

## Programming Manual

# ShockLine™ Series Vector Network Analyzers

**MS46121A/B, 150 kHz to 6 GHz, 1-Port**

**MS46122A/B, 1 MHz to 43.5 GHz, 2-Port**

**MS46131A, 1 MHz to 43.5 GHz, 1-Port**

**ME7868A, 1 MHz to 43.5 GHz, 2-Port**

**ME7869A, 1 MHz to 43.5 GHz, 2-Port**

**MS46322A/B, 1 MHz to 43.5 GHz, 2-Port**

**MS46522B, 50 kHz to 43.5 GHz, 55 GHz to 92 GHz, 2-Port**

**MS46524B, 50 kHz to 43.5 GHz, 4-Port**



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# Chapter 1 — General Information

## 1-1 About This Manual

ShockLine™ Vector Network Analyzers (VNAs) support remote operations commanded via the TCP/IP or VXI-11 protocols. This manual provides operation and programming information for this activity. This manual applies to the following instruments:

- MS46121A/B
- MS46122A/B
- MS46131A
- ME7868A
- ME7869A
- MS46322A/B
- MS46522B
- MS46524B

This document identifies which commands of the following types are supported:

- IEEE-488
- SCPI
- IVI-C

This document covers:

- Ethernet connection and setup instructions
- A general description of bus data transfer and control functions
- A listing of the IEEE-488 Interface Function Messages recognized by the VNA
- A brief description of the Ethernet program interface to the VNA
- A complete listing and description of all the Standard Commands for Programmable Instruments (SCPI) commands that can be used to control VNA operation, with examples of command usage
- Applicable IEEE-488.2, System and Troubleshooting, and SCPI commands

This document should be used together with the Operation Manual for the target instrument. The Operation Manual or Calibration and Measurement Guide provides information about equipment set up and manual operation. Some user interface descriptions here use formats and conventions covered in the User Interface Reference Manual for the target instrument.

Read the *ShockLine Vector Network Analyzers Product Information, Compliance, and Safety Guide* (10100-00067) for important safety, legal, and regulatory notices before operating the equipment.

<b>Note</b>	Many of the images in this document are typical representations of the product or its features. Your instrument and its displays may vary slightly from these images.
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## Remote Programming

This document covers the ShockLine commands for remote programming of the MS46121A/B, MS46122A/B, MS46131A, ME7868A, ME7869A, MS46322A/B, MS46522B, and MS46524B series ShockLine VNAs. Drivers are required for IVI-C and can be found on any of the ShockLine product web-page Library tabs. Certain commands as well as interconnect setups will not be applicable to some ShockLine VNA models. Those differences are noted in the table below.

**Table 1-1.** Remote Programming

	<b>MS46524B</b>	<b>MS46522B</b>	<b>MS46322A/B</b>	<b>MS46122A/B, MS46121A/B, MS46131A, ME7868A, ME7869A</b>
<b>Controller Computer</b>	Embedded	Embedded	Embedded	External
<b>Hardware Interface</b>	LAN	LAN	LAN	USB (between VNA and Controller Computer)
<b>Communication Protocol</b>	TCP/IP Sockets or VXI-11 with NI VISA			
<b>Remote Command Types</b>	SCPI	SCPI	SCPI	SCPI
	IVI-C	IVI-C	IVI-C	IVI-C

## Document Conventions

### User Interface Navigation

Elements in navigation shortcuts or paths are separated with the pipe symbol (“|”). Menu and dialog box names are distinctive Sans Serif font in CAPITALS. Button names are in Title Case. For example, the path to the Manual Cal menu is:

MAIN | Calibration | CALIBRATION | Calibrate | CALIBRATE | Manual Cal | MANUAL CAL

## 1-2 Introduction

This chapter provides a general description of the data transfer and control functions. It also contains a listing of the Shockline™ software application’s interface remote programming capability and response to IEEE-488 interface function messages.

The information presented in this chapter is general in nature. For complete and specific information, refer to the following documents, available from the *Institute of Electrical and Electronics Engineers*:

- ANSI/IEEE Standard 488.1-1987 IEEE Standard Digital Interface for Programmable Instrumentation
- ANSI/IEEE Standard 488.2-1987 IEEE Standard Codes, Formats, Protocols, and Common Commands

These documents precisely define the total specification of the mechanical and electrical interface, and of the data transfer and control protocols.

The final section in this chapter, “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22, provides a listing of the VNA minimum and maximum frequency settings and related parameters such as default frequency span.

**Note** When operating the ShockLine VNA through remote programming, on-screen user interface controls are disabled in the Shockline™ software application. To return to local control, press the keyboard **Esc** key or send the **RTL** command.

For general information about GPIB, refer to [Section 1-3 “IEEE-488 Description”](#).

## 1-3 IEEE-488 Description

IEEE-488 is an international instrumentation interface standard for integrating instruments, computers, printers, plotters, and other measurement devices into systems. IEEE stands for the Institute of Electrical and Electronics Engineers and is currently the world’s largest technical professional society. Refer to <http://www.ieee.org> for more information about the society and its standards.

## 1-4 Ethernet LAN TCP/IP Description

Shockline™ MS46322B and MS4652xB VNAs support gigabit Ethernet. The instrument connects directly to a LAN via the rear panel RJ-45 Ethernet Port using a standard CAT-5 Ethernet cable. LAN connectivity for the MS46121A/B, MS46122A/B, MS46131A, ME7868A, and ME7869A VNAs is done through the required external controller computers. All the ShockLine VNAs are remotely programmable through Ethernet by means of IEEE488, SCPI and IVI-C commands.

The general requirements for manual Ethernet LAN configuration are discussed in the sections below.

**Note** ShockLine VNAs do not support USB networking. This section is provided for general information about manually configuring an Ethernet connection. Consult your local network administrator for the exact requirements and settings that are required for your network installation.

### TCP/IP General Requirements and Settings

Transmission Control Protocol/Internet Protocol (TCP/IP) is a network protocol. In the embedded Windows operating systems, TCP/IP is automatically installed and in most cases, installation, configuration, and communication are transparent to the user.

In a TCP/IP network, you must provide IP addresses and other information to clients. Clients may also require a naming service or a method for name resolution. The TCP/IP protocol setup requires the following information:

- **IP Address**

Every device in a TCP/IP network requires an IP address that consists of four numbers, each between 0 and 255, separated by periods. For example: 128.111.122.42 is a valid IP address.

- **Subnet Mask**

The subnet mask distinguishes the portion of the IP address that is the network identification (ID) address from the portion that is the station ID address. When the subnet mask 255.255.0.0 is applied to the IP address above, it would identify the network ID address as 128.111 and the station ID address as 122.42. All stations in the same Local Area Network (LAN) should have the same network ID, but different station IDs.

- **Default Gateway**

A TCP/IP network can have a gateway to communicate beyond the LAN identified by the network ID. A gateway is a computer or electronic device that is connected to two different networks and can move TCP/IP data from one network to the other. A single LAN that is not connected to other LANs requires a default gateway setting of 0.0.0.0. The default gateway setting for the ShockLine MS46522B/MS46524B Series VNA is 0.0.0.0. If your network has a gateway, then the default gateway would be set to the appropriate value of your gateway.

- **Hardware Address (MAC Address)**

An Ethernet address is a unique 48-bit value that identifies a network interface card internal to the VNA to the rest of the network. Every network card has a unique Ethernet address permanently stored into its memory.

- **TCP/IP Port Number**

TCP/IP Sockets or VXI-11 with NI VISA port is a communication endpoint that enables connection to a particular application or service at the specified IP address.

- **Network Interface Setup**

TCP/IP connectivity requires setting up the parameters described at the beginning of this section. You may need to contact your network administrator or refer to your network documentation for further assistance. The following procedure is a general overview of how to set up a general LAN connection on both the VNA and the remote machine. The actual menus and sequence may vary.

## 1-5 ShockLine Series VNA Models

The basic ShockLine VNAs are listed in the tables in this section. All A version models listed here are obsolete. All currently available MS46121, MS46122, MS46322, MS46522, and MS46524 VNA models are B models. All currently available MS46131, ME7868, and ME7869 VNA models are A models.

### ShockLine MS46121A/B VNA Models

The MS46121A/B basic models are described in [Table 1-2](#).

**Table 1-2.** ShockLine MS46121A/B Series VNA Models

VNA Model Number	Name	Specifications	Test Port Connectors
MS46121A/B-004	USB 1-Port Vector Network Analyzer	40 MHz to 4 GHz	N(m) Connector Test Port
MS46121A/B-006	USB 1-Port Vector Network Analyzer	150 kHz to 6 GHz	N(m) Connector Test Port

### ShockLine MS46122A/B Series VNA Models

The MS46122A/B basic models are described in [Table 1-3](#).

**Table 1-3.** ShockLine MS46122A/B Series VNA Models

VNA Model Number	Name	Specifications	Test Port Connectors
MS46122A/B-010	Compact Vector Network Analyzer	1 MHz to 8 GHz	N(f) Connector Test Ports (2)
MS46122A/B-020	Compact Vector Network Analyzer	1 MHz to 20 GHz	K(m) Connector Test Ports (2)
MS46122A/B-040	Compact Vector Network Analyzer	1 MHz to 43.5 GHz	K(m) Connector Test Ports (2)
MS46122B-043	Compact Vector Network Analyzer	1 MHz to 43.5 GHz	Extended-K™(m) Connector Test Ports (2)

## ShockLine MS46131A, ME7868A, and ME7869A Series VNA Models

The MS46131A basic models are described in Table 1-3.

ME7868A 2-port VNAs consist of two MS46131A 1-port VNAs with option 012, PhaseLync™ synchronization, and PhaseLync cabling. The frequency range of the ME7868A is determined by the MS46131A frequency option.

ME7869A VNAs consist of two MS46131A 1-port VNAs with option 025, 050, or 100, PhaseLync synchronization, and PhaseLync cabling. The frequency range of the ME7869A is determined by the MS46131A frequency option.

**Table 1-4.** ShockLine MS46131A Series VNA Models

VNA Model Number	Name	Specifications	Test Port Connectors
MS46131A-010	Modular Vector Network Analyzer	1 MHz to 8 GHz	N(f) Connector Test Ports (2)
MS46131A-020	Modular Vector Network Analyzer	1 MHz to 20 GHz	K(m) Connector Test Ports (2)
MS46131A-043	Modular Vector Network Analyzer	1 MHz to 43.5 GHz	Extended-K™(m) Connector Test Ports (2)

## ShockLine MS46322A/B Series VNA Models

The MS46322A/B basic models are described in [Table 1-5](#).

**Table 1-5.** ShockLine™ MS46322A/B Series VNA Models

VNA Model Number	Name	Specifications	Test Port Connectors
MS46322A-004	Economy Vector Network Analyzer	1 MHz to 4 GHz	N(f) Connector Test Ports (2)
MS46322A/B-010	Economy Vector Network Analyzer	1 MHz to 8 GHz	N(f) Connector Test Ports (2)
MS46322A-014	Economy Vector Network Analyzer	1 MHz to 14 GHz	K(m) Connector Test Ports (2)
MS46322A/B-020	Economy Vector Network Analyzer	1 MHz to 20 GHz	K(m) Connector Test Ports (2)
MS46322A-030	Economy Vector Network Analyzer	1 MHz to 30 GHz	K(m) Connector Test Ports (2)
MS46322A/B-040	Economy Vector Network Analyzer	1 MHz to 43.5 GHz	K(m) Connector Test Ports (2)
MS46322B-043	Economy Vector Network Analyzer	1 MHz to 43.5 GHz	Extended-K™(m) Connector Test Ports (2)

## ShockLine MS46522B Series VNA Models

The MS46522B basic models are described in [Table 1-6](#).

**Table 1-6.** ShockLine™ MS46522B Series VNA Models

VNA Model Number	Name	Specifications	Test Port Connectors
MS46522B-010	Vector Network Analyzer	50 kHz to 8.5 GHz	N(f) Connector Test Ports (2)
MS46522B-020	Vector Network Analyzer	50 kHz to 20 GHz	K(m) Connector Test Ports (2)
MS46522B-040	Vector Network Analyzer	50 kHz to 43.5 GHz	K(m) Connector Test Ports (2)
MS46522B-043	Vector Network Analyzer	50 kHz to 43.5 GHz	Extended-K™(m) Connector Test Ports (2)
MS46522B-082	Vector Network Analyzer	55 GHz to 92 GHz	WR12 waveguide on 1 meter tethered module (2)

**Table 1-6.** ShockLine™ MS46522B Series VNA Models

VNA Model Number	Name	Specifications	Test Port Connectors
MS46522B-083	Vector Network Analyzer	55 GHz to 92 GHz	WR12 waveguide on 5 meter tethered module (2)

**ShockLine MS46524B Series VNA Models**

The MS46524B basic models as described in [Table 1-7](#).

**Table 1-7.** ShockLine™ MS46524B Series VNA Models

VNA Model Number	Name	Specifications	Test Port Connectors
MS46524B-010	Vector Network Analyzer	50 kHz to 8.5 GHz	N(f) Connector Test Ports (4)
MS46524B-020	Vector Network Analyzer	50 kHz to 20 GHz	K(m) Connector Test Ports (4)
MS46524B-040	Vector Network Analyzer	50 kHz to 43.5 GHz	K(m) Connector Test Ports (4)
MS46524B-043	Vector Network Analyzer	50 kHz to 43.5 GHz	Extended-K™(m) Connector Test Ports (4)

**1-6 Communication****MS46121A/B Default Plug-and-Play Configuration**

The MS46121A/B uses USB interface to communicate with the PC controller. When the PC is connected to the USB VNAs, the PC becomes the controller.



1. Mini USB 2.0

**Figure 1-1.** MS46121A/B Network Connection

## MS46122A/B Default Plug-and-Play Configuration

The MS46122A/B uses USB interface to communicate with the PC controller. When the PC is connected to the USB VNAs, the PC becomes the controller.



1. Mini USB 2.0

**Figure 1-2.** MS46122A/B Network Connection

## MS46131A Default Plug-and-Play Configuration (with or without Option 012)

The MS46131A uses USB interface to communicate with the PC controller. When the PC is connected to the VNA USBs, the PC becomes the controller. Both of MS46131A 1-port VNAs must communicate over USB to the same computer when configured as an ME7868A or ME7869A 2-port VNA.

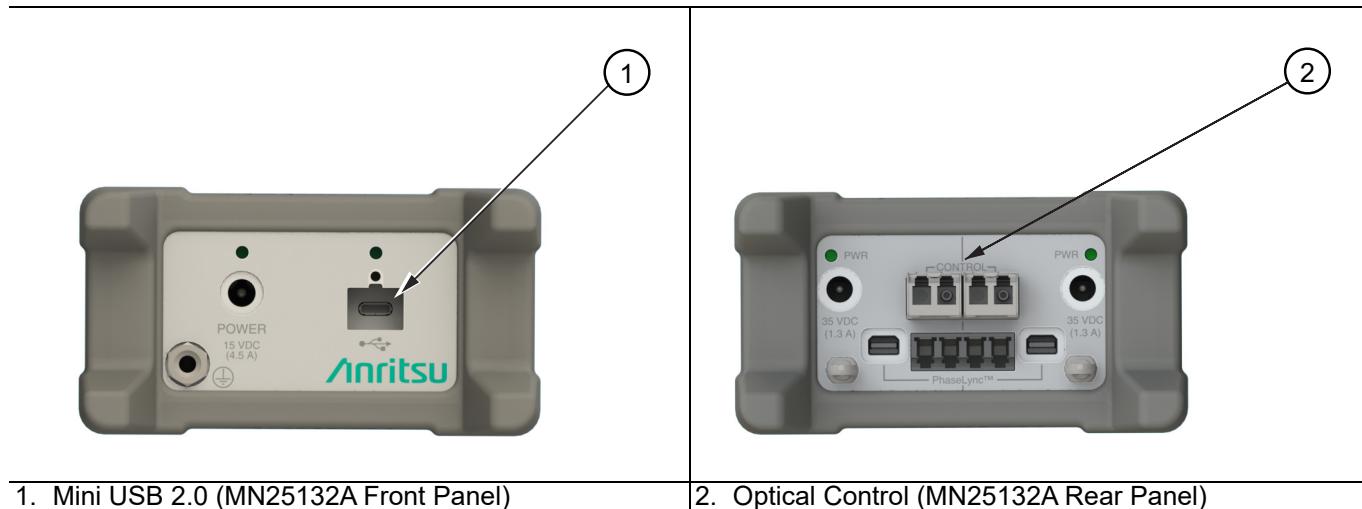


1. Mini USB 2.0 (MS46131A without Option 012 shown)

**Figure 1-3.** MS46131A Network Connection with or without Option 012

## MS46131A Default Plug-and-Play Configuration (with Options 025, 050, 100)

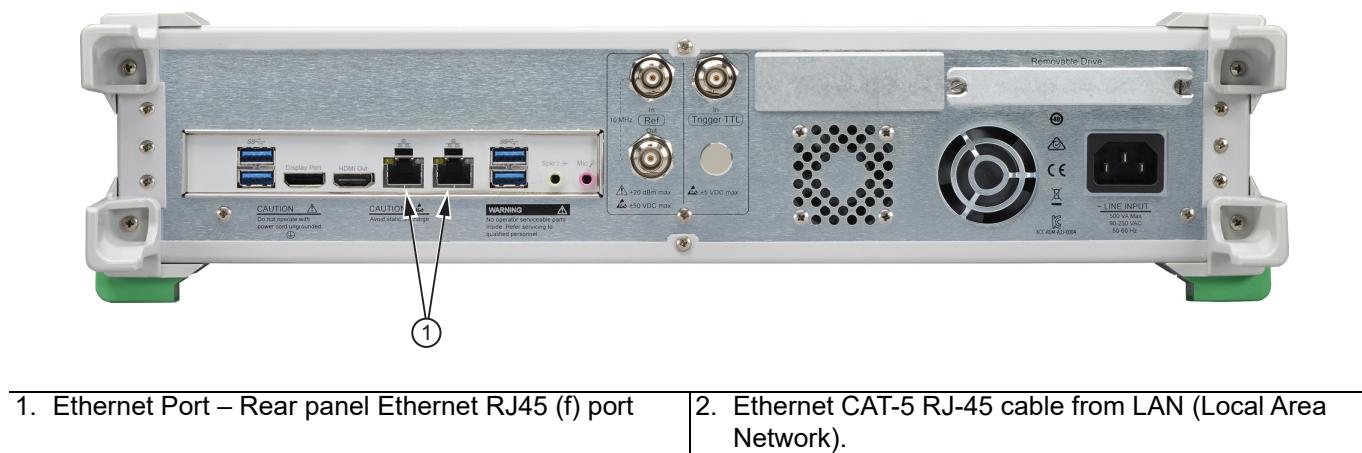
Both of MS46131A 1-port VNAs communicate to the MN25132A using optical connections. The MN25132A Front Panel communicates using USB to the PC, which becomes the controller.



**Figure 1-4.** ME7869A Network Connection – Options 025, 050, 100)

## MS46322A/B Default Plug-and-Play Configuration

The Shockline™ VNA with an embedded Windows operating system (OS) is pre-configured for connection to any Ethernet network with a gateway and DNS/DHCP. For physical connection, attach as shown below an Ethernet cable between the VNA rear panel RJ-45 Ethernet Port and your local network port. The Windows OS in the instrument automatically detects the network settings and configures the network connection.



**Figure 1-5.** MS46322A/B Network Connection

## MS46522B and MS46524B Default Plug-and-Play Configuration

The Shockline™ VNA with an embedded Windows operating system (OS) is pre-configured for connection to any Ethernet network with a gateway and DNS/DHCP. For physical connection, attach as shown below an Ethernet cable between the VNA rear panel RJ-45 Ethernet Port and your local network port. The Windows OS in the instrument automatically detects the network settings and configures the network connection.



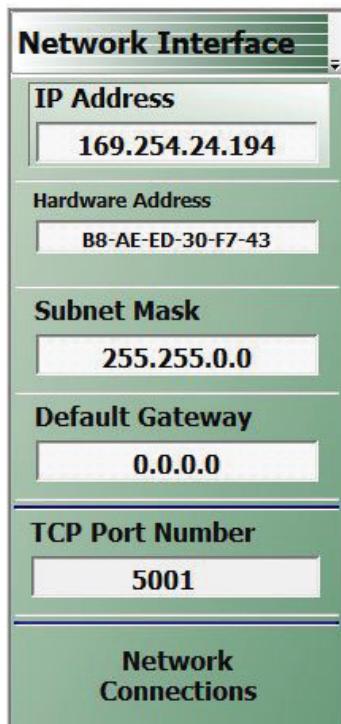
- |  |  |
|--|--|
| 1. Ethernet Port – Rear panel Ethernet RJ45 (f) port | 2. Ethernet CAT-5 RJ-45 cable from LAN (Local Area Network). |
|--|--|

**Figure 1-6.** MS4652xB Network Connection

## Manually Configuring TCP/IP Ethernet LAN Settings

To see the current network settings for the VNA, run the ShockLine Application Software and navigate to the NETWORK INTERFACE menu as follows:

- MAIN | System | SYSTEM | Network Interface | NETWORK INTERFACE



**Figure 1-7.** NETWORK INTERFACE Menu

The top display buttons provide information for the current network settings. Changes to these settings must be made through the Microsoft Windows configuration utilities reached by clicking the lowest button, Network Connections. This opens the relevant Windows CONTROL PANEL dialog.

The NETWORK CONNECTIONS dialog box shows the current available local networks and provides access to various network configuration utilities. If connected to one or more networks, a link to each network name is provided with links to the settings of each connection.

**Note** You may need to consult your network documentation or network administrator for assistance in manually configuring your network setup. The Microsoft Windows **Network Connections Help** system provides information related to computer networking. If an Internet connection is present, links to Microsoft and other URLs are also provided.

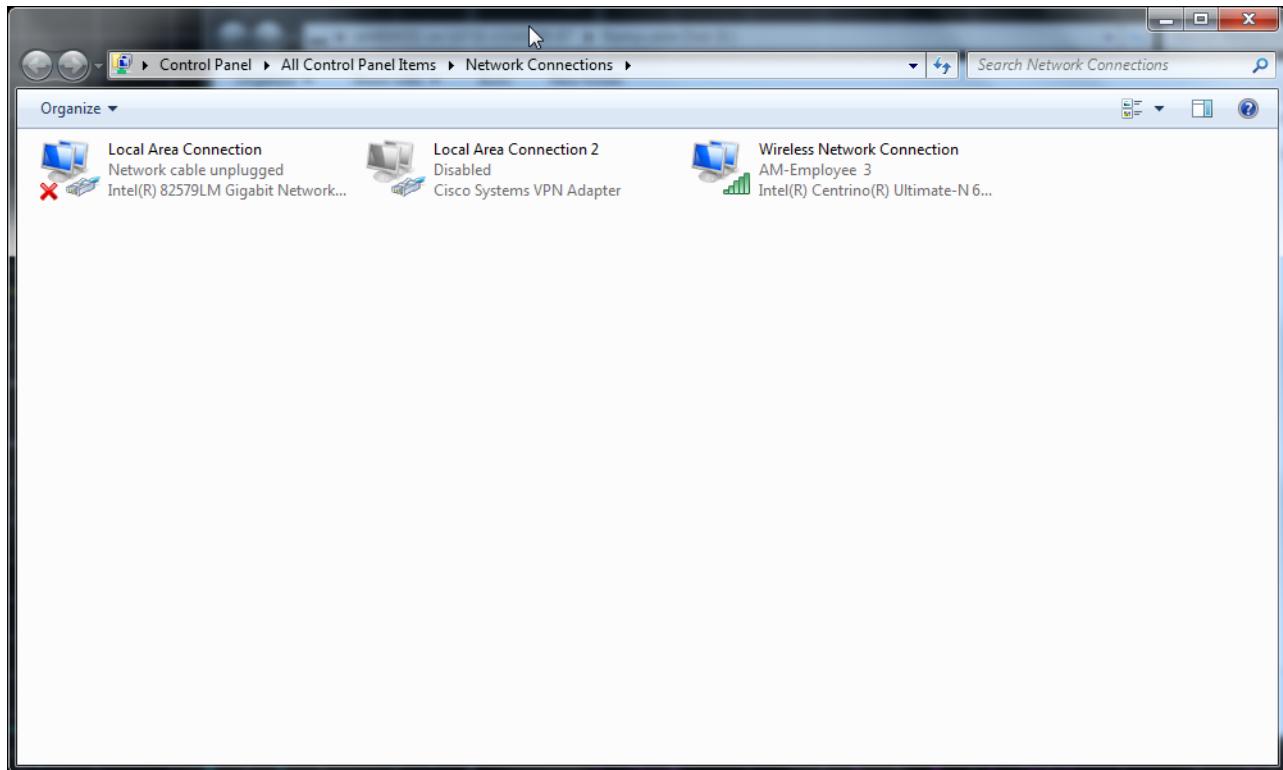


Figure 1-8. Windows NETWORK CONNECTIONS Dialog Box

## Connecting SOCKETS

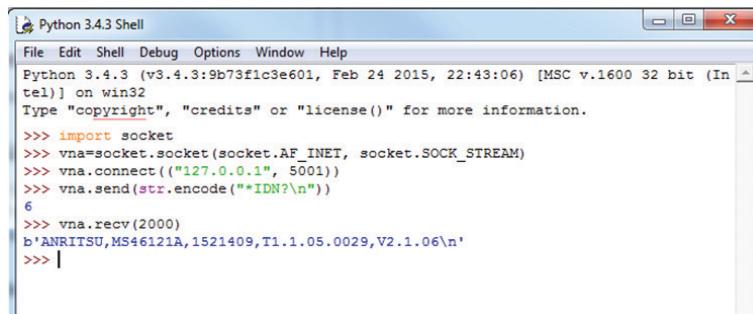
The MS46122A/B, MS46121A/B, and MS46131A all use USB interface to communicate with the PC controller.

**Note** When the PC is connected to the USB VNAs, the PC becomes the controller. This means that the PC that is controlling the VNA DOES NOT require another external PC to control it and the VNA. The below example will work on the MS46322A/B in the instance that the Python program is running on the desktop of the MS46322A/B's embedded computer.

1. Download Python 3.4 or the latest edition of Python from the Python.org website:  
<https://www.python.org/downloads/>
2. In the section for downloads, choose the latest Python edition.
3. Run software and install for all users
4. Open the Windows icon on the PC's desktop and select All Programs

5. Find the folder labeled, "Python 3.4" and open this folder. When this file is open, choose IDLE (Python 3.4 GUI)
6. The Python 3.4.X shell will open and take line by line commands. See [Figure 1-9](#)
7. Open the ShockLine application

**Note** If application is not launched before running Python, an error message will occur.



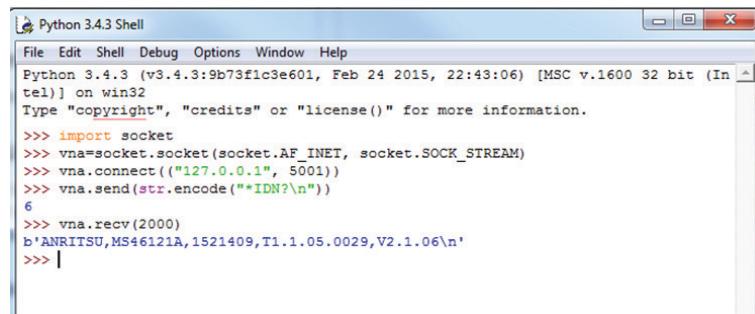
```

Python 3.4.3 Shell
File Edit Shell Debug Options Window Help
Python 3.4.3 (v3.4.3:9b73f1c3e601, Feb 24 2015, 22:43:06) [MSC v.1600 32 bit (In
tel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>> import socket
>>> vna=socket.socket(socket.AF_INET, socket.SOCK_STREAM)
>>> vna.connect(("127.0.0.1", 5001))
>>> vna.send(str.encode("*IDN?\n"))
6
>>> vna.recv(2000)
b'ANRITSU,MS46121A,1521409,T1.1.05.0029,V2.1.06\n'
>>>

```

**Figure 1-9.** Python 3.4.X Shell

8. Type the following commands. Press Enter after each command
  - `vna=socket.socket(socket.AF_INET, socket.SOCK_STREAM)`
  - `vna.connect(("127.0.0.1", 5001))`
  - `vna.send(str.encode("*IDN?\n"))`
  - `vna.recv(2000)`
9. The response of the \*IDN query will be instrument name, serial number, software version, firmware version. See [Figure 1-10](#).



```

Python 3.4.3 Shell
File Edit Shell Debug Options Window Help
Python 3.4.3 (v3.4.3:9b73f1c3e601, Feb 24 2015, 22:43:06) [MSC v.1600 32 bit (In
tel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>> import socket
>>> vna=socket.socket(socket.AF_INET, socket.SOCK_STREAM)
>>> vna.connect(("127.0.0.1", 5001))
>>> vna.send(str.encode("*IDN?\n"))
6
>>> vna.recv(20000)
b'ANRITSU,MS46121A,1521409,T1.1.05.0029,V2.1.06\n'
>>>

```

**Figure 1-10.** Python Shell With IDN? Query

The commands are described below:

Import `socket`-allows the module for socket API to exist.

**`vna=socket.socket(socket.AF_INET, socket.SOCK_STREAM)`**

VNA is the variable and can be changed to the user's specification. Socket is the module and dot socket is the object instantiation from the socket module. The two arguments open the API for communication.

**vna.connect("127.0.0.1", 5001)**

VNA that defines the socket instance and the connect is a function call from the socket module. The address 127.0.0.1 is a local TCP/IP resource loop between the PC and the VNA, and 5001 is the port number that the application is listening on.

**vna.send(str.encode("\*IDN?\n"))**

The send function has a nested str.encode function that converts strings to a specific character set (here it's UTF-8 unless otherwise defined). This is not needed in Python 2.7. The \*IDN? String is an instrument query.

**vna.recv(2056)**

The recv function has an argument that defines the number of bytes Python will receive from the socket until it hits a newline ("\n").

**Note**

All commands sent to the VNA with SCPI commands will look like  
vna.send(str.encode("\*IDN?\n")) . The quotation marks and the \n line termination are also required when using Python 3.4 sockets. The standard string for SCPI will now look like the string below:

vna.send(str.encode("SCPI Command String\n"))

When using SOCKETS, make use of the header ("#9\_ \_ \_ \_") when querying information, as the exact number of bytes will be displayed in the response.

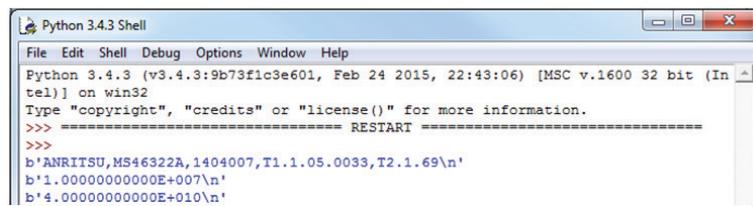
## Creating a Script Using an MS46122A/B with Python 3.4 SOCKETS

This script will query the instruments general information along with the start frequency and stop frequencies. It will then set the number of points to 401 and the IFBW to 10 kHz and set trace 4 to Smith Chart.

1. Open the ShockLine application.
2. Open Python 3.4.3 Shell. This is labeled Python IDLE in the Python 3.4 folder.
3. In the Python Shell, choose File option near the header and select New File.
4. An Untitled file will open and it will be blank.

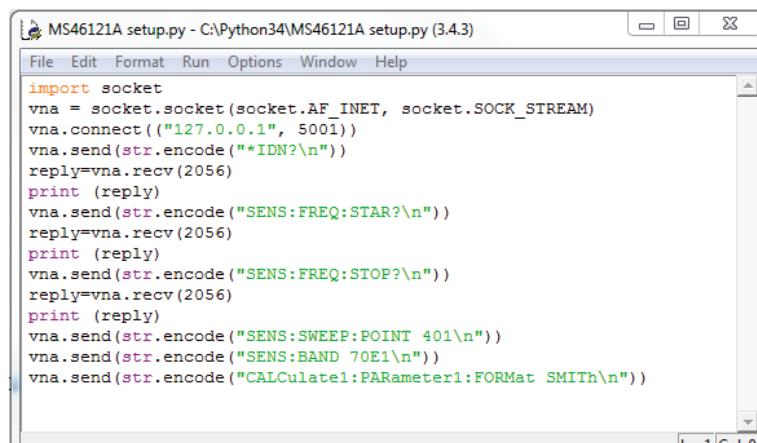
5. Type in the following commands:

```
import socket
vna = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
vna.connect(("127.0.0.1", 5001))
vna.send(str.encode("*IDN?\n"))
reply=vna.recv(2056)
print (reply)
vna.send(str.encode("SENS:FREQ:STAR?\n"))
reply=vna.recv(2056)
print (reply)
vna.send(str.encode("SENS:FREQ:STOP?\n"))
reply=vna.recv(2056)
print (reply)
vna.send(str.encode("SENS:SWEET:POINT 401\n"))
vna.send(str.encode("SENS:BAND 70E1\n"))
vna.send(str.encode("CALCulate1:PARameter4:FORMAT SMITH\n"))
```



**Figure 1-11.** Python Script with SCPI Commands for the MS46122A/B

6. Save the file by selecting the **File** option near the header and select **Save As**.
7. Name the file and push the **Save** button. Press **F5** to run the script.
8. The input of the script should look like [Figure 1-12](#).



**Figure 1-12.** Execution of the MS46122A/B Python Script

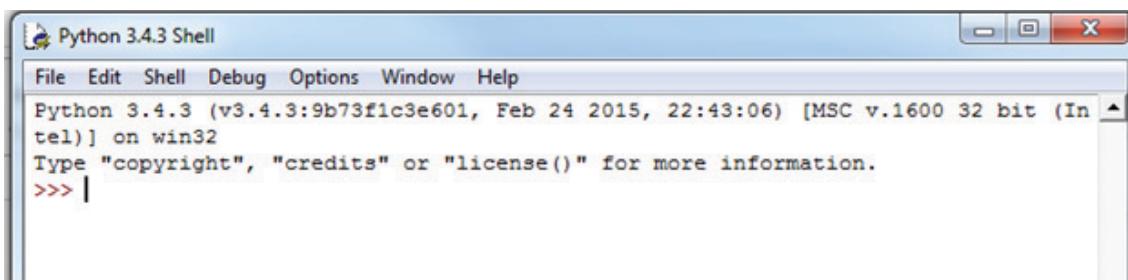
**Note** There are some extra commands that are needed to run a script that are not needed when inputting line by line commands in the Python Shell. A line termination is required after each string which is \n.

## Connecting the MS46322A/B, MS4652xB to Python 3.4

The MS46322A/B, MS4652xB can be run from the embedded PC or through a controller PC. This example will be done with an external controller PC using Python 3.4, PyVISA and a MS46322A/B or MS4652xB. The controller PC will use an RJ-45 cable (Ethernet interface) to communicate with the MS46322A/B, MS4652xB.

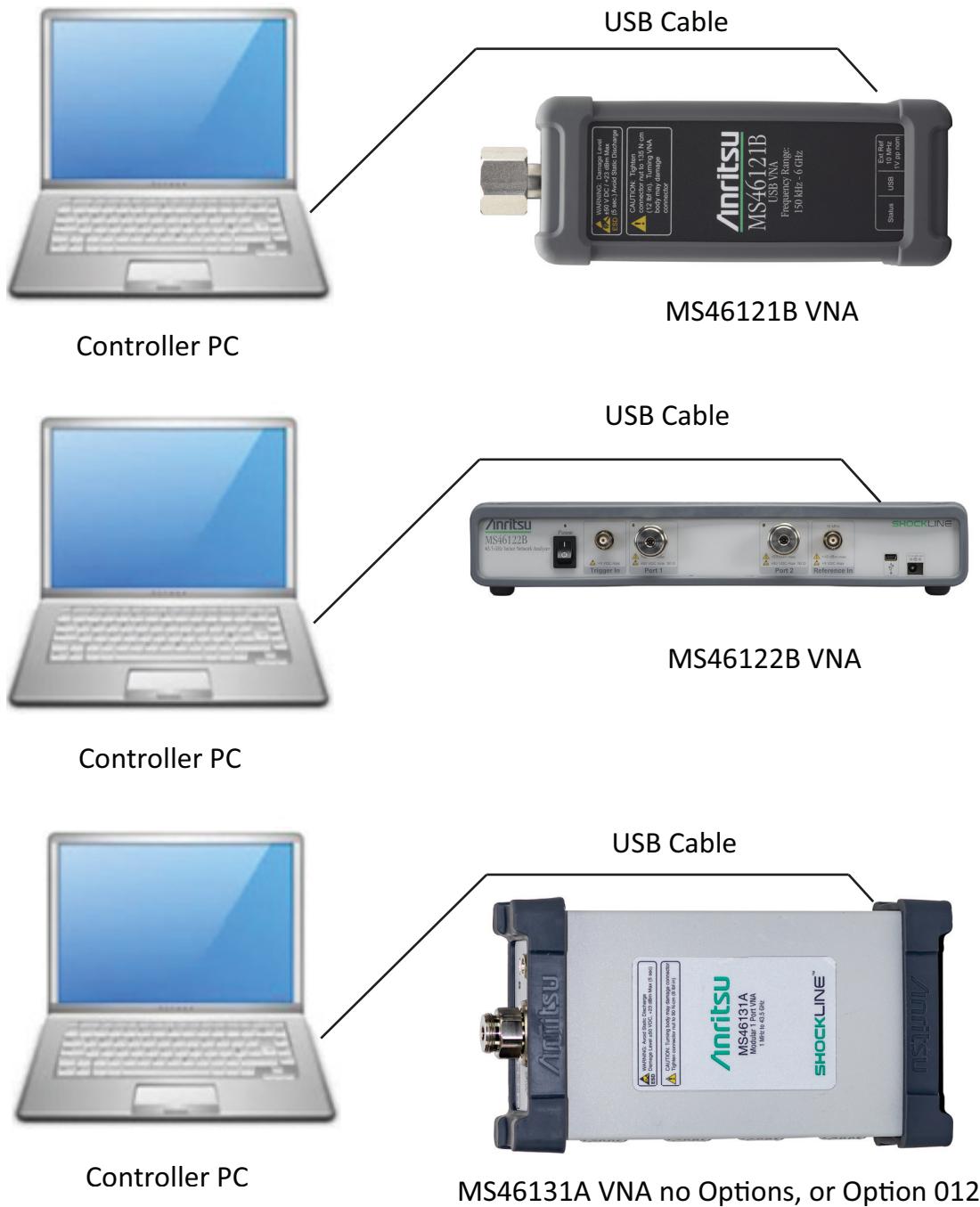
**Note** PyVISA must be enabled on the controller PC for this example. TCP/IP sockets may be used to communicate with the VNA if VISA is not available. There are several resource available to get PyVISA and many online tutorials for loading the software.

1. Download Python 3.4 or the latest edition of Python 3.4 from the Python.org website:  
<https://www.python.org/downloads/>
2. In the section for downloads, choose the latest Python edition. i.e. Python 3.4.X.
3. Run software and install for all users.
4. Open the Windows icon on the PC's desktop and select All Programs.
5. Find the folder labeled, "Python 3.4" and open this folder. When this file is open, choose IDLE (Python 3.4 GUI).
6. The Python 3.4.X shell will open and take line by line commands. See [Figure 1-13](#).



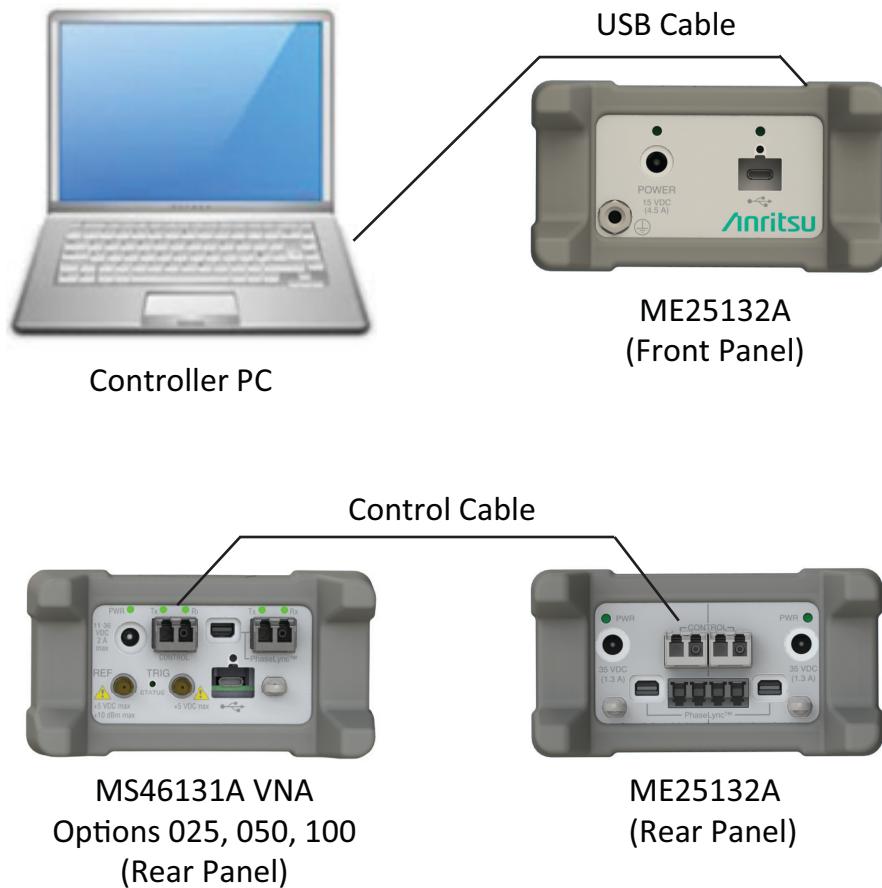
**Figure 1-13.** Python Shell

7. Connect the controller PC to the ShockLine VNA as shown in [Figure 1-14](#) or [Figure 1-16](#).



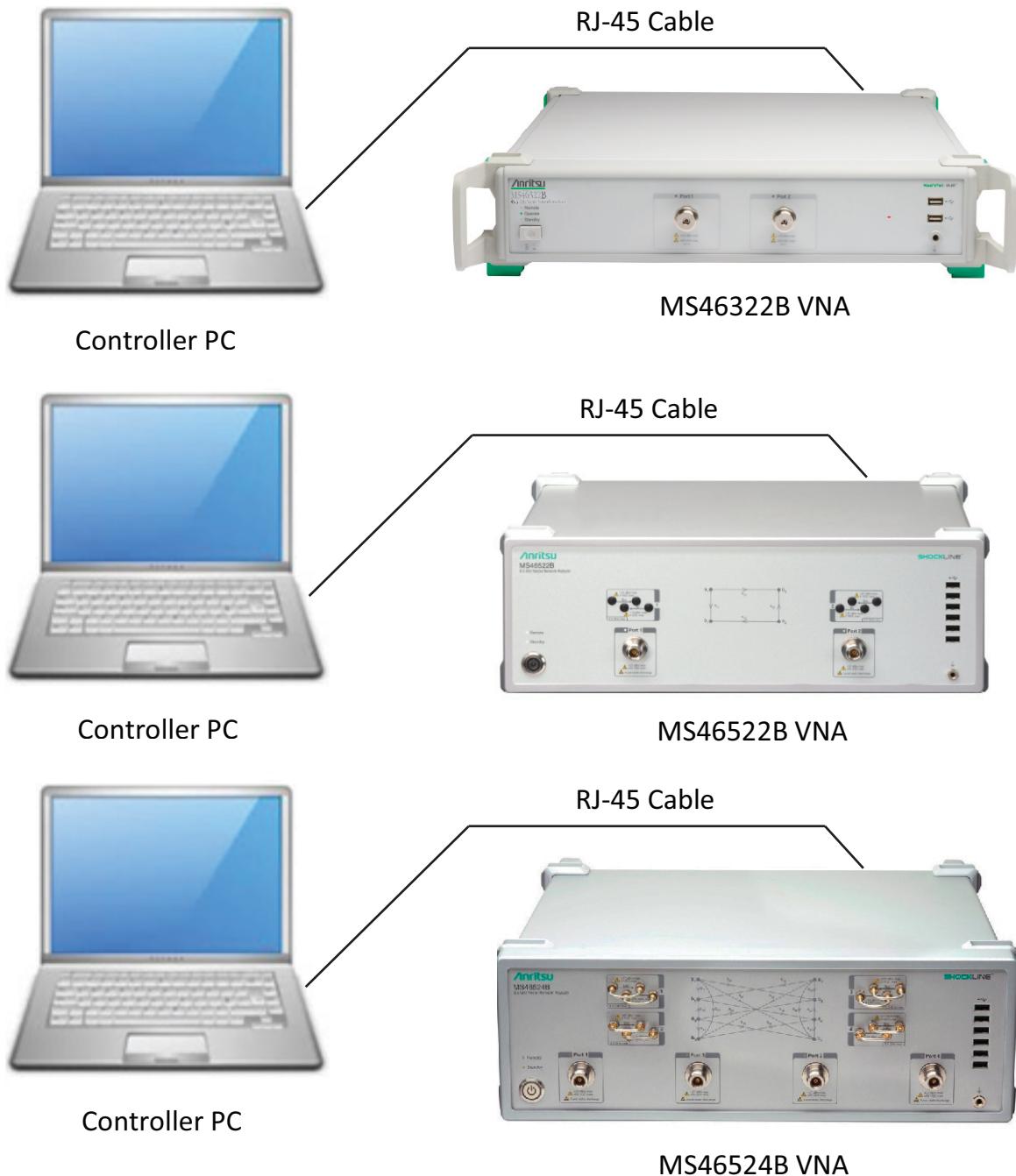
**Figure 1-14.** Connecting the ShockLine VNA (MS46121B, MS46122B, MS46131A, ME7868A) to Required External Control PC

For ME7868A, both MS46131A VNAs must communicate with the same PC either through a direct USB connection or through a USB extension for wider distances.



**Figure 1-15.** Connecting the ShockLine VNA (ME7869A) to Required External Control PC

For ME7869A, both MS46131A VNAs must communicate with the MN25132A, which connects directly with the PC.



**Figure 1-16.** Connecting the ShockLine VNA (MS46322B, MS46522B, MS46524B) to Optional External Test Control PC

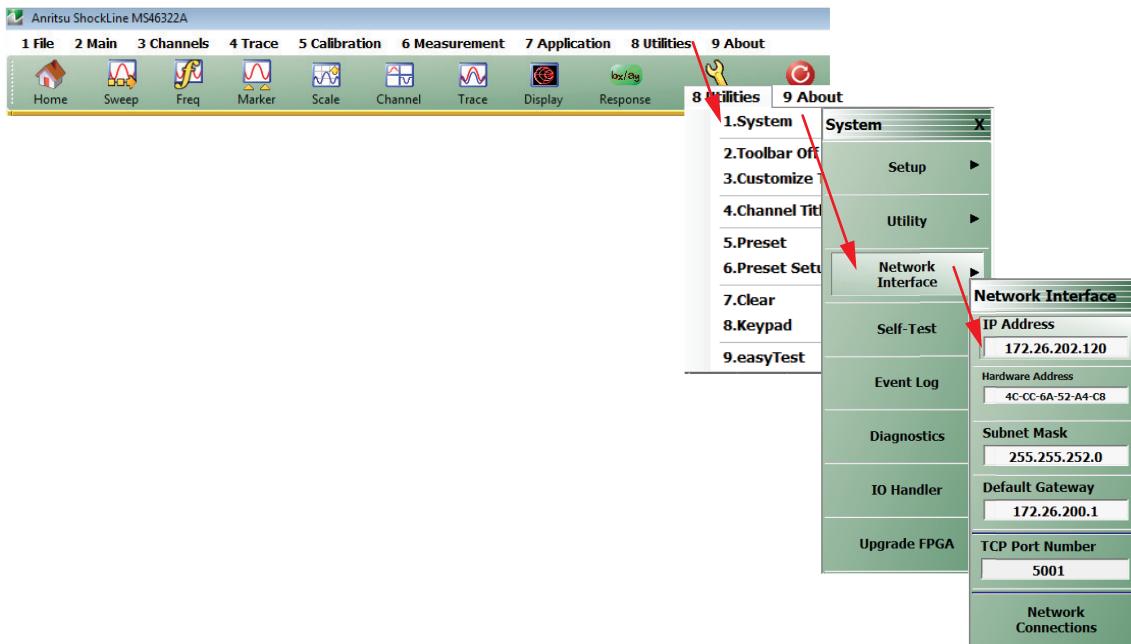
8. Open the ShockLine application to run SCPI commands.

**Note** If the application is not launched before running Python, an error message will occur.  
These ShockLine VNAs have internal PC controllers that can be used to run test programs.

9. Navigate to the IP Address in the Network Interface menu. See [Figure 1-17](#).

**Navigation:**

Utilities | System | SYSTEM | Network Interface | NETWORK INTERFACE | IP Address



**Figure 1-17.** IP Address Menu Navigation Path

10. Type the following commands (CAPS matter). Press Enter after each command. IP Address will be found using Step 9.

- import visa
- rm=visa.ResourceManager()
- MS46522B=rm.open\_resource('TCPIPO::IP Address::INSTR')
- print(MS46522B.query("\*IDN?"))

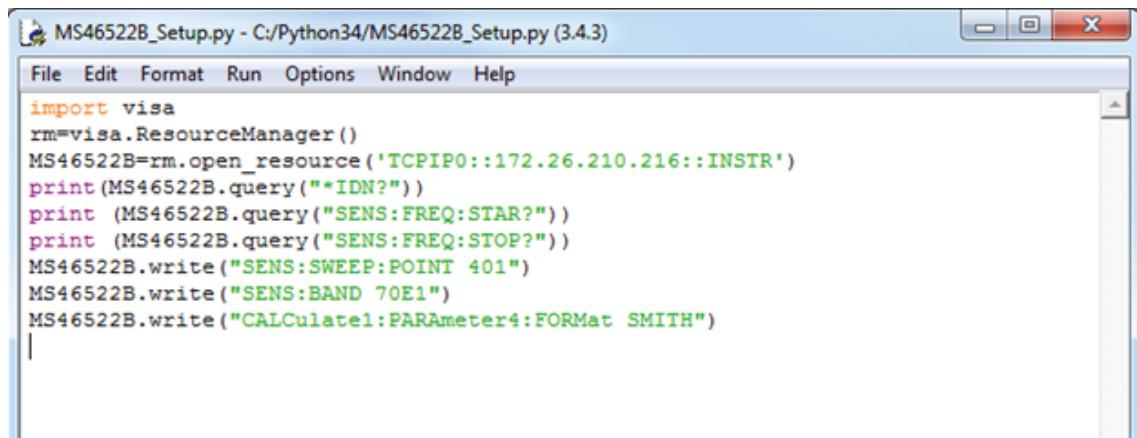
```
Python 3.4.3 Shell
File Edit Shell Debug Options Window Help
Python 3.4.3 (v3.4.3:9b73f1c3e601, Feb 24 2015, 22:43:06) [MSC v.1600 32 bit (In tel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>> import visa
>>> rm=visa.ResourceManager ()
>>> MS46522B=rm.open_resource('TCPIPO::172.26.210.13::INSTR')
>>> print(MS46522B.query("*IDN?"))
ANRITSU,MS46522B,1111111,V2.1.03.0006,V3.2.01
>>> |
```

**Figure 1-18.** Instrument Identification Inquiry

## Creating a Script using an MS46522B using Python 3.4 and PyVISA

This script will query the instruments general information along with the start frequency and stop frequencies. It will then set the number of points to 401 and the IFBW to 10 kHz and set trace 4 to Smith Chart.

1. Open the ShockLine application.
2. Open Python 3.4.3 Shell. This is labeled Python IDLE in the Python 3.4 folder.
3. In the Python Shell, choose File option near the header and select New File.
  - An Untitled file will open and it will be blank.
4. Type in the following commands:
  - import visa
  - rm=visa.ResourceManager()
  - MS46522B=rm.open\_resource('TCPIPO::IP Address::INSTR')
  - print(MS46522B.query("\*IDN?"))
  - print(MS46522B.query("SENS:FREQ:STAR?"))
  - print(MS46522B.query("SENS:FREQ:STOP?"))
  - MS46522B.write("SENS:SWEEP:POINT 401")
  - MS46522B.write("SENS:BAND 70E1")
  - MS46522B.write("CALCulate1:PARAmeter4:FORMAT SMITH")



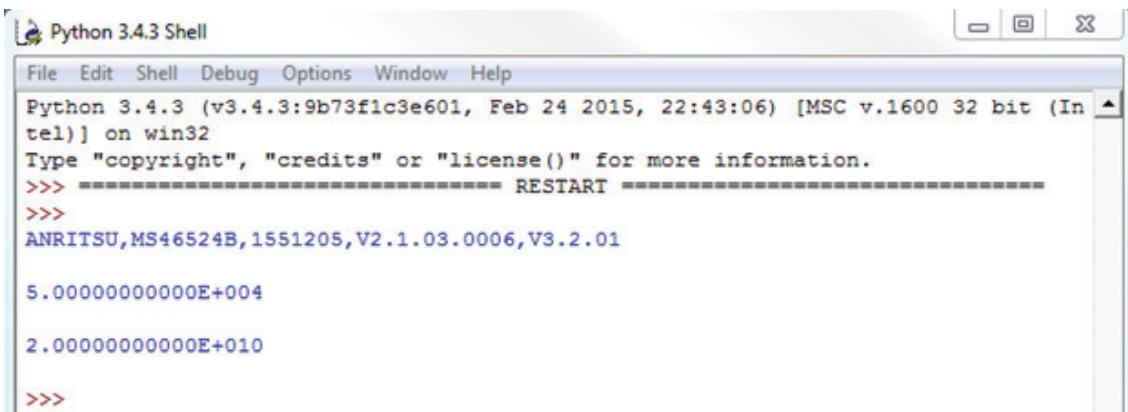
The screenshot shows a Python IDLE window with the title bar "MS46522B\_Setup.py - C:/Python34/MS46522B\_Setup.py (3.4.3)". The menu bar includes File, Edit, Format, Run, Options, Window, and Help. The code area contains the following Python script:

```
import visa
rm=visa.ResourceManager()
MS46522B=rm.open_resource('TCPIPO::172.26.210.216::INSTR')
print(MS46522B.query("*IDN?"))
print(MS46522B.query("SENS:FREQ:STAR?"))
print(MS46522B.query("SENS:FREQ:STOP?"))
MS46522B.write("SENS:SWEEP:POINT 401")
MS46522B.write("SENS:BAND 70E1")
MS46522B.write("CALCulate1:PARAmeter4:FORMAT SMITH")
```

Figure 1-19. Python Script with SCPI Commands

5. Save the file by selecting the File option near the header and select Save As.
6. Name the file and push the Save button. Press F5 to run the script.

7. The input of the script should look like [Figure 1-20](#).



The screenshot shows a Windows application window titled "Python 3.4.3 Shell". The menu bar includes File, Edit, Shell, Debug, Options, Window, and Help. The main window displays the Python 3.4.3 startup message: "Python 3.4.3 (v3.4.3:9b73f1c3e601, Feb 24 2015, 22:43:06) [MSC v.1600 32 bit (In tel)] on win32", followed by "Type "copyright", "credits" or "license()" for more information.", a "RESTART" message, and the text "ANRITSU,MS46524B,1551205,V2.1.03.0006,V3.2.01". Below this, two large floating-point numbers are shown: "5.0000000000E+004" and "2.0000000000E+010". A final "">>>>" prompt is visible at the bottom.

**Figure 1-20.** Execution of Python Script

## 1-7 Minimum/Maximum Instrument Frequency and Related Parameters

The minimum and maximum instrument frequencies depend on the instrument model and the installed options. The general frequency limits for the :SENSe{1-16}:FREQuency subsystem and related commands are defined in the following material.

### Standalone VNAs – Default Start, Default CW, and Default Stop Frequencies

The instrument default start and stop frequencies are listed below:

**Table 1-8.** Standalone VNAs – Default Start, Default CW, and Default Stop Frequencies (1 of 2)

Model-Option	Default Start Frequency and Default CW Frequency	Default Stop Frequency
<b>MS46121A/B</b>		
MS46121A/B-004	4.0000000 E+07 (40 MHz)	4.0000000000 E+09 (4 GHz)
MS46121A/B-006	1.50000 E+05 (150 kHz)	6.0000000000 E+09 (6 GHz)
<b>MS46122A/B</b>		
MS46122A/B-010	1.0000000 E+06 (1 MHz)	8.0000000000 E+09 (8 GHz)
MS46122A/B-020	1.0000000 E+06 (1 MHz)	2.0000000000 E+10 (20 GHz)
MS46122A/B-040	1.0000000 E+06 (1 MHz)	4.3500000000 E+10 (43.5 GHz)
MS46122B-043	1.0000000 E+06 (1 MHz)	4.3500000000 E+10 (43.5 GHz)
<b>MS46131A, ME7868A, ME7869A</b>		
MS46131A-010	1.0000000 E+06 (1 MHz)	8.0000000000 E+09 (8 GHz)
MS46131A-020	1.0000000 E+06 (1 MHz)	2.0000000000 E+10 (20 GHz)
MS46131A-043	1.0000000 E+06 (1 MHz)	4.3500000000 E+10 (43.5 GHz)
<b>MS46322/B</b>		
MS46322A-004	1.0000000 E+06 (1 MHz)	4.0000000000 E+09 (4 GHz)
MS46322A/B-010	1.0000000 E+06 (1 MHz)	8.0000000000 E+09 (8 GHz)
MS46322A-014	1.0000000 E+06 (1 MHz)	1.4000000000 E+10 (14 GHz)
MS46322A/B-020	1.0000000 E+06 (1 MHz)	2.0000000000 E+10 (20 GHz)
MS46322A-030	1.0000000 E+06 (1 MHz)	3.0000000000 E+10 (30 GHz)
MS46322A/B-040	1.0000000 E+06 (1 MHz)	4.3500000000 E+10 (43.5 GHz)
MS46322B-043	1.0000000 E+06 (1 MHz)	4.3500000000 E+10 (43.5 GHz)
<b>MS46522B</b>		
MS46522B-010	5.0000 E+04 (50 kHz)	8.5000000000 E+09 (8.5 GHz)
MS46522B-020	5.0000 E+04 (50 kHz)	2.0000000000 E+10 (20 GHz)
MS46522B-040	5.0000 E+04 (50 kHz)	4.3500000000 E+10 (43.5 GHz)
MS46522B-043	5.0000 E+04 (50 kHz)	4.3500000000 E+10 (43.5 GHz)
MS46522B-082	5.5000000000 E+10 (55 GHz)	9.2000000000 E+10 (92.0 GHz)
MS46522B-083	5.5000000000 E+10 (55 GHz)	9.2000000000 E+10 (92.0 GHz)

**Table 1-8.** Standalone VNAs – Default Start, Default CW, and Default Stop Frequencies (2 of 2)

Model-Option	Default Start Frequency and Default CW Frequency	Default Stop Frequency
<b>MS46524B</b>		
MS46524B-010	5.0000 E+04 (50 kHz)	8.500000000 E+09 (8.5 GHz)
MS46524B-020	5.0000 E+04 (50 kHz)	2.0000000000 E+10 (20 GHz)
MS46524B-040	5.0000 E+04 (50 kHz)	4.3500000000 E+10 (43.5 GHz)
MS46524B-043	5.0000 E+04 (50 kHz)	4.3500000000 E+10 (43.5 GHz)

## Standalone VNAs – Minimum Start, Minimum CW, and Maximum Start Frequencies

The highest possible setting for the Start Frequency is the Stop Frequency minus 20 Hz. This yields a sweep with three data points.

**Table 1-9.** Standalone VNAs – Minimum Start, Minimum CW, and Maximum Start Frequencies

Model-Option	Minimum Start Frequency and Minimum CW Frequency	Maximum Start Frequency (Stop Frequency - 20 Hz)
<b>MS46121A/B</b>		
MS46121A/B-004	4.0000000 E+07 (40 MHz)	3.999999998 E+09 (4GHz - 2 Hz)
MS46121A/B-006	0.150000 E+06 (150 kHz)	5.999999998 E+09 (6 GHz - 2 Hz)
<b>MS46122A/B</b>		
MS46122A/B-010	1.000000 E+06 (1 MHz)	7.999999998 E+09 (8 GHz - 2 Hz)
MS46122A/B-020	1.000000 E+06 (1 MHz)	1.999999998 E+10 (20 GHz - 2 Hz)
MS46122A/B-040	1.000000 E+06 (1 MHz)	4.349999998 E+10 (43.5 GHz - 2 Hz)
MS46122B-043	1.000000 E+06 (1 MHz)	4.349999998 E+10 (43.5 GHz - 2 Hz)
<b>MS46131A, ME7868A, ME7869A</b>		
MS46131A-010	1.000000 E+06 (1 MHz)	7.999999998 E+09 (8 GHz - 2 Hz)
MS46131A-020	1.000000 E+06 (1 MHz)	1.999999998 E+10 (20 GHz - 2 Hz)
MS46131A-043	1.000000 E+06 (1 MHz)	4.349999998 E+10 (43.5 GHz - 2 Hz)
<b>MS46322A/B</b>		
MS46322A-004	1.000000 E+06 (1 MHz)	3.999999998 E+09 (4 GHz - 2 Hz)
MS46322A/B-010	1.000000 E+06 (1 MHz)	7.999999998 E+09 (8 GHz - 2 Hz)
MS46322A-014	1.000000 E+06 (1 MHz)	1.399999998 E+10 (14 GHz - 2 Hz)
MS46322A/B-020	1.000000 E+06 (1 MHz)	1.999999998 E+10 (20 GHz - 2 Hz)
MS46322A-030	1.000000 E+06 (1 MHz)	2.999999998 E+10 (30 GHz - 2 Hz)
MS46322A/B-040	1.000000 E+06 (1 MHz)	4.349999998 E+10 (43.5 GHz - 2 Hz)
MS46322B-043	1.000000 E+06 (1 MHz)	4.349999998 E+10 (43.5 GHz - 2 Hz)
<b>MS46522B</b>		
MS46522B-010	5.0000 E+04 (50 kHz)	8.499999980 E+09 (8.5 GHz - 20 Hz)
MS46522B-020	5.0000 E+04 (50 kHz)	1.999999980 E+10 (20 GHz - 20 Hz)
MS46522B-040	5.0000 E+04 (50 kHz)	4.349999980 E+10 (43.5 GHz - 20Hz)
MS46522B-043	5.0000 E+04 (50 kHz)	4.349999980 E+10 (43.5 GHz - 20Hz)
MS46522B-082	5.50000000000 E+10 (55 GHz)	9.1999999980 E+10 (92 GHz - 20 Hz)
MS46522B-083	5.50000000000 E+10 (55 GHz)	9.1999999980 E+10 (92 GHz - 20 Hz)
<b>MS46524B</b>		
MS46524B-010	5.0000 E+04 (50 kHz)	8.499999980 E+09 (8.5 GHz - 20 Hz)
MS46524B-020	5.0000 E+04 (50 kHz)	1.999999980 E+10 (20 GHz - 20 Hz)
MS46524B-040	5.0000 E+04 (50 kHz)	4.349999980 E+10 (43.5 GHz - 20 Hz)
MS46524B-043	5.0000 E+04 (50 kHz)	4.349999980 E+10 (43.5 GHz - 20 Hz)

## Standalone VNAs – Minimum Stop and Maximum Stop Frequencies

The lowest possible setting for the stop frequency is the start frequency plus 20 Hz which yields a sweep of two data points.

**Table 1-10.** Standalone VNAs – Minimum Stop, Maximum Stop, and Maximum CW Frequencies (1 of 2)

Model-Option	Minimum Stop Frequency Stop Min = Start + 2 Hz = 2 data points	Maximum Stop Frequency or Maximum CW Frequency (Stop Max = Instrument Max)
<b>MS46121A/B</b>		
MS46121A/B-004	4.00000002 E+07 (40 MHz + 2 Hz)	4.0000000000 E+09 (4 GHz)
MS46121A/B-006	1.50002 E+05 (150 kHz + 2 Hz)	6.0000000000 E+09 (6 GHz)
<b>MS46122A/B</b>		
MS46122A/B-010	1.000002 E+06 (1 MHz + 2 Hz)	8.0000000000 E+09 (8 GHz)
MS46122A/B-020	1.000002 E+06 (1 MHz + 2 Hz)	2.0000000000 E+10 (20 GHz)
MS46122A/B-040	1.000002 E+06 (1 MHz + 2 Hz)	4.3500000000 E+10 (43.5 GHz)
MS46122B-043	1.000002 E+06 (1 MHz + 2 Hz)	4.3500000000 E+10 (43.5 GHz)
<b>MS46131A, ME7868A, ME7869A</b>		
MS46131A-010	1.000002 E+06 (1 MHz + 2 Hz)	8.0000000000 E+09 (8 GHz)
MS46131A-020	1.000002 E+06 (1 MHz + 2 Hz)	2.0000000000 E+10 (20 GHz)
MS46131A-043	1.000002 E+06 (1 MHz + 2 Hz)	4.3500000000 E+10 (43.5 GHz)
<b>MS46322A/B</b>		
MS46322A-004	1.000002 E+06 (1 MHz + 2 Hz)	4.0000000000 E+09 (4 GHz)
MS46322A/B-010	1.000002 E+06 (1 MHz + 2 Hz)	8.0000000000 E+09 (8 GHz)
MS46322A-014	1.000002 E+06 (1 MHz + 2 Hz)	1.4000000000 E+10 (14 GHz)
MS46322A/B-020	1.000002 E+06 (1 MHz + 2 Hz)	2.0000000000 E+10 (20 GHz)
MS46322A-030	1.000002 E+06 (1 MHz + 2 Hz)	3.0000000000 E+10 (30 GHz)
MS46322A/B-040	1.000002 E+06 (1 MHz + 2 Hz)	4.3500000000 E+10 (43.5 GHz)
MS46322B-043	1.000002 E+06 (1 MHz + 2 Hz)	4.3500000000 E+10 (43.5 GHz)
Model-Option	Minimum Stop Frequency Stop Min = Start + 20 Hz = 3 data points	Maximum Stop Frequency or Maximum CW Frequency (Stop Max = Instrument Max)
<b>MS46522B</b>		
MS46522B-010	5.0020 E+04 (50 kHz + 20 Hz)	8.5000000000 E+09 (8.5 GHz)
MS46522B-020	5.0020 E+04 (50 kHz + 20 Hz)	2.0000000000 E+10 (20 GHz)
MS46522B-040	5.0020 E+04 (50 kHz + 20 Hz)	4.3500000000 E+10 (43.5 GHz)
MS46522B-043	5.0020 E+04 (50 kHz + 20 Hz)	4.3500000000 E+10 (43.5 GHz)
MS46522B-082	5.5000000020 E+10 (55 GHz + 20 Hz)	9.2000000000 E+10 (92 GHz)
MS46522B-083	5.5000000020 E+10 (55 GHz + 20 Hz)	9.2000000000 E+10 (92 GHz)

**Table 1-10.** Standalone VNAs – Minimum Stop, Maximum Stop, and Maximum CW Frequencies (2 of 2)

<b>Model-Option</b>	<b>Minimum Stop Frequency Stop Min = Start + 2 Hz = 2 data points</b>	<b>Maximum Stop Frequency or Maximum CW Frequency (Stop Max = Instrument Max)</b>
<b>MS46524B</b>		
MS46524B-010	5.0020 E+04 (50 kHz + 20 Hz)	8.500000000 E+09 (8.5 GHz)
MS46524B-020	5.0020 E+04 (50 kHz + 20 Hz)	2.0000000000 E+10 (20 GHz)
MS46524B-040	5.0020 E+04 (50 kHz + 20Hz)	4.3500000000 E+10 (43.5 GHz)
MS46524B-043	5.0020 E+04 (50 kHz + 20Hz)	4.3500000000 E+10 (43.5 GHz)

## Standalone VNAs – Default, Minimum, and Maximum Frequency Span

The frequency span equals the stop frequency minus the start frequency. The minimum possible frequency span is 20 Hz.

**Table 1-11.** Standalone VNAs – Minimum and Maximum Frequency Span (1 of 2)

Model-Option	Default Frequency Span (Minimum Frequency Span All Models: Span Min = 20 Hz)	Maximum Frequency Span Span Max = Stop – Start
<b>MS46121A/B</b>		
MS46121A/B-004	3.960000000 E+09 (4 GHz - 40 MHz)	3.960000000 E+09 (4 GHz - 40 MHz)
MS46121A/B-006	5.999850000 E+09 (6 GHz - 150 kHz)	5.999850000 E+09 (6 GHz - 150 kHz)
<b>MS46122A/B</b>		
MS46122A/B-010	7.990000000 E+09 (8 GHz - 10 MHz)	7.999000000 E+09 (8 GHz - 10 MHz)
MS46122A/B-020	1.999000000 E+10 (20 GHz - 10 MHz)	1.999900000 E+10 (20 GHz - 10 MHz)
MS46122A/B-040	4.349900000 E+10 (43.5 GHz - 1 MHz)	4.349900000 E+10 (43.5 GHz - 1 MHz)
MS46122B-043	4.349900000 E+10 (43.5 GHz - 1 MHz)	4.349900000 E+10 (43.5 GHz - 1 MHz)
<b>MS46131A, ME7868A, ME7869A</b>		
MS46131A-010	7.990000000 E+09 (8 GHz - 10 MHz)	7.999000000 E+09 (8 GHz - 10 MHz)
MS46131A-020	1.999000000 E+10 (20 GHz - 10 MHz)	1.999900000 E+10 (20 GHz - 10 MHz)
MS46131A-043	4.349900000 E+10 (43.5 GHz - 1 MHz)	4.349900000 E+10 (43.5 GHz - 1 MHz)
<b>MS46322A/B</b>		
MS46322A-004	3.990000000 E+09 (4 GHz - 10 MHz)	3.999000000 E+09 (4 GHz - 10 MHz)
MS46322A/B-010	7.990000000 E+09 (8 GHz - 10 MHz)	7.999000000 E+09 (8 GHz - 10 MHz)
MS46322A-014	1.399000000 E+10 (14 GHz - 10 MHz)	1.399900000 E+10 (14 GHz - 10 MHz)
MS46322A/B-020	1.999000000 E+10 (20 GHz - 10 MHz)	1.999900000 E+10 (20 GHz - 10 MHz)
MS46322A-030	2.999000000 E+10 (30 GHz - 10 MHz)	2.999900000 E+10 (30 GHz - 10 MHz)
MS46322A/B-040	4.349900000 E+10 (43.5 GHz - 1 MHz)	4.349900000 E+10 (43.5 GHz - 1 MHz)
MS46322B-043	4.349900000 E+10 (43.5 GHz - 1 MHz)	4.349900000 E+10 (43.5 GHz - 1 MHz)
<b>MS46522B</b>		
MS46522B-010	8.499950000 E+09 (8.5 GHz - 50 kHz)	8.499950000 E+09 (8.5 GHz - 50 kHz)
MS46522B-020	1.999950000 E+10 (20 GHz - 50 kHz)	1.9999950000 E+10 (20 GHz - 50 kHz)
MS46522B-040	4.349995000 E+10 (43.5 GHz - 50 kHz)	4.3499950000 E+10 (43.5 GHz - 50 kHz)
MS46522B-043	4.349995000 E+10 (43.5 GHz - 50 kHz)	4.3499950000 E+10 (43.5 GHz - 50 kHz)
MS46522B-082	3.700000000 E+10 (92 GHz - 55 GHz)	9.1999050000 E+10 (92 GHz - 50 kHz)
MS46522B-083	3.700000000 E+10 (92 GHz - 55 GHz)	9.1999050000 E+10 (92 GHz - 50 kHz)

**Table 1-11.** Standalone VNAs – Minimum and Maximum Frequency Span (2 of 2)

Model-Option	Default Frequency Span (Minimum Frequency Span All Models: Span Min = 20 Hz)	Maximum Frequency Span Span Max = Stop – Start
<b>MS46524B</b>		
MS46524B-010	8.4999500000 E+09 (8.5 GHz - 50 kHz)	8.499950000 E+09 (8.5 GHz - 50 kHz)
MS46524B-020	1.9999500000 E+10 (20 GHz - 50 kHz)	1.9999950000 E+10 (20 GHz - 50 kHz)
MS46524B-040	4.3499950000 E+10 (43.5 GHz - 50 kHz)	4.3499950000 E+10 (43.5 GHz - 50 kHz)
MS46524B-043	4.3499950000 E+10 (43.5 GHz - 50 kHz)	4.3499950000 E+10 (43.5 GHz - 50 kHz)

## Standalone VNAs – Minimum Center and Maximum Center Frequencies

The minimum possible center frequency is the minimum start frequency plus 10 Hz. The maximum possible center frequency is the maximum stop frequency minus 10 Hz.

**Table 1-12.** Standalone VNAs – Minimum Center Frequency and Maximum Center Frequency (1 of 2)

Model-Option	Minimum Center Frequency Center Min = Start + 1 Hz	Maximum Center Frequency All Models Center Max = Stop – 1 Hz
<b>MS46121A/B</b>		
MS46121A/B-004	4.0000001 E+07 (40 MHz + 1 Hz)	3.999999999 E+09 (4 GHz - 1 Hz)
MS46121A/B-006	1.50001 E+05 (150 kHz + 1 Hz)	5.999999999 E+09 (6 GHz - 1 Hz)
<b>MS46122A/B</b>		
MS46122A/B-010	1.000001 E+06 (1 MHz + 1 Hz)	7.999999999 E+09 (8 GHz - 1 Hz)
MS46122A/B-020	1.000001 E+06 (1 MHz + 1 Hz)	1.999999999 E+10 (20 GHz - 1 Hz)
MS46122A/B-040	1.000001 E+06 (1 MHz + 1 Hz)	4.3499999999 E+10 (43.5 GHz - 1 Hz)
MS46122B-043	1.000001 E+06 (1 MHz + 1 Hz)	4.3499999999 E+10 (43.5 GHz - 1 Hz)
<b>MS46131A, ME7868A, ME7869A</b>		
MS46131A-010	1.000001 E+06 (1 MHz + 1 Hz)	7.999999999 E+09 (8 GHz - 1 Hz)
MS46131A-020	1.000001 E+06 (1 MHz + 1 Hz)	1.999999999 E+10 (20 GHz - 1 Hz)
MS46131A-043	1.000001 E+06 (1 MHz + 1 Hz)	4.3499999999 E+10 (43.5 GHz - 1 Hz)
<b>MS46322A/B</b>		
MS46322A-004	1.000001 E+06 (1 MHz + 1 Hz)	3.999999999 E+09 (4 GHz - 1 Hz)
MS46322A/B-010	1.000001 E+06 (1 MHz + 1 Hz)	7.999999999 E+09 (8 GHz - 1 Hz)
MS46322A-014	1.000001 E+06 (1 MHz + 1 Hz)	1.3999999999 E+10 (14 GHz - 1 Hz)
MS46322A/B-020	1.000001 E+06 (1 MHz + 1 Hz)	1.9999999999 E+10 (20 GHz - 1 Hz)
MS46322A-030	1.000001 E+06 (1 MHz + 1 Hz)	2.9999999999 E+10 (30 GHz - 1 Hz)
MS46322A/B-040	1.000001 E+06 (1 MHz + 1 Hz)	4.3499999999 E+10 (43.5 GHz - 1 Hz)
MS46322B-043	1.000001 E+06 (1 MHz + 1 Hz)	4.3499999999 E+10 (43.5 GHz - 1 Hz)
Model-Option	Minimum Center Frequency Center Min = Start + 10 Hz	Maximum Center Frequency All Models Center Max = Stop – 10 Hz
<b>MS46522B</b>		
MS46522B-010	5.0010 E+04 (50 kHz + 10 Hz)	8.499999990 E+09 (8.5 GHz - 10 Hz)
MS46522B-020	5.0010 E+04 (50 kHz + 10 Hz)	1.9999999990 E+10 (20 GHz - 10 Hz)
MS46522B-040	5.0010 E+04 (50 kHz + 10 Hz)	4.3499999990 E+10 (43.5 GHz - 10 Hz)
MS46522B-043	5.0010 E+04 (50 kHz + 10 Hz)	4.3499999990 E+10 (43.5 GHz - 10 Hz)
MS46522B-082	5.5000000010 E+10 (55 GHz + 10 Hz)	9.1999999990 E+10 (92 GHz - 10 Hz)
MS46522B-083	5.5000000010 E+10 (55 GHz + 10 Hz)	9.1999999990 E+10 (92 GHz - 10 Hz)

**Table 1-12.** Standalone VNAs – Minimum Center Frequency and Maximum Center Frequency (2 of 2)

<b>Model-Option</b>	<b>Minimum Center Frequency Center Min = Start + 1 Hz</b>	<b>Maximum Center Frequency All Models Center Max = Stop - 1 Hz</b>
<b>MS46524B</b>		
MS46524B-010	5.0010 E+04 (50 kHz + 10 Hz)	8.499999990 E+09 (8.5 GHz - 10 Hz)
MS46524B-020	5.0010 E+04 (50 kHz + 10 Hz)	1.999999990 E+10 (20 GHz - 10 Hz)
MS46524B-040	5.0010 E+04 (50 kHz + 10 Hz)	4.349999990 E+10 (43.5 GHz - 10 Hz)
MS46524B-043	5.0010 E+04 (50 kHz + 10 Hz)	4.349999990 E+10 (43.5 GHz - 10 Hz)

## Standalone VNAs – Default Center Frequencies

The center frequency is equal to Start Frequency plus the Stop Frequency divided by two (2). The minimum possible frequency span is 20 Hz.

**Table 1-13.** Standalone VNAs – Default Center Frequencies (1 of 2)

Model-Option	Default Center Frequency Center Default = (Start + Stop)/2 Center Minimum Frequency Span = 2 Hz
<b>MS46121A/B</b>	
MS46121A/B-004	2.020000000 E+09
MS46121A/B-006	3.000075000 E+09
<b>MS46122A/B</b>	
MS46122A/B-010	4.005000000 E+09
MS46122A/B-020	1.000500000 E+10
MS46122A/B-040	2.175050000 E+10
MS46122B-043	2.175050000 E+10
<b>MS46131A, ME7868A, ME7869A</b>	
MS46131A-010	4.005000000 E+09
MS46131A-020	1.000500000 E+10
MS46131A-043	2.175050000 E+10
<b>MS46322A/B</b>	
MS46322A-004	2.005000000 E+09
MS46322A/B-010	4.005000000 E+09
MS46322A-014	7.005000000 E+09
MS46322A/B-020	1.000500000 E+10
MS46322A-030	1.500500000 E+10
MS46322A/B-040	2.175050000 E+10
MS46322B-043	2.175050000 E+10
Model-Option	
Default Center Frequency Center Default = (Start + Stop)/2 Center Minimum Frequency Span = 20 Hz	
<b>MS46522B</b>	
MS46522B-010	4.250150000 E+09
MS46522B-020	1.0000025000 E+10
MS46522B-040	2.1750025000 E+10
MS46522B-043	2.1750025000 E+10
MS46522B-082	7.3500000000 E+10
MS46522B-083	7.3500000000 E+10

**Table 1-13.** Standalone VNAs – Default Center Frequencies (2 of 2)

Model-Option	Default Center Frequency Center Default = (Start + Stop)/2 Center Minimum Frequency Span = 2 Hz
<b>MS46524B</b>	
MS46524B-010	4.250150000 E+09
MS46524B-020	1.0000025000 E+10
MS46524B-040	2.1750025000 E+10
MS46524B-043	2.1750025000 E+10

## 1-8 User Documentation

The following ShockLine Series VNA documentation is provided on the Anritsu website:

### Product Information, Compliance and Safety

- ShockLine™ Product Information, Compliance, and Safety (PICS) – 10410-00067

### Technical Data Sheets

- MS46121A Series VNA Technical Data Sheet – 11410-00839
- MS46121B Series VNA Technical Data Sheet – 11410-00994
- MS46122A Series VNA Technical Data Sheet – 11410-00822
- MS46122B Series VNA Technical Data Sheet – 11410-00995
- MS46131A Series VNA Technical Data Sheet – 11410-01146
- ME7868A Series VNA Technical Data Sheet – 11410-02824
- ME7869A Series VNA Technical Data Sheet – 11410-02904
- MS46322A Series VNA Technical Data Sheet – 11410-00751
- MS46322B Series VNA Technical Data Sheet – 11410-00996
- MS46522B Series VNA Technical Data Sheet – 11410-00858
- MS46524B Series VNA Technical Data Sheet – 11410-00860

### Operation Manuals

- MS46121A/B Series VNA Operation Manual – 10410-00344
- MS46122A/B Series VNA Operation Manual – 10410-00340
- MS46131A, ME7868A, ME7869A Series VNA Operation Manual – 10410-00780
- MS46322A/B Series VNA Operation Manual – 10410-00335
- MS46522B/524B Series VNA Operation Manual – 10410-00743

## User Interface Reference Manuals

- MS46121A/B, MS46122A/B, MS46131A, ME7868A, ME7869A MS46322A/B Series VNA ShockLine User Interface Reference Manual – 10410-00337
- MS46522B/MS46524B Series VNA User Interface Reference Manual – 10410-00744

## Operation and Measurement Guides

- MS46122A/B, MS46131A, ME7868A, ME7869A, MS46322A/B Series VNA Measurement Guide – 10410-00336
- MS4652xB Series VNA Measurement Guide – 10410-00753

## Programming Manual

- ShockLine Programming Manual – 10410-00746

## Maintenance Manuals

- MS46121A/B Series VNA Maintenance Manual – 10410-00757
- MS46122A/B Series VNA Maintenance Manual – 10410-00341
- MS46131A Series VNA Maintenance Manual – 10410-00781
- MS46322A/B Series VNA Maintenance Manual – 10410-00342
- MS4652xB Series VNA Maintenance Manual – 10410-00765



# Chapter 2 — Programming the ShockLine Series VNA

## 2-1 Introduction

This chapter provides an introduction to programming the ShockLine VNA with the SCPI programming language. It also includes descriptions of the command types the instrument accepts, program command structures, data parameters and input/output specifications, and notational conventions. Information on the instrument's status system and trigger system programming is also provided.

**Note** When the ShockLine VNA is operated through remote programming, the ShockLine™ application screen's user interface controls are disabled (grayed out). To return to local screen control, press the keyboard **Esc** key, or send the **RTL** command.

## 2-2 Introduction to SCPI Programming

The Standard Commands for Programmable Instruments (SCPI) protocol defines a set of standard programming commands for use by all SCPI compatible instruments. SCPI is intended to give the ATE user a consistent environment for program development. It does so by defining controller messages, instrument responses, and message formats for all SCPI compatible instruments. The IEEE-488 interface for the VNA is designed to conform to the requirements of SCPI 1999.0. The set of SCPI commands implemented by the instrument interface provides a comprehensive set of programming functions covering all of the major functions of the instrument.

### Command Types

SCPI commands, which are also referred to as SCPI instructions, are messages to the instrument to perform specific tasks. The instrument's command set, introduced in this chapter, includes these command types:

- “IEEE-488.2 Commands”
- “System Commands”
- “SCPI Commands”
- “Native SCPI Commands”

## 2-3 IEEE-488.2 Commands

The IEEE-488.2 commands are defined in the IEEE-488.2 standard and must be implemented by all SCPI compatible instruments. The mandated commands listed in [Table 2-1](#) are identified by the asterisk (\*) at the beginning of the command keyword. These commands are used to control instrument status registers, status reporting, synchronization, and other common functions. The IEEE-488.2 required common commands are described in detail in the first half of [Chapter 3, “IEEE Commands”](#) starting with [“IEEE-488.2 Commands” on page 3-2](#).

**Table 2-1.** IEEE-488.2 Mandated Commands

*CLS	*ESE	*IDN?	*OPT?	*STB?
*DDT	*ESE?	*OPC	*RST	*TRG
*DDT?	*ESR?	*OPC?	*SRE	*TST?
			*SRE?	*WAI

## 2-4 System Commands

The set of system commands are primarily used to control the state of the instrument for system diagnostics, hardware calibration, and troubleshooting.

## 2-5 SCPI Commands

There are two general classifications of SCPI commands described in the two sections below:

- Required (or mandated) SCPI Commands
- Native SCPI Commands

Note that the Required SCPI Commands are a subset of the Native SCPI commands.

### Required SCPI Commands

The required SCPI commands are listed in the table below:

**Table 2-2.** SCPI Required or Mandated Commands

:STATus	:SYSTem
:OPERation	:ERRor
[ :EVENT] ?	[ :NEXT] ?
:CONDITION?	
:ENABLE	
:QUESTIONable	
[ :EVENT] ?	
:CONDITION?	
:ENABLE	

The SCPI Required Commands are described in detail in

- “:[:STATus:OPERation Subsystem](#)” on page 5-589
- “:[:STATus:QUESTIONable Subsystem](#)” on page 5-591
- “:[:SYSTem Subsystem](#)” on page 5-594

### Native SCPI Commands

The majority of the commands are native SCPI commands and are also described in detail in, [Chapter 5, “SCPI Commands”](#). Depending on the number of keywords in the command, the subsystems are grouped by either the first two keywords (such as :CALCulate{1-16}:MARKer Subsystem) or the first three keywords (such as :CALCulate{1-16}[:SELected]:CONVersion Subsystem).

The commands are listed in strict ASCII sort sequence.

See the sections below starting with “[Command Requirements](#)” on page 2-3 for definitions of parameters and other notations.

## 2-6 Command Requirements

### Query Commands

All commands, unless specifically noted in the commands syntax descriptions, have a query form. Exceptions are noted as:

- Commands without a query form are marked “No Query” in the description.
- Queries without a command form are marked “Query only” in the description.

As defined in IEEE-488.2, a query is a command with a question mark symbol appended (examples are \*ESR? and \*TST?). When a query form of a command is received, the current setting associated with the command is placed in the output buffer. Query commands always return the short form of the parameter. For example, NORMAL or INVerted is returned as NORM or INV. Boolean values are returned as 1 or 0, even when they can be set as ON or OFF.

### Command Names

Typical SCPI commands consist of one or more keywords, parameters, and punctuation. SCPI command keywords can be a mixture of upper and lower case characters. Except for common commands, each keyword has a long and a short form. In this manual, the long form is presented with the short form in upper case and the remainder in lower case. For example, the long form of the command keyword to control the instrument display is :DISPlay.

The short form keyword is usually the first four characters of the long form (example: DISP for DISPlay). The exception to this is when the long form is longer than four characters and the fourth character is a vowel. In such cases, the vowel is dropped and the short form becomes the first three characters of the long form.

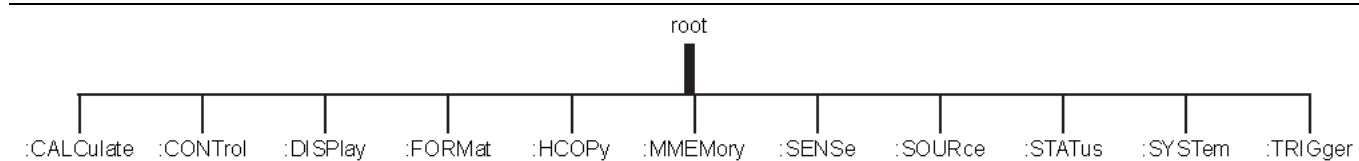
Example: the short form of the keyword :POWer is :POW.

Some command keywords may have a numeric suffix to differentiate between multiple instrument features such as multiple pulse widths. For example, keywords :WIDTh2 (or :WIDT2).

As with any programming language, the exact command keywords and command syntax must be used. The syntax of the individual commands is described in detail in [Chapter 5, “SCPI Commands”](#). Unrecognized versions of long form or short form commands, or improper syntax, will generate an error.

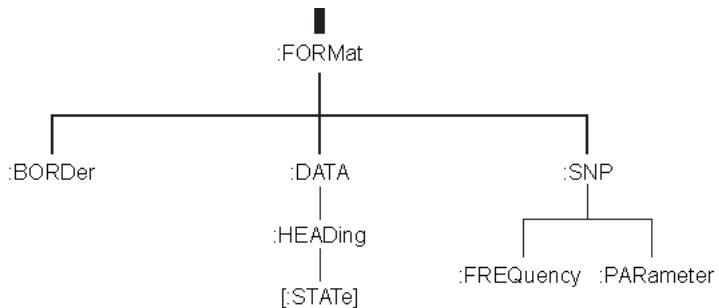
### Hierarchical Command Structure

All SCPI commands, except the common commands, are organized in a hierarchical structure similar to the inverted tree file structure used in most computers. The SCPI standard refers to this structure as “the Command Tree.” The command keywords that correspond to the major instrument control functions are located at the top of the command tree. The command keywords for the VNA’s SCPI command set are shown in the diagram below.



**Figure 2-1.** Shockline™ VNA Top-Level SCPI Command Tree

All Shockline™ VNA SCPI commands have one or more subcommands (keywords) associated with them to further define the instrument function to be controlled. The subcommand keywords may also have one or more associated subcommands (keywords). Each subcommand level adds another layer to the command tree. The command keyword and its associated subcommand keywords form a portion of the command tree called a command subsystem. The :FORMAT command subsystem is shown below.



**Figure 2-2.** SCPI :FORMAT Subsystem

## Data Parameters

Data parameters, referred to simply as “parameters,” are the quantitative values used as arguments for the command keywords. The parameter type associated with a particular SCPI command is determined by the type of information required to control the particular instrument function. For example, Boolean (ON | OFF) type parameters are used with commands that control switch functions.

The command descriptions in [Chapter 5, “SCPI Commands”](#) specify the type of data parameter to be used with each command. The most commonly used parameter types are numeric, extended numeric, discrete, and Boolean.

- **Numeric**

Numeric parameters comprise integer numbers or any number in decimal or scientific notation, and may include polarity signs. This includes <NR1>, <NR2>, and <NR3> numeric data as defined in [“Parameter Notations” on page 2-6](#). This type of numeric element is abbreviated as <NRf> throughout this document.

- **Discrete**

Discrete parameters, such as INTernal and EXTERNAL, are used to control program settings to a predetermined finite value or condition.

- **Boolean**

Boolean parameters represent binary conditions and may be expressed as ON, OFF or 1, 0.

<b>Note</b>	The ShockLine command parser will generally accept all numerical values within the parameter ranges specified. In cases where a command parameter value is outside of the indicated range or resolution of the instrument, the nearest appropriate value will be entered.
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## 2-7 Notational Conventions

The SCPI interface standardizes command syntax and style that simplifies the task of programming across a wide range of instrumentation. As with any programming language, the exact command keywords and command syntax must be used. Unrecognized commands or improper syntax will not function.

### General Notations

The syntax conventions that are used for all SCPI command keywords and data parameter descriptions in this manual are described below:

**Table 2-3.** General Notations

:	A colon links command keywords together to form commands. The colon is not an actual part of the keyword, but is a signal to the SCPI interface parser. A colon must precede a root keyword immediately following a semicolon (see “ <a href="#">Notational Examples</a> ” on page 2-7).
;	A semicolon separates commands if multiple commands are placed on a single program line (see “ <a href="#">Notational Examples</a> ” on page 2-7).
[]	Square brackets enclose one or more optional keywords.
{}	Braces enclose one or more keyword parameters that may be included one or more times.
	A vertical bar (also called a “pipe”) indicates “or” and is used to separate alternative parameter options. For Example: ON   OFF is the same as ON or OFF.
<>	Angle brackets enclose parameter descriptions.
::=	Means “is defined as” For example: <a> ::= <b><c> indicates that <b><c> can replace <a>.

For further information about SCPI command syntax and style, refer to the **Standard Commands for Programmable Instruments (SCPI) 1999.0 document**.

## Parameter Notations

The following syntax conventions are used for all data parameter descriptions in this manual:

**Table 2-4.** Parameter Notations

Parameter	Definition
<b>&lt;ASCII&gt;</b>	A non-delimited 7-bit ASCII text. The end of the text must be terminated with the 0A character (decimal 10) and concurrent setting (^) of the GPIB End of Transmission State (EOI). <ASCII> (also called <Arbitrary ASCII>) text is transmitted only at the end of a program or response message.
<b>&lt;block&gt;</b>	IEEE-488.2 block data format. Can be in ASCII, XML, or other format.
<b>&lt;bNR1&gt;</b>	Boolean values in <NR1> format; numeric 1 or 0
<b>&lt;boolean&gt;</b>	ON   OFF. Can also be represented as 1 or 0, where 1 means ON and 0 means OFF Boolean parameters are always returned as 1 or 0 in <NR1> format by query commands
<b>&lt;char&gt;</b>	<CHARACTER PROGRAM DATA> Examples: CW, FIXed, UP, and DOWN
<b>&lt;INF&gt;</b>	Positive Infinity. Positive infinity is represented as 9.9E37. The numeric value for positive infinity fits into a 32-bit IEEE 754 floating point number.
<b>&lt;integer&gt;</b>	An unsigned integer without a decimal point (implied radix point)
<b>&lt;NA&gt;</b>	Not Applicable
<b>&lt;NAN&gt;</b>	Not A Number. Not a number is represented as 9.91E37 and is defined in IEEE 754. Typically used where applications are dividing zero by zero or subtracting infinity from infinity. NAN is also used to represent missing data such as a trace that has not been yet acquired.
<b>&lt;NINF&gt;</b>	Negative Infinity. Negative infinity is represented as -9.9E37. The numeric value for negative infinity fits into a 32-bit IEEE 754 floating point number.
<b>&lt;NR1&gt;</b>	A signed integer without a decimal point (implied radix point)
<b>&lt;NR2&gt;</b>	A signed number with an explicit radix point
<b>&lt;NR3&gt;</b>	A scaled explicit decimal point numeric value with an exponent (e.g., floating point number)
<b>&lt;NRf&gt;</b>	Values in NR1, NR2, or NR3 formats are accepted. Logically, <NR1>   <NR2>   <NR3>
<b>&lt;string&gt;</b>	<STRING PROGRAM DATA> ASCII characters surrounded by double quotes For example: "C:\Anritsu\ShockLine\filename.s2p"
<b>MPND</b>	Numeric Limit. Maximum Positive/Negative Double Precision Number. +/- 1.792 693 134 860 E+308
<b>MPNF</b>	Numeric Limit. Maximum Positive/Negative Float Number +/- 3.402 819 E+38
<b>MPNI</b>	Numeric Limit. Maximum Positive/Negative Integer - 2 147 483 648 to +2 147 483 647

Refer to “[Data Transmission Methods](#)” on page 2-9 for detailed information about parameter input/output and transferring data to/from the instrument.

## Notational Examples

The following is an example showing command syntax:

```
:SENSe{1-16}:FREQuency:STARt 2.0E9
```

Command statements read from left to right and from top to bottom. In the command statement above, the :FREQuency keyword immediately follows the :SENSe{1-16} keyword with no separating space. The braces { } indicate an optional keyword parameter.

For commands in general, if the keyword's optional parameter is not used, a value of 1 is assumed.

A space is required between the command string and its argument.

Note that the first keyword in the command string does not require a leading colon; however, it is good practice to always use a leading colon for all keywords.

The following is an example of a multiple command statement that uses two separate commands in a single statement:

```
:SENSe3:FREQuency:STARt 2.0E9;:SENSe3:FREQuency:STOP 20.0E9
```

Using the command keyword short form, the command string above would be:

```
:SENS3:FREQ:STAR 2.0E9;:SENS3:FREQ:STOP 20.0E9
```

Note the semicolon used to join the commands. Also note the leading colon used immediately after the semicolon.

## 2-8 Numeric Data Suffix Reference

Unit suffixes are not required for data parameters, provided the values are scaled for the global default units. The VNA's SCPI default units are:

- Hz (hertz) for frequency-related parameters
- s (second) for time-related parameters
- m (meter) for distance-related parameters
- ohm for impedance-related parameters
- dB for power-related parameters
- Henry and Farad for reactance-related parameters

For example, the commands below set the VNA marker 1 frequency to 3 GHz.

```
:CALC1:MARK:MOV:STAR 3000000000
:CALC1:MARK:MOV:STAR 3.0 E9
```

The following table provides a reference to the I/O parameter types (and the appropriate multiplier) used with the VNA.

**Table 2-5.** Numeric Data Suffix

Code	Parameter Type	Multiplier
DB, DBL, DBM	Power	1.0
DEG	Phase	1.0
RAD	Phase	$180/\pi$ (180/Pi)
HZ	Frequency (Hertz)	1.0
KHZ	Frequency (Kilohertz)	1.0E3
MHZ	Frequency (Megahertz)	1.0E6
GHZ	Frequency (Gigahertz)	1.0E9
REU	Real	1.0
IMU	Imaginary	1.0
S	Time	1.0
MS	Time (Millisecond)	1.0E-3
US, USC	Time (Microsecond)	1.0E-6
NS, NSC	Time (Nanosecond)	1.0E-9
PS, PSC	Time (Picosecond)	1.0E-12
M, MTR	Distance (Meter)	1.0
CM, CMT	Distance (Centimeter)	1.0E-2
MM, MMT	Distance (Millimeter)	1.0E-3
OHM	Impedance	1.0
V, VLT	Voltage	1.0
MV	Voltage (Millivolt)	1.0E-3
XM3	Unitless	1.0E-3
XX1	Unitless	1.0
XX3	Unitless	1.0E3

## 2-9 Data Transmission Methods

Data transmissions to and from the VNA conform to the protocols specified by the IEEE-488.2 Standard. The 488.2 Standard specifies how any data, such as ASCII numbers, strings, or blocks of data bytes, will be transmitted over the GPIB. This section describes the various transmission methods in use by the VNA. The transmission method names described below (also called notations) will be used throughout the Programming Manual when describing specific VNA data transfer commands. Data transmission notations are easily distinguished in text as they are always shown surrounded by the “less than” and the “greater than” characters (<>). The transmission type notations used in describing various VNA data transmissions are:

- For ASCII numbers, the notations are: <NR1>, <NR2>, <NR3>, or <NRf>
- For ASCII strings (printable characters and print formatting codes), the notation is: <string>
- For generic (7-bit) ASCII characters, the notation is: <Arbitrary ASCII>
- For generic binary bytes, (7-bit ASCII or binary), the notation is: <block>

### <NR1>

This notation represents ASCII integer values. A comma (,) is used to separate multiple values sent in a single command's input or output string. Examples of values that can be represented by <NR1> notation:

10  
-29,179

### <NR2>

This notation represents ASCII floating point values in decimal point format. A comma (,) is used to separate multiple values sent in a single command's input or output string. Examples of values that can be represented by <NR2> notation:

1.0  
-0.00015  
12.743,-180.07

### <NR3>

This notation represents ASCII floating point values in exponential format (scientific notation). A comma (,) is used to separate multiple values sent in a single command's input or output string. Examples of values that can be represented by <NR3> notation:

1.0E9  
-7.056E3  
9.0E-2,3.42E2

### <NRf>

This notation is used to signify that data can be in either <NR1>, <NR2>, or <NR3> format as described above. Examples of values that can be represented by <NRf> notation:

1.0E-9  
10.005  
-83,4.5E2,-234.9901

## <string>

This notation represents a string of ASCII characters (including non-printable characters) that is delimited (surrounded) with either single quotes (' ') or double quotes (" "). The string can include text formatting characters such as line feed, space, carriage return, or printer control characters. Note that if a double quote character must be sent as part of the string, then it must be followed by an additional double quote. Alternatively, the string can be sent using single quotes (See "cal\_file" example below). Examples of data represented by <string> notation:

```
"1/15/98"  
"Save ""cal_file"" now"  
'Save "cal_file" now'
```

## <ASCII> or <Arbitrary ASCII>

This notation represents undelimited 7-bit ASCII text. The end of the text must be terminated with the 0A character (decimal 10) and concurrent setting (^) of the GPIB End of Transmission State (EOI). This requirement makes it necessary for <Arbitrary ASCII> text to be transmitted only at the end of a program or response message, i.e., at the end of a multiple input or output statement. Example of data represented by <Arbitrary ASCII> notation:

```
ANRITSU,MS46322A,123456,1.0<0A^EOI>  
ANRITSU,MS46522B,123456,1.0<0A^EOI>
```

These examples show sample responses from the \*IDN?, 488.2 common query. In these examples, the instrument identifies itself as an ANRITSU MS46322A or ANRITSU MS46522B, with serial number 123456, and software version 1.0 installed.

## <block> or <arbitrary block>

This notation represents data that is transmitted as 8-bit data bytes (00–FF hex, 0–255 decimal, notation is <DAB>). This is useful for transmitting large blocks of:

- Formatted ASCII data
- Formatted XML data
- Formatted binary data
- Unformatted binary data

The data stream is immediately preceded by a variable length ASCII header that is encoded with the number of data bytes to be sent. The header always starts with the pound (#) character. The header and the transmitted data messages are described as follows:

#nm1..mn<DAB1>...<DABm>

Where:

**#** = The pound sign character. Required for binary data transfer.

**n** = Number of digits to follow (m1..mn) that make up the number m.

**m1..mn** = Taken together, this makes up the number m which is the number of data bytes to follow that constitute the requested data.

**<DAB>** = An 8 bit binary data byte. This is the data (or information) being sent.

The number of data bytes does not account for the final Line Feed (0A, or decimal 10).

**Note** If n = 0, then m is omitted, and transmission end is signaled by sending the line feed character (0A, or decimal 10) and concurrent setting (^) of the End Of Transmission State (EOI) immediately following the last <DAB>.

**Example 1: #3204<DAB1>...<DAB204>**

Example 1 shows how 204 8-bit bytes are transmitted using the proper header. The header in this example is comprised of 5 characters (#3204). It begins with the pound character (#). The next character (3) indicates there are 3 digits to follow that indicate the number of bytes being transmitted (204). The next three characters (204) indicate the number of data bytes being transmitted immediately after the header. Next comes the actual data bytes, or information, being transmitted (<DAB1>...<DAB204>).

**Example 2: #512808<DAB1>...<DAB12808>**

Example 2 shows how 12808 bytes are transmitted using the proper header. The header in this example is comprised of 7 characters (#512808). It begins with the pound character (#). The next character (5) indicates there are 5 digits to follow that indicate the number of bytes being transmitted (12808). The next five characters (12808) indicate the number of data bytes being transmitted immediately after the header. Next comes the actual data bytes, or information, being transmitted (<DAB1>...<DAB12808>).

**Note** Examples 1 and 2 above demonstrate the <block> form referred to as <Definite Length Arbitrary Block>. It is so called because the number of data bytes being transmitted is known from the encoded header.

**Example 3: #0<DAB1>...<DABm><0A^EOI>**

Example 3 shows how an unknown number of bytes are transmitted using the proper header. The header in this example is comprised of 2 characters (#0). As usual, the header begins with the pound character (#). The next character (0) indicates there is an unknown number of data bytes being transmitted immediately after the header. Next comes the actual data bytes being transmitted (<DAB1>...<DABm>). The end of the data stream is signaled by sending the line feed character (0A, or decimal 10) and concurrent setting (^) of the End of Transmission State (EOI).

**Note** Example 3, above, demonstrates a special form of <block> data referred to as the <Indefinite Length Arbitrary Block>. It is so called because the number of data bytes being transmitted is unknown, and therefore cannot be encoded in the header. Instead, the header always consists of the pound and zero characters (#0) and end of the data stream is always signaled by sending the line feed character (0A, or decimal 10) and concurrent setting (^) of the End of Transmission State (EOI). This requirement makes it necessary for <Indefinite Length Arbitrary Block> text to be transmitted only at the end of a program or response message (at the end of a multiple input or output statement).

**<char>**

Character program data such as CW, FIXed, UP, and DOWN. A single instance in a command or query is <char>. If multiple instances are required, each is identified such as <char1> or <char2> and the individual elements are separated by commas:

- <char1>,<char2>
- <char1>,<char2>,<char3>
- <char1>,<char2>,<char3>,<char4>

**MPND**

The instrument numeric limit as the Maximum Positive/Negative Double Precision Number or:

+/- 1.792 639 134 86 E+308

**MPNF**

The instrument numeric limit as the Maximum Positive/Negative Float Number or:

+/- 3.402 819 E+38

## MPNI

The instrument numeric limit as the Maximum Positive/Negative Integer or:

- 2 147 483 648 to +2 147 483 647

## Formatting Data Output

Three commands are provided to alter the way the arbitrary block header for output data is formed.

- **FDH0**

Specifies that the length of the arbitrary block header will be minimized; that is, the byte count section will not contain leading zeros, thus its length is indeterminate. This means that a program must decode the header in order to skip over it.

- **FDH1**

Specifies that the length of the arbitrary block header will be fixed at 11 characters. This is accomplished by forcing leading zeros as required in the byte count section. This means that a program can skip over the arbitrary block header by skipping 11 characters. FDH1 is the default mode.

- **FDH2**

Specifies that no arbitrary block header will be sent with the next transmission. This mode is not in compliance with IEEE-488.2 specifications and will persist for all subsequent program messages.

- **FDHX?**

FDH mode query yields the following results:

- 0: FDH0
- 1: FDH1
- 2: FDH2

## ASCII or Binary Data Format

The following sections discuss the various data output formats:

### Non-Array Data

The formats used for data transfers not involving numerical data arrays are preset. They always occur in either binary format or ASCII format, depending on the data. These data transfers include a variety of information. Examples include:

- Instrument setup strings
- Marker data, queries
- Disk directory listings

### Numerical Data Arrays

Numerical data array transfers are used to transfer the following types of data:

- Measurement data
- Calibration data
- Sweep frequency, time, or distance values

Each of these data transfer types are individually explained below. You can select either binary or ASCII format for data transfers involving numerical data arrays. The commands described below select and keep the format for all subsequent data transfers.

- **ASCII Format – FMA**

ASCII formatted values represented in <NR1>, <NR2>, <NR3>, or <NRf> formats. The VNA accepts any of the above formats as input. It will always output values using <NR3> exponential format with each value represented using 18 characters plus a comma to separate multiple values.

- **Binary Formats**

- **FMB**

Each eight consecutive data bytes represent one floating point value in IEEE 754 64-bit format (double precision, 8 byte, floating point value).

- **FMC**

Each four consecutive data bytes represent one floating point value in IEEE 754 32-bit format (single precision, 4 byte, floating point value).

- **FMX?**

FMA, FMB, FMC format selection query

- **Byte Ordering**

- **MSB**

Byte ordering is most significant byte first. For use only with FMB and FMC. This is the optional byte mode for the VNA.

- **LSB**

Byte ordering is least significant byte first. For use with FMB and FMC. This is required for transferring data to/from Intel/IBM based computers. LSB is the default mode.

- **XSB?**

MSB, LSB format selection query.

- **FMT0**

Turn ASCII enhancement off (normal default mode).

- **FMT1**

Turn ASCII enhancement on.

- **FMTX?**

ASCII enhancement ON/OFF status query.

The following SCPI commands select either ASCII or Binary format as described above:

```
:FORMAT:DATA <char>
```

Where the <char> arguments of ASC or ASCII ::= FMA, REAL ::= FMB, REAL32 ::= FMC

:FORMAT:DATA? is the ASC or ASCII, REAL, or REAL32 format selection query.

```
:FORMAT:BORDER <char>
```

Where the <char> arguments of NORMAL ::= MSB, SWAPPED ::= LSB

:FORMAT:BORDER? is the MSB | LSB format selection query.

### Enhanced ASCII Formatting

Enhanced ASCII formatting can be applied to both non-array ASCII data and numerical data arrays in the FMA format when this data is output within an <block> format. The format selectively replaces comma data element separators with a line feeds (ASCII 10) in order to enhance the visual effect. The following provides two examples of this enhanced structure:

- An unenhanced directory listing

```
#9000000392Directory of C:\ 1-30-96 13:03,UTIL <DIR> 1-25-96 12:58,PLOT
BMB 38462 1-22-96 14:41,PLOT BMC 307446 1-22-96 14:41,TTT CAL
44174 1-22-96 17:02,TTT2 CAL 44174 1-22-96 17:16,PLOT1 DAT
10323 1-22-96 14:03,PLOT1 HGL 19899 1-22-96 14:02,PLOT2 HGL
38462 1-25-96 13:16,8 Files 502940 Bytes
```

- An enhanced directory listing

```
#9000000392
Directory of C:\ 1-30-96 13:03
UTIL <DIR> 1-25-96 12:58
PLOT BMB 38462 1-22-96 14:41
PLOT BMC 307446 1-22-96 14:41
TTT CAL 44174 1-22-96 17:02
TTT2 CAL 44174 1-22-96 17:16
PLOT1 DAT 10323 1-22-96 14:03
PLOT1 HGL 19899 1-22-96 14:02
PLOT2 HGL 38462 1-25-96 13:16
8 Files 502940 Bytes
```

- An unenhanced response to OCD

```
#9000000189-9.99750733376E-01, 3.21409821510E-01, 3.60706359148E-01,
9.82860028744E-01, 7.76742696762E-01,-5.06587028503E-01,-5.07535457611E-01,
-8.45697641373E-01,-6.10321164131E-01,6.05827927589E-01
```

- An enhanced response to OCD

```
#9000000189
-9.99750733376E-01, 3.21409821510E-01
3.60706359148E-01, 9.82860028744E-01
7.76742696762E-01,-5.06587028503E-01
-5.07535457611E-01,-8.45697641373E-01
-6.10321164131E-01, 6.05827927589E-01
```

## 2-10 Calculating the Byte Size

This section describes the factors for calculating the byte size of responses to selected remote-only queries. The byte size of the resultant data from several of the remote only queries depends on several factors:

- Parameters per Output
- Numbers Output per Data Point
- Bytes Output per Number
- Size of Block Data
- Number of Bytes Output

### Numbers Output-per-Data Point (NODP)

The data for each data point is a complex number ( $A + jB$ ) where A and B are floating point numbers. This data is saved internally for use and possible future output. Additionally, if an RF correction is active, the RF correction is applied to the RAW measurement and the result is saved internally for use and possible future output. Either the RAW or CORRECTED data are taken and converted into the data format for the display type selected.

This data is saved internally in the FORMATTED (final) measurement form for use and possible future output. When this conversion takes place, the data will, in most cases, still be two orthogonal numbers. However, several of the displays types throw away a portion of the data and the result will be one number only. The display types that produce only one number are:

- Group Delay
- Imaginary
- Linear Magnitude
- Log Magnitude
- Phase
- Power Out
- Real
- SWR

To summarize, the RAW, CORRECTED, and FORMATTED data output will be two numbers-per-point, unless the display type is one of those mentioned above.

### Bytes Output-per-Number (BOPN)

The number of bytes output per number is shown below:

**Table 2-6.** Bytes Output per Number

Number	Output Format	Output-per-Number
<b>FMA</b>	(ASCII)	14 plus comma (short form data) 19 plus comma (long form data)
<b>FMB</b>	(double precision binary)	8
<b>FMC</b>	(single precision binary)	4

## Size of Data Block (SODB)

In the case where there is only one parameter to output, the formula is:

$$\text{SODB} = \text{NODP} * \text{BOPN} * \text{Number of points in the sweep}$$

If the command is O4SC, O4FD, or O4SR, the formula is:

$$\text{SODB} = 8 * \text{BOPN} * \text{Number of points in the sweep}$$

## Number of Bytes Output (NBO)

The number of bytes output is the number of bytes transmitted over the GPIB. In most cases, the data block is proceeded by an arbitrary block header followed by an end character (line feed), as shown below:

- Response Message = [Arbitrary Block Header] + [Data Block] + [End Character]

The size of the end character is one byte. The size of the arbitrary block header is variable between 2 and 11. If we always assume an arbitrary block header size of 11, then: NBO = 12 + SODB. For example:

- The VNA is set up for a one channel, four-trace display with a 1601 point sweep.
- Trace 1 is displaying S11 in LogMag and Phase format
- Trace 2 is displaying S12 in LogMag format
- Trace 3 is displaying S21 in Phase format
- Trace 4 is displaying S22 in Smith Chart format
- The output formatting commands CH2, FMC, and LSB are received

The number of output bytes for the O4FD query command is:

$$\text{NBO} = 12 + 8 * 4 * 1601 = 51244 \text{ bytes}$$

The number of output bytes for the ORD query command is:

$$\text{NBO} = 12 + 2 * 4 * 1601 = 12820 \text{ bytes}$$

The number of output bytes for the OFD3 query command is:

$$\text{NBO} = 12 + 1 * 4 * 1601 = 6416 \text{ bytes}$$

The number of output bytes for the FMA or O4SR query command is:

$$\text{NBO} = 12 + 8 * 19 * 1601 = 243364 \text{ bytes}$$

## 2-11 Input Buffer Size and NRFD Holdoff

ShockLine VNAs provide a very large input buffer that can hold up to 100 commands. Each command plus any associated data can be as large as the amount of memory available in the VNA at the time. If a programmer attempts to exceed 100 commands, the LAN will go into Not Ready For Data (NRFD) Holdoff. This Holdoff condition will hold onto the controller PC until a command is executed which frees up room for another command. Then the new command will be read in. Some controller PCs can detect this Holdoff condition and programmers interpret this condition as an Error. It is not an Error. Rather, it is a function provided by any listener device to guarantee that commands and data are not lost. It might be an ATE program error, but not a VNA error.

## 2-12 Synchronization of Commands

The ShockLine VNA provides synchronization by executing commands in a serial fashion. Subsequent commands will not be parsed and executed until the current SCPI command is parsed and completely executed. Indeed, as far as VNA operations are concerned, if this serial execution method is not incorporated, the VNA and the controller PC will be in chaos. Avoiding this chaos condition is so important that the IEEE488.2 standard mandated three commands to be provided: \*OPC, \*OPC?, and \*WAI.

**Note** For more information, see the descriptions of the \*OPC, \*OPC?, and \*WAI commands in Chapter 3, “IEEE Commands”.

This synchronization is accomplished by the SCPI parser which waits for a **Completed** signal from the internal interface after starting execution of the command. While the parser is waiting, it is not parsing newer commands. Subsequent commands are put into the input buffer, awaiting their turn to be parsed and executed.

## 2-13 Forcing the Parser to Stop Waiting

The parser will wait forever for the **Completed** signal as discussed above in “[Synchronization of Commands](#)”. Therefore there is no SCPI command (which would itself require parsing) that can stop the parser from waiting. The controller PC will have to send a SCPI bus command called Device Clear (DCL) or Selected Device Clear (SDC). SDC is directed at a particular device address. DCL will perform the same action on all devices on the Bus. Among the required things DCL and SDC do is reset the Parser. This causes the parser to stop waiting for the ‘Completed’ signal and get ready to execute a command. In the **IEEE488.2 Specification**, see **IEEE488.2 Section 5.8** and **IEEE488.1 Section 4.10** for a discussion of DCL and SDC.

## 2-14 Aborting an RF or Hardware Calibration

From the interface, select the Abort Cal button on the ONE PORT CAL, TWO PORT CAL, THREE PORT CAL, and FOUR PORT CAL menus to stop the current calibration procedure. One can also send the ABORT command to abort these manually initiated calibrations. However, when a calibration is initiated from the program interface, the parser is busy waiting for the ‘Completed’ message from the internal interface and is not available to parse the ABORT command to abort the calibration. Refer to the sections above to see how that is done. Once the parser is ready for a new command, send the ABORT command.

## 2-15 Time-Out Settings

ShockLine VNAs provide synchronization by executing commands in a serial fashion. A new command will not be parsed and executed until the previous command has finished processing. Therefore, the synchronization commands stipulated in IEEE-488.2 (\*OPC?, \*OPC, and \*WAI) execute with ease.

ShockLine VNAs provide a very large input buffer that permits storing many commands until they can be executed. The ShockLine VNAs can store very large command strings (a series of characters terminated with a line feed), but only 100 command strings at most. This creates a situation where the LAN can go into Not Ready for Data (NRFD) hold off if the controller sends more than two command strings at a time. NRFD hold off will hold onto the controller until it can store the data byte that is currently being transferred. This hold off merely guarantees that no data byte will be lost from a message. Although some controllers can detect this hold off, its occurrence is of no consequence and it is how instruments are kept communicating at the same rate on the LAN.

Some commands may take a very long time to execute, such as waiting for the end of a sweep when the IF bandwidth is very low (10 Hz to 100 Hz). In spite of the long sweep time, the controller should avoid timing out because it creates a situation where synchronization and data can be lost. A controller time-out also leaves the VNA in an unknown I/O state. This unknown I/O state may not be responsive because the proper data handshake has been interrupted, thus creating a hung interface.

In many cases, the SCPI parser will also be busy participating in a long event, such as when the commands TRS;WFS are sent. The parser will not be available until the sweep is finished. The only way to get the parser to stop its current task and start processing new commands is to issue a command called Device Clear (DCL). This command brings the parser back to the Ready for Data (RFD) state. The command also resets the input and output buffers, which results in both input and output data being lost.

Below is a sequence that shows how to apply a time-out properly:

```
SETTIMEOUT(40000); // Sets a longer time-out for the controller.  
OUTPUT ; RST // RST (reset) is a command that can take 30 seconds or longer.  
ENTER ; ONP // Outputs the number of points. The actual wait occurs here.  
SETTIMEOUT(20000); // Sets the time-out back to its normal value.
```

Setting the proper time-out on the controller is very important to guarantee that the SCPI will be synchronized and data will not be lost. One should choose a time-out that allows most operations to finish without problems and set the time-out to different values on those commands that require a longer time to execute. If time-outs do occur in program execution, the time-out settings for the particular commands in question should be increased. If a time-out is due to an application error, such as sending a syntax error preceding a query or an impossible state is set up such as being in HOLD and waiting for the end of the sweep, the coding error should be fixed and the time-out setting left as it is. Timing out also leaves the bus in an unknown I/O state, so a DCL should be sent to synchronize handshaking.

## 2-16 Trace Type Parameters and Coefficients

The following table provides a reference for the various graph types and related data types used in the ShockLine Series VNA.

**Table 2-7.** Trace Parameters and Coefficients (1 of 3)

Trace Name SCPI Keyword Display Trace Abbreviation	Trace Graph Format	Default Reference Level	Reference Level Range	Default Resolution	Resolution Range Parameter/ Division	Default Scale Position	Scale Reference Range – Num of Vertical Div.
<b>Group Delay</b> <b>GDElAy</b> <b>GDEL</b>	Single Rectilinear Graph	0	+/-9.9999E2	1 microsecond	1E-13 to 1E9	5	4 to 30
<b>Imaginary</b> <b>IMAGInary</b> <b>IMAG</b>	Single Rectilinear Graph	0	+/-9.9999E2	1 Unit (U)	1E-5 to 1E6	5	4 to 30
<b>Linear Mag and Phase</b> <b>LINPPhase</b> <b>LINPH</b>	Double Rectilinear Graphs	Top=0 Bottom = 0	+/-9.9999E2	Top = 10 U Bottom = 45 degrees	-NA-	Top = 5 Bottom = 5	Top = 4 to 30 Bottom = 4 to 30
<b>Log Mag and Phase</b> <b>LOGPPhase</b> <b>LOGPH</b>	Double Rectilinear Graphs	Top=0 Bottom = 0	+/-9.9999E2	Top = 10 dB Bottom = 45 degrees	Top = 1E-3 to 1E3 Bottom = 1E-2 to 1E6	Top = 5 Bottom = 5	Top = 4 to 30 Bottom = 4 to 30
<b>Linear Mag</b> <b>MLINear</b> <b>MLIN</b>	Single Rectilinear Graph	0	+/-9.9999E2	10 U	1E-5 to 1E6	5	4 to 30
<b>Log Mag</b> <b>MLOGarithmic</b> <b>MLOG</b>	Single Rectilinear Graph	0	+/-9.9999E2	10 dB	1E-3 to 1E3	5	4 to 30
<b>Phase</b> <b>PHASe</b> <b>PHAS</b>	Single Rectilinear Graph	0	+/-9.9999E2	45 degrees	1E-2 to 1E6	5	4 to 30
<b>Linear Polar Lin/Phase</b> <b>PLINear</b> <b>PLIN</b>	Polar Graph	5	1E-8 to 9.9999E2	1 U	2E-9 to 1E6	-NA-	-NA-
<b>Linear Polar Real/Imag</b> <b>PLINCOMPlEx</b> <b>PLIN</b>	Polar Graph	5	1E-8 to 9.9999E2	1 U	2E-9 to 1E6	-NA-	-NA-

**Table 2-7.** Trace Parameters and Coefficients (2 of 3)

Trace Name SCPI Keyword Display Trace Abbreviation	Trace Graph Format	Default Reference Level	Reference Level Range	Default Resolution	Resolution Range Parameter/Division	Default Scale Position	Scale Reference Range – Num of Vertical Div.
<b>Log Polar Log/Phase</b> <b>PLOGarithmic</b> <b>PLOG</b>	Polar Graph	0	+/-9.9999E2	10 dB	1E-5 to 1E6	-NA-	-NA-
<b>Log Polar Real/Imag</b> <b>PLOGCOMPLex</b> <b>PLOGCOMP</b>	Polar Graph	0	+/-9.9999E2	10 dB	1E-5 to 1E6	-NA-	-NA-
<b>Real</b> <b>REAL</b> <b>REAL</b>	Single Rectilinear Graph	0	+/-9.9999E2	1 U	1E-5 to 1E6	5	4 to 30
<b>Real and Imaginary</b> <b>REIMaginary</b> <b>REIM</b>	Double Rectilinear Graphs	TOP = 0 Bottom = 0	+/-9.9999E2	Top = 1 U Bottom = 1 U	Top = 1E-5 to 1E6 Bottom = 1E-5 to 1E6	Top = 5 Bottom = 5	Top = 4 to 30 Bottom = 40 to 30
<b>Smith (R + jX)</b> <b>Real/Imag</b> <b>SCOMPLex</b> <b>SCOMP</b>	Smith Chart – Impedance (Complex)	-NA-	+/-9.9999E2	10 U	1E-5 to 1E6	-NA-	-NA-
<b>Smith (R + jX)</b> <b>Lin/Phase</b> <b>SLINear</b> <b>SLIN</b>	Smith Chart – Impedance (Linear)	-NA-	+/-9.9999E2	10 U	1E-5 to 1E6	-NA-	-NA-
<b>Smith (R + jX)</b> <b>Log/Phase</b> <b>SLOGarithmic</b> <b>SLOG</b>	Smith Chart – Impedance (Log)	-NA-	+/-9.9999E2	10 U	1E-5 to 1E6	-NA-	-NA-
<b>Smith (R + jX)</b> <b>Impedance</b> <b>SMITH</b> <b>SMIT</b>	Smith Chart – Impedance (Impedance)	-NA-	+/-9.9999E2	10 U	1E-5 to 1E6	-NA-	-NA-
<b>SWR</b> <b>SWR</b> <b>SWR</b>	Single Rectilinear Graph	0	+/-9.9999E2	10 U	1E-5 to 1E6	5	4 to 30

**Table 2-7.** Trace Parameters and Coefficients (3 of 3)

Trace Name SCPI Keyword Display Trace Abbreviation	Trace Graph Format	Default Reference Level	Reference Level Range	Default Resolution	Resolution Range Parameter/ Division	Default Scale Position	Scale Reference Range – Num of Vertical Div.
<b>Impedance Real &amp; Imaginary</b> <b>ZCOMplex</b> <b>ZCOMP</b>	Double Rectilinear Graphs	Top = 0 Ohms Bottom = 0 Ohms	+/-9.9999E2	Top = 10 Ohms Bottom = 10 Ohms	Top = 1E-5 to 1E6 Bottom = 1E-5 to 1E6	Top = 5 Bottom = 5	Top = 4 to 30 Bottom = 4 to 30
<b>Impedance Imaginary</b> <b>ZIMAGInary</b> <b>ZIMAG</b>	Single Rectilinear Graph	0 Ohms	+/-9.9999E2	10 Ohms	1E-5 to 1E6	5	4 to 30
<b>Impedance Magnitude</b> <b>ZMAGNitude</b> <b>ZMAGN</b>	Single Rectilinear Graph	0 Ohms	+/-9.9999E2	10 Ohms	1E-5 to 1E6	5	4 to 30
<b>Impedance Real</b> <b>ZREAL</b> <b>ZREAL</b>	Single Rectilinear Graph	0 Ohms	+/-9.9999E2	10 Ohms	1E-5 to 1E6	5	4 to 30
<b>Impedance Capacitance</b> <b>ZCAPacitance</b> <b>ZCAP</b>	Single Rectilinear Graph	0 farads	+/-9.9999E2	1pF	1E 15 to 1E9	5	4 to 30
<b>Impedance Inductance</b> <b>ZINDuctance</b> <b>ZIND</b>	Single Rectilinear Graph	0 henrys	+/-9.9999E2	1 nH	1E-15 to 1E9	5	4 to 30

## 2-17 Input/Output Data Files

The following is a list of file types that are supported by the VNA:

**Table 2-8.** Supported File Types (1 of 3)

File Extension	Description	Command Compatibility
<b>AHC</b>	All hardware calibration file. On a per system basis, the file contains all hardware calibration data.	:MMEMory:LOAD <string>   :MMEMory:STORe <string>
<b>AIC</b>	Analog in calibration file. Per-system.	:MMEMory:LOAD <string>   :MMEMory:STORe <string>
<b>ALC</b>	ALC calibration file. Saves all available ALC calibration for all ports. Per-system.	:MMEMory:LOAD <string>   :MMEMory:STORe <string>
<b>BMP</b>	Bitmap image file of data display area.	:MMEMory:STORe <string>   :MMEMory:STORe:IMAGE <string>
<b>CCF</b>	Calibration kit coefficients file.	:MMEMory:LOAD:CKIT
<b>CHA</b>	Setup and Calibration file for all channels.	:MMEMory:LOAD <string>   :MMEMory:STORe <string>
<b>CHX</b>	Setup and Calibration file for a single channel.	:MMEMory:LOAD <string>   :MMEMory:STORe <string>
<b>CSV</b>	Comma separated text data file.	:MMEMory:STORe <string>
<b>EDL</b>	Embedding/De-embedding array file.	:MMEMory:LOAD <string>   :MMEMory:STORe <string>
<b>INI</b>	Frequency Initialization and Source Initialization table files. Default name is FreqIniTable.ini (for troubleshooting only).	
<b>JPG</b>	JPEG image file of data display area.	:MMEM:STORE <string> :MMEM:STORE:IMAGE <string>
<b>KIT_INFO. “Extension”</b>	The Anritsu Calibration kit files are supported by the instrument. The files are usually bundled together on a USB memory device. When plugged into the VNA, the USB drive is identified as drive E:\. Files can be manually loaded by navigating to drive E:\ and selecting the files. The VNA then loads all of files.  Alternatively, use the LKT command to load all of the calibration kit files. The calibration kit files all have a base name of “KIT_INFO.Extension” where the extension identifies the connector geometry and gender.	Command: LKT
<b>LMT</b>	Set up for limit lines.	:MMEMory:STORe:LIMIT <string> :MMEMory:LOAD:LIMit <string>
<b>LST</b>	List of component file names for .s1p characterized calibration kits.  An LST text file lists the component file names for an .s1p characterized calibration kit so all components can be loaded at once.  The filenames for the .lst calkit file or any of its constituent .s1p files should not be modified, otherwise the files will not be loaded correctly.	:MMEMory:LOAD:CKIT

**Table 2-8.** Supported File Types (2 of 3)

<b>File Extension</b>	<b>Description</b>	<b>Command Compatibility</b>
<b>LOG</b>	A list of all entries in the ShockLine event log.	:MMEMory:STORe <string>
<b>MKR</b>	List of all markers.	:MMEMory:STORe <string>
<b>MFT</b>	Multiple Frequency Table configuration file. Default file name is FreqTable.mft (for troubleshooting).	
<b>PNG</b>	PNG image of data display area.	:MMEMory:STORe <string>   :MMEMory:STORe:IMAGe <string>
<b>PTC</b>	Pretune calibration file.	
<b>RCVR</b>	Receiver calibration file.	:MMEMory:LOAD <string>   :MMEMory:STORe <string>
<b>S1P</b>	Data file in S1P format (see S2P below).  An .s1p file type holds the characteristics of a reflective calibration component. These files are loaded as needed during calibration if the calibration components are characterized by this file type.	:MMEMory:STORe <string>
<b>S2P</b>	Data file in S2P standard microwave simulator text format. Includes a controlled header and only one or four S-parameters are saved. If an S2P file is requested, but not all of the S-parameters are currently being measured, a value of 0 (zero) is entered for missing parameters. If a full two-port calibration is applied, all of the S-parameters are measured, even if they do not need to be displayed. The resultant S2P file is complete with all S-parameter information. S2P files can be recalled and displayed as trace memory when they are loaded into the active channel.	:MMEMory:STORe <string>
<b>S3P</b>	Data file in S3P format (see S2P above).	:MMEMory:LOAD <string>   :MMEMory:STORe <string>
<b>SFT</b>	Single frequency table file (for troubleshooting).	:MMEMory:LOAD <string>   :MMEMory:STORe <string>
<b>SGS</b>	Setup file for segmented traces.	:MMEMory:LOAD:FSEGment <string>   :MMEMory:LOAD:ISEGment <string>
<b>SLC</b>	Source Local Oscillator (Src LO) calibration file. Per-system.	:MMEMory:LOAD <string>   :MMEMory:STORe <string>
<b>SQM</b>	Source Quadrupler hardware calibration file.	:MMEMory:LOAD <string>   :MMEMory:STORe <string>
<b>STA</b>	Setup file for all channels.	:MMEMory:LOAD <string>   :MMEMory:STORe <string>
<b>STX</b>	Setup file for a single channel.	:MMEMory:LOAD <string>   :MMEMory:STORe <string>
<b>TDF</b>	Active trace data memory formatted file.	:MMEMory:LOAD:MDATA <string>
<b>TDU</b>	Active trace data memory unformatted file.	:MMEMory:LOAD:MDATA <string>
<b>TMZ</b>	Ten (10) MHz calibration file. Per-system.	:MMEMory:LOAD <string>   :MMEMory:STORe <string>

**Table 2-8.** Supported File Types (3 of 3)

File Extension	Description	Command Compatibility
TXT	Active channel trace data text file. Similar to the .CSV format described above. A tab-delimited format with an optional descriptive heading in which the data for every trace is saved to a defined location folder. The data for each trace is saved as an X and a Y column to accommodate multiple parameters such as mixed frequency and time domain. Subsequent traces are added as additional columns. The .txt file cannot be recalled into the VNA memory.	:MMEMory:STORe <string>

## 2-18 Status System Reporting

The VNA's status system consists of the following SCPI-defined status-reporting structures:

- The Instrument Summary Status Byte Group
- The Standard Event Status Group
- The Operation Status Group
- The Questionable Status Group

The following paragraphs describe the registers that make up a status group and explain the status information that each status group provides.

**Note** Parallel Polling is not supported in the VNA.

### Status Group Registers

In general, a status group consists of a condition register, a transition filter, an event register, and an enable register. Each component is briefly described in the following paragraphs.

#### Condition Register

The condition register is continuously updated to reflect the current status of the instrument. There is no latching or buffering for this register, it is updated in real time. Reading the contents of a condition register does not change its contents.

#### Transition Filter

The transition filter is a special register that specifies which types of bit state changes in the condition register will set corresponding bits in the event register.

- Negative transition filters (NTR) are used to detect condition changes from True (1) to False (0).
- Positive transition filters (PTR) are used to detect condition changes from False (0) to True (1).
- Setting both positive and negative filters True allows an event to be reported anytime the condition changes.
- Transition filters are read-write.
- Transition filters are unaffected by queries or \*CLS (clear status) and \*RST commands.

#### Event Register

The event register latches transition events from the condition register as specified by the transition filter. Bits in the event register are latched, and once set they remain set until cleared by a query or a \*CLS command. Event registers are read only.

#### Enable Register

The enable register specifies the bits in the event register that can produce a summary bit. The VNA logically ANDs corresponding bits in the event and enable registers, and ORs all the resulting bits to obtain a summary bit. Summary bits are recorded in the Summary Status Byte. Enable registers are read-write. Querying an enable register does not affect it.

### Status Group Reporting

The state of certain ShockLine VNA hardware and operational events and conditions can be determined by programming the status system. Three lower status groups provide status information to the Summary Status Byte group. The Summary Status Byte group is used to determine the general nature of an event or condition and the other status groups are used to determine the specific nature of the event or condition. The following paragraphs explain the information that is provided by each status group. Programming commands for the status system, including examples of command usage, can be found in [Chapter 5, “SCPI Commands”](#).

### Summary Status Byte Group

The Summary Status Byte group, consisting of the Summary Status Byte Enable register and the Summary Status Byte, is used to determine the general nature of a ShockLine VNA event or condition. The bits in the Summary Status Byte provide the following:

**Table 2-9.** Status Byte Group

Bit #	Bit Name	Description
<b>0, 1</b>	Not Used	These bits are always set to 0.
<b>2</b>	Error Queue (ERRQ)	Set to indicate the Error Queue contains data. The Error Query command can then be used to read the error message(s) from the queue.
<b>3</b>	Questionable Event (QUEST)	Set to indicate the Questionable Status summary bit has been set. The Questionable Status Event register can then be read to determine the specific condition that caused the bit to be set.
<b>4</b>	Message Available (MAV)	Set to indicate that the VNA has data ready in its output queue.
<b>5</b>	Standard Event (STD)	Set to indicate that the Standard Event Status summary bit has been set. The Standard Event Status register can then be read to determine the specific event that caused the bit to be set.
<b>6</b>	Summary Status (RQS)	Set to indicate that the VNA has at least one reason to require service. The individual bits in the Status Byte are ANDed with their corresponding Service Request Enable Register bits, then each bit value is ORed and input to this bit.
<b>7</b>	Operation Event (OPER)	Set to indicate that the Operation Status summary bit has been set. The Operation Status Event register can then be read to determine the specific condition that caused the bit to be set.

### Standard Event Status Group

The Standard Event Status group, consisting of the Standard Event Status register (an Event register) and the Standard Event Status Enable register, is used to determine the specific event that set bit 5 of the Summary Status Byte. The bits in the Standard Event Status register provide the following:

**Table 2-10.** Standard Event Status Group

Bit #	Bit Name	Description
<b>0</b>	Operation Complete (OP)	Set to indicate that all pending VNA operations were completed following execution of the “*OPC” command. For more information, see the descriptions of the *OPC, *OPC?, and *WAI commands in <a href="#">Chapter 3, “IEEE Commands”</a> .
<b>1</b>	Not Used	The bit is always set to 0.
<b>2</b>	Query Error	Set to indicate that a query error has occurred.
<b>3</b>	Device Dependent Error	Set to indicate that a device-dependent error has occurred.
<b>4</b>	Execution Error	Set to indicate that an execution error has occurred.
<b>5</b>	Command Error	Set to indicate that a command error (usually a syntax error) has occurred.
<b>6</b>	Not Used	This bit should be set to 0 (zero).
<b>7</b>	Power ON	Set to indicate that the VNA is powered ON and in operation.

### Operation Status Group

The Operation Status group, consisting of the Operation Condition register, the Operation Positive Transition register, the Operation Negative Transition register, the Operation Event register, and the Operation Event Enable register, is used to determine the specific condition that set bit 7 in the Summary Status Byte. The bits in the Operation Event register provide the following:

**Table 2-11.** Operation Status Group

Bit #	Bit Name	Description
<b>0</b>	Calibration Complete	Set to indicate that a calibration is complete.
<b>1</b>	Sweep Complete	Set to indicate that a sweep is complete. Note that the Sweep Complete Bit will not be set unless the sweep was started by an appropriate trigger command.
<b>2-3</b>	Not Used	These bits should be set to 0 (zero).
<b>4</b>	Waiting for Trigger	Set to indicate that the VNA is in an armed “wait for trigger” state.
<b>6-15</b>	Not Used	These bits should be set to 0 (zero).

### Questionable Status Register

The Questionable Status Register consists of the Questionable Condition register, the Questionable Positive Transition register, the Questionable Negative Transition register, the Questionable Event register, and the Questionable Event Enable register.

The Questionable Status Register is used to determine the specific condition that set bit 3 in the Summary Status Byte. The bits in the Questionable Event register provide the following:

**Table 2-12.** Questionable Status Register

Bit #	Bit Name	Description
<b>0</b>	New Service Log Entry	Set to indicate that a new entry has been made to the Windows service log.
<b>1</b>	Limit Failure	Set to indicate that trace data is outside a limit line boundary.
<b>2</b>	RF Unleveled	Set to indicate that an RF unleveled condition exists.
<b>3</b>	Unlocked	Set to indicate that an internal PLL unlocked condition exists.
<b>4-15</b>	Not Used	These bits should be set to 0 (zero).

### Questionable Limits Status Register

The Questionable Limits Status Register (QLSR) consists of the Questionable Limits Condition register, the Questionable Limits Event register, the Positive and Negative Transition Filters, and the Questionable Limits Event Enable register.

The QLSR is used to determine the channels that continuous limits testing failures and set Bit B1 of the Questionable Status Register. The bits in the QLSR provide the information described in the table below.

**Table 2-13.** Questionable Limits Status Register (QLSR)

Bit #	Bit Name	Description
<b>0</b>	Channel1Fail	Limits testing on Channel 1 detected a failure
<b>1 – 15</b>	NA	NA

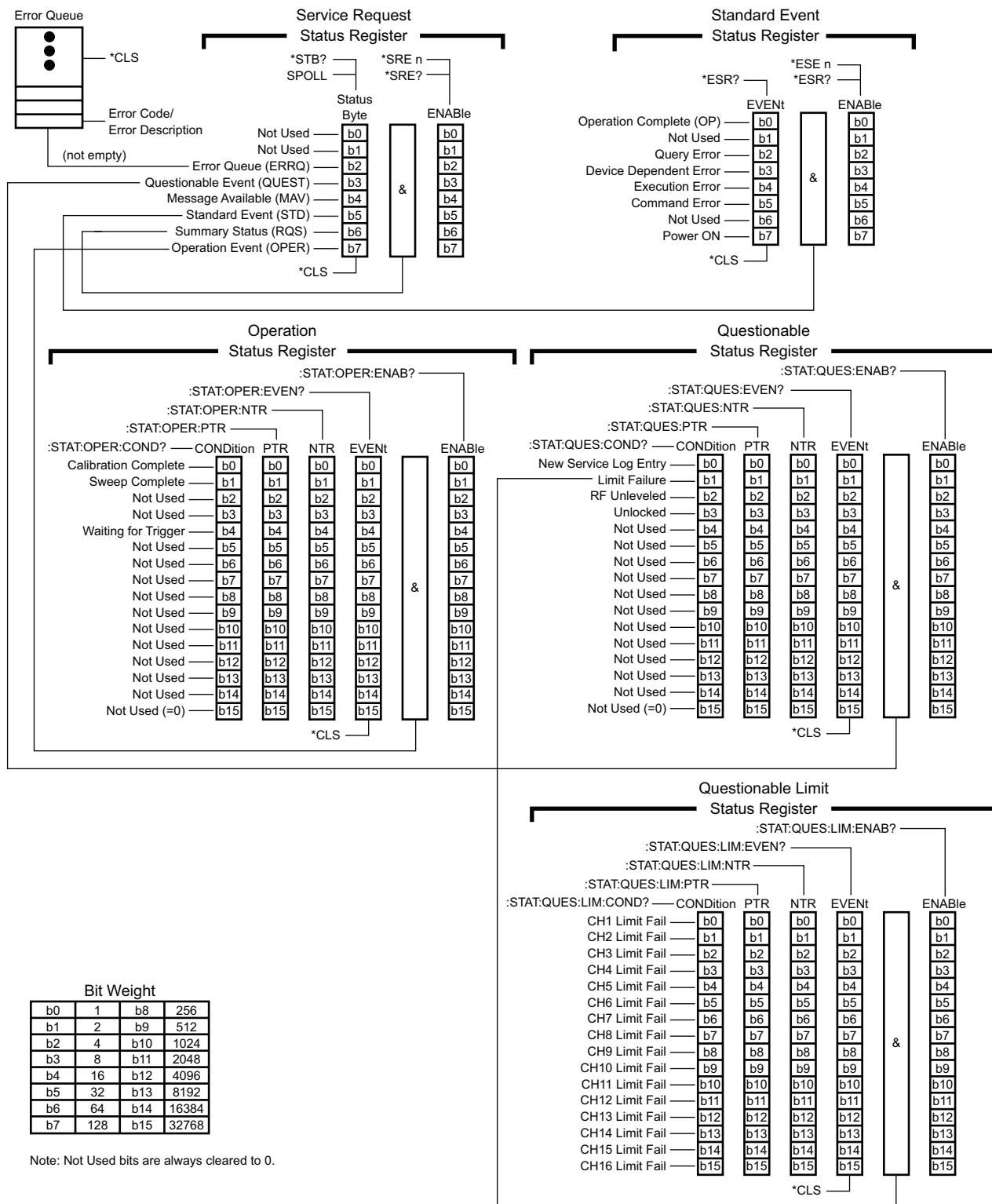


Figure 2-3. Status Register Structure

## 2-19 Trigger System

The VNA's trigger system is used to synchronize analyzer actions with software trigger commands. The VNA follows the layered trigger model used in SCPI instruments. The following paragraphs describe the operation of the analyzer's trigger system. A sample logic flowchart of the trigger model is shown in [Figure 2-4](#).

### Trigger Modes

The trigger system supports three trigger modes:

- **Internal Trigger Mode**

This is an automatic triggered point-by-point measurement that is internally controlled by the DSP software.

- **External Trigger Mode**

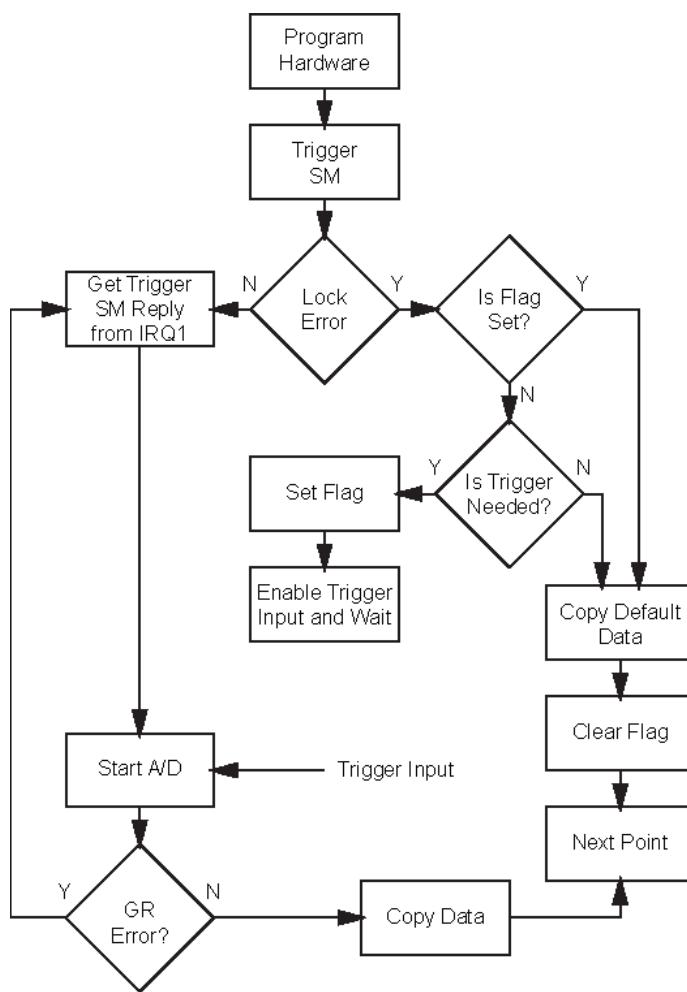
External mode is triggered through the rear panel input of the instrument to start a measurement based on a sweep-per-sweep trigger mode. External mode is triggered through a front or rear panel input depending on which ShockLine VNA model is used. Per sweep trigger mode is supported on all ShockLine models except for the MS46121B. Per point trigger mode is supported on the MS46131A, ME7868A, ME7869A, and MS4652xB only

**Note**

External trigger is not supported if there are multiple MS46131A units acting as Base units. This will happen if:

- The system is in parallel Return Loss sweep mode.
- The sync option (Option 012) is not enabled on one of the two MS46131A units in an ME7868A 2-port VNA.
- The sync option (Option 025, 050, 100) is not enabled on one of the two MS46131A units in an ME7869A 2-port VNA.
- There is no sync cable connected between MS46131A units in a 2-port ME786xA configuration.

The following diagram is a flowchart of the triggering logic:



**Figure 2-4.** Triggering Logic Flowchart

## 2-20 Calibration Component Parameters

Calibration component parameter values depend on the calibration kit used and the reset status of the instrument. [Table 2-14, “Loads and Through-Line Values](#), [Table 2-15, “Default Connector Coefficients](#), and [Table 2-16, “Connector Type Abbreviations and Descriptions” on page 2-36](#) summarize parameters related to calibration components, and list the factory default values for the various connector coefficients and lengths. These values may change if calibration kits are loaded that overwrite them.

A Factory Default using the :SYSTem:PRESet:ZERo command restores all connector values to those in the tables below. After restoration, a Factory Default also performs a Default Default (System Default not set to USER) that changes the connector type to the appropriate connector type based on the model number.

The following general calibration component parameters should also be noted:

- A Default Default (System Default not set to USER) will change the Microstrip Kit to 10 Mil.
- A Default Default (System Default not set to USER) will change the Waveguide Kit to WR10.

### Loads and Through Lines

Standard values for Loads and Through Lines are listed in the table below.

**Table 2-14.** Loads and Through-Line Values

Type	Parameter	Value	Units
Loads	Impedance	50	Ohms
	Resistance	50	Ohms
Through Lines	Impedance	50	Ohms
	Length	0	Meters
	Loss	0	dB
	Frequency	0	Hz

### Other Connector Coefficients

Default connector coefficients apply if not overwritten by the connector values loaded from a calibration kit. Load calibration kit coefficients for the best calibration results.

**Table 2-15.** Default Connector Coefficients (1 of 2)

Value	SMA (male)	SMA (female)	K (male)	K (female)	N (male)	N (female)	GPC3.5 (male)	GPC3.5 (female)
<b>OpenC0</b>	0	0	-1e-15	-1.5e-15	65e-15	-125e-15	0	0
<b>OpenC1</b>	0	0	650e-27	720e-27	0	0	0	0
<b>OpenC2</b>	0	0	-23e-36	-23e-36	0	0	0	0
<b>OpenC3</b>	0	0	0.35e-45	0.35e-45	6e-45	10e-45	0	0
<b>OpenOffsetLength</b>	0	0	5	5	20.37	8.97	0	0
<b>ShortL0</b>	0	0	0	0	0	0	0	0
<b>ShortL1</b>	0	0	0	0	0	0	0	0
<b>ShortL2</b>	0	0	0	0	0	0	0	0
<b>ShortL3</b>	0	0	0	0	0	0	0	0

**Table 2-15.** Default Connector Coefficients (2 of 2)

Value	SMA (male)	SMA (female)	K (male)	K (female)	N (male)	N (female)	GPC3.5 (male)	GPC3.5 (female)
ShortOffsetLength	0	0	5	5	20.37	8.97	0	0

## 2-21 Calibration Command Overview

This section provides an overview of the calibration commands and when they should be used.

### Setting Up a 2-Port Calibration

The commands listed in this section work on any two ports of the instrument. The FULL2 calibration is set up with the following calibration commands:

#### 1. Calibration method

```
:SENSe{1-16}:CORRection:COLLect:METHod
Available calibration methods: LRL | LRM | SOLR | SOLT | SSLT | SSST | TRX
```

#### 2. Calibration type

```
:SENSe{1-16}:CORRection:COLLect:1P2PF
:SENSe{1-16}:CORRection:COLLect:1P2PR
:SENSe{1-16}:CORRection:COLLect:FULL1
:SENSe{1-16}:CORRection:COLLect:FULL2
:SENSe{1-16}:CORRection:COLLect:FULLB
:SENSe{1-16}:CORRection:COLLect:RESP1
:SENSe{1-16}:CORRection:COLLect:RESPB
:SENSe{1-16}:CORRection:COLLect:TFRB
:SENSe{1-16}:CORRection:COLLect:TFRF
:SENSe{1-16}:CORRection:COLLect:TFRR
:SENSe{1-16}:CORRection:COLLect:TYPE?
```

#### 3. Line type

```
:SENSe{1-16}:CORRection:COLLect:LINE
Available line types: COAXial | NONDISpersive
```

#### 4. Load type

```
:SENSe{1-16}:CORRection:COLLect:LOAD
Available load types: FIXED | SLIDING
:SENSe{1-16}:CORRection:COLLect:PORT{1-2}:LOAD:SElect
Available loads: LOAD1 | LOAD2
```

#### 5. Calibration port

```
:SENSe{1-16}:CORRection:COLLect:PORT
Available calibration ports: PORT1 | PORT2 | PORTP12
```

## Setting Up a 4-Port Calibration

4-port calibrations are more complex and are hence divided into six broad categories:

- “Reflection Response Calibration”
- “Full 1-Port Calibration”
- “Transmission Response Calibration”
- “Full 2-Port Calibration”
- “Full 3-Port Calibration”
- “Full 4-Port Calibration”

### Reflection Response Calibration

Under the reflection response calibration type, one can specify up to four individual 1-port response calibrations to be performed using the following command:

```
:SENSe{1-16}:CORRection:COLLect:PORT {1 | 2 | 3 | 4 | 12 | 13 | 14 | 23 | 24 |
34 | 123 | 124 | 134 | 234 | 1234}:RESP1
```

For instance, to perform a reflection response calibration on ports 2, 3, and 4, the command is:

```
:SENS1:CORR:COLL:PORT234:RESP1
```

The following command is used to define the components used in the reflection calibration:

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:REFlection:COMPonent
```

Available reflection components are: NONE | OPEN | SHORt | OFSH1 | OFSH2 | OFSH3

### Full 1-Port Calibration

With a Full 1-Port Calibration, one can specify up to four individual 1-port calibrations to be performed using the following command:

```
:SENSe{1-16}:CORRection:COLLect:PORT {1 | 2 | 3 | 4 | 12 | 13 | 14 | 23 | 24 |
34 | 123 | 124 | 134 | 234 | 1234}:FULL1
```

For instance, to perform a full 1-port calibration on ports 2, 3, and 4, the command is:

```
:SENS1:CORR:COLL:PORT234:FULL1
```

### Transmission Response Calibration

Under the Transmission Response Calibration, one can specify up to six 2-port combinations (12 | 13 | 14 | 23 | 24 | 34) using three response methods that are stored in a list:

TFRF: transmission frequency response, forward

TFRR: transmission frequency response, reverse

TFRB: transmission frequency response, both

First clear the list using:

```
:SENSe{1-16}:CORRection:COLLect:TFR:CLEAR
```

Next, use a combination of the following three commands:

```
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 | 34}:TFRB
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 | 34}:TFRF
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 | 34}:TFRR
```

For instance, to specify a forward response calibration on port12, a reverse response calibration on port13, and both forward and reverse calibrations on port14, the commands are:

```
:SENS1:CORR:COLL:TFR:CLE
:SENS1:CORR:COLL:PORT12:TFRF
:SENS1:CORR:COLL:PORT13:TFRR
:SENS1:CORR:COLL:PORT14:TFRB
```

### Full 2-Port Calibration

With a Full 2-Port Calibration, one can specify two, 2-port calibrations to be performed with six 2-port combinations:

```
12 | 13 | 14 | 23 | 24 | 34
```

The port pairs selected must be port exclusive. For instance, if the first calibration is on port23, then the second, if specified, must be on port14. There are three calibration types that can be specified

```
FULL2 | 1P2PF | 1P2PR
```

This is accomplished using one of the commands for the first calibration:

```
:SENSe{1-16}:CORRection:COLLect[:CALa]:PORT{12 | 13 | 14 | 23 | 24 | 34}:1P2PF
:SENSe{1-16}:CORRection:COLLect[:CALa]:PORT{12 | 13 | 14 | 23 | 24 | 34}:1P2PR
:SENSe{1-16}:CORRection:COLLect[:CALa]:PORT{12 | 13 | 14 | 23 | 24 | 34}:FULL2
```

And one of the following commands for the second calibration:

```
:SENSe{1-16}:CORRection:COLLect:CALB:1P2PF
:SENSe{1-16}:CORRection:COLLect:CALB:1P2PR
:SENSe{1-16}:CORRection:COLLect:CALB:FULL2
```

For instance, the commands below specify a Full, 2-Port Calibration on port12 and use a one path, 2-Port Forward Calibration as the second calibration:

```
:SENS1:CORR:COLL:PORT12:FULL2
:SENS1:CORR:COLL:CALB:1P2PF
```

### Full 3-Port Calibration

With a Full 3-Port Calibration, one can specify a 3-port calibration to be performed on the indicated ports with the following command:

```
:SENSe{1-16}:CORRection:COLLect:PORT{123 | 124 | 134 | 234}:FULL3
```

In addition to selecting the above ports, two or three thru lines must be measured using the commands:

```
:SENSe{1-16}:CORRection:COLLect:THRu:CLEar
:SENSe{1-16}:CORRection:COLLect:THRu:ADD
```

The arguments of the above commands are:

```
THRu12 | THRu13 | THRu14 | THRu23 | THRu24 | THRu34
```

For example, to perform a Full, 3-Port Calibration on ports 1, 3, and 4 with thru lines on port pairs 13, 14, and 34, send the following commands:

```
:SENS1:CORR:COLL:PORT134:FULL3
:SENS1:CORR:COLL:THR:CLE
:SENS1:CORR:COLL:THR:ADD THR13
:SENS1:CORR:COLL:THR:ADD THR14
:SENS1:CORR:COLL:THR:ADD THR34
```

## Full 4-Port Calibration

With a Full 4-Port Calibration type, one can specify a 4-port calibration to be performed on all four ports with the following command:

```
:SENSe{1-16}:CORRection:COLLect:FULL4
```

In addition, three to six thru lines must be measured using the commands below

```
:SENSe{1-16}:CORRection:COLLect:THRu:CLEAR
```

```
:SENSe{1-16}:CORRection:COLLect:THRu:ADD
```

Available throughs are:

```
THR12 | THR13 | THR14 | THR23 | THR24 | THR34
```

For example, to perform a Full, 4-Port Calibration with thru lines on port pairs 12, 13, 14, and 24, send the following commands:

```
:SENS1:CORR:COLL:FULL4  
:SENS1:CORR:COLL:THR:CLEAR  
:SENS1:CORR:COLL:THR:ADD THR12  
:SENS1:CORR:COLL:THR:ADD THR13  
:SENS1:CORR:COLL:THR:ADD THR14  
:SENS1:CORR:COLL:THR:ADD THR24
```

## Defining the Calibration Standards

The following command sets the connector type:

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:CONNector
```

Port 3 and 4 can only be used with a 4-port VNA.

The connector types are as follows (the second letter is the gender: F for female, M for male, N for no gender):

**Table 2-16.** Connector Type Abbreviations and Descriptions

Connector Type	Connector Description
CF1, CM1	W1
CF2, CM2	2.4 mm
CF3, CM3	3.5 mm
CF716, CM716	7/16
CFC, CMC	TNC
CFK, CMK	K
CFKT	K (female) TOSLKF Cal Kit
CFNT	N (female) TOSLNF Cal Kit
CMKT	K (male) TOSLK Cal Kit
CMNT	N (male) TOSLN Cal Kit
CFN, CMN	N
CFN75, CMN75	N 75 ohm
CFS, CMS	SMA
CFV, CMV	V
CNG	GPC7 (no gender)
CFU1, CMU1; CFU2, CMU2; CFU3, CMU3; ...CFU32, CMU32	User Defined 1; User Defined 2; User Defined 3; ...User Defined 32

Use the following command to load a calibration kit file with its path and name as string data:

```
:MMEMory:LOAD:CKIT
```

The many calibration standard types are divided into four categories of **OPEN**, **SHORT**, **LOAD**, and **THRU** (or **THROUGH**) as described in the following sections.

## OPEN

An OPEN standard has the following parameters that define its electrical behavior:

- C0, C1, C2 and C3 are power series coefficients used to calculate capacitance as follows:

$$C = C_0 + C_1 \cdot f + C_2 \cdot f^2 + C_3 \cdot f^3$$

These coefficients are often displayed in scientific notation as shown below:

$$C_0 = \text{number} \times 10^{E-15}$$

$$C_1 = \text{number} \times 10^{E-27}$$

$$C_2 = \text{number} \times 10^{E-36}$$

$$C_3 = \text{number} \times 10^{E-45}$$

If one enters a number for Cx whose magnitude is > 10E-5, then it is assumed that the number must be multiplied by the appropriate power of 10 shown above to determine the coefficient. Otherwise, the coefficient value is taken as is.

- OFFSET is the offset length of the load expressed in meters

**Note**

The parameters of the predefined types cannot be changed. Only the parameters of the User Defined types can be changed.

The following commands are used to change the OPEN standard parameters:

```
:SENSe{1-16}:CORRection:COLLect:PORT12:OPEN:C0
:SENSe{1-16}:CORRection:COLLect:PORT12:OPEN:C1
:SENSe{1-16}:CORRection:COLLect:PORT12:OPEN:C2
:SENSe{1-16}:CORRection:COLLect:PORT12:OPEN:C3
:SENSe{1-16}:CORRection:COLLect:PORT12:OPEN:LABEL
:SENSe{1-16}:CORRection:COLLect:PORT12:OPEN:OFFS
:SENSe{1-16}:CORRection:COLLect:PORT12:OPEN:SERIAL
```

## SHORT

A SHORT standard has the following parameters that define its electrical behavior:

L0, L1, L2 and L3 are power series coefficients used to calculate inductance as follows:

$$L = L_0 + L_1 \cdot f + L_2 \cdot f^2 + L_3 \cdot f^3$$

These coefficients are often displayed in scientific notation as shown below:

$$L_0 = \text{number} \times 10^{E-12}$$

$$L_1 = \text{number} \times 10^{E-24}$$

$$L_2 = \text{number} \times 10^{E-33}$$

$$L_3 = \text{number} \times 10^{E-42}$$

If one enters a number for Lx whose magnitude is > 10E-5, then it is assumed that the number must be multiplied by the appropriate power of 10 shown above to determine the coefficient. Otherwise, the coefficient value is taken as is.

- OFFSET is the offset length of the load expressed in meters

The following commands are used to change the SHORT standard parameters:

```
:SENSe{1-16}:CORRection:COLLect:PORT12:SHORT:L0
:SENSe{1-16}:CORRection:COLLect:PORT12:SHORT:L1
:SENSe{1-16}:CORRection:COLLect:PORT12:SHORT:L2
:SENSe{1-16}:CORRection:COLLect:PORT12:SHORT:L3
:SENSe{1-16}:CORRection:COLLect:PORT12:SHORT:LABEL
:SENSe{1-16}:CORRection:COLLect:PORT12:SHORT:OFFS
:SENSe{1-16}:CORRection:COLLect:PORT12:SHORT:SERIAL
```

## LOAD

A LOAD standard has the following parameters that define its electrical behavior:

- C0 is a capacitance term
- LO, L1, L2, L3 are power series coefficients used to calculate inductance as follows:  

$$L = L0 + L1*f + L2*f^2 + L3*f^3$$
- R is the resistance of the load
- Z0 is the characteristic impedance
- OFFSET is the offset length of the load expressed in meters

Most calibration kits have two loads; therefore, they are differentiated by naming them LOAD1 and LOAD2.

Use the following commands to modify the LOAD parameters:

```
:SENSe{1-16}:CORRection:COLLect:PORT12:LOAD1:C0
:SENSe{1-16}:CORRection:COLLect:PORT12:LOAD1:L0
:SENSe{1-16}:CORRection:COLLect:PORT12:LOAD1:L1
:SENSe{1-16}:CORRection:COLLect:PORT12:LOAD1:L2
:SENSe{1-16}:CORRection:COLLect:PORT12:LOAD1:L3
:SENSe{1-16}:CORRection:COLLect:PORT12:LOAD1:OFFS
:SENSe{1-16}:CORRection:COLLect:PORT12:LOAD1:R
:SENSe{1-16}:CORRection:COLLect:PORT12:LOAD1:Z0
:SENSe{1-16}:CORRection:COLLect:PORT12:LOAD1:LABEL
:SENSe{1-16}:CORRection:COLLect:PORT12:LOAD1:SERIAL
:SENSe{1-16}:CORRection:COLLect:PORT12:LOAD2:C0
:SENSe{1-16}:CORRection:COLLect:PORT12:LOAD2:L0
:SENSe{1-16}:CORRection:COLLect:PORT12:LOAD2:L1
:SENSe{1-16}:CORRection:COLLect:PORT12:LOAD2:L2
:SENSe{1-16}:CORRection:COLLect:PORT12:LOAD2:L3
:SENSe{1-16}:CORRection:COLLect:PORT12:LOAD2:OFFS
:SENSe{1-16}:CORRection:COLLect:PORT12:LOAD2:R
:SENSe{1-16}:CORRection:COLLect:PORT12:LOAD2:Z0
:SENSe{1-16}:CORRection:COLLect:PORT12:LOAD2:LABEL
:SENSe{1-16}:CORRection:COLLect:PORT12:LOAD2:SERIAL
```

## THRU (or THROUGH)

A THRU (technically a “through”) standard has the following parameters that define its electrical behavior:

- LENGTH is the length of the line
- LOSS is the loss of the line
- FREQUENCY is the frequency at which the loss was measured
- Z0 is the Characteristic impedance
- USERECIPROCAL is not an electrical parameter. It is a flag to notify the calibrator that it should use a reciprocal type of calculation.

For 2-port VNAs, use the following commands to modify the THRU parameters:

```
:SENSe{1-16}:CORRection:COLLect:PORT12:THRU:FREQuency
:SENSe{1-16}:CORRection:COLLect:PORT12:THRU:LENGTH
:SENSe{1-16}:CORRection:COLLect:PORT12:THRU:LOSS
:SENSe{1-16}:CORRection:COLLect:PORT12:THRU:Z0
:SENSe{1-16}:CORRection:COLLect:PORT12:THRU:RECIProcal
:SENSe{1-16}:CORRection:COLLect:PORT12:THRU:LABEL
:SENSe{1-16}:CORRection:COLLect:PORT12:THRU:SERIAL
```

For 4-port VNAs, use the following commands to modify the THRU parameters:

```
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 | 34}:THRU:FREQuency
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 | 34}:THRU:LENGTH
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 | 34}:THRU:LOSS
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 | 34}:THRU:Z0
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 | 34}:THRU:RECIProcal
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 | 34}:THRU:LABEL
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 | 34}:THRU:SERIAL
```

## Performing the Calibration

After completion of the THRU parameters calibration, the actual measurements for the calibration type and methods can be performed. Each calibration type and method requires measuring the appropriate standards using the commands listed below.

2-Port Measurements:

```
:SENSe{1-16}:CORRection:COLLect:PORT12:LOAD
:SENSe{1-16}:CORRection:COLLect:PORT12:OPEN
:SENSe{1-16}:CORRection:COLLect:PORT12:SHORT
:SENSe{1-16}:CORRection:COLLect:PORT12:SLOAD1
:SENSe{1-16}:CORRection:COLLect:PORT12:SLOAD2
:SENSe{1-16}:CORRection:COLLect:PORT12:SLOAD3
:SENSe{1-16}:CORRection:COLLect:PORT12:SLOAD4
:SENSe{1-16}:CORRection:COLLect:PORT12:SLOAD5
:SENSe{1-16}:CORRection:COLLect:PORT12:SLOAD6
```

## 2-Port Isolation and Thru:

```
:SENSe{1-16}:CORRection:COLLect:PORT12:ISOL
:SENSe{1-16}:CORRection:COLLect:PORT12:THRU
```

## 4-Port Measurements:

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:OPEN
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT1
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT2
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT3
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SLOAD1
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SLOAD2
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SLOAD3
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SLOAD4
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SLOAD5
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SLOAD6
```

## 4-Port Isolation and Thru:

```
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 | 34}:ISOL
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 | 34}:THRU
```

## 2- and 4-Port Thru Update:

```
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 | 34}:THRu:UPDAtE
```

Once the measurements are complete, the correction coefficients must be calculated and the calibration corrections must be applied (turned on):

```
:SENSe{1-16}:CORRection:COLLect:SAVE
:SENSe{1-16}:CORRection:ISOLation:STATE
:SENSe{1-16}:CORRection:STATE
```

To simulate a calibration, use one of the commands below to specify the calibration type:

```
:SENSe{1-16}:CORRection:COEFFicient:1P2PF
:SENSe{1-16}:CORRection:COEFFicient:1P2PR
:SENSe{1-16}:CORRection:COEFFicient:FULL1
:SENSe{1-16}:CORRection:COEFFicient:FULL2
:SENSe{1-16}:CORRection:COEFFicient:FULLB
:SENSe{1-16}:CORRection:COEFFicient:RESP1
:SENSe{1-16}:CORRection:COEFFicient:RESPB
:SENSe{1-16}:CORRection:COEFFicient:TFRB
:SENSe{1-16}:CORRection:COEFFicient:TFRF
:SENSe{1-16}:CORRection:COEFFicient:TFRR
```

The following command inputs and outputs the specified correction coefficients:

```
:SENSe{1-16}:CORRection:COEFFicient
```

The correction coefficients must be specified using one of the character data arguments below:

- 2-port only:

ED1 | EP1S | ET11 | ET21 | EP2L | EX21 | ED2 | EP2S | ET22 | ET12 | EP1L | EX1

- 4-port only:

ED3 | ET31 | ET32 | ET13 | ET23 | ET33 | EP3L | EP3S | EX31 | EX32 | EX13 | EX23

| ED4 | ET14 | ET41 | ET24 | ET42 | ET34 | ET43 | ET44 | EP4L | EP4S | EX14 |

EX24 | EX34 | EX41 | EX42 | EX43

## AutoCal/SmartCal

**Note** AutoCal™ is not available with Option 082.

The AutoCal or SmartCal calibration method (calibration using a compatible Precision Automatic Calibrator module) must first be specified using the command below:

```
:SENSe{1-16}:CORRection:COLLect:METHod
```

Then the calibration type is selected using the commands described above in [“Setting Up a 2-Port Calibration” on page 2-32](#).

The 2-port VNA calibration types supported are FULL1 and FULL2.

With a 4-port test set, the calibration types supported are FULL1, FULL2, and FULL4

**Note** Multiple calibrations are not supported with AutoCal or SmartCal.

Use the commands described above to set the desired calibration type. The exception to this is the FULL4 calibration. For a FULL4 calibration use the calibration type command:

```
:SENSe{1-16}:CORRection:COLLect:ECAL:PORT{12 | 13 | 14 | 23 | 24 | 34}:FULL4
```

The FULL4 calibration is achieved by performing two FULL2 calibrations on independent port pairs. One to four thru lines must also be measured using the commands listed above in [“Full 3-Port Calibration” on page 2-34](#).

The following command sets the AutoCal box orientation manually:

```
:SENSe{1-16}:CORRection:COLLect:ECAL:ORIentation
```

This command inputs a list of up to four comma-separated items:

```
L1 | L2 | L3 | L4 | R1 | R2 | R3 | R4 | L1R2 | L1R3 | L1R4 | L2R3 | L2R4 | L3R4 |
R1L2 | R1L3 | R1L4 | R2L3 | R2L4 | R3L4 | R2L1 | R3L1 | R4L1 | R3L2 | R4L2 | R4L3
| L2R1 | L3R1 | L4R1 | L3R2 | L4R2 | L4R3
```

The following command specifies substituting a true thru line instead of using the thru provided in the AutoCal box.

```
:SENSe{1-16}:CORRection:COLLect:ECAL[:CALa]:TRUEthru
```

The command's input argument list consists of comma separated data with alternating port selections and on/off flags. For instance, if AutoCals are being performed on Ports 1 and 3 and Ports 2 and 4 with true thrus on the Ports 2 and 4 calibration, then the command is:

```
:SENS1:CORR:COLL:ECAL:TRUE PORT13,OFF,PORT24,ON
```

Automatic detection of the AutoCal module orientation is available with the following command only with 2-port configurations, but is not offered when a 4-port test set is connected:

```
:SENSe{1-16}:CORRection:COLLect:ECAL:AUTOmatic:ORIentation[:STATE]
```

Once the AutoCal setup is complete, the following command starts the calibration:

```
:SENSe{1-16}:CORRection:COLLect:ECAL:BEGin?
```

The AutoCal calibration may require interaction with a user to perform some mechanical setup steps such as reversing the AutoCal box, connecting the AutoCal box to different port(s), or connecting external thru lines. As each step is completed, send the following command to instruct the VNA to continue with the measurements:

```
:SENSe{1-16}:CORRection:COLLect:ECAL:CONTinue?
```

The following command outputs a copy of the AutoCal messages list:

```
:SENSe{1-16}:CORRection:COLLect:ECAL:MSGs:LIST?
```

This command outputs a list of up to four comma-separated items from the following list:

The following is a list of AutoCal return codes:

**Table 2-17.** AutoCal Module Return Code Definitions (1 of 2)

Return Code	Code Description
0	Assurance: Assurance passed for AutoCal Modules that have an assurance step. AutoCal complete for AutoCal Modules that have no assurance step.
1	Update: AutoCal complete for AutoCal Modules that have no assurance step.
2	True Thru: Connect through line.
3	Adapter: Reverse AutoCal module connection for Adapter Removal
4	NoModule: AutoCal module not found.
5	NoOrient: AutoCal module orientation not detected.
6	NoFile: AutoCal Characterization file not found.
7	NoMatch: AutoCal Characterization file and module mismatch. Check AutoCal serial number match to AutoCal Characterization file name.
8	No12T: Characterization function needs Full 2-Port (12-Term) calibration. Full 2-Port calibration not found.
9	NotAllowed: AutoCal automatic orientation not available on Lightning modules. Orientation must be manually specified.
10	OutOfRange: Frequencies are out of AutoCal module range.
11	AssuranceFailed: Assurance failed for AutoCal modules that have an assurance step. Not applicable for AutoCal Modules that do not have an assurance step
12	Aborted: AutoCal calibration or Characterization aborted, typically by user.
13	AbortOK: Abort operation concluded successfully.
14	AbortNotOK: Abort operation not concluded successfully.
15	ACError: AutoCal unspecified error.
16	ACFatalError: AutoCal unspecified fatal error.
17	DoneCalculateCoeff: AutoCal module has completed calculating required coefficients.
18	ACConnectCalB
19	CharacBad: Characterization is bad.
20	DisplayMessage
21	ConnectToPort1: Connect AutoCal module to Port 1.
22	ConnectToPort2: Connect AutoCal module to Port 2.
23	ConnectToPort3: Connect AutoCal module to Port 3. Requires 4-Port VNA.
24	ConnectToPort4: Connect AutoCal module to Port 4. Requires 4-Port VNA.
25	ConnectToPorts12: Connect AutoCal module to Ports 1 and 2.
26	ConnectToPorts13: Connect AutoCal module to Ports 1 and 3. Requires a 4-Port VNA.
27	ConnectToPorts14: Connect AutoCal module to Ports 1 and 4. Requires a 4-Port VNA.
28	ConnectToPorts23: Connect AutoCal module to Ports 2 and 3. Requires a 4-Port VNA.
29	ConnectToPorts24: Connect AutoCal box to Ports 2 and 4. Requires a 4-Port VNA.
30	ConnectToPorts34: Connect AutoCal module to Ports 3 and 4. Requires a 4-Port VNA.

**Table 2-17.** AutoCal Module Return Code Definitions (2 of 2)

Return Code	Code Description
31	ConnectThrubwPorts12: Connect Thru line to Ports 1 and 2.
32	ConnectThrubwPorts13: Connect Thru line to Ports 1 and 3. Requires a 4-Port VNA.
33	ConnectThrubwPorts14: Connect Thru line to Ports 1 and 4. Requires a 4-Port VNA.
34	ConnectThrubwPorts23: Connect Thru line to Ports 2 and 3. Requires a 4-Port VNA.
35	ConnectThrubwPorts24: Connect Thru line to Ports 2 and 4. Requires a 4-Port VNA.
36	ConnectThrubwPorts34: Connect Thru line to Ports 3 and 4. Requires a 4-Port VNA.

All ShockLine-compatible AutoCal modules support an assurance step.

## LRL Calibration

The LRL calibration method must first be specified using the command below:

```
:SENSe{1-16}:CORRection:COLLect:METHod LRL
```

### FULL3 LRL Calibration

The FULL3 LRL calibration is accomplished by performing two, FULL2 calibrations having a common port. The following command sets the calibration type to a full 3-port LRL calibration for the indicated channel:

```
:SENSe{1-16}:CORRection:COLLect:LRL:PORT{13|14|23|24|34}:FULL3
```

The port selection for the CALA calibration is limited to the ports shown below. The command's argument must complement that of the port selection for the CALB calibration. The port selections available for the CALB calibration are limited based on the port selection made in the CALA calibration as follows:

CALA Port Selection		CALB Port Choices
PORt13 or PORT24	<----->	PORt14 or PORT23
PORt14 or PORT23	<----->	PORt13 or PORT24

**Caution** If the rules above for the CALB calibration port pair is violated, the FULL3 command will fail.

### FULL4 LRL Calibration

The FULL4 LRL calibration is accomplished by performing two, FULL2 calibrations on independent port pairs. The following command sets the calibration type to a Full 4-Port LRL Calibration for the indicated channel:

```
:SENSe{1-16}:CORRection:COLLect:LRL:PORT{12|13|14|23|24|34}:FULL4
```

In addition, one to four thru lines must be measured using the commands listed below:

```
:SENSe{1-16}:CORRection:COLLect:THRu:CLEar
```

```
:SENSe{1-16}:CORRection:COLLect:THRu:ADD
```

Available throughs are:

```
THRu12 | THRu13 | THRu14 | THRu23 | THRu24 | THRu34
```

### Setting Up the Device Parameters

The following three commands provide support for ShockLine software and are used to set up the frequency, line length, and loss values:

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{1-10}:LINE:FREQuency
```

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{1-10}:LINE:LENGth
```

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{1-10}:LINE:LOSS
```

The following commands provide support for ShockLine software. Omitting the optional [:CALa] keyword in these commands provides support for 2-port instruments:

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:BAND{1-5}
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:BAND:COUNT
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEvice{1-10}:PORT12:MATCH:C0
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEvice{1-10}:PORT12:MATCH:L0
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEvice{1-10}:PORT12:MATCH:OFFS
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEvice{1-10}:PORT12:MATCH:R
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEvice{1-10}:PORT12:MATCH:Z0
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEvice{1-10}:TYPE
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:FREQuency:BREAKpoint
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:OPEN:OFFS
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:REFPlane
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:SHORT:OFFS
```

The following commands are used for the corresponding CALB parameters:

```
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:BAND{1-5}:REFlection:TYPE
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:BAND:COUNT
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEvice{1-10}:LINE:FREQuency
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEvice{1-10}:LINE:LENGTH
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEvice{1-10}:LINE:LOSS
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEvice{2 | 4 | 6 | 8 | 10}:PORT{1-4}
:MATCH:C0
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEvice{2 | 4 | 6 | 8 | 10}:PORT{1-4}
:MATCH:L0
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEvice{2 | 4 | 6 | 8 | 10}:PORT{1-4}
:MATCH:OFFS
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEvice{2 | 4 | 6 | 8 | 10}:PORT{1-4}
:MATCH:R
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEvice{2 | 4 | 6 | 8 | 10}:PORT{1-4}
:MATCH:Z0
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEvice{1-10}:TYPE
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:FREQuency:BREAKpoint
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:OPEN:OFFS
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:REFPlane
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:SHORT:OFFS
```

The following command defines which match corresponds to which port:

```
:SENSe{1-16}:CORRection:COLLect:LRL:DEvice{1-10}:MATCH:PORT
```

The following commands collect LRL calibration data:

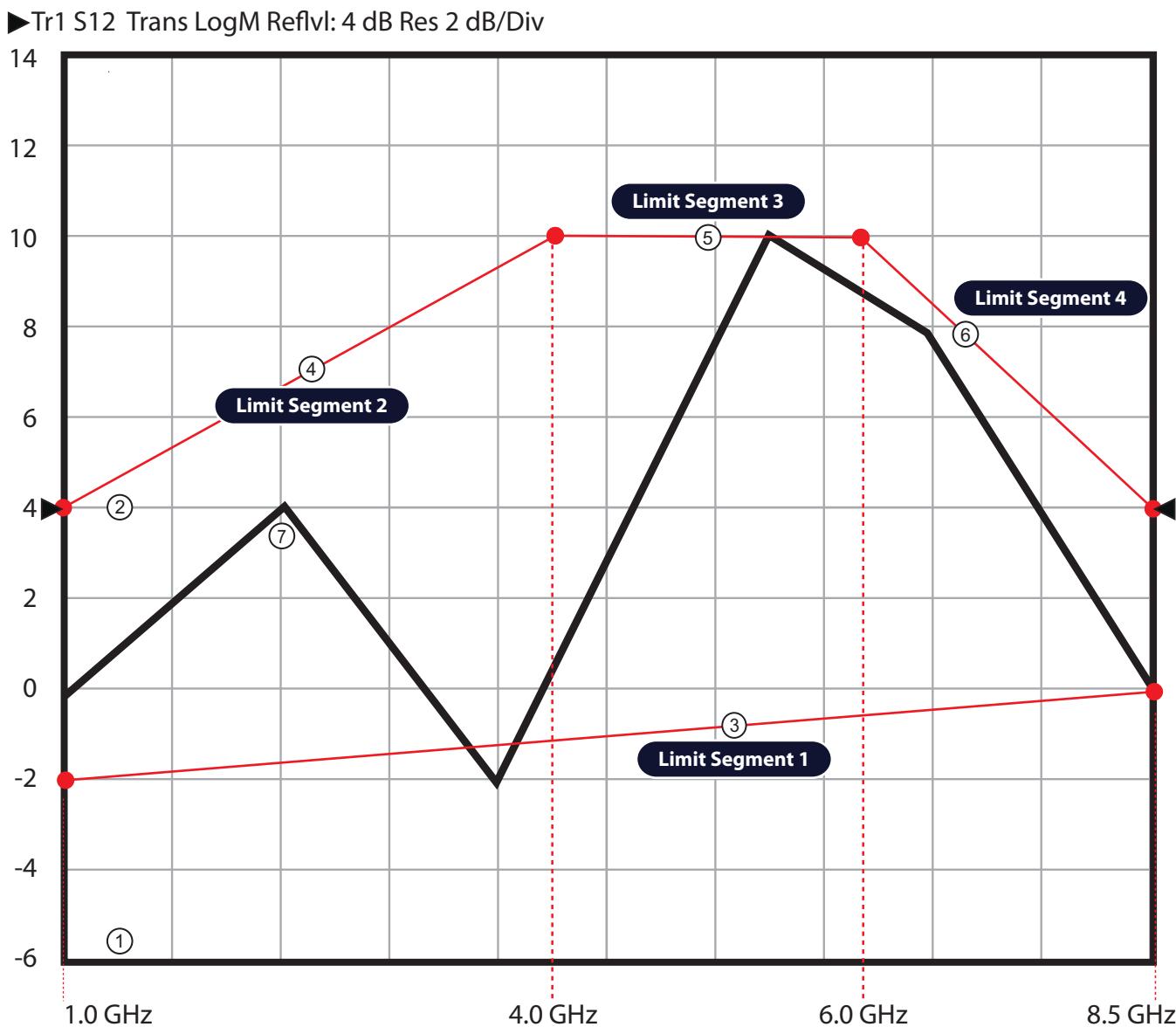
```
:SENSe{1-16}:CORRection:COLLect:LRL:DEvice{1-10}:PORT12:MATCH
:SENSe{1-16}:CORRection:COLLect:LRL:DEvice{1-10}:PORT12:LINE
```

## 2-22 Command Script Example – Limit Lines

This script example provides the basic procedure for establishing upper and lower limit lines for a trace.

### Limit Lines for Single Rectilinear Trace Display

The requirements for this limit line example are shown in the figure below where one lower limit has been established with three upper limits.



- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. Representative trace display for frequency from 1 GHz to 8.5 GHz, and levels from -6 to +14 dB.</li> <li>2. Log Magnitude trace display measuring S12, with:           <ul style="list-style-type: none"> <li>• Resolution set at 2 dB per division.</li> <li>• Reference value set at 2 dB.</li> <li>• Reference position set at 5.</li> </ul> </li> <li>3. Limit Segment 1 – A lower limit line from 1 GHz at -2 dB to 8.5 GHz at 0 dB.</li> </ol> | <ol style="list-style-type: none"> <li>4. Limit Segment 2 – An upper limit line from 1 GHz at 4 dB to 4.0 GHz at 10 dB.</li> <li>5. Limit Segment 3 – An upper limit line from 4.0 GHz at 10 dB to 6.0 GHz at 10 dB.</li> <li>6. Limit Segment 4 – An upper limit line from 6.0 GHz at 10 dB to 8.5 GHz at 4.0 dB.</li> <li>7. Typical signal trace for this DUT.</li> </ol> |
|--|--|

**Figure 2-5.** Limit Line Concept and Example

## Required Equipment for This Example

**Note**

Other ShockLine VNAs may use the same example command syntax shown in this example, as long as appropriate frequencies are used.

(This example is written for a VNA that goes to 8.5 GHz. The 122B and 322B do not go to 8.5 GHz with the -010 option. They only go to 8 GHz, so they do not fit this example).

- ShockLine MS46522B VNA, N Connectors, 50 kHz to 8.5 GHz
- ShockLine MS46524B VNA, N Connectors, 50 kHz to 8.5 GHz
- ShockLine MS46322A Series VNA

## Prerequisites

- The VNA has warmed up for at least 90 minutes.
- The calibration kit characterization file has been installed on the VNA.

## DUT Requirements

The DUT measurements require the following parameters:

- S-Parameter Required: S12
- Frequency Range: 1 GHz to 8.5 GHz
- Segment 1: Lower Limit, -2 dB at 1 GHz to 0 dB at 8.5 GHz
- Segment 2: First Upper Limit, 4 dB at 1 GHz to 10 dB at 4 GHz
- Segment 3: Second Upper Limit, 10 dB at 4 GHz to 10 dB at 6 GHz
- Segment 4: Third Upper Limit, 10 dB at 6 GHz to 4 dB at 8.5 GHz

## Channel and Trace Display Requirements

The following VNA setup parameters are required:

- Traces: 1
- Trace Display Type: Log Magnitude
- Trace Scale Resolution: 2 dB/Division
- Trace Scale Reference Value: 4 dB
- Trace Scale Reference Position: 5 (Positions the reference value above at the fifth gridline from the display counting from the display bottom.)

## VNA General Setup and Configuration

Throughout the script examples, long form commands are used for clarity. The command explanation follows the command. In this section, the VNA is cleared and per-instrument settings established. Optional commands or queries are noted and are presented for clarity.

```
:SYSTem:ERRor:CLEar
```

Clears the system error queue.

```
:DISPlay:COLor:RESet
```

Resets all colors to normal factory default value. This returns the channel, channel background, trace, limit line, and graticule colors to their default values.

```
:DISPlay:COUNt 1
```

Sets one (1) channel.

- If the channel display is set to a non-listed number (5, 7, 11, 13, 14, 15), the instrument is set to the next higher channel number.

```
:CALCulate1:PARameter:COUNt 1
```

Sets the number of traces as 1 on Channel 1.

```
:DISPlay:WINDOW1:SPLit R1C1
```

Sets the channel display layout in a Row-by-Column format where channel window display is set to one channel on one row and one column. This is the same as maximizing a multi-channel display.

```
:DISPlay:WINDOW1:ACTivate 1
```

Sets the active channel

```
:DISPlay:SIZE MAXimum
```

Closes the right-side menu and sets the maximum size of the graticule display.

```
:CALCulate1:PARameter1:DEFine S12
```

Sets the measurement parameter as S12 for Trace 1.

```
:CALCulate1:PARameter1:FORMAT MLOGarithmic
```

Selects the display format as Log Magnitude (MLOGarithmic) for Trace 1 on Channel 1.

## Frequency and Sweep Settings

In this section, the required frequency and sweep settings are established.

Examples:

```
:SENSe1:FREQuency:STARt 1.0E9
    Sets channel 1 start frequency to 1 GHz.

:SENSe1:FREQuency:STOP 8.5E9
    Sets channel 1 stop frequency to 8.5 GHz.

:SENSe1:FREQuency:SPAN?
    Optional query. Span is automatically calculated as Stop Frequency minus Start Frequency. The query returns the resulting span in Hertz.

7.5e9
    Frequency span is 7.5 GHz.

:SENSe1:FREQuency:CENTER?
    Optional query. Center frequency is automatically calculated using Stop Frequency and Start Frequency as:
     $F_c = ((F_{stop} - F_{start})/2) + F_{start}$ 

4.75 GHz
    Center frequency is 4.75 GHz

:SENSe1:SWEep:TYPE LINear
    Sets the sweep for Channel 1 as Frequency-Based Linear.

:SENSe1:SWEep:POINT 401
    Sets the number of measurement points for Channel 1 to 401 points.
    • The minimum number of points is 2.
    • The maximum number of points is limited to the total point instrument mode as 20,001.
```

## Limit Lines Setup

There are several ways to programmatically add limit lines to a trace display. The technique below uses the :CALCulate{1-16}:SELected:LIMit command subsystem in the following general procedure:

1. Create an empty limit line segment by using the :ADD command to create a blank limit.
  - Note that each :ADD command must be followed by the :TYPE and :X1, :X2, :Y1, and :Y2 commands.
  - The first :ADD command creates a limit line that uses the entire frequency range of the instrument.
  - If the :TYPE and :X1, :X2, :Y1, and :Y2 values are not changed, no further limit line segments can be added.
2. Use the :TYPE command to define the segment as a lower or upper limit.
3. Use the :X1 and :X2 commands to configure the horizontal X-Axis start and stop points for each limit segment. In this example, the start and stop values are frequency in GHz.
4. Use the :Y1 and :Y2 commands to configure the vertical Y-Axis start and stop points for each limit segment. In this example, the start and stop values are in dB.
5. The :TYPE and :X1, :X2, :Y1, and :Y2 commands can be issued in any sequence for the segment being defined.

## Clear Previous Limit Lines

Best practices recommend clearing all previous segments.

```
:CALCulate{1-16}[:SElected]:LIMit:SEGMenT:CLEAR
```

The command clears all the limit segment definitions on the active trace of the indicated channel.

## Create and Configure Limit Line Segment 1

In this section, the first limit line is added, and then configured as to limit line type, start and stop frequencies, and start and stop Y-axis parameters.

Examples:

```
:CALCulate1:SElected:LIMit:SEGMenT:ADD
```

On Channel 1, the command adds a limit line segment. This limit line segment will be identified as Segment 1 and set as the lower limit line across the entire frequency range of interest.

```
:CALCulate1:SElected:LIMit:SEGMenT1:TYPE LOWER
```

Sets the Channel 1 Segment 1 limit line type as a lower limit line.

```
:CALCulate1:SElected:LIMit:SEGMenT1:X1 1.0E9
```

Sets the Channel 1 Segment 1 lower limit line start frequency value at 1 GHz.

```
:CALCulate1:SElected:LIMit:SEGMenT1:X2 8.5E9
```

Sets the Channel 1 Segment 1 lower limit line stop frequency value at 8.5 GHz.

```
:CALCulate1:SElected:LIMit:SEGMenT1:Y1 -2.0
```

Sets the Channel 1 Segment 1 lower limit start Y1 value at -2.0 dB.

```
:CALCulate1:SElected:LIMit:SEGMenT1:Y2 0.0
```

Sets the Channel 1 Segment 1 lower limit stop Y2 value at 0.0 dB.

## Create and Configure Limit Line Segment 2

In this section, the second limit line is added, and then configured as to limit line type, start and stop frequencies, and start and stop Y-axis parameters.

```
:CALCulate1:SElected:LIMit:SEGMenT:ADD
```

On Channel 1, command adds a blank limit line segment. This limit line segment will be later identified as Segment 2 and set as the first upper limit line segment.

```
:CALCulate1:SElected:LIMit:SEGMenT2:TYPE UPPer
```

Sets the Channel 1 Segment 2 limit line type as an upper limit line.

```
:CALCulate1:SElected:LIMit:SEGMenT2:X1 1.0E9
```

Sets the Channel 1 Segment 2 upper limit start frequency value at 1 GHz.

```
:CALCulate1:SElected:LIMit:SEGMenT2:X2 4.0E9
```

Sets the Channel 1 Segment 2 upper limit line stop frequency value at 4 GHz.

```
:CALCulate1:SElected:LIMit:SEGMenT2:Y1 4.0
```

Sets the Channel 1 Segment 2 upper limit start Y1 value at 4.0 dB.

```
:CALCulate1:SElected:LIMit:SEGMenT2:Y2 10.0
```

Sets the Channel 1 Segment 2 upper limit stop Y2 value at 10.0 dB.

## Create and Configure Limit Line Segment 3

In this section, the third limit line is added, and then configured as to limit line type, start and stop frequencies, and start and stop Y-axis parameters.

```
:CALCulate1:SElected:LIMit:SEGment:ADD
```

On Channel 1, the command adds a blank limit line segment. This limit line segment will be later identified as Segment 3 and set as the second upper limit line segment.

```
:CALCulate1:SESelected:LIMit:SEGment3:TYPE UPPer
```

Sets the Channel 1 Segment 3 limit line type as an upper limit line.

```
:CALCulate1:SESelected:LIMit:SEGment3:X1 4.0E9
```

Sets the Channel 1 Segment 3 upper limit start frequency value at 4 GHz.

```
:CALCulate1:SESelected:LIMit:SEGment3:X2 6.0E9
```

Sets the Channel 1 Segment 3 upper limit line stop frequency value at 6 GHz.

```
:CALCulate1:SESelected:LIMit:SEGment3:Y1 10.0
```

Sets the Channel 1 Segment 3 upper limit start Y1 value at 10.0 dB.

```
:CALCulate1:SESelected:LIMit:SEGment3:Y2 10.0
```

Sets the Channel 1 Segment 3 upper limit stop Y2 value at 10.0 dB.

## Create and Configure Limit Line Segment 4

In this section, the third limit line is added, and then configured as to limit line type, start and stop frequencies, and start and stop Y-axis parameters.

```
:CALCulate1:SESelected:LIMit:SEGment:ADD
```

On Channel 1, command adds a blank limit line segment. This limit line segment will be later identified as Segment 4 and set as the third and final upper limit line segment.

```
:CALCulate1:SESelected:LIMit:SEGment4:TYPE UPPer
```

Sets the Channel 1 Segment 4 limit line type as an upper limit line.

```
:CALCulate1:SESelected:LIMit:SEGment4:X1 6.0E9
```

Sets the Channel 1 Segment 4 upper limit start frequency value as 6 GHz.

```
:CALCulate1:SESelected:LIMit:SEGment4:X2 8.5E9
```

Sets the Channel 1 Segment 4 upper limit line stop frequency value at 8.5 GHz.

```
:CALCulate1:SESelected:LIMit:SEGment4:Y1 10.0
```

Sets the Channel 1 Segment 4 upper limit start Y1 value at 10.0 dB.

```
:CALCulate1:SESelected:LIMit:SEGment4:Y2 4.0
```

Sets the Channel 1 Segment 4 upper limit stop Y2 value at 4.0 dB.

```
:CALCulate:LIMit:DISPLAY ON
```

Toggles the selected limits ON

## Configure AutoCal Calibration

**Note** AutoCal is not available with Option 082

For this example, the Anritsu 36585K Precision Automatic Calibrator (AutoCal) Calibration Module will be used to perform the calibration. If the characterization file for the AutoCal module has not been loaded, best practices recommend using the User Interface menus to load the characterization file.

```
:SENSe1:CORRection:COLLect:ECAL:AUTOmatic:ORIentation:STATe OFF
```

Turn the AutoCal module automatic orientation detection off for Channel 1.

```
:SENSe1:CORRection:COLLect:ECAL:ORIentation L1R2
```

Set the AutoCal module orientation detection off and sets the port-to-port orientation manually for Channel 1 so that Port 1 is on the left and Port 2 is on the right.

```
:SENSe1:CORRection:COLLect:ECAL:TRUEThru OFF
```

The command turns off the use of the AutoCal True Thru feature, where a cable through is used during the AutoCal calibration for Channel 1. By setting this to OFF, the AutoCal module will use its Internal Thru capability to complete the calibration.

## Ready for Measurements

The VNA is ready for measurements.



# Chapter 3 — IEEE Commands

## 3-1 Introduction

This chapter contains all of the IEEE commands that are implemented in the instrument.

**Note**

When operating the ShockLine VNA through remote programming, the ShockLine application screen user interface controls are disabled. To return to local control, press the keyboard **Esc** key, or send the **RTL** command.

For general information about GPIB, refer to [Section 1-3 “IEEE-488 Description”](#).

## 3-2 Command Descriptions

IEEE commands are used to control instrument status registers, status reporting, synchronization, data storage, and other common functions. All IEEE-488.2 commands are identified by the leading asterisk in the command word and are fully defined in IEEE-488.2.

Each IEEE command is followed by a complete descriptive listing of the command description, parameters, and output. If applicable, an example for each command, the default value, and the range information is written out at the end of the individual description.

- See [Chapter 2, “Programming the ShockLine Series VNA”, “Notational Conventions” on page 2-5](#) for definitions of parameters and notations.
- Detailed descriptions of parameter types is available in [“Data Transmission Methods” on page 2-9](#) and through the links below.
  - [`<NR1>`](#)
  - [`<NR2>`](#)
  - [`<NR3>`](#)
  - [`<NRf>`](#)
  - [`<string>`](#)
  - [`<ASCII> or <Arbitrary ASCII>`](#)
  - [`<block> or <arbitrary block>`](#)
  - [`<char>`](#)
  - [`<char1>,<char2>`](#)
  - [`<char1>,<char2>,<char3>`](#)
  - [`<char1>,<char2>,<char3>,<char4>`](#)
  - [`MPND`](#)
  - [`MPNF`](#)
  - [`MPNI`](#)

### 3-3 Numeric Limits

The following numeric limits are abbreviated in the IEEE command descriptions:

- **MPND – Maximum Positive/Negative Double Precision Number**
  - $+/- 1.792\ 693\ 134\ 86\ E+308$
- **MPNI – Maximum Positive/Negative Integer**
  - $-2\ 147\ 483\ 648$  to  $+2\ 147\ 483\ 647$
  - $+/- 2\ E31$
- **MPNF – Maximum Positive/Negative Float Number**
  - $+/- 3.402\ 819\ E+38$

### 3-4 IEEE-488.2 Commands

#### \*CLS

Description: Clear Status Command. Clears the Status Byte, the Data Questionable Event Register, the Standard Event Status Register, the Standard Operation Status Register, the error queue, the OPC pending flag, and any other registers that are summarized in the Status Byte. No Query

Cmd Parameters: NA

Query Parameters: NA

Query Output: NA

Syntax Example: \*CLS

#### \*DDT <Arbitrary Block> | <string>

#### \*DDT?

Description: Define Device Trigger. The command enters the 488.2 Define Device Trigger command with an input of arbitrary block or string. The query returns the 488.2 Define Device Trigger command as an arbitrary block output string. Note that the IEEE488.2 Standard specifies the input type to only be <Arbitrary Block>. In addition, ShockLine VNAs will also accept a <string>.

Cmd Parameters: <Arbitrary Block> | <string>

Query Parameters: NA

Query Output: <Arbitrary Block>

Range: NA

Default: NA

Syntax Example: \*DDT <string>

\*DDT?

**\*ESE <NRf>****\*ESE?**

Description: Standard Event Status Enable and Query. The command sets the Standard Event Status Enable Register bits. The binary weighted <NRf> data parameter used with this command must have a value between 0 to 255. The query returns the value of the Standard Event Status Enable Register in <NR1> format. Refer to “[Status System Reporting](#)” on page 2-25.

Cmd Parameters: <NRf>

Query Parameters: NA

Range: 0 to 255

Query Output: <NR1>

Syntax Example: \*ESE <NRf>

\*ESE?

**\*ESR?**

Description: Standard Event Status Register Query. Query only. Returns the value of the Standard Event Status Register in <NR1> format and clears the Standard Event Status Register. Refer to “[Status System Reporting](#)” on page 2-25.

Cmd Parameters: NA

Query Parameters: NA

Query Output: <NR1>

Range: NA

Default: NA

Syntax Example: \*ESR?

**\*IDN?**

Description Identification Query. Query only. This query returns an instrument identification string in IEEE-488.2 specified <Arbitrary ASCII> format consisting of four fields separated by commas. The fields are: <Manufacturer>, <Model>, <Serial #>, <Firmware Revision Level> where the actual model number, serial number, and firmware version of the ShockLine VNA model queried will be passed. The character output is of indeterminate length and must be the last statement issued if multiple commands and/or queries are issued at the same time. See [Chapter 2](#) for definition of <ASCII>.

Cmd Parameters: NA

Query Parameters: NA

Query Output: <Arbitrary ASCII>

Range: NA

Default: NA

Syntax Example: \*IDN?

**\*OPC**

Description: Operation Complete Command. When the \*OPC command is encountered, it does nothing. Program flow is allowed to proceed to the next command in the input buffer. No query. Note that \*OPC and \*OPC? are not a command/query pair although they appear to be.

When the \*OPC command is encountered, it immediately sets the Operational Complete bit in the Standard Events Status Register. The \*OPC command is a control command for overlapped commands in systems that support command overlapping. The ShockLine does not support overlapped commands, and as a result, no pause function is provided.

### Overlapped Command Background

Some non-ShockLine SCPI implementations allow commands to execute simultaneously, which is called an Overlapped Command. For example, a calibration step which takes many minutes could be set into operation and then allow other communication and control commands to proceed while the calibration step continues to take place.

At some point in these non-ShockLine implementations, the separate Overlapped Operational Streams need to be brought back together and placed under programmatic control in a process called Regaining Synchronization between the controller PC and the instrument. The commands \*OPC, \*OPC?, and \*WAI are designed to regain synchronization control and three different synchronization methods.

### IEEE-488.2 Overlapped Command Definitions

The \*OPC, \*OPC?, and \*WAI commands provide coverage for command completion before the next command is parsed and executed and comprise a class of commands termed Overlapped Commands. For instruments that support overlapped commands, each command works differently. Per the IEEE-488.2 specification:

- IEEE-488.2 defines a distinction between overlapped and sequential commands.
- As defined in IEEE-488.2, a sequential command is one which finishes executing before the next command starts executing. An overlapped command is one which does not finish executing before the next command starts executing.
- These types of commands are described in IEEE-488.2, section 12. Examples are given in IEEE-488.2, Appendix B.
- IEEE-488.2 defines three common commands (\*OPC, \*OPC?, \*WAI) which a device controller can use to synchronize its operation to the execution of overlapped commands.
- Each overlapped command has associated with it a Pending Operation flag.
- The device sets this flag TRUE when it passes the corresponding command from the Execution Control block to the Device Action block.
- The device sets the flag false when the device operation is finished, or has been aborted.

### \*OPC Synchronization

The \*OPC Operation Complete command is defined in **IEEE-488.2-1992, Section 10.18**. \*OPC works only if one or more preceding commands are overlapped command. In systems that support overlapped commands, when this command is encountered, it waits until all overlapped commands have completed. Once all prior overlapped commands are complete, it instructs the parser to execute the next following command. A typical use would be to issue a \*OPC before issuing a command for a long duration measurement sweep. \*OPC causes the instrument to continuously sense the No Operation Pending flag. When the No Operation Pending (NOP) flag becomes TRUE, the OPC event bit in the Standard Event Status Register is set to “1” to indicate that the state of all pending operations have been completed. If this bit had been previously programmed to send a Service Request, then the controller would be aware that all is synchronized.

- For example, OV1 through OV3 are overlapped commands where the command series is OV1, OV2, OV3, \*OPC, XXX.
- Commands OV1, OV2, OV3 start running. The NOP is set to FALSE.
- Parser execution stops at \*OPC and the parser waits while the NOP is FALSE.
- Commands OV1, OV2, and OV3 continue to run in overlapped mode.
- Commands OV1, OV2, and OV3 are finally complete.
- The NOP flag is set to TRUE and \*OPC sets the status bit to 1.
- Parser execution resumes.
- Command XXX starts running.

### \*OPC? Synchronization

In systems that support overlapped commands, the \*OPC? Operation Complete Query command waits until all overlapped commands have been completed. When that synchronizing moment arrives, the ASCII character “1” is placed in the output buffer. This sets the MAV bit in the Status byte to TRUE which indicates there is data in the output buffer. If the controller had been attempting to read data, the moment the “1” appears in the output buffer, it is read by the controller, making it aware that all is synchronized. When that synchronizing moment arrives, the next command in the input buffer is executed and the command execution is synchronized.

- For example, OV1 through OV3 are overlapped commands where the command series is OV1, OV2, OV3, \*OPC?, XXX.
- Commands OV1, OV2, OV3 start running. The NOP is set to FALSE.
- Parser execution stops at \*OPC? and the parser waits while the NOP is FALSE.
- Commands OV1, OV2, and OV3 continue to run in overlapped mode.
- Commands OV1, OV2, and OV3 are finally complete.
- The NOP flag is set to TRUE and \*OPC? puts a one (“1”) in the output buffer.
- Parser execution resumes.
- Command XXX starts running.

### \*WAI Synchronization

In systems that support overlapped commands, the \*WAI Wait-to-Continue Command causes the parser to wait until all overlapped commands have been completed. When that synchronizing moment arrives, the next command in the input buffer is executed and command execution is synchronized.

- For example, OV1 through OV3 are overlapped commands where the command series is OV1, OV2, OV3, \*WAI, XXX.
- Commands OV1, OV2, OV3 start running. The NOP is set to FALSE.
- Parser execution stops at \*WAI and the parser waits while the NOP is FALSE.
- Commands OV1, OV2, and OV3 continue to run in overlapped mode.
- Commands OV1, OV2, and OV3 are finally complete.
- The NOP flag is set to TRUE.
- Parser execution resumes.
- Command XXX starts running.

### ShockLine and Overlapped Commands

In ShockLine VNAs, there are no Overlapped Commands. Everything works synchronously and no command is executed until the preceding command has completed. Because of this, the commands \*OPC, \*OPC? and \*WAI work slightly differently than the IEEE-488.2 specification.

Related Commands: \*OPC, “\*OPC?”, and “\*WAI” commands.

Cmd Parameters: NA

Query Parameters: NA

Query Output: <NR1>

Range: NA

Default: NA

Syntax Example: \*OPC

**\*OPC?**

Description: Operation Complete Query. Query only. Not a command/query pair with \*OPC. When the \*OPC? command is encountered, it does nothing. Program flow is allowed to proceed to the next command in the input buffer.

Per IEEE-488.2, \*OPC? is an Overlapped Command which ShockLine VNAs do not support. When the \*OPC? command is encountered, it immediately puts the character “1” (one) in the Output Queue buffer, and parser execution continues. It sets the MAV bit true when all pending operations are complete.

The \*OPC, \*OPC?, and \*WAI Overlapped Commands are related. Because ShockLine does not support overlapped commands, they do not function exactly as specified in IEEE-488.2. See “[IEEE-488.2 Overlapped Command Definitions](#)” in the \*OPC command description above.

Related commands: “\*OPC?”, \*OPC?, and “\*WAI” commands.

Cmd Parameters: NA

Query Parameters: NA

    Query Output: <NR1>

    Range: NA

    Default: NA

Syntax Example: \*OPC?

**\*OPT?**

Description: Operation Query. Query only. The query reads out the identification number of an option installed in the ShockLine VNA. See [Chapter 2](#) for definition of <ASCII>.

Cmd Parameters: NA

Query Parameters: NA

    Range: NA

    Default: NA

    Query Output: <Arbitrary ASCII>

Syntax Example: \*OPT?

**\*RST**

Description: Reset Command. The \*RST command performs a device reset of the VNA to a pre-defined condition or to a user-defined condition. No query. The user-defined condition of \*RST resets all user programmable parameters to those defined by the user in a saved configuration file. The pre-defined condition of the \*RST command sets the defaults described below. For additional information on default parameter values, see each SCPI command in this manual.

**\*RST Does Reset the Following Parameters**

Except as explicitly excluded in the next section, the \*RST command does the following:

- Sets the device-specific functions to a known state that is independent of the past-use history of the device;
- Device specific commands may be provided to program a different reset state than the original factory-supplied one;
- Sets the macro defined by \*DDT to a device-defined state;
- Disables macros;
- Forces the device into the OCIS state (Operation Complete Command Idle State);
- Forces the device into the OQIS state (Operation Complete Query Idle State).

**\*RST Does Not Reset the Following Parameters**

The \*RST command does not change the parameters listed below:

- Does not change the state of the IEEE-488.1 interface;
- Does not change the selected IEEE-488.1 address of the device;
- Does not change the GPIB address of the device;
- Does not change the Output Queue;
- Does not change any Event Enable Register settings including the Standard Event Status Enable Register;
- Does not change any Event Register setting including the Standard Event Status Register settings;
- Does not change the power-on-status-clear flag setting;
- Does not change the Service Request Enable Register;

Cmd Parameters: NA

Query Parameters: NA

Query Output: NA

Range: NA

Default: NA

Syntax Example: \*RST

**\*SRE <NRf>****\*SRE?**

Description: Service Request Enable. The command sets the Service Request Enable Register bits. A zero value in the command resets the register. The query returns the value of the Service Request Enable Register in <NR1> format. Bit 6 is always zero. The integer data parameter used with this query have a value between 0 to 255.

Cmd Parameters: <NRf>

Query Parameters: NA

Query Output: <NR1>

Range: 0 to 255; 0 performs a register reset.

Default: NA

Syntax Example: \*SRE <NRf>

\*SRE?

**\*STB?**

Description: Read Status Byte Query. Query only. Returns the content of the Status Byte Register (bits 0 through 5 and 7). Bit 6 is the Summary Status Bit value (RQS). The command does not reset the status byte values.

Query Parameters: NA

Query Output: <NR1>

Range: NA

Default: NA

Syntax Example: \*STB?

**\*TRG**

Description: Trigger Command. Triggers the instrument if :TRIGger:SOURce{1-16} command data parameter is set to REMOTE. Performs the same function as the Group Execute Trigger (<GET>) bus command as defined in IEEE-488.2. \*TRG or the <GET> can trigger a measurement. No query.

The \*TRG and <GET> commands are handled differently by the parser. The \*TRG command:

- Can be mixed with other GPIB commands in a command string which goes through the parser.
- Can only trigger a single measurement event on only one device in the GPIB network.

The <GET> command:

- Is changed into the command \*TRG and goes through the parser by itself.
- Can trigger single measurement events on any or all instruments in the GPIB network.

What is measured depends on the setting of the \*DDT and :TRIGger[:SEQUence]:EXTernal:TYPE commands.

- If a \*DDT command has been issued previously, the \*TRG or <GET> will execute what is defined in the \*DDT instead.
- If a \*DDT has not been issued, the \*TRG triggers a measurement based on the :TRIG:EXT:TYP command, which can be measurement of a point, a single sweep, a single channel, or all channels.
- If a sweep is selected, on 2-port VNAs, it can be either a either a forward or reverse sweep.

Cmd Parameters: NA

Query Parameters: NA

Query Output: NA

Range: NA

Output: NA

Syntax Example: \*TRG

**\*TST?**

Description: Self Test Query. Query only. Performs a self test and outputs the self test status in <NR1> format with the following values:

- 0 indicates that self test passed
- Any number greater than 0 indicates the number of the self test that failed
- 144 indicates that the self test was aborted.

Cmd Parameters: NA

Query Parameters: NA

Query Output: <NR1>

Range: NA

Default: NA

Syntax Example: \*TST?

**\*WAI**

Description: Wait-to-Continue Command. When the \*WAI command is encountered, it does nothing. Program flow is allowed to proceed to the next command in the input buffer. No query.

The \*WAI command is an Overlapped Command that provides coverage for command completion when the device supports overlapped command execution. The ShockLine does not support overlapped commands, and as a result, the \*WAI does not function exactly as specified in IEEE-488.2. See “[IEEE-488.2 Overlapped Command Definitions](#)” in the \*OPC command description.

Related commands: “[\\*OPC](#)”, “[\\*OPC?](#)”, and [\\*WAI](#).

Cmd Parameters: NA

Query Parameters: NA

Query Output: NA

Syntax Example: \*WAI



# Chapter 4 — Diagnostic and Troubleshooting Commands

## 4-1 Introduction

This chapter provides a listing and description of general system-related commands used for configuration, diagnostics, internal calibration, and troubleshooting. Complete details of each command is given in the listing following each command SCPI subsystem. If applicable, an example for each command, the default value, and the SCPI information is written out at the end of the individual description.

**Note** When operating the ShockLine VNA through remote programming, the user interface controls are disabled. To return to local control, press the keyboard **Esc** key, or send the **RTL** command.  
For general information about GPIB, refer to “[IEEE-488 Description](#)” on page 1-3.

## 4-2 Parameters and Notations

See [Chapter 2, “Notational Conventions” on page 2-5](#) for definitions of parameters and notations. A notation summary table is available in [Table 2-4, “Parameter Notations” on page 2-6](#).

Detailed descriptions are available in [“Data Transmission Methods” on page 2-9](#) and through the links below.

- <NR1>
- <NR2>
- <NR3>
- <NRf>
- <string>
- <ASCII> or <Arbitrary ASCII>
- <block> or <arbitrary block>
- <char>
- <char1>,<char2>
- <char1>,<char2>,<char3>
- <char1>,<char2>,<char3>,<char4>
- MPND
- MPNF
- MPNI

## 4-3 Numeric Limits

The following numeric limits are shown abbreviated in the command descriptions:

- MPND --- Maximum Positive/Negative Double Precision Number
  - $+/- 1.792\ 693\ 134\ 86\ E+308$
- MPNI --- Maximum Positive/Negative Integer
  - $-2\ 147\ 483\ 648$  to  $+2\ 147\ 483\ 647$
  - $+/- 2\ E31$
- MPNF --- Maximum Positive/Negative Float Number
  - $+/- 3.402\ 819\ E+38$

## 4-4 Self-Test Commands

### TST?

Description: Self-Test and Output Status. Query only. The query performs an instrument self-test and outputs its status in <NR1> format with the following values:

- 0 indicates that self-test passed.
- Any number greater than 0 indicates the number of the self-test that failed.
- 144 indicates that the self-test was aborted.

Cmd Parameters: NA

Query Parameters: NA

Query Output: <NR1>

Command Type: System Command

Syntax Example: TST?

### TSTRES?

Description: Self-Test Results Output. Query only. The query outputs the last self-test results.

Query Output: <Arbitrary Block>

Query Parameters: NA

Command Type: System Command

Syntax Example: TSTRES?

## 4-5 ANVNA Commands

If the communication with the "IVI" (C #) examples fails, whether 32- or 64-bits, verify the IVI Shared Components has successfully been installed under: C:\Program Files (x86)\IVI Foundation\IVI.

# Chapter 5 — SCPI Commands

## 5-1 Introduction

This chapter contains all of the SCPI commands (required and native) that are implemented in the MS46xxx and ME786xA instruments.

The SCPI commands are grouped by their respective subsystems. For each subsystem, the commands are described in detail in the listing. The notation corresponds to one of the SCPI standards to a large extent.

**Note** When operating the ShockLine VNA through remote programming, the user interface controls are disabled. To return to local control, press the keyboard **Esc** key, or send the **RTL** command.  
For general information about GPIB, refer to [Section 1-3 “IEEE-488 Description”](#).

## 5-2 SCPI Configurations

- The MS46522B and MS46524B comes with an embedded computer that is pre-configured with NI VISA and will handle the TCP/IP protocol for sending SCPI commands using VXI-11.
- The MS46322A/B comes with an embedded computer that is pre-configured with NI VISA and will handle the TCP/IP protocol for sending SCPI commands using VXI-11.
- The MS46121A/B, MS46122A/B, MS46131A, ME7868A, and ME7869A require an external PC and will send SCPI commands through a TCP/IP protocol, but the external PC configuration has some important information that is necessary for proper command handling. If the external PC has a registered version of NI VISA, the user can proceed with using VXI-11 for SCPI command support.

## 5-3 Minimum/Maximum Frequency Limits and Related Parameters

The minimum and maximum instrument frequencies depend on the instrument model, the installed options, and whether the VNA is a standalone unit or part of a system. See [Chapter 1, “General Information”, “Minimum/Maximum Instrument Frequency and Related Parameters” on page 1-22](#) for additional information.

The following tables for standalone VNA frequency limits are available:

- [Table 1-8, “Standalone VNAs – Default Start, Default CW, and Default Stop Frequencies” on page 1-22](#)
- [Table 1-9, “Standalone VNAs – Minimum Start, Minimum CW, and Maximum Start Frequencies” on page 1-24](#)
- [Table 1-10, “Standalone VNAs – Minimum Stop, Maximum Stop, and Maximum CW Frequencies” on page 1-25](#)
- [Table 1-11, “Standalone VNAs – Minimum and Maximum Frequency Span” on page 1-27](#)
- [Table 1-12, “Standalone VNAs – Minimum Center Frequency and Maximum Center Frequency” on page 1-29](#)
- [Table 1-13, “Standalone VNAs – Default Center Frequencies” on page 1-31](#)

## 5-4 Command Level Hierarchy

The different levels of the SCPI command hierarchy are represented in a table by means of indentations to the right. Lower command levels are indented farther to the right. Observe that the complete notation of the command always includes the higher levels as well.

For example, :SENSe{1-16}:FREQuency:CENTER has three command levels and is represented in the table as follows:

```
:SENSe{1-16} (first level)
  :FREQuency (second level)
    :CENTER (third level)
```

The maximum number of command levels is eight. For example, the command:

:SENSe{1-16}:CORRection:COLLect:LRL:DEViCe{1-10}:PORT12:LINE:FREQuency  
has eight command levels as follows:

```
:SENSe{1-16} (first level)
  :CORRection (second level)
    :COLLect (third level)
      :LRL (fourth level)
        :DEViCe{1-10} (fifth level)
          :PORT12 (sixth level)
            :LINE (seventh level)
              :FREQuency (eighth level)
```

## Command Descriptions and Notation Conventions

Complete details of each command is given following the table of commands for each SCPI subsystem. If applicable, an example for each command, the default value, and the SCPI information is written out at the end of the individual description.

When a range is given in braces, such as {1-16}, it means supply a single value in that range.

Example: :CALCulate{12} refers to channel 12

## Numeric Limits

The following numeric limits are abbreviated in the SCPI command descriptions:

- MPND – Maximum Positive/Negative Double Precision Number  
+/- 1.792 631 348 6 E+308
- MPNI – Maximum Positive/Negative Integer  
– 2 147 483 648 to +2 147 483 647  
+/- 2 E31
- MPNF – Maximum Positive/Negative Float Number  
+/- 3.402 819 E+38

## Notational Conventions

See Chapter 2, “Programming the ShockLine Series VNA”, “Notational Conventions” on page 2-5 for definitions of parameters and notations.

Detailed descriptions of parameter types is available in “Data Transmission Methods” on page 2-9 and through the links below.

- <NR1>
- <NR2>
- <NR3>
- <NRf>
- <string>
- <ASCII> or <Arbitrary ASCII>
- <block> or <arbitrary block>
- <char>
- <char1>,<char2>
- <char1>,<char2>,<char3>
- <char1>,<char2>,<char3>,<char4>
- MPND
- MPNF
- MPNI

## 5-5 General Parameters

The following general parameters are defined for multiple subsystems in the sections following.

- :CALCulate{1-16} refers to the indicated channel in the range (here, from 1 to 16).  
If the index number is not used (the braces are empty), the command applies to channel 1.
- :DEVICE{1-10} refers to the indicated device for the LRL calibration.  
If the index number is not used, the first device is used.
- :FILE{1-4} refers to one of the four hybrid calibration files or files used for UFX (if option 24 is present). Each file must be uniquely identified.  
If the index number is not used, the command displays a syntax error.
- :FSEGMENT refers to the active frequency-based segment.
- :FSEGMENT{1-100} refers to the indicated frequency-based segment.  
If the index number is not used, the command applies to the frequency-based segment 1.
- :ISEGMENT refers to the active index-based segment.
- :ISEGMENT{1-100} refers to the indicated index-based segment.  
If the index number is not used, the command applies index-based segment 1.
- :MARKer refers to the active marker.
- :MARKer{1-13} refers to the indicated marker where Marker 1 through 12 are standard measurement markers and Marker 13 is the reference marker. If the index number is not used, the command applies to marker 1.
- :PARameter{1-16} refers to the indicated trace.  
If the index number is not used, the command applies to trace 1.
- :PORT{1 | 2 | 3 | 4 | 12 | 13 | 14 | 23 | 24 | 34 | 123 | 124 | 134 | 234 | 1234} refers to the indicated individual port or port pair, port triplet, or port quartet to be used in the calibration.  
The use of Port 3 and/or Port 4 requires a 4-port VNA instrument and related test set.  
If the index number is not used, the command applies to Port 1.
- :PORT{123 | 124 | 134 | 234} refers to the indicated port triplet to be used in the hybrid calibration. A 4-port VNA is required.  
If the index number is not used, the command is applied to Port 1, Port 2, and Port 3.
- :SEGMENT refers to the currently active limit line.
- :SEGMENT{1-50} refers to the indicated limit line.  
If the index number is not used, the command applies to segment 1.
- :SENSe{1-16} refers to the indicated channel in the range (here, from 1 to 16).  
If the index number is not used, the command applies to channel 1.
- :THRu{12} refers to the through line between the indicated port pair.  
If the index number is not used, the command applies to the Port 1 and Port 2 pair.
- :TRACe{1-16} refers to the indicated trace.  
If the index number is not used, the command applies to trace 1.
- :WINDow{1-16} refers to the indicated channel in the range (here, from 1 to 16).  
If the index number is not used, the command applies to channel 1.

## 5-6 :CALCulate{1-16}:ALTerNate:TRACe NAME Subsystem

The :CALCulate{1-16}:ALTerNate TRACe subsystem commands are used to assign the names to identify traces.

**:CALCulate{1-16}:ALL:ALTerNate:TRACe:NAME <char>**

Description: No query. Toggles the All Alternate Trace Name select on or off.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:ALL:ALT:TRAC:NAM:ON

**:CALCulate{1-16}:ALTerNate:TRACe:NAME:STATE <char>**

**:CALCulate{1-16}:ALTerNate:TRACe:NAME:STATE?**

Description: Toggles the trace name on and off on the indicated channel.

Returns the trace name on/off status for the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:ALT:TRAC:NAM:STAT ON

:CALC1:ALT:TRAC:NAM:STAT?

**:CALCulate{1-16}[:SELECTed]:ALTerNate:TRACe:NAME <string>**

**:CALCulate{1-16}[:SELECTed]:ALTerNate:TRACe:NAME?**

Description: Allows entry of the trace name of the indicated channel.

Returns the trace name for the indicated channel.

Cmd Parameters: <string> "user-defined name"

Query Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :CALC1:ALT:TRAC:NAMe "Sparky"

:CALC1:ALT:TRAC:NAMe?

## 5-7 :CALCulate{1-16}:CORRection Subsystem

The :CALCulate{1-16}:CORRection subsystem commands are used to configure and control calibrations related to adapter removal and merge calibration.

### Calibration Option Subsystems

Related calibration option configuration and control subsystems are:

- “:CALCulate{1-16}:CORRection Subsystem” on page 5-6
- “:SENSe{1-16}:CORRection:COLLECT:MULTIple Subsystem” on page 5-405
- “:CALCulate{1-16}:UFEXtraction:GENB Subsystem – Network Extraction” on page 5-237
- “:CALCulate{1-16}:UFEXtraction:MSTD Subsystem – Network Extraction” on page 5-244
- “:CALCulate{1-16}:UFEXtraction:PLOCalized Subsystem – Network Extraction” on page 5-257
- “:CALCulate{1-16}:UFEXtraction:SEQuential Subsystem – Network Extraction” on page 5-276

### :CALCulate{1-16}:CORRection:ADAPter:REMoval

Description: Performs the adapter removal. No query.

Cmd Parameters: None

Query Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :CALC1:CORR:ADAP:REM

### :CALCulate{1-16}:CORRection:ADAPter:REMoval:CALibration:X <string> :CALCulate{1-16}:CORRection:ADAPter:REMoval:CALibration:X?

Description: Assigns calibration X filename to be used in adapter removal.

Returns the calibration X filename to be used in adapter removal. The X filename refers to the calibration done with adapter connected to Port 2.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.chx' where x:\directory\filename.chx must exist.

Query Parameters: NA

Query Output: <char> Filename and path in the form: x:\directory\filename.chx where the directory and filename must exist.

Range: NA

Default Value: NA

Syntax Example: :CALC1:CORR:ADAP:REM:CAL:X 'C:\filename.chx'  
:CALC1:CORR:ADAP:REM:CAL:X?

```
:CALCulate{1-16}:CORRection:ADAPter:REMoval:CALibration:Y <string>
:CALCulate{1-16}:CORRection:ADAPter:REMoval:CALibration:Y?
```

Description: Assigns calibration Y filename to be used in adapter removal.

Returns the calibration Y filename to be used in adapter removal. The Y filename refers to the calibration done with adapter connected to Port 1.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.chx' where x:\directory\filename.chx must exist.

Query Parameters: NA

Query Output: <char> Filename and path in the form: x:\directory\filename.chx

Range: NA

Default Value: NA

Syntax Example: :CALC1:CORR:ADAP:REM:CAL:Y 'C:\filename.chx'
:CALC1:CORR:ADAP:REM:CAL:Y?

```
:CALCulate{1-16}:CORRection:ADAPter:REMoval:LENGth <NRf>
:CALCulate{1-16}:CORRection:ADAPter:REMoval:LENGth?
```

Description: Inputs the adapter length (in seconds) to be used in adapter removal.

Returns the adapter length to be used in adapter removal.

Cmd Parameters: <NRf> The input parameter is in Seconds.

Query Parameters: NA

Query Output: <NR3> The output parameter is in Seconds.

Range: MPND

Default Value: NA

Syntax Example: :CALC1:CORR:ADAP:REM:LENG 6.6E-11
:CALC1:CORR:ADAP:REM:LENG?

## 5-8 :CALCulate{1-16}:EXTRaction Subsystem

The :CALCulate{1-16}:EXTRaction subsystem commands provide configuration control and execution for network extraction functions during an instrument calibration.

### Calibration Option Subsystems

Related calibration option configuration and control subsystems are:

- “:CALCulate{1-16}:CORRection Subsystem” on page 5-6
- “:CALCulate{1-16}:UFEXtraction:GENB Subsystem – Network Extraction” on page 5-237
- “:CALCulate{1-16}:UFEXtraction:MSTD Subsystem – Network Extraction” on page 5-244
- “:CALCulate{1-16}:UFEXtraction:PLOCalized Subsystem – Network Extraction” on page 5-257
- “:CALCulate{1-16}:UFEXtraction:SEQuential Subsystem – Network Extraction” on page 5-276

### General Parameters

The general command parameters are:

- [:METHod] :A refers to Extraction Method Type A, which extracts one 2-port network using the adapter extraction method.
- [:METHod] :B refers to Extraction Method Type B, which extracts one 2-port network using a two-tier calibration.
- [:METHod] :C refers to Extraction Method Type C, which extracts two 2-port networks using inner and outer calibrations.
- [:METHod] :D refers to Extraction Method Type D, which extracts two Two-port networks using outer calibrations only using the divide-by-two method.
- [:METHod] :E refers to Extraction Method Type E, which extracts four 2-port networks using inner and outer calibrations. Only available on 4-port VNA instruments.
- [:METHod] :F refers to Extraction Method Type F, which extracts four 2-port networks with outer calibrations only using the divide-by-two method. Only available on 4-port VNA instruments.
- [:METHod] :G refers to Extraction Method Type G, which extracts two 4-port networks with outer calibrations only using the divide-by-two method. Only available on 4-port VNA instruments.

#### :CALCulate{1-16}:EXTRaction

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Performs the network extraction after using the network extraction setup commands below. This is the same as :CALCulate{1-16}:EXTRaction[:METHod]:C on page 5-21.

No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :CALC1:EXTR

```
:CALCulate{1-16}:EXTRaction:CALibration[:CALa]:FILE <string>
:CALCulate{1-16}:EXTRaction:CALibration[:CALa]:FILE?
```

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Assigns the Calibration A filename to be used in Network Extraction on the indicated channel.

Returns the Calibration A filename that is to be used in Network Extraction on the indicated channel.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.chx' where x:\directory\filename.chx must exist.

Query Parameters: NA

Query Output: <char> Filename and path in the form: x:\directory\filename.chx

Range: NA

Default Value: NA

Syntax Example: :CALC1:EXTR:CAL:FIL 'C:\directory\cala.chx'
:CALC1:EXTR:CAL:FIL?

```
:CALCulate{1-16}:EXTRaction:CALibration[:CALa]:PORT <char>
:CALCulate{1-16}:EXTRaction:CALibration[:CALa]:PORT?
```

Applicability: MS46122, MS46322, MS46522, MS46524

The use of Port 3 or Port 4 requires a 4-port VNA.

Description: Assigns the Calibration A port to be used in Network Extraction on the indicated channel.

Returns the Calibration A Port to be used in the Network Extraction on the indicated channel.

Cmd Parameters: <char> PORT1 | PORT2 | PORT3 | PORT4

Query Parameters: NA

Query Output: <char> PORT1 | PORT2 | PORT3 | PORT4

Range: NA

Default Value: N

Syntax Example: :CALC1:EXTR:CAL:PORT PORT2
:CALC1:EXTR:CAL:PORT?

```
:CALCulate{1-16}:EXTRaction:CALibration:CALB:FILE <string>
```

```
:CALCulate{1-16}:EXTRaction:CALibration:CALB:FILE?
```

Applicability: MS46524

Description: Assigns the Calibration B filename to be used in Network Extraction on the indicated channel.

Returns the Calibration B filename to be used in Network Extraction on the indicated channel.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.chx' where x:\directory\filename.chx must exist.

Query Parameters: NA

Query Output: <char> Filename and path in the form: x:\directory\filename.chx

Range: NA

Default Value: NA

Syntax Example: :CALC1:EXTR:CAL:CALB:FIL 'C:\directory\filename.chx'

```
:CALC1:EXTR:CAL:CALB:FIL?
```

```
:CALCulate{1-16}:EXTRaction:CALibration:CALB:PORT <char>
```

```
:CALCulate{1-16}:EXTRaction:CALibration:CALB:PORT?
```

Applicability: MS46524

Description: Assigns the Calibration B port to be used in Network Extraction on the indicated channel.

Returns the Calibration B port to be used in the Network Extraction on the indicated channel.

Cmd Parameters: <char> PORT1 | PORT2 | PORT3 | PORT4

Query Parameters: NA

Query Output: <char> PORT1 | PORT2 | PORT3 | PORT4

Range: NA

Default Value: NA

Syntax Example: :CALC1:EXTR:CAL:CALB:PORT PORT4

```
:CALC1:EXTR:CAL:CALB:PORT?
```

```
:CALCulate{1-16}:EXTRaction:CALibration:INNer <string>
:CALCulate{1-16}:EXTRaction:CALibration:INNer?
```

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Assigns the inner calibration filename to be used in network extraction on the indicated channel.

Returns the inner calibration filename to be used in network extraction on the indicated channel.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.chx' where x:\directory\filename.chx must exist.

Query Parameters: NA

Query Output: <char> Filename and path in the form: x:\directory\filename.chx

Range: NA

Default Value: NA

Syntax Example: :CALC1:EXTR:CAL:INN 'C:\filename.chx'
:CALC1:EXTR:CAL:INN?

```
:CALCulate{1-16}:EXTRaction:CALibration:OUTer <string>
:CALCulate{1-16}:EXTRaction:CALibration:OUTer?
```

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Assigns the outer calibration filename to be used in network extraction on the indicated channel.

Returns the outer calibration filename to be used in network extraction on the indicated channel.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.chx' where x:\directory\filename.chx must exist.

Query Parameters: NA

Query Output: <char> Filename and path in the form: x:\directory\filename.chx

Range: NA

Default Value: NA

Syntax Example: :CALC1:EXTR:CAL:OUT 'C:\directory\filename.chx'
:CALC1:EXTR:CAL:OUT?

```
:CALCulate{1-16}:EXTRaction:ELL1:LENGTH <NRf>
:CALCulate{1-16}:EXTRaction:ELL1:LENGTH?
```

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Sets the estimated delay 1 of the given network to be used in Network Extraction on the indicated channel.

Returns the delay 1 of the given network to be used in Network Extraction on the indicated channel.

The ELL1 value is used in the following extraction methods:

- Type A = Extract one 2-port network, with adapter extraction
- Type B = Extract one 2-port network, with two-tier calibration
- Type D = Extract two 2-port networks, with outer calibration only, using divide-by-two method
- Type E = Extract four 2-port networks, with inner and outer calibrations available MS46524
- Type F = Extract four 2-port networks, with outer calibration only, using divide-by-two method MS46524
- Type G = Extract two 4-port networks, with outer calibration only, using divide-by-two method MS46524

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: NA

Query Output: <NR3> The output parameter is in Meters.

Range: NA

Default: 0

Syntax Example: :CALC1:EXTR:ELL1:LENG 2.5E-10

```
:CALC1:EXTR:ELL1:LENG?
```

```
:CALCulate{1-16}:EXTRaction:ELL2:LENGTH <NRf>
:CALCulate{1-16}:EXTRaction:ELL2:LENGTH?
```

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Sets the estimated delay 2 of the given network to be used in Network Extraction on the indicated channel.

Returns the delay 2 of the given network to be used in Network Extraction on the indicated channel.

#### 2-Port and 4-Port VNAs:

The ELL2 value is used in the following extraction methods:

- Type A – Extract one 2-port network, with adapter extraction

#### 4-Port VNAs:

- Type E – Extract four 2-port networks, with inner and outer calibrations available MS46524
- Type F – Extract four 2-port networks, with outer calibration only, using divide-by-two method MS46524

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: NA

Query Output: <NR3> The output parameter is in Meters.

Range: MPND

Default: 0

Syntax Example: :CALC1:EXTR:ELL2:LENG 2.5E-10

```
:CALC1:EXTR:ELL2:LENG?
```

```
:CALCulate{1-16}:EXTRaction:ELL3:LENGTH <NRf>
```

```
:CALCulate{1-16}:EXTRaction:ELL3:LENGTH?
```

Applicability: MS46524

Description: Sets the estimated delay 3 of the given network to be used in Network Extraction on the indicated channel.

Returns the delay 3 of the given network to be used in Network Extraction on the indicated channel description.

The ELL3 value is used in the following extraction methods:

- Type E – Extract four 2-port networks, with inner and outer calibrations available

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: NA

Query Output: <NR3> The output parameter is in Meters.

Range: MPND

Default: 0

Syntax Example: :CALC1:EXTR:ELL3:LENG 2.5E-10

```
:CALC1:EXTR:ELL3:LENG?
```

```
:CALCulate{1-16}:EXTRaction:ELL4:LENGTH <NRf>
:CALCulate{1-16}:EXTRaction:ELL4:LENGTH?
```

Applicability: MS46524

Description: Sets the estimated delay 4 of the given network to be used in Network Extraction on the indicated channel.

Returns the delay 4 of the given network to be used in Network Extraction on the indicated channel description.

The ELL4 value is used in the following extraction methods:

- Type E – Extract four 2-port networks, with inner and outer calibrations available

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: NA

Query Output: <NR3> The input parameter is in Meters.

Range: MPND

Default: 0

Syntax Example: :CALC1:EXTR:ELL4:LENG 2.5E-10

```
:CALC1:EXTR:ELL4:LENG?
```

```
:CALCulate{1-16}:EXTRaction:DELay{1-4} <NRf>
:CALCulate{1-16}:EXTRaction:DELay{1-4}?
```

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Sets the indicated electric delay of the given network to be used in Network Extraction on the indicated channel.

Returns the delay of the given network to be used in Network Extraction on the indicated channel

Cmd Parameters: <NRf> The input parameter is in seconds.

Query Parameters: NA

Query Output: <NR3> The output parameter is in seconds.

Range: NA

Default: NA

Syntax Example: :CALC1:EXTR:DEL1 2.5E-10

```
:CALC1:EXTR:DEL1?
```

```
:CALCulate{1-16}:EXTRaction:S2P1filename:FILE <string>
:CALCulate{1-16}:EXTRaction:S2P1filename:FILE?
```

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Assigns the S2P file 1 name which receives the Extracted Network S2P data for the indicated port on the indicated channel.

Returns the S2P file 1 name which receives the Extracted Network S2P data for the indicated port on the indicated channel.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.s2p' where x:\directory\ must exist.

Query Parameters: NA

Query Output: <char> Filename and path in the form: x:\directory\filename.s2p.

Range: NA

Default: NA

Syntax Example: :CALC1:EXTR:S2P1:FIL 'C:\directory\filename.s2p'
:CALC1:EXTR:S2P1:FIL?

```
:CALCulate{1-16}:EXTRaction:S2P2filename:FILE <string>
:CALCulate{1-16}:EXTRaction:S2P2filename:FILE?
```

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Assigns the S2P file 2 name which receives the Extracted Network S2P data for the indicated port on the indicated channel.

Returns the S2P file 2 name which receives the Extracted Network S2P data for the indicated port on the indicated channel.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.s2p' where x:\directory\ must exist. See [Chapter 2, “Programming the ShockLine Series VNA”, “Notational Conventions” on page 5-3](#) for more information.

Query Parameters: NA

Query Output: <char> Filename and path in the form: x:\directory\filename.s2p.

Range: NA

Default: NA

Syntax Example: :CALC1:EXTR:S2P2:FIL 'C:\directory\filename.s2p'
:CALC1:EXTR:S2P2:FIL?

```
:CALCulate{1-16}:EXTRaction:S2P3filename:FILE <string>
:CALCulate{1-16}:EXTRaction:S2P3filename:FILE?
```

Applicability: MS46524

Description: Assigns the S2P file 3 name which receives the Extracted Network S2P data for the indicated port on the indicated channel.

Returns the S2P file 3 name which receives the Extracted Network S2P data for the indicated port on the indicated channel.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.s2p' where x:\directory\ must exist.

Query Parameters: NA

Query Output: <char> Filename and path in the form: x:\directory\filename.s2p.

Range: NA

Default: NA

Syntax Example: :CALC1:EXTR:S2P3:FIL 'C:\directory\filename.s2p'
:CALC1:EXTR:S2P3:FIL?

```
:CALCulate{1-16}:EXTRaction:S2P4filename:FILE <string>
:CALCulate{1-16}:EXTRaction:S2P4filename:FILE?
```

Applicability: MS46524

Description: Assigns the S2P file 4 name which receives the Extracted Network S2P data for the indicated port on the indicated channel.

Returns the S2P file 4 name which receives the Extracted Network S2P data for the indicated port on the indicated channel.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.s2p' where x:\directory\ must exist.

Query Parameters: NA

Query Output: <char> Filename and path in the form: x:\directory\filename.s2p.

Range: NA

Default: NA

Syntax Example: :CALC1:EXTR:S2P4:FIL 'C:\directory\filename.s2p'
:CALC1:EXTR:S2P4:FIL?

```
:CALCulate{1-16}:EXTRaction:S4P1filename:FILE <string>
:CALCulate{1-16}:EXTRaction:S4P1filename:FILE?
```

Applicability: MS46524

Description: Assigns the S4P file 1 name which receives the Extracted Network S4P data for the indicated port on the indicated channel.

Returns the S4P file 1 name which receives the Extracted Network S4P data for the indicated port on the indicated channel.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.s4p' where x:\directory\ must exist.

Query Parameters: NA

Query Output: <char> Filename and path in the form: x:\directory\filename.s4p.

Range: NA

Default: NA

Syntax Example: :CALC1:EXTR:S4P1:FIL 'C:\directory\filename.s4p'
:CALC1:EXTR:S4P1:FIL?

```
:CALCulate{1-16}:EXTRaction:S4P2filename:FILE <string>
:CALCulate{1-16}:EXTRaction:S4P2filename:FILE?
```

Applicability: MS46524

Description: Assigns the S4P file 2 name which receives the Extracted Network S4P data for the indicated port on the indicated channel.

Returns the S4P file 2 name which receives the Extracted Network S4P data for the indicated port on the indicated channel.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.s4p' where x:\directory\ must exist.

Query Parameters: NA

Query Output: <char> Filename and path in the form: x:\directory\filename.s4p.

Range: NA

Default: NA

Syntax Example: :CALC1:EXTR:S4P2:FIL 'C:\directory\filename.s4p'
:CALC1:EXTR:S4P2:FIL?

```
:CALCulate{1-16}:EXTRaction:SXPPortpair:PORT <char>
:CALCulate{1-16}:EXTRaction:SXPPortpair:PORT?
```

Applicability: MS46122, MS46322, MS46522, MS46524

The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

Description: Assigns the data port set to use when creating an S2P data file on the indicated channel.

Returns the data port set assigned to use when creating an S2P data file on the indicated channel.

Cmd Parameters: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34

Query Parameters: NA

Query Output: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34

Range: NA

Default: NA

Syntax Example: :CALC1:EXTR:SXPP:PORT PORT12

```
:CALC1:EXTR:SXPP:PORT?
```

```
:CALCulate{1-16}:EXTRaction:ZERO:COUPling[:STATE] <char>
```

```
:CALCulate{1-16}:EXTRaction:ZERO:COUPling[:STATE]?
```

Applicability: MS46524

Description: Turns on/off neglect fixture near-end coupling terms in extraction on the indicated channel

Returns the on/off status of neglect fixture near-end coupling terms in extraction on the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:EXTR:ZERO:COUP 1

```
:CALC1:EXTR:ZERO:COUP?
```

```
:CALCulate{1-16}:EXTRaction:ZERO:MATCh[:STATE] <char>
```

```
:CALCulate{1-16}:EXTRaction:ZERO:MATCh[:STATE]?
```

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Sets whether to neglect fixture match or not on the indicated channel.

Returns the selected state of neglect fixture match on the given channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:EXTR:ZER:MATC 1

```
:CALC1:EXTR:ZER:MATC?
```

**:CALCulate{1-16}:EXTRaction[:METHOD]:A**

Applicability: MS46122, MS46322, MS46522, MS46524

Prerequisites: The following commands must be sent before performing network extraction Method A:

- :CALCulate{1-16}:EXTRaction:CALibration[:CALa]:FILE <string>
- :CALCulate{1-16}:EXTRaction:CALibration:CALB:FILE <string>  
[MS46524 only]
- :CALCulate{1-16}:EXTRaction:CALibration[:CALa]:PORT <char>
- :CALCulate{1-16}:EXTRaction:CALibration:CALB:PORT <char>  
[MS46524 only]
- :CALCulate{1-16}:EXTRaction:ELL1:LENGTH <NRf>
- :CALCulate{1-16}:EXTRaction:S2P1filename:FILE <string>

Description: Performs the Network Extraction using Method A on the given channel. Method Type A extracts one 2-port network using the adapter extraction method.

No query.

Cmd Parameters: NA

Query Parameters: NA

Query Output: NA

Range: NA

Default: NA

Syntax Example: :CALC1:EXTR:METH:A

**:CALCulate{1-16}:EXTRaction[:METHOD] :B**

Applicability: MS46122, MS46322, MS46522, MS46524

Prerequisites: **2-Port VNAs:**

The following commands must be sent before performing network extraction Method B:

- :CALCulate{1-16}:EXTRaction:CALibration[:CALa]:FILE <string>
- :CALCulate{1-16}:EXTRaction:CALibration[:CALa]:PORT <char>
- :CALCulate{1-16}:EXTRaction:ELL1:LENGTH <NRf>
- :CALCulate{1-16}:EXTRaction:S2P1filename:FILE <string>

**4-Port VNAs:**

The following commands must be sent before performing network extraction Method B:

- :CALCulate{1-16}:EXTRaction:CALibration[:CALa]:FILE <string>
- :CALCulate{1-16}:EXTRaction:CALibration:CALB:FILE <string> [MS46524 only]
- :CALCulate{1-16}:EXTRaction:CALibration[:CALa]:PORT <char>
- :CALCulate{1-16}:EXTRaction:CALibration:CALB:PORT <char> [MS46524 only]
- :CALCulate{1-16}:EXTRaction:ELL1:LENGTH <NRf>
- :CALCulate{1-16}:EXTRaction:S2P1filename:FILE <string>

Description: Performs the Network Extraction using Method B on the given channel. Method Type B extracts one 2-port network using a two-tier calibration.

No query.

Cmd Parameters: NA

Query Parameters: NA

Query Output: NA

Range: NA

Default: NA

Syntax Example: :CALC1:EXTR:METH:B

**:CALCulate{1-16}:EXTRaction[:METHOD]:C**

Applicability: MS46122, MS46322, MS46522, MS46524

Prerequisites: The following commands must be sent before performing network extraction Method C:

- :CALCulate{1-16}:EXTRaction:CALibration[:CALa]:FILE <string>
- :CALCulate{1-16}:EXTRaction:CALibration:CALB:FILE <string> [MS46524 only]
- :CALCulate{1-16}:EXTRaction:SXPPortpair:PORT <char>
- :CALCulate{1-16}:EXTRaction:S2P1filename:FILE <string>
- :CALCulate{1-16}:EXTRaction:S2P2filename:FILE <string>

Description: Performs the Network Extraction using Method C on the given channel. Method Type C extracts two 2-port networks using inner and outer calibrations.

No query.

Cmd Parameters: NA

Query Parameters: NA

    Query Output: NA

    Range: NA

    Default: NA

Syntax Example: :CALC1:EXTR:METH:C

**:CALCulate{1-16}:EXTRaction[:METHOD]:D**

Applicability: MS46122, MS46322, MS46522, MS46524

Prerequisites: The following commands must be sent before performing network extraction Method D:

- :CALCulate{1-16}:EXTRaction:ZERO:MATCh[:STATe] <char>
- :CALCulate{1-16}:EXTRaction:ELL1:LENGTH <NRf>
- :CALCulate{1-16}:EXTRaction:SXPPortpair:PORT <char>
- :CALCulate{1-16}:EXTRaction:S2P1filename:FILE <string>
- :CALCulate{1-16}:EXTRaction:S2P2filename:FILE <string>

Description: Performs the Network Extraction using Method D on the given channel. Method Type D extracts two 2-port networks using outer calibrations only using the divide-by-two method.

No query.

Cmd Parameters: NA

Query Parameters: NA

    Query Output: NA

    Range: NA

    Default: NA

Syntax Example: :CALC1:EXTR:METH:D

**:CALCulate{1-16}:EXTRaction[:METHOD] :E**

Applicability: MS46524

Prerequisites: The following commands must be sent before performing network extraction Method E:

- :CALCulate{1-16}:EXTRaction:CALibration[:CALa]:FILE <string>
- :CALCulate{1-16}:EXTRaction:CALibration:CALB:FILE <string>  
[MS46524 only]
- :CALCulate{1-16}:EXTRaction:ELL1:LENGTH <NRf>
- :CALCulate{1-16}:EXTRaction:ELL2:LENGTH <NRf>
- :CALCulate{1-16}:EXTRaction:ELL3:LENGTH <NRf>
- :CALCulate{1-16}:EXTRaction:ELL4:LENGTH <NRf>
- :CALCulate{1-16}:EXTRaction:S2P1filename:FILE <string>
- :CALCulate{1-16}:EXTRaction:S2P2filename:FILE <string>
- :CALCulate{1-16}:EXTRaction:S2P3filename:FILE <string>
- :CALCulate{1-16}:EXTRaction:S2P4filename:FILE <string>

Description: Performs the Network Extraction using Method E on the given channel. Method Type E extracts four 2-port networks using inner and outer calibrations.

No query.

Cmd Parameters: NA

Query Parameters: NA

Query Outputs: NA

Range: NA

Default: NA

Syntax Example: :CALC1:EXTR:METH:E

**:CALCulate{1-16}:EXTRaction[:METHOD]:F**

Applicability: MS46524

Prerequisites: The following commands must be sent before performing network extraction Method F:

- :CALCulate{1-16}:EXTRaction:ZERO:MATCh[:STATE] <char>
- :CALCulate{1-16}:EXTRaction:ELL1:LENGTH <NRf>
- :CALCulate{1-16}:EXTRaction:ELL2:LENGTH <NRf>
- :CALCulate{1-16}:EXTRaction:S2P1filename:FILE <string>
- :CALCulate{1-16}:EXTRaction:S2P2filename:FILE <string>
- :CALCulate{1-16}:EXTRaction:S2P3filename:FILE <string>
- :CALCulate{1-16}:EXTRaction:S2P4filename:FILE <string>

Description: Performs the Network Extraction using Method F on the given channel. Method Type F extracts four 2-port networks with outer calibrations only using the divide-by-two method.

No query.

Cmd Parameters: NA

Query Parameters: NA

    Query Output: NA

    Range: NA

    Default: NA

Syntax Example: :CALC1:EXTR:METH:F

**:CALCulate{1-16}:EXTRaction[:METHOD]:G**

Applicability: MS46524

Prerequisites: The following commands must be sent before performing network extraction Method G:

- :CALCulate{1-16}:EXTRaction:ZERO:MATCh[:STATE] <char>
- :CALCulate{1-16}:EXTRaction:ELL1:LENGTH <NRf>
- :CALCulate{1-16}:EXTRaction:SXPPortpair:PORT <char>
- :CALCulate{1-16}:EXTRaction:S4P1filename:FILE <string>
- :CALCulate{1-16}:EXTRaction:S4P2filename:FILE <string>

Description: Performs the Network Extraction using Method G on the given channel. Method Type G extracts two 4-port networks with outer calibrations only using the divide-by-two method.

No query.

Cmd Parameters: NA

Query Parameters: NA

    Query Output: NA

    Query Output: NA

    Range: NA

    Default: NA

Syntax Example: :CALC1:EXTR:METH:G

## 5-9 :CALCulate{1-16}:DISPlay:MARKer Subsystem

The :CALCulate{1-16}:DISPlay:MARKer subsystem command toggles the display of all markers on and off.

### Marker Subsystems

Related marker configuration, control, and reporting commands are described multiple subsystems:

- “:CALCulate{1-16}:DISPlay:MARKer Subsystem” on page 5-24
- “:CALCulate{1-16}:MARKer Subsystem” on page 5-72
- “:CALCulate{1-16}:PARameter{1-16}:MARKer Subsystem” on page 5-125
- “:CALCulate{1-16}:PARameter{1-16}:MLOCATION Subsystem” on page 5-131
- “:CALCulate{1-16}:PARameter{1-16}:MStatistics Subsystem” on page 5-133
- “:CALCulate{1-16}:TRACE{1-16}:MARKer{1-12} Subsystem” on page 5-236
- “:CALCulate{1-16}[{:SELECTed}]:MARKer Subsystem” on page 5-177
- “:CALCulate{1-16}[{:SELECTed}]:MARKer{1-13} Subsystem” on page 5-198
- “:DISPlay Subsystem” on page 5-281

**:CALCulate{1-16}:DISPlay:MARKer:ALL[:STATE] <char>**

**:CALCulate{1-16}:DISPlay:MARKer:ALL[:STATE]?**

Description: Turns on/off the markers for the indicated channel.

Returns the on/off display status of the existing markers for the indicated channel.

Note that turning the Display Markers ON does not turn on the markers unless the markers are already actively ON via the Marker menu.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default: 1

Syntax Example: :CALC1:DISP:MARK:ALL ON

:CALC1:DISP:MARK:ALL?

**:CALCulate{1-16}:DISPlay:FREQuency:RESolution <NRf>**

**:CALCulate{1-16}:DISPlay:FREQuency:RESolution?**

Description: Sets the marker frequency display resolution.

Returns the marker frequency display resolution.

Cmd Parameters: <NRf> 3 | 6 | 9

Query Parameters: NA

Query Output: <NR1> 3 | 6 | 9

Range: 3 or 6 or 9

Default: 9

Syntax Example: :CALC1:DISP:FREQ:RES 9

:CALC1:DISP:FREQ:RES?

```
:CALCulate{1-16}:DISPlay:MARKer:INOVerlay[:STATE] <char>
:CALCulate{1-16}:DISPlay:MARKer:INOVerlay[:STATE]?
```

Description: Turns on/off the rectangular overlay mode for marker data display on the given channel.

Returns the state of the rectangular overlay mode for the given channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:DISP:MARK:INOV ON  
:CALC1:DISP:MARK:INOV?

## 5-10 :CALCulate{1-16}:EOOE Subsystem

The :CALCulate{1-16}:EOOE subsystem commands provide configuration control, network extraction, and execution functions of the O/E or E/O module.

**Note** This subsystem contains legacy E/O and O/E optical commands. See the more current :OPTical subsystem which includes these E/O and O/E commands, as well as O/O commands:  
[":CALCulate{1-16}:OPTical Subsystem" on page 5-73](#)

### :CALCulate{1-16}:EOOE:EOMeasurment:CALCulate?

Applicability: MS46122, MS46322, MS46522

Description: Query only.

De-embeds the O/E Device characterization data from the E/O calibration of the given channel and return status. This query performs a de-embedding. In order for it to work, the user must first supply O/E device characterization data with an .S2P file and E/O calibration data with a .CHX file.

Cmd Parameters: NA

Query Parameters: <NR1> Query returns one of the following:

- 0 – Valid
- 1 – Invalid
- 2 – InvalidSnPFile
- 3 – InvalidCHXFile
- 4 – InvalidCalType
- 5 – IncompatibleFreq
- 6 – IncompatiblePort
- 7 – NoCalExist
- 8 – WARNING:Extrapolation
- 9 – InvalidPortSelection
- 10 – InvalidSnPFileType
- 11 – InvalidEOFFileType
- 12 – InvalidOEOFFileType
- 13 – WARNING:CHXFileContainsOpticalSetup
- 14 – InvalidPortAssignment
- 15 – InvalidPortReassignment

Range: NA

Default Value: NA

Syntax Example: :CALC1:EOOE:EOM:CALC?

**:CALCulate{1-16}:EOOE:EO4Measurment:CALCulate?**

Applicability: MS46524

Description: Query only.

De-embeds the O/E Device characterization data from the multi-port E/O calibration of the given channel and return status.

Cmd Parameters: NA

Query Parameters: <NR1> Query returns one of the following:

- 0 – Valid
- 1 – Invalid
- 2 – InvalidSnPFile
- 3 – InvalidCHXFile
- 4 – InvalidCalType
- 5 – IncompatibleFreq
- 6 – IncompatiblePort
- 7 – NoCalExist
- 8 – WARNING:Extrapolation
- 9 – InvalidPortSelection
- 10 – InvalidSnPFileType
- 11 – InvalidEOFFileType
- 12 – InvalidOEFFileType
- 13 – WARNING:CHXFileContainsOpticalSetup
- 14 – InvalidPortAssignment
- 15 – InvalidPortReassignment

Range: NA

Default Value: NA

Syntax Example: :CALC1:EOOE:EO4M:CALC?

**:CALCulate{1-16}:EOOE:EOMeasurment:CALFile <string>****:CALCulate{1-16}:EOOE:EOMeasurment:CALFile?**

Applicability: MS46122, MS46322, MS46522

Description: Sets the calibration filename for the E/O measurement on the given channel.

Returns the calibration filename for the E/O measurement of the given channel.

Cmd Parameters: <string> Path and file: 'c:\eofiles\myfile1.chx'

Query Parameters: <char> Query returns: c:\eofiles\myfile1.chx

Range: NA

Default Value: NA

Syntax Example: :CALC1:EOOE:EOM:CALF 'c:\eofiles\myfile1.chx'

:CALC1:EOOE:EOM:CALF?

**:CALCulate{1-16}:EOOE:EO4Measurment:CALFile <string>**

**:CALCulate{1-16}:EOOE:EO4Measurment:CALFile?**

Applicability: MS46524

Description: Sets the O/E calibration filename for the multi-port E/O measurement on the given channel.

Returns the calibration filename for the E/O measurement of the given channel.

Cmd Parameters: <string> Path and file: 'c:\eofiles\myfile1.chx'

Query Parameters: <char> Query returns selected file if no path is defined

Range: NA

Default Value: NA

Syntax Example: :CALC1:EOOE:EO4M:CALF 'c:\eofiles\myfile1.chx'

:CALC1:EOOE:EO4M:CALF?

**:CALCulate{1-16}:EOOE:EOMeasurment:CHARfile <string>**

**:CALCulate{1-16}:EOOE:EOMeasurment:CHARfile?**

Applicability: MS46122, MS46322, MS46522

Description: Sets the O/E device characterization filename for the E/O measurement on the given channel.

Returns the O/E device characterization filename for the E/O measurement of the given channel.

Cmd Parameters: <string> 'c:\eofiles\myfile1.s2p'

Query Parameters: <char> c:\eofiles\myfile1.s2p

Range: NA

Default Value: NA

Syntax Example: :CALC1:EOOE:EOM:CHAR 'c:\eofiles\myfile1.s2p'

:CALC1:EOOE:EOM:CHAR?

**:CALCulate{1-16}:EOOE:EO4Measurment:CHARfile <char>**

**:CALCulate{1-16}:EOOE:EO4Measurment:CHARfile?**

Applicability: MS46524

Description: Sets the O/E device characterization filename for the multi-port E/O measurement on the given channel.

Returns the O/E device characterization filename for the multi-port E/O measurement on the given channel.

Cmd Parameters: <string> Path and file: "c:\eofiles\myfile1.s2p"

Query Parameters: <char> Query returns c:\eofiles\myfile1.s2p

Range: NA

Default Value: NA

Syntax Example: :CALC1:EOOE:EO4M:CHAR "c:\eofiles\myfile1.s2p"

:CALC1:EOOE:EO4M:CHAR?

```
:CALCulate{1-16}:EOOE:EOMeasurment:CHARfile:SWAP[:STATE] <char>
:CALCulate{1-16}:EOOE:EOMeasurment:CHARfile:SWAP[:STATE]?
```

Applicability: MS46122, MS46322, MS46522

Description: Sets the O/E device characterization filename for the E/O measurement on the given channel.

Returns the O/E device characterization filename for the E/O measurement of the given channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:EOOE:EOM:CHAR:SWAP ON

:CALC1:EOOE:EOM:CHAR:SWAP?

```
:CALCulate{1-16}:EOOE:EO4Measurment:CHARfile:SWAP[:STATE] <char>
:CALCulate{1-16}:EOOE:EO4Measurment:CHARfile:SWAP[:STATE]?
```

Applicability: MS46524

Description: Sets the O/E device characterization Swap flag for the multi-port E/O measurement on the given channel.

Returns the O/E device characterization Swap flag for the multi-port E/O measurement of the given channel.

Cmd Parameters: <char> 1|0|ON|OFF

Query Parameters: <char> 1|0

Range: NA

Default Value: 0

Syntax Example: :CALC1:EOOE:EO4M:CHAR:SWAP ON

:CALC1:EOOE:EO4M:CHAR:SWAP?

```
:CALCulate{1-16}:EOOE:EO4Measurment:CONFIGuration <char>
:CALCulate{1-16}:EOOE:EO4Measurment:CONFIGuration?
```

Applicability: MS46524

Description: Sets the configuration of the multi-port E/O measurement on the given channel.

Returns the configuration of the multi-port E/O measurement of the given channel.

Cmd Parameters: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 | PORT2 | PORT3 | PORT4

Query Parameters: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 | PORT2 | PORT3 | PORT4

Range: NA

Default Value: PORT1

Syntax Example: :CALC1:EOOE:EO4M:CONF PORT12

:CALC1:EOOE:EO4M:CONF?

**:CALCulate{1-16}:EOOE:EOMeasurment:EOPort <char>**

**:CALCulate{1-16}:EOOE:EOMeasurment:EOPort?**

Applicability: MS46122, MS46322, MS46522

Description: Sets the E/O port assignment for the E/O measurement on the given channel.

Returns the E/O port assignment for the E/O measurement of the given channel.

Cmd Parameters: <char> PORT1 | PORT2

Query Parameters: <char> PORT1 | PORT2

Range: NA

Default Value: PORT1

Syntax Example: :CALC1:EOOE:EOM:EOP PORT1

:CALC1:EOOE:EOM:EOP?

**:CALCulate{1-16}:EOOE:EO4Measurment:EOPort <char>**

**:CALCulate{1-16}:EOOE:EO4Measurment:EOPort?**

Applicability: MS46524

Description: Sets the configuration of the multi-port E/O measurement on the given channel.

Returns the configuration of the multi-port E/O measurement of the given channel.

Cmd Parameters: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 | PORT2 | PORT3 | PORT4

Query Parameters: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 | PORT2 | PORT3 | PORT4

Range: NA

Default Value: PORT2

Syntax Example: :CALC1:EOOE:EO4M:EOP PORT12

:CALC1:EOOE:EO4M:EOP?

**:CALCulate{1-16}:EOOE:EO4Measurment:OEP <char>**

**:CALCulate{1-16}:EOOE:EO4Measurment:OEP?**

Applicability: MS46524

Description: Sets the O/E port assignment for the multi-port E/O measurement on the given channel.

Returns the O/E port assignment for the multi-port E/O measurement of the given channel.

Cmd Parameters: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 | PORT2 | PORT3 | PORT4

Query Parameters: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 | PORT2 | PORT3 | PORT4

Range: NA

Default Value: PORT2

Syntax Example: :CALC1:EOOE:EO4M:OEP PORT12

:CALC1:EOOE:EO4M:OEP?

**:CALCulate{1-16}:EOOE:GOMeasurment:CALCulate?**

Applicability: MS46122, MS46322, MS46522

Description: Query only.

Measures and stores the E/O device characterization data to the target file of the given channel and return status.

Cmd Parameters: NA

Query Output: <NR1> Query returns one of the following:

- 0 – Valid
- 1 – Invalid
- 2 – InvalidSnPFile
- 3 – InvalidCHXFile
- 4 – InvalidCalType
- 5 – IncompatibleFreq
- 6 – IncompatiblePort
- 7 – NoCalExist
- 8 – WARNING:Extrapolation
- 9 – InvalidPortSelection
- 10 – InvalidSnPFileType
- 11 – InvalidEOFFileType
- 12 – InvalidOEFFileType
- 13 – WARNING:CHXFileContainsOpticalSetup
- 14 – InvalidPortAssignment
- 15 – InvalidPortReassignment

Range: NA

Default Value: NA

Syntax Example: :CALC1:EOOE:GOM:CALC?

**:CALCulate{1-16}:EOOE:GO4Measurment:CALCulate?**

Applicability: MS46524

Description: Query only.

De-embeds the O/E Device characterization data from the E/O calibration of the given channel and return status.

Cmd Parameters: NA

Query Output: <NR1> Query returns one of the following:

- 0 – Valid
- 1 – Invalid
- 2 – InvalidSnPFile
- 3 – InvalidCHXFile
- 4 – InvalidCalType
- 5 – IncompatibleFreq
- 6 – IncompatiblePort
- 7 – NoCalExist
- 8 – WARNING:Extrapolation
- 9 – InvalidPortSelection
- 10 – InvalidSnPFileType
- 11 – InvalidEOFFileType
- 12 – InvalidOEFFileType
- 13 – WARNING:CHXFileContainsOpticalSetup
- 14 – InvalidPortAssignment
- 15 – InvalidPortReassignment

Range: Any number from the query parameters list

Default Value: NA

Syntax Example: :CALC1:EOOE:GO4M:CALC?

**:CALCulate{1-16}:EOOE:GOMeasurment:CALFile <string>****:CALCulate{1-16}:EOOE:GOMeasurment:CALFile?**

Applicability: MS46122, MS46322, MS46522

Description: Sets the calibration filename for the GO measurement on the given channel.

Returns the calibration filename for the GO measurement of the given channel.

Cmd Parameters: <string> Path and file: 'c:\eofiles\myfile1.chx'

Query Parameters: <char> Query returns: c:\eofiles\myfile1.chx

Range: NA

Default: NA

Syntax Example: :CALC1:EOOE:GOM:CALF 'c:\eofiles\myfile1.chx'

:CALC1:EOOE:GOM:CALF?

```
:CALCulate{1-16}:EOOE:GO4Measurment:CALFile <string>
:CALCulate{1-16}:EOOE:GO4Measurment:CALFile?
```

Applicability: MS46524

Description: Sets the O/E calibration filename for the multi-port GO measurement on the given channel.

Returns the O/E calibration filename for the multi-port GO measurement of the given channel.

Cmd Parameters: <string> Path and file: 'c:\eofiles\myfile1.chx'

Query Parameters: <char> Query returns c:\eofiles\myfile1.chx

Range: NA

Default: NA

Syntax Example: :CALC1:EOOE:GO4M:CALF 'c:\eofiles\myfile1.chx'

:CALC1:EOOE:GO4M:CALF?

```
:CALCulate{1-16}:EOOE:GOMeasurment:CHARfile <char>
```

```
:CALCulate{1-16}:EOOE:GOMeasurment:CHARfile?
```

Applicability: MS46122, MS46322, MS46522

Description: Sets the O/E device characterization filename for the GO measurement on the given channel.

Returns the O/E device characterization filename for the GO measurement of the given channel.

Cmd Parameters: <string> Path and file: 'c:\eofiles\myfile1.s2p'

Query Parameters: <char> Query returns: c:\eofiles\myfile1.s2p

Range: NA

Default Value: NA

Syntax Example: :CALC1:EOOE:GOM:CHAR 'c:\eofiles\myfile1.s2p'

:CALC1:EOOE:GOM:CHAR?

```
:CALCulate{1-16}:EOOE:GO4Measurment:CHARfile <char>
```

```
:CALCulate{1-16}:EOOE:GO4Measurment:CHARfile?
```

Applicability: MS46524

Description: Sets the O/E device characterization filename for the multi-port GO measurement on the given channel.

Returns the O/E device characterization filename for the multi-port GO measurement of the given channel.

Cmd Parameters: <char> Path and file: 'c:\eofiles\myfile1.s2p'

Query Parameters: <char> Query returns c:\eofiles\myfile1.s2p

Range: NA

Default Value: NA

Syntax Example: :CALC1:EOOE:GO4M:CHAR 'c:\eofiles\myfile1.s2p'

:CALC1:EOOE:GO4M:CHAR?

**:CALCulate{1-16}:EOOE:GO4Measurment:CONFiguration <char>**

**:CALCulate{1-16}:EOOE:GO4Measurment:CONFiguration?**

Applicability: MS46524

Description: Sets the O/E configuration of the multi-port GO measurement on the given channel.

Returns the O/E configuration of the multi-port GO measurement of the given channel.

Cmd Parameters: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 |  
PORT2 | PORT3 | PORT4

Query Parameters: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 |  
PORT2 | PORT3 | PORT4

Range: NA

Default Value: PORT1

Syntax Example: :CALC1:EOOE:GO4M:CONF PORT12

:CALC1:EOOE:GO4M:CONF?

**:CALCulate{1-16}:EOOE:GOMeasurment:EOPort <char>**

**:CALCulate{1-16}:EOOE:GOMeasurment:EOPort?**

Applicability: MS46122, MS46322, MS46522

Description: Sets the E/O port assignment for the GO measurement on the given channel.

Returns the E/O port assignment for the GO measurement of the given channel.

Cmd Parameters: <char> PORT1 | PORT2

Query Parameters: <char> PORT1 | PORT2

Range: NA

Default Value: PORT1

Syntax Example: :CALC1:EOOE:GOM:EOP PORT1

:CALC1:EOOE:GOM:EOP?

**:CALCulate{1-16}:EOOE:GO4Measurment:EOPort <char>**

**:CALCulate{1-16}:EOOE:GO4Measurment:EOPort?**

Applicability: MS46524

Description: Sets the E/O port assignment for the multi-port GO measurement on the given channel.

Returns the E/O port assignment for the multi-port GO measurement of the given channel.

Cmd Parameters: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 |  
PORT2 | PORT3 | PORT4

Query Parameters: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 |  
PORT2 | PORT3 | PORT4

Range: NA

Default Value: PORT1

Syntax Example: :CALC1:EOOE:GO4M:EOP PORT1

:CALC1:EOOE:GO4M:EOP?

**:CALCulate{1-16}:EOOE:GO4Measurment:OEPort <char>**  
**:CALCulate{1-16}:EOOE:GO4Measurment:OEPort?**

Applicability: MS46524

Description: Sets the O/E port assignment for the multi-port GO measurement on the given channel.

Returns the O/E port assignment for the multi-port GO measurement of the given channel.

Cmd Parameters: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 |  
PORT2 | PORT3 | PORT4

Query Parameters: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 |  
PORT2 | PORT3 | PORT4

Range: NA

Default Value: PORT2

Syntax Example: :CALC1:EOOE:GO4M:EOP Port12

:CALC1:EOOE:GO4M:EOP?

**:CALCulate{1-16}:EOOE:GOMeasurment:TARGetfile <string>**  
**:CALCulate{1-16}:EOOE:GOMeasurment:TARGetfile?**

Applicability: MS46122, MS46322, MS46522

Description: Sets the E/O device characterization target filename to use for the GO measurement on the indicated channel.

Returns the E/O device characterization target filename to use for the GO measurement of the indicated channel.

Cmd Parameters: <string> 'c:\eofiles\myfile1.s2p'

Query Parameters: NA

Query Output: <char> c:\eofiles\myfile1.s2p

Range: N/A

Default Value: N/A

Syntax Example: :CALC1:EOOE:GOM:TARG 'c:\eofiles\myfile1.s2p'

:CALC1:EOOE:GOM:TARG?

**:CALCulate{1-16} : EOOE : MSGS : LIST?**

Description: Query only.

Returns a copy of the EOOE messages list.

Cmd Parameters: NA

Query Parameters: <arbitrary block data>

Query returns the following list:

0 – Valid

1 – Invalid

2 – InvalidSnPFile

3 – InvalidCHXFile

4 – InvalidCalType

5 – IncompatibleFreq

6 – IncompatiblePort

7 – NoCalExist

8 – WARNING:Extrapolation

9 – InvalidPortSelection

10 – InvalidSnPFileType

11 – InvalidEOFFileType

12 – InvalidOEFFileType

13 – WARNING:CHXFileContainsOpticalSetup

14 – InvalidPortAssignment

15 – InvalidPortReassignment

Range: NA

Default Value: NA

Syntax Example: :CALC1 : EOOE : MSGS : LIST?

**:CALCulate{1-16}:EOOE:OEMeasurment:CALCulate?**

Applicability: MS46122, MS46322, MS46522

Description: Query only.

De-embeds the E/O Device characterization data from the O/E calibration of the given channel and return status.

Cmd Parameters: NA

Query Parameters: <NR1> Query returns one of the following:

- 0 – Valid
- 1 – Invalid
- 2 – InvalidSnPFile
- 3 – InvalidCHXFile
- 4 – InvalidCalType
- 5 – IncompatibleFreq
- 6 – IncompatiblePort
- 7 – NoCalExist
- 8 – WARNING:Extrapolation
- 9 – InvalidPortSelection
- 10 – InvalidSnPFileType
- 11 – InvalidEOFFileType
- 12 – InvalidOEFFileType
- 13 – WARNING:CHXFileContainsOpticalSetup
- 14 – InvalidPortAssignment
- 15 – InvalidPortReassignment

Range: NA

Default Value: NA

Syntax Example: :CALC1:EOOE:OEM:CALC? 3

**:CALCulate{1-16}:EOOE:OEMeasurment:CALFile <string>****:CALCulate{1-16}:EOOE:OEMeasurment:CALFile?**

Applicability: MS46122, MS46322, MS46522

Description: Sets the calibration filename for the O/E measurement on the given channel.

Returns the calibration filename for the O/E measurement of the given channel.

Cmd Parameters: <string> 'c:\eofiles\myfile1.chx'

Query Parameters: <char> c:\eofiles\myfile1.chx

Range: NA

Default: NA

Syntax Example: :CALC1:EOOE:OEM:CALF 'c:\eofiles\myfile1.chx'

:CALC1:EOOE:OEM:CALF?

```
:CALCulate{1-16}:EOOE:OE4Measurment:CALFile <string>
:CALCulate{1-16}:EOOE:OE4Measurment:CALFile?
```

Applicability: MS46524

Description: Sets the calibration filename for the multi-port O/E measurement on the given channel.

Returns the calibration filename for the multi-port O/E measurement of the given channel.

Cmd Parameters: <string> Path and file: 'c:\eofiles\myfile1.chx'

Query Parameters: <char> Query returns c:\eofiles\myfile1.chx

Range: NA

Default Value: NA

Syntax Example: :CALC1:EOOE:OE4M:CALF 'c:\eofiles\myfile1.chx'
:CALC1:EOOE:OE4M:CALF?

```
:CALCulate{1-16}:EOOE:OEMeasurment:CHARfile <string>
:CALCulate{1-16}:EOOE:OEMeasurment:CHARfile?
```

Applicability: MS46122, MS46322, MS46522

Description: Sets the E/O device characterization filename to use for the O/E measurement on the given channel.

Returns the E/O device characterization filename to use for the O/E measurement of the given channel.

Cmd Parameters: <string> 'c:\eofiles\myfile1.s2p'

Query Parameters: <char> c:\eofiles\myfile1.s2p

Range: NA

Default: NA

Syntax Example: :CALC1:EOOE:OEM:CHAR 'c:\eofiles\myfile1.s2p'
:CALC1:EOOE:OEM:CHAR?

```
:CALCulate{1-16}:EOOE:OE4Measurment:CHARfile <string>
:CALCulate{1-16}:EOOE:OE4Measurment:CHARfile?
```

Applicability: MS46524

Description: Sets the E/O device characterization filename for the multi-port O/E measurement on the given channel.

Returns the E/O device characterization filename for the multi-port O/E measurement of the given channel.

Cmd Parameters: <string> Path and file: 'c:\eofiles\myfile1.s2p'

Query Parameters: <char> Query returns c:\eofiles\myfile1.s2p

Range: NA

Default Value: NA

Syntax Example: :CALC1:EOOE:OE4M:CHAR 'c:\eofiles\myfile1.s2p'
:CALC1:EOOE:OE4M:CHAR?

```
:CALCulate{1-16}:EOOE:OEMeasurment:CHARfile:SWAP[:STATE] <char>
:CALCulate{1-16}:EOOE:OEMeasurment:CHARfile:SWAP[:STATE]?
```

Applicability: MS46122, MS46322, MS46522

Description: Sets the E/O device characterization Swap flag for the O/E measurement on the given channel.

Returns the E/O device characterization Swap flag for the O/E measurement on the given channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:EOOE:OEM:CHAR:SWAP ON  
:CALC1:EOOE:OEM:CHAR:SWAP?

```
:CALCulate{1-16}:EOOE:OE4Measurment:CHARfile:SWAP[:STATE] <char>
:CALCulate{1-16}:EOOE:OE4Measurment:CHARfile:SWAP[:STATE]?
```

Applicability: MS46524

Description: Sets the E/O device characterization Swap flag for the multi-port O/E measurement on the given channel.

Returns the E/O device characterization Swap flag for the multi-port O/E measurement of the given channel.

Cmd Parameters: <char> 1|0|ON|OFF

Query Parameters: <char> 1|0|

Range: NA

Default Value: 0

Syntax Example: :CALC1:EOOE:OE4M:CHAR:SWAP ON  
:CALC1:EOOE:OE4M:CHAR:SWAP?

```
:CALCulate{1-16}:EOOE:OE4Measurment:CONFIGuration <char>
:CALCulate{1-16}:EOOE:OE4Measurment:CONFIGuration?
```

Applicability: MS46524

Description: Sets the configuration of the multi-port O/E measurement on the given channel.

Returns the configuration of the multi-port O/E measurement of the given channel.

Cmd Parameters: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 |  
PORT2 | PORT3 | PORT4

Query Parameters: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 |  
PORT2 | PORT3 | PORT4

Range: NA

Default Value: PORT2

Syntax Example: :CALC1:EOOE:OE4M:CONF PORT12  
:CALC1:EOOE:OE4M:CONF?

```
:CALCulate{1-16}:EOOE:OEMeasurment:EOPort <char>
:CALCulate{1-16}:EOOE:OEMeasurment:EOPort?
```

Applicability: MS46122, MS46322, MS46522

Description: Sets the E/O port assignment for the O/E measurement on the given channel.

Returns the E/O port assignment for the O/E measurement on the given channel.

Cmd Parameters: <char> PORT1 | PORT2

Query Parameters: <char> PORT1 | PORT2

Range: NA

Default Value: PORT1

Syntax Example: :CALC1:EOOE:OEM:EOP PORT1

```
:CALC1:EOOE:OEM:EOP?
```

```
:CALCulate{1-16}:EOOE:OE4Measurment:EOPort <char>
:CALCulate{1-16}:EOOE:OE4Measurment:EOPort?
```

Applicability: MS46524

Description: Sets the E/O port assignment for the multi-port O/E measurement on the given channel.

Returns the E/O port assignment for the multi-port O/E measurement of the given channel.

Cmd Parameters: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 | PORT2 | PORT3 | PORT4

Query Parameters: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 | PORT2 | PORT3 | PORT4

Range: NA

Default Value: PORT1

Syntax Example: :CALC1:EOOE:OE4M:EOP PORT12

```
:CALC1:EOOE:OE4M:EOP?
```

```
:CALCulate{1-16}:EOOE:OE4Measurment:OEPort <char>
:CALCulate{1-16}:EOOE:OE4Measurment:OEPort?
```

Applicability: MS46524

Description: Sets the O/E port assignment for the multi-port O/E measurement on the given channel.

Returns the O/E port assignment for the multi-port O/E measurement of the given channel.

Cmd Parameters: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 | PORT2 | PORT3 | PORT4

Query Parameters: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 | PORT2 | PORT3 | PORT4

Range: NA

Default Value: PORT2

Syntax Example: :CALC1:EOOE:OE4M:OEP PORT12

```
:CALC1:EOOE:OE4M:OEP?
```

**:CALCulate{1-16}:EOOE:TYPE?**

Applicability: MS46122, MS46322, MS46522

Description: Query only.

Returns the type of EOOE measurement that is currently loaded on the instrument.

Cmd Parameters: NA

Query Parameters: NA

Query Output: <char> EO | OE | OO | NONE

Range: NA

Default Value: NA

Syntax Example: :CALC1:EOOE:TYPE?

## 5-11 :CALCulate{1-16}:FORMAT Subsystem – SnP Data

The :CALCulate{1-16}:FORMAT subsystem commands assign data ports when creating SnP data files.

### I/O Configuration and File Operation Subsystems

Related subsystems for I/O configuration and file operation are:

- “:CALCulate{1-16}:FORMAT Subsystem – SnP Data” on page 5-42
- “:CALCulate{1-16}[:SELected]:DATA Subsystem” on page 5-156
- “:CALCulate{1-16}[:SELected]:TDATA Subsystem” on page 5-223
- “:FORMAT Subsystem” on page 5-301
- “:HCOPy Subsystem” on page 5-304
- “:MMEMory Subsystem” on page 5-310

**:CALCulate{1-16}:FORMAT:S1P:PORT <char>**

**:CALCulate{1-16}:FORMAT:S1P:PORT?**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Assigns data port to use when creating an S1P data file.

Returns the data port assigned to use when creating an S1P data file.

Cmd Parameters: <char> PORT1 | PORT2 | PORT3 | PORT4

Query Parameters: NA

Query Output: <char> PORT1 | PORT2 | PORT3 | PORT4

Range: NA

Default: PORT1

Syntax Example: :CALC1:FORM:S1P:PORT PORT1

:CALC1:FORM:S1P:PORT?

**:CALCulate{1-16}:FORMAT:S2P:PORT <char>**

**:CALCulate{1-16}:FORMAT:S2P:PORT?**

Applicability: The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

Description: Assigns the data port pair to use when creating an S2P data file.

Returns the data port pair assigned to use when creating an S2P data file.

Cmd Parameters: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34

Query Parameters: NA

Query Output: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34

Range: NA

Default: PORT12

Syntax Example: :CALC1:FORM:S2P:PORT PORT12

:CALC1:FORM:S2P:PORT?

```
:CALCulate{1-16} :FORMAT:S3P:PORT <char>
```

```
:CALCulate{1-16} :FORMAT:S3P:PORT?
```

Applicability: MS46524

Description: Assigns the data port triplet to use when creating an S3P data file.

Returns the data port triplet assigned to use when creating an S3P data file.

Cmd Parameters: <char> PORT123 | PORT124 | PORT134 | PORT234

Query Parameters: NA

Query Output: <char> PORT123 | PORT124 | PORT134 | PORT234

Range: NA

Default Value: PORT123

Syntax Example: :CALC1:FORM:S3P:PORT PORT123

```
:CALC1:FORM:S3P:PORT?
```

## 5-12 :CALCulate{1-16}:FSIMulator:NETWork Subsystem

The :CALCulate{1-16}:FSIMulator:NETWork subsystem commands use existing calibration files with a simulated network of various types to evaluate predicted performance. The commands apply to the active network.

For the purposes of entering line information, the ShockLine VNAs use an even/odd mode formalism as is consistent with many circuit simulators. The central concept is that a coupled line pair can be driven in phase (the even mode), or 180 degrees out of phase (the odd mode), or any combination of those modes. The term “common-mode” is also used for even mode. The term “differential-mode” is also used for odd mode.

In the case of very weak coupling where  $C_x$  is close to 0, these modes see the same impedances, same losses, and same phase velocities so there is no need to use this mode separation. As the coupling increases, at the very least, the impedances seen by these two modes diverge requiring two impedance entries where the effective capacitances seen by the conductors in the two modes are clearly different. That is the end of changes for symmetric TEM systems, where this approach will work for common coax, stripline and some microstrip cases.

### Calibration Simulation Subsystems

These subsystems are used to create a calibrated state in the instrument which is followed by adding the required error correction coefficients for the required calibration type. If this approach is used, each error correction coefficient is entered by separate commands. Simulated calibration subsystems are:

- “:CALCulate{1-16}:FSIMulator:NETWork Subsystem” on page 5-44
- “:CALCulate{1-16}:FSIMulator:NETWork {1-50} Subsystem” on page 5-57
- “:SENSe{1-16}:CORRection:COEFFicient:PORT – Simulation Subsystem” on page 5-325
- “:SENSe{1-16}:CORRection:COEFFicient Subsystem” on page 5-331

### :CALCulate{1-16}:FSIMulator:NETWork:ADD

Description: Adds a blank network to be defined on the indicated channel.

No query.

Cmd Parameters: NA

Query Parameters: NA

Query Output: NA

Range: NA

Default Value: NA

Syntax Example: :CALC1:FSIM:NETW:ADD

**:CALCulate{1-16}:FSIMulator:NETWork:C <NRf>**

**:CALCulate{1-16}:FSIMulator:NETWork:C?**

Description: Sets the current LC network capacitance value on the indicated channel.

Returns the current LC network capacitance value on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Farads.

Query Parameters: NA

Query Output: <NR3> The output parameter is in Farads.

Range: MPND

Default Value: 0.00000000000E+000

Syntax Example: :CALC1:FSIM:NETW:C 3.0E-12

:CALC1:FSIM:NETW:C?

**:CALCulate{1-16}:FSIMulator:NETWork:CLEar**

Description: Clears all networks on the indicated channel.

No query.

Cmd Parameters: NA

Query Parameters: NA

Query Output: NA

Range: NA

Default Value: NA

Syntax Example: :CALC1:FSIM:NETW:CLE

**:CALCulate{1-16}:FSIMulator:NETWork:COUNt?**

Description: Query only.

Returns the number of embedding/de-embedding networks on the indicated channel.

Cmd Parameters: NA

Query Parameters: NA

Query Output: <NR1> The output parameter is an integer.

Range: NA

Default Value: 0

Syntax Example: :CALC1:FSIM:NETW:COUN?

```
:CALCulate{1-16}:FSIMulator:NETWork:DIElectric <NRf>
:CALCulate{1-16}:FSIMulator:NETWork:DIElectric?
```

Description: Sets the current T-Line network other dielectric value on the indicated channel.

Returns the current T-Line network dielectric value on the indicated channel.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: NA

Query Output: <NR3> The output parameter is a unitless number.

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :CALC1:FSIM:NETW:DIEL 2.5

```
:CALC1:FSIM:NETW:DIEL?
```

```
:CALCulate{1-16}:FSIMulator:NETWork:DIElectric:EVEN <NRf>
```

```
:CALCulate{1-16}:FSIMulator:NETWork:DIElectric:EVEN?
```

Applicability: MS46524

Description: Sets the current network other dielectric even value on the indicated channel.

Returns the current network dielectric even value on the indicated channel.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: NA

Query Output: <NR3> The output parameter is unitless number.

Range: MPND

Default: 0

Syntax Example: :CALC1:FSIM:NETW:DIEL:EVEN 1.2E0

```
:CALC1:FSIM:NETW:DIEL:EVEN?
```

```
:CALCulate{1-16}:FSIMulator:NETWork:DIElectric:ODD <NRf>
```

```
:CALCulate{1-16}:FSIMulator:NETWork:DIElectric:ODD?
```

Applicability: MS46524

Description: Sets the current network other dielectric odd value on the indicated channel.

Returns the current network dielectric odd value on the indicated channel.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: NA

Query Output: <NR3> The output parameter is unitless number.

Range: MPND

Default: 0

Syntax Example: :CALC1:FSIM:NETW:DIEL:ODD 1.2E0

```
:CALC1:FSIM:NETW:DIEL:ODD?
```

```
:CALCulate{1-16}:FSIMulator:NETWork:FREQuency <NRf>
:CALCulate{1-16}:FSIMulator:NETWork:FREQuency?
```

Description: Sets the current T-Line network line loss frequency value on the indicated channel.

Returns the current T-Line network line loss frequency value on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: NA

Query Output: <NR3> The output parameter is in Hertz.

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :CALC1:FSIM:NETW:FREQ 1E7

```
:CALC1:FSIM:NETW:FREQ?
```

```
:CALCulate{1-16}:FSIMulator:NETWork:L <NRf>
```

```
:CALCulate{1-16}:FSIMulator:NETWork:L?
```

Description: Sets the current LC network inductance value on the indicated channel.

Returns the current LC network inductance value on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Henrys.

Query Parameters: NA

Query Output: <NR3> The output parameter is in Henrys.

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :CALC1:FSIM:NETW:L 3.0E-9

```
:CALC1:FSIM:NETW:L?
```

```
:CALCulate{1-16}:FSIMulator:NETWork:LENGth <NRf>
```

```
:CALCulate{1-16}:FSIMulator:NETWork:LENGth?
```

Description: Sets the current T-Line network line length value on the indicated channel.

Returns the current T-Line network line length value on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: NA

Query Output: <NR3> The output parameter is in Meters.

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :CALC1:FSIM:NETW:LENG 2.5E-2

```
:CALC1:FSIM:NETW:LENG?
```

```
:CALCulate{1-16}:FSIMulator:NETWork:LOSS <NRf>
:CALCulate{1-16}:FSIMulator:NETWork:LOSS?
```

Description: Sets the current T-Line network line loss value on the indicated channel.

Returns the current T-Line network line loss value on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in dB/mm.

Query Parameters: NA

Query Output: <NR3> The output parameter is in dB/mm.

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :CALC1:FSIM:NETW:LOSS 3.0E0

```
:CALC1:FSIM:NETW:LOSS?
```

```
:CALCulate{1-16}:FSIMulator:NETWork:LOSS:EVEN <NRf>
```

```
:CALCulate{1-16}:FSIMulator:NETWork:LOSS:EVEN?
```

Description: Sets the current network line loss even value on the indicated channel.

Returns the current network line loss even value on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in dB/mm.

Query Parameters: NA

Query Output: <NR3> The output parameter is in dB/mm.

Range: MPND

Default: 0

Syntax Example: :CALC1:FSIM:NETW:LOSS:EVEN 3.0E0

```
:CALC1:FSIM:NETW:LOSS:EVEN?
```

```
:CALCulate{1-16}:FSIMulator:NETWork:LOSS:ODD <NRf>
```

```
:CALCulate{1-16}:FSIMulator:NETWork:LOSS:ODD?
```

Description: Sets the current network line loss odd value on the indicated channel.

Returns the current network line loss odd value on the indicated channel.

For the purposes of entering line information, the ShockLine Series VNAs use an even/odd mode formalism as is consistent with many circuit simulators. The central concept is that a coupled-line pair can be driven:

- In phase (the even mode, also called common-mode) or
- 180 degrees out of phase (the odd mode, also called differential-mode) or
- Any combination of those modes.

The term “common-mode” is also used for even mode. The term “differential-mode” is also used for odd mode. In the case of very weak coupling where  $C_x$  is close to 0, these modes see the same impedances, same losses, and same phase velocities so there is no need to use this mode separation.

As the coupling increases, at the very least, the impedances seen by these two modes diverge requiring two impedance entries where the effective capacitances seen by the conductors in the two modes are clearly different. That is the end of changes for symmetric TEM systems, where this approach will work for common coax, stripline, and some microstrip cases.

Cmd Parameters: <NRf> The input parameter is in dB/mm.

Query Parameters: NA

Query Output: <NR3> The output parameter is in dB/mm.

Range: MPND

Default: 0

Syntax Example: :CALC1:FSIM:NETW:LOSS:ODD 3.0E0

```
:CALC1:FSIM:NETW:LOSS:ODD?
```

```
:CALCulate{1-16}:FSIMulator:NETWork:MODE <char>
:CALCulate{1-16}:FSIMulator:NETWork:MODE?
```

Description: Sets the current network embed/de-embed mode on the indicated channel.

Returns the current network embed/de-embed mode on the indicated channel.

Cmd Parameters: <char> EMBed | DEEMbed

Query Parameters: NA

Query Output: <char> EMB | DEEM

Range: NA

Default Value: EMB

Syntax Example: :CALC1:FSIM:NETW:MOD EMB

```
:CALC1:FSIM:NETW:MOD?
```

```
:CALCulate{1-16}:FSIMulator:NETWork:PORT <char>
```

```
:CALCulate{1-16}:FSIMulator:NETWork:PORT?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the current network port number on the indicated channel.

Returns the current network port number on the indicated channel.

Cmd Parameters: **2-Port VNAs:**

<char> PORT1 | PORT2 | PORT12

**4-Port VNAs:**

<char> PORT1 | PORT2 | PORT3 | PORT4 | PORT12 | PORT13 | PORT14 | PORT23  
| PORT24 | PORT34

Query Parameters: NA

Query Output: **2-Port VNAs:**

<char> PORT1 | PORT2 | PORT12

**4-Port VNAs:**

<char> PORT1 | PORT2 | PORT3 | PORT4 | PORT12 | PORT13 | PORT14 | PORT23  
| PORT24 | PORT34

Range: NA

Default Value: PORT1

Syntax Example: :CALC1:FSIM:NETW:PORT PORT1

```
:CALC1:FSIM:NETW:PORT?
```

```
:CALCulate{1-16}:FSIMulator:NETWork:R <NRf>
```

```
:CALCulate{1-16}:FSIMulator:NETWork:R?
```

Description: Sets the current R network resistance value on the indicated channel.

Returns the current R network resistance value on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Ohms.

Query Parameters: NA

Query Output: <NR3> The output parameter is in Ohms.

Range: MPND

Default Value: 0.00000000000E+000

Syntax Example: :CALC1:FSIM:NETW:R 7.5E1

```
:CALC1:FSIM:NETW:R?
```

```
:CALCulate{1-16}:FSIMulator:NETWork:S2P <string>
```

```
:CALCulate{1-16}:FSIMulator:NETWork:S2P?
```

Description: Sets the current network S2P filename on the indicated channel.

Returns the current network S2P filename on the indicated channel.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.s2p' where x:\directory\ must exist. See [Chapter 2, "Programming the ShockLine Series VNA", "Notational Conventions" on page 5-3](#) for more information.

Query Parameters: NA

Query Output: <char> Filename and path in the form: x:\directory\filename.s2p

Range: NA

Default Value: NA

Syntax Example: :CALC1:FSIM:NETW:S2P 'C:\filename.s2p'

```
:CALC1:FSIM:NETW:S2P?
```

```
:CALCulate{1-16}:FSIMulator:NETWork:S4P <string>
```

```
:CALCulate{1-16}:FSIMulator:NETWork:S4P?
```

Applicability: MS46524

Description: Sets the current network S4P Filename on the indicated channel.

Returns the current network S4P Filename on the indicated channel.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.s4p' where x:\directory\filename.s2p must exist. See ["Notational Conventions" on page 2-5](#) for more information.

Query Parameters: NA

Query Output: <string>

Range: NA

Default Value: NA

Syntax Example: :CALC1:FSIM:NETW:S4P 'C:\filename.s4p'

```
:CALC1:FSIM:NETW:S4P?
```

```
:CALCulate{1-16}:FSIMulator:NETWork:S4P:PORTs <char1>, <char2>,
<char3>, <char4>
:CALCulate{1-16}:FSIMulator:NETWork:S4P:PORTs?
```

Applicability: MS46524

Description: Sets the port assignments for the current S4P network to be embedded/de-embedded on the channel indicated.

Returns the port assignments for the current S4P network to be embedded/de-embedded on the channel indicated.

The port assignments are set by four <char> values where:

- The <char1> value sets the Port 1 assignment.
- The <char2> value sets the Port 2 assignment.
- The <char3> value sets the Port 3 assignment.
- The <char4> value sets the Port 4 assignment.
- When considered as a set, the value of each <char> must be unique.

Cmd Parameters: <char1> PORT1 | PORT2 | PORT3 | PORT4  
                   <char2> PORT1 | PORT2 | PORT3 | PORT4  
                   <char3> PORT1 | PORT2 | PORT3 | PORT4  
                   <char4> PORT1 | PORT2 | PORT3 | PORT4

Query Parameters: NA

Query Output: <char> PORT1 | PORT2 | PORT3 | PORT4

Syntax Example: :CALC1:FSIM:NETW:S4P:PORT PORT1, PORT4, PORT3, PORT2  
                   :CALC1:FSIM:NETW:S4P:PORT?

```
:CALCulate{1-16}:FSIMulator:NETWork:S4P:TERM:IGNore <char1>, {<char2>,
..., <charn>}
```

```
:CALCulate{1-16}:FSIMulator:NETWork:S4P:TERM:IGNore?
```

Applicability: MS46524

Description: Sets one or more S-Parameter terms to ignore from the current S4P network to be embedded/de-embedded on the channel indicated. At least one S-Parameter must be specified. Up to 16 S-parameters can be specified.

Returns the S-Parameter terms to ignore from the current S4P network to be embedded/de-embedded on the channel indicated.

Cmd Parameters: <char> S11 | S12 | S21 | S22 | S13 | S31 | S23 | S32 | S33 | S14 | S24 | S34 | S41 |  
                   S42 | S43 | S44

Query Parameters: NA

Query Output: <char> S11 | S12 | S21 | S22 | S13 | S31 | S23 | S32 | S33 | S14 | S24 | S34 | S41 |  
                   S42 | S43 | S44

Range: NA

Default: NA

Syntax Example: :CALC1:FSIM:NETW:S4P:TERM:IGN S11, S22, S33, S44  
                   :CALC1:FSIM:NETW:S4P:TERM:IGN?

```
:CALCulate{1-16}:FSIMulator:NETWork:S4P:TRANsmision:TERM <NRf>
:CALCulate{1-16}:FSIMulator:NETWork:S4P:TRANsmision:TERM?
```

Applicability: MS46524

Description: Sets the current network S4P transmission terms value to 1 (one) or 0 (zero) on the indicated channel.

Returns the current network S4P transmission term set value on the indicated channel.

Cmd Parameters: <NRf> Input parameter is unitless number either 1 or 0.

Query Parameters: NA

Query Output: <NR1> Output parameter is a unitless number.

Range: 0 or 1

Default Value: 0

Syntax Example: :CALC1:FSIM:NETW:S4P:TRAN:TERM 1

```
:CALC1:FSIM:NETW:S4P:TRAN:TERM?
```

```
:CALCulate{1-16}:FSIMulator:NETWork:SWAPs2p <char>
```

```
:CALCulate{1-16}:FSIMulator:NETWork:SWAPs2p?
```

Description: Sets the current network swap S2P file data flag on the indicated channel.

Returns the current network swap S2P file data flag on the indicated channel.

Cmd Parameters: <char> TRUE | FALSe | 1 | 0

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default Value: FALS

Syntax Example: :CALC1:FSIM:NETW:SWAP TRUE

```
:CALC1:FSIM:NETW:SWAP?
```

```
:CALCulate{1-16}:FSIMulator:NETWork:TYPE <char>
:CALCulate{1-16}:FSIMulator:NETWork:TYPE?
```

Description: Sets the current network type on the indicated channel.

Returns the current network type on the indicated channel.

The following network types are available:

#### **Types Available for 2-Port or 4-Port VNA Instruments**

If the instrument is in two-port mode, the following network types are available:

- LS = 2-port – Series inductance
- LP = 2-port – Parallel inductance
- CS = 2-port – Series capacitance
- CP = 2-port – Parallel capacitance
- RS = 2-port – Resistive series network.
- RP = 2-port – Resistive parallel network.
- TLine = A defined transmission line with specifications for Impedance (Ohms), Length (Meters), Loss (dB/mm), @ Frequency (GHz), and Dielectric Value. Note that programmatically, length is entered in Meters. From the user interface, length is usually entered in millimeters.
- S2Pfile = Allows an S2P calibration file to be used.

#### **Types Available for 4-Port VNA Instruments**

If the instrument is in 4-port mode, all of the network types above are available, as well as the following network types:

- S4Pfile = 4-port VNAs only. Allows an S4P calibration file to be used.
- LCKTFour = 4-port VNAs only. A four-node inductance L circuit. Port assignments are defined in separate commands.
- CCKTFour = 4-port VNAs only. A four-node capacitance C circuit. Port assignments are defined in separate commands.
- TLINEFour = 4-port VNAs only. Allows two separate through (“thru”) lines to be used. In separate commands, each line is defined by Length (Meters), @ Frequency (GHz), Z0-Odd (Ohms), Loss-Odd (dB/mm), Dielectric Odd (unitless number), Z0Even (Ohms), Loss-Even (dB/mm), and Dielectric Even (unitless number). Note that programmatically, length is entered in Meters. From the user interface, length is usually entered in millimeters.
- RCKTFour = 4-port VNAs only. A four-node resistive R circuit. Port assignments are defined in separate commands.

Cmd Parameters: **2-Port VNAs:**

<char> LS | LP | CS | CP | RS | RP | TLine | S2Pfile

**4-Port VNAs:**

<char> LS | LP | CS | CP | RS | RP | TLine | S2Pfile | S4Pfile | LCKTFour | CCKTFour | TLINEFour | RCKTFour

Query Parameters: NA

Query Output: **2-Port VNAs:**

<char> LS | LP | CS | CP | RS | RP | TL | S2P

**4-Port VNAs:**

<char> LS | LP | CS | CP | RS | RP | TL | S2P | S4P | LCKTF | CCKTF | TLINEF | RCKTF

Range: NA

Default Value: LSCP

Syntax Example: :CALC1:FSIM:NETW:TYP S2PFILE  
:CALC1:FSIM:NETW:TYP?

**:CALCulate{1-16}:FSIMulator:NETWork:Z0 <NRf>**  
**:CALCulate{1-16}:FSIMulator:NETWork:Z0?**

Description: Sets the current T-Line network impedance Z0 (Z zero) value on the indicated channel.  
Returns the current T-Line network impedance value on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Ohms.

Query Parameters: NA

Query Output: <NR3> The output parameter is in Ohms.

Range: MPND

Default Value: 50.0000000000E+000

Syntax Example: :CALC1:FSIM:NETW:Z0 7.5E1  
:CALC1:FSIM:NETW:Z0?

**:CALCulate{1-16}:FSIMulator:NETWork:Z0:EVEN <NRf>**  
**:CALCulate{1-16}:FSIMulator:NETWork:Z0:EVEN?**

Applicability: MS46524

Description: Sets the current network impedance Z0 (Z zero) even value on the indicated channel.  
Returns the current network impedance even value on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Ohms.

Query Parameters: NA

Query Output: <NR3> The output parameter is in Ohms.

Range: MPND

Default: 50.0000000000E+000

Syntax Example: :CALC1:FSIM:NETW:Z0:EVEN 7.5E1  
:CALC1:FSIM:NETW:Z0:EVEN?

**:CALCulate{1-16}:FSIMulator:NETWork:Z0:ODD <NRf>**  
**:CALCulate{1-16}:FSIMulator:NETWork:Z0:ODD?**

Applicability: MS46524

Description: Sets the current network impedance odd value on the indicated channel.  
Returns the current network impedance odd value on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Ohms.

Query Parameters: NA

Query Output: <NR3> The output parameter is in Ohms.

Range: MPND

Default: 50

Syntax Example: :CALC1:FSIM:NETW:Z0:ODD 7.5E1  
:CALC1:FSIM:NETW:Z0:ODD?

```
:CALCulate{1-16}:FSIMulator:NETWork[:STATE] <char>
:CALCulate{1-16}:FSIMulator:NETWork[:STATE]?
```

Description: Sets the network embedding/de-embedding function on/off state on the indicated channel.

Returns the network embedding/de-embedding function on/off state on the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:FSIM:NETW ON

```
:CALC1:FSIM:NETW?
```

## 5-13 :CALCulate{1-16}:FSIMulator:NETWork {1-50} Subsystem

The :CALCulate{1-16}:FSIMulator:NETWork{1-50} subsystem uses existing calibration files with a simulated network of various types to evaluate predicted performance. The commands use index numbers to identify the appropriate network.

For the purposes of entering line information, the MS46322As use an even/odd mode formalism as is consistent with many circuit simulators. The central concept is that a coupled line pair can be driven in phase (the even mode) or 180 degrees out of phase (the odd mode) or any combination of those modes. The term “common-mode” is also used for even mode. The term “differential-mode” is also used for odd mode.

In the case of very weak coupling where  $C_x$  is close to 0, these modes see the same impedances, same losses, and same phase velocities so there is no need to use this mode separation. As the coupling increases, at the very least, the impedances seen by these two modes diverge requiring two impedance entries where the effective capacitances seen by the conductors in the two modes are clearly different. That is the end of changes for symmetric TEM systems, where this approach will work for common coax, stripline and some microstrip cases.

### Calibration Simulation Subsystems

These subsystems are used to create a calibrated state in the instrument which is followed by adding the required error correction coefficients for the required calibration type. If this approach is used, each error correction coefficient is entered by separate commands. Simulated calibration subsystems are:

- “:CALCulate{1-16}:FSIMulator:NETWork Subsystem” on page 5-44
- “:CALCulate{1-16}:FSIMulator:NETWork {1-50} Subsystem” on page 5-57
- “:SENSe{1-16}:CORRection:COEFFicient:PORT – Simulation Subsystem” on page 5-325
- “:SENSe{1-16}:CORRection:COEFFicient Subsystem” on page 5-331

**:CALCulate{1-16}:FSIMulator:NETWork{1-50}:C <NRf>**

**:CALCulate{1-16}:FSIMulator:NETWork{1-50}:C?**

Description: Modifies the indicated LC network capacitance value on the indicated channel.

Returns the indicated LC network capacitance value on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Farads.

Query Parameters: <NR3> The output parameter is in Farads.

Range: MPND

Default Value: 0.00000000000E+000

Syntax Example: :CALC1:FSIM:NETW1:C 3.0E-12

:CALC1:FSIM:NETW1:C?

**:CALCulate{1-16}:FSIMulator:NETWork{1-50}:DELetE**

Description: Deletes the indicated network from the indicated channel.

No query.

Cmd Parameters: NA

Query Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :CALC1:FSIM:NETW1:DEL

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:DIElectric <NRf>
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:DIElectric?
```

Description: Modifies the indicated T-Line network other dielectric value on the indicated channel.

Returns the indicated T-Line network other dielectric value on the indicated channel.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR3> The output parameter is a unitless number.

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :CALC1:FSIM:NETW1:DIEL 2.5E0  
:CALC1:FSIM:NETW1:DIEL?

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:DIElectric:EVEN <NRf>
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:DIElectric:EVEN?
```

Applicability: MS46524

Description: Modifies the indicated network other dielectric even value on the indicated channel.

Returns the indicated network dielectric even value on the indicated channel.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR3> The output parameter is a unitless number.

Range: MPND

Default Value: See [Chapter 2, “Programming the ShockLine Series VNA”, “Calibration Component Parameters” on page 2-31](#).

Syntax Example: :CALC1:FSIM:NETW1:DIEL:EVEN 1.2E0  
:CALC1:FSIM:NETW1:DIEL:EVEN?

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:DIElectric:ODD <NRf>
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:DIElectric:ODD?
```

Applicability: MS46524

Description: Modifies the indicated network other dielectric odd value on the indicated channel.

Returns the indicated network dielectric odd value on the indicated channel.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR3> The output parameter is a unitless number.

Range: MPND

Default Value: See [“Calibration Component Parameters” on page 2-31](#).

Syntax Example: :CALC1:FSIM:NETW1:DIEL:ODD 1.2E0  
:CALC1:FSIM:NETW1:DIEL:ODD?

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:FREQuency <NRf>
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:FREQuency?
```

Description: Modifies the indicated T-Line network line loss frequency value on the indicated channel.

Returns the indicated T-Line network line loss frequency value on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: MPND

Default Value: 0.00000000000E+000

Syntax Example: :CALC1:FSIM:NETW1:FREQ 1.0E4  
:CALC1:FSIM:NETW1:FREQ?

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:L <NRf>
```

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:L?
```

Description: Modifies the indicated LC network inductance value on the indicated channel.

Returns the indicated LC network inductance value on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Henrys.

Query Parameters: <NR3> The output parameter is in Henrys.

Range: MPND

Default Value: 0.00000000000E+000

Syntax Example: :CALC1:FSIM:NETW1:L 5.0E-9  
:CALC1:FSIM:NETW1:L?

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:LENGth <NRf>
```

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:LENGth?
```

Description: Modifies the indicated T-Line network line length value on the indicated channel.

Returns the indicated T-Line network line length value on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default Value: 0.00000000000E+000

Syntax Example: :CALC1:FSIM:NETW1:LENG 2.5E-2  
:CALC1:FSIM:NETW1:LENG?

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:LOSS <NRf>
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:LOSS?
```

Description: Modifies the indicated T-Line network line loss value on the indicated channel.

Returns the indicated T-Line network line loss value on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in dB/mm.

Query Parameters: <NR3> The output parameter is in dB/mm.

Range: MPND

Default Value: 0.00000000000E+000

Syntax Example: :CALC1:FSIM:NETW1:LOSS 3.0E0
:CALC1:FSIM:NETW1:LOSS?

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:LOSS:EVEN <NRf>
```

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:LOSS:EVEN?
```

Applicability: MS46524

Description: Modifies the indicated network line loss even value on the indicated channel.

Returns the indicated network line loss even value on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in dB/mm.

Query Parameters: <NR3> The output parameter is in dB/mm.

Range: MPND

Default: 0

Syntax Example: :CALC1:FSIM:NETW1:LOSS:EVEN 3.0E0
:CALC1:FSIM:NETW1:LOSS:EVEN?

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:LOSS:ODD <NRf>
```

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:LOSS:ODD?
```

Applicability: MS46524

Description: Modifies the indicated network line loss odd value on the indicated channel.

Returns the indicated network line loss odd value on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in dB/mm.

Query Parameters: <NR3> The output parameter is in dB/mm.

Range: MPND

Default: 0

Syntax Example: :CALC1:FSIM:NETW1:LOSS:ODD 3.0E0
:CALC1:FSIM:NETW1:LOSS:ODD?

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:MODE <char>
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:MODE?
```

Description: Modifies the indicated network embed/de-embed mode on the indicated channel.

Returns the indicated network embed/de-embed mode on the indicated channel.

Cmd Parameters: <char> EMBed | DEEMbed

Query Parameters: <char> EMB | DEEM

Range: NA

Default Value: EMB

Syntax Example: :CALC1:FSIM:NETW1:MOD EMB  
                   :CALC1:FSIM:NETW1:MOD?

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:PORT <char>
```

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:PORT?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Modifies the indicated network port number on the indicated channel.

Returns the indicated network port number on the indicated channel.

Cmd Parameters: **2-Port VNAs:**

<char> PORT1 | PORT2 | PORT12

**4-Port VNAs:**

<char> PORT1 | PORT2 | PORT3 | PORT4 | PORT12 | PORT13 | PORT14 | PORT23  
   | PORT24 | PORT34

Query Parameters: **2-Port VNAs:**

<char> PORT1 | PORT2 | PORT12

**4-Port VNAs:**

<char> PORT1 | PORT2 | PORT3 | PORT4 | PORT12 | PORT13 | PORT14 | PORT23  
   | PORT24 | PORT34

Range: NA

Default Value: PORT1

Syntax Example: :CALC1:FSIM:NETW1:PORT PORT1  
                   :CALC1:FSIM:NETW1:PORT?

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:R <NRf>
```

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:R?
```

Description: Modifies the indicated R network resistance value on the indicated channel.

Returns the indicated R network resistance value on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Ohms.

Query Parameters: <NR3> The output parameter is in Ohms.

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :CALC1:FSIM:NETW1:R 7.5E1  
                   :CALC1:FSIM:NETW1:R?

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:S2P <string>
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:S2P?
```

Description: Modifies the indicated network S2P filename on the indicated channel.

Returns the indicated network S2P filename on the indicated channel.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.s2p' where  
x:\directory\filename.s2p must exist. See [Chapter 2, "Programming the ShockLine Series VNA"](#), ["Notational Conventions"](#) on page 5-3 for more information.

Query Parameters: <char> Filename and path in the form: x:\directory\filename.s2p

Range: NA

Default Value: NA

Syntax Example: :CALC1:FSIM:NETW1:S2P 'C:\filename.s2p'
:CALC1:FSIM:NETW1:S2P?

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:S4P <string>
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:S4P?
```

Applicability: MS46524

Description: Modifies the indicated network S4P filename on the indicated channel.

Returns the indicated network S4P filename on the indicated channel.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.s4p' where  
x:\directory\filename.s4p must exist. See [Chapter 2, "Programming the ShockLine Series VNA"](#), ["Notational Conventions"](#) on page 2-5 for more information.

Query Parameters: <string>

Range: NA

Default Value: NA

Syntax Example: :CALC1:FSIM:NETW1:S4P 'C:\filename.s4p'
:CALC1:FSIM:NETW1:S4P?

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:S4P:PORTs <char>, <char>,
          <char>, <char>
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:S4P:PORTs?
```

Applicability: MS46524

Description: Sets the port assignments for the indicated S4P network to be embedded/de-embedded on the indicated channel.

Returns the port assignments for the indicated S4P network to be embedded/de-embedded on the channel indicated.

The first entered port number is for Port 1, the second for Port 2, the third for Port 3, and the fourth for Port 4. For the Syntax Example below, to assign Port 2, Port 3, Port 1, and Port 4, the command is:

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:S4P:PORTs PORT2, PORT3,
          PORT1, PORT4
```

Cmd Parameters: <char> PORT1 | PORT2 | PORT3 | PORT4

Query Parameters: <char> PORT1 | PORT2 | PORT3 | PORT4

Range: NA

Default: NA

Syntax Example: :CALC1:FSIM:NETW1:S4P:PORT PORT2,PORT3,PORT1,PORT4  
:CALC1:FSIM:NETW1:S4P:PORT?

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:S4P:TERM:IGNore <char>
          {,<char2>, . . . ,<charn>}
```

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:S4P:TERM:IGNore?
```

Applicability: MS46524

Description: Sets the S-Parameters to ignore from the indicated S4P network to be embed/de-embed on the channel indicated. At least one S-Parameter to ignore must be defined. Up to 16 S-Parameters to ignore can be defined.

Returns the S-Parameters to ignore from the indicated S4P network to be embedded/de-embedded on the channel indicated.

Cmd Parameters: <char> S11 | S12 | S21 | S22 | S13 | S31 | S23 | S32 | S33 | S14 | S24 | S34 | S41 | S42 | S43 | S44

Query Parameters: <char> S11 | S12 | S21 | S22 | S13 | S31 | S23 | S32 | S33 | S14 | S24 | S34 | S41 | S42 | S43 | S44

Range: NA

Default: NA

Syntax Example: :CALC1:FSIM:NETW1:S4P:TERM:IGN S11, S22, S33, S44  
:CALC1:FSIM:NETW1:S4P:TERM:IGN?

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:S4P:TRANsmision:TERM <NRf>
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:S4P:TRANsmision:TERM?
```

Applicability: MS46524

Description: Sets the current network S4P Transmission Terms value to 1 (one) or 0 (zero) on the indicated channel.

Returns the current network S4P transmission term set value on the indicated channel.

Cmd Parameters: <NRf> Input parameter is unitless number either 1 or 0.

Query Parameters: <NR1> Output parameter is a unitless number.

Range: 0 or 1

Default Value: 0

Syntax Example: :CALC1:FSIM:NETW1:S4P:TRAN:TERM

```
:CALC1:FSIM:NETW1:S4P:TRAN:TERM?
```

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:SWAPs2p <char>
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:SWAPs2p?
```

Description: Modifies the indicated network swap S2P file data flag on the indicated channel.

Returns the indicated network swap S2P file data flag on the indicated channel.

Cmd Parameters: <char> TRUE | FALSE | 1 | 0

Query Parameters: <char> 1 | 0

Range: NA

Default Value: FALSE

Syntax Example: :CALC1:FSIM:NETW1:SWAP TRUE

```
:CALC1:FSIM:NETW1:SWAP?
```

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:TYPE <char>
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:TYPE?
```

Description: On the indicated channel, modifies the indicated network type.

Returns the indicated network type on the indicated channel.

The following network types are available.

### **Types Available for 2-Port VNA Instruments**

If the instrument is in two-port mode, the following types are available:

- s = 2-port – Series inductance
- LP = 2-port – Parallel inductance
- CS = 2-port – Series capacitance
- CP = 2-port – Parallel capacitance
- RS = 2-port – Resistive series network.
- RP = 2-port – Resistive parallel network.
- TLine = A defined transmission line with specifications for Impedance (Ohms), Length (Meters), Loss (dB/mm), @ Frequency (GHz), and Dielectric Value. Note that programmatically, length is entered in Meters. From the user interface, length is usually entered in millimeters.
- S2Pfile = Allows an S2P calibration file to be used.

### Types Available for 4-Port VNA Instruments

If the instrument is in four-port mode, all of the network types above are available, as well as the following network types:

- S4Pfile = 4-port VNAs only. Allows an S4P calibration file to be used.
- LCKTFour = 4-port VNAs only. A four-node inductance L circuit. Port assignments are defined in separate commands.
- CCKTFour = 4-port VNAs only. A four-node capacitance C circuit. Port assignments are defined in separate commands.
- TLINEFour = 4-port VNAs only. Allows two separate through (“thru”) lines to be used. In separate commands, each line is defined by Length (Meters), @ Frequency (GHz), Z0-Odd (Ohms), Loss-Odd (dB/mm), Dielectric Odd (unitless number), Z0Even (Ohms), Loss-Even (dB/mm), and Dielectric Even (unitless number). Note that programmatically, length is entered in Meters. From the user interface, length is usually entered in millimeters.
- RCKTFour = 4-port VNAs only. A four-node resistive R circuit. Port assignments are defined in separate commands.

**Cmd Parameters:** <char> LS | LP | CS | CP | RS | RP | TLine | S2Pfile  
 <char> LS | LP | CS | CP | RS | RP | TLine | S2Pfile | S4Pfile | LCKTFour |  
 CCKTFour | TLINEFour | RCKTFour

**Query Parameters:** <char> LS | LP | CS | CP | RS | RP | TL | S2P  
 <char> LS | LP | CS | CP | RS | RP | TL | S2P | S4P | LCKTF | CCKTF | TLINEF |  
 RCKTF

**Range:** NA

**Default Value:** LSCP

**Syntax Example:** :CALC1:FSIM:NETW1:TYP TLine  
 :CALC1:FSIM:NETW1:TYP?

**:CALCulate{1-16}:FSIMulator:NETWork{1-50}:Z0 <NRf>**  
**:CALCulate{1-16}:FSIMulator:NETWork{1-50}:Z0?**

**Description:** Modifies the indicated T-Line network impedance value on the indicated channel.

Returns the indicated T-Line network impedance value on the indicated channel.

**Cmd Parameters:** <NRf> The input parameter is in Ohms.

**Query Parameters:** <NR3> The output parameter is in Ohms.

**Range:** MPND

**Default Value:** 50.0000000000E+000

**Syntax Example:** :CALC1:FSIM:NETW1:Z0 7.5E1  
 :CALC1:FSIM:NETW1:Z0?

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:Z0:EVEN <NRf>
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:Z0:EVEN?
```

Applicability: MS46524

Description: Modifies the indicated network impedance even value on the indicated channel.

Returns the indicated network impedance even value on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Ohms.

Query Parameters: <NR3> The output parameter is in Ohms.

Range: MPND

Default: 5.00000000000E+001

Syntax Example: :CALC1:FSIM:NETW1:Z0:EVEN 7.5E1

```
:CALC1:FSIM:NETW1:Z0:EVEN?
```

```
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:Z0:ODD <NRf>
:CALCulate{1-16}:FSIMulator:NETWork{1-50}:Z0:ODD?
```

Applicability: MS46524

Description: Modifies the indicated network impedance odd value on the indicated channel.

Returns the indicated network impedance odd value on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Ohms.

Query Parameters: <NR3> The output parameter is in Ohms.

Range: MPND

Default: 5.00000000000E+001

Syntax Example: :CALC1:FSIM:NETW1:Z0:ODD 7.5E1

```
:CALC1:FSIM:NETW1:Z0:ODD?
```

## 5-14 CALCulate{1-16}:IF Ranging Subsystem

The :CALCulate:IFRanging:subsystem commands provides disable ranging control.

```
:CALCulate:IFRanging:DISable[:STATe]<char>
:CALCulate:IFRanging:DISable?
```

Applicability: MS4652xA

Description : Set the on/off value of IF Ranging disable. Valid only on MS4652xs systems.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default: 0

Example: CALC:IFR:DIS 1

```
:CALC:IFR:DIS?
```

## 5-15 :CALCulate{1-16}:IMPedance:TRANSformation Subsystem

The :CALCulate{1-16}:IMPedance:TRANSformation subsystem commands set configuration parameters for impedance transformation.

### Calibration Setup Subsystems

These subsystems are used during various phases of calibration configuration setup:

- “:CALCulate{1-16}:IMPedance:TRANSformation Subsystem” on page 5-68
- “:CALCulate{1-16}:REFerence Subsystem” on page 5-144
- “:SENSe{1-16}:CORRection:COLLect:METHod Subsystem” on page 5-399
- “:SENSe{1-16}:CORRection:COLLect:MICrostrip Subsystem” on page 5-400
- “:SENSe{1-16}:CORRection:COLLect:MULTIple Subsystem” on page 5-405
- “:SENSe{1-16}:CORRection:COLLect:WAVeguide Subsystem” on page 5-463
- “:SENSe{1-16}:CORRection:COLLect[:CALa]:PORT Subsystem” on page 5-450
- “:SENSe{1-16}:CORRection:ISOLation Subsystem” on page 5-508
- “:SENSe{1-16}:CORRection:STATe Subsystem” on page 5-509

```
:CALCulate{1-16}:IMPedance:TRANSformation:PORT{12 | 13 | 14 | 23 | 24 | 34}:PAIR:COMMON:R0 <NRf>
:CALCulate{1-16}:IMPedance:TRANSformation:PORT{12 | 13 | 14 | 23 | 24 | 34}:PAIR:COMMON:R0?
```

**Applicability:** The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

**Description:** Sets the Common Mode Resistive term value for given port pair on the given channel.

Returns the Common Mode Resistive term value for given port pair on the given channel.

**Cmd Parameters:** <NRf> The input parameter is in Ohms.

**Query Parameters:** <NR3> The output parameter is in Ohms.

**Range:** Any value greater than 0 to maximum value storable by 32-bit floating point number.

**Default Value:** 0

**Syntax Example:** :CALC1:IMP:TRAN:PORT12:PAIR:COMM:R0 40

```
:CALC1:IMP:TRAN:PORT12:PAIR:COMM:R0?
```

```
:CALCulate{1-16}:IMPedance:TRANSformation:PORT{1-4}:R0 <NRf>
:CALCulate{1-16}:IMPedance:TRANSformation:PORT{1-4}:R0?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the resistive value of the impedance transformation on the given port and channel.  
If the channel is not specified, applies the resistive impedance transformation to the active port on the active channel.

Returns the resistive value of the impedance transformation on the given port and channel.

Cmd Parameters: <NRf> The input parameter is in Ohms.

Query Parameters: <NR3> The output parameter is in Ohms.

Range: MPND

Default Value: 0

Syntax Example: :CALC1:IMP:TRAN:PORT1:R0 25.5  
:CALC1:IMP:TRAN:PORT1:R0?

```
:CALCulate{1-16}:IMPedance:TRANSformation:PORT{1-4}:X0 <NRf>
:CALCulate{1-16}:IMPedance:TRANSformation:PORT{1-4}:X0?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the reactive value of the impedance transformation on the given port and channel.  
Returns the reactive value of the impedance transformation on the given port and channel.

Cmd Parameters: <NRf> The input parameter is in Ohms

Query Parameters: <NR3> The input parameter is in Ohms.

Range: MPND

Default Value: NA

Syntax Example: :CALC1:IMP:TRAN:PORT1:X0 1E3  
:CALC1:IMP:TRAN:PORT1:X0?

```
:CALCulate{1-16}:IMPedance:TRANSformation:PORT{12 | 13 | 14 | 23 | 24 | 34}:PAIR:COMMON:X0 <NRf>
```

```
:CALCulate{1-16}:IMPedance:TRANSformation:PORT{12 | 13 | 14 | 23 | 24 | 34}:PAIR:COMMON:X0?
```

Applicability: The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

Description: Sets the Common Mode Reactive term value for given port pair on the given channel.

Returns the Common Mode Reactive term value for given port pair on the given channel.

Cmd Parameters: <NRf> The input parameter (in Ohms)

Query Parameters: <NR3> The output parameter, (in Ohms)

Min-Max Range: Any value storable by 32-bit floating point number (positive or negative)

Default Value: 00

Syntax Example: :CALC1:IMP:TRAN:PORT12:PAIR:COMM:X0 -20  
:CALC1:IMP:TRAN:PORT12:PAIR:COMM:X0?

```
:CALCulate{1-16}:IMPedance:TRANSformation:PORT{12 | 13 | 14 | 23 | 24 | 34}:PAIR:DIFFerential:R0 <NRf>
:CALCulate{1-16}:IMPedance:TRANSformation:PORT{12 | 13 | 14 | 23 | 24 | 34}:PAIR:DIFFerential:R0?
```

**Applicability:** The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

**Description:** Sets the Differential mode Resistive term value for given Port Pair on the given Channel.

Returns the differential mode Resistive term value for given Port Pair on the given Channel

**Cmd Parameters:** <NRf> The input parameter (in Ohms)

**Query Parameters:** <NR3> The output parameter, (in Ohms)

**Min-Max Range:** Any value greater than 0 to maximum value storable by 32-bit floating point number

**Default Value:** 50

**Syntax Example:** :CALC1:IMP:TRAN:PORT12:PAIR:DIFF:R0 40  
:CALC1:IMP:TRAN:PORT12:PAIR:DIFF:R0?

```
:CALCulate{1-16}:IMPedance:TRANSformation:PORT{12 | 13 | 14 | 23 | 24 | 34}:PAIR:DIFFerential:X0 <NRf>
:CALCulate{1-16}:IMPedance:TRANSformation:PORT{12 | 13 | 14 | 23 | 24 | 34}:PAIR:DIFFerential:X0?
```

**Applicability:** The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

**Description:** Sets the Differential mode Reactive term value for given Port Pair on the indicated channel.

Returns the Differential mode Reactive term value for given Port Pair on the indicated channel.

**Cmd Parameters:** <NRf> The input parameter (in Ohms)

**Query Parameters:** <NR3> The output parameter (in Ohms)

**Min-Max Range :** Any value storable by 32-bit floating point number (positive or negative)

**Default Value:** 50

**Syntax Example :** :CALC1:IMP:TRAN:PORT12:PAIR:DIFF:X0 -20  
:CALC1:IMP:TRAN:PORT12:PAIR:DIFF:X0?

```
:CALCulate{1-16}:IMPedance:TRANSformation[:STATE] <char>
:CALCulate{1-16}:IMPedance:TRANSformation[:STATE]?
```

**Description:** Toggles the impedance transformation on and off on the indicated channel.

Returns the impedance transformation on/off status for the indicated channel.

**Cmd Parameters:** <char> 1 | 0 | ON | OFF

**Query Parameters:** <char> 1 | 0

**Range:** NA

**Default Value:** 0

**Syntax Example:** :CALC1:IMP:TRAN ON  
:CALC1:IMP:TRAN?

```
:CALCulate{1-16}:IMPedance:TRANSformation:TYPE <char>
:CALCulate{1-16}:IMPedance:TRANSformation:TYPE?
```

Description: Sets the impedance transformation type (by Port or by Port Pair) on the indicated channel.

Returns the impedance transformation type (by Port or by Port Pair) on the indicated channel.

Cmd Parameters: PORT | PAIR

Query Parameters: NA

Query Output: PORT | PAIR

Min-Max Range: NA

Default Value: PORT

Syntax Example: :CALC1:IMP:TRAN:TYPE PORT

```
:CALC1:IMP:TRAN:TYPE?
```

## 5-16 :CALCulate{1-16}:MARKer Subsystem

The :CALCulate{1-16}:MARKer subsystem commands provide control of the marker table display and marker coupling.

### Marker Subsystems

Related marker configuration, control, and reporting commands are described multiple subsystems:

- “:CALCulate{1-16}:DISPlay:MARKer Subsystem” on page 5-24
- “:CALCulate{1-16}:MARKer Subsystem” on page 5-72
- “:CALCulate{1-16}:PARameter{1-16}:MARKer Subsystem” on page 5-125
- “:CALCulate{1-16}:PARameter{1-16}:MLOCation Subsystem” on page 5-131
- “:CALCulate{1-16}:PARameter{1-16}:MSTatistics Subsystem” on page 5-133
- “:CALCulate{1-16}:TRACE{1-16}:MARKer{1-12} Subsystem” on page 5-236
- “:CALCulate{1-16}[{:SELECTed}]:MARKer Subsystem” on page 5-177
- “:CALCulate{1-16}[{:SELECTed}]:MARKer{1-13} Subsystem” on page 5-198
- “:DISPlay Subsystem” on page 5-281

**:CALCulate:MARKer:TABLE[:STATE] <char>**

**:CALCulate:MARKer:TABLE[:STATE]?**

Description: Turns the marker table display on/off.

Returns the marker table display on/off status.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC:MARK:TAB ON

:CALC:MARK:TAB?

**:CALCulate{1-16}:MARKer:COUPle <char>**

**:CALCulate{1-16}:MARKer:COUPLE?**

Description: Toggles marker coupling on/off, which changes the active state of the markers on other traces to match that of the markers on the active trace when toggled on. For example, if Trace 2 has only Marker 2 on at 2 GHz, every other trace will change to have only Marker 2 on at 2 GHz.

Returns the marker coupling on/off state.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:MARK:COUP ON

:CALC1:MARK:COUP?

## 5-17 :CALCulate{1-16}:OPTical Subsystem

The following commands provide for generating E/O, O/E, and O/O measurements on optical conversion components and purely optical components. These commands are listed in the following sections:

- “Optical Commands – General” on page 5-73
- “E/O Measurement Commands” on page 5-75
- “O/E Measurement Commands” on page 5-82
- “O/O Measurement Commands” on page 5-94

### Optical Commands – General

**:CALCulate{1-16}:OPTical:ISON[:STATe] <char>**  
**:CALCulate{1-16}:OPTical:ISON[:STATe]?**

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Sets the Optical Measurements on/off state on the indicated channel.

Returns the Optical Measurements on/off state on the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:OPT:ISON ON

:CALC1:OPT:ISON?

**:CALCulate{1-16}:OPTical:MSGs:LIST?**

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Query only.

Returns a copy of the Optical messages list.

Cmd Parameters: NA

Query Parameters: NA

Query Output: <NR1> Query returns one of the following:

- 0 – Valid
- 1 – Invalid
- 2 – InvalidSnPFile
- 3 – InvalidCHXFile
- 4 – InvalidCalType
- 5 – IncompatibleFreq
- 6 – IncompatiblePort
- 7 – NoCalExist
- 8 – WARNING:Extrapolation
- 9 – InvalidPortSelection
- 10 – InvalidSnPFileType
- 11 – InvalidEOFFileType
- 12 – InvalidOEFFileType
- 13 – WARNING:CHXFileContainsOpticalSetup
- 14 – InvalidPortAssignment
- 15 – InvalidPortReassignment

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:MSGs:LIST?

**:CALCulate{1-16}:OPTical:TYPE?**

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Query only.

Returns the type of Optical measurement that is currently loaded on the instrument.

Cmd Parameters: NA

Query Parameters: NA

Query Output: <char> EO | OE | OO | NONE

Range: NA

Default Value: NONE

Syntax Example: :CALC1:OPT:TYPE?

## E/O Measurement Commands

### :CALCulate{1-16}:OPTical:EO:CALCulate?

Applicability: MS46122, MS46322, MS46522, MS46524

Description: De-embeds the O/E Device characterization data from the E/O calibration of the given channel and return status.

Returns the O/E Device characterization data status from the E/O calibration of the given channel.

Cmd Parameters: NA

Query Parameters: NA

Query Output: <NR1> Return status indicates one of the following:

- 0 – Valid
- 1 – Invalid
- 2 – InvalidSnPFile
- 3 – InvalidCHXFile
- 4 – InvalidCalType
- 5 – IncompatibleFreq
- 6 – IncompatiblePort
- 7 – NoCalExist
- 8 – WARNING:Extrapolation
- 9 – InvalidPortSelection
- 10 – InvalidSnPFileType
- 11 – InvalidEOFFileType
- 12 – InvalidOEFFileType
- 13 – WARNING:CHXFileContainsOpticalSetup
- 14 – InvalidPortAssignment
- 15 – InvalidPortReassignment

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:EO:CALC?

**:CALCulate{1-16}:OPTical:EO4Port:CALCulate?**

Applicability: MS46524

Description: De-embeds the O/E Device characterization data from the multi-port E/O calibration of the given channel and return status.

Returns the O/E Device characterization data status from the multi-port E/O calibration of the given channel

Cmd Parameters: NA

Query Parameters: NA

Query Output: <NR1> Query returns one of the following:

- 0 – Valid
- 1 – Invalid
- 2 – InvalidSnPFile
- 3 – InvalidCHXFile
- 4 – InvalidCalType
- 5 – IncompatibleFreq
- 6 – IncompatiblePort
- 7 – NoCalExist
- 8 – WARNING:Extrapolation
- 9 – InvalidPortSelection
- 10 – InvalidSnPFileType
- 11 – InvalidEOFFileType
- 12 – InvalidOEFFileType
- 13 – WARNING:CHXFileContainsOpticalSetup
- 14 – InvalidPortAssignment
- 15 – InvalidPortReassignment

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:EO4P:CALC?

**:CALCulate{1-16}:OPTical:EO:CALFile <string>****:CALCulate{1-16}:OPTical:EO:CALFile?**

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Sets the calibration filename for the E/O measurement on the given channel.

Returns the calibration filename for the E/O measurement of the given channel.

Cmd Parameters: <string> 'c:\eofiles\myfile1.chx'

Query Parameters: NA

Query Output: <char> c:\eofiles\myfile1.chx

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:EO:CALF 'c:\eofiles\myfile1.chx'

:CALC1:OPT:EO:CALF?

```
:CALCulate{1-16}:OPTical:EO4Port:CALFile <string>
```

```
:CALCulate{1-16}:OPTical:EO4Port:CALFile?
```

Applicability: MS46524

Description: Sets the calibration filename for the multi-port E/O measurement on the given channel.

Returns the calibration filename for the multi-port E/O measurement of the given channel.

Cmd Parameters: <string> 'c:\eofiles\myfile1.chx'

Query Parameters: NA

Query Output: <char> c:\eofiles\myfile1.chx

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:EO4P:CALF 'c:\eofiles\myfile1.chx'

```
:CALC1:OPT:EO4P:CALF?
```

```
:CALCulate{1-16}:OPTical:EO:CHARfile <string>
```

```
:CALCulate{1-16}:OPTical:EO:CHARfile?
```

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Sets the O/E device characterization filename to be used for the E/O measurement on the given channel.

Returns the O/E device characterization filename used for the E/O measurement of the given channel.

Cmd Parameters: <string> 'c:\eofiles\myfile1.s2p'

Query Parameters: NA

Query Output: <char> c:\eofiles\myfile1.s2p

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:EO:CHAR 'c:\eofiles\myfile1.s2p'

```
:CALC1:OPT:EO:CHAR?
```

```
:CALCulate{1-16}:OPTical:EO4Port:CHARfile <string>
:CALCulate{1-16}:OPTical:EO4Port:CHARfile?
```

Applicability: MS46524

Description: Sets the O/E device characterization filename for the multi-port E/O measurement on the given channel.

Returns the O/E device characterization filename for the multi-port E/O measurement of the given channel.

Cmd Parameters: <string> 'c:\eofiles\myfile1.s2p'

Query Parameters: NA

Query Output: <char> c:\eofiles\myfile1.s2p

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:EO4P:CHAR 'c:\eofiles\myfile1.s2p'
:CALC1:OPT:EO4P:CHAR?

```
:CALCulate{1-16}:OPTical:EO4Port:CHARfile:REASsign:PORT{1-4} <char>
```

```
:CALCulate{1-16}:OPTical:EO4Port:CHARfile:REASsign:PORT{1-4}?
```

Applicability: MS46524

This command can only be used if configuration is Differential O/E.

Description: Reassigns the O/E Port for the multi-port E/O measurement on the given channel.

Returns the O/E Port assignment for the multi-port E/O measurement of the given channel.

Cmd Parameters: <char> PORT1 | PORT2 | PORT3 | PORT4

Query Parameters: NA

Query Output: <char> PORT1 | PORT2 | PORT3 | PORT4

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:EO4P:CHAR:REAS:PORT1 PORT4
:CALC1:OPT:EO4P:CHAR:REAS:PORT1?

```
:CALCulate{1-16}:OPTical:EO:CHARfile:SWAP[:STATE] <char>
:CALCulate{1-16}:OPTical:EO:CHARfile:SWAP[:STATE]?
```

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Sets the O/E device characterization Swap flag to swap ports for the E/O measurement on the given channel.

Returns the O/E device characterization Swap flag to swap ports for the E/O measurement of the given channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:OPT:EO:CHAR:SWAP ON

```
:CALC1:OPT:EO:CHAR:SWAP?
```

```
:CALCulate{1-16}:OPTical:EO4Port:CHARfile:SWAP[:STATE] <char>
```

```
:CALCulate{1-16}:OPTical:EO4Port:CHARfile:SWAP[:STATE]?
```

Applicability: MS46524

This command can only be used if configuration is Single Ended O/E.

Description: Sets the O/E device characterization Swap flag to swap ports for the multi-port E/O measurement on the given channel

Returns the O/E device characterization Swap flag to swap ports for the multi-port E/O measurement of the given channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:OPT:EO4P:CHAR:SWAP ON

```
:CALC1:OPT:EO4P:CHAR:SWAP?
```

```
:CALCulate{1-16}:OPTical:EO4Port:CONFiguration <char>
```

```
:CALCulate{1-16}:OPTical:EO4Port:CONFiguration?
```

Applicability: MS46524

Description: Sets the configuration of the multi-port E/O measurement on the given channel.

Returns the configuration of the multi-port E/O measurement of the given channel.

Cmd Parameters: <char> SESO | DESO | SEDO | DEDO

Definitions:

SESO = Single Ended E/O – Single Ended O/E

DESO = Differential E/O – Single Ended O/E

SEDO = Single Ended E/O – Differential O/E

DED0 = Differential E/O – Differential O/E

Query Parameters: NA

Query Output: <char> SESO | DESO | SEDO | DEDO

Range: NA

Default Value: SESO

Syntax Example: :CALC1:OPT:EO4P:CONF SESO

```
:CALC1:OPT:EO4P:CONF?
```

```
:CALCulate{1-16}:OPTical:EO:EOPort <char>
```

```
:CALCulate{1-16}:OPTical:EO:EOPort?
```

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Sets the E/O port assignment for the E/O measurement on the given channel.

Returns the E/O port assignment for the E/O measurement of the given channel.

Cmd Parameters: <char> PORT1 | PORT2

Query Parameters: NA

Query Output: <char> PORT1 | PORT2

Range: NA

Default Value: PORT1

Syntax Example: :CALC1:OPT:EO:EOP PORT1

```
:CALC1:OPT:EO:EOP?
```

```
:CALCulate{1-16}:OPTical:EO4Port:EOPort <char>
:CALCulate{1-16}:OPTical:EO4Port:EOPort?
```

Applicability: MS46524

Description: Sets the E/O port assignment for the multi-port E/O measurement on the given channel.

Returns the E/O port assignment for the multi-port E/O measurement of the given channel.

Cmd Parameters: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 |  
PORT2 | PORT3 | PORT4

Query Parameters: NA

Query Output: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 |  
PORT2 | PORT3 | PORT4

Range: NA

Default Value: PORT1

Syntax Example: :CALC1:OPT:EO4P:EOP PORT12  
:CALC1:OPT:EO4P:EOP?

```
:CALCulate{1-16}:OPTical:EO4Port:OEPort <char>
:CALCulate{1-16}:OPTical:EO4Port:OEPort?
```

Applicability: MS46524

Description: Sets the O/E port assignment for the multi-port E/O measurement on the given channel.

Returns the O/E port assignment for the multi-port E/O measurement of the given channel.

Cmd Parameters: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 |  
PORT2 | PORT3 | PORT4

Query Parameters: NA

Query Output: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 |  
PORT2 | PORT3 | PORT4

Range: NA

Default Value: PORT2

Syntax Example: :CALC1:OPT:EO4P:OEP PORT12  
:CALC1:OPT:EO4P:OEP?

## O/E Measurement Commands

### :CALCulate{1-16}:OPTical:OE:CALCulate?

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Query only.

De-embeds the E/O Device characterization data from the O/E calibration of the given channel and return status.

Cmd Parameters: NA

Query Parameters: NA

Query Output: <NR1> Query returns one of the following:

- 0 – Valid
- 1 – Invalid
- 2 – InvalidSnPFile
- 3 – InvalidCHXFile
- 4 – InvalidCalType
- 5 – IncompatibleFreq
- 6 – IncompatiblePort
- 7 – NoCalExist
- 8 – WARNING:Extrapolation
- 9 – InvalidPortSelection
- 10 – InvalidSnPFileType
- 11 – InvalidEOFFileType
- 12 – InvalidOEFFileType
- 13 – WARNING:CHXFileContainsOpticalSetup
- 14 – InvalidPortAssignment
- 15 – InvalidPortReassignment

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OE:CALC?

**:CALCulate{1-16}:OPTical:OE4Port:CALCulate?**

Applicability: MS46524

Description: Query only.

De-embeds the E/O Device characterization data from the multi-port O/E calibration of the given channel and return status.

Cmd Parameters: NA

Query Parameters: NA

Query Output: <NR1> Query returns one of the following:

- 0 – Valid
- 1 – Invalid
- 2 – InvalidSnPFile
- 3 – InvalidCHXFile
- 4 – InvalidCalType
- 5 – IncompatibleFreq
- 6 – IncompatiblePort
- 7 – NoCalExist
- 8 – WARNING:Extrapolation
- 9 – InvalidPortSelection
- 10 – InvalidSnPFileType
- 11 – InvalidEOFFileType
- 12 – InvalidOEFFileType
- 13 – WARNING:CHXFileContainsOpticalSetup
- 14 – InvalidPortAssignment
- 15 – InvalidPortReassignment

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OE4P:CALC?

```
:CALCulate{1-16}:OPTical:OE:CALFile <string>
```

```
:CALCulate{1-16}:OPTical:OE:CALFile?
```

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Sets the calibration filename for the O/E measurement on the given channel.

Returns the calibration filename for the O/E measurement of the given channel.

Cmd Parameters: <string> 'c:\eofiles\myfile1.chx'

Query Parameters: NA

Query Output: <char> c:\eofiles\myfile1.chx

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OE:CALF 'c:\eofiles\myfile1.chx'

```
:CALC1:OPT:OE:CALF?
```

```
:CALCulate{1-16}:OPTical:OE4Port:CALFile <string>
```

```
:CALCulate{1-16}:OPTical:OE4Port:CALFile?
```

Applicability: MS46524

Description: Sets the calibration filename for the multi-port O/E measurement on the given channel.

Returns the calibration filename for the multi-port O/E measurement of the given channel.

Cmd Parameters: <string> 'c:\eofiles\myfile1.chx'

Query Parameters: NA

Query Output: <char> c:\eofiles\myfile1.chx

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OE4P:CALF 'c:\eofiles\myfile1.chx'

```
:CALC1:OPT:OE4P:CALF?
```

```
:CALCulate{1-16}:OPTical:OE:CHARfile:EO <string>
```

```
:CALCulate{1-16}:OPTical:OE:CHARfile:EO?
```

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Sets the E/O device characterization filename to be used for the O/E measurement on the given channel.

Returns the E/O device characterization filename used for the O/E measurement of the given channel.

Cmd Parameters: <string> 'c:\eofiles\myfile1.s2p'

Query Parameters: NA

Query Output: <char> c:\eofiles\myfile1.s2p

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OE:CHAR:EO 'c:\eofiles\myfile1.s2p'

```
:CALC1:OPT:OE:CHAR:EO?
```

```
:CALCulate{1-16}:OPTical:OE4Port:CHARfile:EO <string>
:CALCulate{1-16}:OPTical:OE4Port:CHARfile:EO?
```

Applicability: MS46524

Description: Sets the E/O device characterization filename for the multi-port O/E measurement on the given channel.

Returns the E/O device characterization filename for the multi-port O/E measurement of the given channel.

Cmd Parameters: <string> 'c:\eofiles\myfile1.s2p'

Query Parameters: NA

Query Output: <char> c:\eofiles\myfile1.s2p

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OE4P:CHAR:EO 'c:\eofiles\myfile1.s2p'
:CALC1:OPT:OE4P:CHAR:EO?

**:CALCulate{1-16}:OPTical:OE:CHARfile:EO:MEASure?**

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Query only.

Generates the E/O Device characterization data of the given channel and return status.

Prerequisites: The following commands must be sent before measuring the E/O characterization data:

- **:CALCulate{1-16}:OPTical:OE:CALFile <string>**  
**(Example)** :CALC1:OPT:OE:CALF 'c:\eofiles\myfile1.chx'
- **:CALCulate{1-16}:OPTical:OE:CHARfile:OE <string>**  
**(Example)** :CALC1:OPT:OE:CHAR:OE 'c:\eofiles\myfile1.s2p'
- **:CALCulate{1-16}:OPTical:OE:CHARfile:TARGetfile <string>**  
**(Example)** :CALC1:OPT:OE:CHAR:TARG 'c:\eofiles\myfile1.s2p'

Cmd Parameters: NA

Query Parameters: NA

Query Output: <NR1> Query returns one of the following:

- 0 – Valid
- 1 – Invalid
- 2 – InvalidSnPFile
- 3 – InvalidCHXFile
- 4 – InvalidCalType
- 5 – IncompatibleFreq
- 6 – IncompatiblePort
- 7 – NoCalExist
- 8 – WARNING:Extrapolation
- 9 – InvalidPortSelection
- 10 – InvalidSnPFileType
- 11 – InvalidEOFFileType
- 12 – InvalidOEFFileType
- 13 – WARNING:CHXFileContainsOpticalSetup
- 14 – InvalidPortAssignment
- 15 – InvalidPortReassignment

Range: NA

Default Value: NA

Syntax Example: **:CALC1:OPT:OE:CHAR:EO:MEAS?**

**:CALCulate{1-16}:OPTical:OE4Port:CHARfile:EO:MEASure? <NR1>**

Applicability: MS46524

Description: Query only.

Generates the E/O Device characterization data of the given channel and return status.

Prerequisites: The following commands must be sent before measuring the E/O characterization data:

- **:CALCulate{1-16}:OPTical:OE4Port:CALFile <string>**  
**(Example)** :CALC1:OPT:OE4P:CALF 'c:\eofiles\myfile1.chx'
- **:CALCulate{1-16}:OPTical:OE4Port:CHARfile:OE <string>**  
**(Example)** :CALC1:OPT:OE4P:CHAR:OE 'c:\eofiles\myfile1.s2p'
- **:CALCulate{1-16}:OPTical:OE4Port:CHARfile:TARGetfile <string>**  
**(Example)** :CALC1:OPT:OE4P:CHAR:TARG 'c:\eofiles\myfile1.s2p'

Cmd Parameters: NA

Query Parameters: NA

Query Output: <NR1> Query returns one of the following:

- 0 – Valid
- 1 – Invalid
- 2 – InvalidSnPFile
- 3 – InvalidCHXFile
- 4 – InvalidCalType
- 5 – IncompatibleFreq
- 6 – IncompatiblePort
- 7 – NoCalExist
- 8 – WARNING:Extrapolation
- 9 – InvalidPortSelection
- 10 – InvalidSnPFileType
- 11 – InvalidEOFFileType
- 12 – InvalidOEFFileType
- 13 – WARNING:CHXFileContainsOpticalSetup
- 14 – InvalidPortAssignment
- 15 – InvalidPortReassignment

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OE4P:CHAR:EO:MEAS?

**:CALCulate{1-16}:OPTical:OE:CHARfile:OE <string>**

**:CALCulate{1-16}:OPTical:OE:CHARfile:OE?**

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Sets the O/E device characterization filename to use for the E/O measurement on the given channel. (This corresponds to the GO MEASURE sequence on the UI.)

Returns the O/E device characterization filename to use for the E/O measurement on the given channel. (This corresponds to the GO MEASURE sequence on the UI.)

Cmd Parameters: <string> 'c:\eofiles\myfile1.s2p'

Query Parameters: NA

Query Output: <char> c:\eofiles\myfile1.s2p

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OE:CHAR:OE 'c:\eofiles\myfile1.s2p'

:CALC1:OPT:OE:CHAR:OE?

**:CALCulate{1-16}:OPTical:OE4Port:CHARfile:OE <string>**

**:CALCulate{1-16}:OPTical:OE4Port:CHARfile:OE?**

Applicability: MS46524

Description: Sets the O/E device characterization filename for the multi-port O/E measurement on the given channel. This is the O/E characterization file used in the GO MEASURE process in order to create an E/O file before measuring the DUT O/E device.

Returns the O/E device characterization filename for the multi-port O/E measurement of the given channel.

Cmd Parameters: <string> 'c:\eofiles\myfile1.s2p'

Query Parameters: NA

Query Output: <char> c:\eofiles\myfile1.s2p

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OE4P:CHAR:OE 'c:\eofiles\myfile1.s2p'

:CALC1:OPT:OE4P:CHAR:OE?

```
:CALCulate{1-16}:OPTical:OE4Port:CHARfile:REASsign:PORT{1-4} <char>
:CALCulate{1-16}:OPTical:OE4Port:CHARfile:REASsign:PORT{1-4}?
```

Applicability: MS46524

This command can only be used if the Configuration is Differential E/O.

Description: Reassigns the E/O Port for the multi-port O/E measurement on the given channel.

Returns the E/O Port assignment for the multi-port O/E measurement of the given channel.

Cmd Parameters: <char> PORT1 | PORT2 | PORT3 | PORT4

Query Parameters: NA

Query Output: <char> PORT1 | PORT2 | PORT3 | PORT4

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OE4P:CHAR:REAS:PORT1 PORT4  
:CALC1:OPT:OE4P:CHAR:REAS:PORT1?

```
:CALCulate{1-16}:OPTical:OE:CHARfile:SWAP[:STATE] <char>
:CALCulate{1-16}:OPTical:OE:CHARfile:SWAP[:STATE]?
```

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Sets the E/O device characterization Swap flag to swap ports for the O/E measurement on the given channel.

Returns the E/O device characterization Swap flag to swap ports for the O/E measurement of the given channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:OPT:OE:CHAR:SWAP ON  
:CALC1:OPT:OE:CHAR:SWAP?

```
:CALCulate{1-16}:OPTical:OE4Port:CHARfile:SWAP[:STATE] <char>
:CALCulate{1-16}:OPTical:OE4Port:CHARfile:SWAP[:STATE]?
```

Applicability: MS46524

This command can only be used if the Configuration is Single Ended E/O.

Description: Sets the E/O device characterization Swap flag to swap ports for the multi-port O/E measurement on the given channel.

Returns the E/O device characterization Swap flag to swap ports for the multi-port O/E measurement of the given channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:OPT:OE4P:CHAR:SWAP ON

```
:CALC1:OPT:OE4P:CHAR:SWAP?
```

```
:CALCulate{1-16}:OPTical:OE:CHARfile:TARGetfile <string>
```

```
:CALCulate{1-16}:OPTical:OE:CHARfile:TARGetfile?
```

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Sets the filename to store the generated E/O device characterization file for the E/O measurement on the given channel. (This corresponds to the GO MEASURE sequence on the UI.)

Returns the filename where the generated E/O device characterization file for the E/O measurement on the given channel. (This corresponds to the GO MEASURE sequence on the UI.)

Cmd Parameters: <string> 'c:\eofiles\myfile1.s2p'

Query Parameters: NA

Query Output: <char> c:\eofiles\myfile1.s2p

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OE:CHAR:TARG 'c:\eofiles\myfile1.s2p'

```
:CALC1:OPT:OE:CHAR:TARG?
```

**:CALCulate{1-16}:OPTical:OE4Port:CHARfile:TARGetfile <string>**  
**:CALCulate{1-16}:OPTical:OE4Port:CHARfile:TARGetfile?**

Applicability: MS46524

Description: Sets the filename to store the generated E/O characterization file (created as part of the GO MEASURE process) for the given channel.

Returns the filename where the generated E/O device characterization file is stored for the given channel.

Cmd Parameters: <string> 'c:\eofiles\myfile1.s2p'

Query Parameters: NA

Query Output: <char> c:\eofiles\myfile1.s2p

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OE4P:CHAR:TARG 'c:\eofiles\myfile1.s2p'  
:CALC1:OPT:OE4P:CHAR:TARG?

**:CALCulate{1-16}:OPTical:OE4Port:CONFIGuration <char>**

**:CALCulate{1-16}:OPTical:OE4Port:CONFIGuration?**

Applicability: MS46524

Description: Sets the configuration of the multi-port O/E measurement on the given channel.

Returns the configuration of the multi-port O/E measurement of the given channel.

Cmd Parameters: <char> SESO | DESO | SEDO | DEDO

Definitions:

SESO = Single Ended E/O – Single Ended O/E

DESO = Differential E/O – Single Ended O/E

SEDO = Single Ended E/O – Differential O/E

DED0 = Differential E/O – Differential O/E

Query Parameters: NA

Query Output: <char> SESO | DESO | SEDO | DEDO

Range: NA

Default Value: SESO

Syntax Example: :CALC1:OPT:OE4P:CONF SESO  
:CALC1:OPT:OE4P:CONF?

```
:CALCulate{1-16}:OPTical:OE:EOPort <char>
:CALCulate{1-16}:OPTical:OE:EOPort?
```

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Sets the E/O port assignment for the O/E measurement on the given channel.

Returns the E/O port assignment for the O/E measurement of the given channel.

Cmd Parameters: <char> PORT1 | PORT2

Query Parameters: NA

Query Output: <char> PORT1 | PORT2

Range: NA

Default Value: PORT1

Syntax Example: :CALC1:OPT:OE:EOP PORT1

```
:CALC1:OPT:OE:EOP?
```

```
:CALCulate{1-16}:OPTical:OE4Port:EOPort <char>
:CALCulate{1-16}:OPTical:OE4Port:EOPort?
```

Applicability: MS46524

Description: Sets the E/O port assignment for the multi-port O/E measurement on the given channel.

Returns the E/O port assignment for the multi-port O/E measurement of the given channel.

Cmd Parameters: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 |  
PORT2 | PORT3 | PORT4

Query Parameters: NA

Query Output: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 |  
PORT2 | PORT3 | PORT4

Range: NA

Default Value: PORT1

Syntax Example: :CALC1:OPT:OE4P:EOP PORT12

```
:CALC1:OPT:OE4P:EOP?
```

```
:CALCulate{1-16}:OPTical:OE4Port:OEPort <char>
:CALCulate{1-16}:OPTical:OE4Port:OEP?
```

Applicability: MS46524

Description: Sets the O/E port assignment for the multi-port O/E measurement on the given channel.

Returns the O/E port assignment for the multi-port O/E measurement of the given channel.

Cmd Parameters: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 |  
PORT2 | PORT3 | PORT4

Query Parameters: NA

Query Output: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 |  
PORT2 | PORT3 | PORT4

Range: NA

Default Value: PORT2

Syntax Example: :CALC1:OPT:OE4P:OEP PORT12  
:CALC1:OPT:OE4P:OEP?

## O/O Measurement Commands

### :CALCulate{1-16}:OPTical:OO:CALCulate?

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Query only.

De-embeds the O/O Device characterization data from the E/O and O/E calibration of the given channel and returns the status.

Cmd Parameters: NA

Query Parameters: NA

Query Output: <NR1> Query returns one of the following:

- 0 – Valid
- 1 – Invalid
- 2 – InvalidSnPFile
- 3 – InvalidCHXFile
- 4 – InvalidCalType
- 5 – IncompatibleFreq
- 6 – IncompatiblePort
- 7 – NoCalExist
- 8 – WARNING:Extrapolation
- 9 – InvalidPortSelection
- 10 – InvalidSnPFileType
- 11 – InvalidEOFFileType
- 12 – InvalidOEOFFileType
- 13 – WARNING:CHXFileContainsOpticalSetup
- 14 – InvalidPortAssignment
- 15 – InvalidPortReassignment

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OO:CALC?

**:CALCulate{1-16}:OPTical:OO4Port:CALCulate?**

Applicability: MS46524

Description: Query only.

De-embeds the O/O Device characterization data from the multi-port E/O and O/E calibration of the given channel and return status.

Cmd Parameters: NA

Query Parameters: NA

Query Output: <NR1> Query returns one of the following:

- 0 – Valid
- 1 – Invalid
- 2 – InvalidSnPFile
- 3 – InvalidCHXFile
- 4 – InvalidCalType
- 5 – IncompatibleFreq
- 6 – IncompatiblePort
- 7 – NoCalExist
- 8 – WARNING:Extrapolation
- 9 – InvalidPortSelection
- 10 – InvalidSnPFileType
- 11 – InvalidEOFFileType
- 12 – InvalidOEFFileType
- 13 – WARNING:CHXFileContainsOpticalSetup
- 14 – InvalidPortAssignment
- 15 – InvalidPortReassignment

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OO4P:CALC?

**:CALCulate{1-16}:OPTical:OO:CALFile <string>****:CALCulate{1-16}:OPTical:OO:CALFile?**

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Sets the calibration filename for the O/O measurement on the given channel.

Returns the calibration filename for the O/O measurement of the given channel.

Cmd Parameters: <string> 'c:\eofiles\myfile1.chx'

Query Parameters: NA

Query Output: <char> c:\eofiles\myfile1.chx

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OO:CALF 'c:\eofiles\myfile1.chx'

:CALC1:OPT:OO:CALF?

```
:CALCulate{1-16}:OPTical:OO4Port:CALFile <string>
:CALCulate{1-16}:OPTical:OO4Port:CALFile?
```

Applicability: MS46524

Description: Sets the calibration filename for the multi-port O/O measurement on the given channel.

Returns the calibration filename for the multi-port O/O measurement of the given channel.

Cmd Parameters: <string> 'c:\eofiles\myfile1.chx'

Query Parameters: NA

Query Output: <char> c:\eofiles\myfile1.chx

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OO4P:CALF 'c:\eofiles\myfile1.chx'
:CALC1:OPT:OO4P:CALF?

```
:CALCulate{1-16}:OPTical:OO:CHARfile:EO <string>
:CALCulate{1-16}:OPTical:OO:CHARfile:EO?
```

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Sets the E/O device characterization filename to be used for the O/O measurement on the given channel.

Returns the E/O device characterization filename used for the O/O measurement of the given channel

Cmd Parameters: <string> 'c:\eofiles\myfile1.s2p'

Query Parameters: NA

Query Output: <char> c:\eofiles\myfile1.s2p

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OO:CHAR:EO 'c:\eofiles\myfile1.s2p'
:CALC1:OPT:OO:CHAR:EO?

```
:CALCulate{1-16}:OPTical:OO4Port:CHARfile:EO <string>
:CALCulate{1-16}:OPTical:OO4Port:CHARfile:EO?
```

Applicability: MS46524

Description: Sets the E/O device characterization filename for the multi-port O/O measurement on the given channel.

Returns the E/O device characterization filename for the multi-port O/O measurement of the given channel.

Cmd Parameters: <string> 'c:\eofiles\myfile1.s2p'

Query Parameters: NA

Query Output: <char> c:\eofiles\myfile1.s2p

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OO4P:CHAR:EO 'c:\eofiles\myfile1.s2p'
:CALC1:OPT:OO4P:CHAR:EO?

**:CALCulate{1-16}:OPTical:OO:CHARfile:EO:MEASure?**

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Query only.

Generates the E/O Device characterization data of the given channel and return status.

Prerequisites: The following commands must be sent before measuring the E/O characterization data:

- **:CALCulate{1-16}:OPTical:OO:CALFile <string>**  
**(Example)** :CALC1:OPT:OO:CALF 'c:\eofiles\myfile1.chx'
- **:CALCulate{1-16}:OPTical:OO:CHARfile:OE <string>**  
**(Example)** :CALC1:OPT:OO:CHAR:OE 'c:\eofiles\myfile1.s2p'
- **:CALCulate{1-16}:OPTical:OO:CHARfile:EO:TARGetfile <string>**  
**(Example)** :CALC1:OPT:OO:CHAR:EO:TARG 'c:\eofiles\myfile1.s2p'

Cmd Parameters: NA

Query Parameters: NA

Query Output: <NR1> Query returns one of the following:

- 0 – Valid
- 1 – Invalid
- 2 – InvalidSnPFile
- 3 – InvalidCHXFile
- 4 – InvalidCalType
- 5 – IncompatibleFreq
- 6 – IncompatiblePort
- 7 – NoCalExist
- 8 – WARNING:Extrapolation
- 9 – InvalidPortSelection
- 10 – InvalidSnPFileType
- 11 – InvalidEOFFileType
- 12 – InvalidOEFFileType
- 13 – WARNING:CHXFileContainsOpticalSetup
- 14 – InvalidPortAssignment
- 15 – InvalidPortReassignment

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OO:CHAR:EO:MEAS?

**:CALCulate{1-16}:OPTical:OO4Port:CHARfile:EO:MEASure?**

Applicability: MS46524

Description: Query only.

Generates the E/O Device characterization data of the given channel and return status.

Prerequisites: The following commands must be sent before measuring the E/O characterization data:

- **:CALCulate{1-16}:OPTical:OO4Port:CALFile <string>**  
**(Example)** :CALC1:OPT:OO4P:CALF 'c:\eofiles\myfile1.chx'
- **:CALCulate{1-16}:OPTical:OO4Port:CHARfile:OE <string>**  
**(Example)** :CALC1:OPT:OO4P:CHAR:OE 'c:\eofiles\myfile1.s2p'
- **:CALCulate{1-16}:OPTical:OO4Port:CHARfile:EO:TARGetfile <string>**  
**(Example)** :CALC1:OPT:OO4P:CHAR:EO:TARG 'c:\eofiles\myfile1.s2p'

Cmd Parameters: NA

Query Parameters: NA

Query Output: <NR1> Query returns one of the following:

- 0 – Valid
- 1 – Invalid
- 2 – InvalidSnPFile
- 3 – InvalidCHXFile
- 4 – InvalidCalType
- 5 – IncompatibleFreq
- 6 – IncompatiblePort
- 7 – NoCalExist
- 8 – WARNING:Extrapolation
- 9 – InvalidPortSelection
- 10 – InvalidSnPFileType
- 11 – InvalidEOFFileType
- 12 – InvalidOEFFileType
- 13 – WARNING:CHXFileContainsOpticalSetup
- 14 – InvalidPortAssignment
- 15 – InvalidPortReassignment

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OO4P:CHAR:EO:MEAS?

```
:CALCulate{1-16}:OPTical:OO4Port:CHARfile:EO:REASsign:PORT{1-4} <char>
:CALCulate{1-16}:OPTical:OO4Port:CHARfile:EO:REASsign:PORT{1-4}?
```

Applicability: MS46524

This command can only be used if the Configuration is Differential O/E

Description: Reassigns the E/O Port for the multi-port O/O measurement on the given channel.

Returns the E/O Port assignment for the multi-port O/O measurement of the given channel.

Cmd Parameters: <char> PORT1 | PORT2 | PORT3 | PORT4

Query Parameters: NA

Query Output: <char> PORT1 | PORT2 | PORT3 | PORT4

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OO4P:CHAR:EO:REAS:PORT1 PORT4
:CALC1:OPT:OO4P:CHAR:EO:REAS:PORT1?

```
:CALCulate{1-16}:OPTical:OO:CHARfile:EO:SWAP[:STATE] <char>
```

```
:CALCulate{1-16}:OPTical:OO:CHARfile:EO:SWAP[:STATE]?
```

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Sets the E/O device characterization Swap flag to swap ports for the O/O measurement on the given channel.

Returns the E/O device characterization Swap flag to swap ports for the O/O measurement of the given channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:OPT:OO:CHAR:EO:SWAP ON
:CALC1:OPT:OO:CHAR:EO:SWAP?

```
:CALCulate{1-16}:OPTical:OO4Port:CHARfile:EO:SWAP[:STATE] <char>
:CALCulate{1-16}:OPTical:OO4Port:CHARfile:EO:SWAP[:STATE] ?
```

Applicability: MS46524

This command can only be used if the Configuration is Single Ended E/O.

Description: Sets the E/O device characterization Swap flag to swap ports for the multi-port O/O measurement on the given channel.

Returns the E/O device characterization Swap flag to swap ports for the multi-port O/O measurement of the given channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:OPT:OO4P:CHAR:EO:SWAP ON

```
:CALC1:OPT:OO4P:CHAR:EO:SWAP?
```

```
:CALCulate{1-16}:OPTical:OO:CHARfile:EO:TARGetfile <string>
```

```
:CALCulate{1-16}:OPTical:OO:CHARfile:EO:TARGetfile?
```

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Sets the filename to store the generated E/O device characterization file for the given channel.

Returns the filename where the generated E/O device characterization file is stored for the given channel.

Cmd Parameters: <string> 'c:\eofiles\myfile1.s2p'

Query Parameters: NA

Query Output: <char> c:\eofiles\myfile1.s2p

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OO:CHAR:EO:TARG 'c:\eofiles\myfile1.s2p'

```
:CALC1:OPT:OO:CHAR:EO:TARG?
```

```
:CALCulate{1-16}:OPTical:OO4Port:CHARfile:EO:TARGetfile <string>
:CALCulate{1-16}:OPTical:OO4Port:CHARfile:EO:TARGetfile?
```

Applicability: MS46524

Description: Sets the filename to store the generated E/O device characterization file for the given channel.

Returns the filename where the generated E/O device characterization file is stored for the given channel.

Cmd Parameters: <string> 'c:\eofiles\myfile1.s2p'

Query Parameters: NA

Query Output: <char> c:\eofiles\myfile1.s2p

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OO4P:CHAR:EO:TARG 'c:\eofiles\myfile1.s2p'
:CALC1:OPT:OO4P:CHAR:EO:TARG?

```
:CALCulate{1-16}:OPTical:OO:CHARfile:OE <string>
```

```
:CALCulate{1-16}:OPTical:OO:CHARfile:OE?
```

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Sets the O/E device characterization filename to use for the O/O measurement on the given channel.

Returns the O/E device characterization filename to use for the O/O measurement of the given channel.

Cmd Parameters: <string> 'c:\eofiles\myfile1.s2p'

Query Parameters: NA

Query Output: <char> c:\eofiles\myfile1.s2p

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OO:CHAR:OE 'c:\eofiles\myfile1.s2p'
:CALC1:OPT:OO:CHAR:OE?

```
:CALCulate{1-16}:OPTical:OO4Port:CHARfile:OE <string>
:CALCulate{1-16}:OPTical:OO4Port:CHARfile:OE?
```

Applicability: MS46524

Description: Sets the O/E device characterization filename for the multi-port O/O measurement on the given channel.

Returns the O/E device characterization filename for the multi-port O/O measurement of the given channel.

Cmd Parameters: <string> 'c:\eofiles\myfile1.s2p'

Query Parameters: NA

Query Output: <char> c:\eofiles\myfile1.s2p

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OO4P:CHAR:OE 'c:\eofiles\myfile1.s2p'
:CALC1:OPT:OO4P:CHAR:OE?

**:CALCulate{1-16}:OPTical:OO:CHARfile:OE:MEASure?**

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Query only.

Generates the O/E Device characterization data of the given channel and return status.

Prerequisites: The following commands must be sent before measuring the O/E characterization data:

- **:CALCulate{1-16}:OPTical:OO:CALFile <string>**  
**(Example)** :CALC1:OPT:OO:CALF 'c:\eofiles\myfile1.chx'
- **:CALCulate{1-16}:OPTical:OO:CHARfile:EO <string>**  
**(Example)** :CALC1:OPT:OO:CHAR:EO 'c:\eofiles\myfile1.s2p'
- **:CALCulate{1-16}:OPTical:OO:CHARfile:OE:TARGetfile <string>**  
**(Example)** :CALC1:OPT:OO:CHAR:OE:TARG 'c:\eofiles\myfile1.s2p'

Cmd Parameters: NA

Query Parameters: NA

Query Output: <NR1> Query returns one of the following:

- 0 – Valid
- 1 – Invalid
- 2 – InvalidSnPFile
- 3 – InvalidCHXFile
- 4 – InvalidCalType
- 5 – IncompatibleFreq
- 6 – IncompatiblePort
- 7 – NoCalExist
- 8 – WARNING:Extrapolation
- 9 – InvalidPortSelection
- 10 – InvalidSnPFileType
- 11 – InvalidEOFFileType
- 12 – InvalidOEFFileType
- 13 – WARNING:CHXFileContainsOpticalSetup
- 14 – InvalidPortAssignment
- 15 – InvalidPortReassignment

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OO:CHAR:OE:MEAS?

**:CALCulate{1-16}:OPTical:OO4Port:CHARfile:OE:MEASure? <NR1>**

Applicability: MS46524

Description: Query only.

Generates the O/E Device characterization data of the given channel and return status.

Prerequisites: The following commands must be sent before measuring the O/E characterization data:

- **:CALCulate{1-16}:OPTical:OO4Port:CALFile <string>**  
**(Example)** :CALC1:OPT:OO4P:CALF 'c:\eofiles\myfile1.chx'
- **:CALCulate{1-16}:OPTical:OO4Port:CHARfile:EO <string>**  
**(Example)** :CALC1:OPT:OO4P:CHAR:EO 'c:\eofiles\myfile1.s2p'
- **:CALCulate{1-16}:OPTical:OO4Port:CHARfile:OE:TARGetfile <string>**  
**(Example)** :CALC1:OPT:OO4P:CHAR:OE:TARG 'c:\eofiles\myfile1.s2p'

Cmd Parameters: NA

Query Parameters: NA

Query Output: <NR1> Query returns one of the following:

- 0 – Valid
- 1 – Invalid
- 2 – InvalidSnPFile
- 3 – InvalidCHXFile
- 4 – InvalidCalType
- 5 – IncompatibleFreq
- 6 – IncompatiblePort
- 7 – NoCalExist
- 8 – WARNING:Extrapolation
- 9 – InvalidPortSelection
- 10 – InvalidSnPFileType
- 11 – InvalidEOFFileType
- 12 – InvalidOEFFileType
- 13 – WARNING:CHXFileContainsOpticalSetup
- 14 – InvalidPortAssignment
- 15 – InvalidPortReassignment

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OO4P:CHAR:OE:MEAS?

```
:CALCulate{1-16}:OPTical:OO4Port:CHARfile:OE:REASsign:PORT{1-4} <char>
:CALCulate{1-16}:OPTical:OO4Port:CHARfile:OE:REASsign:PORT{1-4}?
```

Applicability: MS46524

This command can only be used if the Configuration is Differential O/E.

Description: Reassigns the O/E Port for the multi-port O/O measurement on the given channel.

Returns the O/E Port assignment for the multi-port O/O measurement of the given channel.

Cmd Parameters: <char> PORT1 | PORT2 | PORT3 | PORT4

Query Parameters: NA

Query Output: <char> PORT1 | PORT2 | PORT3 | PORT4

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OO4P:CHAR:OE:REAS:PORT1 PORT4
:CALC1:OPT:OO4P:CHAR:OE:REAS:PORT1?

```
:CALCulate{1-16}:OPTical:OO:CHARfile:OE:SWAP[:STATE] <char>
```

```
:CALCulate{1-16}:OPTical:OO:CHARfile:OE:SWAP[:STATE]?
```

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Sets the O/E device characterization Swap flag to swap ports for the O/O measurement on the given channel.

Returns the O/E device characterization Swap flag to swap ports for the O/O measurement of the given channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:OPT:OO:CHAR:OE:SWAP ON
:CALC1:OPT:OO:CHAR:OE:SWAP?

```
:CALCulate{1-16}:OPTical:OO4Port:CHARfile:OE:SWAP[:STATE] <char>
:CALCulate{1-16}:OPTical:OO4Port:CHARfile:OE:SWAP[:STATE] ?
```

Applicability: MS46524

This command can only be used if the Configuration is Single Ended O/E.

Description: Sets the O/E device characterization Swap flag to swap ports for the multi-port O/O measurement on the given channel.

Returns the O/E device characterization Swap flag to swap ports for the multi-port O/O measurement of the given channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:OPT:OO4P:CHAR:OE:SWAP ON

```
:CALC1:OPT:OO4P:CHAR:OE:SWAP?
```

```
:CALCulate{1-16}:OPTical:OO:CHARfile:OE:TARGetfile <string>
```

```
:CALCulate{1-16}:OPTical:OO:CHARfile:OE:TARGetfile?
```

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Sets the filename to store the generated O/E device characterization file for the given channel.

Returns the filename where the generated O/E device characterization file is stored for the given channel.

Cmd Parameters: <string> 'c:\eofiles\myfile1.s2p'

Query Parameters: NA

Query Output: <char> c:\eofiles\myfile1.s2p

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OO:CHAR:OE:TARG 'c:\eofiles\myfile1.s2p'

```
:CALC1:OPT:OO:CHAR:OE:TARG?
```

```
:CALCulate{1-16}:OPTical:OO4Port:CHARfile:OE:TARGetfile <string>
```

```
:CALCulate{1-16}:OPTical:OO4Port:CHARfile:OE:TARGetfile?
```

Applicability: MS46524

Description: Sets the filename to store the generated O/E device characterization file for the given channel.

Returns the filename where the generated O/E device characterization file is stored for the given channel.

Cmd Parameters: <string> 'c:\eofiles\myfile1.s2p'

Query Parameters: NA

Query Output: <char> c:\eofiles\myfile1.s2p

Range: NA

Default Value: NA

Syntax Example: :CALC1:OPT:OO4P:CHAR:OE:TARG 'c:\eofiles\myfile1.s2p'

```
:CALC1:OPT:OO4P:CHAR:OE:TARG?
```

```
:CALCulate{1-16}:OPTical:OO:EOPort <char>
```

```
:CALCulate{1-16}:OPTical:OO:EOPort?
```

Applicability: MS46122, MS46322, MS46522, MS46524

Description: Sets the E/O port assignment for the O/O measurement on the given channel.

Returns the E/O port assignment for the O/O measurement of the given channel.

Cmd Parameters: <char> PORT1 | PORT2

Query Parameters: NA

Query Output: <char> PORT1 | PORT2

Range: NA

Default Value: PORT1

Syntax Example: :CALC1:OPT:OO:EOP PORT1

```
:CALC1:OPT:OO:EOP?
```

```
:CALCulate{1-16}:OPTical:OO4Port:CONFiguration <char>
:CALCulate{1-16}:OPTical:OO4Port:CONFiguration?
```

Applicability: MS46524

Description: Sets the configuration of the multi-port O/O measurement on the given channel.

Returns the configuration of the multi-port O/O measurement of the given channel.

Cmd Parameters: <char> SESO | DESO | SEDO | DEDO

Definitions:

SESO = Single ended E/O – Single ended O/E

DESO = Differential E/O – Single ended O/E

SEDO = Single ended E/O – Differential O/E

DED0 = Differential E/O – Differential O/E

Query Parameters: NA

Query Output: <char> SESO | DESO | SEDO | DEDO

Range: NA

Default Value: SESO

Syntax Example: :CALC1:OPT:OO4P:CONF SESO

```
:CALC1:OPT:OO4P:CONF?
```

```
:CALCulate{1-16}:OPTical:OO4Port:EOPort <char>
:CALCulate{1-16}:OPTical:OO4Port:EOPort?
```

Applicability: MS46524

Description: Sets the E/O port assignment for the multi-port O/O measurement on the given channel.

Returns the E/O port assignment for the multi-port O/O measurement of the given channel.

Cmd Parameters: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 |  
PORT2 | PORT3 | PORT4

Query Parameters: NA

Query Output: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 |  
PORT2 | PORT3 | PORT4

Range: NA

Default Value: PORT1

Syntax Example: :CALC1:OPT:OO4P:EOP PORT12

```
:CALC1:OPT:OO4P:EOP?
```

```
:CALCulate{1-16}:OPTical:OO4Port:OEPort <char>
:CALCulate{1-16}:OPTical:OO4Port:OEPort?
```

Applicability: MS46524

Description: Sets the O/E port assignment for the multi-port O/O measurement on the given channel.

Returns the O/E port assignment for the multi-port O/O measurement of the given channel.

Cmd Parameters: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 |  
PORT2 | PORT3 | PORT4

Query Parameters: NA

Query Output: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34 | PORT1 |  
PORT2 | PORT3 | PORT4

Range: NA

Default Value: PORT2

Syntax Example: :CALC1:OPT:OO4P:OEP PORT12

```
:CALC1:OPT:OO4P:OEP?
```

## 5-18 :CALCulate{1-16}:PARameter and :PARameter{1-16} Subsystem

The :CALCulate{1-16}:PARameter subsystem commands control and report on the number of traces. The :CALCulate{1-16}:PARameter{1-16} subsystem commands configure the types of parameters used and how they are displayed on each trace.

### Trace Subsystems

Related trace and display subsystems are:

- “:CALCulate{1-16}:PARameter and :PARameter{1-16} Subsystem” on page 5-111
- “:CALCulate{1-16}:PARameter{1-16}:MStatistics Subsystem” on page 5-133
- “:CALCulate{1-16}:PARameter{1-16}:SElect Subsystem” on page 5-140
- “:CALCulate{1-16}[:SELected]:DATA Subsystem” on page 5-156
- “:CALCulate{1-16}[:SELected]:FORmat Subsystem” on page 5-158
- “:CALCulate{1-16}[:SELected]:MDATA Subsystem” on page 5-206
- “:CALCulate{1-16}[:SELected]:SMOothing Subsystem” on page 5-222
- “:CALCulate{1-16}[:SELected]:TDATA Subsystem” on page 5-223
- “:DISPlay Subsystem” on page 5-281

**:CALCulate{1-16} :PARameter:COUNT <NRf>**

**:CALCulate{1-16} :PARameter:COUNT?**

Description: Sets number of traces for the indicated channel.

Returns the number of traces for the indicated channel.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR1> The output parameter is an integer.

Range: 1 to 16

Default Value: 4

Syntax Example: :CALC1:PAR:COUN 4

:CALC1:PAR:COUN?

**:CALCulate{1-16} :PARameter:SElect?**

Description: Query only.

Returns the number of the active trace number.

Use :CALCulate{1-16}:PARameter{1-16}:SElect to select the active trace.

Cmd Parameters: NA

Query Parameters: <NR1> The output parameter is an integer.

Range: 1 to 16

Default Value: 1

Syntax Example: :CALC1:PAR5:SEL <block>

:CALC1:PAR5:SEL?

**:CALCulate{1-16}:PARameter{1-16}:DATA:FDATA <block>**

**:CALCulate{1-16}:PARameter{1-16}:DATA:FDATA?**

Description: Inputs formatted data to display on the active channel.

The :FDATA command should only be used when the instrument is in HOLD mode.

Returns formatted data of the active channel.

Cmd Parameters: <block> See definition of “<block> or <arbitrary block>” on page 2-10.

Query Parameters: <block> See definition of “<block> or <arbitrary block>” on page 2-10.

Range: NA

Default Value: NA

Syntax Example: :CALC1:PAR1:DATA:FDAT <block>

:CALC1:PAR1:DATA:FDAT?

**:CALCulate{1-16}:PARameter{1-16}:DATA:FMEMory <block>**

**:CALCulate{1-16}:PARameter{1-16}:DATA:FMEMory?**

Applicability: MS46121

Command is for MS46121A/B multiple channels configuration.

Description: Inputs formatted data to display on the active channel and writes it to trace memory. The command can also perform math functions.

Returns the formatted memory of the active channel trace.

Cmd Parameters: <block> See definition of “<block> or <arbitrary block>” on page 2-10.

Query Parameters: <block> See definition of “<block> or <arbitrary block>” on page 2-10.

Range: NA

Default Value: NA

Syntax Example: :CALC1:PAR1:DATA:FMEM <block>

:CALC1:PAR1:DATA:FMEM?

**:CALCulate{1-16}:PARameter{1-16}:DATA:SDATA <block>**

**:CALCulate{1-16}:PARameter{1-16}:DATA:SDATA?**

Description: Inputs the corrected real and imaginary S-parameter data to display on the active channel's trace. The data must be real and imaginary formatted data. Converts the active trace display appropriately.

The :SDATA command should only be used when the instrument is in HOLD mode.

Returns the real/imaginary S-parameter data for the active trace.

Cmd Parameters: <block> See definition of “<block> or <arbitrary block>” on page 2-10.

Query Parameters: <block> See definition of “<block> or <arbitrary block>” on page 2-10.

Output: <block>

Range: NA

Default Value: NA

Syntax Example: :CALC1:PAR1:DATA:SDAT <block>

:CALC1:PAR1:DATA:SDAT?

```
:CALCulate{1-16}:PARameter{1-16}:DATA:SMEMory <block>
:CALCulate{1-16}:PARameter{1-16}:DATA:SMEMory?
```

Applicability: MS46121

Description: Command is for MS46121A/B multiple channels configuration. Inputs the corrected S-parameter trace memory to display on the active channel's trace.

Returns the corrected S-parameter trace memory of the active trace.

Cmd Parameters: <block> See definition of “<block> or <arbitrary block>” on page 2-10.

Query Parameters: <block> See definition of “<block> or <arbitrary block>” on page 2-10.

Range: NA

Default Value: NA

Syntax Example: :CALC1:PAR1:DATA:SMEM <block>

```
:CALC1:PAR1:DATA:SMEM?
```

```
:CALCulate{1-16}:PARameter{1-16}:DEFine <char1> |
    <char1>,<char2>,<char3>,<char4>
:CALCulate{1-16}:PARameter{1-16}:DEFine?
```

**Applicability:** The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

**Description:** Sets the measurement parameter of the indicated trace. Additional command parameters (<char2>, <char3>, and <char4>) may be required depending on the selection of the first <char> parameter. If multiple command parameters are required, each additional parameter is separated by a comma. Spaces between command parameters are ignored.

Return varies depending on the command parameters that were set in the command string.

### Available Measurement Parameters

The first parameter <char1> defines which S-Parameter or user-defined S-Parameter is measured. The available selections are:

- S11, S12, S21, S22, S13, S23, S33, S31, S32, S14, S24, S34, S41, S42, S43, S44 — No other <char> parameters are required.
- USR — <char2> is also required to define the numerator, <char3> is also required to define the denominator, and <char4> is also required to define the Port number.
- MEA — Maximum Efficiency Analysis. No other <char> parameters are required.
- MIXed — Response Mixed Mode. No other <char> parameters are required.

### Command Parameter Requirements when S11, S12, S21, S22, S13, S23, S33, S31, S32, S14, S24, S34, S41, S42, S43, or S44 is Selected

If the S11, S12, S21, S22, S13, S23, S33, S31, S32, S14, S24, S34, S41, S42, S43, or S44 parameters are selected for <char>:

- The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.
- No additional command parameters are required.
- For example, :CALC1:PAR1:DEF S11 sets the input-reflection coefficient measurement.
- The command syntax for S-Parameters:  
`:CALCulate{1-16}:PARameter{1-16}:DEFine <char1>`

### Command Parameter Requirements when USR is Selected

If the user-defined S-Parameter of USR is selected for <char1>:

- Three additional command parameters are required as <char2>, <char3>, <char4>.
- The second additional parameter <char2> represents the numerator. The numerator values are selected from values of  
**MS46131A 1-port:** A1, A2, B1, B2, or 1 (one)  
**2-port:** A1, A2, B1, B2, or 1 (one)  
**4-port:** A1, A2, A3, A4, B1, B2, B3, B4, or 1 (one)
- The third additional parameter <char3> represents the denominator and is also selected from values of  
**MS46131A 1-port:** A1, A2, B1, B2, or 1  
**2-port:** A1, A2, B1, B2, or 1  
**4-port:** A1, A2, A3, A4, B1, B2, B3, B4, or 1.
- For <char2> and <char3> for MS46131A 1-port only VNAs, the only valid user-defined parameters are:
  - A1/B1, A1/1, B1/A1, B1/1 all driven by port 1
  - A2/B2, A2/1, B2/A2, B2/1 all driven by port 2

Any cross ratios (Ax/By where x not equal to y) or where the opposite port is driving (i.e., for A1/B1 if port 2 was driving) are not valid.

- The fourth additional parameter <char4> defines the power source port and is selected from PORT1, PORT2, L1, or L2
- For example, the command :CALC1:PAR1:DEF USR,A1,B1,PORT1 sets a user-defined S-Parameter value of A1/B1 for Port1.
- The USR parameter is provided for users who want to deviate from standard S-Parameter measurements. A typical application of the USR parameter would be to remove external effects from antenna analysis where a test antenna is compared to a reference antenna by using a ratio such as B2/A2.
- The command syntax for user-defined S-Parameters:  
`:CALCulate{1-16}:PARameter{1-16}:DEFine <char1>,<char2>,<char3>,<char4>`

### Query Outputs

Return varies depending on the command parameters that were set in the command string.

### Query Output for S-Parameters, Parameters

If the command sets S11, S12, S21, S22, S13, S23, S33, S31, S32, S14, S24, S34, S41, S42, S43, or S44:

- The query returns only the selected parameter.
- The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.
- For example, with a command setting S11, the query returns the following:

```
:CALC1:PAR1:DEF S11
:CALC1:PAR1:DEF?
S11
```

### Query Output for USR

If the command sets USR for a user-defined S-Parameter, the output parameters for 2-port VNAs are:

- <char1> USR
- <char2> A1 | A2 | B1 | B2 | 1
- <char3> A1 | A2 | B1 | B2 | 1
- <char4> PORT1 | PORT2

If the command sets USR for a user-defined S-Parameter, the output parameters for 4-port VNAs are:

- <char1> USR
- <char2> A1 | A2 | A3 | A4 | B1 | B2 | B3 | B4 | 1
- <char3> A1 | A2 | A3 | A4 | B1 | B2 | B3 | B4 | 1
- <char4> PORT1 | PORT2 | PORT3 | PORT4
- The query returns USR, the numerator, denominator, and the associated port. Note that the numerator and denominator are separated by a forward slash (“/”).
- For example, the command and query below return the following:

```
:CALC1:PAR1:DEF USR,A1,B1,PORT1
:CALC1:PAR1:DEF?
USR,A1/B1,PORT1
```

**Cmd Parameters:** The required command parameters for 2-port VNAs depend on the first parameter selected:

- <char1> S11 | S12 | S21 | S22 | USR | MEA | MIXed
- <char2> A1 | A2 | B1 | B2 | 1
- <char3> A1 | A2 | B1 | B2 | 1
- <char4> PORT1 | PORT2

The required command parameters for 4-port VNAs depend on the first parameter selected:

- <char1> S11 | S12 | S21 | S22 | S13 | S23 | S33 | S31 | S32 | S14 | S24 | S34 | S41 | S42 | S43 | S44 | USR | MIXed | MEA
- <char2> A1 | A2 | A3 | A4 | B1 | B2 | B3 | B4 | 1
- <char3> A1 | A2 | A3 | A4 | B1 | B2 | B3 | B4 | 1
- <char4> PORT1 | PORT2 | PORT3 | PORT4

**Query Output:** The query parameters returned for 2-port VNAs depend on which S-Parameter was selected for the command:

- <char1> S11 | S12 | S21 | S22 | USR | MEA | MIXed
- <char2> A1 | A2 | B1 | B2 | 1
- <char3> A1 | A2 | B1 | B2 | 1
- <char4> PORT1 | PORT2

The query parameters returned for 4-port VNAs depend on which S-Parameter was selected for the command:

- <char1> S11 | S12 | S21 | S22 | S13 | S23 | S33 | S31 | S32 | S14 | S24 | S34 | S41 | S42 | S43 | S44 | USR | MIX | MEA
- <char2> A1 | A2 | A3 | A4 | B1 | B2 | B3 | B4 | 1
- <char3> A1 | A2 | A3 | A4 | B1 | B2 | B3 | B4 | 1
- <char4> PORT1 | PORT2 | PORT3 | PORT4

**Output:** <char1> |<char1>,<char2>/<char3>,<char4>

**Range:** NA

**Default Value:** The default values returned by the query depend on which trace was selected by PARameter{1-16}:

- S11 for PAR1
- S12 for PAR2
- S21 for PAR3
- S22 for PAR4
- S11 for PAR{5-16}

**Syntax Example:** :CALC1:PAR1:DEF S11

```
:CALC1:PAR1:DEF USR A1,B1,PORT1
:CALC1:PAR1:DEF?
```

**:CALCulate{1-16} :PARameter{1-16} :FORMAT <char>**

**:CALCulate{1-16} :PARameter{1-16} :FORMAT?**

Description: Selects the display format of the indicated trace. See [Chapter 2, “Programming the ShockLine Series VNA”](#) for more information. The available display types are:

- ETamax = η Max (MEA-only)
- GDElay = Group Delay
- IMAGInar = ImaginaryLINPHase = Linear Mag and Phase
- KQ = kQ quality (MEA-only)
- KQETamax = kQ quality and η Max (MEA-only)
- LINPHase = Linear Magnitude and Phase
- LOGPHase = Log Magnitude and Phase
- MLINear = Linear Magnitude
- MLOGarithmic = Log Magnitude
- PHASE = Phase
- PLINear = Linear Polar and Linear Phase
- PLINCOMPlEx = Linear Polar and Real/Imaginary
- PLOGarithmic = Log Polar and Log Phase
- PLOGCOMPlEx = Log Polar and Real/Imaginary
- PWRIn = Power In
- PWROUT = Power Out
- REAL = Real
- REIMaginary = Real and Imaginary
- SCOMPlex = Smith (R + jX) Impedance Real/Imaginary
- SLINear = Smith (R + jX) Impedance Linear/Phase
- SLOGarithmic = Smith (R + jX) Impedance Log/Phase
- SMITH = Smith (R + jX) Impedance
- SWR = SWR
- ZREAL = Impedance Real
- ZCAPacitance = Impedance Capacitance
- ZCOMPlEx = Impedance Real and Imaginary
- ZIMAGinary = Impedance Imaginary
- ZINDuctance = Impedance Inductance
- ZMAGNitude = Impedance Magnitude

Returns the display format of the indicated trace.

See [Chapter 2, “Programming the ShockLine Series VNA”](#) for more information and a complete listing of trace graph types, default settings, and available ranges.

**Cmd Parameters:** <char> ETamax | GDElay | IMAGInar | KQ | KQETamax | LINPHase | LOGPHase | MLINear | MLOGarithmic | PHASE | PLINear | PLINCOMPlEx | PLOGarithmic | PLOGCOMPlEx | REAL | REIMaginary | SCOMPlex | SLINear | SLOGarithmic | SMITH | SWR | ZREAL | ZCAPacitance | ZCOMPlEx | ZIMAGinary | ZINDuctance | ZMAGNitude

**Query Parameters:** <char> ETA | GDEL | IMAG | KQ | KQETA | LINPH | LOGPH | MLIN | MLOG | PHAS | PLIN | PLINCOMP | PLOG | PLOGCOMP | REAL | REIM | SCOMP | SLIN | SLOG | SMIT | SWR | ZREAL | ZCAP | ZCOMP | ZIMAG | ZIND | ZMAGN

**Range:** NA

**Default Value:** MLOG

Output: <char>

Syntax Example: :CALC1:PAR1:FORM MLOG  
:CALC1:PAR1:FORM?

:CALCulate{1-16}:PARameter{1-16}:IMPedance:LC[:STATE] <char>  
:CALCulate{1-16}:PARameter{1-16}:IMPedance:LC[:STATE]?

Applicability: MS46121, MS46122, MS46131, MS46322, MS46522

Effects only apply to PLINear, PLINCOMPlex, PLOGarithmic, PLOGCOMPlex, and SMITH graph types.

Description: Toggles the display of marker LC value on impedance measurements of the indicated trace on/off.

Returns the status of the marker LC value display on the indicated trace.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:PAR1:IMP:LC ON  
:CALC1:PAR1:IMP:LC?

:CALCulate{1-16}:PARameter{1-16}:MEA:DEFine <NRf>  
:CALCulate{1-16}:PARameter{1-16}:MEA:DEFine?

Applicability: The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

Description: Changes the ports measured for the indicated trace's MEA measurement.

Returns the ports measured for the indicated trace's MEA measurement.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR1> The output parameter is an integer.

Range: 12 | 13 | 14 | 23 | 24 | 34

Default Value: 12

Syntax Example: :CALC1:PAR1:MEA:DEF 12  
:CALC1:PAR1:MEA:DEF?

## 5-19 :CALCulate{1-16}:PARameter{1-16}:FSIMulator Subsystem

The :CALCulate{1-16} PARameter{1-16}:FSIMulator commands select a mapped-to port pair for 2-port VNA measurements. Use these commands to configure the ports for a multi-port system measuring a DUT with various port pairs and none, one, or two singletons.

### Measurement and Mixed Mode Subsystems

- “:CALCulate{1-16}:PARameter{1-16}:FSIMulator Subsystem” on page 5-119

**:CALCulate{1-16} :PARameter{1-16} :FSIMulator:BALun:D1S1:DEFine <char>**  
**:CALCulate{1-16} :PARameter{1-16} :FSIMulator:BALun:D1S1:DEFine?**

Applicability: MS46524

Requires a 4-port test set.

Description: Sets the Mixed Mode measurement parameter for the D1S1 Differential Device for the indicated channel and trace.

Returns the Mixed Mode measurement parameter for the D1S1 Differential Device for the indicated channel and trace.

Cmd Parameters: <char> SXX | SXD | SXC | SDX | SCX | SDD | SDC | SCD | SCC

Where the mixed-mode configurations are:

- SXX = S-Parameter for first singleton reception and first singleton drive
- SXD = S-Parameter for first singleton reception and differential drive at Pair 1
- SXC = S-Parameter for first singleton reception and common-mode drive at Pair 1
- SDX = S-Parameter for differential reception at Pair 1 and first singleton drive
- SCX = S-Parameter for common-mode reception at Pair 1 and first singleton drive
- SDD = S-Parameter for differential reception at Pair 1 and differential drive at Pair 1
- SDC = S-Parameter for differential reception at Pair 1 and common-mode drive at Pair 2
- SCD = S-Parameter for common-mode reception at Pair 1 and differential drive at Pair 1
- SCC = S-Parameter for common-mode reception at Pair 1 and common-mode drive at Pair 1

Query Parameters: <char> SXX | SXD | SXC | SDX | SCX | SDD | SDC | SCD | SCC

Range: NA

Default: SXX

Syntax Example: :CALC1:PAR1:FSIM:BAL:D1S1:DEF SXX

:CALC1:PAR1:FSIM:BAL:D1S1:DEF?

**:CALCulate{1-16}:PARameter{1-16}:FSIMulator:BALun:D1S1:TOPology**

<char1>, <char2>

**:CALCulate{1-16}:PARameter{1-16}:FSIMulator:BALun:D1S1:TOPology?**

Applicability: MS46524

Description: Sets the D1S1 Differential Device logical ports to actual ports mapping for the indicated channel and trace. Note that port mappings must be port exclusive.

Returns the D1S1 Differential Device logical ports to actual ports mapping for the indicated channel and trace.

Cmd Parameters: <char1> MAP12 | MAP21 | MAP13 | MAP31 | MAP23 | MAP32 | MAP14 | MAP41 | MAP24 | MAP42 | MAP34 | MAP43

<char2> MAP1 | MAP2 | MAP3 | MAP4

Query Parameters: <char1> MAP12 | MAP21 | MAP13 | MAP31 | MAP23 | MAP32 | MAP14 | MAP41 | MAP24 | MAP42 | MAP34 | MAP43 | NONE

<char2> MAP1 | MAP2 | MAP3 | MAP4 | NONE

Range: NA

Default: MAP12,MAP3

Syntax Example: :CALC1:PAR1:FSIM:BAL:D1S1:TOP MAP34, MAP2

:CALC1:PAR1:FSIM:BAL:D1S1:TOP?

```
:CALCulate{1-16} :PARameter{1-16} :FSIMulator:BALun:D1S2:DEFine <char>
:CALCulate{1-16} :PARameter{1-16} :FSIMulator:BALun:D1S2:DEFine?
```

Applicability: MS46524

Requires a 4-port test set.

Description: Sets the Mixed Mode measurement parameter for the D1S2 Differential Device as one differential pair and two singletons for the indicated channel and trace.

Returns the Mixed Mode measurement parameter for the D1S2 Differential Device for the indicated channel and trace.

Cmd Parameters: <char> SXX | SXY | SYX | SYY | SXD | SXC | SYD | SYC | SDX | SDY | SCX | SCY | SDD | SDC | SCD | SCC

Where the mixed-mode configurations are:

- SXX = S-Parameter for first singleton reception and first singleton drive
- SXY = S-Parameter for first singleton reception and second singleton drive
- SYX = S-Parameter for second singleton reception and first singleton drive
- SYY = S-Parameter for second singleton reception and second singleton drive
- SXD = S-Parameter for first singleton reception and differential drive at Pair 1
- SXC = S-Parameter for first singleton reception and common-mode drive at Pair 1
- SYD = S-Parameter for second singleton reception and differential drive at Pair 1
- SYC = S-Parameter for second singleton reception and common-mode drive at Pair 1
- SDX = S-Parameter for differential reception at Pair 1 and first singleton drive
- SDY = S-Parameter for differential reception at Pair 1 and second singleton drive
- SCX = S-Parameter for common-mode reception at Pair 1 and first singleton drive
- SCY = S-Parameter for common-mode reception at Pair 1 and second singleton drive
- SDD = S-Parameter for differential reception at Pair 1 and differential drive at Pair 1
- SDC = S-Parameter for differential reception at Pair 1 and common-mode drive at Pair 2
- SCD = S-Parameter for common-mode reception at Pair 1 and differential drive at Pair 1
- SCC = S-Parameter for common-mode reception at Pair 1 and common-mode drive at Pair 1

Query Parameters: <char> Return characters are the same as command parameters.

Range: NA

Default: SXX

Syntax Example: :CALC1:PAR1:FSIM:BAL:D1S2:DEF SYD  
:CALC1:PAR1:FSIM:BAL:D1S2:DEF?

```
:CALCulate{1-16}:PARameter{1-16}:FSIMulator:BALun:D1S2:TOPology  
    <char1>, <char2>, <char3>  
:CALCulate{1-16}:PARameter{1-16}:FSIMulator:BALun:D1S2:TOPology?
```

Applicability: MS46524

Description: Sets the D1S2 Device logical ports to actual ports mapping for the indicated channel and trace. Note that port mappings must be port exclusive.

Returns the D1S2 Device logical ports to actual ports mapping for the indicated channel and trace.

Cmd Parameters: <char1> MAP12 | MAP21 | MAP13 | MAP31 | MAP23 | MAP32 | MAP14 | MAP41 |  
MAP24 | MAP42 | MAP34 | MAP43  
<char2> MAP1 | MAP2 | MAP3 | MAP4  
<char3> MAP1 | MAP2 | MAP3 | MAP4

Query Parameters: <char1> MAP12 | MAP21 | MAP13 | MAP31 | MAP23 | MAP32 | MAP14 | MAP41 |  
MAP24 | MAP42 | MAP34 | MAP43 | NONE  
<char2> MAP1 | MAP2 | MAP3 | MAP4 | NONE  
<char3> MAP1 | MAP2 | MAP3 | MAP4 | NONE

Default: MAP12, MAP3, MAP4

Syntax Example: :CALC1:PAR1:FSIM:BAL:D1S2:TOP MAP34, MAP2, MAP1  
:CALC1:PAR1:FSIM:BAL:D1S2:TOP?

```
:CALCulate{1-16} :PARameter{1-16} :FSIMulator:BALun:D2S0:DEFIne <char>
:CALCulate{1-16} :PARameter{1-16} :FSIMulator:BALun:D2S0:DEFIne?
```

Applicability: MS46524

Requires a 4-port test set.

Description: Sets the Mixed Mode measurement parameter for the D2S0 Differential Device as two differential pairs and no singletons for the indicated channel and trace.

Returns the Mixed Mode measurement parameter for the D2S0 Differential Device for the indicated channel and trace.

Cmd Parameters: <char> SD1D1 | SD1D2 | SD2D1 | SD2D2 | SC1C1 | SC1C2 | SC2C1 | SC2C2 | SD1C1 | SD1C2 | SD2C1 | SD2C2 | SC1D1 | SC1D2 | SC2D1 | SC2D2

Where the following balun types are available:

- SD1D1 = S-parameter for differential reception at Pair 1 and differential drive at Pair 2
- SD1D2 = S-parameter for differential reception at Pair 1 and differential drive at Pair 2
- SD2D1 = S-parameter for differential reception at Pair 2 and differential drive at Pair 1
- SD2D2 = S-parameter for differential reception at Pair 2 and differential drive at Pair 2
- SC1D1 = S-parameter for common-mode reception at Pair 1 and differential drive at Pair 1
- SC1D2 = S-parameter for common-mode reception at Pair 1 and differential drive at Pair 2
- SC2D1 = S-parameter for common-mode reception at Pair 2 and differential drive at Pair 1
- SC2D2 = S-parameter for common-mode reception at Pair 2 and differential drive at Pair 2
- SD1C1 = S-parameter for differential reception at Pair 1 and common-mode drive at Pair 2
- SD1C2 = S-parameter for differential reception at Pair 1 and common-mode drive at Pair 2
- SD2C1 = S-parameter for differential reception at Pair 2 and common-mode drive at Pair 1
- SD2C2 = S-parameter for differential reception at Pair 2 and common-mode drive at Pair 2
- SC1C1 = S-parameter for common-mode reception at Pair 1 and common-mode drive at Pair 1
- SC1C2 = S-parameter for common-mode reception at Pair 1 and common-mode drive at Pair 2
- SC2C1 = S-parameter for common-mode reception at Pair 2 and common-mode drive at Pair 1
- SC2C2 = S-parameter for common-mode reception at Pair 2 and common-mode drive at Pair 2

Query Parameters: <char> Return characters are the same as command parameters.

Range: NA

Default: SD1D1

Syntax Example: :CALC1:PAR1:FSIM:BAL:D2S0:DEF SD1D1  
                  :CALC1:PAR1:FSIM:BAL:D2S0:DEF?

```
:CALCulate{1-16}:PARameter{1-16}:FSIMulator:BALun:D2S0:TOPoLogy
    <char1>, <char2>
:CALCulate{1-16}:PARameter{1-16}:FSIMulator:BALun:D2S0:TOPoLogy?
```

Applicability: MS46524

Description: Sets the D2S0 Device logical ports to actual ports mapping for the indicated channel and trace. Note that port mappings must be port exclusive.

Returns the D2S0 Device logical ports to actual ports mapping for the indicated channel and trace.

Cmd Parameters: <char1> MAP12 | MAP21 | MAP13 | MAP31 | MAP23 | MAP32 | MAP14 | MAP41 | MAP24 | MAP42 | MAP34 | MAP43

<char2> MAP12 | MAP21 | MAP13 | MAP31 | MAP23 | MAP32 | MAP14 | MAP41 | MAP24 | MAP42 | MAP34 | MAP43

Query Parameters: <char1> MAP12 | MAP21 | MAP13 | MAP31 | MAP23 | MAP32 | MAP14 | MAP41 | MAP24 | MAP42 | MAP34 | MAP43 | NONE

<char2> MAP12 | MAP21 | MAP13 | MAP31 | MAP23 | MAP32 | MAP14 | MAP41 | MAP24 | MAP42 | MAP34 | MAP43 | NONE

Range: NA

Default: MAP12,MAP34

Syntax Example: :CALC1:PAR1:FSIM:BAL:D2S0:TOP MAP13, MAP24
 :CALC1:PAR1:FSIM:BAL:D2S0:TOP?

```
:CALCulate{1-16}:PARameter{1-16}:FSIMulator:BALun:DEvice <char>
```

```
:CALCulate{1-16}:PARameter{1-16}:FSIMulator:BALun:DEvice?
```

Applicability: MS46524

Description: Selects the Balance Device type for the Balance Simulator function for the indicated channel and trace where the device type can be:

- D2S0 = Two differential pairs and no singletons.
- D1S1 = One differential pair and one singleton.
- D1S2 = One differential pair and two singletons.
- D1S0 = One differential pair and no singletons.

Returns the Balance Device type for the Balance Simulator function for the indicated channel and trace.

Cmd Parameters: <char> D2S0 | D1S1 | D1S2 | D1S0

Query Parameters: <char> D2S0 | D1S1 | D1S2 | D1S0

Range: NA

Default: D1S1 with a 4-port test set.

D1S0 without a 4-port test set.

Syntax Example: :CALC1:PAR1:FSIM:BAL:DEV D2S0
 :CALC1:PAR1:FSIM:BAL:DEV?

## 5-20 :CALCulate{1-16}:PARameter{1-16}:MARKer Subsystem

The :CALCulate{1-16}:PARameter{1-16}:MARKer subsystem commands control the active marker, the discrete marker mode, and whether the markers are displayed.

### Marker Subsystems

Related marker configuration, control, and reporting commands are described multiple subsystems:

- “:CALCulate{1-16}:DISPlay:MARKer Subsystem” on page 5-24
- “:CALCulate{1-16}:MARKer Subsystem” on page 5-72
- “:CALCulate{1-16}:PARameter{1-16}:MARKer Subsystem” on page 5-125
- “:CALCulate{1-16}:PARameter{1-16}:MLOCation Subsystem” on page 5-131
- “:CALCulate{1-16}:PARameter{1-16}:MStatistics Subsystem” on page 5-133
- “:CALCulate{1-16}:TRACE{1-16}:MARKer{1-12} Subsystem” on page 5-236
- “:CALCulate{1-16}[:SElected]:MARKer Subsystem” on page 5-177
- “:CALCulate{1-16}[:SElected]:MARKer{1-13} Subsystem” on page 5-198
- “:DISPlay Subsystem” on page 5-281

### :CALCulate{1-16} :PARameter{1-16} :MARKer:ACTivate?

Description: Query only.

Returns the number of the active marker on the indicated trace. If there is no active marker, the query returns a 0 (zero). Markers 1 through 12 are standard measurement markers. Marker 13 is the reference marker.

**Note**

The instrument user interface supports six measurement markers and 1 reference marker. SCPI supports up to 13 markers. The user interface reference marker is equivalent to SCPI marker 13.

Cmd Parameters: NA

Query Parameters: <NR1> The output parameter is an integer.

Range: 0 to 13

Default Value: 0

Syntax Example: :CALC1:PAR5:MARK:ACT

:CALC1:PAR5:MARK:ACT?

**:CALCulate{1-16}:PARameter{1-16}:MARKer:DISCrete <char>**  
**:CALCulate{1-16}:PARameter{1-16}:MARKer:DISCrete?**

Description: Turns the discrete marker mode on/off on the given trace.

Returns the discrete marker mode on/off state on the given trace.

- Discrete ON: Marker will only lock onto measured trace points
- Discrete OFF: Markers can be placed between measured points

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 1

Syntax Example: **:CALC1:PAR1:MARK:DISC ON**  
**:CALC1:PAR1:MARK:DISC?**

**:CALCulate{1-16}:PARameter{1-16}:MARKer{1-13}:ACTivate**

Description: Makes the indicated marker the active marker on the indicated trace. Markers 1 through 12 are standard measurement markers. Marker 13 is the reference marker.

No query.

Cmd Parameters: NA

Query Parameters: NA

Range: NA

Default Value: NA

Syntax Example: **:CALC1:PAR1:MARK1:ACT**

**:CALCulate{1-16}:PARameter{1-16}:MARKer{1-13}:X <NRf>**

**:CALCulate{1-16}:PARameter{1-16}:MARKer{1-13}:X?**

Description: Enters the frequency, distance, or time value of the indicated marker and turns the marker on. The example below supposes that a point exists at 10.0E6 and is within the predefined frequency range.

Returns the frequency, distance, or time value of the indicated marker. Markers 1 through 12 are standard measurement markers. Marker 13 is the reference marker.

Cmd Parameters: <NRf> The input parameter is in Hertz, Meters, or Seconds.

Query Parameters: <NR3> The output parameter is in Hertz, Meters, or Seconds.

Range: The range is user-defined by a start and stop frequency, a start and stop distance, or a start and stop time.

Default Value: For the X-axis, the default is the Minimum Instrument Frequency.

Syntax Example: **:CALC1:PAR1:MARK1:X 10.0E6**

**:CALC1:PAR1:MARK1:X?**

**:CALCulate{1-16} :PARameter{1-16} :MARKer{1-13} :Y?**

Description: Query only.

Returns the response value of the indicated marker. Markers 1 through 12 are standard measurement markers. Marker 13 is the reference marker.

Use the following command to set the display type:

**:CALCulate{1-16} :PARameter{1-16} :FORMAT <char>**

See [Chapter 2, “Programming the ShockLine Series VNA”](#) for more information and a complete listing of trace graph types, default settings, and available ranges.

Query Parameters: <NR3> | <NR3>,<NR3> The output parameter depends on the display type.

Range: NA

Default Value: NA

Syntax Example: **:CALC1:PAR1:MARK1:Y?**

**:CALCulate{1-16} :PARameter{1-16} :MARKer{1-13} [:STATe] <char>**

**:CALCulate{1-16} :PARameter{1-16} :MARKer{1-13} [:STATe]?**

Description: For the indicated trace, toggles the indicated marker display on/off. Markers 1 through 12 are standard measurement markers. Marker 13 is the reference marker.

For the indicated the indicated trace, returns the marker display on/off status of the indicated marker. Markers 1 through 12 are standard measurement markers. Marker 13 is the reference marker.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: **:CALC1:PAR1:MARK1 ON**

**:CALC1:PAR1:MARK1?**

## 5-21 :CALCulate{1-16}:PARameter{1-16}:MEMORY Subsystem

The :CALCulate{1-16}:PARameter{1-16}:MEMORY subsystem allows users to have multiple memory traces. Each channel may have up to 20 memory traces which can be spread among the regular display traces. Each trace can display up to 20 memory traces.

**:CALCulate{1-16}:PARameter{1-16}:MEMORY{1-20}:DISPLAY:STATE <char>**  
**:CALCulate{1-16}:PARameter{1-16}:MEMORY{1-20}:DISPLAY:STATE?**

Description: Sets Display state (ON/OFF) of the indicated memory location for the specified trace and channel.

Returns the display state of the indicated memory location for the specified trace and channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: **CALC1:PAR1:MEM1:DISP:STAT ON**  
**CALC1:PAR1:MEM1:DISP:STAT?**

**:CALCulate{1-16}:PARameter{1-16}:MEMORY:MMLocation <char>**  
**:CALCulate{1-16}:PARameter{1-16}:MEMORY:MMLocation?**

Description: Sets the memory math location to use for given channel and trace.

Returns the memory math location used for given channel and trace.

To store the active trace data to memory for the channel indicated:

**:CALCulate{1-16}[:SElected]:MATH:MEMorize**

Cmd Parameters: <char> ML1, ML2...ML20

Query Parameters: NA

Query Output: <char> ML1, ML2...ML20 or NONE

Range: ML1, ML2...to ML20

Default Value: NA

Syntax Example: **CALC1:PAR1:MEM:MML ML2**  
**CALC1:PAR1:MEM:MML?**

**:CALCulate{1-16} :PARameter{1-16} :MEMory:DMARKer <char>**

**:CALCulate{1-16} :PARameter{1-16} :MEMory:DMARKer?**

Description: Sets the dominant memory trace to be used for the marker of the given channel and trace.

Returns the dominant memory trace to be used for the marker of the given channel and trace.

Cmd Parameters: <char> ML1, ML2...ML20

Query Parameters: NA

Query Output: <char> ML1, ML2...ML20 or NONE

Range: ML1, ML2...to ML20

Default Value: NA

Syntax Example: **CALC1:PAR1:MEM:DMAR ML2**

**CALC1:PAR1:MEM:DMAR?**

**:CALCulate{1-16} :PARameter{1-16} :MEMory:DMSaverecall <char>**

**:CALCulate{1-16} :PARameter{1-16} :MEMory:DMSaverecall?**

Description: Sets the dominant memory trace to use for save/recall for given channel and trace.

Returns the dominant memory trace to use for save/recall for given channel and trace.

Cmd Parameters: <char> ML1, ML2...ML20

Query Parameters: NA

Query Output: <char> ML1, ML2...ML20 or NONE

Range: ML1, ML2...to ML20

Default Value: NA

Syntax Example: **CALC1:PAR1:MEM:DMS ML1**

**CALC1:PAR1:MEM:DMS?**

**:CALCulate{1-16} [:SELECTed] :PARameter{1-16} :MEMory:ACTive?**

Description: Query only.

Returns active trace memory location of a given channel and trace.

Cmd Parameters: NA

Query Parameters: NA

Query Output: <char> ML1, ML2...ML20

Range: ML1, ML2...to ML20

Default Value: NA

Syntax Example: **CALC1:PAR1:MEM:ACT?**

**:CALCulate{1-16} [:SElected] :PARameter{1-16} :MEMORY:MEMorize**

Description: Stores the trace data to a specified memory trace for the indicated channel and trace.

No query.

Cmd Parameters: <char> ML1, ML2...ML20

Query Parameters: NA

Query Output: NA

Range: ML1, ML2...to ML20

Default Value: NA

Syntax Example: **CALC1:PAR1:MEM:MEM ML1**

**:CALCulate{1-16} [:SElected] :PARameter{1-16} :MEMORY{1-20} :TRACe?**

Description: Query only.

Returns the trace number of trace stored at given memory location and channel, or NONE if no trace is stored there.

Cmd Parameters: NA

Query Parameters: NA

Query Output: <char> ML1, ML2...ML20 or NONE

Range: ML1, ML2...to ML20

Default Value: NONE

Syntax Example: **CALC1:PAR1:MEM1:TRAC?**

**:CALCulate{1-16} :PARameter{1-16} :MEMORY:CONFig <char>****:CALCulate{1-16} :PARameter{1-16} :MEMORY:CONFig?**

Description: Sets the Store to Memory Configuration setting: Options include:

- Use Specified Memory Location
- Use Last Location
- Increment Memory Location

Returns the Store to Memory configuration setting.

Cmd Parameters: <char> SPECified | LAST | INCRelement

Query Parameters: NA

Query Output: <char> SPEC | LAST | INCR

Range: NA

Default Value: LAST

Syntax Example: **CALC1:PAR1:MEM:CONF SPEC**

**CALC1:PAR1:MEM:CONF?**

## 5-22 :CALCulate{1-16}:PARameter{1-16}:MLOCation Subsystem

The :CALCulate{1-16}:PARameter{1-16}:MLOCation subsystem commands reposition the marker data table display location within the response display trace.

### Marker Subsystems

Related marker configuration, control, and reporting commands are described multiple subsystems:

- “:CALCulate{1-16}:DISPlay:MARKer Subsystem” on page 5-24
- “:CALCulate{1-16}:MARKer Subsystem” on page 5-72
- “:CALCulate{1-16}:PARameter{1-16}:MARKer Subsystem” on page 5-125
- “:CALCulate{1-16}:PARameter{1-16}:MLOCation Subsystem” on page 5-131
- “:CALCulate{1-16}:PARameter{1-16}:MStatistics Subsystem” on page 5-133
- “:CALCulate{1-16}:TRACE{1-16}:MARKer{1-12} Subsystem” on page 5-236
- “:CALCulate{1-16}[:SElected]:MARKer Subsystem” on page 5-177
- “:CALCulate{1-16}[:SElected]:MARKer{1-13} Subsystem” on page 5-198
- “:DISPlay Subsystem” on page 5-281

**:CALCulate{1-16}:PARameter{1-16}:MLOCation <char>**

**:CALCulate{1-16}:PARameter{1-16}:MLOCation?**

Description: For the given trace on the indicated channel, sets the location of the Marker Data Display. DSOFF turns off the Marker Data Display.

Returns the location of the Marker Data Display.

Cmd Parameters: <char> ULEFt | URIGHt | LLEFt | LRIGHt | DSOFF | CUSTom

Query Parameters: <char> ULEF | URIG | LLEF | LRIG | DSOF | CUST

Range: NA

Default Value: URIG

Syntax Example: :CALC1:PAR1:MLOC LLEF

:CALC1:PAR1:MLOC?

```
:CALCulate{1-16}:PARameter{1-16}:MLOCation:X <NRf>
:CALCulate{1-16}:PARameter{1-16}:MLOCation:X?
```

Applicability: Requires Marker Data Display Location to be set to Custom.

Description: For the given trace on the indicated channel, sets the X offset location of the Marker Data Display.

Returns the X Offset location of the Marker Data Display for the given trace on the indicated channel.

The default marker data display is the top left corner of the trace display area. A value in the range of 0-100 can be set which can suitably get coerced based on the display size of the trace.

Cmd Parameters: <NRf> The input parameter is a unitless number between 0-100.

Query Parameters: <NR3> The output parameter is a unitless number value between 0-100.

Range: 0-100

Default Value: 0

Syntax Example: :CALC1:PAR1:MLOC:X 1.0E1  
:CALC1:PAR1:MLOC:X?

```
:CALCulate{1-16}:PARameter{1-16}:MLOCation:Y <NRf>
```

```
:CALCulate{1-16}:PARameter{1-16}:MLOCation:Y?
```

Applicability: Requires Marker Data Display Location to be set to Custom.

Description: For the given trace on the indicated channel, sets the Y offset location of the Marker Data Display.

Returns the Y Offset location of the Marker Data Display for the given trace on the indicated channel.

The default marker data display is the top left corner of the trace display area. A value in the range of 0-100 can be set which can suitably get coerced based on the display size of the trace.

Cmd Parameters: <NRf> The input parameter is a unitless value between 0-100.

Query Parameters: <NR3> The output parameter is a unitless value between 0-100.

Range: 0-100

Default Value: 0

Syntax Example: :CALC1:PAR1:MLOC:Y 1.0E1  
:CALC1:PAR1:MARK?

## 5-23 :CALCulate{1-16}:PARameter{1-16}:MSTatistics Subsystem

The :CALCulate{1-16}:PARameter{1-16}:MSTatistics subsystem commands control the marker data table display and output its values.

### Marker Subsystems

Related marker configuration, control, and reporting commands are described multiple subsystems:

- “:CALCulate{1-16}:DISPlay:MARKer Subsystem” on page 5-24
- “:CALCulate{1-16}:MARKer Subsystem” on page 5-72
- “:CALCulate{1-16}:PARameter{1-16}:MARKer Subsystem” on page 5-125
- “:CALCulate{1-16}:PARameter{1-16}:MLOCation Subsystem” on page 5-131
- “:CALCulate{1-16}:PARameter{1-16}:MSTatistics Subsystem” on page 5-133
- “:CALCulate{1-16}:TRACE{1-16}:MARKer{1-12} Subsystem” on page 5-236
- “:CALCulate{1-16}[:SElected]:MARKer Subsystem” on page 5-177
- “:CALCulate{1-16}[:SElected]:MARKer{1-13} Subsystem” on page 5-198
- “:DISPlay Subsystem” on page 5-281

**:CALCulate{1-16}:PARameter{1-16}:MSTatistics <char>**  
**:CALCulate{1-16}:PARameter{1-16}:MSTatistics?**

**Description:** Toggles the marker statistics display on and off for the indicated trace. Markers do not need to be turned on to display the statistics data. If the statistics are toggled on, the statistics are determined for the entire sweep range. The three values displayed are Mean (Mean), Standard Deviation (Std Dev), and Peak-to-Peak (P-P), each measured in dB. Markers do not need to be displayed to output the statistics. If the marker statistics are displayed, a label of Stat Range Entire Sweep (Statistics Range – Entire Sweep) appears above the statistic values.

Returns the marker statistics display on/off state for the indicated trace.

**Cmd Parameters:** <char> 1 | 0 | ON | OFF

**Query Parameters:** <char> 1 | 0

**Range:** NA

**Default Value:** 0

**Syntax Example:** :CALC1:PAR1:MST ON  
                  :CALC1:PAR1:MST?

**:CALCulate{1-16} :PARameter{1-16} :MStatistics :DATA?**

Description: Query only.

For the indicated trace, returns the three marker statistics of the upper display. The statistics are determined for the entire sweep range. The three values output are Mean (Mean), Standard Deviation (Std Dev), and Peak-to-Peak (P-P), each measured in dB. The values are measured for the entire sweep range for the indicated trace. Markers do not need to be on to output (or display) the statistics.

Cmd Parameters: NA

Query Parameters: <NR3>, <NR3>, <NR3> Returns marker on-screen statistics in units of dB.

Range: NA

Default Value: NA

Syntax Example: :CALC1:PAR1:MST:DATA?

**:CALCulate{1-16} :PARameter{1-16} :MStatistics :DATA2?**

Prerequisites: A dual display trace must be set up before sending the query.

Description: Query only.

Returns the marker statistics of the lower display on the given trace. The statistics are determined for the entire sweep range. The three values output are Mean (Mean), Standard Deviation (Std Dev), and Peak-to-Peak (P-P), each measured in dB. The values are measured for the entire sweep range for the indicated trace. Markers do not need to be on to output (or display) the statistics.

Cmd Parameters: NA

Query Parameters: <NR3>, <NR3>, <NR3> Returns marker on-screen statistics.

Range: NA

Default Value: NA

Syntax Example: :CALC1:PAR1:MST:DATA2?

## 5-24 :CALCulate{1-16}:PARameter{1-16}:REference Subsystem

The :CALCulate{1-16}:PARameter:REference subsystem commands configure the types of parameters used for the calibration reference plane.

**:CALCulate{1-16}:PARameter{1-16}:REference:EXTension:AUTomatic**

Applicability: MS46522, MS46524

Description: Calculates and applies the Reference Plane extension delay for the indicated trace on the indicated channel.

No query.

Cmd Parameters: NA

Query Parameters: NA

Output: NA

Range: NA

Default: NA

Syntax Example: :CALC1:PAR1:REF:EXT:AUTo

**:CALCulate{1-16}:PARameter{1-16}:REference:EXTension:DISTance <NRf>**

**:CALCulate{1-16}:PARameter{1-16}:REference:EXTension:DISTance?**

Applicability: MS46522, MS46524

Description: Sets the Reference Plane extension distance in meters for the indicated trace on the indicated channel.

Returns the Reference Plane extension distance in meters for the indicated trace on the indicated channel.

Cmd Parameters: <NRf>

Query Parameters: NA

Output: <NR3>

Range: NA

Default: 0

Syntax Example: :CALC1:PAR1:REF:EXT:DIST <NRf>

:CALC1:PAR1:REF:EXT:DIST?

**:CALCulate{1-16}:PARameter{1-16}:REference:EXTension:FDEPendent:AUTOMATIC**

Applicability: MS46522, MS46524

Description: Calculates and applies the Reference Plane extension for length and loss for the indicated trace on the indicated channel.

No query.

Cmd Parameters: NA

Query Parameters: NA

Query Output: NA

Range: NA

Default: NA

Syntax Example: :CALC1:PAR1:REF:EXT:FDEP:AUTo

```
:CALCulate{1-16}:PARameter{1-16}:REFerence:EXTension:FDEPendent:EXPonent <NRf>
:CALCulate{1-16}:PARameter{1-16}:REFerence:EXTension:FDEPendent:EXPonent?
```

Applicability: MS46522, MS46524

Description: Sets the frequency-dependent exponent (the power of the frequency dependence of the loss that will be assumed) for reference plane for the indicated channel and trace. Values are usually between 0.01 to 10)

Returns the frequency-dependent exponent for reference plane for the indicated channel and trace.

Cmd Parameters: <NRf> The input parameter is a unitless number

Query Parameters: NA

Query Output: <NR3> The output parameter is a unitless number

Range: 0.1 to 10

Default: 0.5

Syntax Example: :CALC1:PAR1:REF:EXT:FDEP:EXP 5  
                  :CALC1:PAR1:REF:EXT:FDEP:EXP?

```
:CALCulate{1-16}:PARameter{1-16}:REFerence:EXTension:FDEPendent:FREQency <NRf>
```

```
:CALCulate{1-16}:PARameter{1-16}:REFerence:EXTension:FDEPendent:FREQency?
```

Applicability: MS46522, MS46524

Description: Sets the frequency-dependent reference frequency for reference plane for the indicated channel and trace. This is the frequency at which loss occurs, 0 denotes constant loss.

Returns the frequency-dependent reference frequency for reference plane for the indicated channel and trace.

Cmd Parameters: <NRf> The input parameter is in Hertz

Query Parameters: NA

Query Output: <NR3> The output parameter is in Hertz

Range: 0 to 99 THz

Default: 0

Syntax Example: :CALC1:PAR1:REF:EXT:FDEP:FREQ 5E9  
                  :CALC1:PAR1:REF:EXT:FDEP:FREQ?

**:CALCulate{1-16} :PARameter{1-16} :REFerence :EXTension :FDEPendent :LOSS <NRf>**  
**:CALCulate{1-16} :PARameter{1-16} :REFerence :EXTension :FDEPendent :LOSS?**

Applicability: MS46522, MS46524

Description: Sets the frequency-dependent reference loss for the indicated channel and trace. Usually greater than 0.

Returns frequency-dependent reference loss for the indicated channel and trace.

Cmd Parameters: <NRf> The input parameter is in dB.

Query Parameters: NA

Query Output: <NR3> The output parameter is in dB

Range: -1000 to 1000

Default: 0

Syntax Example: :CALC1:PAR1:REF:EXT:FDEP:LOSS 5  
:CALC1:PAR1:REF:EXT:FDEP:LOSS?

**:CALCulate{1-16} :PARameter{1-16} :REFerence :EXTension :FDEPendent :MSUPpr ession <char>**  
**:CALCulate{1-16} :PARameter{1-16} :REFerence :EXTension :FDEPendent :MSUPpr ession?**

Applicability: MS46522, MS46524

Description: Turns on/off the status of the mismatch suppression for reference plane for the indicated channel and trace. When ON, ensures that even on mismatch ripple peaks, the result will not show gain.

Returns the on/off status of the mismatch suppression for reference plane for the indicated channel and trace.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default: 0

Syntax Example: :CALC1:PAR2:REF:EXT:FDEP:MSUP OFF  
:CALC1:PAR2:REF:EXT:FDEP:MSUP?

```
:CALCulate{1-16}:PARameter{1-16}:REFerence:EXTension:LOSS <NRf>
:CALCulate{1-16}:PARameter{1-16}:REFerence:EXTension:LOSS?
```

Applicability: MS46522, MS46524

Description: Sets the Reference Plane extension loss in dB for the indicated trace on the indicated channel.

Returns the Reference Plane extension loss in dB for the indicated trace on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in dB.

Query Parameters: NA

Query Output: <NR3> The output is in dB.

Range: -1000 to 1000

Default: 0

Syntax Example: :CALC1:PAR1:REF:EXT:LOSS 10

```
:CALC1:PAR1:REF:EXT:LOSS?
```

```
:CALCulate{1-16}:PARameter{1-16}:REFerence:EXTension:PHAse <NRf>
```

```
:CALCulate{1-16}:PARameter{1-16}:REFerence:EXTension:PHAse?
```

Applicability: MS46522, MS46524

Description: Sets the Reference Plane extension phase offset in degrees for the indicated trace on the indicated channel.

Returns the Reference Plane extension phase offset in degrees for the indicated trace on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in degrees.

Query Parameters: NA

Query Output: <NR3> The output is in degrees.

Range: -360 to 360

Default: 0

Syntax Example: :CALC1:PAR1:REF:EXT:PHA 70

```
:CALC1:PAR1:REF:EXT:PHA?
```

```
:CALCulate{1-16} :PARameter{1-16} :REFerence :EXTension :TERMinator <char>
:CALCulate{1-16} :PARameter{1-16} :REFerence :EXTension :TERMinator?
```

Description: Sets the terminator selection for the reference plane extension for the indicated channel and trace.

Returns the terminator selection for the reference plane extension for the indicated channel and trace.

Cmd Parameters: <char> GENeral | OPEN | SHORt

Query Parameters: NA

Query Output: <char> GENeral | OPEN | SHORt

Range: NA

Default Value: GENeral

Syntax Example: :CALC1:PAR1:REF:EXT:TERM OPEN

```
:CALC1:PAR1:REF:EXT:TERM?
```

```
:CALCulate{1-16} :PARameter{1-16} :REFerence :EXTension :TIME <NRf>
```

```
:CALCulate{1-16} :PARameter{1-16} :REFerence :EXTension :TIME?
```

Applicability: MS46522, MS46524

Description: Sets the Reference Plane extension time in seconds for the indicated trace on the indicated channel.

Returns the Reference Plane extension time in seconds for the indicated trace on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in seconds.

Query Parameters: NA

Query Output: <NR3> The output is in seconds.

Range: NA

Default: 0

Syntax Example: :CALC1:PAR1:REF:EXT:TIM <NRf>

```
:CALC1:PAR1:REF:EXT:TIM?
```

## 5-25 :CALCulate{1-16}:PARameter{1-16}:SElect Subsystem

The :CALCulate{1-16} :PARameter{1-16} :SElect subsystem command sets the active trace.

### Trace Subsystems

Related trace subsystems are:

- “:CALCulate{1-16}:PARameter and :PARameter{1-16} Subsystem” on page 5-111
- “:CALCulate{1-16}:PARameter{1-16}:SElect Subsystem” on page 5-140
- “:CALCulate{1-16}[:SELected]:DATA Subsystem” on page 5-156
- “:CALCulate{1-16}[:SELected]:FORmat Subsystem” on page 5-158
- “:CALCulate{1-16}[:SELected]:MDATA Subsystem” on page 5-206
- “:CALCulate{1-16}[:SELected]:SMOothing Subsystem” on page 5-222
- “:CALCulate{1-16}[:SELected]:TDATA Subsystem” on page 5-223
- “:DISPlay Subsystem” on page 5-281

### :CALCulate{1-16} :PARameter{1-16} :SElect

Description: Sets the active trace.

No query.

To determine the active trace, use:

`:CALCulate{1-16} :PARameter:SElect?`

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: `:CALC1:PAR1:SEL`

## 5-26 :CALCulate{1-16}:POLar Subsystem

The :CALCulate{1-16}:POLar subsystem commands configure the polar chart trace displays on a per-channel basis and how they are displayed on each trace.

### Trace Subsystems

Related trace subsystems are:

- “:CALCulate{1-16}:PARameter and :PARameter{1-16} Subsystem” on page 5-111
- “:CALCulate{1-16}:PARameter{1-16}:SElect Subsystem” on page 5-140
- “:CALCulate{1-16}:POLar Subsystem” on page 5-141
- “:CALCulate{1-16}:PROCessing:ORDer Subsystem” on page 5-143
- “:CALCulate{1-16}[:SElected]:DATA Subsystem” on page 5-156
- “:CALCulate{1-16}[:SElected]:FORmat Subsystem” on page 5-158
- “:CALCulate{1-16}[:SElected]:MDATA Subsystem” on page 5-206
- “:CALCulate{1-16}[:SElected]:SMOothing Subsystem” on page 5-222
- “:CALCulate{1-16}[:SElected]:TDATA Subsystem” on page 5-223
- “:DISPlay Subsystem” on page 5-281

**:CALCulate{1-16}:POLar:ANGLE:START <NRf>**  
**:CALCulate{1-16}:POLar:ANGLE:START?**

Description: Sets the start angle to use on all polar chart displays on the indicated channel.

Returns the start angle to use on all polar chart displays on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Degrees.

Query Parameters: <NR3> The output parameter is in Degrees.

Range: -3.6E2 to 3.6E2

Default Value: 0.00000000000E+000

Syntax Example: :CALC1:POL:ANGL:STAR 2.10E1  
:CALC1:POL:ANGL:STAR?

**:CALCulate{1-16}:POLar:ANGLE:STOP <NRf>**  
**:CALCulate{1-16}:POLar:ANGLE:STOP?**

Description: Sets the stop angle to use on all polar chart displays on the indicated channel.

Returns the stop angle to use on all polar chart displays on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Degrees.

Query Parameters: <NR3> The output parameter is in Degrees.

Range: -3.6E2 to 3.6E2

Default Value: 3.60000000000E+002

Syntax Example: :CALC1:POL:ANGL:STOP 2.10E1  
:CALC1:POL:ANGL:STOP?

```
:CALCulate{1-16}:POLar:CHARt <char>
```

```
:CALCulate{1-16}:POLar:CHARt?
```

Description: Sets the polar chart mode of all polar chart displays on the indicated channel.

Returns the polar chart mode of all polar chart displays on the indicated channel.

Cmd Parameters: <char> MAGPhase | MAGSweep

Query Parameters: <char> MAGP | MAGS

Range: NA

Default Value: MAGP

Syntax Example: :CALC1:POL:CHAR MAGS

```
:CALC1:POL:CHAR?
```

## 5-27 :CALCulate{1-16}:PROCeSSing:ORDer Subsystem

The :CALCulate{1-16}:PROCeSSing:ORDer subsystem configures the measurement port-processing order for the reference plane and group delay.

### Time Domain, Group Delay, and Reference Plane Subsystems

Related time domain, group delay, and reference place subsystems are:

- “:CALCulate{1-16}:PROCeSSing:ORDer Subsystem” on page 5-143
- “:CALCulate{1-16}:REFerence Subsystem” on page 5-144
- “:CALCulate{1-16}[:SELected]:TRANSform:TIME Subsystem” on page 5-225
- “:SENSe{1-16}:CORRection:EXTension Subsystem” on page 5-506

**:CALCulate{1-16}:PROCeSSing:ORDer:GRPDelay <char>**  
**:CALCulate{1-16}:PROCeSSing:ORDer:GRPDelay?**

Description: Sets the order of processing of group delay and trace math data.

Returns the order of processing of group delay and trace math data.

Cmd Parameters: <char> GRPDtracemath | TRACemathgrpD

Query Parameters: <char> GRPD | TRAC

Range: NA

Default Value: NA

Syntax Example: :CALC1:PROC:ORD:GRPD TRAC  
:CALC1:PROC:ORD:GRPD?

**:CALCulate{1-16}:PROCeSSing:ORDer:REFPlane <char>**  
**:CALCulate{1-16}:PROCeSSing:ORDer:REFPlane?**

Description: Sets the order of processing of reference plane and impedance transformation data.

Returns the order of processing of reference plane and impedance transformation data.

Cmd Parameters: <char> IMPedrefplane | REFplaneimpD

Query Parameters: <char> IMP | REF

Range: NA

Default Value: NA

Syntax Example: :CALC1:PROC:ORD:REFP IMP  
:CALC1:PROC:ORD:REFP?

## 5-28 :CALCulate{1-16}:REFerence Subsystem

The :CALCulate{1-16}:REFerence subsystem commands configure various parameters related to the reference plane in line types such as coaxial, microstrip, and waveguides.

### Calibration Setup Subsystems

These subsystems are used during various phases of calibration configuration setup:

- “:CALCulate{1-16}:REFerence Subsystem” on page 5-144
- “:SENSe{1-16}:CORRection:COLLect:METHod Subsystem” on page 5-399
- “:SENSe{1-16}:CORRection:COLLect:MULTIple Subsystem” on page 5-405
- “:SENSe{1-16}:CORRection:COLLect[:CALa]:PORT Subsystem” on page 5-450
- “:SENSe{1-16}:CORRection:COLLect:SOLX:CALKit Subsystem” on page 5-470
- “:SENSe{1-16}:CORRection:ISOLation Subsystem” on page 5-508
- “:SENSe{1-16}:CORRection:STATe Subsystem” on page 5-509

### Time Domain, Group Delay, and Reference Plane Subsystems

Related time domain, group delay, and reference place subsystems are:

- “:CALCulate{1-16}:REFerence Subsystem” on page 5-144
- “:CALCulate{1-16}[:SELected]:TRANSform:TIME Subsystem” on page 5-225
- “:SENSe{1-16}:CORRection:EXTension Subsystem” on page 5-506

**:CALCulate{1-16}:REFerence:EXTension:COAXial:DIElectric <char>**  
**:CALCulate{1-16}:REFerence:EXTension:COAXial:DIElectric?**

Description: Sets the reference plane extension coaxial line dielectric type.

Returns the reference plane extension coaxial line dielectric type.

Cmd Parameters: <char> AIR | MICROporous | OTHER | POLYethylene | TEFLON

Query Parameters: <char> AIR | MICRO | OTHER | POLY | TEFLON

Range: NA

Default Value: AIR

Syntax Example: :CALC1:REF:EXT:COAX:DIEL AIR

:CALC1:REF:EXT:COAX:DIEL?

**:CALCulate{1-16}:REFerence:EXTension:COAXial:DIElectric:OTHer <NRf>**  
**:CALCulate{1-16}:REFerence:EXTension:COAXial:DIElectric:OTHer?**

Description: Sets the reference plane extension coaxial line manual dielectric value.

Returns the reference plane extension coaxial line manual dielectric value.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR3> The output parameter is a unitless number.

Range: 1 to 9.99E3

Default Value: 1.00000000000E+000

Syntax Example: :CALC1:REF:EXT:COAX:DIEL:OTH 1.0E3

:CALC1:REF:EXT:COAX:DIEL:OTH?

**:CALCulate{1-16}:REFerence:EXTension:COAXial:DIElectric:VALue?**

Description: Query only.

Returns the reference plane extension coaxial line dielectric value.

Cmd Parameters: NA

Query Parameters: <NR3> The output parameter is a unitless number.

Range: NA

Default Value: 1.00064900000E+000

Syntax Example: :CALC1:REF:EXT:COAX:DIEL:VAL?

**:CALCulate{1-16}:REFerence:EXTension:LINE <char>**

**:CALCulate{1-16}:REFerence:EXTension:LINE?**

Description: Sets the reference plane extension line type. See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

Returns the reference plane extension line type.

Cmd Parameters: <char> COAXial | MICRostrip | NONDispersive | WAVeguide

Query Parameters: <char> COAX | MICR | NOND | WAV

Range: NA

Default Value: COAX

Syntax Example: :CALC1:REF:EXT:LINE COAX

:CALC1:REF:EXT:LINE?

**:CALCulate{1-16}:REFerence:EXTension:MICrostrip:DIElectric <NRf>**

**:CALCulate{1-16}:REFerence:EXTension:MICrostrip:DIElectric?**

Description: Sets the reference plane extension microstrip substrate dielectric value on the indicated channel.

Returns the reference plane extension microstrip substrate dielectric value on the indicated channel.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: NA

Query Output: <NR3> The output is a unitless number.

Range: Command range: 1 to 10

Query range: 1 to 9.99E3

Default Value: 9.96000000000E+000

Syntax Example: :CALC1:REF:EXT:MIC:DIEL 2.80

:CALC1:REF:EXT:MIC:DIEL?

**:CALCulate{1-16}:REFerence:EXTension:MICrostrip:EFFective <NRf>**

**:CALCulate{1-16}:REFerence:EXTension:MICrostrip:EFFective?**

Description: Sets the reference plane extension microstrip effective dielectric value on the indicated channel.

Returns the reference plane extension microstrip effective dielectric value on the indicated channel.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: NA

Query Output: <NR3> The output is a unitless number.

Range: MPND

Default Value: 6.6900000000E+000

Syntax Example: :CALC1:REF:EXT:MIC:EFF 2.80

:CALC1:REF:EXT:MIC:EFF?

**:CALCulate{1-16}:REFerence:EXTension:MICrostrip:THICKness <NRf>**

**:CALCulate{1-16}:REFerence:EXTension:MICrostrip:THICKness?**

Description: Sets the reference plane extension microstrip substrate thickness on the indicated channel.

Returns the reference plane extension microstrip substrate thickness on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: NA

Query Output: <NR3> The output parameter is in Meters.

Range: MPND

Default Value: 2.5400000000E-004

Syntax Example: :CALC1:REF:EXT:MIC:THICK 3.0E-4

:CALC1:REF:EXT:MIC:THICK?

**:CALCulate{1-16}:REFerence:EXTension:MICrostrip:WIDth <NRf>**

**:CALCulate{1-16}:REFerence:EXTension:MICrostrip:WIDth?**

Description: Sets the reference plane extension microstrip width on the indicated channel.

Returns the reference plane extension microstrip width on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: NA

Query Output: <NR3> The output is in Meters.

Range: MPND

Default Value: 2.3876000000E-004

Syntax Example: :CALC1:REF:EXT:MIC:WID 3.0E-4

:CALC1:REF:EXT:MIC:WID?

```
:CALCulate{1-16}:REFerence:EXTension:MICrostrip:Z0 <NRf>
:CALCulate{1-16}:REFerence:EXTension:MICrostrip:Z0?
```

Description: Sets the reference plane extension microstrip impedance on the indicated channel.

Returns the reference plane extension microstrip impedance on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Ohms.

Query Parameters: NA

Query Output: <NR3> The output parameter is in Ohms.

Range: MPND

Default Value: 5.00000000000E+001

Syntax Example: :CALC1:REF:EXT:MIC:Z0 7.5E1

```
:CALC1:REF:EXT:MIC:Z0?
```

```
:CALCulate{1-16}:REFerence:EXTension:PARameter <char>
```

```
:CALCulate{1-16}:REFerence:EXTension:PARameter?
```

Description: Selects the reference extension parameter type Port or Trace.

Returns the reference extension parameter type Port or Trace.

Cmd Parameters: <char> PORT | TRACe

Query Parameters: NA

Output: <char> PORT | TRAC

Range: NA

Default: PORT

Syntax Example: :CALC1:REF:EXT:PAR <char>

```
:CALC1:REF:EXT:PAR?
```

```
:CALCulate{1-16}:REFerence:EXTension:PORT{1-4}:AUTOMATIC
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Calculates and applies the reference plane extension delay for the indicated port.

No query.

Cmd Parameters: NA

Query Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :CALC1:REF:EXT:PORT1:AUTO

```
:CALCulate{1-16}:REFerence:EXTension:PORT{1-4}:DISTance <NRf>
:CALCulate{1-16}:REFerence:EXTension:PORT{1-4}:DISTance?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the reference plane extension distance in meters for the indicated port.

Returns the reference plane extension distance in meters for the indicated port.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default Value: 0

Syntax Example: :CALC1:REF:EXT:PORT1:DIST 5E-4

```
:CALC1:REF:EXT:PORT1:DIST?
```

```
:CALCulate{1-16}:REFerence:EXTension:PORT{1-4}:FDEPendent:AUTOmatic
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Calculates and applies the Reference Plane extension for length and loss for the indicated port on the indicated channel.

No query.

Cmd Parameters: NA

Query Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :CALC1:REF:EXT:PORT1:FDEP:AUTO

```
:CALCulate{1-16}:REFerence:EXTension:PORT{1-4}:FDEPendent:EXPonent
<NRf>
```

```
:CALCulate{1-16}:REFerence:EXTension:PORT{1-4}:FDEPendent:EXPonent?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the frequency-dependent exponent (the power of the frequency dependence of the loss that will be assumed) for the indicated channel and port. Values are usually between 0.01 to 10).

Returns the frequency-dependent exponent for the indicated channel and port.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: NA

Query Output: <NR3> The output parameter is a unitless number.

Range: 0.1 to 10

Default Value: 0.5

Syntax Example: :CALC1:REF:EXT:PORT1:FDEP:EXP 5

```
:CALC1:REF:EXT:PORT1:FDEP:EXP?
```

```
:CALCulate{1-16}:REFerence:EXTension:PORT{1-4}:FDEPendent:FREQuency  
<NRf>  
:CALCulate{1-16}:REFerence:EXTension:PORT{1-4}:FDEPendent:FREQuency?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the frequency-dependent reference frequency for the indicated channel and port.  
This is the frequency at which loss occurs, 0 denotes constant loss.

Returns the frequency-dependent reference frequency for the indicated channel and port.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: NA

Query Output: <NR3> The output parameter is in Hertz.

Range: 0 to 99 THz

Default Value: 0

Syntax Example: :CALC1:REF:EXT:PORT1:FDEP:FREQ 5E9  
:CALC1:REF:EXT:PORT1:FDEP:FREQ?

```
:CALCulate{1-16}:REFerence:EXTension:PORT{1-4}:FDEPendent:LOSS <NRf>
```

```
:CALCulate{1-16}:REFerence:EXTension:PORT{1-4}:FDEPendent:LOSS?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the frequency-dependent reference loss for the indicated channel and port. Usually greater than 0.

Returns the frequency-dependent reference loss for the indicated channel and port.

Cmd Parameters: <NRf> The input parameter is in dB.

Query Parameters: <NR3> The output parameter is in dB.

Range: -1000 to 1000

Default Value: 0

Syntax Example: :CALC1:REF:EXT:PORT1:FDEP:LOSS 5  
:CALC1:REF:EXT:PORT1:FDEP:LOSS?

```
:CALCulate{1-16}:REFerence:EXTension:PORT{1-4}:FDEPendent:MSUPpression
    <char>
:CALCulate{1-16}:REFerence:EXTension:PORT{1-4}:FDEPendent:MSUPpression
    ?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Turns on/off the status of the mismatch suppression for reference plane for the indicated channel and port. When on, ensures that even on mismatch ripple peaks, the result will not show gain.

Returns the on/off status of the mismatch suppression for reference plane for the indicated channel and port.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:REF:EXT:PORT1:FDEP:MSUP OFF  
:CALC1:REF:EXT:PORT1:FDEP:MSUP?

```
:CALCulate{1-16}:REFerence:EXTension:PORT{1-4}:LOSS <NRf>
:CALCulate{1-16}:REFerence:EXTension:PORT{1-4}:LOSS?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the reference plane extension loss in dB for the indicated port.

Returns the reference plane extension loss in dB for the indicated port.

Cmd Parameters: <NRf> The input parameter is in dB.

Query Parameters: <NR3> The output parameter is in dB.

Range: -1E3 to +1E3

Default Value: 0.0000000000E+000

Syntax Example: :CALC1:REF:EXT:PORT1:LOSS 3E0  
:CALC1:REF:EXT:PORT1:LOSS?

```
:CALCulate{1-16}:REFerence:EXTension:PORT{1-4}:PHAsE <NRf>
:CALCulate{1-16}:REFerence:EXTension:PORT{1-4}:PHAsE?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the reference plane extension phase offset in degrees for the indicated port. The allowable range is -360 degrees to +360 degrees. If the -360 value is exceeded, the instrument truncates the input to -360; if the +360 value is exceeded, the instrument truncates the input to +360.

Returns the reference plane extension phase offset in degrees for the indicated port.

Cmd Parameters: <NRf> The input parameter is in Degrees.

Query Parameters: <NR3> The output parameter is in Degrees.

Range: -360 to +360

Default Value: 0.000000E+000

Syntax Example: :CALC1:REF:EXT:PORT1:PHA 1.5E1

```
:CALC1:REF:EXT:PORT1:PHA?
```

```
:CALCulate{1-16}:REFerence:EXTension:PORT{1-4}:TERMinator <char>
```

```
:CALCulate{1-16}:REFerence:EXTension:PORT{1-4}:TERMinator?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the terminator selection for the reference plane extension for the indicated channel and port.

Returns the terminator selection for the reference plane extension for the indicated channel and port.

Cmd Parameters: <char> GENeral | OPEN | SHORT

Query Parameters: NA

Query Output: <char> GENeral | OPEN | SHORT

Range: NA

Default Value: GENeral

Syntax Example: :CALC1:REF:EXT:PORT1:TERM SHOR

```
:CALC1:REF:EXT:PORT1:TERM?
```

```
:CALCulate{1-16}:REFerence:EXTension:PORT{1-4}:TIME <NRf>
```

```
:CALCulate{1-16}:REFerence:EXTension:PORT{1-4}:TIME?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the reference plane extension in time in seconds for the indicated port.

Returns the reference plane extension in time in seconds for the indicated port.

Cmd Parameters: <NRf> The input parameter is in Seconds.

Query Parameters: <NR3> The output parameter is in Seconds.

Range: MPND

Default Value: 0.000000000000E+000

Syntax Example: :CALC1:REF:EXT:PORT1:TIM 5.0E-2

```
:CALC1:REF:EXT:PORT1:TIM?
```

**:CALCulate{1-16}:RFRanging:ENABLE**

Applicability: MS46522, MS46524

Description: Enables auto RF gain ranging.

No query.

Cmd Parameters: NA

Query Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :CALC1:RFR:ENABLE

**:CALCulate{1-16}:RFRanging:DISABLE**

Applicability: MS46522, MS46524

Description: Disables RF gain ranging.

No query.

Cmd Parameters: NA

Query Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :CALC1:RFR:DISABLE

## 5-29 :CALCulate{1-16}:SNPSetup Subsystem

The :CALCulate{1-16}:SNPSetup subsystem sets the option for saving gated or trace match data into fixture data files.

```
:CALCulate{1-16}:SNPSetup:GATED:DATA[:STATE] <char>
:CALCulate{1-16}:SNPSetup:GATED:DATA[:STATE]?
```

Applicability: Only applicable if the Time Domain option (Option 02) is installed.

Description: Turns on/off the option for saving gated data into fixture data files on the given channel.

Returns the on/off state of the option for saving gated data into fixture data files on the given channel.

Cmd Parameters: <char> ON | OFF | 1 | 0

Query Parameters: NA

Range: NA

Default Value: 0

Syntax Example: :CALC1:SNPS:GAT:DAT ON  
:CALC1:SNPS:GAT:DAT?

```
:CALCulate{1-16}:SNPSetup:MATH:DATA[:STATE] <char>
:CALCulate{1-16}:SNPSetup:MATH:DATA[:STATE]?
```

Description: Turns on/off the option for saving trace math data into fixture data files on the given channel.

Returns the on/off state of the option for saving trace math data into fixture data files on the given channel.

Cmd Parameters: <char> ON | OFF | 1 | 0

Query Parameters: NA

Range: NA

Default Value: 0

Syntax Example: :CALC1:SNPS:MATH:DAT ON  
:CALC1:SNPS:MATH:DAT?

## 5-30 :CALCulate{1-16}[:SElected]:CONVersion Subsystem

The :CALCulate{1-16}[:SElected]:CONVersion subsystem sets the parameter conversion configuration and control for the indicated channel and the active trace.

### Trace Subsystems

Related trace subsystems are:

- “:CALCulate{1-16}:PARameter and :PARameter{1-16} Subsystem” on page 5-111
- “:CALCulate{1-16}:PARameter{1-16}:SELect Subsystem” on page 5-140
- “:CALCulate{1-16}:POLar Subsystem” on page 5-141
- “:CALCulate{1-16}:PROcessing:ORDer Subsystem” on page 5-143
- “:CALCulate{1-16}[:SElected]:DATA Subsystem” on page 5-156
- “:CALCulate{1-16}[:SESelected]:FORmat Subsystem” on page 5-158
- “:CALCulate{1-16}[:SESelected]:MDATA Subsystem” on page 5-206
- “:CALCulate{1-16}[:SESelected]:SMOothing Subsystem” on page 5-222
- “:CALCulate{1-16}[:SESelected]:TDATA Subsystem” on page 5-223
- “:DISPlay Subsystem” on page 5-281

**:CALCulate{1-16} [:SElected] :CONVersion:FUNCTION <char>**

**:CALCulate{1-16} [:SElected] :CONVersion:FUNCTION?**

Description: Sets the parameter conversion function on the active trace of the indicated channel.

Returns the parameter conversion function on the active trace of the indicated channel.

Cmd Parameters: <char> ZREFlection | ZTRansmit | YREFlection | YTRansmit | INVersion

Where:

- ZREFlection = Sets the conversion parameter to Z:Reflection.
- ZTRansmit = Sets the conversion parameter to Z:Transmission.
- YREFlection = Sets the conversion parameter to Y:Reflection.
- YTRansmit = Sets the conversion parameter to Y:Transmission.
- INVersion = Inverts the parameter to 1/S.

Query Parameters: <char> ZREF | ZTR | YREF | YTR | INV

Range: NA

Default Value: INV

Syntax Example: :CALC1:CONV:FUNC ZREF

:CALC1:CONV:FUNC?

```
:CALCulate{1-16}[:SELected]:CONVersion[:STATe] <char>
:CALCulate{1-16}[:SELected]:CONVersion[:STATe]?
```

Description: Sets the on/off status of parameter conversion on the active trace of the indicated channel.

Returns the on/off status of parameter conversion on the active trace of the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Default Value: 0

Syntax Example: :CALC1:CONV ON

```
:CALC1:CONV?
```

## 5-31 :CALCulate{1-16}[:SElected]:DATA Subsystem

The :CALCulate{1-16} [:SElected] :DATA subsystem commands input and output various instrument information sets such as trace data and S-Parameters.

### I/O Configuration and File Operation Subsystems

Related subsystems for I/O configuration and file operation are:

- “:CALCulate{1-16}:FORMat Subsystem – SnP Data” on page 5-42
- “:CALCulate{1-16}[:SElected]:DATA Subsystem” on page 5-156
- “:CALCulate{1-16}[:SESelected]:TDATA Subsystem” on page 5-223
- “:FORMat Subsystem” on page 5-301
- “:HCOPy Subsystem” on page 5-304
- “:MMEMemory Subsystem” on page 5-310

### Trace Subsystems

Related trace subsystems are:

- “:CALCulate{1-16}:PARameter and :PARameter{1-16} Subsystem” on page 5-111
- “:CALCulate{1-16}[:SElected]:FORmat Subsystem” on page 5-158
- “:CALCulate{1-16}:PARameter{1-16}:SELect Subsystem” on page 5-140
- “:CALCulate{1-16}[:SESelected]:DATA Subsystem” on page 5-156
- “:CALCulate{1-16}[:SESelected]:FORmat Subsystem” on page 5-158
- “:CALCulate{1-16}[:SESelected]:MDATA Subsystem” on page 5-206
- “:CALCulate{1-16}[:SESelected]:SMOothing Subsystem” on page 5-222
- “:CALCulate{1-16}[:SESelected]:TDATA Subsystem” on page 5-223
- “:DISPlay Subsystem” on page 5-281

**:CALCulate{1-16} [:SElected] :DATA:FDATA <block>**

**:CALCulate{1-16} [:SElected] :DATA:FDATA?**

Description: Inputs formatted data to display on the active trace.

Returns formatted data of the active trace.

Use the FDATA command to pull data while the unit is sweeping.

Cmd Parameters: <block> See definition of “<block> or <arbitrary block>” on page 2-10.

Query Parameters: <block> See definition of “<block> or <arbitrary block>” on page 2-10.

Range: NA

Default Value: NA

Syntax Example: **:CALC1:DATA:FDAT <block>**

**:CALC1:DATA:FDAT?**

```
:CALCulate{1-16}[:SElected]:DATA:FMEMory <block>
:CALCulate{1-16}[:SElected]:DATA:FMEMory?
```

Description: Inputs formatted data to display on the active trace and writes it to trace memory. The command can also perform math functions.

Returns the formatted memory of the active trace.

Cmd Parameters: <block> See definition of “<block> or <arbitrary block>” on page 2-10.

Cmd Parameters: <block> See definition of “<block> or <arbitrary block>” on page 2-10.

Range: NA

Default Value: NA

Syntax Example: :CALC1:DATA:FMEM <block>
:CALC1:DATA:FMEM?

```
:CALCulate{1-16}[:SElected]:DATA:SDATa <block>
```

```
:CALCulate{1-16}[:SElected]:DATA:SDATa?
```

Prerequisites: The SDATA command should only be used when the instrument is in Hold state.

Description: Inputs corrected real and imaginary S-parameter data to display on the active trace. The data must be real and imaginary formatted data. The command converts the active trace display appropriately.

Returns the real/imaginary S-parameter data for the active trace.

Cmd Parameters: <block> See definition of “<block> or <arbitrary block>” on page 2-10.

Query Parameters: <block>

Output: <block>

Range: NA

Default Value: NA

Syntax Example: :CALC1:DATA:SDAT <block>
:CALC1:DATA:SDAT?

```
:CALCulate{1-16}[:SElected]:DATA:SMEMory <block>
```

```
:CALCulate{1-16}[:SElected]:DATA:SMEMory?
```

Description: Inputs corrected S-parameter trace memory to display on the active trace.

Returns corrected S-parameter trace memory of the active trace.

Cmd Parameters: <block> See definition of “<block> or <arbitrary block>” on page 2-10.

Query Parameters: <block> See definition of “<block> or <arbitrary block>” on page 2-10.

Range: NA

Default Value: NA

Syntax Example: :CALC1:DATA:SMEM <block>
:CALC1:DATA:SMEM?

## 5-32 :CALCulate{1-16}[:SElected]:FORmat Subsystem

The :CALCulate{1-16} [:SElected] :FORmat subsystem command configures the display type for the active trace.

### Trace Subsystems

Related trace subsystems are:

- “:CALCulate{1-16}:PARameter and :PARameter{1-16} Subsystem” on page 5-111
- “:CALCulate{1-16}:PARameter{1-16}:SELect Subsystem” on page 5-140
- “:CALCulate{1-16}[:SESelected]:DATA Subsystem” on page 5-156
- “:CALCulate{1-16}[:SESelected]:FORmat Subsystem” on page 5-158
- “:CALCulate{1-16}[:SESelected]:MDATA Subsystem” on page 5-206
- “:CALCulate{1-16}[:SESelected]:SMOothing Subsystem” on page 5-222
- “:CALCulate{1-16}[:SESelected]:TDATA Subsystem” on page 5-223
- “:DISPlay Subsystem” on page 5-281

**:CALCulate{1-16} [:SElected] :FORMAT <char>**

**:CALCulate{1-16} [:SElected] :FORMAT?**

Description: Selects the display format of the active trace.

Returns the display format of the active trace.

The available display types are:

- ETAmax =  $\eta$  Max (MEA-only)
- GDElAy = Group Delay
- IMAGInary = Imaginary
- KQ = kQ quality (MEA-only)
- KQETAmax = kQ quality and  $\eta$  Max (MEA-only)
- LINPhase = Linear Mag and Phase
- LOGPhase = Log Magnitude and Phase
- MLINear = Linear Magnitude
- MLOGarithmic = Log Magnitude
- PHASe = Phase
- PLINear = Linear Polar and Linear Phase
- PLINCOMplex = Linear Polar and Real/Imaginary
- PLOGarithmic = Log Polar and Log Phase
- PLOGCOMplex = Log Polar and Real/Imaginary
- PWRIIn = Power In
- PWROut = Power Out
- REAL = Real
- REIMaginary = Real and Imaginary
- SCOMplex = Smith ( $R + jX$ ) Impedance Real/Imaginary
- SLINear = Smith ( $R + jX$ ) Impedance Linear/Phase
- SLOGarithmic = Smith ( $R + jX$ ) Impedance Log/Phase
- SMITH = Smith ( $R + jX$ ) Impedance
- SWR = SWR
- ZREAL = Impedance Real

- ZCAPacitance = Impedance Capacitance
- ZCOMPlEx = Impedance Real and Imaginary
- ZIMAGinary = Impedance Imaginary
- ZINDuctance = Impedance Inductance
- ZMAGNitude = Impedance Magnitude

Returns the display format of the indicated trace. See [Chapter 2, “Programming the ShockLine Series VNA”](#) for more information and a complete listing of trace graph types, default settings, and available ranges.

**Cmd Parameters:** <char> ETamax | GDELay | IMAGInary | KQ | KQETamax | LINPHase | LOGPHase | MLINear | MLOGarithmic | PHASe | PLINear | PLINCOMPlEx | PLOGarithmic | PLOGCOMPlEx | REAL | REIMaginary | SCOMPlEx | SLINear | SLOGarithmic | SMITH | SWR | ZREAL | ZCAPacitance | ZCOMPlEx | ZIMAGinary | ZINDuctance | ZMAGNitude

**Query Parameters:** <char> ETA | GDEL | IMAG | KQ | KQETA | LINPH | LOGPH | MLIN | MLOG | PHAS | PLIN | PLINCOMP | PLOG | PLOGCOMP | REAL | REIM | SCOMP | SLIN | SLOG | SMIT | SWR | ZREAL | ZCAP | ZCOMP | ZIMAG | ZIND | ZMAGN

**Range:** NA

**Default Value:** MLOG for all traces

**Syntax Example:** :CALC1:FORM LOGPH  
:CALC1:FORM?

**:CALCulate{1-16}[:SELected]:IMPedance:LC[:STATE] <char>**

**:CALCulate{1-16}[:SELected]:IMPedance:LC[:STATE]? :**

**Applicability:** MS46121, MS46122, MS46131, MS46322, MS46522

**Description:** : Toggles the display of marker LC value on impedance measurements of the active trace on/off.

Effects only apply to PLINear, PLINCOMPlEx, PLOGarithmic, PLOGCOMPlEx, and SMITH graph types.

Returns the status of the marker LC value display on the active trace.

**Cmd Parameters:** <char> 1 | 0 | ON | OFF

**Query Parameters:** <char> 1 | 0

**Range:** NA

**Default Value:** 0

**Syntax Example:** :CALC1:IMP:LC ON  
:CALC1:IMP:LC?

## 5-33 :CALCulate{1-16}[:SElected]:LIMit Subsystem

The :CALCulate{1-16}[:SElected]:LIMit subsystem provides limit line configuration and control for the active trace.

### Limit Line and Segment Subsystems

Related limit line and segment configuration and control subsystems are:

- “:CALCulate{1-16}[:SElected]:LIMit Subsystem” on page 5-160
- “:CALCulate{1-16}[:SElected]:RLIMit Subsystem” on page 5-208
- “:DISPlay Subsystem” on page 5-281
- “:SENSe{1-16}:FSEGMENT Subsystem” on page 5-514.
- “:SENSe{1-16}:FSEGMENT{1-100} Subsystem” on page 5-526.
- “:SENSe{1-16}:ISEGMENT Subsystem” on page 5-538.
- “:SENSe{1-16}:ISEGMENT{1-100} Subsystem” on page 5-548.
- “:SENSe{1-16}:ISEGMENT{1-100} Subsystem” on page 5-548
- “:SENSe{1-16}:SEGMENT Subsystem” on page 5-565

### Trace Subsystems

Related trace subsystems are:

- “:CALCulate{1-16}:PARameter and :PARameter{1-16} Subsystem” on page 5-111
- “:CALCulate{1-16}:PARameter{1-16}:SElect Subsystem” on page 5-140
- “:CALCulate{1-16}[:SElected]:DATA Subsystem” on page 5-156
- “:CALCulate{1-16}[:SElected]:FORmat Subsystem” on page 5-158
- “:CALCulate{1-16}[:SElected]:MDATA Subsystem” on page 5-206
- “:CALCulate{1-16}[:SElected]:SMOothing Subsystem” on page 5-222
- “:CALCulate{1-16}[:SElected]:TDATA Subsystem” on page 5-223
- “:DISPlay Subsystem” on page 5-281

**:CALCulate{1-16}[:TRACe{1-16}]:LIMit:DISPlay:LOCation <char>**  
**:CALCulate{1-16}[:TRACe{1-16}]:LIMit:DISPlay:LOCation?**

Description: Sets the location of the limit and ripple of the indicated channel and trace.

Returns the location of the limit and ripple of the indicated channel and trace.

Cmd Parameters: <char> URIGHT | ULEFT | LRIGHt | LLEFT | CUSTom

Query Parameters: <char> URIGHT | ULEFT | LRIGHt | LLEFT | CUSTom

Range: NA

Default Value: URIGHT

Syntax Example: :CALC1:TRAC1:LIM:DISP:LOC CUST

:CALC1:TRAC1:LIM:DISP:LOC?

```
:CALCulate{1-16}:TRACe{1-16}:LIMit:DISPLAY:LOCation:X <NRf>
:CALCulate{1-16}:TRACe{1-16}:LIMit:DISPLAY:LOCation:X?
```

Applicability: Requires Limit Data Display Location to be set to Custom.

Description: Sets the X offset location of the limit and ripple of the indicated channel and trace.

Returns the X offset location of the limit and ripple of the indicated channel and trace.

Cmd Parameters: <NRf> The input parameter is a unitless number between 0-100.

Query Parameters: <NR3> The output parameter is a unitless number between 0-100.

Range: 0-100

Default Value: 0

Syntax Example: :CALC1:TRAC1:DISP:LOC:X 32.46

```
:CALC1:TRAC1:DISP:LOC:X?
```

```
:CALCulate{1-16}:TRACe{1-16}:LIMit:DISPLAY:LOCation:Y <NRf>
:CALCulate{1-16}:TRACe{1-16}:LIMit:DISPLAY:LOCation:Y?
```

Applicability: Requires Limit Data Display Location to be set to Custom.

Description: Sets the Y offset location of the limit and ripple of the indicated channel and trace.

Returns the Y offset location of the limit and ripple of the indicated channel and trace.

Cmd Parameters: <NRf> The input parameter is a unitless number between 0-100.

Query Parameters: <NR3> The output parameter is a unitless number between 0-100.

Range: 0-100

Default Value: 0

Syntax Example: :CALC1:TRAC1:DISP:LOC:Y 42.36

```
:CALC1:TRAC1:DISP:LOC:Y?
```

```
:CALCulate{1-16}[:SELected]:LIMit:ALARm <char>
:CALCulate{1-16}[:SELected]:LIMit:ALARm?
```

Description: Turns the limit alarm function on/off for the whole system.

Returns the limit alarm on/off status of the system.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:LIM:ALAR ON

```
:CALC1:LIM:ALAR?
```

```
:CALCulate{1-16} [:SElected]:LIMIT:DATA <block>
:CALCulate{1-16} [:SElected]:LIMIT:DATA?
```

Description: Inputs the limit line table for the active trace.

Returns the limit line table of the active trace.

Cmd Parameters: <block> Block data formatted as XML. See definition of “[<block>](#) or [<arbitrary block>](#)” on page 2-10.

Query Parameters: <block> Block data formatted as XML. See definition of “[<block>](#) or [<arbitrary block>](#)” on page 2-10.

Range: NA

Default Value: NA

Syntax Example: :CALC1:LIM:DATA <block>
:CALC1:LIM:DATA?

```
:CALCulate{1-16} [:SElected]:LIMIT:DISPlay:LOCation <char>
:CALCulate{1-16} [:SElected]:LIMIT:DISPlay:LOCation?
```

Description: Sets the location of the limit and ripple of the active trace of the indicated channel.

Returns the location of the limit and ripple of the active trace of the indicated channel.

Cmd Parameters: <char> URIGHt | ULEFt | LRIGHt | LLEFt | CUSTom

Query Parameters: <char> URIGHt | ULEFt | LRIGHt | LLEFt | CUSTom

Range: NA

Default Value: URIGHt

Syntax Example: :CALC1:LIM:DISP:LOC CUST
:CALC1:LIM:DISP:LOC?

```
:CALCulate{1-16} [:SElected]:LIMIT:DISPlay:LOCation:X <NRf>
:CALCulate{1-16} [:SElected]:LIMIT:DISPlay:LOCation:X?
```

Description: Sets the X offset location of the limit and ripple of the active trace of the indicated channel.

Returns the X offset location of the limit and ripple of the active trace of the indicated channel.

Cmd Parameters: <NRf> The input parameter is a unitless number between 0-100.

Query Parameters: <NR3> The output parameter is a unitless number between 0-100.

Range: 0-100

Default Value: 0

Syntax Example: :CALC1:LIM:DISP:LOC:X 32.46
:CALC1:LIM:DISP:LOC:X?

```
:CALCulate{1-16}[:SELected]:LIMit:DISPlay:LOCation:Y <NRf>
:CALCulate{1-16}[:SELected]:LIMit:DISPlay:LOCation:Y?
```

Description: Sets the Y offset location of the limit and ripple of the active trace of the indicated channel.

Returns the Y offset location of the limit and ripple of the active trace of the indicated channel.

Cmd Parameters: <NRf> The input parameter is a unitless number between 0-100.

Query Parameters: <NR3> The output parameter is a unitless number between 0-100.

Range: 0-100

Default Value: 0

Syntax Example: :CALC1:LIM:DISP:LOC:Y 42.36

```
:CALC1:LIM:DISP:LOC:Y?
```

```
:CALCulate{1-16}[:SELected]:LIMit:DISPlay[:STATe] <char>
:CALCulate{1-16}[:SELected]:LIMit:DISPlay[:STATe]?
```

Description: Turns on/off limit display for the active trace.

Returns the limit display on/off status for the active trace.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:LIM:DISP ON

```
:CALC1:LIM:DISP?
```

```
:CALCulate{1-16}[:SELected]:LIMit:FAIL?
```

Description: Query only.

Returns the limit testing result for the active trace, where:

- “0” = The limit passed.
- “1” = The limit failed.

Cmd Parameters: NA

Query Parameters: <NR1> The output parameter is an integer.

Range: 0 | 1

Default Value: 0

Syntax Example: :CALC1:LIM:FAIL?

**:CALCulate{1-16} [:SElected]:LIMit:LOAD <string>**

Description : Loads the limit segments to the filepath passed as argument on the given channel.

Cmd Parameters : <string> Filename and path in the form: 'x:\directory\filename.lmt' where x:\directory\filename.lmt must exist. See definition of "[“<block> or <arbitrary block>” on page 2-10](#)".

No query.

Query Output : <char> Filename and path in the form: x:\directory\filename.lmt

Range : NA

Default : NA

Syntax Example : :CALC1:LIM:LOAD 'x:\directory\filename.lmt'

**:CALCulate{1-16} [:SElected]:LIMit:OFF**

Description: Turns all limits off and clears limit table.

No query.

Cmd Parameters: NA

Query Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :CALC1:LIM:OFF

**:CALCulate{1-16} [:SElected]:LIMit:REPort:POINT?**

Description: Query only.

Returns the number of points failing limit testing.

Query Parameters: <NR1> The output parameter is an integer.

Range: 0 to the current number of set measurement points.

Default Value: 0

Syntax Example: :CALC1:LIM:REP:POIN?

**:CALCulate{1-16}[:SELected]:LIMit:REPort?**

Description: Query only.

Returns a list of formatted data points that failed the limit test on the active trace. Each failed point is listed on a separate line as:

LIMTYPE, FREQ, YVAL, LIMYVAL

- LIMTYPE = UPPER, LOWER, or BOTH
- FREQ = Frequency of failing point
- YVAL = Y value of the failing point
- LIMYVAL = Limit Y value

Cmd Parameters: NA

Query Parameters: <block> See definition of “<block> or <arbitrary block>” on page 2-10.

Range: NA

Default Value: NA

Syntax Example: :CALC1:LIM:REP?

#9000000638UPPER, 9.20885000000E+008, 9.874321E+000, 9.800000E+000

**:CALCulate{1-16}[:SELected]:LIMit:SAVe <string>**

Description : No query.

Saves the limit segments to the filepath passed as parameter for the selected trace on the indicated channel.

Cmd Parameters : <string> Filename and path in the form: 'x:\directory\filename.lmt' where x:\directory\filename.lmt must exist.

Query Output : <char> Filename and path in the form: x:\directory\filename.lmt

Range : NA

Default : NA

Syntax Example : :CALC1:LIM:SAV 'x:\directory\filename.lmt'

**:CALCulate{1-16}[:SELected]:LIMit:SEGMenT:X1ACTual?**

Description: Query only.

Returns start X (X1) actual value of the current limit line segment being defined for the active trace of the indicated channel. The actual value is the X-value of the nearest discrete data point to the X1 value provided by the user, rounded down. This matches the start drawing point for the limit line segment on-screen.

Cmd Parameters: No command

Query Parameters: NA

Output: <NR3>

Range: MPND

Default Value: 0.00000000000E+000

Syntax Example: :CALC1:LIM:SEGM:X1AC?

**:CALCulate{1-16} [:SElected]:LIMit:SEGMenT:X2ACtual?**

Description: Query only.

Returns start X (X2) actual value of the current limit line segment being defined for the active trace of the indicated channel. The actual value is the X-value of the nearest discrete data point to the X2 value provided by the user, rounded down. This matches the stop drawing point for the limit line segment on-screen.

Cmd Parameters: No command

Query Parameters: NA

Output: <NR3>

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :CALC1:LIM:SEG: X2AC?

**:CALCulate{1-16} [:SElected]:LIMit:SEGMenT:X1 <NRf>****:CALCulate{1-16} [:SElected]:LIMit:SEGMenT:X1?**

Applicability: MS46524

Description: Sets the start X (X1) value of the current limit line segment being defined for the active trace of the indicated channel.

Returns start X (X1) value of the current limit line segment being defined for the active trace of the indicated channel.

Cmd Parameters: <NRf>

Query Parameters: NA

Output: <NR3>

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :CALC1:LIM:SEG: X1 10E9

:CALC1:LIM:SEG:X1?

**:CALCulate{1-16} [:SElected]:LIMit:SEGMenT:X2 <NRf>****:CALCulate{1-16} [:SElected]:LIMit:SEGMenT:X2?**

Applicability: MS46524

Description: Sets the stop X value of the current limit line segment being defined for the active trace of the indicated channel.

Returns stop X value of the current limit line segment being defined for the active trace of the indicated channel.

Cmd Parameters: <NRf>

Query Parameters: NA

Output: <NR3>

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :CALC1:LIM:SEG: X2 20E9

:CALC1:LIM:SEG:X2?

**:CALCulate{1-16}[:SELected]:LIMit:SEGMen{1-50}:X1ACtual?**

Description: Query only.

Returns start X (X1) actual value of the selected limit line segment on the active trace of the indicated channel. The actual value is the X-value of the nearest discrete data point to the X1 value provided by the user, rounded down. This matches the start drawing point for the limit line segment on-screen.

Cmd Parameters: No command

Query Parameters: NA

Output: <NR3>

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :CALC1:LIM:SEG1:X1AC?

**:CALCulate{1-16}[:SELected]:LIMit:SEGMen{1-50}:X2ACtual?**

Applicability: MS46524

Description: Query only.

Returns start X (X2) actual value of the selected limit line segment on the active trace of the indicated channel. The actual value is the X-value of the nearest discrete data point to the X2 value provided by the user, rounded down. This matches the stop drawing point for the limit line segment on-screen.

Cmd Parameters: No command

Query Parameters: NA

Output: <NR3>

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :CALC1:LIM:SEG1:X2AC?

**:CALCulate{1-16}[:SELected]:LIMit:SEGMen:Y1 <NRf>****:CALCulate{1-16}[:SELected]:LIMit:SEGMen:Y1?**

Applicability: MS46524

Description: Sets the start Y value of the current limit line segment being defined for the active trace of the indicated channel.

Returns the start Y value of the current limit line segment being defined for the active trace of the indicated channel.

Cmd Parameters: <NRf>

Query Parameters: NA

Output: <NR3>

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :CALC1:LIM:SEG1:Y1 10

:CALC1:LIM:SEG1:Y1?

```
:CALCulate{1-16}[:SElected]:LIMIT:SEGMENT:Y12 <NRf>
:CALCulate{1-16}[:SElected]:LIMIT:SEGMENT:Y12?
```

Applicability: MS46524

Description: Sets the start Y value of the bottom graph current limit line segment being defined for the active trace of the indicated channel.

Returns start Y value of the bottom graph current limit line segment being defined for the active trace of the indicated channel.

Cmd Parameters: <NRf>

Query Parameters: NA

Output: <NR3>

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :CALC1:LIM:SEG:Y12 15

```
:CALC1:LIM:SEG:Y12?
```

```
:CALCulate{1-16}[:SElected]:LIMIT:SEGMENT:Y2 <NRf>
```

```
:CALCulate{1-16}[:SESelected]:LIMIT:SEGMENT:Y2?
```

Applicability: MS46524

Description: Sets the stop Y value of the current limit line segment being defined for the active trace of the indicated channel.

Returns the stop Y value of the current limit line segment being defined for the active trace of the indicated channel.

Cmd Parameters: <NRf>

Query Parameters: NA

Output: <NR3>

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :CALC1:LIM:SEG:Y2 20

```
:CALC1:LIM:SEG:Y2?
```

```
:CALCulate{1-16}[:SESelected]:LIMIT:SEGMENT:Y22 <NRf>
```

```
:CALCulate{1-16}[:SESelected]:LIMIT:SEGMENT:Y22?
```

Description: Sets the stop Y22 value of the bottom graph current limit line segment being defined for the active trace of the indicated channel.

Returns the stop Y22 value of the bottom graph current limit line segment being defined for the active trace of the indicated channel.

Cmd Parameters: <NRf>

Query Parameters: NA

Output: <NR3>

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :CALC1:LIM:SEG:Y22 17

```
:CALC1:LIM:SEG:Y22?
```

**:CALCulate{1-16} [:SELected]:LIMit:SEGment{1-50}:DELETED**

Applicability: MS46524

Description: Deletes the indicated limit line segment of the active trace of the indicated channel.

No query.

Cmd Parameters: NA

Query Parameters: NA

Output: NA

Range: NA

Default Value: NA

Example: :CALC1:LIM:SEGM1:DEL

**:CALCulate{1-16} [:SELected]:LIMit:SEGment{1-50}:FAIL?**

Description : Query only.

Returns the limit testing result for the segment on the active trace of the given channel

0 = The limit passed.

1 = The limit failed.

Cmd Parameters : NA

Query Output : <NR1> The output parameter is an integer.

Range : 0 | 1

Default : 0

Syntax Example : :CALC1:LIM:SEGM1:FAIL?

**:CALCulate{1-16}:TRACe{1-16}:LIMit:SEGment{1-50}:FAIL?**

Description : Query only.

Returns the limit testing result for the segment on the indicated trace of the given channel.

0 = The limit passed.

1 = The limit failed.

Cmd Parameters : NA

Query Output : <NR1> The output parameter is an integer.

Range : 0 | 1

Default : 0

Syntax Example : :CALC1:TRAC1:LIM:SEGM1:FAIL?

```
:CALCulate{1-16} [:SElected]:LIMIT:SEGMENT{1-50}:TYPE <char>
:CALCulate{1-16} [:SElected]:LIMIT:SEGMENT{1-50}:TYPE?
```

Applicability: MS46524

Prerequisites: The limit line must exist before using this command. If no limit lines have been created, use the prerequisite command below to add one or more limit lines:

```
:CALCulate{1-16}:LIMIT:SEGMENT:ADD
```

Description: Sets the limit line type of the indicated limit line segment for the active trace of the indicated channel, where:

- UPPer = Upper limit line
- LOWer = Lower limit line
- NONe = No limit line

Returns the limit line type of the indicated limit line segment for the active trace of the indicated channel.

This adds one (1) limit segment, which permits the example below to work.

Cmd Parameters: <char> UPP | LOWER | NONE

Query Parameters: NA

Output: <char> UPP | LOW | NON

Range: NA

Default Value: NON

Syntax Example: :CALC1:LIM:SEGMENT1:TYP UPP

```
:CALC1:LIM:SEGMENT1:TYP?
```

```
:CALCulate{1-16} [:SElected]:LIMIT:SEGMENT{1-50}:X1 <NRf>
```

```
:CALCulate{1-16} [:SElected]:LIMIT:SEGMENT{1-50}:X1?
```

Applicability: MS46524

Description: Sets the start X1 value of the indicated limit line segment for the active trace of the indicated channel. For a dual trace rectilinear display, this sets the X1 start value for both the upper and lower traces.

Returns start X1 value of the indicated limit line segment for the active trace of the indicated channel.

Cmd Parameters: <NRf>

Query Parameters: NA

Output: <NR3>

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :CALC1:LIM:SEGMENT1:X1 10E9

```
:CALC1:LIM:SEGMENT1:X1?
```

```
:CALCulate{1-16}[:SElected]:LIMit:SEGMENT{1-50}:X2 <NRf>
:CALCulate{1-16}[:SESelected]:LIMit:SEGMENT{1-50}:X2?
```

Applicability: MS46524

Description: Sets the stop X2 value of the indicated limit line segment for the active trace of the indicated channel. For a dual trace rectilinear display, this sets the X1 start value for both the upper and lower traces.

Returns stop X2 value of the indicated limit line segment for the active trace of the indicated channel.

Cmd Parameters: <NRf>

Query Parameters: NA

Output: <NR3>

Range: MPND

Default Value: 0.00000000000E+000

Syntax Example: :CALC1:LIM:SEGMENT1:X2 20E9  
:CALC1:LIM:SEGMENT1:X2?

```
:CALCulate{1-16}[:SESelected]:LIMit:SEGMENT{1-50}:Y1 <NRf>
:CALCulate{1-16}[:SESelected]:LIMit:SEGMENT{1-50}:Y1?
```

Applicability: MS46524

Description: Sets the start Y1 value of the indicated limit line segment for the active trace of the indicated channel. For a dual trace rectilinear display, this sets the Y1 start value for only the upper trace.

Returns the start Y1 value of the indicated limit line segment for the active trace of the indicated channel.

Cmd Parameters: <NRf>

Query Parameters: NA

Output: <NR3>

Range: MPND

Default Value: 0.00000000000E+000

Syntax Example: :CALC1:LIM:SEGMENT1:Y1 10  
:CALC1:LIM:SEGMENT1:Y1?

```
:CALCulate{1-16} [:SElected]:LIMIT:SEGMENT{1-50}:Y12 <NRf>
:CALCulate{1-16} [:SElected]:LIMIT:SEGMENT{1-50}:Y12?
```

Applicability: MS46524

Only for use on dual rectilinear displays. If a single rectilinear display is used, the value is accepted but no change is made to the trace display.

Description: Sets the start Y12 value of the bottom graph indicated limit line segment for the active trace of the indicated channel.

Returns start Y12 value of the bottom graph indicated limit line segment for the active trace of the indicated channel.

Cmd Parameters: <NRf>

Query Parameters: NA

Output: <NR3>

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :CALC1:LIM:SEGMENT1:Y12 15
:CALC1:LIM:SEGMENT1:Y12?

```
:CALCulate{1-16} [:SElected]:LIMIT:SEGMENT{1-50}:Y2 <NRf>
:CALCulate{1-16} [:SElected]:LIMIT:SEGMENT{1-50}:Y2?
```

Applicability: MS46524

Description: Sets the stop Y2 value of the indicated limit line segment for the active trace of the indicated channel. For a dual trace rectilinear display, this sets the Y2 stop value for the upper trace only.

Returns the stop Y2 value of the indicated limit line segment for the active trace of the indicated channel.

Cmd Parameters: <NRf>

Query Parameters: NA

Output: <NR3>

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :CALC1:LIM:SEGMENT1:Y2 20
:CALC1:LIM:SEGMENT1:Y2?

```
:CALCulate{1-16}[:SElected]:LIMit:SEGMENT{1-50}:Y22 <NRf>
:CALCulate{1-16}[:SESelected]:LIMit:SEGMENT{1-50}:Y22?
```

Applicability: MS46524

Only for use on dual rectilinear displays. If a single rectilinear display is used, the value is accepted but no change is made to the trace display.

Description: Sets the stop Y22 value of the bottom graph indicated limit line segment for the active trace of the indicated channel.

Returns the stop Y22 value of the bottom graph indicated limit line segment for the active trace of the indicated channel.

Cmd Parameters: <NRf>

Query Parameters: NA

Output: <NR3>

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :CALC1:LIM:SEG1:Y22 17

```
:CALC1:LIM:SEG1:Y22?
```

```
:CALCulate{1-16}[:SESelected]:LIMit:SEGMENT:ADD {No argument} | {<char>}
| {<char>,<NRf>,<NRf>}
```

Description: Adds a limit line segment for the active trace. If the optional parameters are omitted, an empty segment is added.

No query.

### **Limit Lines for Rectilinear Displays**

For rectilinear displays, up to 50 segment lines can be added to each trace display.

Cmd Parameters: {<No argument>} | {<char>} | {<char>,<NRf>,<NRf>}

<No argument> If no argument is added to the command, the command adds an empty segment.

<char> NONE | UPPer | LOWER

<NRf> Start time, frequency, or distance for X1.

<NRf> Stop time, frequency, or distance for X2.

Range: NA

Default Value: NA

Syntax Example: :CALC1:LIM:SEG:ADD UPPER, 2.0E9, 3.0E9

```
:CALCulate{1-16}[:SESelected]:LIMit:SEGMENT:CLEar
```

Description: Clears all the limit segment definitions on the active trace.

No query.

Cmd Parameters: NA

Query Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :CALC1:LIM:SEG:CLE

**:CALCulate{1-16} [:SElected]:LIMIT:SEGMENT:COUNT?**

Description: Query only.

Returns the number of limit segments defined on the active trace.

Query Parameters: <NR1> The output parameter is an integer.

Range: 0 to 50

Default Value: 0

Syntax Example: :CALC1:LIM:SEG:COUNT?

```
:CALCulate{1-16} [:SElected]:LIMIT:SEGMENT:DEFine <NRf> | <NRf>,<NRf> |
<NRf>,<NRf>,<NRf>,<NRf>
```

**:CALCulate{1-16} [:SElected]:LIMIT:SEGMENT:DEFine?**

Description: Defines a limit line segment for an added segment for the active trace.

Returns the current limit line segment for the active trace.

- If only one <NRf> parameter is set, it defines the limit radius for a circular display.
- If two <NRf> parameters are used, it defines the Y1 start value and the Y2 stop value.
- If four <NRf> parameters are used, it defines the Y1 start value and the Y2 stop value for the upper trace in a dual trace display, and the Y12 (Y1sub in the GUI) start value and the Y22 (Y2sub in the GUI) stop value for the lower trace in a dual trace display.

Cmd Parameters: <NRf> | <NRf>,<NRf> | <NRf>,<NRf>,<NRf>,<NRf>

Query Parameters: <NRf> | <NRf>,<NRf> | <NRf>,<NRf>,<NRf>,<NRf>

Range: NA

Default Value: NA

Syntax Example: :CALC1:LIM:SEG:DEF 2.0, 3.0

:CALC1:LIM:SEG:DEF?

```
:CALCulate{1-16} [:SElected]:LIMIT:SEGMENT:RADius <NRf>
```

**:CALCulate{1-16} [:SElected]:LIMIT:SEGMENT:RADius?**

Applicability: MS46524

Description: Sets the radius value of the current circular limit line segment being defined for the active trace of the indicated channel.

Returns the radius value of the current circular limit line segment being defined for the active trace of the indicated channel.

Cmd Parameters: <NRf>

Query Parameters: NA

Output: <NR3>

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :CALC1:LIM:SEG:RAD 0.75

:CALC1:LIM:SEG:RAD?

```
:CALCulate{1-16}[:SELected]:LIMit[:STATE] <char>
:CALCulate{1-16}[:SELected]:LIMit[:STATE]?
```

Description: Turns on/off limit testing for the active trace of the indicated channel.

Returns the limit testing on/off status for the active trace of the given channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:LIM ON

```
:CALC1:LIM?
```

```
:CALCulate{1-16}[:SELected]:LIMit:SEGment:TYPE <char>
```

```
:CALCulate{1-16}[:SELected]:LIMit:SEGment:TYPE?
```

Prerequisites: The limit line must exist before using this command. If no limit lines have been created, use the prerequisite command below to add one or more limit lines:

```
:CALCulate{1-16}[:SELected]:LIMit:SEGment:ADD {No argument} |
{<char>} | {<char>,<NRf>,<NRf>}
```

This adds one (1) limit segment, which permits the example below to work.

Description: Sets the limit line type of the current limit line segment being defined for the active trace of the indicated channel where:

- UPPer = Upper limit line
- LOWer = Lower limit line
- NONE = No limit line

Returns the limit line type of the current limit line segment being defined for the active trace of the indicated channel.

Cmd Parameters: <char> UPPer | LOWer | NONE

Query Parameters: NA

Output: <char> UPP | LOW | NON

Range: NA

Default Value: NON

Syntax Example: :CALC1:LIM:SEGM:TYPE UPP

```
:CALC1:LIM:SEGM:TYPE?
```

```
:CALCulate{1-16} [:SElected]:LIMIT:SEGMENT{1-51}:DEFine <NRf>,<NRf> |  
    <NRf>,<NRf>,<NRf>,<NRf>  
:CALCulate{1-16} [:SESelected]:LIMIT:SEGMENT{1-51}:DEFine?
```

Applicability: MS46524

Description: Define the indexed limit line segment for the active trace. The limit segment must exist.

Returns the indexed limit line segment for the active trace.

Note that if a :SYSTem:PRESet is issued where the :SYSTem:PRESet:TYPE RESET has been previously set, any user-defined segmented limit lines are cleared and the query generates an error.

#### Two <NRf> Parameters

If two <NRf> parameters are used, it defines the Y1 start value and the Y2 stop value.

#### Four <NRf> Parameters

If four <NRf> parameters are used, it defines the Y1 start value and the Y2 stop value for the upper trace in a dual trace display, and the Y12 (Y1sub in the GUI) start value and the Y22 (Y2sub in the GUI) stop value for the lower trace in a dual trace display.

Cmd Parameters: <NRf>,<NRf> | <NRf>,<NRf>,<NRf>,<NRf>

Query Parameters: <NRf>,<NRf> | <NRf>,<NRf>,<NRf>,<NRf>

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :CALC1:LIM:SEGMENT1:DEF 2.0000000000E009, 4.0000000000E09

```
:CALC1:LIM:SEGMENT1:DEF?
```

## 5-34 :CALCulate{1-16}[:SESelected]:MARKer Subsystem

The :CALCulate{1-16} [:SESelected] :MARKer subsystem commands control the active marker display, value, and search functions.

### Marker Subsystems

Related marker configuration, control, and reporting commands are described multiple subsystems:

- “:CALCulate{1-16}:DISPlay:MARKer Subsystem” on page 5-24
- “:CALCulate{1-16}:MARKer Subsystem” on page 5-72
- “:CALCulate{1-16}:PARameter{1-16}:MARKer Subsystem” on page 5-125
- “:CALCulate{1-16}:PARameter{1-16}:MLOCation Subsystem” on page 5-131
- “:CALCulate{1-16}:PARameter{1-16}:MSTatistics Subsystem” on page 5-133
- “:CALCulate{1-16}:TRACE{1-16}:MARKer{1-12} Subsystem” on page 5-236
- “:CALCulate{1-16}[:SESelected]:MARKer Subsystem” on page 5-177
- “:CALCulate{1-16}[:SESelected]:MARKer{1-13} Subsystem” on page 5-198
- “:DISPlay Subsystem” on page 5-281

### :CALCulate{1-16} [:SESelected]:MARKer:ACTivate?

Description: Query only.

Returns the active marker number of the active trace.

To activate a marker, use the command:

:CALCulate{1-16}[:SESelected]:MARKer{1-13}:ACTivate

Markers 1 through 12 are standard measurement markers. Marker 13 is the reference marker.

Query Parameters: <NR1> The output parameter is an integer.

Range: 1 to 13

Default Value: 0

Syntax Example: :CALC1:MARK:ACT?

### :CALCulate{1-16} [:SESelected]:MARKer:ALL[:STATE] <char>

Description: Toggles all markers on/off on the active trace.

No query.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Range: NA

Default Value: 0

Syntax Example: :CALC1:MARK:ALL ON

**:CALCulate{1-16} [:SElected]:MARKer:MOVE:CENTer**

Description: Moves the active marker range value to the stimulus center range on the active trace.

No query. To query current location of the active marker, use:

[:CALCulate{1-16}\[:SElected\]:MARKer{1-13}:X?](#)

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :CALC1:MARK:MOV:CENT

**:CALCulate{1-16} [:SElected]:MARKer:MOVE:REFMarker**

Description: Moves the active marker to the reference marker on the active trace. The active marker cannot be a reference marker. The reference marker must be on.

No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :CALC1:MARK:MOV:REFM

**:CALCulate{1-16} [:SElected]:MARKer:MOVE:STARt**

Description: Moves the active marker range value to the stimulus start range on the active trace.

No query. To query current location of the active marker, use:

[:CALCulate{1-16}\[:SElected\]:MARKer{1-13}:X?](#)

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :CALC1:MARK:MOV:STAR

**:CALCulate{1-16} [:SElected]:MARKer:MOVE:STOP**

Description: Moves the active marker range value to the stimulus stop range on the active trace.

No query. To query current location of the active marker, use:

[:CALCulate{1-16}\[:SElected\]:MARKer{1-13}:X?](#)

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :CALC1:MARK:MOV:STOP

**:CALCulate{1-16} [:SELECTed] :MARKer :MPSEArch**

Description: Performs a multiple peak search on the active trace.

No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :CALC1:MARK:MPSEA

**:CALCulate{1-16} [:SELECTed] :MARKer :MPSEArch :EXCursion <NRf>****:CALCulate{1-16} [:SELECTed] :MARKer :MPSEArch :EXCursion?**

Description: Sets the marker search excursion value for multiple peak searches on the active trace.

Returns the marker search excursion value for multiple peak searches on the active trace.

Cmd Parameters: <NRf> The input parameter is in dB.

Query Parameters: <NR3> The output parameter depends on the display type.

Range: MPNF

Default Value: 0.000000E+000

Syntax Example: :CALC1:MARK:MPSEA:EXC 1.8E1

:CALC1:MARK:MPSEA:EXC?

**:CALCulate{1-16} [:SELECTed] :MARKer :MPSEArch :POLarity <char>****:CALCulate{1-16} [:SELECTed] :MARKer :MPSEArch :POLarity?**

Description: Sets the marker search polarity value for multiple peak searches on the active trace  
Returns the marker search polarity value for multiple peak searches on the active trace.

Cmd Parameters: <char> POSitive | NEGative | BOTH

Query Parameters: <char> POS | NEG | BOTH

Range: NA

Default Value: POS

Syntax Example: :CALC1:MARK:MPSEA:POL POS

:CALC1:MARK:MPSEA:POL?

**:CALCulate{1-16} [:SELECTed] :MARKer :MPSEArch :THREshold <NRf>****:CALCulate{1-16} [:SELECTed] :MARKer :MPSEArch :THREshold?**

Description: Sets the marker search threshold value for multiple peak searches on the active trace.

Returns the marker search threshold value for multiple peak searches on the active trace.

Cmd Parameters: <NRf> The input parameter is in dB.

Query Parameters: <NR3> The output parameter depends on the display type.

Range: MPNF

Default Value: 0.000000E+000

Syntax Example: :CALC1:MARK:MPSEA:THRE 1.8E1

:CALC1:MARK:MPSEA:THRE?

**:CALCulate{1-16} [:SElected]:MARKer:MTSEArch**

Description: Performs a multiple target search on the active trace.  
No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :CALC1:MARK:MTSEA

**:CALCulate{1-16} [:SElected]:MARKer:MTSEArch:TARget <NRf>**  
**:CALCulate{1-16} [:SElected]:MARKer:MTSEArch:TARget?**

Description: Sets the marker search target value for multiple target searches on the active trace.  
Returns the marker search target value for multiple target searches on the active trace.

Cmd Parameters: <NRf> The input parameter depends on the display type.

Query Parameters: <NR3>, <NR3>, <NR3> The output parameter depends on the display type.

Range: MPNI

Default Value: 0.000000E+000

Syntax Example: :CALC1:MARK:MTSEA:TAR 1E7

:CALC1:MARK:MTSEA:TAR?

**:CALCulate{1-16} [:SElected]:MARKer:MTSEArch:TRANSition <char>**  
**:CALCulate{1-16} [:SElected]:MARKer:MTSEArch:TRANSition?**

Description: Sets the marker search transition value for multiple target searches on the active trace.  
Returns the marker search transition value for multiple target searches on the active trace.

Cmd Parameters: <char> POSitive | NEGative | BOTH

Query Parameters: <char> POS | NEG | BOTH

Range: NA

Default Value: BOTH

Syntax Example: :CALC1:MARK:MTSEA:TRAN POS

:CALC1:MARK:MTSEA:TRAN?

**:CALCulate{1-16} [:SElected]:MARKer:OFF**

Description: Turns all markers off.  
No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :CALC1:MARK:OFF

```
:CALCulate{1-16}[:SElected]:MARKer:PSEArch <char>
:CALCulate{1-16}[:SElected]:MARKer:PSEArch?
```

Description: Performs a peak search on the active trace.

Returns the last marker search type for peak searches on the active trace.

Cmd Parameters: <char> PEAK | LEFT | RIGHT

Query Parameters: <char> PEAK | LEFT | RIGHT

Range: NA

Default Value: PEAK

Syntax Example: :CALC1:MARK:PSEA PEAK  
:CALC1:MARK:PSEA?

```
:CALCulate{1-16}[:SElected]:MARKer:PSEArch:EXCursion <NRf>
:CALCulate{1-16}[:SElected]:MARKer:PSEArch:EXCursion?
```

Description: Sets the marker search excursion value for peak searches on the active trace.

Returns the marker search excursion value for peak searches on the active trace.

Cmd Parameters: <NRf> The input parameter is in dB.

Query Parameters: <NR3> The output parameter depends on the display type.

Range: MPNI

Default Value: 0.000000E+000

Syntax Example: :CALC1:MARK:PSEA:EXC 1.8E1  
:CALC1:MARK:PSEA:EXC?

```
:CALCulate{1-16}[:SElected]:MARKer:PSEArch:POLarity <char>
:CALCulate{1-16}[:SElected]:MARKer:PSEArch:POLarity?
```

Description: Sets the marker search polarity value for peak searches on the active trace.

Returns the marker search polarity value for peak searches on the active trace.

Cmd Parameters: <char> POSitive | NEGative | BOTH

Query Parameters: <char> POS | NEG | BOTH

Range: NA

Default Value: POS

Syntax Example: :CALC1:MARK:PSEA:POL POS  
:CALC1:MARK:PSEA:POL?

```
:CALCulate{1-16} [:SElected]:MARKer:PSEArch:THREshold <NRf>
:CALCulate{1-16} [:SElected]:MARKer:PSEArch:THREshold?
```

Description: Sets the marker search threshold value for peak searches on the active trace.

Returns the marker search threshold value for peak searches on the active trace.

Cmd Parameters: <NRf> The input parameter is in dB.

Query Parameters: <NR3> The output parameter depends on the display type.

Range: MPNF

Default Value: 0.000000E+000

Syntax Example: :CALC1:MARK:PSEA:THRE 1.8E1  
:CALC1:MARK:PSEA:THRE?

```
:CALCulate{1-16} [:SElected]:MARKer:SEArch <char>
:CALCulate{1-16} [:SElected]:MARKer:SEArch?
```

Description: Sets the marker search type for the active marker on the active trace.

Returns the marker search type for the active marker on the active trace.

Cmd Parameters: <char> MAX | MIN | PEAK | TARGet

Query Parameters: <char> MAX | MIN | PEAK | TARG

Range: NA

Default Value: MAX

Syntax Example: :CALC1:MARK:SEA MAX  
:CALC1:MARK:SEA?

```
:CALCulate{1-16} [:SElected]:MARKer:SEArch:BANDwidth:DATA?
```

Description: Query only.

Returns the marker search bandwidth data of the active marker on the active trace.

Query Parameters: <NR3>, <NR3>, <NR3>, <NR3>{,<NR3>} The query returns four or five <NR3> data elements in the following sequence:

- First <NR3> – Bandwidth in Hertz.
- Second <NR3> – Center of marker search range in Hertz, Meters, or Seconds.
- Third <NR3> – Q which is a unitless number.
- Fourth <NR3> – Loss in dB.
- Fifth <NR3> – Optional. The Shape Factor which is a unitless number. This parameter is optional, depending on if the Shape Function is turned on or off using the Shape Command.

Syntax Example: :CALC1:MARK:SEA:BAND:DATA?

```
:CALCulate{1-16} [:SElected]:MARKer:SEArch:BANDwidth:DEFine <NRf>
:CALCulate{1-16} [:SESelected]:MARKer:SEArch:BANDwidth:DEFine?
```

Description: Sets the marker search define value for bandwidth calculation of the active marker on the active trace.

Returns the marker search define value for bandwidth calculation of the active marker on the active trace.

Cmd Parameters: <NRf> The input parameter depends on the display type.

Query Parameters: <NR3> The output parameter is in Hertz, Meters, or Seconds.

Range: MPNF

Default Value: 0.000000E+000

Syntax Example: :CALC1:MARK:SEA:BAND:DEF 3.0E4

```
:CALC1:MARK:SEA:BAND:DEF?
```

```
:CALCulate{1-16} [:SESelected]:MARKer:SEArch:BANDwidth:RTYPE <char>
:CALCulate{1-16} [:SESelected]:MARKer:SEArch:BANDwidth:RTYPE?
```

Description: Sets the reference type for bandwidth search on the active trace of the indicated channel.

Returns the reference type for bandwidth search on the active trace of the indicated channel.

Cmd Parameters: MARKer|RVALue

- MARKer = Marker
- RVALue = Reference Value

Query Output: MARK|RVAL

Range: NA

Default Value: MARK

Syntax Example: :CALC1:MARK:SEA:BAND:RTYPE RVAL

```
:CALC1:MARK:SEA:BAND:RTYPE?
```

```
:CALCulate{1-16} [:SESelected]:MARKer:SEArch:BANDwidth:RVALue <char>
:CALCulate{1-16} [:SESelected]:MARKer:SEArch:BANDwidth:RVALue?
```

Description: Sets the reference value for bandwidth search on the active trace of the indicated channel.

Returns the reference value for bandwidth search on the active trace of the indicated channel.

Cmd Parameters: <NRf>

Query Output: <NR3>

Range: NA

Default Value: 0

Syntax Example: :CALC1:MARK:SEA:BAND:RVAL 5

```
:CALC1:MARK:SEA:BAND:RVAL?
```

**:CALCulate{1-16} [:SElected]:MARKer:SEArch:BANDwidth:SHAPe:HIGH <NRf>**  
**:CALCulate{1-16} [:SElected]:MARKer:SEArch:BANDwidth:SHAPe:HIGH?**

Description: Sets the marker search high value for bandwidth shape factor calculation of the active marker on the active trace.

Returns the marker search high value for bandwidth shape factor calculation of the active marker on the active trace.

Cmd Parameters: <NRf> The input parameter depends on the display type.

Query Parameters: <NR3> The output parameter is a unitless number.

Range: MPNF

Default Value: 0.000000E+000

Syntax Example: :CALC1:MARK:SEA:BAND:SHAP:HIGH 4E0

:CALC1:MARK:SEA:BAND:SHAP:HIGH?

**:CALCulate{1-16} [:SElected]:MARKer:SEArch:BANDwidth:SHAPe:LOW <NRf>**  
**:CALCulate{1-16} [:SElected]:MARKer:SEArch:BANDwidth:SHAPe:LOW?**

Description: Sets the marker search low value for bandwidth shape factor calculation of the active marker on the active trace.

Returns the marker search low value for bandwidth shape factor calculation of the active marker on the active trace.

Cmd Parameters: <NRf> The input parameter depends on the display type.

Query Parameters: <NR3> The output parameter is a unitless number.

Range: MPNF

Default Value: 0.000000E+000

Syntax Example: :CALC1:MARK:SEA:BAND:SHAP:LOW 4E0

:CALC1:MARK:SEA:BAND:SHAP:LOW?

**:CALCulate{1-16} [:SElected]:MARKer:SEArch:BANDwidth:SHAPe[:STATE]**  
**<char>**

**:CALCulate{1-16} [:SElected]:MARKer:SEArch:BANDwidth:SHAPe[:STATE]?**

Description: Toggles on/off the marker search bandwidth shape factor calculation of the active marker on the active trace.

Returns the on/off status of marker search bandwidth shape factor of the active marker calculation on the active trace.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:MARK:SEA:BAND:SHAP 1

:CALC1:MARK:SEA:BAND:SHAP?

**:CALCulate{1-16} [:SELECTed] :MARKer :SEArch :BANDwidth :SSTart <char>**  
**:CALCulate{1-16} [:SELECTed] :MARKer :SEArch :BANDwidth :SSTart?**

Applicability: Only used when the bandwidth reference type is set to Reference Value.

Description: Sets the bandwidth start position on the active trace of the indicated channel.

Returns the bandwidth start position on the active trace of the indicated channel.

Cmd Parameters: BEGinning | MAXimum

- BEGinning
- MAXimum = Reference

Query Parameters: <NR3>

Query Output: BEG | MAX

Range: NA

Default Value: MAX

Syntax Example: :CALC1:MARK:SEA:BAND:SSTart MAX  
                   :CALC1:MARK:SEA:BAND:SSTart?

**:CALCulate{1-16} [:SELECTed] :MARKer :SEArch :BANDwidth[:STATE] <char>**  
**:CALCulate{1-16} [:SELECTed] :MARKer :SEArch :BANDwidth[:STATE]?**

Description: Toggles on/off the marker search bandwidth calculation of the active marker on the active trace.

Returns the on/off status of marker search bandwidth calculation of the active marker on the active trace.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:MARK:SEA:BAND ON  
                   :CALC1:MARK:SEA:BAND?

**:CALCulate{1-16} [:SELECTed] :MARKer :SEArch :DISTance :RANGE{1-20} :STARt:X <NRf>**

**:CALCulate{1-16} [:SELECTed] :MARKer :SEArch :DISTance :RANGE{1-20} :STARt:X?**

Description: Sets the marker search range start position for the indicated channel and range for the distance axis.

Returns the marker search range start position for the indicated channel and range for the distance axis.

Cmd Parameters: <NRf> The input parameter is in meters.

Query Parameters: NA

Query Output: <NR3> The input parameter is in meters.

Range: MPND

Default: 0.00000000000E+000

Syntax Example: :CALC1:MARK:SEA:DIST:RANG1:STAR:X 20  
                   :CALC1:MARK:SEA:DIST:RANG1:STAR:X?

```
:CALCulate{1-16}[:SElected]:MARKer:SEArch:DISTance:RANGE{1-20}:STOP:X  
    <NRf>  
:CALCulate{1-16}[:SElected]:MARKer:SEArch:DISTance:RANGE{1-20}:STOP:X?
```

Description : Sets the marker search range stop position for the indicated channel and range for the distance axis.

Returns the marker search range stop position for the indicated channel and range for the distance axis.

Cmd Parameters : <NRf> The input parameter is in seconds.

Query Parameters: NA

Query Output : <NR3> The input parameter is in seconds.

Range : MPND

Default : 0.0000000000E+000

Syntax Example : :CALC1:MARK:SEA:DIST:RANG1:STOP:X 2.0  
 :CALC1:MARK:SEA:DIST:RANG1:STOP:X?

```
:CALCulate{1-16}[:SElected]:MARKer:SEArch:FREQuency:RANGE{1-20}:STARt:  
    X <NRf>
```

```
:CALCulate{1-16}[:SElected]:MARKer:SEArch:FREQuency:RANGE{1-20}:STARt:  
    X?
```

Description : Sets the marker search range start position for the indicated channel and range for the frequency axis.

Returns the marker search range start position for the indicated channel and range for the frequency axis.

Cmd Parameters : <NRf> The input parameter is in Hertz.

Query Parameters: NA

Query Output : <NR3> The input parameter is in Hertz.

Range : MPND

Default : 0.0000000000E+000

Syntax Example : :CALC1:MARK:SEA:FREQ:RANG1:STAR:X 2.5E9  
 :CALC1:MARK:SEA:FREQ:RANG1:STAR:X?

```
:CALCulate{1-16} [:SELECTed] :MARKer :SEArch :FREQuency :RANGE{1-20} :STOP:X  
    <NRf>  
:CALCulate{1-16} [:SELECTed] :MARKer :SEArch :FREQuency :RANGE{1-20} :STOP:X  
?
```

Description : Sets the marker search range stop position for the indicated channel and range for the frequency axis.

Returns the marker search range stop position for the indicated channel and range for the frequency axis.

Cmd Parameters : <NRf> The input parameter is in Hertz.

Query Parameters: NA

Query Output : <NR3> The input parameter is in Hertz.

Range : MPND

Default : 0.00000000000E+000

Syntax Example : :CALC1:MARK:SEA:FREQ:RANG1:STOP:X 2.5E9  
:CALC1:MARK:SEA:FREQ:RANG1:STOP:X?

```
:CALCulate{1-16} [:SELECTed] :MARKer :SEArch :NOTCh :DATA?
```

Description: Query only.

Returns the marker search notch bandwidth data of the active marker on the active trace.

Query Parameters: <NR3>, <NR3>, <NR3>, <NR3>, <NR3> The query returns four or five <NR3> data elements in the following sequence:

- First <NR3> – Bandwidth in Hertz.
- Second <NR3> – Center of marker search range in Hertz, Meters, or Seconds.
- Third <NR3> – Q which is a unitless number.
- Fourth <NR3> – Loss in dB.
- Fifth <NR3> – Optional. The Shape Factor which is a unitless number. This parameter is optional, depending on if the Shape Function is turned on or off using the Shape Command

Range: Outputs multiple NR3 data.

Default Value: NA

Syntax Example: :CALC1:MARK:SEA:NOTC:DATA?

```
:CALCulate{1-16} [:SElected]:MARKer:SEArch:NOTCh:DEFine <NRf>
:CALCulate{1-16} [:SElected]:MARKer:SEArch:NOTCh:DEFine?
```

Description: Sets the marker search define value for notch bandwidth calculation of the active marker on the active trace.

Returns the marker search define value for notch bandwidth calculation of the active marker on the active trace.

Cmd Parameters: <NRf> The input parameter depends on the display type.

Query Parameters: <NR3> The output parameter is in Hertz, Meters, or Seconds.

Range: MPNF

Default Value: 0.000000E+000

Syntax Example: :CALC1:MARK:SEA:NOTC:DEF 1.0E4

:CALC1:MARK:SEA:NOTC:DEF?

```
:CALCulate{1-16} [:SElected]:MARKer:SEArch:NOTCh:RTYPe <char>
```

```
:CALCulate{1-16} [:SElected]:MARKer:SEArch:NOTCh:RTYPe?
```

Description: Sets the reference type for notch search on the active trace of the indicated channel.

Returns the reference type for notch search on the active trace of the indicated channel.

MARKer = Marker reference

RVALue = Reference Value entered into the Reference Value toolbar.

Cmd Parameters: MARKer | RVALue

Query Output: MARK | RVAL

Range: NA

Default Value: MARK

Syntax Example: :CALC1:MARK:SEA:NOTCh:RTYPE RVAL

Syntax Example: :CALC1:MARK:SEA:NOTCh:RTYPE?

```
:CALCulate{1-16} [:SElected]:MARKer:SEArch:NOTCh:RVALue <NRf>
```

```
:CALCulate{1-16} [:SElected]:MARKer:SEArch:NOTCh:RVALue?
```

Description: Sets the reference value for notch search on the active trace of the indicated channel.

Returns the reference value for notch search on the active trace of the indicated channel.

Cmd Parameters: <NRf> The input parameter depends on the display type.

Query Output: <NR3> The output parameter is a unitless number.

Range: NA

Default Value: 0

Syntax Example: :CALC1:MARK:SEA:NOTCh:RVAL 5

Syntax Example: :CALC1:MARK:SEA:NOTCh:RVAL?

```
:CALCulate{1-16} [:SElected]:MARKer:SEArch:NOTCh:SHAPe:HIGH <NRf>
:CALCulate{1-16} [:SESelected]:MARKer:SEArch:NOTCh:SHAPe:HIGH?
```

Description: Sets the marker search high value for notch shape factor calculation of the active marker on the active trace.

Returns the marker search high value for notch shape factor calculation of the active marker on the active trace.

Cmd Parameters: <NRf> The input parameter depends on the display type.

Query Parameters: <NR3> The output parameter is in Hertz, Meters, or Seconds.

Range: MPNF

Default Value: 0.000000E+000

Syntax Example: :CALC1:MARK:SEA:NOTC:SHAP:HIGH 4E0

```
:CALC1:MARK:SEA:NOTC:SHAP:HIGH?
```

```
:CALCulate{1-16} [:SESelected]:MARKer:SEArch:NOTCh:SHAPe:LOW <NRf>
:CALCulate{1-16} [:SESelected]:MARKer:SEArch:NOTCh:SHAPe:LOW?
```

Description: Sets the marker search low value for notch shape factor calculation of the active marker on the active trace.

Returns the marker search low value for notch shape factor calculation of the active marker on the active trace.

Cmd Parameters: <NRf> The input parameter depends on the display type.

Query Parameters: <NR3> The output parameter is a unitless number.

Range: MPNF

Default Value: 0.000000E+000

Syntax Example: :CALC1:MARK:SEA:NOTC:SHAP:LOW 4E0

```
:CALC1:MARK:SEA:NOTC:SHAP:LOW?
```

```
:CALCulate{1-16} [:SESelected]:MARKer:SEArch:NOTCh:SSTart <char>
:CALCulate{1-16} [:SESelected]:MARKer:SEArch:NOTCh:SSTart?
```

Applicability: Only used when the notch reference type is set to Reference Value.

Description: Sets the notch start position on the active trace of the indicated channel.

Returns the notch start position on the active trace of the indicated channel.

BEGinning = Start position

MINimum = Reference

Cmd Parameters: BEGinning | MINimum

Query Output: BEG | MIN

Range: NA

Default Value: MIN

Syntax Example: :CALC1:MARK:SEA:NOTCh:SSTart MIN

```
::CALC1:MARK:SEA:NOTCh:SSTart?
```

**:CALCulate{1-16} [:SElected]:MARKer:SEArch:NOTCh:SHAPe[:STATE] <char>**  
**:CALCulate{1-16} [:SElected]:MARKer:SEArch:NOTCh:SHAPe[:STATE]?**

Description: Toggles on/off the marker search notch shape factor calculation of the active marker on the active trace.

Returns on/off status of marker search notch shape factor calculation of the active marker on the active trace.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:MARK:SEA:NOTC:SHAP ON

:CALC1:MARK:SEA:NOTC:SHAP?

**:CALCulate{1-16} [:SElected]:MARKer:SEArch:NOTCh[:STATE] <char>**  
**:CALCulate{1-16} [:SElected]:MARKer:SEArch:NOTCh[:STATE]?**

Description: Toggles on/off the marker search notch calculation of the active marker on the active trace.

Returns the on/off status of marker search notch calculation of the active marker on the active trace.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:MARK:SEA:NOTC ON

:CALC1:MARK:SEA:NOTC?

**:CALCulate{1-16} [:SElected]:MARKer:SEArch:POINT:RANGE{1-20}:START:X <NRf>**

**:CALCulate{1-16} [:SElected]:MARKer:SEArch:POINT:RANGE{1-20}:START:X?**

Description: Sets the marker search range start position for the indicated channel and range for the point- or indexed-based axis (i.e., CW mode).

Returns the marker search range start position for the indicated channel and range for the point- or indexed-based axis (i.e., CW mode).

Cmd Parameters: <NRf> The input parameter is unitless.

Query Parameters: NA

Query Output: <NR3> The input parameter is unitless.

Range: 0 to 16001, based on max points available.

Default: 0.0000000000E+000

Syntax Example: :CALC1:MARK:SEA:POIN:RANG1:STAR:X 5.0

:CALC1:MARK:SEA:POIN:RANG1:STAR:X?

**:CALCulate{1-16} [:SElected] :MARKer :SEArch :POInt :RANGe{1-20} :STOP:X  
<NRf>**

**:CALCulate{1-16} [:SElected] :MARKer :SEArch :POInt :RANGe{1-20} :STOP:X?**

Description : Sets the marker search range stop position for the indicated channel and range for the point- or indexed-based axis (i.e., CW mode).

Returns the marker search range stop position for the indicated channel and range for the point- or indexed-based axis (i.e., CW mode).

Cmd Parameters : <NRf> The input parameter is unitless.

Query Parameters: NA

Query Output : <NR3> The input parameter is unitless.

Range : 0 to 16001, based on max points available.

Default : 0.00000000000E+000

Syntax Example : :CALC1:MARK:SEA:POIN:RANG1:STOP:X 100

:CALC1:MARK:SEA:POIN:RANG1:STOP:X?

**:CALCulate{1-16} [:SElected] :MARKer :SEArch :POWer :RANGe{1-20} :STARt:X  
<NRf>**

**:CALCulate{1-16} [:SElected] :MARKer :SEArch :POWer :RANGe{1-20} :STARt:X?**

Description : Sets the marker search range start position for the indicated channel and range for the power axis.

Returns the marker search range start position for the indicated channel and range for the power axis.

Cmd Parameters : <NRf> The input parameter is in dBm.

Query Parameters: NA

Query Output : <NR3> The input parameter is in dBm.

Range : MPND

Default : 0.00000000000E+000

Syntax Example : :CALC1:MARK:SEA:DIST:RANG1:STAR:X 3.0E0

:CALC1:MARK:SEA:DIST:RANG1:STAR:X?

```
:CALCulate{1-16} [:SElected]:MARKer:SEArch:POWeR:RANGe{1-20}:STOP:X
    <NRf>
:CALCulate{1-16} [:SESelected]:MARKer:SEArch:POWeR:RANGe{1-20}:STOP:X?
```

Description: Sets the marker search range stop position for the indicated channel and range for the power axis.

Returns the marker search range stop position for the indicated channel and range for the power axis.

Cmd Parameters: <NRf> The input parameter is in dBm.

Query Parameters: NA

Query Output: <NR3> The input parameter is in dBm.

Range: MPND

Default: 0.0000000000E+000

Syntax Example: :CALC1:MARK:SEA:DIST:RANG1:STOP:X -10.0e0
 :CALC1:MARK:SEA:DIST:RANG1:STOP:X?

```
:CALCulate{1-16} [:SESelected]:MARKer:SEArch:RANGE:ALL[:STATE] <char>
:CALCulate{1-16} [:SESelected]:MARKer:SEArch:RANGE:ALL[:STATE]?
```

Description: Toggles on/off applying the marker search range to all traces.

Returns the on/off status of applying the marker search range to all traces.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:MARK:SEA:RANG:ALL ON
 :CALC1:MARK:SEA:RANG:ALL?

```
:CALCulate{1-16} [:SESelected]:MARKer:SEArch:RANGE:STARt:X <NRf>
:CALCulate{1-16} [:SESelected]:MARKer:SEArch:RANGE:STARt:X?
```

Description: Sets the marker search range start range value on the active trace.

Returns the marker search range start range value on the active trace.

Cmd Parameters: <NRf> The input parameter is in Hertz, Meters, or Seconds.

Query Parameters: <NR3> The output parameter is in Hertz, Meters, or Seconds.

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :CALC1:MARK:SEA:RANG:STAR:X 2.5E9
 :CALC1:MARK:SEA:RANG:STAR:X?

**:CALCulate{1-16} [:SELECTed] :MARKer :SEArch :RANGE :STOP:X <NRf>**  
**:CALCulate{1-16} [:SELECTed] :MARKer :SEArch :RANGE :STOP:X?**

Description: Sets the marker search range stop range value on the active trace.

Returns the marker search range stop range value on the active trace.

Cmd Parameters: <NRf> The input parameter is in Hertz, Meters, or Seconds.

Query Parameters: <NR3> The output parameter is in Hertz, Meters, or Seconds.

Range: MPND

Default Value: 0.00000000000E+000

Syntax Example: :CALC1:MARK:SEA:RANG:STOP:X 2.5E9  
:CALC1:MARK:SEA:RANG:STOP:X?

**:CALCulate{1-16} [:SELECTed] :MARKer :SEArch :RANGE[:STATE] <char>**  
**:CALCulate{1-16} [:SELECTed] :MARKer :SEArch :RANGE[:STATE] ?**

Description: Toggles on/off the marker search range on the active trace.

Returns the on/off status of marker search range on the active trace.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:MARK:SEA:RANG ON  
:CALC1:MARK:SEA:RANG?

**:CALCulate{1-16} [:SELECTed] :MARKer :SEArch :RANGE{1-20} :STARt:X <NRf>**  
**:CALCulate{1-16} [:SELECTed] :MARKer :SEArch :RANGE{1-20} :STARt:X?**

Description: Sets the marker search range start position for the indicated channel and range.

Returns the marker search range start position for the indicated channel and range. The x-axis domain will be based on the domain of the active trace.

Cmd Parameters: <NRf> The input parameter is in Hertz, meters, seconds, dBm, or unitless, based on the domain of the active trace.

Query Parameters: NA

Query Output: <NR3> The input parameter is in Hertz, meters, seconds, dBm, or unitless, based on the domain of the active trace.

Range: MPND

Default: 0.00000000000E+000

Syntax Example: :CALC1:MARK:SEA:DIST:RANG1:STAR:X 2.5E9  
:CALC1:MARK:SEA:DIST:RANG1:STAR:X?

```
:CALCulate{1-16} [:SElected] :MARKer :SEArch :RANGE{1-20} :STOP:X <NRf>
:CALCulate{1-16} [:SESelected] :MARKer :SEArch :RANGE{1-20} :STOP:X?
```

Description : Sets the marker search range stop position for the indicated channel and range.

Returns the marker search range stop position for the indicated channel and range. The x-axis domain will be based on the domain of the active trace.

Cmd Parameters : <NRf> The input parameter is in Hertz, meters, seconds, dBm, or unitless, based on the domain of the active trace.

Query Parameters: NA

Query Output : <NR3> The input parameter is in Hertz, meters, seconds, dBm, or unitless, based on the domain of the active trace.

Range : MPND

Default : 0.00000000000E+000

Syntax Example : :CALC1:MARK:SEA:DIST:RANG1:STOP:X 2.5E9

```
:CALC1:MARK:SEA:DIST:RANG1:STOP:X?
```

```
:CALCulate{1-16} [:SESelected] :MARKer :SEArch :TIME :RANGE{1-20} :START:X
<NRf>
```

```
:CALCulate{1-16} [:SESelected] :MARKer :SEArch :TIME :RANGE{1-20} :START:X?
```

Description : Sets the marker search range start position for the indicated channel and range for the time axis.

Returns the marker search range start position for the indicated channel and range for the time axis.

Cmd Parameters : <NRf> The input parameter is in seconds.

Query Parameters: NA

Query Output : <NR3> The input parameter is in seconds.

Range : MPND

Default : 0.00000000000E+000

Syntax Example : :CALC1:MARK:SEA:FREQ:RANG1:STAR:X 2.0E-3

```
:CALC1:MARK:SEA:FREQ:RANG1:STAR:X?
```

```
:CALCulate{1-16} [:SESelected] :MARKer :SEArch :TIME :RANGE{1-20} :STOP:X <NRf>
:CALCulate{1-16} [:SESelected] :MARKer :SEArch :TIME :RANGE{1-20} :STOP:X?
```

Description : Sets the marker search range stop position for the indicated channel and range for the time axis.

Returns the marker search range stop position for the indicated channel and range for the time axis.

Cmd Parameters : <NRf> The input parameter is in seconds.

Query Parameters: NA

Query Output : <NR3> The input parameter is in seconds.

Range : MPND

Default : 0.00000000000E+000

Syntax Example : :CALC1:MARK:SEA:TIME:RANG1:STOP:X 1.0E-2

```
:CALC1:MARK:SEA:TIME:RANG1:STOP:X?
```

**:CALCulate{1-16} [:SELECTed] :MARKer:SEArch:TRACKing [:STATE] <char>**  
**:CALCulate{1-16} [:SELECTed] :MARKer:SEArch:TRACKing [:STATE]?**

Description: Toggles on/off marker search tracking on the active trace.

Returns the on/off status of marker search tracking on the active trace.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:MARK:SEA:TRACK ON  
:CALC1:MARK:SEA:TRACK?

**:CALCulate{1-16} [:SELECTed] :MARKer:SET:CENTER**

Description: Sets the stimulus center range to the active marker range value on the active trace.  
Equivalent to setting :SENSe{1-16}:FREQuency:CENTer <NRf> to the active marker X value.

No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :CALC1:MARK:SET:CENT

**:CALCulate{1-16} [:SELECTed] :MARKer:SET:REFLevel**

Description: Sets the display reference level to the active marker response value on the active trace.

No query.

Related Cmd: :DISPlay:WINDOW{1-16}:TRACe{1-16}:Y:RLEV <NRf>

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :CALC1:MARK:SET:REFL

**:CALCulate{1-16} [:SELECTed] :MARKer:SET:START**

Description: Sets the stimulus start range to the active marker range value on the active trace.  
Equivalent to setting :SENSe{1-16}:FREQuency:START <NRf> to the active marker X value.  
No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :CALC1:MARK:SET:STAR

**:CALCulate{1-16} [:SElected]:MARKer:SET:STOP**

Description: Sets the stimulus stop range to the active marker range value on the active trace.

Equivalent to setting :SENSe{1-16}:FREQuency:STOP <NRf> to the active marker X value.

No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :CALC1:MARK:SET:STOP

**:CALCulate{1-16} [:SElected]:MARKer:TSEArch <char>****:CALCulate{1-16} [:SElected]:MARKer:TSEArch?**

Description: Performs a target search on the active trace.

Returns the marker search type for target searches on the active trace.

Cmd Parameters: <char> TARGET | LEFT | RIGHT

Query Parameters: <char> TARG | LEFT | RIGHT

Range: NA

Default Value: TARG

Syntax Example: :CALC1:MARK:TSEA TARG

:CALC1:MARK:TSEA?

**:CALCulate{1-16} [:SElected]:MARKer:TSEArch:TARget <NRf>****:CALCulate{1-16} [:SElected]:MARKer:TSEArch:TARget?**

Description: Sets the marker search target value for target searches on the active trace.

Returns the marker search target value for target searches on the active trace.

See [Table 2-7, “Trace Parameters and Coefficients” on page 2-19](#) for a complete listing of trace graph types, default settings, and available ranges.

Cmd Parameters: <NRf> The input parameter depends on the display type.

Query Parameters: <NR3>, <NR3>, <NR3> The output parameter depends on the display type.

Range: MPNF

Default Value: 0.000000E+000

Syntax Example: :CALC1:MARK:TSEA:TAR 1E7

:CALC1:MARK:TSEA:TAR?

```
:CALCulate{1-16} [:SELected]:MARKer:TSEArch:TRANSition <char>
:CALCulate{1-16} [:SELected]:MARKer:TSEArch:TRANSition?
```

Description: Sets the marker search transition value for target searches on the active trace.

Returns the marker search transition value for target searches on the active trace.

Cmd Parameters: <char> POSitive | NEGative | BOTH

Query Parameters: <char> POS | NEG | BOTH

Range: NA

Default Value: BOTH

Syntax Example: :CALC1:MARK:TSEA:TRAN POS  
:CALC1:MARK:TSEA:TRAN?

## 5-35 :CALCulate{1-16}[:SElected]:MARKer{1-13} Subsystem

The :CALCulate{1-16} [:SElected]:MARKer{1-13} subsystem commands provide configuration and control for the indicated marker.

### Marker Subsystems

Related marker configuration, control, and reporting commands are described multiple subsystems:

- “:CALCulate{1-16}:DISPlay:MARKer Subsystem” on page 5-24
- “:CALCulate{1-16}:MARKer Subsystem” on page 5-72
- “:CALCulate{1-16}:PARameter{1-16}:MARKer Subsystem” on page 5-125
- “:CALCulate{1-16}:PARameter{1-16}:MLOCation Subsystem” on page 5-131
- “:CALCulate{1-16}:PARameter{1-16}:MSTATistics Subsystem” on page 5-133
- “:CALCulate{1-16}:TRACE{1-16}:MARKer{1-12} Subsystem” on page 5-236
- “:CALCulate{1-16}[:SElected]:MARKer Subsystem” on page 5-177
- “:CALCulate{1-16}[:SESelected]:MARKer{1-13} Subsystem” on page 5-198
- “:DISPlay Subsystem” on page 5-281

### Trace Subsystems

Related trace subsystems are:

- “:CALCulate{1-16}:PARameter and :PARameter{1-16} Subsystem” on page 5-111
- “:CALCulate{1-16}:PARameter{1-16}:SElect Subsystem” on page 5-140
- “:CALCulate{1-16}[:SElected]:DATA Subsystem” on page 5-156
- “:CALCulate{1-16}[:SESelected]:FORmat Subsystem” on page 5-158
- “:CALCulate{1-16}[:SESelected]:MDATA Subsystem” on page 5-206
- “:CALCulate{1-16}[:SESelected]:SMOothing Subsystem” on page 5-222
- “:CALCulate{1-16}[:SESelected]:TDATA Subsystem” on page 5-223
- “:DISPlay Subsystem” on page 5-281

### :CALCulate{1-16} [:SElected] :MARKer{1-13} :ACTivate

Description: Makes the indicated marker of the active trace the active marker.

No query.

To find if a marker is active, use the query:

`:CALCulate{1-16} [:SElected] :MARKer:ACTivate?`

Markers 1 through 12 are standard measurement markers. Marker 13 is the reference marker.

Cmd Parameters: NA

Range: NA

Default Value: 0

Syntax Example: `:CALC1:MARK1:ACT`

```
:CALCulate{1-16}[:SElected]:MARKer{1-12}:SEArch:RANGE <char>
:CALCulate{1-16}[:SElected]:MARKer{1-12}:SEArch:RANGE?
```

**Note** This command/query does not support Marker 13 (Reference Marker).

Description: Sets the marker search range for the active trace of the indicated channel and marker.

Returns the marker search range for the active trace of the indicated channel and marker.

Cmd Parameters: <char> TRACe | RNG1 | RNG2 | ... | RNG20

Query Parameters: NA

Query Output: <char> TRACe | RNG1 | RNG2 | ... | RNG20

Range: NA

Default: TRACe

Syntax Example: :CALC1:MARK1:SEA:RANG RNG5

:CALC1:MARK1:SEA:RANG?

#### **:CALCulate{1-16}[:SElected]:MARKer{1-13}:MOVE <char>**

Description: Moves the indicated marker to the indicated location on the active trace. Markers 1 through 12 are standard measurement markers. Marker 13 is the reference marker.

No query.

The available locations are:

- CENTER = Moves the marker to the center of the trace range.
- REFmarker = Moves the marker to the reference marker on the active trace
- START = Moves the marker to the start frequency of the active trace
- STOP = Moves the marker to the stop frequency of the active trace

Cmd Parameters: <char> CENTER | REFmarker | START | STOP

Range: NA

Default Value: NA

Syntax Example: :CALC1:MARK1:MOV CENT

#### **:CALCulate{1-16}[:SElected]:MARKer{1-13}:SET <char>**

Description: Sets the start, stop, or center range of the display reference level to the indicated marker range/response on the active trace. Markers 1 through 12 are standard measurement markers. Marker 13 is the reference marker.

No query.

Cmd Parameters: <char> CENTER | REFmarker | START | STOP

Range: NA

Default Value: NA

Syntax Example: :CALC1:MARK1:SET CENT

```
:CALCulate{1-16}[:SElected]:MARKer{1-13}:X <NRf>
:CALCulate{1-16}[:SElected]:MARKer{1-13}:X?
```

Description: Enters the frequency, distance, or time of indicated marker on the active trace and turn on. Markers 1 through 12 are standard measurement markers. Marker 13 is the reference marker.

Returns the frequency, distance, or time of the indicated marker on the active trace.

Cmd Parameters: <NRf> The input parameter is in Hertz, Meters, or Seconds.

Query Parameters: <NR3> The output parameter is in Hertz, Meters, or Seconds.

Range: The range depends on the parameter type setting:

- Frequency = Minimum Instrument Frequency to the Maximum Instrument Frequency
- Time = 1E-9 Seconds to 4E-9 Seconds
- Distance = -29.965E-3 Meters to 1.1988 Meters

Default Value: 10 MHz

Syntax Example: :CALC1:MARK1:X 2.0E7  
:CALC1:MARK1:X?

```
:CALCulate{1-16}[:SElected]:MARKer{1-13}:Y?
```

Description: Query only.

Returns the response value of the indicated marker on the active trace. Markers 1 through 12 are standard measurement markers. Marker 13 is the reference marker.

See [Table 2-7, “Trace Parameters and Coefficients” on page 2-19](#) for a complete listing of trace graph types, default settings, and available ranges.

Query Parameters: <NR3> | <NR3>, <NR3> The output parameters depend on the display type.

Range: NA

Default Value: NA

Syntax Example: :CALC1:MARK1:Y?

```
:CALCulate{1-16}[:SElected]:MARKer{1-13}[:STATE] <char>
:CALCulate{1-16}[:SElected]:MARKer{1-13}[:STATE]?
```

Description: Toggles on/off displaying the indicated marker of the active trace on/off. Markers 1 through 12 are standard measurement markers. Marker 13 is the reference marker.

Returns the on/off display status of the indicated marker of the active trace. Markers 1 through 12 are standard measurement markers. Marker 13 is the reference marker.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 1

Syntax Example: :CALC1:MARK1 ON  
:CALC1:MARK1?

## 5-36 :CALCulate{1-16}[:SESelected]:MATH Subsystem

The :CALCulate{1-16} [:SESelected] :MATH subsystem commands provide configuration and control for inter-trace mathematics operations.

### Trace Subsystems

Related trace subsystems are:

- “:CALCulate{1-16};PARameter and :PARameter{1-16} Subsystem” on page 5-111
- “:CALCulate{1-16};PARameter{1-16};SElect Subsystem” on page 5-140
- “:CALCulate{1-16};POLar Subsystem” on page 5-141
- “:CALCulate{1-16};PROcessing:ORDer Subsystem” on page 5-143
- “:CALCulate{1-16}[:SESelected]:CONVersion Subsystem” on page 5-154
- “:CALCulate{1-16}[:SESelected]:DATA Subsystem” on page 5-156
- “:CALCulate{1-16}[:SESelected]:FORmat Subsystem” on page 5-158
- “:CALCulate{1-16}[:SESelected]:MATH Subsystem” on page 5-201
- “:CALCulate{1-16}[:SESelected]:MDATA Subsystem” on page 5-206
- “:CALCulate{1-16}[:SESelected]:SMOoothing Subsystem” on page 5-222
- “:CALCulate{1-16}[:SESelected]:TDATA Subsystem” on page 5-223
- “:DISPlay Subsystem” on page 5-281

**:CALCulate{1-16} [:SESelected] :MATH:DISPlay <char>**  
**:CALCulate{1-16} [:SESelected] :MATH:DISPlay?**

Description: Selects the trace memory display operation for the active trace of the indicated channel where:

- DATA = Display only the current sweep data
- MEM = Display only the memory data
- DTM = Display both the current sweep data and the memory data at the same time.
- DMM = Combine the sweep data and the memory data mathematically using a addition, subtraction, multiplication, or division and display only the results.
- OFF = Turn the trace display.

Returns the trace memory display operation for the active trace of the indicated channel.

Cmd Parameters: <char> DATA | MEM | DTM | DMM | OFF

Query Parameters: <char> DATA | MEM | DTM | DMM | OFF

Range: NA

Default Value: DATA

Syntax Example: :CALC1:MATH:DISP MEM

:CALC1:MATH:DISP?

```
:CALCulate{1-16}[:SElected]:MATH:FUNCTION <char>
:CALCulate{1-16}[:SElected]:MATH:FUNCTION?
```

Description: Selects the trace memory math operation on the active trace of the indicated channel.

Returns the trace memory math operation on the active trace of the indicated channel.

Cmd Parameters: <char> ADD | SUBTract | MULTIply | DIVide

Query Parameters: <char> ADD | SUBT | MULT | DIV

Range: NA

Default Value: DIV

Syntax Example: :CALC1:MATH:FUNC ADD

```
:CALC1:MATH:FUNC?
```

```
:CALCulate{1-16}[:SElected]:MATH:INTERtrace:CTUse <char>
```

```
:CALCulate{1-16}[:SElected]:MATH:INTERtrace:CTUse?
```

Description: Sets the source of the equation that will be applied for inter-trace math to the active trace.

Returns the source that is currently in use for inter-trace math to the active trace.

Cmd Parameters: <char> SIMPle | EQUation

Query Output: <char> SIMP | EQU

Range: NA

Default Value: SIMP

Syntax Example: :CALC1:MATH:INTE:CTU EQU

```
:CALC1:MATH:INTE:CTU?
```

```
:CALCulate{1-16}[:SElected]:MATH:INTERtrace:EQUation <string>
```

```
:CALCulate{1-16}[:SElected]:MATH:INTERtrace:EQUation?
```

Description: Sets the equation to be used when the source is set to use the equation editor.

Returns the current equation.

Cmd Parameters: <string> The equation to be used.

Query Output: <string> The equation that is currently used.

Range: NA

Default Value: The active trace number

Syntax Example: :CALC1:MATH:EQU "Tr3 / Tr4"

```
:CALC1:MATH:EQU?
```

**:CALCulate{1-16} [:SELected]:MATH:INTERtrace:EQUation:LOAD <string>**

Description: Sets the file path from which the current equation will be loaded.

No query.

Cmd Parameters: <string> The path from which the current equation will be loaded.

Query Output: NA

Range: NA

Default Value: NA

Syntax Example: :CALC1:MATH:INTE:EQU:LOAD "C:/AnritsuVNA/Data/Equation.eqn"

**:CALCulate{1-16} [:SELected]:MATH:INTERtrace:EQUation:SAVE <string>**

Description: Sets the file path to which the current equation will be saved.

No query.

Cmd Parameters: <string> The path to which the current equation will be saved.

Query Output: NA

Range: NA

Default Value: NA

Syntax Example: :CALC1:MATH:INTE:EQU:SAVE "C:/AnritsuVNA/Data/Equation.eqn"

**:CALCulate{1-16} [:SELected]:MATH:INTERtrace:EQUation:TDOMain[:STATE] <char>****:CALCulate{1-16} [:SELected]:MATH:INTERtrace:EQUation:TDOMain[:STATE]? :**

Description: Sets whether inter-trace math equation editor will use time domain data for all traces.

Returns whether inter-trace math equation editor uses time domain data for all traces.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Output: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:MATH:INTE:EQU:TDOM ON

:CALC1:MATH:INTE:EQU:TDOM?

**:CALCulate{1-16} [:SELected]:MATH:INTERtrace:FUNCTION <char>****:CALCulate{1-16} [:SELected]:MATH:INTERtrace:FUNCTION? :**

Description: Selects the inter-trace memory math operation on the active trace of the indicated channel. The result will be displayed on the active trace.

Returns the inter-trace memory math operation on the active trace of the indicated channel.

Cmd Parameters: <char> ADD | SUBTract | MULTiply | DIVide

Query Parameters: <char> ADD | SUBT | MULT | DIV

Range: NA

Default Value: DIV

Syntax Example: :CALC1:MATH:INTE:FUNC ADD

:CALC1:MATH:INTE:FUNC?

```
:CALCulate{1-16}[:SElected]:MATH:INTERtrace:OPERand{1-2}:DEFine
    <char1>, <char2>
:CALCulate{1-16}[:SESelected]:MATH:INTERtrace:OPERand{1-2}:DEFine?
```

Description: Sets the trace number and data type for the indicated operand on the active trace of the indicated channel. Note that both parameters must be defined.

The <char1> value sets the trace number from the following selections:

- TR1 = Trace 1
- TR2 = Trace 2
- TR3 = Trace 3
- TR4 = Trace 4
- TR5 = Trace 5
- TR6 = Trace 6
- TR7 = Trace 7
- TR8 = Trace 8
- TR9 = Trace 9
- TR10 = Trace 10
- TR11 = Trace 11
- TR12 = Trace 12
- TR13 = Trace 13
- TR14 = Trace 14
- TR15 = Trace 15
- TR16 = Trace 16

The <char2> value sets the data operand as:

- DATA = Display just the current sweep data
- DMM = Combine the sweep data and the memory data mathematically using a addition, subtraction, multiplication, or division and display only the results.

Returns the trace number and data type for the indicated operand on the active trace of the indicated channel.

Cmd Parameters: <char1> TR1 | TR2 | TR3 | TR4 | TR5 | TR6 | TR7 | TR8 | TR9 | TR10 | TR11 |
TR12 | TR13 | TR14 | TR15 | TR16  
<char2> DATA | DMM

Query Parameters: <char1>, <char2>

Range: NA

Default Value: TR1, DATA

Syntax Example: :CALC1:MATH:INTE:OPER1:DEF TR1, DATA  
:CALC1:MATH:INTE:OPER1:DEF?

```
:CALCulate{1-16}[:SELected]:MATH:INTERtrace[:STATE] <char>
:CALCulate{1-16}[:SELected]:MATH:INTERtrace[:STATE]?
```

Description: Toggles on/off the inter-trace math operation on the active trace of the indicated channel.

Returns the on/off state of the inter-trace math operation on the active trace of the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:MATH:INTE ON

:CALC1:MATH:INTE?

### :CALCulate{1-16}[:SELected]:MATH:MEMorize

Description: Stores the active trace data to memory for the channel indicated. The trace memory to stored to will be based on the Store to Memory setting. Refer to the command:

:CALCulate{1-16}:PARameter{1-16}:MEMory:CONFig <char>

To specify a specific memory trace, use the command:

:CALCulate{1-16}[:SELected]:PARameter{1-16}:MEMory:MEMorize

To set or get the memory math location to use for given channel and trace:

:CALCulate{1-16}:PARameter{1-16}:MEMory:MMLocation <char>

No query.

Cmd Parameters: NA

Query Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :CALC1:MATH:MEM

## 5-37 :CALCulate{1-16}[:SElected]:MDATA Subsystem

The :CALCulate{1-16} [:SElected] :MDATA subsystem provides configuration and control for trace memory data.

### Trace Subsystems

Related trace subsystems are:

- “:CALCulate{1-16}:PARameter and :PARameter{1-16} Subsystem” on page 5-111
- “:CALCulate{1-16}:PARameter{1-16}:SELect Subsystem” on page 5-140
- “:CALCulate{1-16}[:SESelected]:DATA Subsystem” on page 5-156
- “:CALCulate{1-16}[:SESelected]:FORmat Subsystem” on page 5-158
- “:CALCulate{1-16}[:SESelected]:MDATA Subsystem” on page 5-206
- “:CALCulate{1-16}[:SESelected]:SMOothing Subsystem” on page 5-222
- “:CALCulate{1-16}[:SESelected]:TDATA Subsystem” on page 5-223
- “:DISPlay Subsystem” on page 5-281

**:CALCulate{1-16} [:SElected] :MDATA:FDATa <block>**

**:CALCulate{1-16} [:SElected] :MDATA:FDATa?**

Description: Inputs formatted trace memory data for the active trace.

Returns formatted trace data of the active trace.

Cmd Parameters: <block> data formatted as XML. See definition of “<block> or <arbitrary block>” on page 2-10. The <block> data must exist.

Query Parameters: <block> data formatted as XML. See definition of “<block> or <arbitrary block>” on page 2-10. The <block> data must exist.

Range: NA

Default Value: NA

Syntax Example: :CALC1:MDATA:FDAT <block>

:CALC1:MDATA:FDAT?

**:CALCulate{1-16} [:SElected] :MDATA:SDATa <block>**

**:CALCulate{1-16} [:SElected] :MDATA:SDATa?**

Description: Inputs S-parameter trace memory data for the active trace.

Returns S-parameter trace memory data of the active trace.

Cmd Parameters: <block> data formatted as XML. See definition of “<block> or <arbitrary block>” on page 2-10.

Query Parameters: <block> data formatted as XML. See definition of “<block> or <arbitrary block>” on page 2-10.

Range: NA

Default Value: NA

Syntax Example: :CALC1:MDATA:SDAT <block>

:CALC1:MDATA:SDAT?

## 5-38 :CALCulate{1-16}[:SElected]:OSNP Subsystem

The :CALCulate{1-16} [:SElected] :OSNP subsystem provides a way to output .snp files for the indicated channel.

**:CALCulate{1-16} [:SElected] :OSNP? <char>**

Description: Query only.

Returns .snp files of the specified type for the indicated channel.

Cmd Parameters: NA

Query Parameters: <char> S1P | S2P | S3P | S4P

Query Output: .snp file

Range: NA

Default Value: NA

Syntax Example: :CALC1:OSNP? S2P

## 5-39 :CALCulate{1-16}[:SElected]:RLIMit Subsystem

The :CALCulate{1-16} [:SElected]:RLIMit subsystem provides ripple limit line configuration and control for the active trace.

### Limit Line and Segment Subsystems

Related Ripple limit line and segment configuration and control subsystems are:

- “:CALCulate{1-16}[:SESelected]:LIMit Subsystem” on page 5-160
- “:DISPlay Subsystem” on page 5-281
- “:SENSe{1-16}:FSEGMeNT Subsystem” on page 5-514.
- “:SENSe{1-16}:FSEGMeNT{1-100} Subsystem” on page 5-526.
- “:SENSe{1-16}:ISEGMeNT Subsystem” on page 5-538.
- “:SENSe{1-16}:ISEGMeNT{1-100} Subsystem” on page 5-548
- “:SENSe{1-16}:SEGMeNT Subsystem” on page 5-565

### Trace Subsystems

Related trace subsystems are:

- “:CALCulate{1-16}:PARameter and :PARameter{1-16} Subsystem” on page 5-111
- “:CALCulate{1-16}:PARameter{1-16}:SELect Subsystem” on page 5-140
- “:CALCulate{1-16}[:SESelected]:DATA Subsystem” on page 5-156
- “:CALCulate{1-16}[:SESelected]:FORmat Subsystem” on page 5-158
- “:CALCulate{1-16}[:SESelected]:MDATA Subsystem” on page 5-206
- “:CALCulate{1-16}[:SESelected]:SMOothing Subsystem” on page 5-222
- “:CALCulate{1-16}[:SESelected]:TDATA Subsystem” on page 5-223
- “:DISPlay Subsystem” on page 5-281

```
:CALCulate{1-16}[:SESelected]:RLIMit:SEGMeNT:ADD {<No argument>} |  
    {<char>} | {<char>,<NRf>,<NRf>}
```

**Description:** Adds a ripple limit segment for the active trace of the indicated channel. If the optional parameters are omitted, a segment with default start and stop frequency values is added.

For rectilinear displays, up to 50 segment lines can be added to each trace display.

No query.

**Cmd Parameters:** {<No argument>} | {<char>} | {<char>,<NRf>,<NRf>}

<No argument> If no argument is added to the command, the command adds a segment with default values.

<char> ON | OFF

<NRf> Start frequency for segment.

<NRf> Stop frequency for segment.

**Query Output:** NA

**Range:** NA

**Default:** NA

**Syntax Example:** :CALC1:RLIM:SEG:ADD ON, 3E6, 5E8

```
:CALCulate{1-16}:TRACe{1-16}:RLIMit:SEGMenT:ADD {<No argument>} |  
    {<char>} | {<char>,<NRf>,<NRf>}
```

Description: Adds a ripple limit segment for the given trace of the indicated channel. If the optional parameters are omitted, a segment with default start and stop frequency values is added.  
No query.

For rectilinear displays, up to 50 segment lines can be added to each trace display.

Cmd Parameters: {<No argument>} | {<char>} | {<char>,<NRf>,<NRf>}

<No argument> If no argument is added to the command, the command adds an segment with default values.

<char> ON | OFF active state of segment

<NRf> Start frequency for segment.

<NRf> Stop frequency for segment.

Query Output: NA

Range: NA

Default: NA

Syntax Example: :CALC1:TRAC1:RLIM:SEG:ADD ON, 1e9, 5e9

```
:CALCulate{1-16} [:SELected]:RLIMit:SAVe <string>
```

Description: Save the ripple limit segments to the filepath passed as parameter on the given channel.  
No query.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.rlmt' where x:\directory\filename.rlmt must exist. See definition of "["<block> or <arbitrary block>" on page 2-10](#)".

Query Output: <char> Filename and path in the form: x:\directory\filename.rlmt

Range: NA

Default: NA

Syntax Example: :CALC1:RLIM:SAV 'x:\directory\filename.rlmt'

```
:CALCulate{1-16} [:SELected]:RLIMit:LOAD <string>
```

Description: Load the ripple limit segments from the filepath passed as parameter on the given channel.

No query.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.rlmt' where x:\directory\filename.rlmt must exist. See definition of "["<block> or <arbitrary block>" on page 2-10](#)".

Query Output: <char> Filename and path in the form: x:\directory\filename.rlmt

Range: NA

Default: NA

Syntax Example: :CALC1:RLIM:LOAD 'x:\directory\filename.rlmt'

**:CALCulate{1-16} [:SElected]:RLIMit:SEGMenT[:STATe] <char>**  
**:CALCulate{1-16} [:SElected]:RLIMit:SEGMenT[:STATe]?**

Description: Sets the active state of the last ripple limit segment for the active trace of the indicated channel.

Returns the active state of the ripple limit segment for the active trace of the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Output: <char> 1 | 0

Range: NA

Default: ON

Syntax Example: :CALC1:RLIM:SEGM:STAT ON

:CALC1:RLIM:SEGM:STAT?

**:CALCulate{1-16} [:SElected]:RLIMit:SEGMenT:DELetE**

Description: Deletes the active (last created) ripple limit segment on the active trace of the indicated channel.

No query.

Cmd Parameters: NA

Query Output: NA

Range: NA

Default: NA

Syntax Example: :CALC1:RLIM:SEGM:DEL

**:CALCulate{1-16} [:SElected]:RLIMit:SEGMenT:STAR <NRf>**

**:CALCulate{1-16} [:SElected]:RLIMit:SEGMenT:STAR?**

Description: Sets the Start frequency of the active ripple limit segment for the active trace of the indicated channel.

Returns the start frequency of the current ripple limit segment for the active trace of the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Hz

Query Output: <NR3> The output parameter is in Hz

Range: MPND

Default: Start Frequency of instrument

Syntax Example: :CALC1:RLIM:SEGM:STAR 1.0E6

:CALC1:RLIM:SEGM:STAR?

```
:CALCulate{1-16}[:SElected]:RLIMit:SEGment:STOP <NRf>
:CALCulate{1-16}[:SElected]:RLIMit:SEGment:STOP?
```

Description: Sets the stop frequency value of the active ripple limit segment for the active trace of the indicated channel.

Returns the stop frequency value of the current ripple limit segment for the active trace of the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Hz.

Query Output: <NR3> The output parameter is in Hz.

Range: MPND

Default: Stop Frequency of instrument

Syntax Example: :CALC1:RLIM:SEGm:STOP 1.0E9

```
:CALC1:RLIM:SEGm:STOP?
```

```
:CALCulate{1-16}[:SElected]:RLIMit:SEGment{1-50}:STARt <NRf>
:CALCulate{1-16}[:SElected]:RLIMit:SEGment{1-50}:STARt?
```

Description: Sets the start value of the selected ripple limit segment for the active trace of the indicated channel.

Returns the start value of the selected ripple limit segment for the active trace of the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Hz.

Query Output: <NR3> The output parameter is in Hz.

Range: MPND

Default: Start Frequency of instrument

Syntax Example: :CALC1:RLIM:SEGm1:STAR 1.0E6

```
:CALC1:RLIM:SEGm1:STAR?
```

```
:CALCulate{1-16}[:SElected]:RLIMit:SEGment{1-50}:STOP <NRf>
:CALCulate{1-16}[:SElected]:RLIMit:SEGment{1-50}:STOP?
```

Description: Sets the stop value of the selected ripple limit segment for the active trace of the indicated channel.

Returns the stop value of the selected ripple limit segment for the active trace of the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Hz.

Query Output: <NR3> The output parameter is in Hz.

Range: MPND

Default: Stop Frequency of instrument

Syntax Example: :CALC1:RLIM:SEGm1:STOP 1.0E9

```
:CALC1:RLIM:SEGm1:STOP?
```

**:CALCulate{1-16} [:SElected]:RLIMit:SEGMenT:RIPPLe <NRf>**  
**:CALCulate{1-16} [:SElected]:RLIMit:SEGMenT:RIPPLe?**

Description: Sets the ripple limit value of the last added ripple limit segment for the active trace of the indicated channel.

Returns the ripple limit value of the last added ripple limit segment for the active trace of the indicated channel.

Cmd Parameters: <NRf> The input parameter is in dBm

Query Output: <NR3> The output parameter is in dBm

Range: MPND

Default: 9.8 dBm

Syntax Example: :CALC1:RLIM:SEGM:RIPP 1.0E-2

:CALC1:RLIM:SEGM:RIPP?

**:CALCulate{1-16} [:SElected]:RLIMit:SEGMenT{1-50}:RIPPLe <NRf>**  
**:CALCulate{1-16} [:SElected]:RLIMit:SEGMenT{1-50}:RIPPLe?**

Description: Sets the ripple limit value of the selected ripple limit segment for the active trace of the indicated channel.

Returns the ripple limit value of the selected ripple limit segment for the active trace of the indicated channel.

Cmd Parameters: <NRf> The input parameter is in dBm

Query Output: <NR3> The output parameter is in dBm

Range: MPND

Default: 9.8

Syntax Example: :CALC1:RLIM:SEGM1:RIPP 1.0E1

:CALC1:RLIM:SEGM1:RIPP?

**:CALCulate{1-16} [:SElected]:RLIMit:SEGMenT:CLEAR**

Description: Clears all the ripple limit segment definitions on the active trace of the indicated channel.

No query.

Cmd Parameters: NA

Query Output: NA

Range: NA

Default: NA

Syntax Example: :CALC1:RLIM:SEGM:CLE

**:CALCulate{1-16} [:SELected]:RLIMit:SEGMen{1-50}:DELetE**

Description: Deletes the specified ripple limit segment on the active trace of the indicated channel.

No query.

Cmd Parameters: NA

Query Output: NA

Range: NA

Default: NA

Syntax Example: :CALC1:RLIM:SEG1:DEL

**:CALCulate{1-16} [:SELected]:RLIMit:SEGMen{1-50}[:STATe] <char>****:CALCulate{1-16} [:SELected]:RLIMit:SEGMen{1-50}[:STATe]?**

Description: Sets the active state of the last added ripple limit segment for the active trace of the indicated channel

Returns the active state of the last added ripple limit segment for the active trace of the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Output: <char> 1 | 0

Range: NA

Default: ON

Syntax Example: :CALC1:RLIM:SEG1:STAT ON

:CALC1:RLIM:SEG1:STAT?

**:CALCulate{1-16} [:SELected]:RLIMit:SEGMen:COUNT?**

Description: Query only

Returns number of ripple limit segments defined on the active trace of the indicated channel.

Cmd Parameters: NA

Query Output: <NR1> The output parameter is an integer.

Range: 0-50

Default: 0

Syntax Example: :CALC1:RLIM:SEG1:COUN?

**:CALCulate{1-16} [:SElected]:RLIMit:DATA <block>**  
**:CALCulate{1-16} [:SElected]:RLIMit:DATA?**

Description: Inputs the ripple limit table for the active trace of the given channel.

Returns the ripple limit table of the active trace of the given channel.

Cmd Parameters: <block> Block data formatted as XML. See definition of “<block> or <arbitrary block>”  
on page 2-10

Query Parameters: NA

Query Output: <block> Block data formatted as XML. See definition of, “<block> or <arbitrary block>”  
on page 2-10.

Range: NA

Default: <block>

Syntax Example: :CALC1:RLIM:DATA <block>

:CALC1:RLIM:DATA?

**:CALCulate{1-16}:TRACe{1-16}:RLIMit:FAIL?**

Description: Query only.

Returns the ripple testing result for the indicated trace of the given channel.

0 = The limit passed.

1 = The limit failed.

Cmd Parameters: NA

Query Output: <NR1> The output parameter is an integer.

Range: 0 | 1

Default: 0

Syntax Example: :CALC1:TRAC1:RLIM:FAIL?

**:CALCulate{1-16}[:SElected]:RLIMit:FAIL?**

Description: Query only.

Returns the ripple limit testing result for the active trace of the given channel.

0 = The limit passed.

1 = The limit failed.

Cmd Parameters: NA

Query Output: <NR1> The output parameter is an integer.

Range: 0 | 1

Default: 0

Syntax Example: :CALC1:RLIM:FAIL?

**:CALCulate{1-16} [:SELECTed] :RLIMit:SEGMENT:FAIL?**

Description: Query only.

Returns the ripple limit testing result for the last added segment in the active trace the active trace of the given channel.

0 = The limit passed.

1 = The limit failed.

Cmd Parameters: NA

Query Output: <NR1> The output parameter is an integer.

Range: 0 | 1

Default: 0

Syntax Example: :CALC1:RLIM:SEGMENT:FAIL?

**:CALCulate{1-16} [:SELECTed] :RLIMit:SEGMENT{1-50}:FAIL?**

Description: Query only.

Returns the ripple limit testing result for the segment in the active trace of the given channel.

0 = The limit passed.

1 = The limit failed.

Cmd Parameters: NA

Query Output: <NR1> The output parameter is an integer.

Range: 0 | 1

Default: 0

Syntax Example: :CALC1:RLIM:SEGMENT1:FAIL?

**:CALCulate{1-16} :TRACe{1-16} :RLIMit:SEGMENT{1-50}:FAIL?**

Description: Query only. Returns the ripple limit testing result for the specified segment in the indicated trace of the given channel.

0 = The limit passed.

1 = The limit failed.

Cmd Parameters: NA

Query Output: <NR1> The output parameter is an integer.

Range: 0 | 1

Default: 0

Syntax Example: :CALC1:TRAC1:RLIM:SEGMENT1:FAIL?

**:CALCulate{1-16}[:TRACe{1-16}]:RLIMit:SEGMenT:FAIL?**

Description: Query only.

Returns the ripple limit testing result for the last added segment in the indicated trace of the given channel.

0 = The limit passed.

1 = The limit failed.

Cmd Parameters: NA

Query Output: <NR1> The output parameter is an integer.

Range: 0 | 1

Default: 0

Syntax Example: :CALC1:TRAC1:RLIM:SEG:FAIL?

**:CALCulate{1-16}[:TRACe{1-16}]:RLIMit:VTYPe <char>****:CALCulate{1-16}[:TRACe{1-16}]:RLIMit:VTYPe?**

Description: Sets the ripple value type for the specified trace of the indicated channel.

Returns the ripple value type for the specified trace of the indicated channel.

OFF = Ripple value is not displayed on the trace

ABSolute = Absolute ripple value is displayed on the trace

MARgin = Maximum difference between the set Ripple limit and Absolute Ripple value is displayed on the trace.

FLATness = Maximum peak-peak value is displayed on the trace.

Cmd Parameters: <char> OFF | ABSolute | MARgin | FLATness

Query Output: <char> OFF | ABSolute | MARgin | FLATness

Range: NA

Default: OFF

Syntax Example: :CALC1:TRAC1:RLIM:VTYP ABS

:CALC1:TRAC1:RLIM:VTYP?

**:CALCulate{1-16} [:SELECTed] :RLIMit:VTYPe <char>**

**:CALCulate{1-16} [:SELECTed] :RLIMit:VTYPe?**

Description: Sets the ripple value type for the active trace of the indicated channel.

Returns the ripple value type for the active trace of the indicated channel.

OFF = Ripple value is not displayed on the trace

ABSolute = Absolute ripple value is displayed on the trace

MARgin = Maximum difference between the set Ripple limit and Absolute Ripple value is displayed on the trace.

FLATness = Maximum peak-peak value is displayed on the trace.

Cmd Parameters: <char> OFF | ABSolute | MARgin | FLATness

Query Output: <char> OFF | ABSolute | MARgin | FLATness

Range: NA

Default: OFF

Syntax Example: :CALC1:RLIM:VTYP ABS

:CALC1:RLIM:VTYP?

**:CALCulate{1-16} :TRACe{1-16} :RLIMit:SEGMenT:VALue?**

Description: Query only.

Returns the trace data ripple value (absolute or margin based on the value type set) for the last added segment in the indicated trace of the given channel.

Cmd Parameters: NA

Query Output: MPND

Range: NA

Default: NA

Syntax Example: :CALC1:TRAC1:RLIM:SEGm:VAL?

**:CALCulate{1-16} [:SELECTed] :RLIMit:SEGMenT:VALue?**

Description: Query only.

Returns the trace data ripple value (absolute or margin based on the value type set) for the last added segment in the active trace of the given channel

Cmd Parameters: NA

Query Output: MPND

Range: NA

Default: NA

Syntax Example: :CALC1:RLIM:SEGm:VAL?

**:CALCulate{1-16} [:SElected]:RLIMit:SEGMen{1-50}:VALue?**

Description: Query only.

Returns the trace data ripple value (absolute or margin based on the value type) set for the specified segment in the active trace of the given channel.

Cmd Parameters: NA

Query Output: MPND

Range: NA

Default: NA

Syntax Example: :CALC1:RLIM:SEG1:VAL?

**:CALCulate{1-16}:TRACe{1-16}:RLIMit:SEGMen{1-50}:VALue?**

Description: Query only.

Returns the trace data ripple value (absolute or margin based on the value type set) for the specified segment in the indicated trace of the given channel.

Cmd Parameters: NA

Query Output: MPND

Range: N

Default: NA

Syntax Example: :CALC1:TRAC1:RLIM:SEG1:VAL?

**:CALCulate{1-16}[:SElected]:RLIMit:OFF**

Description: No query.

Turns all ripple limits for the active trace of the indicated channel off.

Cmd Parameters: NA

Query Output: NA

Range: NA

Default: NA

Syntax Example: :CALC1:RLIM:OFF

**:CALCulate{1-16}[:SElected]:RLIMit[:STATE] <char>****:CALCulate{1-16}[:SElected]:RLIMit[:STATE]?**

Description: Turns ripple limit testing on/off for the active trace of the indicated channel.

Returns the ripple limit testing on/off status for the active trace of the given channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Output: <char> 1 | 0

Range: NA

Default: OFF

Syntax Example: :CALC1:RLIM:STAT OFF

:CALC1:RLIM:STAT?

**:CALCulate{1-16}[:SELected]:RLIMit:DISPLAY[:STATe] <char>**  
**:CALCulate{1-16}[:SELected]:RLIMit:DISPLAY[:STATe]?**

Description: Turns ripple limit line display on/off for the active trace of the indicated channel.

Returns the ripple limit line display on/off status for the active trace of the given channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Output: <char> 1 | 0

Range: NA

Default: ON

Syntax Example: :CALC1:RLIM:DISP:STAT ON

:CALC1:RLIM:DISP:STAT?

**:CALCulate{1-16}[:SELected]:RLIMit:REPort?**

Description: Query only.

Returns the table of ripple limit failures along with the upper ripple limit on the active trace of the given channel. Each failed point is listed on a separate line as:

LIMTYPE, FREQ, YVAL, LIMYVAL

- LIMTYPE = UPPER, LOWER, or BOTH
- FREQ = Frequency of failing point
- YVAL = Y value of the failing point
- LIMYVAL = Limit Y value

Cmd Parameters: NA

Query Output: <block> See definition of “<block> or <arbitrary block>” on page 2-10.

Range: NA

Default: NA

Syntax Example: :CALC1:RLIM:REP?

**:CALCulate{1-16}[:SELected]:RLIMit:REPort:POINT?**

Description: Query only.

Returns the number of points failing ripple limit test on the given channel.

Cmd Parameters: NA

Query Output: 0 to the current number of set measurement points.

Range: NA

Default: 0

Syntax Example: :CALC1:RLIM:REP:POIN?

```
:CALCulate{1-16}:TRACe{1-16}:RLIMit[:STATe] <char>
:CALCulate{1-16}:TRACe{1-16}:RLIMit[:STATe]?
```

Description: Turns ripple testing on/off for the indicated trace of the indicated channel

Returns the ripple testing on/off status for the indicated trace of the given channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Output: <char> 1 | 0

Range: NA

Default: ON

Syntax Example: :CALC1:TRAC1:RLIM:STAT ON

```
:CALC1:TRAC1:RLIM:STAT?
```

```
:CALCulate{1-16}:TRACe{1-16}:RLIMit:DISPlay[:STATe] <char>
:CALCulate{1-16}:TRACe{1-16}:RLIMit:DISPlay[:STATe]?
```

Description: Turns ripple limit line display on/off for the indicated trace of the indicated channel.

Returns the ripple limit line display on/off status for the indicated trace of the given channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Output: <char> 1 | 0

Range: NA

Default: ON

Syntax Example: :CALC1:TRAC1:RLIM:DISP:STAT ON

```
:CALC1:TRAC1:RLIM:DISP:STAT?
```

```
:CALCulate{1-16}:TRACe{1-16}:RLIMit:REPort:POINTs?
```

Description: Query only.

Returns the number of points failing ripple limit test on indicated trace of the given channel.

Cmd Parameters: NA

Query Output: 0 to the current number of set measurement points.

Range: NA

Default: 0

Syntax Example: :CALC1:TRAC1:RLIM:REP:POIN?

**:CALCulate{1-16} :TRACe{1-16} :RLIMit:REPort[:DATA] ?**

Description: Query only.

Returns the table of ripple limit failures on the indicated trace of the given channel. Each failed point is listed on a separate line as:

LIMTYPE, FREQ, RVAL, RLIMYVAL

- LIMTYPE = UPPER, LOWER, or BOTH
- FREQ = Frequency of failing point
- RVAL = Absolute Ripple at the failing point
- RLIMYVAL = Ripple limit at the failing point

Cmd Parameters: NA

Query Output: <block> See definition “<block> or <arbitrary block>” on page 2-10.

Range: NA

Default: NA

Syntax Example: :CALC1:TRAC1:RLIM:REP?

## 5-40 :CALCulate{1-16}[:SElected]:SMOothing Subsystem

The :CALCulate{1-16} [:SElected] :SMOothing subsystem commands are used to configure and control trace smoothing functions.

### Trace Subsystems

Related trace subsystems are:

- “:CALCulate{1-16}:PARameter and :PARameter{1-16} Subsystem” on page 5-111
- “:CALCulate{1-16}:PARameter{1-16}:SELect Subsystem” on page 5-140
- “:CALCulate{1-16}[:SESelected]:DATA Subsystem” on page 5-156
- “:CALCulate{1-16}[:SESelected]:FORmat Subsystem” on page 5-158
- “:CALCulate{1-16}[:SESelected]:MDATA Subsystem” on page 5-206
- “:CALCulate{1-16}[:SESelected]:SMOothing Subsystem” on page 5-222
- “:CALCulate{1-16}[:SESelected]:TDATA Subsystem” on page 5-223
- “:DISPlay Subsystem” on page 5-281

**:CALCulate{1-16} [:SElected] :SMOothing:APERture <NRf>**

**:CALCulate{1-16} [:SElected] :SMOothing:APERture?**

Description: Sets the smoothing aperture for the indicated active trace.

Returns the smoothing aperture for the indicated active trace.

Cmd Parameters: <NRf> The input parameter is in Percent.

Query Parameters: <NR3> The output parameter is in Percent.

Range: 0 to 100

Default Value: 0.000000E+000

Syntax Example: :CALC1:SMO:APER 2

:CALC1:SMO:APER?

**:CALCulate{1-16} [:SElected] :SMOothing[:STATe] <char>**

**:CALCulate{1-16} [:SElected] :SMOothing[:STATe]?**

Description: Toggles smoothing on/off for the indicated active trace.

Returns the smoothing on/off status for the indicated active trace.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:SMO ON

:CALC1:SMO?

## 5-41 :CALCulate{1-16}[:SESelected]:TDATA Subsystem

The :CALCulate{1-16} [:SESelected] :TDATA subsystem commands are used to input and report on trace data files.

### Trace Subsystems

Related trace subsystems are:

- “:CALCulate{1-16}:PARameter and :PARameter{1-16} Subsystem” on page 5-111
- “:CALCulate{1-16}:PARameter{1-16}:SElect Subsystem” on page 5-140
- “:CALCulate{1-16}[:SESelected]:DATA Subsystem” on page 5-156
- “:CALCulate{1-16}[:SESelected]:FORmat Subsystem” on page 5-158
- “:CALCulate{1-16}[:SESelected]:MDATA Subsystem” on page 5-206
- “:CALCulate{1-16}[:SESelected]:SMOothing Subsystem” on page 5-222
- “:CALCulate{1-16}[:SESelected]:TDATA Subsystem” on page 5-223
- “:DISPlay Subsystem” on page 5-281

### I/O Configuration and File Operation Subsystems

Related subsystems for I/O configuration and file operation are:

- “:CALCulate{1-16}:FORMat Subsystem – SnP Data” on page 5-42
- “:CALCulate{1-16}[:SESelected]:DATA Subsystem” on page 5-156
- “:CALCulate{1-16}[:SESelected]:TDATA Subsystem” on page 5-223
- “:FORMat Subsystem” on page 5-301
- “:HCOPy Subsystem” on page 5-304
- “:MMEMory Subsystem” on page 5-310

**:CALCulate{1-16} [:SELECTed] :TDATA:FDATa <block>**  
**:CALCulate{1-16} [:SELECTed] :TDATA:FDATa?**

Description: Inputs formatted trace data to display on the active trace.

Returns formatted trace data of the active trace.

Cmd Parameters: <block> data formatted as XML. See definition of “<block> or <arbitrary block>” on page 2-10.

Query Parameters: <block> data formatted as XML. See definition of “<block> or <arbitrary block>” on page 2-10.

Range: NA

Default Value: NA

Syntax Example: :CALC1:TDATA:FDAT <block>  
:CALC1:TDATA:FDAT?

```
:CALCulate{1-16} [:SElected] :TData:SDATA <block>
:CALCulate{1-16} [:SElected] :TData:SDATA?
```

Description: Inputs S-parameter trace data to display on the active trace.

Returns S-parameter trace data of the active trace.

Cmd Parameters: <block> data formatted as XML. See definition of “<block> or <arbitrary block>”  
on page 2-10.

Query Parameters: <block> data formatted as XML. See definition of “<block> or <arbitrary block>”  
on page 2-10.

Range: NA

Default Value: NA

Syntax Example: :CALC1:TData:SDAT <block>

```
:CALC1:TData:SDAT?
```

## 5-42 :CALCulate{1-16}[:SESelected]:TRANSform:TIME Subsystem

The :CALCulate{1-16} [:SESelected] :TRANSform:TIME subsystem commands are used to configure and control time domain transformation parameters, time domain displays, gate parameters, and window parameters. Requires the Time Domain option (Option 02) to be installed and available.

### Time Domain, Group Delay, and Reference Plane Subsystems

Related time domain, group delay, and reference place subsystems are:

- “:CALCulate{1-16}:REference Subsystem” on page 5-144
- “:CALCulate{1-16}[:SESelected]:TRANSform:TIME Subsystem” on page 5-225
- “:SENSe{1-16}:CORRection:EXTension Subsystem” on page 5-506

### Trace Subsystems

Related trace subsystems are:

- “:CALCulate{1-16}:PARameter and :PARameter{1-16} Subsystem” on page 5-111
- “:CALCulate{1-16}:PARameter{1-16}:SElect Subsystem” on page 5-140
- “:CALCulate{1-16}[:SESelected]:DATA Subsystem” on page 5-156
- “:CALCulate{1-16}[:SESelected]:FORmat Subsystem” on page 5-158
- “:CALCulate{1-16}[:SESelected]:MDATA Subsystem” on page 5-206
- “:CALCulate{1-16}[:SESelected]:SMOothing Subsystem” on page 5-222
- “:CALCulate{1-16}[:SESelected]:TDATA Subsystem” on page 5-223
- “:DISPlay Subsystem” on page 5-281

### :CALCulate{1-16} [:SELECTed] :TRANSform:TIME:ALIASfree?

Description: Query only.

Returns the alias free range of the time domain transform on the active trace of the indicated channel.

The default for ALIASfree depends on the ShockLine instrument model number and the installed frequency option, and is calculated based on the formula below, where:

- ST = The frequency step size
- Alias free time (AFT) =  $0.5 / ST$  immediately after reset.

Query Parameters: <NR3> The output parameter is in Seconds.

Range: -1E-9 to 4E-9

Default Value: The default for ALIASfree depends on the ShockLine instrument model number and the installed frequency option.

Syntax Example: :CALC1:TRAN:TIME:ALIA?

**:CALCulate{1-16} [:SElected]:TRANSform:TIME:CENTER <NRf>**  
**:CALCulate{1-16} [:SElected]:TRANSform:TIME:CENTER?**

Description: Sets the center time/distance of the range of the time domain transform on the active trace.

Returns the center time/distance of the range of the time domain transform on the active trace.

Cmd Parameters: <NRf> The input parameter is in Seconds or Meters.

Query Parameters: <NR3> The output parameter is in Seconds or Meters.

Range: -999.999 to 999.999 Seconds  
           -2.99649E11 to 21.99649E11 Meters

Default Value: 1.5000000000E-009

Syntax Example: :CALC1:TRAN:TIME:CENT 5E2  
                   :CALC1:TRAN:TIME:CENT?

**:CALCulate{1-16} [:SElected]:TRANSform:TIME:DCTerm <char>**  
**:CALCulate{1-16} [:SElected]:TRANSform:TIME:DCTerm?**

Description: Sets the DC term of the time domain transform on the active trace.

- Use the AUTO value to allow the VNA to determine the appropriate DC Term value.
- Use the OTHER value to allow for a user-defined DC Term value using the command:

:CALCulate{1-16} [:SElected]:TRANSform:TIME:DCTerm:OTHer <NRf>

Returns the state of the current DC Term type.

Cmd Parameters: <char> AUTO | OTHER

Query Parameters: <char> AUTO | OTHER

Range: NA

Default Value: AUTO

Syntax Example: :CALC1:TRAN:TIME:DCT AUTO  
                   :CALC1:TRAN:TIME:DCT?

**:CALCulate{1-16} [:SElected]:TRANSform:TIME:DCTerm:OTHer <NRf>**  
**:CALCulate{1-16} [:SElected]:TRANSform:TIME:DCTerm:OTHer?**

Description: Enters the other value for the DC term of the time domain transform on the active trace.

Returns the Other value for the DC Term of the time domain transform on the active trace.

Cmd Parameters: <NRf> The input parameter is in Ohms.

Query Parameters: <NR3> The output parameter is in Ohms.

Range: 0 to 5E3

Default Value: 0.0000000000E+000

Syntax Example: :CALC1:TRAN:TIME:DCT:OTH 5.0E1  
                   :CALC1:TRAN:TIME:DCT:OTH?

**:CALCulate{1-16} [:SELECTed] :TRANSform:TIME:DISTance?**

Description: Query only.

Returns the list of time domain distance values on the active trace.

Query Parameters: <block> or <arbitrary block> See definition of “<block> or <arbitrary block>” on page 2-10.

Range: NA

Default Value: NA

Syntax Example: :CALC1:TRAN:TIME:DIST?

**:CALCulate{1-16} [:SELECTed] :TRANSform:TIME:EXTrapolate <char>****:CALCulate{1-16} [:SELECTed] :TRANSform:TIME:EXTrapolate?**

Description: Sets the extrapolation method of the time domain transform on the active trace.

Returns the extrapolation method of the time domain transform on the active trace.

Cmd Parameters: <char> MAGPHase | PHASE | USER

Query Parameters: <char> MAGPH | PHASE | USER

Range: NA

Default Value: PHASE

Syntax Example: :CALC1:TRAN:TIME:EXT MAGPH

:CALC1:TRAN:TIME:EXT?

**:CALCulate{1-16} [:SELECTed] :TRANSform:TIME:GATE:CENTER <NRf>****:CALCulate{1-16} [:SELECTed] :TRANSform:TIME:GATE:CENTER?**

Description: Sets the center time/distance of the gate of the time domain transform on the active trace.

Returns the center time/distance of the gate of the time domain transform on the active trace.

Cmd Parameters: <NRf> The input parameter is in Seconds or Meters.

Query Parameters: <NR3> The output parameter is in Seconds or Meters.

Range: -999.99 to 999.99 Seconds

-2.99649E11 to 2.99649E11 Meters

Default Value: 1.5000000000E-009

Syntax Example: :CALC1:TRAN:TIME:GATE:CENT 1.0E-3

:CALC1:TRAN:TIME:GATE:CENT?

```
:CALCulate{1-16} [:SElected]:TRANSform:TIME:GATE:DCGamma <NRf>
:CALCulate{1-16} [:SElected]:TRANSform:TIME:GATE:DCGamma?
```

Description: Sets the Dolph-Chebyshev gamma value of the time domain transform gate on the active trace.

Returns the Dolph-Chebyshev gamma value of the time domain transform gate on the active trace.

Cmd Parameters: <NRf> The input parameter depends on the display type.

Query Parameters: <NR3> The output parameter is a unitless number.

Range: 0 to 2E2

Default Value: 4.00000000000E+001

Syntax Example: :CALC1:TRAN:TIME:GATE:DCG 3

```
:CALC1:TRAN:TIME:GATE:DCG?
```

```
:CALCulate{1-16} [:SElected]:TRANSform:TIME:GATE:KBBeta <NRf>
```

```
:CALCulate{1-16} [:SESelected]:TRANSform:TIME:GATE:KBBeta?
```

Description: Sets the Kaiser-Bessel beta value of the time domain transform gate on the active trace.

Returns the Kaiser-Bessel beta value of the time domain transform gate on the active trace.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR3> The output parameter is a unitless number.

Range: 0 to E308

Default Value: 5.00000000000E-001

Syntax Example: :CALC1:TRAN:TIME:GATE:KBB 3

```
:CALC1:TRAN:TIME:GATE:KBB?
```

```
:CALCulate{1-16} [:SESelected]:TRANSform:TIME:GATE:NOTCh[:STATe] <char>
```

```
:CALCulate{1-16} [:SESelected]:TRANSform:TIME:GATE:NOTCh[:STATe]?
```

Description: Turns anti-gating on/off in the time domain transform on the active trace.

Returns the anti-gating on/off status in the time domain transform on the active trace.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :CALC1:TRAN:TIME:GATE:NOT ON

```
:CALC1:TRAN:TIME:GATE:NOT?
```

**:CALCulate{1-16} [:SELECTed] :TRANSform:TIME:GATE:SHAPe <char>**  
**:CALCulate{1-16} [:SELECTed] :TRANSform:TIME:GATE:SHAPe?**

Description: Sets the gate shape of the time domain transform on the active trace. The various gate shapes provide different point weighting with resultant changes in the display and its resolution. The available gate shapes are:

- DCHebyshev = Sets a Dolph-Chebyshev window with a trade-off between the side lobe level and resolution. In the DCH, the side lobe level is parameterized in absolute dB where a larger value leads to a wider main lobe width with lower resolution.
- KBessel = Sets a Kaiser-Bessel window with a trade-off between the side lobe level and resolution. The KBE larger Beta value provides lower side lobes with a wider main lobe width with lower resolution.
- MINimum = This is a rectangular (or null) gate. It will produce the best resolution but the worst side lobe levels.
- NOMinal = The default value which provides about one-half of the resolution with no window but approximately a 30 dB reduction in side lobe levels. This setting advised for mode applications. The NOMinal setting is equivalent to a Hamming gate.
- WIDE = The WIDE gate (Blackman 3 term) will reduce resolution relative to the nominal gate but further reduce side lobe levels.
- MAXimum = The MAXimum gate (Blackman-Harris 4 term) has the poorest resolution of the fixed gates but has the lowest side lobe levels.

Returns the gate shape of the time domain transform on the active trace.

Cmd Parameters: <char> MINimum | NOMinal | WIDE | MAXimum | DCHebyshev | KBessel

Query Parameters: <char> MIN | NOM | WIDE | MAX | DCH | KBE

Range: NA

Default Value: NOM

Syntax Example: :CALC1:TRAN:TIME:GATE:SHAP MIN  
                   :CALC1:TRAN:TIME:GATE:SHAP?

**:CALCulate{1-16} [:SELECTed] :TRANSform:TIME:GATE:SPAN <NRf>**  
**:CALCulate{1-16} [:SELECTed] :TRANSform:TIME:GATE:SPAN?**

Description: Sets the span time/distance of the gate of the time domain transform on the active trace.

Returns the span time/distance of the gate of the time domain transform on the active trace.

Cmd Parameters: <NRf> The input parameter is in Seconds or Meters.

Query Parameters: <NR3> The output parameter is in Seconds or Meters.

Range: -999.99 to 999.99 Seconds

-2.99649E11 to 2.99649E11 Meters

Default Value: 1.0000000000E-009

Syntax Example: :CALC1:TRAN:TIME:GATE:SPAN 5.0E-3  
                   :CALC1:TRAN:TIME:GATE:SPAN?

**:CALCulate{1-16} [:SElected]:TRANSform:TIME:GATE:STAR <NRf>**  
**:CALCulate{1-16} [:SElected]:TRANSform:TIME:GATE:STAR?**

Description: Sets the start time/distance of the gate of the time domain transform on the active trace.

Returns the start time/distance of the gate of the time domain transform on the active trace.

Cmd Parameters: <NRf> The input parameter is in Seconds or Meters.

Query Parameters: <NR3> The output parameter is in Seconds or Meters.

Range: -999.99 to 999.99 Seconds

-2.99649E11 to 2.99649E11 Meters

Default Value: 1.0000000000E-009

Syntax Example: :CALC1:TRAN:TIME:GATE:STAR 2.0E-3

:CALC1:TRAN:TIME:GATE:STAR?

**:CALCulate{1-16} [:SElected]:TRANSform:TIME:GATE:STOP <NRf>**  
**:CALCulate{1-16} [:SElected]:TRANSform:TIME:GATE:STOP?**

Description: Sets the stop time/distance of the gate of the time domain transform on the active trace.

Returns the stop time/distance of the gate of the time domain transform on the active trace.

Cmd Parameters: <NRf> The input parameter is in Seconds or Meters.

Query Parameters: <NR3> The output parameter is in Seconds or Meters.

Range: -999.99 to 999.99 Seconds

-2.99649E11 to 2.99649E11 Meters

Default Value: 2.0000000000E-009

Syntax Example: :CALC1:TRAN:TIME:GATE:STOP 1.0E-2

:CALC1:TRAN:TIME:GATE:STOP?

**:CALCulate{1-16} [:SElected]:TRANSform:TIME:GATE[:STATE] <char>**  
**:CALCulate{1-16} [:SElected]:TRANSform:TIME:GATE[:STATE]?**

Description: Sets the status of the gate of the time domain transform on the active trace, where:

- ON = The selected gate is turned on and the display adjusted appropriately.
- OFF = The gate is turned off, and the display returns to its prior state.
- DISPLAY = The upper and lower bounds of the gate are shown along with the trace display in its normal state. Use this setting to help position the gate accurately on the trace.

Returns the status of the gate of the time domain transform on the active trace.

Cmd Parameters: <char> ON | OFF | DISPLAY

Query Parameters: <char> ON | OFF | DISP

Range: NA

Default Value: OFF

Syntax Example: :CALC1:TRAN:TIME:GATE ON

:CALC1:TRAN:TIME:GATE?

**:CALCulate{1-16} [:SElected] :TRANSform:TIME :IMPulsewidth?**

Description: Query only.

Returns the impulse width of the time domain transform on the active trace.

Query Parameters: <NR3> The output parameter is in Seconds or Meters.

Range: NA

Default Value: 0.00000000000E+000

Syntax Example: :CALC1:TRAN:TIME:IMP?

**:CALCulate{1-16} [:SElected] :TRANSform:TIME :RESPonse <char>****:CALCulate{1-16} [:SElected] :TRANSform:TIME :RESPonse?**

Description: Sets the response of the time domain transform on the active trace.

Returns the response of the time domain transform on the active trace.

Cmd Parameters: <char> IMPulse | STEP

Query Parameters: <char> IMP | STEP

Range: NA

Default Value: IMP

Syntax Example: :CALC1:TRAN:TIME:RESP STEP

:CALC1:TRAN:TIME:RESP?

**:CALCulate{1-16} [:SElected] :TRANSform:TIME :SPAN <NRf>****:CALCulate{1-16} [:SElected] :TRANSform:TIME :SPAN?**

Description: Sets the span time/distance of the range of the time domain transform on the active trace.

Returns the span time/distance of the range of the time domain transform on the active trace.

Cmd Parameters: <NRf> The input parameter is in Seconds or Meters.

Query Parameters: <NR3> The output parameter is in Seconds or Meters.

Range: -999.99 to 999.99 Seconds

-2.99649E11 to 2.99649E11 Meters

Default Value: 5.0000000000E-009

Syntax Example: :CALC1:TRAN:TIME:SPAN 5.0E-3

:CALC1:TRAN:TIME:SPAN?

**:CALCulate{1-16} [:SElected]:TRANSform:TIME:SST0 <char>**  
**:CALCulate{1-16} [:SElected]:TRANSform:TIME:SST0?**

Applicability: MS46524

Description: Sets whether the selected trace on the given channel should Start the Step response calculation at Time = 0 rather than the start range.

Returns the time zoom mode on/off status in the time domain transform on the active trace of the given channel.

Cmd Parameters: 1 | 0 | ON | OFF

Query Parameters: 1 | 0

Range: -NA

Default Value: 0

Syntax Example: :CALC1:TRAN:TIME:SST0 ON

Syntax Example: :CALC1:TRAN:TIME:SST0?

**:CALCulate{1-16} [:SElected]:TRANSform:TIME:STAR <NRf>**  
**:CALCulate{1-16} [:SElected]:TRANSform:TIME:STAR?**

Description: Sets the start time/distance of the range of the time domain transform on the active trace.

Returns the start time/distance of the range of the time domain transform on the active trace.

Cmd Parameters: <NRf> The input parameter is in Seconds or Meters.

Query Parameters: <NR3> The output parameter is in Seconds or Meters.

Range: -999.99 to 999.99 Seconds  
-2.99649E11 to 2.99649E11 Meters

Default Value: -1.00000000000E-009

Syntax Example: :CALC1:TRAN:TIME:STAR 2.0E-3

:CALC1:TRAN:TIME:STAR?

**:CALCulate{1-16} [:SElected]:TRANSform:TIME:STOP <NRf>**  
**:CALCulate{1-16} [:SElected]:TRANSform:TIME:STOP?**

Description: Sets the stop time/distance of the range of the time domain transform on the active trace.

Returns the stop time/distance of the range of the time domain transform on the active trace.

Cmd Parameters: <NRf> The input parameter is in Seconds or Meters.

Query Parameters: <NR3> The output parameter is in Seconds or Meters.

Range: -999.99 to 999.99 Seconds  
-2.99649E11 to 2.99649E11 Meters

Default Value: 4.00000000000E-009

Syntax Example: :CALC1:TRAN:TIME:STOP 1.0E-2

:CALC1:TRAN:TIME:STOP?

**:CALCulate{1-16} [:SELECTed] :TRANSform:TIME:TIME?**

Description: Query only.

Returns the list of time domain time values on the active trace.

Query Parameters: See definition of “[<block>](#) or [<arbitrary block>](#)” on page 2-10.

Range: NA

Default Value: NA

Syntax Example: :CALC1:TRAN:TIME:TIME?

**:CALCulate{1-16} [:SELECTed] :TRANSform:TIME:TRIP <char>**

**:CALCulate{1-16} [:SELECTed] :TRANSform:TIME:TRIP?**

Description: Sets the trip length of the time domain transform on the active trace.

Returns the trip length of the time domain transform on the active trace.

Cmd Parameters: <char> ONEway | ROUNDtrip | AUTO

Query Parameters: <char> ONE | ROUND | AUTO

Range: NA

Default Value: AUTO

Syntax Example: :CALC1:TRAN:TIME:TRIP ONE

:CALC1:TRAN:TIME:TRIP?

**:CALCulate{1-16} [:SELECTed] :TRANSform:TIME:TYPe <char>**

**:CALCulate{1-16} [:SELECTed] :TRANSform:TIME:TYPe?**

Description: Sets the time domain transform type on the active trace.

Returns the time domain transform type on the active trace.

Cmd Parameters: <char> FREQuency | FREQGATE | LOWpass | BANDpass

Query Parameters: <char> FREQ | FREQGATE | LOW | BAND

Range: NA

Default Value: FREQ

Syntax Example: :CALC1:TRAN:TIME:TYP FREQ

:CALC1:TRAN:TIME:TYP?

**:CALCulate{1-16} [:SELECTed] :TRANSform:TIME:UNIT <char>**

**:CALCulate{1-16} [:SELECTed] :TRANSform:TIME:UNIT?**

Description: Sets the unit used in the time domain transform on the active trace.

Returns the unit used in time domain transform on the active trace.

Cmd Parameters: <char> TIME | DISTance

Query Parameters: <char> TIME | DIST

Range: NA

Default Value: TIME

Syntax Example: :CALC1:TRAN:TIME:UNI DIST

:CALC1:TRAN:TIME:UNI?

**:CALCulate{1-16} [:SElected]:TRANSform:TIME:WINDOW:DCGamma <NRf>**  
**:CALCulate{1-16} [:SElected]:TRANSform:TIME:WINDOW:DCGamma?**

Description: Sets the Dolph-Chebyshev gamma value of the time domain transform window on the active trace.

Returns the Dolph-Chebyshev gamma value of the time domain transform window on the active trace.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR3> The output parameter is a unitless number.

Range: 0 to 2E2

Default Value: 4.00000000000E+001

Syntax Example: :CALC1:TRAN:TIME:WIND1:DCG 3

:CALC1:TRAN:TIME:WIND1:DCG?

**:CALCulate{1-16} [:SElected]:TRANSform:TIME:WINDOW:KBBeta <NRf>**  
**:CALCulate{1-16} [:SESelected]:TRANSform:TIME:WINDOW:KBBeta?**

Description: Sets the Kaiser-Bessel beta value of the time domain transform window on the active trace.

Returns the Kaiser-Bessel beta value of the time domain transform window on the active trace.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR3> The output parameter is a unitless number.

Range: 0 to E308

Default Value: 5.00000000000E-001

Syntax Example: :CALC1:TRAN:TIME:WIND1:KBB 3

:CALC1:TRAN:TIME:WIND1:KBB?

**:CALCulate{1-16} [:SElected]:TRANSform:TIME:WINDOW:SHAPe <char>**  
**:CALCulate{1-16} [:SESelected]:TRANSform:TIME:WINDOW:SHAPe?**

Description: Sets the time window shape of the time domain transform on the active trace. The various time window shapes provide different point weighting with resultant changes in the display and its resolution. The available time window shapes are:

- RECTangular
- NOMinal
- LOWsidelobe
- MINsidelobe
- DCHebyshev
- KBEssel

Returns the window shape of the time domain transform on the active trace.

Cmd Parameters: <char> RECTangular | NOMinal | LOWsidelobe | MINsidelobe | DCHebyshev | KBEssel

Query Parameters: <char> RECT | NOM | LOW | MIN | DCH | KBE

Range: NA

Default Value: NOM

Syntax Example: :CALC1:TRAN:TIME:WIND1:SHAP RECT  
:CALC1:TRAN:TIME:WIND1:SHAP?

## 5-43 :CALCulate{1-16}:TRACE{1-16}:MARKer{1-12} Subsystem

The :CALCulate{1-16}:TRACE{1-16}:MARKer{1-12} subsystem command provides configuration and control for the indicated marker and indicated trace.

### Marker Subsystems

Related marker configuration, control, and reporting commands are described multiple subsystems:

- “:CALCulate{1-16}:DISPlay:MARKer Subsystem” on page 5-24
- “:CALCulate{1-16}:MARKer Subsystem” on page 5-72
- “:CALCulate{1-16}:PARameter{1-16}:MARKer Subsystem” on page 5-125
- “:CALCulate{1-16}:PARameter{1-16}:MLOCation Subsystem” on page 5-131
- “:CALCulate{1-16}:PARameter{1-16}:MSTatistics Subsystem” on page 5-133
- “:CALCulate{1-16}:TRACE{1-16}:MARKer{1-12} Subsystem” on page 5-236
- “:CALCulate{1-16}[{:SElected}]:MARKer Subsystem” on page 5-177
- “:CALCulate{1-16}[{:SElected}]:MARKer{1-13} Subsystem” on page 5-198
- “:DISPlay Subsystem” on page 5-281

**:CALCulate{1-16}:TRACe{1-16}:MARKer{1-12}:SEArch:RANGE <char>**

**:CALCulate{1-16}:TRACe{1-16}:MARKer{1-12}:SEArch:RANGE?**

Description : Sets the marker search range for the indicated channel, trace and marker.

Returns the marker search range for the indicated channel, trace and marker.

Cmd Parameters : <char> TRACe | RNG1 | RNG2 | ... | RNG20

Query Parameters: NA

Query Output : <char> TRACe | RNG1 | RNG2 | ... | RNG20

Range : NA

Default : TRACe

Syntax Example : :CALC1:TRAC1:MARK1:SEA:RANG RNG5

:CALC1:TRAC1:MARK1:SEA:RANG?

## 5-44 :CALCulate{1-16}:UFEXtraction:GENB Subsystem – Network Extraction

The :CALCulate{1-16}:UFEXtraction subsystem commands provide configuration control and execution for Generalized B (GENB) network extraction functions. Requires the Universal Fixture Extraction option (UFX, Option 24) to be installed and available. These commands are not applicable to MS46121.

### Calibration Option Subsystems

Related calibration option configuration and control subsystems are:

- [Section 5-7 “:CALCulate{1-16}:CORRection Subsystem” on page 5-6](#)
- [Section 5-8 “:CALCulate{1-16}:EXTRaction Subsystem” on page 5-8](#)
- [Section 5-12 “:CALCulate{1-16}:FSIMulator:NETWork Subsystem” on page 5-44](#)
- [Section 5-44 “:CALCulate{1-16}:UFEXtraction:GENB Subsystem – Network Extraction” on page 5-237](#)
- [Section 5-45 “:CALCulate{1-16}:UFEXtraction:MSTD Subsystem – Network Extraction” on page 5-244](#)
- [Section 5-46 “:CALCulate{1-16}:UFEXtraction:PLOCalized Subsystem – Network Extraction” on page 5-257](#)
- [Section 5-47 “:CALCulate{1-16}:UFEXtraction:SEQential Subsystem – Network Extraction” on page 5-276](#)
- [Section 5-63 “:SENSe{1-16}:CORRection:COLLect:HYBRid Subsystem” on page 5-349](#)

### :CALCulate{1-16}:UFEXtraction [:METHOD] :GENB

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Prerequisites: The following commands must be sent before performing GenB network extraction:

- “:CALCulate{1-16}:UFEXtraction:GENB:S2P:FILE <string>”
- “:CALCulate{1-16}:UFEXtraction:GENB:DELay <NRf>”
- “:CALCulate{1-16}:UFEXtraction:GENB:STDNumber <NRf>”

#### Measurement For Individual Standards

- “:CALCulate{1-16}:UFEXtraction:GENB:STD{1-3}:COLLect”

Description: Performs the Network Extraction using Generalized B Method on the indicated channel. Method Type B extracts one 2-port network using a two-tier calibration.

No query.

Cmd Parameters: NA

Query Parameters: NA

Query Output: NA

Range: NA

Default: NA

Syntax Example: :CALC1:UFEX:METH:GENB

```
:CALCulate{1-16}:UFEXtraction:GENB:DELay <NRf>
:CALCulate{1-16}:UFEXtraction:GENB:DELay?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Sets the estimated fixture delay for Generalized B Network Extraction on the indicated channel. Note that 0 entry triggers auto-estimation.

Returns the estimated fixture delay for Generalized B on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in seconds.

Query Parameters: NA

Query Output: <NR3> The input parameter is in seconds.

Range: NA

Default: 0

Syntax Example: :CALC1:UFEX:GENB:DEL 2.5E-10

```
:CALC1:UFEX:GENB:DEL?
```

```
:CALCulate{1-16}:UFEXtraction:GENB:OSCLassical[:STATe] <char>
:CALCulate{1-16}:UFEXtraction:GENB:OSCLassical[:STATe]?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Sets to use or not use classical open-short in Generalized B Network Extraction on the indicated channel.

Returns the status to use or not use classical open-short in Generalized B on the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: 1 | 0

Range: NA

Default: 0

Syntax Example: :CALC1:UFEX:GENB:OSCL 1

```
:CALC1:UFEX:GENB:OSCL?
```

**:CALCulate{1-16} :UFEXtraction:GENB :PORT <char>**

**:CALCulate{1-16} :UFEXtraction:GENB :PORT?**

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Assigns the port to be used in Generalized B Network Extraction on the indicated channel.

Returns the selected port to be used in the Generalized B Network Extraction on the indicated channel.

Cmd Parameters: <char> PORT1 | PORT2 | PORT3 | PORT4

Query Parameters: NA

Query Output: <char> PORT1 | PORT2 | PORT3 | PORT4

Range: NA

Default: PORT1

Syntax Example: :CALC1:UFEX:GENB:PORT PORT3

:CALC1:UFEX:GENB:PORT?

**:CALCulate{1-16} :UFEXtraction:GENB:S2P:FILE <string>**

**:CALCulate{1-16} :UFEXtraction:GENB:S2P:FILE?**

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Sets the file path location to output the S2P for Generalized B on the indicated channel.

Returns the file path location to output the S2P for Generalized B on the indicated channel.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.s2p', where x:\directory must exist

Query Parameters: NA

Query Output: <string> x:\directory\filename.s2p

Range: NA

Default: NA

Syntax Example: :CALC1:UFEX:GENB:S2P:FIL 'c:\nenffiles\myfile1.s2p'

:CALC1:UFEX:GENB:S2P:FIL?

**:CALCulate{1-16} :UFEXtraction:GENB:STD{1-3} :COLLect**

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Initiates collection of data for the given standard number for Generalized B Network Extraction on the indicated channel and returns status.

No query.

Cmd Parameters: NA

Query Parameters: NA

Query Output: NA

Range: NA

Default: NA

Syntax Example: :CALC1:UFEX:GENB:STD1:COLL

```
:CALCulate{1-16}:UFEXtraction:GENB:STD{1-3}:LOAD:L <NRf>
:CALCulate{1-16}:UFEXtraction:GENB:STD{1-3}:LOAD:L?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Sets the inductance value of the load for the given standard number for Generalized B Network Extraction to be used on the indicated channel

Returns the load inductance for the given standard number for Generalized B Network Extraction on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Henrys

Query Parameters: NA

Query Output: <NR3> The output parameter is in Henrys

Range: MPND

Default: 0.000000000E+000

Syntax Example: :CALC1:UFEX:GENB:STD1:LOAD:L 5.0E-9

```
:CALC1:UFEX:GENB:STD1:LOAD:L?
```

```
:CALCulate{1-16}:UFEXtraction:GENB:STD{1-3}:LOAD:OFFSet <NRf>
```

```
:CALCulate{1-16}:UFEXtraction:GENB:STD{1-3}:LOAD:OFFSet?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Sets the offset length of the load for the given standard number for Generalized B Network Extraction to be used in Generalized B Network Extraction on the indicated channel

Returns the offset length of the short for the given standard number for Generalized B Network Extraction on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in meters.

Query Parameters: NA

Query Output: <NR3> The output parameter is in meters

Range: MPND

Default: 0.000000000E+000

Syntax Example: :CALC1:UFEX:GENB:STD1:LOAD:OFFS 2.5e-3

```
:CALC1:UFEX:GENB:STD1:LOAD:OFFS?
```

```
:CALCulate{1-16}:UFEXtraction:GENB:STD{1-3}:LOAD:R <NRf>
```

```
:CALCulate{1-16}:UFEXtraction:GENB:STD{1-3}:LOAD:R?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Sets the resistance value of the load for the given standard number for Generalized B Network Extraction to be used on the indicated channel

Returns the load resistance for the given standard number for Generalized B Network Extraction on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Ohms.

Query Parameters: NA

Query Output: <NR3> The output parameter is in Ohms

Range: MPND (positive number only)

Default: 50

Syntax Example: :CALC1:UFEX:GENB:STD1:LOAD:R 7.5E+1

```
:CALC1:UFEX:GENB:STD1:LOAD:R?
```

```
:CALCulate{1-16}:UFEXtraction:GENB:STD{1-3}:MEAS?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Queries if the given standard number has been measured for Generalized B Network Extraction on the indicated channel.

Cmd Parameters: NA

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default: 0

Syntax Example: :CALC1:UFEX:GENB:STD1:MEAS?

```
:CALCulate{1-16}:UFEXtraction:GENB:STD{1-3}:OPEN:OFFSet <NRf>
```

```
:CALCulate{1-16}:UFEXtraction:GENB:STD{1-3}:OPEN:OFFSet?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Sets the offset length of the open for the given standard number for Generalized B Network Extraction to be used in Generalized B network extraction on the indicated channel.

Returns the offset length of the open for the given standard number for Generalized B Network Extraction on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in meters.

Query Parameters: NA

Query Output: <NR3> The output parameter is in meters

Range: MPND

Default: 0.000000000E+000

Syntax Example: :CALC1:UFEX:GENB:STD1:OPEN:OFFS 2.5e-3

```
:CALC1:UFEX:GENB:STD1:OPEN:OFFS?
```

```
:CALCulate{1-16}:UFEXtraction:GENB:STD{1-3}:S1P:PATH <string>
:CALCulate{1-16}:UFEXtraction:GENB:STD{1-3}:S1P:PATH?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Sets the file path of the S1P for the given standard number to be used in Generalized B network extraction on the indicated channel

Returns the S1P file path for the given standard number for Generalized B Network Extraction on the indicated channel.

Cmd Parameters: <string> 'x:\directory\filename.slp'

Query Parameters: NA

Query Output: <string> x:\directory\filename.slp

Range: NA

Default: NA

Syntax Example: :CALC1:UFEX:GENB:STD1:S1P:PATH 'c:\nenffiles\myfile1.slp'
:CALC1:UFEX:GENB:STD1:S1P:PATH?

```
:CALCulate{1-16}:UFEXtraction:GENB:STD{1-3}:SHORT:OFFSet <NRf>
```

```
:CALCulate{1-16}:UFEXtraction:GENB:STD{1-3}:SHORT:OFFSet?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Sets the offset length of the short for the given standard number for Generalized B Network Extraction to be used in Generalized B network extraction on the indicated channel.

Returns the offset length of the short for the given standard number for Generalized B Network Extraction on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in meters.

Query Parameters: NA

Query Output: <NRf> The output parameter is in meters

Range: MPND

Default: 0.00000000E+000

Syntax Example: :CALC1:UFEX:GENB:STD1:SHOR:OFFS 2.5e-3
:CALC1:UFEX:GENB:STD1:SHOR:OFFS?

```
:CALCulate{1-16}:UFEXtraction:GENB:STD{1-3}:TYPe <CHAR>
:CALCulate{1-16}:UFEXtraction:GENB:STD{1-3}:TYPe?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Sets the standard type (short, open, load, or S1P) for the given standard number to be used in Generalized B network extraction on the indicated channel

Returns the standard type for the given standard number for Generalized B Network Extraction on the indicated channel.

Cmd Parameters: <char> SHORt | OPEN | LOAD | S1P

Query Parameters: NA

Query Output: <char> SHORt | OPEN | LOAD | S1P

Range: NA

Default: SHORT

Syntax Example: :CALC1:UFEX:GENB:STD1:TYP SHOR

```
:CALC1:UFEX:GENB:STD1:TYP?
```

```
:CALCulate{1-16}:UFEXtraction:GENB:STDNumber <NRf>
```

```
:CALCulate{1-16}:UFEXtraction:GENB:STDNumber?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Sets the number of standards to be used for Generalized B Network Extraction on the indicated channel.

Returns the number of standards to be used in Generalized B Network Extraction on the indicated channel.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: NA

Query Output: <NR1> The output is an integer.

Range: 1 to 3

Default: 1

Syntax Example: :CALC1:UFEX:GENB:STDN 3

```
:CALC1:UFEX:GENB:STDN?
```

## 5-45 :CALCulate{1-16}:UFEXtraction:MSTD Subsystem – Network Extraction

The :CALCulate{1-16}:UFEXtraction subsystem commands provide configuration control and execution for the Multi-Standard (MSTD) D network extraction function. Requires the Universal Fixture Extraction option (UFX, Option 24) to be installed and available. These commands are not applicable to MS46121.

### Calibration Option Subsystems

Related calibration option configuration and control subsystems are:

- [Section 5-7 “:CALCulate{1-16}:CORRection Subsystem” on page 5-6](#)
- [Section 5-8 “:CALCulate{1-16}:EXTRaction Subsystem” on page 5-8](#)
- [Section 5-12 “:CALCulate{1-16}:FSIMulator:NETWork Subsystem” on page 5-44](#)
- [Section 5-44 “:CALCulate{1-16}:UFEXtraction:GENB Subsystem – Network Extraction” on page 5-237](#)
- [Section 5-45 “:CALCulate{1-16}:UFEXtraction:MSTD Subsystem – Network Extraction” on page 5-244](#)
- [Section 5-46 “:CALCulate{1-16}:UFEXtraction:PLOCalized Subsystem – Network Extraction” on page 5-257](#)
- [Section 5-47 “:CALCulate{1-16}:UFEXtraction:SEQential Subsystem – Network Extraction” on page 5-276](#)
- [Section 5-63 “:SENSe{1-16}:CORRection:COLLect:HYBRid Subsystem” on page 5-349](#)

### **:CALCulate{1-16}:UFEXtraction[:METHOD] :MSTD:{D|F|G}**

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Methods F or G requires a 4-port VNA.

Prerequisites: At a minimum, the following commands must be sent before performing Multi-standard network extraction. This assumes appropriate cal has been completed and is on.

#### Set paths for necessary output SNP files:

##### Type D:

- [“:CALCulate{1-16}:UFEXtraction:MSTD:D:S2P:FILE{1|2} <string>”](#)

##### Type F

- [“:CALCulate{1-16}:UFEXtraction:MSTD:F:S2P:FILE{1|2|3|4} <string>”](#)

##### Type G

- [“:CALCulate{1-16}:UFEXtraction:MSTD:G:S4P:FILE{1|2} <string>”](#)

#### Perform Line 1 Measurement for D, F, or G

- [“:CALCulate{1-16}:UFEXtraction:MSTD:{D|F|G}:LINE{1|2}:COLLect”](#)

Description: Performs the Network Extraction using Multi-standard Type D, F, or G Method on the indicated channel.

Cmd Parameters: NA

Query Parameters: NA

Query Output: NA

Range: NA

Default: NA

Syntax Example: :CALC1:UFEX:METH:MSTD:D

**:CALCulate{1-16}:UFEXtraction:MSTD:{D|F|G}:LINE{1|2}:COLLect**

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Methods F or G requires a 4-port VNA.

Description: Initiate collection of data for Line 1 (or 2) for Multi-standard D (or F or G) Network Extraction on the indicated channel and returns status.

Cmd Parameters: NA

Query Parameters: NA

Query Output: NA

Range: NA

Default: NA

Syntax Example: :CALC1:UFEX:MSTD:D:LIN1:COLL

**:CALCulate{1-16}:UFEXtraction:MSTD:{D|F|G}:LINE{1|2}:LENGTH****:CALCulate{1-16}:UFEXtraction:MSTD:{D|F|G}:LINE{1|2}:LENGTH?**

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Methods F or G requires a 4-port VNA.

Description: Sets the Line 1 (or 2) length in Multi-standard D (or F or G) Network Extraction on the indicated channel.

Returns the Line 1 (or 2) length in Multi-standard D (or F or G) Network Extraction on the indicated channel.

Cmd Parameters: The input parameter is in meters.

Query Parameters: NA

Query Output: The output parameter is in meters.

Range: MPND

Default: 0.00000000E+000

Syntax Example: :CALC1:UFEX:MSTD:D:LIN1:LENG 2.5E-10

:CALC1:UFEX:MSTD:D:LIN1:LENG?

**:CALCulate{1-16}:UFEXtraction:MSTD:D:LINE{1|2}:MEASure?**

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Methods F or G requires a 4-port VNA.

Description: Query only.

Queries if the Line 1 (or 2) has been measured for Multi-standard D (or F or G) Network Extraction on the indicated channel

Cmd Parameters: NA

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default: 0

Syntax Example: :CALC1:UFEX:MSTD:D:LIN1:MEAS?

```
:CALCulate{1-16}:UFEXtraction:MSTD:{D|F|G}:LINe2[:STATe] <char>
:CALCulate{1-16}:UFEXtraction:MSTD:{D|F|G}:LINe2[:STATe]?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Methods F or G requires a 4-port VNA.

Description: Turns on/off the Line 2 option in Multi-standard D (or F or G) Network Extraction on the indicated channel.

Returns the on/off status of the Line 2 in Multi-standard D (or F or G) Network Extraction on the indicated channel.

Cmd Parameters: ON | OFF | 1 | 0

Query Parameters: NA

Query Output: 1 | 0

Range: NA

Default: 0

Syntax Example: :CALC1:UFEX:MSTD:D:LIN2 ON

```
:CALC1:UFEX:MSTD:D:LIN2?
```

```
:CALCulate{1-16}:UFEXtraction:MSTD:{D|F|G}:REFLect:COLlect
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Methods F or G requires a 4-port VNA.

Description: Initiates collection of data for the Reflect for Multi-standard D (or F or G) Network Extraction on the indicated channel and returns status.

Cmd Parameters: NA

Query Parameters: NA

Query Output: NA

Range: NA

Default: NA

Syntax Example: :CALC1:UFEX:MSTD:D:REFL:COLL

```
:CALCulate{1-16} :UFEXtraction:MSTD :{D|F|G} :REFlect:LOAD:L <NRf>
:CALCulate{1-16} :UFEXtraction:MSTD :{D|F|G} :REFlect:LOAD:L?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Methods F or G requires a 4-port VNA.

Description: Sets the inductance value of the load for the Reflect for Multi-standard D (or F or G) Network Extraction to be used on the indicated channel.

Returns the load inductance for the Reflect for Multi-standard D (or F or G) Network Extraction on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Henrys

Query Parameters: NA

Query Output: <NR3> The output parameter is in Henrys

Range: MPND

Default: 0.000000000E+000

Syntax Example: :CALC1:UFEX:MSTD:D:REFL:LOAD:L 5.0E-9

```
:CALC1:UFEX:MSTD:D:REFL:LOAD:L?
```

```
:CALCulate{1-16} :UFEXtraction:MSTD :{D|F|G} :REFlect:LOAD:OFFSet <NRf>
```

```
:CALCulate{1-16} :UFEXtraction:MSTD :{D|F|G} :REFlect:LOAD:OFFSet?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Methods F or G requires a 4-port VNA.

Description: Sets the offset length of the load for the Reflect for Multi-standard D (or F or G) Network Extraction to be used on the indicated channel.

Returns the offset length of the Load for the Reflect for Multi-standard D (or F or G) Network Extraction on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in meters

Query Parameters: NA

Query Output: <NR3> The output parameter is in meters

Range: MPND

Default: 0.000000000E+000

Syntax Example: :CALC1:UFEX:MSTD:D:REFL:LOAD:OFFS 2.5e-3

```
:CALC1:UFEX:MSTD:D:REFL:LOAD:OFFS?
```

```
:CALCulate{1-16}:UFEXtraction:MSTD:{D|F|G}:REFLect:LOAD:R <NRf>
:CALCulate{1-16}:UFEXtraction:MSTD:{D|F|G}:REFLect:LOAD:R?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Methods F or G requires a 4-port VNA.

Description: Sets the resistance value of the load for the Reflect for Multi-standard D (or F or G) Network Extraction to be used on the indicated channel.

Returns the load resistance for the Reflect for Multi-standard D (or F or G) Network Extraction on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Ohms

Query Parameters: NA

Query Output: <NR3> The output parameter is in Ohms

Range: MPND (positive number only)

Default: 50

Syntax Example: :CALC1:UFEX:MSTD:D:REFL:LOAD:R 7.5E+1

```
:CALC1:UFEX:MSTD:D:REFL:LOAD:R?
```

```
:CALCulate{1-16}:UFEXtraction:MSTD:{D|F|G}:REFLect:MEASure?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Methods F or G requires a 4-port VNA.

Description: Queries if the Reflect has been measured for Multi-standard D (or F or G) Network Extraction on the indicated channel.

Cmd Parameters: NA

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default: 0

Syntax Example: :CALC1:UFEX:MSTD:D:REFL:MEAS?

```
:CALCulate{1-16} :UFEXtraction:MSTD :{D|F|G} :REFlect:OPEN:OFFSet <NRf>
:CALCulate{1-16} :UFEXtraction:MSTD :{D|F|G} :REFlect:OPEN:OFFSet?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Methods F or G requires a 4-port VNA.

Description: Sets the offset length of the open for the Reflect for Multi-standard D (or F or G) Network Extraction to be used on the indicated channel.

Returns the offset length of the Open for the Reflect for Multi-standard D (or F or G) Network Extraction on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in meters

Query Parameters: NA

Query Output: <NR3> The output parameter is in meters

Range: MPND

Default: 0.000000000E+000

Syntax Example: :CALC1:UFEX:MSTD:D:REFL:OPEN:OFFS 2.5e-3

```
:CALC1:UFEX:MSTD:D:REFL:OPEN:OFFS?
```

```
:CALCulate{1-16} :UFEXtraction:MSTD :{D|F|G} :REFlect:S1P:PATH <string>
```

```
:CALCulate{1-16} :UFEXtraction:MSTD :{D|F|G} :REFlect:S1P:PATH?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Methods F or G requires a 4-port VNA.

Description: Sets the file path of the S1P for the Reflect to be used in Multi-standard D (or F or G) Network extraction on the indicated channel.

Returns the S1P file path for the Reflect for Multi-standard D (or F or G) Network Extraction on the indicated channel.

Cmd Parameters: <string> 'x:\directory\filename.slp'

Query Parameters: NA

Query Output: <string> x:\directory\filename.slp

Range: NA

Default: NA

Syntax Example: :CALC1:UFEX:MSTD:D:REFL:S1P:PATH 'c:\nenffiles\myfile1.slp'

```
:CALC1:UFEX:MSTD:D:REFL:S1P:PATH?
```

```
:CALCulate{1-16}:UFEXtraction:MSTD:{D|F|G}:REFLect:SHORT:OFFSet <NRf>
:CALCulate{1-16}:UFEXtraction:MSTD:{D|F|G}:REFLect:SHORT:OFFSet?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Methods F or G requires a 4-port VNA.

Description: Sets the offset length of the short for the Reflect for Multi-standard D (or F or G) Network Extraction to be used in Multi-standard D (or F or G) network extraction on the indicated channel.

Returns the offset length of the short for the Reflect for Multi-standard D (or F or G) Network Extraction on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in meters

Query Parameters: NA

Query Output: <NR3> The output parameter is in meters

Range: MPND

Default: 0.000000000E+000

Syntax Example: :CALC1:UFEX:MSTD:D:REFL:SHOR:OFFS 2.5e-3

```
:CALC1:UFEX:MSTD:D:REFL:SHOR:OFFS?
```

```
:CALCulate{1-16}:UFEXtraction:MSTD:{D|F|G}:REFLect[:STATE] <char>
:CALCulate{1-16}:UFEXtraction:MSTD:{D|F|G}:REFLect[:STATE]?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Methods F or G requires a 4-port VNA.

Description: Turns on/off the Reflect option in Multi-standard D (or F or G) Network Extraction on the indicated channel.

Returns the on/off status of the Reflect in Multi-standard D (or F or G) Network Extraction on the indicated channel.

Cmd Parameters: ON | OFF | 1 | 0

Query Parameters: NA

Query Output: 1 | 0

Range: NA

Default: 0

Syntax Example: :CALC1:UFEX:MSTD:D:REFL ON

```
:CALC1:UFEX:MSTD:D:REFL?
```

```
:CALCulate{1-16} :UFExtraction:MSTD :{D|F|G} :REFlect:TYPE <char>
:CALCulate{1-16} :UFExtraction:MSTD :{D|F|G} :REFlect:TYPE?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Methods F or G requires a 4-port VNA.

Description: Sets the Reflect type (short, open, load, or S1P) to be used in Multi-standard D (or F or G) Network Extraction on the indicated channel.

Returns the Reflect type for Multi-standard D (or F or G) Network Extraction on the indicated channel.

Cmd Parameters: <char> SHORt | OPEN | LOAD | S1P

Query Parameters: NA

Query Output: SHOR | OPEN | LOAD | S1P

Range: NA

Default: SHORT

Syntax Example: :CALC1:UFEX:MSTD:D:REFL:TYP SHOR  
:CALC1:UFEX:MSTD:D:REFL:TYP?

```
:CALCulate{1-16} :UFExtraction:MSTD :{D|F|G} :ZERO:MATCh[:STATE] <char>
:CALCulate{1-16} :UFExtraction:MSTD :{D|F|G} :ZERO:MATCh[:STATE]?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Methods F or G requires a 4-port VNA.

Description: Turns on/off the neglect fixture match in Multi-standard D (or F or G) Network Extraction on the indicated channel.

Returns the on/off status of the neglect fixture match in Multi-standard D (or F or G) Network Extraction on the indicated channel.

Cmd Parameters: ON | OFF | 1 | 0

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default: 0

Syntax Example: :CALC1:UFEX:MSTD:D:ZER:MATC ON  
:CALC1:UFEX:MSTD:D:ZER:MATC?

```
:CALCulate{1-16}:UFEXtraction:MSTD:D:DELay <NRf>
```

```
:CALCulate{1-16}:UFEXtraction:MSTD:D:DELay?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Sets estimated fixture delay for Multi-standard D Network Extraction on the indicated channel. Note that 0 entry triggers auto-estimation.

Returns the estimated fixture delay for Multi-standard D on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in seconds

Query Parameters: NA

Query Output: <NR3> The output parameter is in seconds

Range: Positive

Default: 0.000000000E+000

Syntax Example: :CALC1:UFEX:MSTD:D:DEL 2.5E-03

```
:CALC1:UFEX:MSTD:D:DEL?
```

```
:CALCulate{1-16}:UFEXtraction:MSTD:D:S2P:FILE{1|2} <string>
```

```
:CALCulate{1-16}:UFEXtraction:MSTD:D:S2P:FILE{1|2}?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Assigns the S2P file 1 (or 2) name which receives the Multi-standard D Extracted Network S2P data on the indicated channel.

Returns the S2P file 1 (or 2) name which receives the Multi-standard D Extracted Network S2P data on the indicated channel.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.s2p', where x:\directory must exist.

<string> 'c:\nenffiles\myfile1.s2p' | 'c:\nenffiles\myfile2.s2p'

Query Parameters: NA

Query Output: <string> c:\nenffiles\myfile1.s2p | c:\nenffiles\myfile2.s2p

Range: NA

Default: NA

Syntax Example: :CALC1:UFEX:MSTD:D:S2P:FILE 'c:\nenffiles\myfile1.s2p'

```
:CALC1:UFEX:MSTD:D:S2P:FILE?
```

```
:CALCulate{1-16}:UFEXtraction:MSTD:D:PORT:PAIR <char>
:CALCulate{1-16}:UFEXtraction:MSTD:D:PORT:PAIR?
```

Applicability: MS46524

Description: Sets port pair in 4-port Multi-standard D Network Extraction on the indicated channel.

Returns the port pair selection in 4-Port Multi-standard D Network Extraction on the indicated channel.

Cmd Parameters: PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34

Query Parameters: NA

Query Output: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34

Range: NA

Default: PORT12

Syntax Example: :CALC1:UFEX:MSTD:D:PORT:PAIR PORT12

```
:CALC1:UFEX:MSTD:D:PORT:PAIR?
```

```
:CALCulate{1-16}:UFEXtraction:MSTD:{F|G}:DPATH <char>
:CALCulate{1-16}:UFEXtraction:MSTD:{F|G}:DPATH?
```

Applicability: MS46524

Description: Sets dominant path in Multi-standard F (or G) Network Extraction on the indicated channel. The dominant path and its partner (e.g., 1-2 implies 3-4 is also dominant) are the low insertion loss paths of the fixture and the ports between which any internal thru standard would be connected.

Returns the dominant path in Multi-standard F (or G) Network Extraction on the indicated channel.

Cmd Parameters: PORT12 | PORT13 | PORT14

Query Parameters: NA

Query Output: <char> PORT12 | PORT13 | PORT14

Range: NA

Default: PORT12

Syntax Example: :CALC1:UFEX:MSTD:F:DPAT PORT12

```
:CALC1:UFEX:MSTD:F:DPAT?
```

```
:CALCulate{1-16}:UFEXtraction:MSTD:F:DELay{1|2} <NRf>
:CALCulate{1-16}:UFEXtraction:MSTD:F:DELay{1|2}?
```

Applicability: MS46524

Description: Sets estimated delay 1 (or 2) that corresponds to a first (or second) pair in dominant path for Multi-standard F Network Extraction on the indicated channel. Note that 0 entry triggers auto-estimation.

Returns the estimated delay 1 (or 2) that corresponds to the first (or second) pair in dominant path for Multi-standard F Network Extraction on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in seconds

Query Parameters: NA

Query Output: <NR3> The output parameter is in seconds

Range: Positive

Default: 0.000000000E+000

Syntax Example: :CALC1:UFEX:MSTD:F:DEL2 2.5E-03

```
:CALC1:UFEX:MSTD:F:DEL2?
```

```
:CALCulate{1-16}:UFEXtraction:MSTD:F:S2P:FILE{1|2|3|4} <string>
:CALCulate{1-16}:UFEXtraction:MSTD:F:S2P:FILE{1|2|3|4}?
```

Applicability: MS46524

Description: Assigns the S2P file 1 (or 2 or 3 or 4) name which receives the Multi-standard F Extracted Network S2P data on the indicated channel.

Returns the S2P file 1 (or 2 or 3 or 4) name which receives the Multi-standard F Extracted Network S2P data on the indicated channel.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.s2p', where x:\directory must exist

<string> 'c:\nenffiles\myfile1.s2p' | 'c:\nenffiles\myfile2.s2p' | 'c:\nenffiles\myfile3.s2p' | 'c:\nenffiles\myfile4.s2p'

Query Parameters: NA

Query Output: <string> c:\nenffiles\myfile1.s2p | c:\nenffiles\myfile1.s2p | c:\nenffiles\myfile3.s2p | c:\nenffiles\myfile4.s2p

Range: NA

Default: NA

Syntax Example: :CALC1:UFEX:MSTD:F:S2P:FILE 'c:\nenffiles\myfile1.s2p'

```
:CALC1:UFEX:MSTD:F:S2P:FILE?
```

```
:CALCulate{1-16} :UFEXtraction:MSTD:G:PORT:CONFig <char>
:CALCulate{1-16} :UFEXtraction:MSTD:G:PORT:CONFig?
```

Applicability: MS46524

Description: Sets file port assignment to use when saving the second S4P file in Multi-standard G Network Extraction on the indicated channel.

First denotes using the assignment of the first file while Current denotes using the current global port assignment (difference is a swap within dominant pairs).

Returns the file port assignment in Multi-standard G Network Extraction on the indicated channel.

Cmd Parameters: <char> FIRST | CURRent

Query Parameters: NA

Query Output: <char> FIRST | CURR

Range: NA

Default: FIRST

Syntax Example: :CALC1:UFEX:MSTD:G:PORT:CONF CURR

```
:CALC1:UFEX:MSTD:G:PORT:CONF?
```

```
:CALCulate{1-16} :UFEXtraction:MSTD:G:COUpling[:STATE] <char>
:CALCulate{1-16} :UFEXtraction:MSTD:G:COUpling[:STATE]?
```

Applicability: MS46524

Description: Sets whether or not to neglect fixture match on the indicated channel.

Returns the selected state of neglect fixture match on the given channel.

Cmd Parameters: ON | OFF | 1 | 0

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default: 0

Syntax Example: :CALC1:UFEX:MSTD:G:COUP 1

```
:CALC1:UFEX:MSTD:G:COUP?
```

```
:CALCulate{1-16}:UFEXtraction:MSTD:G:S4P:FILE{1|2} <string>
:CALCulate{1-16}:UFEXtraction:MSTD:G:S4P:FILE{1|2}?
```

Applicability: MS46524

Description: Assigns the S4P file 1 (or 2) name which receives the Multi-standard G Extracted Network S4P data on the indicated channel.

Returns the S4P file 1 (or 2) name which receives the Multi-standard G Extracted Network S4P data on the indicated channel.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.s4p', where x:\directory must exist  
<string> 'c:\nenffiles\myfile1.s4p' | 'c:\nenffiles\myfile2.s4p'

Query Parameters: NA

Query Output: <string> c:\nenffiles\myfile1.s4p | c:\nenffiles\myfile2.s4p

Range: NA

Default: NA

Syntax Example: :CALC1:UFEX:MSTD:G:S4P:FILE 'c:\nenffiles\myfile1.s4p'  
:CALC1:UFEX:MSTD:G:S4P:FILE?

## 5-46 :CALCulate{1-16}:UFEXtraction:PLOCalized Subsystem – Network Extraction

The :CALCulate{1-16}:UFEXtraction:PLOCalized subsystem commands provide configuration control and execution for Phase Localized network extraction functions. Requires the Universal Fixture Extraction option (UFX, Option 24) to be installed and available. These commands are not applicable to MS46121.

### Calibration Option Subsystems

Related calibration option configuration and control subsystems are:

- Section 5-7 “:CALCulate{1-16}:CORRection Subsystem” on page 5-6
- Section 5-8 “:CALCulate{1-16}:EXTRaction Subsystem” on page 5-8
- Section 5-12 “:CALCulate{1-16}:FSIMulator:NETWork Subsystem” on page 5-44
- Section 5-44 “:CALCulate{1-16}:UFEXtraction:GENB Subsystem – Network Extraction” on page 5-237
- Section 5-45 “:CALCulate{1-16}:UFEXtraction:MSTD Subsystem – Network Extraction” on page 5-244
- Section 5-46 “:CALCulate{1-16}:UFEXtraction:PLOCalized Subsystem – Network Extraction” on page 5-257
- Section 5-47 “:CALCulate{1-16}:UFEXtraction:SEQential Subsystem – Network Extraction” on page 5-276
- Section 5-63 “:SENSe{1-16}:CORRection:COLLect:HYBRid Subsystem” on page 5-349

### :CALCulate{1-16}:UFEXtraction [:METHOD] :PLOCalized: {D|F|G}

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524  
The use of Methods F or G requires a 4-port VNA.

Prerequisites: At a minimum, the following commands must be sent before performing Phase-Localized network extraction. This assumes the appropriate cal has been completed and is on.

#### Set paths for necessary output SNP files:

##### Type D:

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:D:S2P:FILE{1-2} <string>
```

##### Type F

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:F:S2P:FILE{1-4} <string>
```

##### Type G

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:G:S4P:FILE{1-2} <string>
```

Description: Performs Phase Localized extraction of the indicated type (D or F or G) on the indicated channel.

No query.

Cmd Parameters: NA

Query Parameters: NA

    Query Output: NA

    Range: NA

    Default: NA

Syntax Example: :CALC1:UFEX:METH:PLOC:D

**:CALCulate{1-16}:UFEXtraction[:METHod]:PLOCalized:GCTalk**

Applicability: MS46524

Description: Performs Network Extraction using the Phase Localized G High CrossTalk Method on the given channel.

No query.

Cmd Parameters: NA

Query Parameters: NA

Query Output: NA

Range: NA

Default: NA

Syntax Example: :CALC1:UFEX:METH:PLOC:GCTalk

**:CALCulate{1-16}:UFEXtraction:PLOCalized:{D|F|G}:REFLect:CTRL:AUTo[:STATE] <char>****:CALCulate{1-16}:UFEXtraction:PLOCalized:{D|F|G}:REFLect:CTRL:AUTo[:STAtE]?**

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Methods F or G requires a 4-port VNA.

Description: Sets whether the reflect control type should be set to automatic or manual for phase-localized network extraction of the indicated type D (or F or G) on the indicated channel. This controls whether the total fixture length will be apportioned automatically between sides of the fixture or whether those values should be assigned manually. This is useful for asymmetric fixtures.

Returns whether the reflect control type is set to automatic or manual for phase-localized network extraction of the indicated type D (or F or G) on the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default: 1

Syntax Examples: :CALC1:UFEX:PLOC:D:REFL:CTRL:AUTo 1

:CALC1:UFEX:PLOC:D:REFL:CTRL:AUTo?

:CALC1:UFEX:PLOC:F:REFL:CTRL:AUTo 1

:CALC1:UFEX:PLOC:F:REFL:CTRL:AUTo?

:CALC1:UFEX:PLOC:G:REFL:CTRL:AUTo 1

:CALC1:UFEX:PLOC:G:REFL:CTRL:AUTo?

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:{D|F|G}:REFLect:MAGNitude  
<NRf>  
:CALCulate{1-16}:UFEXtraction:PLOCalized:{D|F|G}:REFLect:MAGNitude?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Methods F or G requires a 4-port VNA.

Description: Sets the magnitude of the reflect standard for the phase-localized network extraction of the indicated type D (or F or G) on the indicated channel. This is usually between -1 and +1.

Returns the magnitude of the reflect standard for the phase- localized network extraction of the indicated type D (or F or G) on the indicated channel.

Cmd Parameters: <NRf> The input parameter is a unitless number

Query Parameters: NA

Query Output: <NR3> The output parameter is a unitless number

Range: MPND

Default: 1

Syntax Examples: :CALC1:UFEX:PLOC:D:REFL:MAGN 1

```
:CALC1:UFEX:PLOC:D:REFL:MAGN?
```

```
:CALC1:UFEX:PLOC:F:REFL:MAGN -1
```

```
:CALC1:UFEX:PLOC:F:REFL:MAGN?
```

```
:CALC1:UFEX:PLOC:G:REFL:MAGN 1
```

```
:CALC1:UFEX:PLOC:G:REFL:MAGN?
```

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:{D|F|G|GCTalk}:REFlect:OFFSet  
    <NRf>  
:CALCulate{1-16}:UFEXtraction:PLOCalized:{D|F|G|GCTalk}:REFlect:OFFSet  
    ?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Methods F, G, or GCT requires a 4-port VNA.

Description: Sets the offset length of the reflect standard for the phase-localized network extraction of type D (or F, G, or GCT) on the indicated channel.

Returns the offset length of the reflect standard for the phase-localized network extraction of type D (or F, G, or GCT) on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in meters

Query Parameters: NA

Query Output: <NR3> The input parameter is in meters

Range: MPND

Default: 0.000000000E+000

Syntax Examples: :CALC1:UFEX:PLOC:D:REFL:OFFS 2.5e-3

```
:CALC1:UFEX:PLOC:D:REFL:OFFS?  
:CALC1:UFEX:PLOC:F:REFL:OFFS 2.5e-3  
:CALC1:UFEX:PLOC:F:REFL:OFFS?  
:CALC1:UFEX:PLOC:G:REFL:OFFS 2.5e-3  
:CALC1:UFEX:PLOC:G:REFL:OFFS?  
:CALC1:UFEX:PLOC:GCT:REFL:OFFS 1.00000000000E+000  
:CALC1:UFEX:PLOC:GCT:REFL:OFFS?
```

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:{D|F|G}:STD <char>
:CALCulate{1-16}:UFEXtraction:PLOCalized:{D|F|G}:STD?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Methods F or G requires a 4-port VNA.

Description: Sets the type of standard type (Thru or Reflect) to use for phase-localized network extraction of type D (or F or G) on the indicated channel.

Returns the standard type selected to use for phase-localized network extraction of type D (or F or G) on the indicated channel.

Cmd Parameters: <char> THRu | REFLect

Query Parameters: NA

Query Output: <char> THR | REFL

Range: NA

Default: THR

Syntax Examples: :CALC1:UFEX:PLOC:D:STD THR

```
:CALC1:UFEX:PLOC:D:STD?
```

```
:CALC1:UFEX:PLOC:F:STD REFL
```

```
:CALC1:UFEX:PLOC:F:STD?
```

```
:CALC1:UFEX:PLOC:G:STD THR
```

```
:CALC1:UFEX:PLOC:G:STD?
```

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:{D|F|G}:THRu:MAGNitude <NRf>
:CALCulate{1-16}:UFEXtraction:PLOCalized:{D|F|G}:THRu:MAGNitude?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Sets the magnitude of the thru standard for the phase-localized network extraction of type D (or F or G) on the indicated channel. Usually between 0 and 1. A positive real.

Returns the magnitude of the thru standard for the phase-localized network extraction of type D (or F or G) on the indicated channel.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: NA

Query Output: <NR1> The output parameter is a unitless number.

Range: MPND

Default: 1

Syntax Examples: :CALC1:UFEX:PLOC:D:THR:MAGN 1

```
:CALC1:UFEX:PLOC:D:THR:MAGN?
```

```
:CALC1:UFEX:PLOC:F:THR:MAGN 1
```

```
:CALC1:UFEX:PLOC:F:THR:MAGN?
```

```
:CALC1:UFEX:PLOC:G:THR:MAGN 1
```

```
:CALC1:UFEX:PLOC:G:THR:MAGN?
```

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:{D|F|G}:THRu:LENGth <NRf>
:CALCulate{1-16}:UFEXtraction:PLOCalized:{D|F|G}:THRu:LENGth?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Methods F or G requires a 4-port VNA.

Description: Sets the length of the thru standard for the phase-localized network extraction of type D (or F or G) on the indicated channel.

Returns the length of the thru standard for the phase-localized network extraction of type D (or F or G) on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in meters.

Query Parameters: NA

Query Output: <NR3> The output parameter is in meters.

Range: MPND

Default: 0.000000000E+000

Syntax Examples: :CALC1:UFEX:PLOC:D:THR:LENG 2.5e-3

```
:CALC1:UFEX:PLOC:D:THR:LENG?
```

```
:CALC1:UFEX:PLOC:F:THR:LENG 2.5e-3
```

```
:CALC1:UFEX:PLOC:F:THR:LENG?
```

```
:CALC1:UFEX:PLOC:G:THR:LENG 2.5e-3
```

```
:CALC1:UFEX:PLOC:G:THR:LENG?
```

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:{D|F|G|GCTalk}:Z0:NEW <NRf>
```

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:{D|F|G|GCTalk}:Z0:NEW?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Methods F, G, or GCT requires a 4-port VNA.

Description: Sets the new impedance value to be used for the phase-localized network extraction of type D (or F, G, or GCT) on the indicated channel. This value will be used if the :Z0:REFERENCE state is set to off.

Returns the defined impedance value to be used for phase-localized network extraction of type D (or F, G, or GCT) on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Ohms.

Query Parameters: NA

Query Output: <NR1> The output parameter is in Ohms.

Range: MPND (positive number only)

Default: 50

Syntax Examples: :CALC1:UFEX:PLOC:D:Z0:NEW 75

```
:CALC1:UFEX:PLOC:D:Z0:NEW?
```

```
:CALC1:UFEX:PLOC:F:Z0:NEW 25
```

```
:CALC1:UFEX:PLOC:F:Z0:NEW?
```

```
:CALC1:UFEX:PLOC:G:Z0:NEW 100
```

```
:CALC1:UFEX:PLOC:G:Z0:NEW?
```

```
:CALC1:UFEX:PLOC:GCT:Z0:NEW 6.00000000000E+001
```

```
:CALC1:UFEX:PLOC:GCT:Z0:NEW?
```

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:{D|F|G|GCTalk}:Z0:REFerence[:  
    STATE] <char>  
:CALCulate{1-16}:UFEXtraction:PLOCalized:{D|F|G|GCTalk}:Z0:REFerence[:  
    STATE]?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Methods F, G, or GCT requires a 4-port VNA.

Description: Sets whether to use the current reference impedance for phase-localized network extraction of type D (or F, G, or GCT) on the indicated channel.

Returns whether the current reference impedance should be used for phase-localized network extraction of type D (or F, G, or GCT) on the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default: 1

Syntax Examples: :CALC1:UFEX:PLOC:D:Z0:REF: 1  
 :CALC1:UFEX:PLOC:D:Z0:REF?  
 :CALC1:UFEX:PLOC:F:Z0:REF OFF  
 :CALC1:UFEX:PLOC:F:Z0:REF?  
 :CALC1:UFEX:PLOC:G:Z0:REF 0  
 :CALC1:UFEX:PLOC:G:Z0:REF?  
 :CALC1:UFEX:PLOC:GCT:Z0:REF 1  
 :CALC1:UFEX:PLOC:GCT:Z0:REF?

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:{D|F|G|GCTalk}:ZERo:MATCh[:ST
    ATe] <char>
:CALCulate{1-16}:UFEXtraction:PLOCalized:{D|F|G|GCTalk}:ZERo:MATCh[:ST
    ATe]?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Methods F, G, or GCT requires a 4-port VNA.

Description: Turns on/off the neglect fixture match terms for phase-localized Network Extraction of type D (or F, G, or GCT) for the indicated channel. This will be used if the REference:Z0 state is set to off.

Returns the on/off status of the neglect fixture the match terms for phase-localized Network Extraction of type D (or F, G, or GCT) Network Extraction for the indicated channel.

Cmd Parameters: ON | OFF | 1 | 0

Query Parameters: NA

Query Output: 1 | 0

Range: NA

Default: 0

Syntax Examples:

```
:CALC1:UFEX:PLOC:D:ZER:MATC ON
:CALC1:UFEX:PLOC:D:ZER:MATC?
:CALC1:UFEX:PLOC:F:ZER:MATC OFF
:CALC1:UFEX:PLOC:F:ZER:MATC?
:CALC1:UFEX:PLOC:G:ZER:MATC 1
:CALC1:UFEX:PLOC:G:ZER:MATC?
:CALC1:UFEX:PLOC:GCT:ZER:MATC 1
:CALC1:UFEX:PLOC:GCT:ZER:MATC?
```

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:D:DElay <NRf>
:CALCulate{1-16}:UFEXtraction:PLOCalized:D:DElay?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Sets the estimated total fixture delay for phase localized Type D on the indicated channel. Note that 0 entry triggers auto-estimation.

Returns the total estimated fixture delay for phase localized Type D on the indicated channel

Cmd Parameters: <NRf> The input parameter is in seconds.

Query Parameters: NA

Query Output: <NR3> The output parameter is in seconds.

Range: NA

Default: 0

Syntax Example:

```
:CALC1:UFEX:PLOC:D:DEL 2.5E-10
:CALC1:UFEX:PLOC:D:DEL?
```

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:D:PORT:PAIR <char>
:CALCulate{1-16}:UFEXtraction:PLOCalized:D:PORT:PAIR?
```

Applicability: MS46524

Only used when performing Phase-Localized D on a 4-port VNA.

Description: Assigns the port pair to use for phase-localized extraction Type D on the indicated channel.

Returns the port pair selected to use for phase-localized extraction D on the indicated channel.

Cmd Parameters: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34

Query Parameters: NA

Query Output: <char> PORT12 | PORT13 | PORT14 | PORT23 | PORT24 | PORT34

Range: NA

Default: PORT12

Syntax Example: :CALC1:UFEX:PLOC:D:PORT:PAIR PORT14

```
:CALC1:UFEX:PLOC:D:PORT:PAIR?
```

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:D:REFlect:DELay{1-2} <NRf>
:CALCulate{1-16}:UFEXtraction:PLOCalized:D:REFlect:DELay{1-2}?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Sets the delay to central fixture interface of the reflect standard for phase-localized network extraction Type D on the indicated channel.

Returns the delay to central fixture interface of the reflect standard for phase-localized network extraction Type D on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in seconds

Query Parameters: NA

Query Output: <NR3> The output parameter is in seconds

Range: NA

Default: 0

Syntax Example: :CALC1:UFEX:PLOC:D:REFL:DEL1 2.5E-10

```
:CALC1:UFEX:PLOC:D:REFL:DEL1?
```

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:D:REFLect:PORT <char>
:CALCulate{1-16}:UFEXtraction:PLOCalized:D:REFLect:PORT?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Sets the Port selection to use for phase-localized network extraction Type D on the indicated channel. It is not necessary to solve for both sides of the fixture when using a reflect standard. This command indicates which side (or both) to solve for.

Returns the Port selection to use for phase-localized network extraction Type D on the indicated channel.

Cmd Parameters: <char> FPORt | SPORt | BOTH

FPORt denotes first port and SPORt denotes the second port. The meaning is obvious for two port systems, but in four port systems, these refer to the first and second ports of the pair that the user selected. If BOTH is selected, both ports of the fixture will be solved for and two .s2p file names must be provided and the reflect standard must be connected to both sides of the fixture simultaneously when network extraction is performed.

Query Parameters: NA

Query Output: <char> FPOR | SPOR | BOTH

Range: NA

Default: FPOR

Syntax Example: :CALC1:UFEX:PLOC:D:REFL:PORT BOTH

```
:CALC1:UFEX:PLOC:D:REFL:PORT?
```

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:D:S2P:FILE{1-2} <string>
```

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:D:S2P:FILE{1-2}?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Sets the file path location to output the S2P for phase-localized network extraction of the indicated Type D on the indicated channel.

Returns the file path location to output the S2P for phase-localized network extraction of the indicated Type D on the indicated channel.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.s2p', where x:\directory must exist. See [Chapter 2, “Programming the ShockLine Series VNA”, “Notational Conventions” on page 2-5](#) for more information.

```
<string> 'c:\nenffiles\myfile1.s2p'
```

Query Parameters: NA

Query Output: <string> c:\nenffiles\myfile1.s2p

Range: NA

Default: NA

Syntax Examples: :CALC1:UFEX:PLOC:D:S2P:FIL2 'c:\nenffiles\myfile1.s2p'

```
:CALC1:UFEX:PLOC:D:S2P:FIL1?
```

```
:CALCulate{1-16} :UFEXtraction:PLOCalized:F:DElay{1-2} <NRf>
:CALCulate{1-16} :UFEXtraction:PLOCalized:F:DElay{1-2}?
```

Applicability: MS46524

Description: Sets the estimated total fixture delay for phase localized Type F on the indicated channel. Total Fixture Delay1 is for the 1st dominant port pair and Total Fixture Delay2 is for the second port pair.

Returns the total estimated fixture delay for phase localized Type F on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in seconds.

Query Parameters: NA

Query Output: <NR3> The output parameter is in seconds.

Range: NA

Default: 0

Syntax Example: :CALC1:UFEX:PLOC:F:DEL2 2.5E-10

```
:CALC1:UFEX:PLOC:F:DEL2?
```

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:F:S2P:FILE{1-4} <string>
:CALCulate{1-16}:UFEXtraction:PLOCalized:F:S2P:FILE{1-4}?
```

Applicability: MS46524

Description: Sets the file path location to output the S2P for phase-localized network extraction of Type F on the indicated channel.

Returns the file path location to output the S2P for phase-localized network extraction Type F on the indicated channel.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.s2p', where x:\directory must exist. See [Chapter 2, “Programming the ShockLine Series VNA”, “Notational Conventions” on page 2-5](#) for more information.  
<string> 'c:\nenffiles\myfile1.s2p'.

Query Parameters: NA

Query Output: <string> c:\nenffiles\myfile1.s2p

Range: NA

Default: NA

Syntax Examples: :CALC1:UFEX:PLOC:F:S2P:FILE 'c:\nenffiles\myfile1.s2p'  
:CALC1:UFEX:PLOC:F:S2P:FILE?

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:{F|G|GTalk}:DPATH <char>
:CALCulate{1-16}:UFEXtraction:PLOCalized:{F|G|GTalk}:DPATH?
```

Applicability: MS46524

Description: Sets dominant path for phase-localized Type F, Type G, or Type G High CrossTalk Network Extraction on the indicated channel. The dominant path and its partner (e.g., 1-2 implies 3-4 is also dominant) are the low insertion loss paths of the fixture and the ports between which any internal thru standard would be connected.

Returns dominant path for phase-localized Type F, Type G, or Type G High CrossTalk Network Extraction on the indicated channel.

Cmd Parameters: 12 | 13 | 14

Query Parameters: NA

Query Output: 12 | 13 | 14

Range: NA

Default: 12

Syntax Example: :CALC1:UFEX:PLOC:F:DPAT 13  
:CALC1:UFEX:PLOC:F:DPAT?  
:CALC1:UFEX:PLOC:G:DPAT 13  
:CALC1:UFEX:PLOC:G:DPAT?  
:CALC1:UFEX:PLOC:GCT:DPAT 13  
:CALC1:UFEX:PLOC:GCT:DPAT?

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:{F|G}:REFlect:DELay{1-4} <NRf>
:CALCulate{1-16}:UFEXtraction:PLOCalized:{F|G}:REFlect:DELay{1-4}?
```

Applicability: MS46524

Description: Sets the delay to central fixture interface of the reflect standard for phase-localized network extraction Type F|G on the indicated channel.

Returns the delay to central fixture interface of the reflect standard for phase-localized network extraction Type F|G on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in seconds

Query Parameters: NA

Query Output: <NR3> The output parameter is in seconds

Range: NA

Default: 0

Syntax Examples: :CALC1:UFEX:PLOC:F:REFL:DEL1 2.5E-10

```
:CALC1:UFEX:PLOC:F:REFL:DEL3?
```

```
:CALC1:UFEX:PLOC:G:REFL:DEL1 2.5E-10
```

```
:CALC1:UFEX:PLOC:G:REFL:DEL3?
```

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:{G|GCTalk}:DELay <NRf>
:CALCulate{1-16}:UFEXtraction:PLOCalized:{G|GCTalk}:DELay?
```

Applicability: MS46524

Description: Sets the estimated total fixture delay for phase localized Type G or Type G High CrossTalk on the indicated channel. Note that 0 entry triggers auto-estimation.

Returns the total estimated fixture delay for phase localized Type G or Type G High CrossTalk on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in seconds.

Query Parameters: NA

Query Output: <NR3> The output parameter is in seconds.

Range: NA

Default: 0

Syntax Example: :CALC1:UFEX:PLOC:G:DEL 2.5E-10

```
:CALC1:UFEX:PLOC:G:DEL?
```

```
:CALC1:UFEX:PLOC:GCT:DEL 1.0000000000E+000
```

```
:CALC1:UFEX:PLOC:GCT:DEL?
```

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:G:PORT:CONFig <char>
:CALCulate{1-16}:UFEXtraction:PLOCalized:G:PORT:CONFig?
```

Applicability: MS46524

Description: Sets file port assignment to use when saving the second S4P file in Phase-localized G network extraction on the indicated channel.

FIRST denotes using the assignment of the first file while CURRENT denotes using the current global port assignment (difference is a swap within dominant pairs).

Returns file port assignment in phase-localized G network extraction on the indicated channel.

Cmd Parameters: <char> FIRST | CURRENT

Query Parameters: NA

Query Output: <char> FIRST | CURRENT

Range: NA

Default: FIRST

Syntax Example: :CALC1:UFEX:PLOC:G:PORT:CONF CURRENT

```
:CALC1:UFEX:PLOC:G:PORT:CONF?
```

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:G:REFlect:PORT <char>
:CALCulate{1-16}:UFEXtraction:PLOCalized:G:REFlect:PORT?
```

Applicability: MS46524

Description: Sets the port selection to use for phase-localized network extraction Type G on the indicated channel. It is not necessary to solve for both sides of the fixture when using a reflect standard. This command indicates which side (or both) to solve for.

Returns the port selection to use for phase-localized network extraction Type G on the indicated channel.

Cmd Parameters: <char> FPORt | SPORt | BOTH

Query Parameters: NA

Query Output: <char> FPOR | SPOR | BOTH

Range: NA

Default: FPOR

Syntax Example: :CALC1:UFEX:PLOC:G:REFL:PORT BOTH

```
:CALC1:UFEX:PLOC:G:REFL:PORT?
```

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:G:S4P:FILE{1-2} <string>
:CALCulate{1-16}:UFEXtraction:PLOCalized:G:S4P:FILE{1-2}?
```

Applicability: MS46524

Description: Sets the file path location to output the S4P for phase-localized network extraction of the indicated Type G on the indicated channel.

Returns the file path location to output the S4P for phase-localized network extraction of the indicated Type G on the indicated channel.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.s4p', where  
x:\directory must exist  
<string> 'c:\nenffiles\myfile1.s4p'

Query Parameters: NA

Query Output: <string> c:\nenffiles\myfile1.s4p

Range: NA

Default: NA

Syntax Examples: :CALC1:UFEX:PLOC:G:S4P:FIL2 'c:\nenffiles\myfile1.s4p'
:CALC1:UFEX:PLOC:G:S4P:FIL1?

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:G:ZERo:COUpling[:STATE] <char>
:CALCulate{1-16}:UFEXtraction:PLOCalized:G:ZERo:COUpling[:STATE]?
```

Applicability: MS46524

Description: Turns on/off the neglect fixture near-end coupling terms for phase-localized type G for the indicated channel.

Returns the on/off status of the neglect fixture near-end coupling terms in phase-localized G Network Extraction on the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default: 0

Syntax Example: :CALC1:UFEX:PLOC:G:ZER:COUP 1
:CALC1:UFEX:PLOC:G:ZER:COUP?

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:GCTalk:MEASurement:PORT:SELec  
tion <string>  
:CALCulate{1-16}:UFEXtraction:PLOCalized:GCTalk:MEASurement:PORT:SELec  
tion?
```

Applicability: MS46524

Description: Sets the measurement port selection for phase localized type G High CrossTalk to be used on the indicated channel.

Returns the measurement port selection for phase localized type G High CrossTalk on the indicated channel.

Cmd Parameters: <string> measurement port selection

Query Parameters: NA

Query Output: <string> measurement port selection

Range: NA

Default: NA

Syntax Example: :CALC1:UFEX:PLOC:GCT:MEAS:PORT:SEL Port 1324

```
:CALC1:UFEX:PLOC:GCT:MEAS:PORT:SEL?
```

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:GCTalk:PREVIOUS:MEASurement[:  
STATE] <char>
```

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:GCTalk:PREVIOUS:MEASurement[:  
STATE]?
```

Applicability: MS46524

Description: Sets whether to use the previous network measurement for phase-localized network extraction type G High CrossTalk for the indicated channel. This will be used if the REference:Z0 state is set to off.

Returns whether the previous network measurement is used for phase-localized network extraction type G High CrossTalk on the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default: 0

Syntax Example: :CALC1:UFEX:PLOC:GCT:PREV:MEAS 1

```
:CALC1:UFEX:PLOC:GCT:PREV:MEAS?
```

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:GCTalk:REFlect:COEFFicient:TY  
PE <char>  
:CALCulate{1-16}:UFEXtraction:PLOCalized:GCTalk:REFlect:COEFFicient:TY  
PE?
```

Applicability: MS46524

Description: Sets the reflection coefficient type for phase-localized network extraction of the Type G High Crosstalk on the indicated channel, where:

- FIXed = a fixed value for each port
- S1PFile = a s1p file for each port

Returns the reflection coefficient type for phase-localized network extraction of the Type G High Crosstalk on the indicated channel.

Cmd Parameters: <char> FIXed | S1PFile

Query Parameters: NA

Query Output: <char> FIXed | S1PFile

Range: NA

Default: FIX

Syntax Example: :CALC1:UFEX:PLOC:GCT:REFL:COEF:TYPE FIX

```
:CALC1:UFEX:PLOC:GCT:REFL:COEF:TYPE?
```

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:GCTalk:REFlect:MAGNitude <NRf>  
:CALCulate{1-16}:UFEXtraction:PLOCalized:GCTalk:REFlect:MAGNitude?
```

Applicability: MS46524

Description: Sets the magnitude of the reflection standard for phase localized type G High CrossTalk to be used on the indicated channel. This is usually between -1 and +1.

Returns the magnitude of the reflection standard for phase localized type G High CrossTalk on the indicated channel.

Cmd Parameters: <NRf> magnitude of the reflection standard

Query Parameters: NA

Query Output: <NR3> magnitude of the reflection standard

Range: MPND

Default: 1

Syntax Example: :CALC1:UFEX:PLOC:GCT:REFL:MAGN 1.0000000000E+000

```
:CALC1:UFEX:PLOC:GCT:REFL:MAGN?47
```

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:GCTalk:REFlect:PORT{1-4}:FIXe
    d <NRf>
:CALCulate{1-16}:UFEXtraction:PLOCalized:GCTalk:REFlect:PORT{1-4}:FIXe
    d?
```

Applicability: MS46524

Description: Sets the fixed value of the reflection coefficients for the indicated port for phase-localized network extraction of the Type G High Crosstalk on the indicated channel.

These are the neighbor-pair terminating reflections with ports 1 and 2 defined to be on the outer plane (port 1 closest to the primary pair) and ports 3 and 4 defined to be on the inner plane (port 3 closest to the primary pair).

Returns the fixed value of the reflection coefficients for the indicated port for phase-localized network extraction of the Type G High Crosstalk on the indicated channel.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: NA

Query Output: <NR3> The output is an integer.

Range: MPND

Default: 0

Syntax Example: :CALC1:UFEX:PLOC:GCT:REFL:PORT1:FIX 1  
                  :CALC1:UFEX:PLOC:GCT:REFL:PORT1:FIX?

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:GCTalk:REFlect:PORT{1-4}:S1P:
    FILE <string>
:CALCulate{1-16}:UFEXtraction:PLOCalized:GCTalk:REFlect:PORT{1-4}:S1P:
    FILE?
```

Applicability: MS46524

Description: Sets the s1p file path location as the reflection coefficients for the indicated port for Phase Localized type G High CrossTalk for the indicated channel.

Returns the s1p file path location as the reflection coefficients for the indicated port for Phase Localized type G High CrossTalk on the indicated channel.

Cmd Parameters: <string> s1p file path location

Query Parameters: NA

Query Output: <string> s1p file path location

Range: NA

Default: NA

Syntax Example: :CALC1:UFEX:PLOC:GCT:REFL:PORT1:S1P:FILE  
                  "C:\AnritsuVNA\Data\File4.s1p"  
                  :CALC1:UFEX:PLOC:GCT:REFL:PORT1:S1P:FILE?

```
:CALCulate{1-16}:UFEXtraction:PLOCalized:GCTalk:S4P:FILE <string>
:CALCulate{1-16}:UFEXtraction:PLOCalized:GCTalk:S4P:FILE?
```

Applicability: MS46524

Description: Sets the file path location to output the S4P file for phase localized type G High CrossTalk to be used on the indicated channel.

Returns the file path location of the S4P file for phase localized type G High CrossTalk on the indicated channel.

Cmd Parameters: <string> file path location to output the S4P

Query Parameters: NA

Query Output: <string> file path location to output the S4P

Range: NA

Default: NA

Syntax Example: :CALC1:UFEX:PLOC:GCT:S4P:FILE "C:\AnritsuVNA\Data\File3.s4p"
:CALC1:UFEX:PLOC:GCT:S4P:FILE?

## 5-47 :CALCulate{1-16}:UFEXtraction:SEQUENTIAL Subsystem – Network Extraction

The :CALCulate{1-16}:UFEXtraction:SEQUENTIAL subsystem commands provide configuration control and execution for Sequential (Peeling) network extraction functions. Requires the Universal Fixture Extraction option (UFX, Option 24) to be installed and available. These commands are not applicable to MS46121.

### Calibration Option Subsystems

Related calibration option configuration and control subsystems are:

- Section 5-7 “:CALCulate{1-16}:CORRection Subsystem” on page 5-6
- Section 5-8 “:CALCulate{1-16}:EXTRaction Subsystem” on page 5-8
- Section 5-12 “:CALCulate{1-16}:FSIMulator:NETWork Subsystem” on page 5-44
- Section 5-44 “:CALCulate{1-16}:UFEXtraction:GENB Subsystem – Network Extraction” on page 5-237
- Section 5-45 “:CALCulate{1-16}:UFEXtraction:MSTD Subsystem – Network Extraction” on page 5-244
- Section 5-46 “:CALCulate{1-16}:UFEXtraction:PLOCalized Subsystem – Network Extraction” on page 5-257
- Section 5-47 “:CALCulate{1-16}:UFEXtraction:SEQUENTIAL Subsystem – Network Extraction” on page 5-276
- Section 5-63 “:SENSe{1-16}:CORRection:COLLect:HYBRid Subsystem” on page 5-349

### :CALCulate{1-16}:UFEXtraction[:METHOD] :SEQUENTIAL

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Prerequisites: At a minimum, the following commands must be sent before performing Sequential network extraction. This assumes that an active cal that contains the appropriate reflection parameter chosen is present and is on.

#### Set paths for necessary output SNP files:

- :CALCulate{1-16}:UFEXtraction:SEQUENTIAL:S2P:FILE <string>
- :CALCulate{1-16}:UFEXtraction:SEQUENTIAL:S4P:FILE <string>

Description: Performs Sequential Extraction on the indicated channel.

No query.

Cmd Parameters: NA

Query Parameters: NA

Query Output: NA

Range: NA

Default: NA

Syntax Examples: :CALC1:UFEX:METH:SEQ

```
:CALCulate{1-16}:UFEXtraction:SEQUENTIAL:DEFect:LOCation <NRf>
:CALCulate{1-16}:UFEXtraction:SEQUENTIAL:DEFect:LOCation?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Sets the estimated defect location delay for Sequential Extraction on the indicated channel. Note that 0 entry triggers auto-estimation.

Returns the estimated defect location for Sequential Extraction on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in seconds

Query Parameters: NA

Query Output: <NR3> The output parameter is in seconds

Range: NA

Default: 0

Syntax Examples: :CALC1:UFEX:SEQ:DEF:LOC 2.5E-10

```
:CALC1:UFEX:SEQ:DEF:LOC?
```

```
:CALCulate{1-16}:UFEXtraction:SEQUENTIAL:DEFect:MODeL <char>
:CALCulate{1-16}:UFEXtraction:SEQUENTIAL:DEFect:MODeL?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Sets the defect model (Shunt Y or Series Z) to be used in Sequential extraction on the indicated channel.

Returns the defect model for Sequential Extraction on the indicated channel.

**Note:** If a mix-mode reflection parameter (SDDxx) is selected, Crossbar model will be used instead.

Cmd Parameters: <char> SHUNt | SERies

Query Parameters: NA

Query Output: SHUN | SER

Range: NA

Default: SHUN

Syntax Examples: :CALC1:UFEX:SEQ:DEF:MOD SER

```
:CALC1:UFEX:SEQ:DEF:MOD?
```

```
:CALCulate{1-16}:UFEXtraction:SEQUENTIAL:REFlect:LOCation <NRf>
:CALCulate{1-16}:UFEXtraction:SEQUENTIAL:REFlect:LOCation?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Sets the reflect defect location for Sequential Extraction to be used on the indicated channel.

Returns the reflect location for Sequential Extraction on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in seconds

Query Parameters: NA

Query Output: <NR3> The output parameter is in seconds

Range: MPND

Default: 0.000000000E+000

Syntax Examples: :CALC1:UFEX:SEQ:REFL:LOC 2.5e-10

```
:CALC1:UFEX:SEQ:REFL:LOC?
```

```
:CALCulate{1-16}:UFEXtraction:SEQUENTIAL:REFlect:MAGNitude <NRf>
```

```
:CALCulate{1-16}:UFEXtraction:SEQUENTIAL:REFlect:MAGNitude?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Sets the magnitude of the reflection standard for Sequential Extraction to be used on the indicated channel. This is usually between -1 and +1.

Returns the magnitude of the reflection standard for Sequential Extraction on the indicated channel.

Cmd Parameters: <NRf> The input parameter is a unitless number

Query Parameters: NA

Query Output: <NR3> The output parameter is a unitless number

Range: MPND

Default: 1

Syntax Examples: :CALC1:UFEX:SEQ:REFL:MAGN 1

```
:CALC1:UFEX:SEQ:REFL:MAGN?
```

```
:CALCulate{1-16}:UFEXtraction:SEQUENTIAL:REFlect[:STATe] <char>
:CALCulate{1-16}:UFEXtraction:SEQUENTIAL:REFlect[:STATe]?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Sets whether to include or not to include a Reflect Standard for Sequential Extraction on the indicated channel.

Returns whether to include a Reflect Standard as part of Sequential Extraction on the indicated channel

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: 1 | 0

Range: NA

Default: 0

Syntax Examples: :CALC1:UFEX:SEQ:REFL 1

```
:CALC1:UFEX:SEQ:REFL?
```

```
:CALCulate{1-16}:UFEXtraction:SEQUENTIAL:RPARameter <char>
```

```
:CALCulate{1-16}:UFEXtraction:SEQUENTIAL:RPARameter?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Assigns the reflection parameter to be used in the defect isolation for Sequential Extraction on the indicated channel. Note that 0 entry triggers auto-estimation.

The selection available is dependent on the number of VNA ports. The use of mixed mode parameters (SDDxx) is only valid if a full term cal is present and the port pair of the selected mixed-mode parameter is included in the cal.

Returns the selected reflection parameter to be used for the defect isolation in Sequential Extraction on the indicated channel.

Cmd Parameters: **For 4-Port VNAs:**

<char> S11 | S22 | S33 | S44 | SDD12 | SDD13 | SDD14 | SDD23 | SDD24 | SDD34

**For 2-Port VNAs:**

<char> S11 | S22 | SDD12

Query Parameters: NA

Query Output: **For 4-Port Systems:**

<char> S11 | S22 | S33 | S44 | SDD12 | SDD13 | SDD14 | SDD23 | SDD24 | SDD34

**For 2-Port Systems:**

<char> S11 | S22 | SDD12

Range: NA

Default: S11

Syntax Examples: :CALC1:UFEX:SEQ:RPAR S22

```
:CALC1:UFEX:SEQ:RPAR?
```

```
:CALCulate{1-16}:UFEXtraction:SEQUENTIAL:S2P:FILE <string>
:CALCulate{1-16}:UFEXtraction:SEQUENTIAL:S2P:FILE?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Sets the file path location to output the S2P for Sequential Extraction on the indicated channel. This will be used if non-mixed mode is selected for reflect parameter (S11, S22, S33, S44).

**Note:** The :CALCulate{1-16}:UFEXtraction:SEQUENTIAL:RPARameter <char> command should precede this command.

Returns the file path location for Sequential Extraction on the indicated channel.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.s2p', where x:\directory must exist. See [Chapter 2, “Programming the ShockLine Series VNA”, “Notational Conventions” on page 2-5](#) for more information.

```
<string> 'c:\nenffiles\myfile1.s2p'
```

Query Parameters: NA

Query Output: <string> c:\nenffiles\myfile1.s2p

Range: NA

Default: NA

Syntax Examples: :CALC1:UFEX:SEQ:S2P:FIL 'c:\nenffiles\myfile1.s2p'
:CALC1:UFEX:SEQ:S2P:FIL?

```
:CALCulate{1-16}:UFEXtraction:SEQUENTIAL:S4P:FILE <string>
:CALCulate{1-16}:UFEXtraction:SEQUENTIAL:S4P:FILE?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Sets the file path location to output the S4P for Sequential Extraction on the indicated channel. This will be used if mixed mode is selected for reflect parameter (SDD12, SDD13, SDD14, SDD23, SDD24, SDD34 in the 4-port case, or SDD in the 2-port case).

**Note:** The :CALCulate{1-16}:UFEXtraction:SEQUENTIAL:RPARameter <char> command should precede this command.

Returns the file path location for Sequential Extraction on the indicated channel.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.s4p', where x:\directory must exist. See [Chapter 2, “Programming the ShockLine Series VNA”, “Notational Conventions” on page 2-5](#) for more information.

```
<string> 'c:\nenffiles\myfile2.s4p'
```

Query Parameters: NA

Query Output: <string> c:\nenffiles\myfile2.s4p

Range: NA

Default: NA

Syntax Examples: :CALC1:UFEX:SEQ:S4P:FIL 'c:\nenffiles\myfile1.s4p'
:CALC1:UFEX:SEQ:S4P:FIL?

## 5-48 :DISPlay Subsystem

The :DISplay subsystem commands are used to control the VNA graphic display information on a per-instrument and per-trace basis.

### Trace Subsystems

Related trace subsystems are:

- “:CALCulate{1-16};PARameter and :PARameter{1-16} Subsystem” on page 5-111
- “:CALCulate{1-16};PARameter{1-16};SElect Subsystem” on page 5-140
- “:CALCulate{1-16}[:SElected]:DATA Subsystem” on page 5-156
- “:CALCulate{1-16}[:SElected]:FORmat Subsystem” on page 5-158
- “:CALCulate{1-16}[:SElected]:MDATA Subsystem” on page 5-206
- “:CALCulate{1-16}[:SElected]:RLIMit Subsystem” on page 5-208
- “:CALCulate{1-16}[:SElected]:SMOoothing Subsystem” on page 5-222
- “:CALCulate{1-16}[:SElected]:TDATA Subsystem” on page 5-223
- “:DISPlay Subsystem” on page 5-281

### Marker Subsystems

Related marker configuration, control, and reporting commands are described multiple subsystems:

- “:CALCulate{1-16}:DISPlay:MARKer Subsystem” on page 5-24
- “:CALCulate{1-16}:MARKer Subsystem” on page 5-72
- “:CALCulate{1-16}:PARameter{1-16}:MARKer Subsystem” on page 5-125
- “:CALCulate{1-16}:PARameter{1-16}:MLOCation Subsystem” on page 5-131
- “:CALCulate{1-16}:PARameter{1-16}:MSTatistics Subsystem” on page 5-133
- “:CALCulate{1-16}:TRACE{1-16}:MARKer{1-12} Subsystem” on page 5-236
- “:CALCulate{1-16}[:SElected]:MARKer Subsystem” on page 5-177
- “:CALCulate{1-16}[:SElected]:MARKer{1-13} Subsystem” on page 5-198
- “:DISPlay Subsystem” on page 5-281

### Limit Line Subsystems

Related limit line subsystems are:

- “:CALCulate{1-16}[:SElected]:LIMit Subsystem” on page 5-160
- “:DISPlay Subsystem” on page 5-281

```
:DISPLAY:ANNotation:FREQuency <char>
:DISPLAY:ANNotation:FREQuency?
```

Description: Command turns displaying all frequency information (such as Marker and Marker Table) off.

Returns the display frequency ON/OFF status.

OFF: Displays “X” in place of frequency values. User will not be able to re-enable the display of the frequency except through Preset, recalling a setup, or restarting the application.

ON: Displays the frequency values.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default Value: 1

Syntax Example: :DISP:ANN:FREQ OFF  
:DISP:ANN:FREQ?

```
:DISPLAY:APPLICATION:VISible[:STATE] <char>
:DISPLAY:APPLICATION:VISible[:STATE]?
```

Description: Command sets the application's visibility state (on or off).

- ON: Application is visible and in maximized state. Application icon is visible in the taskbar.
- OFF: Application is invisible, but is still running in the background. Application icon is not present in the taskbar.

Returns the application's visibility state (on or off).

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default Value: 1

Syntax Example: :DISP:APPL:VIS 1  
:DISP:APPL:VIS?

```
:DISPLAY:COLor:INVert[:STATE] <char>
:DISPLAY:COLor:INVert[:STATE]?
```

Description: Sets screen object colors to their inverted/normal color state. Use the command below to reset the display to the factory default:

```
:DISPLAY:COLor:RESet
```

Returns the inverted/normal color state of screen objects.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :DISP:COL:INV ON

```
:DISP:COL:INV?
```

```
:DISPLAY:COLor:INVert:BACK <NRf>, <NRf>, <NRf>
```

```
:DISPLAY:COLor:INVert:BACK?
```

Prerequisites: The invert color should be on before using this command.

Description: Sets the inverted color of the background.

To reset the display to the factory default, use the command:

```
:DISPLAY:COLor:RESet
```

Returns the inverted RGB color of the background.

Cmd Parameters: <NRf> The input parameters are integers between 0 and 255 representing the Red, Green, and Blue color values.

Query Parameters: <NR1>, <NR1>, <NR1> The output parameters are integers between 0 and 255 representing the Red, Green, and Blue color values.

Range: 0 to 255

Default Value: 255,255,255

Syntax Example: :DISP:COL:INV:BACK 0, 0, 0

```
:DISP:COL:INV:BACK?
```

```
:DISPLAY:COLor:INVert:GRATICULE:MAIN <NRf>, <NRf>, <NRf>
:DISPLAY:COLor:INVert:GRATICULE:MAIN?
```

Description: Sets the inverted color of the main graticule.

To reset the display to the factory default, use the command:

```
:DISPLAY:COLor:RESET
```

Returns the inverted RGB color of the main graticule.

Cmd Parameters: <NRf> The input parameters are integers between 0 and 255 representing the Red, Green, and Blue color values.

Query Parameters: <NR1>, <NR1>, <NR1> The output parameters are integers between 0 and 255 representing the Red, Green, and Blue color values.

Range: 0 to 255

Default Value: 0,0,0

Syntax Example: :DISP:COL:INV:GRAT:MAIN 255, 0, 0

```
:DISP:COL:INV:GRAT:MAIN?
```

```
:DISPLAY:COLor:INVert:GRATICULE:SUB <NRf>, <NRf>, <NRf>
:DISPLAY:COLor:INVert:GRATICULE:SUB?
```

Description: Sets the inverted color of the subgraticule.

Use the command below to reset the display to the factory default:

```
:DISPLAY:COLor:RESET
```

Returns the inverted RGB color of the subgraticule.

Cmd Parameters: <NRf> The input parameters are integers between 0 and 255 representing the Red, Green, and Blue color values.

Query Parameters: <NR1>, <NR1>, <NR1> The output parameters are integers between 0 and 255 representing the Red, Green, and Blue color values.

Range: 0 to 255

Default Value: 100, 100, 100

Syntax Example: :DISP:COL:INV:GRAT:SUB 255, 255, 0

```
:DISP:COL:INV:GRAT:SUB?
```

```
:DISPLAY:COLor:INVert:LIMit <NRf>, <NRf>, <NRf>
:DISPLAY:COLor:INVert:LIMit?
```

Description: Sets the inverted color of the limit lines.

Use the command below to reset the display to the factory default:

```
:DISPLAY:COLor:RESet
```

Returns the inverted RGB color of the limit lines.

Cmd Parameters: <NRf> The input parameters are integers between 0 and 255 representing the Red, Green, and Blue color values.

Query Parameters: <NR1>, <NR1>, <NR1> The output parameters are integers between 0 and 255 representing the Red, Green, and Blue color values.

Range: 0 to 255

Default Value: 255,0,0

Syntax Example: :DISP:COL:INV:LIM 0, 255, 255

```
:DISP:COL:INV:LIM?
```

```
:DISPLAY:COLor:INVert:TRACe{1-16}:DATA <NRf>, <NRf>, <NRf>
```

```
:DISPLAY:COLor:INVert:TRACe{1-16}:DATA?
```

Description: Sets the inverted color of the indicated data trace.

Use the command below to reset the display to the factory default:

```
:DISPLAY:COLor:RESet
```

Returns inverted RGB color of the indicated data trace.

Cmd Parameters: <NRf> The input parameters are integers between 0 and 255 representing the Red, Green, and Blue color values.

Query Parameters: <NR1>, <NR1>, <NR1> The output parameters are integers between 0 and 255 representing the Red, Green, and Blue color values.

Range: 0 to 255

Default Value: 255, 255, 0

Syntax Example: :DISP:COL:INV:TRAC1:DATA 255, 0, 255

```
:DISP:COL:INV:TRAC1:DATA?
```

```
:DISPLAY:COLor:INVert:TRACe{1-16}:LIMit <NRf>, <NRf>, <NRf>
```

```
:DISPLAY:COLor:INVert:TRACe{1-16}:LIMit?
```

Description: Sets the inverted color of the limit line for the given trace.

Returns the inverted RGB color of the limit line for the given trace.

Cmd Parameters: <NRf> The input parameters are integers between 0 and 255 representing the Red, Green, and Blue color values.

Query Parameters: NA

Query Output: <NR1>, <NR1>, <NR1> The output values are integers between 0 and 255 representing the Red, Green, and Blue color values.

Min-Max Range: 0 to 255

Default Value: 255, 0, 0

Syntax Example: :DISP:COL:INV:TRAC1:LIM 255, 255, 0

```
:DISP:COL:INV:TRAC1:LIM?
```

```
:DISPLAY:COLor:INVert:TRACe{1-16}:MEMORY <NRf>, <NRf>, <NRf>
:DISPLAY:COLor:INVert:TRACe{1-16}:MEMORY?
```

Description: Sets the inverted color of the indicated memory trace. Memory trace must be on. Use the command below to reset the display to the factory default:

```
:DISPLAY:COLor:RESet
```

Returns inverted RGB color of the indicated memory trace.

Cmd Parameters: <NRf> The input parameters are integers between 0 and 255 representing the Red, Green, and Blue color values.

Query Parameters: <NR1>, <NR1>, <NR1> The output parameters are integers between 0 and 255 representing the Red, Green, and Blue color values.

Range: 0 to 255

Default Value: 175, 143, 47

Syntax Example: :DISP:COL:INV:TRAC1:MEM 0, 0, 255

```
:DISP:COL:INV:TRAC1:MEM?
```

```
:DISPLAY:COLor:NORMal:BACK <NRf>, <NRf>, <NRf>
```

```
:DISPLAY:COLor:NORMal:BACK?
```

Description: Sets the normal color of the background. Use the command below to reset the display to the factory default:

```
:DISPLAY:COLor:RESet
```

Returns the normal RGB color of the background.

Cmd Parameters: <NRf> The input parameters are integers between 0 and 255 representing the Red, Green, and Blue color values.

Query Parameters: <NR1>, <NR1>, <NR1> The output parameters are integers between 0 and 255 representing the Red, Green, and Blue color values.

Range: 0 to 255

Default Value: 0, 0, 0

Syntax Example: :DISP:COL:NORM:BACK 255, 0, 255

```
:DISP:COL:NORM:BACK?
```

```
:DISPLAY:COLor:NORMal:GRATICule:MAIN <NRf>, <NRf>, <NRf>
```

```
:DISPLAY:COLor:NORMal:GRATICule:MAIN?
```

Description: Sets the normal color of the main graticule. Use the command below to reset the display to the factory default:

```
:DISPLAY:COLor:RESet
```

Returns the normal RGB color of the main graticule.

Cmd Parameters: <NRf> The input parameters are integers between 0 and 255 representing the Red, Green, and Blue color values.

Query Parameters: <NR1>, <NR1>, <NR1> The output parameters are integers between 0 and 255 representing the Red, Green, and Blue color values.

Range: 0 to 255

Default Value: 255, 255, 255

Syntax Example: :DISP:COL:NORM:GRAT:MAIN 255, 255, 255

```
:DISP:COL:NORM:GRAT:MAIN?
```

```
:DISPLAY:COLor:NORMal:GRATICule:SUB <NRf>, <NRf>, <NRf>
:DISPLAY:COLor:NORMal:GRATICule:SUB?
```

Description: Sets the normal color of the sub graticule. Use the command below to reset the display to the factory default:

```
:DISPLAY:COLor:RESet
```

Returns the normal RGB color of the sub graticule.

Cmd Parameters: <NRf> The input parameters are integers between 0 and 255 representing the Red, Green, and Blue color values.

Query Parameters: <NR1>, <NR1>, <NR1> The output parameters are integers between 0 and 255 representing the Red, Green, and Blue color values.

Range: 0 to 255

Default Value: 100, 100, 100

Syntax Example: :DISP:COL:NORM:GRAT:SUB 45, 45, 45  
:DISP:COL:NORM:GRAT:SUB?

```
:DISPLAY:COLor:NORMal:LIMit <NRf>, <NRf>, <NRf>
:DISPLAY:COLor:NORMal:LIMit?
```

Description: Sets the normal color of the limit lines. Use the command below to reset the display to the factory default:

```
:DISPLAY:COLor:RESet
```

Returns the normal RGB color of the limit lines.

Cmd Parameters: <NRf> The input parameters are integers between 0 and 255 representing the Red, Green, and Blue color values.

Query Parameters: <NR1>, <NR1>, <NR1> The output parameters are integers between 0 and 255 representing the Red, Green, and Blue color values.

Range: 0 to 255

Default Value: 255, 0, 0

Syntax Example: :DISP:COL:NORM:LIM 100, 0, 0  
:DISP:COL:NORM:LIM?

```
:DISPLAY:COLor:NORMal:TRACe{1-16}:DATA <NRf>, <NRf>, <NRf>
:DISPLAY:COLor:NORMal:TRACe{1-16}:DATA?
```

Description: Sets the normal color of the indicated data trace. Use the command below to reset the display to the factory default:

```
:DISPLAY:COLor:RESet
```

Returns normal RGB color of the indicated data trace.

Cmd Parameters: <NRf> The input parameters are integers between 0 and 255 representing the Red, Green, and Blue color values.

Query Parameters: <NR1>, <NR1>, <NR1> The output parameters are integers between 0 and 255 representing the Red, Green, and Blue color values.

Range: 0 to 255

Default Value: 255, 255, 0

Syntax Example: :DISP:COL:NORM:TRAC1:DATA 100, 100, 0  
:DISP:COL:NORM:TRAC1:DATA?

**:DISPLAY:COLor:NORMAl:TRACe{1-16}:LIMIT <NRf>, <NRf>, <NRf>**  
**:DISPLAY:COLor:NORMAl:TRACe{1-16}:LIMIT?**

Description: Sets the normal color of the limit line for the given trace.

Returns the normal RGB color of the limit line for the given trace.

Cmd Parameters: <NRf> The input parameters are integers between 0 and 255 representing the Red, Green, and Blue color values.

Query Parameters: NA

Query Output: <NR1>, <NR1>, <NR1> The output values are integers between 0 and 255 representing the Red, Green, and Blue color values.

Min-Max Range: 0 to 255

Default Value: 255, 0, 0

Syntax Example: **:DISP:COL:NORM:TRAC1:LIM 255,255,0**

**:DISP:COL:NORM:TRAC1:LIM?**

**:DISPLAY:COLor:NORMAl:TRACe{1-16}:MEMORY <NRf>, <NRf>, <NRf>**  
**:DISPLAY:COLor:NORMAl:TRACe{1-16}:MEMORY?**

Description: Sets the normal color of the indicated memory trace. Use the command below to reset the display to the factory default:

**:DISPLAY:COLor:RESet**

Returns normal RGB color of the indicated memory trace.

Cmd Parameters: <NRf> The input parameters are integers between 0 and 255 representing the Red, Green, and Blue color values.

Query Parameters: <NR1>, <NR1>, <NR1> The output parameters are integers between 0 and 255 representing the Red, Green, and Blue color values.

Range: 0 to 255

Default Value: 175, 143, 47

Syntax Example: **:DISP:COL:NORM:TRAC1:MEM 100, 0, 100**

**:DISP:COL:NORM:TRAC1:MEM?**

**:DISPLAY:COLor:RESet**

Description: Resets all colors and inverted colors to their normal default values

No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: **:DISP:COL:RES**

**:DISPLAY:FONT:SIZE:CTITLE <NRf>**  
**:DISPLAY:FONT:SIZE:CTITLE?**

Description: Sets the font size of the channel title.

Returns the font size of the channel title.

Cmd Parameters: <NRf> Font size value in points

Query Output: <NR1> Set font size value in points

Range: 8 to 48

Default Value: 9

Syntax Example: :DISP:FONT:SIZ:CTIT 12  
:DISP:FONT:SIZ:CTIT?

**:DISPLAY:FONT:SIZE:LTRResult <NRf>**  
**:DISPLAY:FONT:SIZE:LTRResult?**

Description: Sets the font size of the limit test result.

Returns the font size of the limit test result.

Cmd Parameters: <NRf> Font size value in points

Query Output: <NR1> Set font size value in points

Range: 8 to 14

Default Value: 9

Syntax Example: :DISP:FONT:SIZ:LTR 14  
:DISP:FONT:SIZ:LTR?

**:DISPLAY:FONT:SIZE:MARKer:READout <NRf>**

**:DISPLAY:FONT:SIZE:MARKer:READout?**

Description: Sets the font size of the marker readout values.

Returns the font size of the marker readout values.

Cmd Parameters: <NRf> Font size value in points

Query Output: <NR1> Set font size value in points

Range: 8 to 48

Default Value: 9

Syntax Example: **:DISP:FONT:SIZ:MARK:READ 28**

**:DISP:FONT:SIZ:MARK:READ?**

**:DISPLAY:FONT:SIZE:MARKer:TABLE <NRf>**

**:DISPLAY:FONT:SIZE:MARKer:TABLE?**

Description: Sets the font size of the marker table

Returns the font size of the marker table.

Cmd Parameters: <NRf> Font size value in points

Query Output: <NR1> Set font size value in points

Range: 8 to 48

Default Value: 9

Syntax Example: **:DISP:FONT:SIZ:MARK:TABL 35**

**:DISP:FONT:SIZ:MARK:TABL?**

**:DISPLAY:FONT:SIZE:TSCale <NRf>**

**:DISPLAY:FONT:SIZE:TSCale?**

Description: Sets the font size of the trace scale values.

Returns the font size of the trace scale values.

Cmd Parameters: <NRf> Font size value in points

Query Output: <NR1> Set font size value in points

Range: 8 to 48

Default Value: 9

Syntax Example: **:DISP:FONT:SIZ:TSC 18**

**:DISP:FONT:SIZ:TSC?**

**:DISPLAY:FONT:SIZE:TTITLE <NRf>**  
**:DISPLAY:FONT:SIZE:TTITLE?**

Description: Sets the font size of the trace title.

Returns the font size of the trace title.

Cmd Parameters: <NRf> Font size value in points

Query Output: <NR1> Set font size value in points

Range: 8 to 14

Default Value: 10

Syntax Example: **:DISP:FONT:SIZ:TTIT 13**

**:DISP:FONT:SIZ:TTIT?**

**:DISPLAY:FSIGN[:STATE] <char>**

**:DISPLAY:FSIGN[:STATE]?**

Description: Turns on/off indicating a limit failure with a failure sign on the VNA screen.

Returns the on/off status of indicating a limit failure with a failure sign on the VNA screen.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: **:DISP:FSIG ON**

**:DISP:FSIG?**

**:DISPLAY:MARKer:FREQuency:RESolution <NRf>**

**:DISPLAY:MARKer:FREQuency:RESolution?**

Description: Sets the marker frequency display resolution.

Returns the marker frequency display resolution.

Cmd Parameters: <NRf> The input parameter is an integer.

Query Parameters: <NR1> The output parameter is an integer.

Range: 3 or 6 or 9

Default: 9

Syntax Example: **:DISP:MARK:FREQ:RES 3**

**:DISP:MARK:FREQ:RES?**

**:DISPLAY:RECONF:CLEar**

Applicability: MS46121

Description: Command is for the MS46121A/B multiple channels configuration. Reconfiguration resets the value of the active channel.

No query.

Range: NA

Default: NA

Syntax Example: :DISP:RECONF:CLE

**:DISPLAY:RECONF:COUNT?**

Applicability: MS46121

Description: Query only.

Returns the number of channels open for a given MS46121A/B configuration using the reconfiguration tool.

Range: NA

Default: NA

Syntax Example: :DISP:RECONF:COUN?

**:DISPLAY:RECONF:STart**

Applicability: MS46121A/B multiple channels configuration

Description: Reconfiguration start process.

No query.

Range: NA

Default: NA

Syntax Example: :DISP:RECONF:ST

**:DISPLAY:SIZE <char>****:DISPLAY:SIZE?**

Description: Sets the maximum/normal size of the graphic display.

Returns the maximum/normal size of the graphic display.

Cmd Parameters: <char> MAXimum | NORMal

Query Parameters: <char> MAX | NORM

Range: NA

Default: NA

Syntax Example: :DISP:SIZ NORM

:DISP:SIZ?

**:DISPLAY:WINDOW{1-16}:ACTivate**

Description: Sets the active channel to the indicated number. The number after WINDOW is the channel activated.

No query. To query about the active channel, use the command:

:DISPLAY:WINDOW:ACTivate?

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :DISP:WIND1:ACT

**:DISPLAY:WINDOW:ACTivate?**

Description: Query only.

Returns the Active Channel number. To specify an active channel, use the following command:

:DISPLAY:WINDOW{1-16}:ACTivate

Query Output: <NR1>

Syntax Example: :DISP:WIND:ACT?

**:DISPLAY:WINDOW{1-16}:CW:TIME:XAXis[:STATE] <char>****:DISPLAY:WINDOW{1-16}:CW:TIME:XAXis[:STATE]?**

Description: Sets the CW Time Axis state for the indicated channel.

Returns the CW Time Axis state for the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :DISP:WIND1:CW:TIME:XAX 1

:DISP:WIND1:CW:TIME:XAX?

**:DISPLAY:WINDOW{1-16}:SIZE <char>****:DISPLAY:WINDOW{1-16}:SIZE?**

Description: Sets the maximum/normal size of the graphic display for the indicated channel.

Returns the maximum/normal size of the graphic display for the indicated channel.

Cmd Parameters: <char> MAXimum | NORMal

Query Parameters: <char> MAX | NORM

Range: NA

Default Value: NORM

Syntax Example: :DISP:WIND1:SIZ MAX

:DISP:WIND1:SIZ?

```
:DISPLAY:WINDOW{1-16}:SPLIT <char>
:DISPLAY:WINDOW{1-16}:SPLIT?
```

Description: Sets the trace display layout in a Row-by-Column format where R represents rows and C represents columns. If more traces are set than the trace display contains, the higher numbered trace display windows are blank. If the trace display layout is less than the number of traces set, some traces will have overlapped displays. The following trace display window arrangements are available.

- R1C1 = One trace on one row and one column
- R1C2 = Two traces, two across
- R2C1 = Two traces, two down
- R1C3 = Three traces, three across
- R3C1 = Three traces, three down
- R2C2C1 = Three traces, two on top, one on bottom
- R2C1C2 = Three traces, one on top, two on bottom
- C2R2R1 = Three traces, two on left, one on right
- C2R1R2 = Three traces, one on left, two on right
- R1C4 = Four traces, four across
- R4C1 = Four traces, four down
- R2C2 = Four traces, two across, two down
- R2C3 = Six traces, three across, two down
- R3C2 = Six traces, three down, two across
- R2C4 = Eight traces, four across, two down
- R4C2 = Eight traces, two across, four down
- R3C3 = Nine traces, three across, three down
- R5C2 = 10 traces, two across, five down
- R2C5 = 10 traces, five across, two down
- R4C3 = 12 traces, four across, three down
- R3C4 = 12 traces, three across, four down
- R4C4 = 16 traces, four across, four down

Returns the trace display layout.

Cmd Parameters: <char> R1C1 | R1C2 | R2C1 | R1C3 | R3C1 | R2C2C1 | R2C1C2 | C2R2R1 | C2R1R2 | R1C4 | R4C1 | R2C2 | R2C3 | R3C2 | R2C4 | R4C2 | R3C3 | R5C2 | R2C5 | R4C3 | R3C4 | R4C4

Query Parameters: <char> R1C1 | R1C2 | R2C1 | R1C3 | R3C1 | R2C2C1 | R2C1C2 | C2R2R1 | C2R1R2 | R1C4 | R4C1 | R2C2 | R2C3 | R3C2 | R2C4 | R4C2 | R3C3 | R5C2 | R2C5 | R4C3 | R3C4 | R4C4

Range: NA

Default Value: R2C2

Syntax Example: :DISP:WIND1:SPL R1C1  
:DISP:WIND1:SPL?

```
:DISPLAY:WINDOW{1-16}:TITLE <string>
:DISPLAY:WINDOW{1-16}:TITLE?
```

Description: Sets the user title.

Returns the user title.

Cmd Parameters: <string>

Query Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :DISP:WIND1:TITL "Title String"
:DISP:WIND1:TITL?

```
:DISPLAY:WINDOW{1-16}:TITLE:STATE <char>
:DISPLAY:WINDOW{1-16}:TITLE:STATE?
```

Description: Enables/disables the display of the user title.

Returns the enable/disable status of the user title display.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :DISP:WIND1:TITL:STAT 1
:DISP:WIND1:TITL:STAT?

```
:DISPLAY:WINDOW{1-16}:TRACe{1-16}:SIZE <char>
:DISPLAY:WINDOW{1-16}:TRACe{1-16}:SIZE?
```

Description: Sets the maximum/normal size of the indicated trace.

Returns the maximum/normal size of the indicated trace.

Cmd Parameters: <char> MAXimum | NORMal

Query Parameters: <char> MAX | NORM

Range: NA

Default Value: NORMal

Syntax Example: :DISP:WIND1:TRAC1:SIZ MAX
:DISP:WIND1:TRAC1:SIZ?

```
:DISPLAY:WINDOW{1-16}:TRACe{1-16}:Y:AUTO
```

Description: Auto-scales the display of the indicated trace.

No query.

See [Table 2-7, “Trace Parameters and Coefficients” on page 2-19](#) for a complete listing of trace graph types, default settings, and available ranges.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :DISP:WIND1:TRAC1:Y:AUTO

```
:DISPLAY:WINDOW{1-16}:TRACE{1-16}:Y:PDIV <NRf>
:DISPLAY:WINDOW{1-16}:TRACE{1-16}:Y:PDIV?
```

Description: Sets the per-division scale value of the top display of the indicated channel and trace subject to the limitations described below.

Returns the per-division scale value of the top display of the indicated channel and trace.

See [Table 2-7, “Trace Parameters and Coefficients” on page 2-19](#) for a complete listing of trace graph types, default settings, and available ranges.

### **Working with Dual-Display Rectangular Trace Formats**

This command is primarily designed to be used to set the per-division (PDIV) scale value on one of the ShockLine family VNA dual-display trace formats. There are four dual-display trace formats:

- Linear Magnitude and Phase (LINPHase)
- Log Magnitude and Phase (LOGPHase)
- Real and Imaginary (REIMaginary)
- Impedance Real and Imaginary (ZCOMPlex)

### **Working with Single-Display Rectangular or Polar Trace Formats**

If the trace is a single-trace non-Smith Chart display, this command can also set the per-division scale value on single trace displays including rectangular and polar graph trace formats.

### **Working with Smith Chart Trace Displays**

If the trace type is a Smith Impedance Chart or a Smith Admittance Chart, the available scale values are limited to the values of +3dB, 0dB, -10dB, -20dB, -30dB. These are the only values permitted and other entered values result in an execution error.

Cmd Parameters: For Smith Charts: <NRf> 3 | 0 | -10 | -20 | -30

Where:

- 3 = +3dB compressed Smith Chart
- 0 = 0 dB standard Smith Chart
- -10 = -10 dB expanded Smith Chart
- -20 = -20 dB expanded Smith Chart
- -30 = -30 dB expanded Smith Chart

For all other displays: <NRf>

Query Parameters: <NR3> The output parameter units varies depending on the trace display type.

For Smith Charts, the output parameter is based on the outside radius of the outer circle.

For all other trace displays, the output is in one of the following:

- dB per division
- Hertz per division
- Meters per division
- Seconds per division.

Range: The range varies depending on display type:

- For Log Magnitude display types: 1E-3 to 1E3
- For all other non-Smith display types: 1E-5 to 1E9
- For all Smith Chart display types, discrete values only: 3 | 0 | -10 | -20 | -30.

Default Value: 1.000000E+001

Syntax Example: :DISP:WIND1:TRAC1:Y:PDIV 1E2

:DISP:WIND1:TRAC1:Y:PDIV?

```
:DISPLAY:WINDOW{1-16}:TRACe{1-16}:Y:PDIV2 <NRf>
:DISPLAY:WINDOW{1-16}:TRACe{1-16}:Y:PDIV2?
```

Description: Sets the per-division scale value of the bottom display of the indicated trace. It does not create an error if the command is invoked using a one-trace display, but, when a two-trace display is re-invoked, all changes made to the “hidden” trace are discarded and the trace reverts to its prior visible settings.

Returns the per-division scale value of the bottom display of the indicated trace.

See [Table 2-7, “Trace Parameters and Coefficients” on page 2-19](#) for a complete listing of trace graph types, default settings, and available ranges.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR3> The output parameter is a unitless number.

Range: 1E-5 to 1E9

Default Value: 1.000000E+001

Syntax Example: :DISP:WIND1:TRAC1:Y:PDIV2 5E0

:DISP:WIND1:TRAC1:Y:PDIV2?

```
:DISPLAY:WINDOW{1-16}:TRACe{1-16}:Y:PHASe:OFFSet <NRf>
:DISPLAY:WINDOW{1-16}:TRACe{1-16}:Y:PHASe:OFFSet?
```

Description: Enters the phase offset value for the display of the indicated trace.

Returns the phase offset value for the display of the indicated trace.

See [Table 2-7, “Trace Parameters and Coefficients” on page 2-19](#) for a complete listing of trace graph types, default settings, and available ranges.

Cmd Parameters: <NRf> The input parameter is in Degrees.

Query Parameters: <NR3> The output parameter is in Degrees.

Range: -3.6E2 to 3.6E2

Default Value: 0.000000E+000

Syntax Example: :DISP:WIND1:TRAC1:Y:PHAS:OFFS 4.5E1

:DISP:WIND1:TRAC1:Y:PHAS:OFFS?

```
:DISPLAY:WINDOW{1-16}:TRACe{1-16}:Y:PHASe:WRAPping[:STATE] <char>
:DISPLAY:WINDOW{1-16}:TRACe{1-16}:Y:PHASe:WRAPping[:STATE]?
```

Applicability: Only used with rectangular graph trace displays.

Description: Turns phase wrapping on/off on the indicated trace.

Returns the on/off status of Phase Wrapping on the indicated trace.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :DISP:WIND1:TRAC1:Y:PHAS:WRAP 1

:DISP:WIND1:TRAC1:Y:PHAS:WRAP?

```
:DISPLAY:WINDOW{1-16}:TRACe{1-16}:Y:PHOFF <NRf>
:DISPLAY:WINDOW{1-16}:TRACe{1-16}:Y:PHOFF?
```

Applicability: Only used with rectangular graph trace displays.

Description: Enters the phase offset value for the display on the indicated trace.

Returns the phase offset value for the display on the indicated trace.

Cmd Parameters: <NRf> The input parameter is in Degrees.

Query Parameters: <NR3> The output parameter is in Degrees.

Range: -3.6E2 to 3.6E2

Default Value: 0.00000000000E+000

Syntax Example: :DISP:WIND1:TRAC1:Y:PHOFF 2.10E1

```
:DISP:WIND1:TRAC1:Y:PHOFF?
```

```
:DISPLAY:WINDOW{1-16}:TRACe{1-16}:Y:RLEV <NRf>
```

```
:DISPLAY:WINDOW{1-16}:TRACe{1-16}:Y:RLEV?
```

Description: Enters the reference level of the top display of the indicated trace.

Returns the reference level of the top display of the indicated trace.

See [Table 2-7, “Trace Parameters and Coefficients” on page 2-19](#) for a complete listing of trace graph types, default settings, and available ranges.

Cmd Parameters: <NRf> The input parameter depends on the display type.

Query Parameters: <NR3> The output parameter depends on the display type.

Range: -9.999E2 to +9.999E2

Default Value: 0.00

Syntax Example: :DISP:WIND1:TRAC1:Y:RLEV -6.0E1

```
:DISP:WIND1:TRAC1:Y:RLEV?
```

```
:DISPLAY:WINDOW{1-16}:TRACe{1-16}:Y:RLEV2 <NRf>
```

```
:DISPLAY:WINDOW{1-16}:TRACe{1-16}:Y:RLEV2?
```

Applicability: For dual-trace displays only.

Description: Enters the reference level of the bottom display of the indicated trace.

Returns the reference level of the bottom display of the indicated trace.

See [Table 2-7, “Trace Parameters and Coefficients” on page 2-19](#) for a complete listing of trace graph types, default settings, and available ranges.

Cmd Parameters: <NRf> The input parameter depends on the display type.

Query Parameters: <NR3> The output parameter depends on the display type.

Range: -9.999E2 to +9.999E2

Default Value: 0.00

Syntax Example: :DISP:WIND1:TRAC1:Y:RLEV2 -6.0E1

```
:DISP:WIND1:TRAC1:Y:RLEV2?
```

```
:DISPLAY:WINDOW{1-16}:TRACe{1-16}:Y:RPOS <NRf>
:DISPLAY:WINDOW{1-16}:TRACe{1-16}:Y:RPOS?
```

Description: Sets the reference line position of the top display of the indicated trace. The command also works with single-display traces.

Returns the reference line position of the top display of the indicated trace.

See [Table 2-7, “Trace Parameters and Coefficients” on page 2-19](#) for a complete listing of trace graph types, default settings, and available ranges.

Cmd Parameters: <NRf> The input parameter depends on the display type.

Query Parameters: <NR3> The output parameter depends on the display type.

Range: Minimum Reference Line Position = 0

Maximum Reference Line Position = Maximum Number of Divisions set by:

```
:DISPLAY:Y:NDIVisions
```

Default Value: 5

Syntax Example: :DISP:WIND1:TRAC1:Y:RPOS 10

```
:DISP:WIND1:TRAC1:Y:RPOS?
```

```
:DISPLAY:WINDOW{1-16}:TRACe{1-16}:Y:RPOS2 <NRf>
```

```
:DISPLAY:WINDOW{1-16}:TRACe{1-16}:Y:RPOS2?
```

Applicability: For dual-trace displays only.

Description: Sets the reference line position of the bottom display of the indicated trace. If the trace display is a single-trace display, this command results in an execution error.

Returns the reference line position of the bottom display of the indicated trace.

See [Table 2-7, “Trace Parameters and Coefficients” on page 2-19](#) for a complete listing of trace graph types, default settings, and available ranges.

Cmd Parameters: <NRf> The input parameter depends on the display type.

Query Parameters: <NR3> The output parameter depends on the display type.

Range: Minimum Reference Line Position = 0

Maximum Reference Line Position = Maximum Number of Divisions set by:

```
:DISPLAY:Y:NDIVisions
```

Default Value: 5

Syntax Example: :DISP:WIND1:TRAC1:Y:RPOS2 10

```
:DISP:WIND1:TRAC1:Y:RPOS2?
```

```
:DISPLAY:WINDOW{1-16}:Y:AUTO
```

Description: Auto scales all traces of the indicated channel.

No query.

See [Table 2-7, “Trace Parameters and Coefficients” on page 2-19](#) for a complete listing of trace graph types, default settings, and available ranges.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :DISP:WIND1:Y:AUTO

```
:DISPLAY:WINDOW{1-16}:Y:NDIVisions <NRf>
:DISPLAY:WINDOW{1-16}:Y:NDIVisions?
```

Description: Sets the number of vertical divisions in the rectilinear displays.

The number of divisions must be an even number and will set an adjacent even number when other values are entered. See [Table 2-7, “Trace Parameters and Coefficients” on page 2-19](#) for a complete listing of trace graph types, default settings, and available ranges.

Returns the number of vertical divisions in the rectilinear displays.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR1> The output parameter is an integer.

Range: 4 to 30

Default Value: 10

Syntax Example: :DISP:WIND1:Y:NDIV 4  
:DISP:WIND1:Y:NDIV?

#### :DISPLAY:Y:AUTO

Description: Auto scales all traces on all channels.

No query.

See [Table 2-7, “Trace Parameters and Coefficients” on page 2-19](#) for a complete listing of trace graph types, default settings, and available ranges.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :DISP:Y:AUTO

#### :DISPLAY:Y:NDIVisions

Description: Programs the number of vertical divisions into all rectilinear displays.

No query.

See [Table 2-7, “Trace Parameters and Coefficients” on page 2-19](#) for a complete listing of trace graph types, default settings, and available ranges.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :DISP:Y:NDIV

## 5-49 :FORMat Subsystem

The :FORMat subsystem commands are used on a per-instrument basis to configure, control, and query the format for I/O data.

### I/O Configuration and File Operation Subsystems

Related subsystems for I/O configuration and file operation are:

- “:CALCulate{1-16}:FORMat Subsystem – SnP Data” on page 5-42
- “:CALCulate{1-16}[:SElected]:DATA Subsystem” on page 5-156
- “:CALCulate{1-16}[:SElected]:TDATA Subsystem” on page 5-223
- “:FORMat Subsystem” on page 5-301
- “:HCOPy Subsystem” on page 5-304
- “:MMEMory Subsystem” on page 5-310

**:FORMat:BORDer <char>**

**:FORMat:BORDer?**

Description: Sets the binary numeric I/O data byte order as either Most Significant Byte (MSB) or Least Significant Byte (LSB) byte order of binary numeric I/O data where:

- NORMal = The MSB is first
- SWAPped = The LSB is first.

Returns the Most Significant Byte (MSB)/Least Significant Byte (LSB) byte order of binary numeric I/O data.

Cmd Parameters: <char> NORMal | SWAPped

Query Parameters: <char> NORM | SWAP

Range: NA

Default Value: SWAP

Syntax Example: :FORM:BORD NORM

:FORM:BORD?

**:FORMAT:DATA <char>**

**:FORMAT:DATA?**

Description: Sets the format for numeric I/O data representation where:

- **ASCii** = An ASCII number of 20 or 21 characters long with floating point notation. For example, 12345E-4.
- **REAL** = 8 Bytes of binary floating point number representation limited to 64 bits which is the value of the MPND (Maximum Positive/Negative Double Precision Number or +/- 1.792 631 348 6E38)
- **REAL32** = 4 Bytes of floating point number representation which is the value of the MPNF (Maximum Positive/Negative Floating Point Number or +/- 3.402 819E38)

Returns the format of numeric I/O data representation.

Cmd Parameters: <char> ASCii | REAL | REAL32

Query Parameters: <char> ASC | REAL | REAL32

Range: NA

Default Value: ASC

Syntax Example: **:FORM:DATA REAL**

**:FORM:DATA?**

**:FORMAT:DATA:HEADING[:STATE] <char>**

**:FORMAT:DATA:HEADING[:STATE]?**

Description: Enables or disables including a heading with data files.

Returns the enable/disable status of including a heading with data files.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 1

Syntax Example: **:FORM:DATA:HEAD ON**

**:FORM:DATA:HEAD?**

**:FORMAT:SNP:FREQuency <char>**

**:FORMAT:SNP:FREQuency?**

Description: Sets the frequency unit displayed in an SNP data file.

Returns the frequency unit displayed in an SNP data file.

Cmd Parameters: <char> HZ | KHZ | MHZ | GHZ

Query Parameters: <char> HZ | KHZ | MHZ | GHZ

Range: NA

Default Value: GHZ

Syntax Example: **:FORM:SNP:FREQ HZ**

**:FORM:SNP:FREQ?**

**:FORMAT:SNP:PARameter <char>**

**:FORMAT:SNP:PARameter?**

Description: Sets the parameter format displayed in an SNP data file.

Returns the parameter format displayed in an SNP data file.

Cmd Parameters: <char> LINPH | LOGPH | REIM

Where:

- LINPH = Linear and Phase
- LOGPH = Log and Phase
- REIM = Real and Imaginary Numbers

Query Parameters: <char> LINPH | LOGPH | REIM

Range: NA

Default Value: REIM

Syntax Example: **:FORM:SNP:PAR LINPH**

**:FORM:SNP:PAR?**

## 5-50 :HCOPy Subsystem

The :HCOPy subsystem commands are used to create print output default settings for the instrument graphics display.

### I/O Configuration and File Operation Subsystems

Related subsystems for I/O configuration and file operation are:

- “:CALCulate{1-16}:FORMAT Subsystem – SnP Data” on page 5-42
- “:CALCulate{1-16}[:SELected]:DATA Subsystem” on page 5-156
- “:CALCulate{1-16}[:SELected]:TDATA Subsystem” on page 5-223
- “:FORMAT Subsystem” on page 5-301
- “:HCOPy Subsystem” on page 5-304
- “:MMEMemory Subsystem” on page 5-310

### :HCOPy [ :IMMEDIATE ]

Description: Prints the display image to the default printer. The default printer is set through Windows print setup.

No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :HCOP

### :HCOPy:DEVice:ID <string>

### :HCOPy:DEVice:ID?

Description: : Sets the Device Identity string for the header printout.

Returns the Device Identify string for the header printout.

Cmd Parameters: <string>

Query Parameters: NA

Query Output: <string>

Range: NA

Default: NA

Syntax Example: :HCOP:DEV:ID <char>

:HCOP:DEV:ID?

**:HCOPy:DEViCe:ID:STATE <char>**  
**:HCOPy:DEViCe:ID:STATE?**

Description: Sets the on/off state of the Device Identity string for the header printout.

Returns the on/off state of the Device Identify string for the header printout.

Cmd Parameters: <char> 1|0|ON|OFF

Query Parameters: NA

Query Output: : <char> 1|0

Range: NA

Default: NA

Syntax Example: **:HCOP:DEV:ID:STAT <char>**  
**:HCOP:DEV:ID:STAT?**

**:HCOPy:IMAGe <char>**  
**:HCOPy:IMAGe?**

Description: Sets the hardcopy print color for the display where:

- NORMAL = As the instrument screen is displayed.
- INVert = Inverts the colors. Typically used to print the traces as colors, and the instrument display background as white.
- BWHITE = Converts all colors to either black or white.

Returns the hardcopy print color for the display.

Cmd Parameters: <char> NORMAL | INVert | BWHITE

Query Parameters: NA

Default Value: INV

Syntax Example: **:HCOP:IMAG NORM**  
**:HCOPy:IMAGe?**

**:HCOPy:MODEl <string>**  
**:HCOPy:MODEl?**

Description: Sets the Model string for the header printout.

Returns the Model string for the header printout

Cmd Parameters: <string>

Query Output: <string>

Range: NA

Default: NA

Syntax Example: **:HCOP:MOD MS46322B**  
**:HCOP:MOD?**

**:HCOPy:MODel:STATE <char>**

**:HCOPy:MODel:STATE?**

Description: Enter the on/off state of the Model string for the header printout. Output the on/off state of the Model string for the header printout.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default: NA

Syntax Example: :HCOP:MOD:STAT ON

:HCOP:MOD:STAT?

**:HCOPy:OPERator:COMMent <string>**

**:HCOPy:OPERator:COMMent?**

Description: Enter the Operator Comment string for the header printout. Output the Operator Command string for the header printout.

Cmd Parameters: <string>

Query Parameters: NA

Query Output: <string>

Range: NA

Default: NA

Syntax Example: :HCOP:OPER:COMM First pass

:HCOP:OPER:COMM?

**:HCOPy:OPERator:COMMent:STATE <char>**

**:HCOPy:OPERator:COMMent:STATE?**

Description: Enters the on/off state of Enter the Operator Comment string for the header printout. Output the on/off state of the Operator Command string for the header printout.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default: NA

Syntax Example: :HCOP:OPER:COMM:STAT ON

:HCOP:OPER:COMM:STAT?

**:HCOPy:OPERator:NAMe <string>**  
**:HCOPy:OPERator:NAMe?**

Description: Enter the Operator Name string for the header printout. Output the Operator Name string for the header printout.

Cmd Parameters: <string>

Query Parameters: NA

Query Output: <string>

Range: NA

Default: NA

Syntax Example: :HCOP:OPER:NAM John Smith  
:HCOP:OPER:NAM?

**:HCOPy:OPERator:NAMe:STATE <char>**  
**:HCOPy:OPERator:NAMe:STATE?**

Description: Enter the on/off state of the Operator Name string for the header printout. Output the on/off state of the Operator Name string for the header printout.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default: NA

Syntax Example: :HCOP:OPER:NAM:STAT ON  
:HCOP:OPER:NAM:STAT?

**:HCOPy:PRINT:DATE:TIME:STATE <char>**  
**:HCOPy:PRINT:DATE:TIME:STATE?**

Description: Turns on/off printing the Date Time information. Output the on/off state of printing the Date Time information.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default: NA

Syntax Example: :HCOP:PRIN:DAT:TIM:STAT ON  
:HCOP:PRIN:DAT:TIM:STAT?

**:HCOPy:PRINT:HEADers:STATE <char>**

**:HCOPy:PRINT:HEADers:STATE?**

Description: Turns on/off printing the header information. Output the on/off state of printing the header information.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default: NA

Syntax Example: **:HCOP:PRIN:HEAD:STAT ON**

**:HCOP:PRIN:HEAD:STAT?**

**:HCOPy:PRINT:LOGO:STATE <char>**

**:HCOPy:PRINT:LOGO:STATE?**

Description: Turns on/off printing a Logo bitmap at the top of the print page. Output the on/off state of printing a Logo bitmap at the top of the print page.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default: NA

Syntax Example: **:HCOP:PRIN:LOGO:STAT ON**

**:HCOP:PRIN:LOGO:STAT?**

**:HCOPy:PRINT:LOGO:TYPE <char>**

**:HCOPy:PRINT:LOGO:TYPE?**

Description: Sets the logo type to print at the top of the print page. Query returns the logo type to print at the top of the print page.

Cmd Parameters: <char> ANRitsu | USER

Where:

- ANRitsu = standard Anritsu corporate logo
- USER = user-defined logo

Query Parameters: NA

Query Output: <char> ANR | USER

Range: NA

Default: NA

Syntax Example: **:HCOP:PRIN:LOGO:TYP ANR**

**:HCOP:PRIN:LOGO:TYP?**

**:HCOPy:PRINT:TYPE <char>**  
**:HCOPy:PRINT:TYPE?**

Description: Select the hardcopy print type for the HCOPy print command. Output the hardcopy print type selected for the HCOPy command.

Cmd Parameters: <char> BITMap | GRAPhical | TABular

Query Parameters: NA

Query Output: <char> BITM | GRAP | TAB

Range: NA

Default: NA

Syntax Example: **:HCOP:PRIN:TYPE BITM**

**:HCOP:PRIN:TYPE?**

## 5-51 :MMEMory Subsystem

The :MMEMory subsystem commands are used to input, load, and read out instrument data files. <string> formatted data is generally used to represent file directories and file names.

### I/O Configuration and File Operation Subsystems

Related subsystems for I/O configuration and file operation are:

- “:CALCulate{1-16}:FORMAT Subsystem – SnP Data” on page 5-42
- “:CALCulate{1-16}[:SELected]:DATA Subsystem” on page 5-156
- “:CALCulate{1-16}[:SELected]:TDATA Subsystem” on page 5-223
- “:FORMAT Subsystem” on page 5-301
- “:HCOPY Subsystem” on page 5-304
- “:MMEMory Subsystem” on page 5-310

#### :MMEMory:CATalog? {<string>}

Description: Query only.

Reads out the directory information of the storage device. If the directory does not exist, it results in an execution error.

Query Parameters: <string> Path specification in the form: 'x:\directory' where x: must exist. See definition of “<string>” on page 2-10.

Range: NA

Default Value: Default path is C:\ if not specified.

Syntax Example: :MMEM:CAT? 'C:\directory'

#### :MMEMory:COPY <string1>, <string2>

Description: Copies the contents of the first <string1> file to the second <string2> file. The directory and file for <string1> must exist. If the directory and file for <string2> do not exist, they will be created. If the directory and file for <string2> already exist, they will be overwritten.

No query.

Cmd Parameters: <string1> Filename and path in the form: 'x:\directory\filename.xxx' where x:\directory\filename.xxx must exist. See definition of “<string>” on page 2-10.

<string2> Filename and path in the form: 'x:\directory\filename.xxx'

Range: NA

Default Value: NA

Syntax Example: :MMEM:COPY 'C:\filename1.s2p', 'C:\filename2.s2p'

**:MMEMory:DELetE <string>**

Description: Deletes a disk, file, or directory. Use caution with this command as there is no recovery operation in case of a user mistake or error.

No query.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.xxx' or 'x:\directory' where x:\directory\filename.xxx or x:\directory must exist. See definition of "[<string>](#)" on page 2-10.

Range: NA

Default Value: NA

Syntax Example: :MMEM:DEL 'C:\directory\filename.s2p'

**:MMEMory:LOAD <string>**

Description: Loads data file whose type is specified by the filename extension into the instrument memory. The directory and file in <string> must exist.

No query.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.xxx' where x:\directory\filename.xxx must exist.

Range: NA

Default Value: NA

Syntax Example: :MMEM:LOAD 'C:\filename.s2p'

**:MMEMory:LOAD:CKIT <string>**

Description: Loads a calibration kit file or multiple files from the given file specification into the instrument memory. The :MMEMory:LOAD:CKIT command supports loading XML files with a .ccf extension or binary files.

No query.

Cmd Parameters: <string> Filename and path where the required format changes depending on the file type being loaded.

If a .ccf file type is used, the required form is: 'x:\directory\filename.ccf' where x:\directory\filename.ccf must exist.

If a .lst file type is used, the required form is: 'x:\directory\filename.lst', where x:\directory\filename.lst must exist, as well as the associated cal kit files.

**Note**

The filenames for the .lst calkit file or any of its constituent .s1p files should not be modified, otherwise the files will not be loaded correctly.

If a binary file type is used, only the path is required in the form: 'x:\directory' where x:\directory and cal kit files must exist. See definition of "[<string>](#)" on page 2-10.

Range: NA

Default Value: NA

Syntax Example: For calibration kit or other .ccf files:

```
:MMEM:LOAD:CKIT 'E:\calibrationfoldermykit.ccf'
```

For binary files:

```
:MMEM:LOAD:CKIT 'E:\calibrationbinaries'
```

**:MMEMory:LOAD:FLAT <string>**

Description: Loads the flat test port power flatness coefficients to the active channel in the form of an .fpc file.

No query.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.fpc' where x:\directory\filename.fpc must exist. See definition of "[“<string>” on page 2-10](#)" and [Table 2-8](#) for a list of supported file types.

Range: NA

Default Value: NA

Syntax Example: :MMEM:LOAD:FLAT 'C:\pwrflt.fpc'

**:MMEMory:LOAD:FSEGMENT <string>**

Description: Loads the frequency-based segmented sweep table from the given filespec.

No query.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.sgs' where x:\directory\filename.sgs must exist. See definition of "[“<string>” on page 2-10](#)".

Range: NA

Default Value: NA

Syntax Example: :MMEM:LOAD:FSEGM 'C:\directory\filename.sgs'

**:MMEMory:LOAD:ISEGMENT <string>**

Description: Loads the index-based segmented sweep table from the given file specification.

No query.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.sgs' where x:\directory\filename.sgs must exist. See definition of "[“<string>” on page 2-10](#)".

Range: NA

Default Value: NA

Syntax Example: :MMEM:LOAD:ISEGM 'C:\directory\filename.sgs'

**:MMEMory:LOAD:LIMit <string>**

Description: Loads a Limit Table from the file system.

No query.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.lmt' where x:\directory\filename.lmt must exist. See definition of "[“<string>” on page 2-10](#)".

Range: NA

Default Value: NA

Syntax Example: :MMEM:LOAD:LIM 'C:\limits3.lmt'

**:MMEMory:LOAD:LINearity <string>**

Description: Loads the power sweep linearity coefficients to the active channel.

No query.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.ppc' where x:\directory\filename.ppc must exist. See "[Notational Conventions](#)" on page 2-5 for more information.

Range: NA

Default Value: NA

Syntax Example: :MMEM:LOAD:LIN 'C:\linch3.ppc'

**:MMEMory:LOAD:MDATA <string>**

Description: Loads formatted or unformatted trace data from a file into the trace memory of the active trace.

No query.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.tdf' or 'x:\directory\filename.tdu' where x:\directory\filename.tdf or x:\directory\filename.tdu must exist. See definition of "[<string>](#)" on page 2-10.

Range: NA

Default Value: NA

Syntax Example: :MMEM:LOAD:MDATA 'C:\directory\filename.tdu'

**:MMEMory:MDIRectory <string>**

Description: Create a new disk directory.

No query.

Cmd Parameters: <string> Path specification in the form: 'x:\directory' where x: must exist. See definition of "[<string>](#)" on page 2-10.

Range: NA

Default Value: NA

Syntax Example: :MMEM:MDIR 'C:\directory'

**:MMEMory:RDIRectory <string>**

Description: Delete a disk directory.

No query.

Cmd Parameters: <string> Path specification in the form: 'x:\directory' where x:\directory\ must exist. See definition of "[<string>](#)" on page 2-10.

Range: NA

Default Value: NA

Syntax Example: :MMEM:RDIR 'C:\directory'

**:MMEMory:STORe <string>**

Description: Stores a data file of the type specified by the filename extension.

No query.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.xxx' where x:\directory\ must exist. See definition of "[<string>](#)" on page 2-10 and [Table 2-8 on page 2-22](#) for a list of supported file types.

Range: NA

Default Value: NA

Syntax Example: :MMEM:STOR 'C:\filename.acd'

**:MMEMory:STORe:FLAT{1-4} <string>**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Saves the flat test port power flatness coefficients for the indicated port and the active channel.

No query.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.fpc' where x:\directory\ must exist. See definition of "[<string>](#)" on page 2-10 and [Table 2-8 on page 2-22](#) for a list of supported file types.

Range: NA

Default Value: NA

Syntax Example: :MMEM:STOR:FLAT1 'C:\filename.fpc'

**:MMEMory:STORe:FSEGMe nt <string>**

Description: Stores the frequency-based segmented sweep table to the given filespec.

No query.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.sgs' where x:\directory\ must exist. See definition of "[<string>](#)" on page 2-10.

Range: NA

Default Value: NA

Syntax Example: :MMEM:STOR:FSEG M 'C:\directory\filename.sgs'

**:MMEMory:STORe:IMAGe <string>**

Description: Save the display image to a disk file (JPEG, PNG, or BMP format).

No query.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.bmp' where x:\directory\ must exist. See definition of "[<string>](#)" on page 2-10.

Range: NA

Default Value: NA

Syntax Example: :MMEM:STOR:IMAG 'C:\directory\filename.bmp'

**:MMEMory:STORe:ISEGMENT <string>**

Description: Stores the index-based segmented sweep table to the given filespec.

No query.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.sgs' where x:\directory\ must exist. See definition of "["<string>" on page 2-10](#).

Range: NA

Default Value: NA

Syntax Example: :MMEM:STOR:ISEG 'C:\directory\filename.sgs'

**:MMEMory:STORe:LIMit <string>**

Description: Stores the limit table to the hard disk.

No query.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.lmt' where x:\directory must exist. See definition of "["<string>" on page 2-10](#).

Range: NA

Default Value: NA

Syntax Example: :MMEM:STOR:LIM 'C:\directory\filename.lmt'

**:MMEMory:STORe:LINEarity{1-4} <string>**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Saves the power sweep linearity coefficients for the indicated port and the active channel.

No query.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.ppc' where x:\directory must exist. See definition of "["<string>" on page 2-10](#) and [Table 2-8 on page 2-22](#) for a list of supported file types.

Range: NA

Default Value: NA

Syntax Example: :MMEM:STOR:LIN1 'C:\directory\filename.ppc'

**:MMEMory:STORe:MDATA <string>**

Description: Save formatted or unformatted trace memory data to the hard disk from the active trace.

No query.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.tdf' or 'x:\directory\filename.tdu' where x:\directory must exist. See definition of "["<string>" on page 2-10](#).

Range: NA

Default Value: NA

Syntax Example: :MMEM:STOR:MDATA 'C:\directory\filename.tdu'

**:MMEMory:TRANSfer <string>, <block>**

**:MMEMory:TRANSfer? <string>**

Description: Writes data to a disk file.

Returns the disk file data. The file must exist.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.xxx' where x:\directory must exist.

<block> Binary data block must exist.

Query Parameters: <string> The filename and path in the form: 'x:\directory\filename.xxx' where x:\directory\filename.xxx must exist.

See definition of “<string>” on page 2-10 and “<block> or <arbitrary block>” on page 2-10.

Range: NA

Default Value: NA

Syntax Example: **:MMEM:TRAN 'C:\directory\filename.cal', <block>**

**:MMEM:TRAN? 'C:\directory\filename.cal'**

**:MMEMory:WRITE:CKIT <char1>, <char2>, <char3>, <string>**

Description: Writes calibration kit file from the current setup.

No query.

User supplies the parameters for Line Type, Cal Type, and specified connector type (Coaxial, Waveguide, or User Defined), and file name parameter string. No query.

#### Definitions for Required Parameters <char1> <char2> <char3>

<char1> is Line Type = COAXial | NONDispersive | WAVEguide.

Microstrip is not an available option.

<char2> is Cal Type = SOLX | SSLT | SSST | LRL/LRM

For SOLR and SOLT calibration methods, use the SOLX parameter.

<char3> is Connector Type (Coaxial, Waveguide, or User Defined).

CID1 = W1	CIDU4 = User-defined 4
CIDV = V	CIDU5 = User-defined 5
CIDK = K	CIDU6 = User-defined 6
CID2 = 2.4 mm	CIDU7 = User-defined 7
CID3 = GPC-3.5	CIDU8 = User-defined 8
CIDS = SMA	CIDU9 = User-defined 9
CIDN = N	CIDU10 = User-defined 10
CIDN75 = N-connector, 75 Ohm	CIDU11 = User-defined 11
CIDG = GPC-7	CIDU12 = User-defined 12
CID716 = 7/16 inch	CIDU13 = User-defined 13
CIDT = TNC	CIDU14 = User-defined 14
CIDWR10 = WR-10 Waveguide	CIDU15 = User-defined 15
CIDWR12 = WR-12 Waveguide	CIDU16 = User-defined 16
CIDWR15 = WR-15 Waveguide	CIDU17 = User-defined 17
CIDWR28 = WR-28 Waveguide	CIDU18 = User-defined 18
CIDWR42 = WR-42 Waveguide	CIDU19 = User-defined 19

CIDWR62 = WR-62 Waveguide	CIDU20 = User-defined 20
CIDWR75 = WR-75 Waveguide	CIDU21 = User-defined 21
CIDWR90 = WR-90 Waveguide	CIDU22 = User-defined 22
CIDWR112 = WR-112 Waveguide	CIDU23 = User-defined 23
CIDWR137 = WR-137 Waveguide	CIDU24 = User-defined 24
CIDWR159 = WR-159 Waveguide	CIDU25 = User-defined 25
CIDWR187 = WR-187 Waveguide	CIDU26 = User-defined 26
CIDWR229 = WR-229 Waveguide	CIDU27 = User-defined 27
CIDMK10 = 10 Mil Kit Microstrip	CIDU28 = User-defined 28
CIDMK15 = 15 Mil Kit Microstrip	CIDU29 = User-defined 39
CIDMK25 = 25 Mil Kit Microstrip	CIDU30 = User-defined 30
CIDU1 = User-defined 1 <sup>a</sup>	CIDU31 = User-defined 31
CIDU2 = User-defined 2	CIDU32 = User-defined 32
CIDU3 = User-defined 3	

a. Note that a user-defined CIDU1 connector can be assigned a user-defined name, but programmatically, it must be referred to as "CIDU1". This also applies to CIDU2 through CIDU32.

See "[Calibration Component Parameters](#)" on page 2-31 for a complete listing of calibration components, connectors, and their parameters.

#### Definitions for Required Parameter <string>

The <string> parameter provides the file name, and optionally the directory name, subject to the limitations described below.

User-provided variations in the <string> parameter command suffix and existing O/S conditions change the way the command will operate.

- Best practices recommend stating a file name and path in the form '`x:\directory\filename.xxx`' where '`x:\directory\`' already exists.
- If the directory and file name in <string> already exist, the command will overwrite them without comment.
- If the directory portion of the <string> is missing such as '`x:\filename.xxx`', the named file is placed in the current O/S-defined default directory.
- If the command uses a <string> in the path and file name form such as '`x:\directory\filename.xxx`' but '`x:\directory\`' does not exist, an error is generated and no file is written.
- See definition of "[<string>](#)" on page 2-10.

Cmd Parameters: <char1> COAXial | NONDispersive | WAVEguide

<char2> SOLX | SSLT | SSST | LRL/LRM

<char3> CID1 = W1 | CIDV | CIDK | CID2 | CID3 | CIDS | CIDN | CIDN75 | CIDG | CID716 | CIDT | CIDWR10 | CIDWR12 | CIDWR15 | CIDWR28 | CIDWR42 | CIDWR62 | CIDWR75 | CIDWR90 | CIDWR112 | CIDWR137 | CIDWR159 | CIDWR187 | CIDWR229 | CIDMK10 | CIDMK15 | CIDMK25 | CIDU1 | CIDU2 | CIDU3 | CIDU4 | CIDU5 | CIDU6 | CIDU7 | CIDU8 | CIDU9 | CIDU10 | CIDU11 | CIDU12 | CIDU13 | CIDU14 | CIDU15 | CIDU16 | CIDU17 | CIDU18 | CIDU19 | CIDU20 | CIDU21 | CIDU22 | CIDU23 | CIDU24 | CIDU25 | CIDU26 | CIDU27 | CIDU28 | CIDU29 | CIDU30 | CIDU31 | CIDU32

<string> Path and filename in the form 'x:\directory\filename.xxx' or 'x:\filename.xxx'. If the 'x:\directory\' form is used, the directory must exist. See <string> parameter definitions above and definition of "[<string>](#)" on page 2-10.

Query Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :MMEM:WRITE:CKIT COAX, SOLX, CID3, 'C:\directory\calfilename.ccf'

## 5-52 :SENSe{1-16}:ABORTcal Subsystem

The :SENSe{1-16} :ABORTcal subsystem command aborts the calibration.

### Calibration Subsystems with Actual Calibrations

Related calibration subsystems that perform actual calibrations are:

- “:SENSe{1-16}:ABORTcal Subsystem” on page 5-319
- “:SENSe{1-16}:CORRection:COLLect:LRL[:CALa] Subsystem” on page 5-363
- “:SENSe{1-16}:CORRection:COLLect:PORT Subsystem” on page 5-406
- “:SENSe{1-16}:CORRection:COLLect[:CALa]:PORT Subsystem” on page 5-450

### :SENSe{1-16} :ABORTcal

Description: Aborts the current hardware or RF calibration.

No query.

Cmd Parameters: NA

Query Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:ABOR

## 5-53 :SENSe{1-16}:AVERage Subsystem

The :SENSe{1-16}:AVERage subsystem commands configure and control the averaging function.

### Sweep Subsystems

Related sweep configuration and control subsystems are:

- [Section 5-53 :SENSe{1-16}:AVERage Subsystem on page 5-320](#)
- [Section 5-87 :SENSe{1-16}:FREQuency Subsystem on page 5-510](#)
- [Section 5-98 :SENSe{1-16}:SWEep Subsystem on page 5-567](#)

#### :SENSe{1-16}:AVERage:CLEar

Description: Clears and restarts the averaging sweep count.

No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:AVER:CLE

#### :SENSe{1-16}:AVERage:COUNT <NRf>

#### :SENSe{1-16}:AVERage:COUNT?

Description: Sets the averaging count. Returns the averaging count.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR1> The output parameter is an integer.

Range: 1 to 1024

Default Value: 1

Syntax Example: :SENS1:AVER:COUN 101

:SENS1:AVER:COUN?

#### :SENSe{1-16}:AVERage:SWEep?

Description: Query only.

Returns the averaging sweep count.

Query Parameters: <NR1> The output parameter is an integer.

Range: NA

Default Value: 0

Syntax Example: :SENS1:AVER:SWE?

**:SENSe{1-16}:AVERage:TYPE <char>**  
**:SENSe{1-16}:AVERage:TYPE?**

Description: Sets the averaging function type to point-by-point or sweep-by-sweep.

Returns the averaging function type of point-by-point or sweep-by-sweep.

Cmd Parameters: <char> POINtbypoint | SWEepbysweep

Query Parameters: <char> POIN | SWE

Range: NA

Default Value: POIN

Syntax Example: **:SENS1:AVER:TYPE POIN**  
**:SENS1:AVER:TYPE?**

**:SENSe{1-16}:AVERage[:STATE] <char>**  
**:SENSe{1-16}:AVERage[:STATE]?**

Description: Turns averaging on/off.

Returns the averaging function on/off status.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: **:SENS1:AVER ON**  
**:SENS1:AVER?**

## 5-54 :SENSe{1-16}:BANDwidth Subsystem

The :SENSe{1-16}:BANDwidth subsystem command sets the IF bandwidth. Note that this command is the same as the :SENSe{1-16}:BWIDth command:

### IF Configuration Subsystems

Related IF configuration and control subsystems are:

- [Section 5-54 :SENSe{1-16}:BANDwidth Subsystem on page 5-322](#)
- [Section 5-55 :SENSe{1-16}:BWIDth Subsystem on page 5-323](#)

**:SENSe{1-16}:BANDwidth [:RESolution] <NRf>**

**:SENSe{1-16}:BANDwidth [:RESolution]?**

Description: Sets the IF bandwidth.

Returns the IF bandwidth.

Related Cmd: [:SENSe{1-16}:BWIDth\[:RESolution\] <NRf>](#)

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: 1 to 5E5. The system will automatically select the closest IF bandwidth from the following options:

- 10, 30, 50, 70, 100, 300, 500, 700 Hz
- 1, 3, 5, 7, 10, 30, 50, 70, 100, 300, 500 kHz

Default Value: 1.00000000000E+003

Syntax Example: **:SENS1:BAND 4**

**:SENS1:BAND?**

## 5-55 :SENSe{1-16}:BWIDth Subsystem

The :SENSe{1-16}:BWIDth subsystem command sets the IF bandwidth. Note that this command is the same as the :SENSe{1-16}:BANDwidth command.

### IF Configuration Subsystems

Related IF configuration and control subsystems are:

- [Section 5-54 :SENSe{1-16}:BANDwidth Subsystem on page 5-322](#)
- [Section 5-55 :SENSe{1-16}:BWIDth Subsystem on page 5-323](#)

**:SENSe{1-16}:BWIDth[:RESolution] <NRf>**

**:SENSe{1-16}:BWIDth[:RESolution]?**

Description: Sets the IF bandwidth.

Returns the IF bandwidth.

Related Cmd: [:SENSe{1-16}:BANDwidth\[:RESolution\] <NRf>](#)

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: 1 to 5E5. The system will automatically select the closest IF bandwidth from the following options:

- 10, 30, 50, 70, 100, 300, 500, 700 Hz
- 1, 3, 5, 7, 10, 30, 50, 70, 100, 300, 500 kHz

Default Value: 1.00000000000E+003

Syntax Example: **:SENS1:BWID 3100**

**:SENS1:BWID?**

## 5-56 :SENSe{1-16}:CORRection:COEFFcient:CAL:FILE Subsystem

The :SENSe{1-16}:CORRection:COEFFcient:CAL:FILE subsystem to set the command calibration coefficients.

**:SENSe{1-16}:CORRection:COEFFcient:CAL:FILE <string>**

Description: Sets cal coefficients on the indicated channel based on the specified .chx file path. The calibration will be turned on at the end of the command execution.

Cmd Parameters: <string> Filename and path in the form 'x:\directory\filename.chx' where x:\directory\ must exist. See definition of "[“<string>”](#) on page 2-10.

Query Parameters: NA

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COEF:CAL:FILE 'c:\AnritsuVNA\SLCalFile.chx'

## 5-57 :SENSe{1-16}:CORRection:COEFFicient:PORT – Simulation Subsystem

The :SENSe{1-16}:CORRection:COEFFicient:PORT Simulation subsystem commands are used to simulate a instrument calibration on a 2-port VNA so that a set of user-defined calibration parameters can be input using the :SENSe{1-16}:CORRection:COEFFicient <char>,<block> command. Note that this subsystem does not perform an actual calibration.

### Calibration Simulation Subsystems

These subsystems are used to create a calibrated state in the instrument which is followed by adding the required error correction coefficients for the required calibration type. If this approach is used, each error correction coefficient is entered by separate commands. Simulated calibration subsystems are:

- [Section 5-57 :SENSe{1-16}:CORRection:COEFFicient:PORT – Simulation Subsystem on page 5-325](#)
- [Section 5-58 :SENSe{1-16}:CORRection:COEFFicient Subsystem on page 5-331](#)

### Calibration Type Abbreviations

The calibration abbreviations and their calibration types are:

- :1P2PF refers to a one-path two-port calibration forward direction
- :1P2PR refers to a one-path two-port calibration reverse direction
- :FULL1 refers to a full one-port calibration
- :FULL2 refers to a full two-port calibration
- :FULL3 refers to a full three-port calibration
- :FULL4 refers to a full four-port calibration
- :FULLB refers to a full one-port reflection calibration on both ports
- :RESP1 refers to a one-port response calibration
- :RESPB refers to a one-port response calibration both ports
- :TFRB refers to a transmission frequency response calibration both directions
- :TFRF refers to a transmission frequency response calibration forward direction
- :TFRR refers to a transmission frequency response calibration reverse direction

Each calibration simulation type command is described in greater detail in the individual command descriptions below.

### Related Query

These commands set the Calibration Type. To query which Calibration Type has been set, use the command:

[:SENSe{1-16}:CORRection:COLlect \[:METHOD\] :TYPE?](#)

```
:SENSe{1-16}:CORRection:COEFFicient <char>, <block>
:SENSe{1-16}:CORRection:COEFFicient? <char>
```

**Description:** Inputs the values for a single calibration correction coefficient, such as ED1. Identifies the coefficient name and then the coefficient data for a calibration. Separate commands are issued for each required correction coefficient.

**Returns** the values of a correction coefficient of the calibration.

- There are 12 correction coefficients available for a Full 2-Port Calibration which are: ED1, EP1S, ET11, ET21, EP2L, EX21, ED2, EP2S, ET22, ET12, EP1L, and EX12.
- There are 24 correction coefficients available for a Full 3-Port Calibration that include the 12 coefficients above and the 12 coefficients below: ED3, ET31, ET32, ET13, ET23, ET33, EP3L, EP3S, EX31, EX32, EX13, and EX23.
- There are 40 correction coefficients available for a Full 4-Port Calibration include the 24 coefficients above and the 16 coefficients below: ED4, ET14, ET41, ET24, ET42, ET34, ET43, ET44, EP4L, EP4S, EX14, EX24, EX34, EX41, EX42, and EX43.

**Cmd Parameters:** **2-Port VNAs:**

<char> ED1 | EP1S | ET11 | ET21 | EP2L | EX21 | ED2 | EP2S | ET22 | ET12 | EP1L | EX12

<block> The second input parameter is a block ASCII value. The actual ASCII block must be constructed and sent.

**4-Port VNAs:**

<char> ED1 | EP1S | ET11 | ET21 | EP2L | EX21 | ED2 | EP2S | ET22 | ET12 | EP1L | EX12 | ED3 | ET31 | ET32 | ET13 | ET23 | ET33 | EP3L | EP3S | EX31 | EX32 | EX13 | EX23 | ED4 | ET14 | ET41 | ET24 | ET42 | ET34 | ET43 | ET44 | EP4L | EP4S | EX14 | EX24 | EX34 | EX41 | EX42 | EX43

<block> The second input parameter is a block ASCII value. The actual ASCII block must be constructed and sent.

**Query Parameters:** **2-Port VNAs:**

<char> ED1 | EP1S | ET11 | ET21 | EP2L | EX21 | ED2 | EP2S | ET22 | ET12 | EP1L | EX12

**4-Port VNAs:**

<char> ED1 | EP1S | ET11 | ET21 | EP2L | EX21 | ED2 | EP2S | ET22 | ET12 | EP1L | EX12 | ED3 | ET31 | ET32 | ET13 | ET23 | ET33 | EP3L | EP3S | EX31 | EX32 | EX13 | EX23 | ED4 | ET14 | ET41 | ET24 | ET42 | ET34 | ET43 | ET44 | EP4L | EP4S | EX14 | EX24 | EX34 | EX41 | EX42 | EX43

**Range:** NA

**Default Value:** NA

**Syntax Example:** :SENS1:CORR:COEF ED1, <block>

:SENS1:CORR:COEF? ED1

```
:SENSe{1-16}:CORRection:COEFFicient:PORT{12 | 13 | 14 | 23 | 24 |  
34}:1P2PF
```

Applicability: The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

Description: Simulates a One-Path 2-port Calibration Forward Direction on the indicated port set.

No query. To query the state of this command use:

```
:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPe?
```

To perform an actual calibration, use:

```
:SENSe{1-16}:CORRection:COLLect[:CALa]:PORT{12 | 13 | 14 | 23 | 24  
| 34}:1P2PF
```

Parameters: NA

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COEF:PORT12:1P2PF

```
:SENSe{1-16}:CORRection:COEFFicient:PORT{12 | 13 | 14 | 23 | 24 |  
34}:1P2PR
```

Applicability: The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

Description: Simulates a One-Path 2-port Calibration Reverse Direction on the indicated port set.

No query. To query the state of this command use:

```
:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPe?
```

Cmd Parameters: NA

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COEF:PORT12:1P2PR

```
:SENSe{1-16}:CORRection:COEFFicient:PORT{12 | 13 | 14 | 23 | 24 |  
34}:FULL2
```

Applicability: The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

Description: Simulates a Full 2-port Calibration on the indicated port set.

No query. To query the state of this command use:

```
:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPe?
```

Cmd Parameters: NA

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COEF:PORT12:FULL2

```
:SENSe{1-16}:CORRection:COEFFicient:PORT{12 | 13 | 14 | 23 | 24 | 34}:FULLB
```

Applicability: The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

Description: Simulates a Full 1-port Reflection Calibration on both ports.

No query. To query the state of this command use:

```
:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPE?
```

Cmd Parameters: NA

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COEF:PORT12:FULLB

```
:SENSe{1-16}:CORRection:COEFFicient:PORT{12 | 13 | 14 | 23 | 24 | 34}:RESPB
```

Applicability: The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

Description: Simulates a 1-port Response Calibration on both ports on the indicated port set.

No query. To query the state of this command use:

```
:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPE?
```

Parameters: NA

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COEF:PORT12:RESPB

```
:SENSe{1-16}:CORRection:COEFFicient:PORT{12 | 13 | 14 | 23 | 24 | 34}:TFRB
```

Applicability: The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

Description: Simulates a Transmission Frequency Response Calibration in both directions on the indicated port set.

No query. To query the state of this command use:

```
:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPE?
```

Cmd Parameters: NA

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COEF:PORT12:TFRB

```
:SENSe{1-16}:CORRection:COEFFicient:PORT{12 | 13 | 14 | 23 | 24 | 34}:TFRF
```

Applicability: The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

Description: Simulates a Transmission Frequency Response Calibration in the forward direction on the indicated port set.

No query. To query the state of this command use:

```
:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPe?
```

Parameters: NA

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COEF:PORT12:TFRF

```
:SENSe{1-16}:CORRection:COEFFicient:PORT{12 | 13 | 14 | 23 | 24 | 34}:TFRR
```

Applicability: The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

Description: Simulates a Transmission Frequency Response Calibration in the reverse direction on the indicated port set.

No query. To query the state of this command use:

```
:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPe?
```

No query.

Cmd Parameters: NA

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COEF:PORT12:TFRR

```
:SENSe{1-16}:CORRection:COEFFicient:PORT{123 | 124 | 134 | 234}:FULL3
```

Applicability: MS46524

Description: Simulates a Full Three Port Calibration on the indicated port set.

No query. To query the state of this command use:

```
:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPe?
```

Cmd Parameters: NA

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COEF:PORT123:FULL3

**:SENSe{1-16}:CORRection:COEFFicient:PORT{1-4}:FULL1**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Simulates a Full 1-port Reflection Calibration on the indicated port.

No query. To query the state of this command use:

[:SENSe{1-16}:CORRection:COLLect\[:METHod\]:TYPE?](#)

Cmd Parameters: NA

Range: NA

Default: NA

Syntax Example: **:SENS1:CORR:COEF:PORT1:FULL1**

**:SENSe{1-16}:CORRection:COEFFicient:PORT{1-4}:RESP1**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Simulates a 1-port Response Calibration on the indicated port.

No query. To query the state of this command use:

[:SENSe{1-16}:CORRection:COLLect\[:METHod\]:TYPE?](#)

Cmd Parameters: NA

Range: NA

Default: NA

Syntax Example: **:SENS1:CORR:COEF:PORT1:RESP1**

**:SENSe{1-16}:CORRection:COEFFicient:FULL4**

Applicability: MS46524

Description: Simulates a Full 4-Port Calibration.

No query. To query the state of this command use:

[:SENSe{1-16}:CORRection:COLLect\[:METHod\]:TYPE?](#)

Cmd Parameters: NA

Range: NA

Default: NA

Syntax Example: **:SENS1:CORR:COEF:FULL4**

## 5-58 :SENSe{1-16}:CORRection:COEFFcient Subsystem

The :SENSe{1-16}:CORRection:COEFFcient subsystem commands are used to simulate a instrument calibration on 2-port VNA instruments so that a set of user-defined calibration parameters can be input using the :SENSe{1-16}:CORRection:COEFFcient <char>,<block> command. Note that this subsystem does not perform an actual calibration.

### Calibration Simulation Subsystems

These subsystems are used to create a calibrated state in the instrument which is followed by adding the required error correction coefficients for the required calibration type. If this approach is used, each error correction coefficient is entered by separate commands. Simulated calibration subsystems are:

- “:SENSe{1-16}:CORRection:COEFFcient:PORT – Simulation Subsystem” on page 5-325
- “:SENSe{1-16}:CORRection:COEFFcient Subsystem” on page 5-331

### Calibration Type Abbreviations

The calibration abbreviations and their calibration types are:

- :1P2PF refers to a one-path two-port calibration forward direction
- :1P2PR refers to a one path two port calibration reverse direction
- :FULL1 refers to a full one port calibration
- :FULL2 refers to a full two port calibration
- :FULLB refers to a full one port reflection calibration on both ports
- :RESP1 refers to a one port response calibration
- :RESPB refers to a one port response calibration both ports
- :TFRB refers to a transmission frequency response calibration both directions
- :TFRF refers to a transmission frequency response calibration forward direction
- :TFRR refers to a transmission frequency response calibration reverse direction

Each calibration simulation type command is described in greater detail in the individual command descriptions below.

### Related Query

These commands set the Calibration Type. To query which Calibration Type has been set, use the command:

:SENSe{1-16}:CORRection:COLLect[:METHOD]:TYPE?

**:SENSe{1-16}:CORRection:COEFFcient[:METHOD]:1P2PF**

Description: Simulates a one-path two-port calibration forward direction.

No query. To query the state of this command use:

:SENSe{1-16}:CORRection:COLLect[:METHOD]:TYPE?

To set this calibration mode and then perform an actual calibration, use:

:SENSe{1-16}:CORRection:COLLect[:METHOD]:1P2PF

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COEF:1P2PF

**:SENSe{1-16}:CORRection:COEFFicient[:METHod]:1P2PR**

Description: Simulates a one-path 2-port Calibration Reverse Direction

No query. To query the state of this command, use:

**:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPe?**

To set this calibration mode and then perform an actual calibration, use:

**:SENSe{1-16}:CORRection:COLLect[:METHod]:1P2PR**

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: **:SENS1:CORR:COEF:1P2PR**

**:SENSe{1-16}:CORRection:COEFFicient[:METHod]:FULL1**

Prerequisites: Before sending this command, the simulation port must be specified using:

**:SENSe{1-16}:CORRection:COLLect[:METHod]:PORT <char>**

Description: Simulates a full 1-port Reflection Calibration.

No query. To query the state of this command, use:

**:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPe?**

To set this calibration mode and then perform an actual calibration, use:

**:SENSe{1-16}:CORRection:COLLect[:METHod]:FULL1**

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: **:SENS1:CORR:COEF:FULL1**

**:SENSe{1-16}:CORRection:COEFFicient[:METHod]:FULL2**

Description: Simulates a full 2-port Calibration.

No query. To query the state of this command, use:

**:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPe?**

To set this calibration mode and then perform an actual calibration, use:

**:SENSe{1-16}:CORRection:COLLect[:METHod]:FULL2**

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: **:SENS1:CORR:COEF:FULL2**

**:SENSe{1-16}:CORRection:COEFFcient[:METHod]:FULLB**

Description: Simulates a full 1-port Reflection Calibration on both ports.

No query. To query the state of this command, use:

**:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPe?**

To set this calibration mode and then perform an actual calibration, use:

**:SENSe{1-16}:CORRection:COLLect[:METHod]:FULLB**

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: **:SENS1:CORR:COEF:FULLB**

**:SENSe{1-16}:CORRection:COEFFcient[:METHod]:RESP1**

Prerequisites: Before sending this command, the simulation port must be specified using:

**:SENSe{1-16}:CORRection:COLLect[:METHod]:PORT?**

Description: Simulates a 1-port Response Calibration.

No query. To query the state of this command, use:

**:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPe?**

To set this calibration mode and then perform an actual calibration, use:

**:SENSe{1-16}:CORRection:COLLect[:METHod]:RESP1**

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: **:SENS1:CORR:COEF:RESP1**

**:SENSe{1-16}:CORRection:COEFFcient[:METHod]:RESPB**

Description: Simulates a 1-port Response Calibration on both ports.

No query. To query the state of this command, use:

**:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPe?**

To set this calibration mode and then perform an actual calibration, use:

**:SENSe{1-16}:CORRection:COLLect[:METHod]:RESPB**

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: **:SENS1:CORR:COEF:RESPB**

**:SENSe{1-16}:CORRection:COEFFicient[:METHod]:TFRB**

Description: Simulates a Transmission Frequency Response Calibration in both directions.

No query. To query the state of this command, use:

**:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPE?**

To set this calibration mode and then perform an actual calibration, use:

**:SENSe{1-16}:CORRection:COLLect[:METHod]:TFRB**

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: **:SENS1:CORR:COEF:TFRB**

**:SENSe{1-16}:CORRection:COEFFicient[:METHod]:TFRF**

Description: Simulates a Transmission Frequency Response Calibration in the forward direction.

No query. To query the state of this command, use:

**:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPE?**

To set this calibration mode and then perform an actual calibration, use:

**:SENSe{1-16}:CORRection:COLLect[:METHod]:TFRF**

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: **:SENS1:CORR:COEF:TFRF**

**:SENSe{1-16}:CORRection:COEFFicient[:METHod]:TFRR**

Description: Simulates a Transmission Frequency Response Calibration in the reverse direction. The available port pair is 12.

No query. To query the state of this command, use:

**:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPE?**

To set this calibration mode and then perform an actual calibration, use:

**:SENSe{1-16}:CORRection:COLLect[:METHod]:TFRR**

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: **:SENS1:CORR:COEF:TFRR**

## 5-59 :SENSe:CORRection:COLLect:AUTobot Subsystem

The :SENSe:CORRection:COLLect:AUTobot subsystem command goes through the autosense process of a SmartCal.

### :SENSe:CORRection:COLLect:AUTobot:PORT:ORIENTATION?

Applicability: MS46122, MS46322, MS 46522, MS46524, ME7868A, ME7869A

Description: Query only.

Returns the port orientation of the current SmartCal module. Goes through the autosense process of a SmartCal. This SCPI command will not query immediately, as the autosense process needs to finish before the ports can be determined. This should take between 30-60 seconds, depending on if a 2-port or a 4-port module is used and the sweep speed of the instrument.

Cmd Parameters: NA

Query Results: 1{A | B | C | D} | 2{A | B | C | D} | 3{A | B | C | D} | 4{A | B | C | D}

Range: NA

Default: No connections

Syntax Example: :SENS:CORR:COLL:AUT:PORT:ORI?

## 5-60 :SENSe{1-16}:CORRection:COLLect:CALB – 4-Port VNAs Subsystem

The :SENSe{1-16}:CORRection:COLLect:CALB subsystem commands set the calibration type for a second calibration (termed :CALB), and can only be used on a 4-port VNA.

### Calibration Subsystems with Actual Calibration

Related calibration subsystems that perform actual calibrations are:

- “:SENSe{1-16}:ABORTcal Subsystem” on page 5-319
- “:SENSe{1-16}:CORRection:COLLect:CALB – 4-Port VNAs Subsystem” on page 5-336
- “:SENSe{1-16}:CORRection:COLLect Subsystem” on page 5-452
- “:SENSe{1-16}:CORRection:COLLect:LRL[:CALa] Subsystem” on page 5-363
- “:SENSe{1-16}:CORRection:COLLect:PORT Subsystem” on page 5-406
- “:SENSe{1-16}:CORRection:COLLect[:CALa]:PORT Subsystem” on page 5-450

### Calibration Type Abbreviations

The calibration abbreviations and their calibration types are:

- :1P2PF refers to a one-path two-port calibration forward direction
- :1P2PR refers to a one path two-port calibration reverse direction
- :FULL2 refers to a full two-port calibration

### Related Query

Most calibration commands of this type do not have a directly related query. To query the state of these commands, use:

**:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPE?**

#### **:SENSe{1-16}:CORRection:COLLect:CALB:1P2PF**

Applicability: MS46524

Description: Sets the second 2-port calibration to One-Path 2-Port Forward on the alternate port pair.

No query.

Cmd Parameters: NA

Range: NA

Default: NA

Syntax Example: **:SENS1:CORR:COLL:CALB:1P2PF**

#### **:SENSe{1-16}:CORRection:COLLect:CALB:1P2PR**

Applicability: MS46524

Description: Sets the second 2-Port calibration to One-Path 2-Port Reverse on the alternate port pair.

No query.

Cmd Parameters: NA

Range: NA

Default: NA

Syntax Example: **:SENS1:CORR:COLL:CALB:1P2PR**

**:SENSe{1-16}:CORRection:COLLect:CALB:FULL2**

Applicability: MS46524

Description: Sets the second 2-port calibration to Full 2-Port on the alternate port pair.

No query.

Cmd Parameters: NA

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COLL:CALB:FULL2

## 5-61 :SENSe{1-16}:CORRection:COLLect:ECAL Subsystems

The :SENSe{1-16}:CORRection:COLLect:ECAL subsystem commands set the automatic calibration parameters.

**Note** References to "AUTO" in the ECAL Subsystem section refers to both the SmartCal and AutoCal modules, unless otherwise specified.

**:SENSe{1-16}:CORRection:COLLect:ECAL:AUTOmatic:ORIentation[:STATE]**  
    <char>

**:SENSe{1-16}:CORRection:COLLect:ECAL:AUTOmatic:ORIentation[:STATE]?**

Description: Turns automatic AutoCal module orientation detection on/off for the given channel.

Returns the on/off status of the AutoCal module orientation detection on the given channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default: NA

Syntax Example: SENS1:CORR:COLL:ECAL:AUTO:ORI ON

SENS1:CORR:COLL:ECAL:AUTO:ORI?

**:SENSe{1-16}:CORRection:COLLect:ECAL:BEGin?**

**Applicability:** The use of Port 3 and/or Port 4 in the port pair requires a 4-port VNA.

**Description:** Query only.

Starts an AutoCal calibration and returns status or next step information.

**Cmd Parameters:** NA

**Query Parameters:** <NR1> One of the following ECAL List of Messages:

0	AssurancePassed	26	ConnectToPorts13
1	Update	27	ConnectToPorts14
2	TrueThru	28	ConnectToPorts23
3	Adapter	29	ConnectToPorts24
4	NoModule	30	ConnectToPorts34
5	NoOrient	31	ConnectThrubwPorts12
6	NoFile	32	ConnectThrubwPorts13
7	NoMatch	33	ConnectThrubwPorts14
8	No12T	34	ConnectThrubwPorts23
9	NotAllowed	35	ConnectThrubwPorts24
10	OutOfRange	36	ConnectThrubwPorts34
11	AssuranceFailed	37	SequentialBegins
12	Aborted	38	ConnectIsolation,
13	AbortOK	39	PowerLevelAdvisory
14	AbortNotOK	40	PowerLevelAdvisoryNotRequired
15	ACError	41	UpdatingChrcFile
16	ACFatalError	42	AmbiguousConnections
17	DoneCalculateCoeff	43	NoDetectedConnections
18	ACConnectCalB	44	ShowProgress
19	CharacBad	45	ConnectLoadsToPorts12
20	DisplayMessage	46	ConnectLoadsToPorts13
21	ConnectToPort1	47	ConnectLoadsToPorts14
22	ConnectToPort2	48	ConnectLoadsToPorts23
23	ConnectToPorts12	49	ConnectLoadsToPorts24
24	ConnectThrubwPorts12	50	ConnectLoadsToPorts34
25	SequentialBegins	51	IncorrectConnection

**Range:** NA

**Default:** NA

**Syntax Example:** :SENS1:CORR:COLL:ECAL:BEG?

**:SENSe{1-16}:CORRection:COLLect:ECAL:CONTinue**  
**:SENSe{1-16}:CORRection:COLLect:ECAL:CONTinue?**

Applicability: The use of Port 3 and/or Port 4 in the port pair requires a 4-port VNA.

Description: Starts an AutoCal characterization.

Returns status or next step information.

Cmd Parameters: NA

Query Parameters: <NR1> One of the following ECAL List of Messages:

0	AssurancePassed	26	ConnectToPorts13
1	Update	27	ConnectToPorts14
2	TrueThru	28	ConnectToPorts23
3	Adapter	29	ConnectToPorts24
4	NoModule	30	ConnectToPorts34
5	NoOrient	31	ConnectThrubwPorts12
6	NoFile	32	ConnectThrubwPorts13
7	NoMatch	33	ConnectThrubwPorts14
8	No12T	34	ConnectThrubwPorts23
9	NotAllowed	35	ConnectThrubwPorts24
10	OutOfRange	36	ConnectThrubwPorts34
11	AssuranceFailed	37	SequentialBegins
12	Aborted	38	ConnectIsolation,
13	AbortOK	39	PowerLevelAdvisory
14	AbortNotOK	40	PowerLevelAdvisoryNotRequired
15	ACError	41	UpdatingCharcFile
16	ACFatalError	42	AmbiguousConnections
17	DoneCalculateCoeff	43	NoDetectedConnections
18	ACConnectCalB	44	ShowProgress
19	CharacBad	45	ConnectLoadsToPorts12
20	DisplayMessage	46	ConnectLoadsToPorts13
21	ConnectToPort1	47	ConnectLoadsToPorts14
22	ConnectToPort2	48	ConnectLoadsToPorts23
23	ConnectToPorts12	49	ConnectLoadsToPorts24
24	ConnectThrubwPorts12	50	ConnectLoadsToPorts34
25	SequentialBegins	51	IncorrectConnection

Range: NA

Default: NA

Syntax Example: **:SENS1:CORR:COLL:ECAL:CONT**

**:SENS1:CORR:COLL:ECAL:CONT?**

**:SENSe{1-16}:CORRection:COLLect:ECAL:ISOLation:2PORt[:STAtE] <char>**  
**:SENSe{1-16}:CORRection:COLLect:ECAL:ISOLation:2PORt[:STAtE]?**

Applicability: MS4652x

Description: Turns on/off the use of the isolation coefficient data during correction for the indicated channel for 2-port calibration.

Returns the on/off status of the isolation coefficient data during correction for the indicated channel for 2-port calibration.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default: 0

Syntax Example: :SENS1:CORR:COLL:ECAL:ISOL:2POR ON  
:SENS1:CORR:COLL:ECAL:ISOL:2POR?

**:SENSe{1-16}:CORRection:COLLect:ECAL:ISOLation:4PORt[:STAtE] <char>**  
**:SENSe{1-16}:CORRection:COLLect:ECAL:ISOLation:4PORt[:STAtE]?**

Applicability: MS46524

Description: Turns on/off the use of the isolation coefficient data during correction for the indicated channel for 4-port calibration.

Returns the on/off status of the isolation coefficient data during correction for the indicated channel for 4-port calibration.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default: 0

Syntax Example: :SENS1:CORR:COLL:ECAL:ISOL:4POR ON  
:SENS1:CORR:COLL:ECAL:ISOL:4POR?

```
:SENSe{1-16}:CORRection:COLLect:ECAL:MULTiple:TRUEthru <char>
:SENSe{1-16}:CORRection:COLLect:ECAL:MULTiple:TRUEthru?
```

Description: Turns on/off the use of TrueThru for additional Thrus in AutoCal calibration on the given channel.

Returns the on/off status of the use of TrueThrus for the additional thrus during AutoCal Calibrations on the given channel.

**Note:** PCStandard refers to Post-Calibration Standard.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default: 0

Syntax Example: :SENS1:CORR:COLL:ECAL:MULT:TRUE ON

```
:SENS1:CORR:COLL:ECAL:MULT:TRUE?
```

```
:SENSe{1-16}:CORRection:COLLect:ECAL:ORIentation <char>
```

```
:SENSe{1-16}:CORRection:COLLect:ECAL:ORIentation?
```

Description: Turns AutoCal module and SmartCal orientation detection off and sets the orientations manually for the given channel.

Returns the AutoCal module and SmartCal orientations of the given channel.

Cmd Parameters: **2-Port VNAs:**

For VNA Port 1: <char> L1 | L2 | R1 | R2 | L1R2 | R1L2 | R2L1 | L2R1

For VNA Port 2: <char> A1 | A2 | B1 | B2 | A1B2 | B1A2 | B2A1 | A2B1

**4-Port VNAs:**

For VNA Port 1: <char> L1 | L2 | L3 | L4 | R1 | R2 | R3 | R4 | L1R2 | L1R3 | L1R4 | L2R3 | L2R4 | L3R4 | R1L2 | R1L3 | R1L4 | R2L3 | R2L4 | R3L4 | R2L1 | R3L1 | R4L1 | R3L2 | R4L2 | R4L3 | L2R1 | L3R1 | L4R1 | L3R2 | L4R2 | L4R3

For VNA Port 2: <char> A1 | A2 | A3 | A4 | B1 | B2 | B3 | B4 | C1 | C2 | C3 | C4 | D1 | D2 | D3 | D4 | L1R2 | L1R3 | L1R4 | L2R3 | L2R4 | L3R4 | R1L2 | R1L3 | R1L4 | R2L3 | R2L4 | R3L4 | R2L1 | R3L1 | R4L1 | R3L2 | R4L2 | R4L3 | L2R1 | L3R1 | L4R1 | L3R2 | L4R2 | L4R3



#### Query Parameters: 2-Port VNAs:

For VNA Port 1:<char> L1 | L2 | R1 | R2 | L1R2 | R1L2 | R2L1 | L2R1

For VNA Port 2:<char> A1 | A2 | B1 | B2 | A1B2 | B1A2 | B2A1 | A2B1

#### 4-Port VNAs:

For VNA Port 1:<char> L1 | L2 | L3 | L4 | R1 | R2 | R3 | R4 | L1R2 | L1R3 | L1R4 | L2R3 | L2R4 | L3R4 | R1L2 | R1L3 | R1L4 | R2L3 | R2L4 | R3L4 | R2L1 | R3L1 | R4L1 | R3L2 | R4L2 | R4L3 | L2R1 | L3R1 | L4R1 | L3R2 | L4R2 | L4R3

For VNA Port 2:<char> A1 | A2 | A3 | A4 | B1 | B2 | B3 | B4 | C1 | C2 | C3 | C4 | D1 | D2 | D3 | D4 | L1R2 | L1R3 | L1R4 | L2R3 | L2R4 | L3R4 | R1L2 | R1L3 | R1L4 | R2L3 | R2L4 | R3L4 | R2L1 | R3L1 | R4L1 | R4L2 | R4L3 | L2R1 | L3R1 | L4R1 | L3R2 | L4R2 | L4R3

Range: NA

Default: L1R2

Syntax Example: :SENS1:CORR:COLL:ECAL:ORI L2R1  
                  :SENS1:CORR:COLL:ECAL:ORI?

```
:SENSe{1-16}:CORRection:COLLect:ECAL:PCSTandard <char>
:SENSe{1-16}:CORRection:COLLect:ECAL:PCSTandard?
```

Description: Sets post calibration standard (open, short, load, or thru) for the SmartCal module for a given channel and given VNA Port (given by the command:

```
:SENSe{1-16}:CORRection:COLLect:ECAL:PCSTandard:VNAPort <char>
```

This command should be initiated before the cal begins.

Returns SmartCal/AutoCal module standard (open, short, load or thru) after a cal for given channel

**Note:** PCStandard refers to Post-Calibration Standard.

Cmd Parameters: <char> OPEN | SHORt | LOAD | THRu

Query Parameters: NA

Query Output: <char> OPEN | SHOR | LOAD | THR

Range: NA

Default: SHOR

Syntax Example: :SENS1:CORR:COLL:ECAL:PCST OPEN

```
:SENS1:CORR:COLL:ECAL:PCST?
```

**:SENSe{1-16}:CORRection:COLLect:ECAL:PCSTandard:VNAPort <char>**  
**:SENSe{1-16}:CORRection:COLLect:ECAL:PCSTandard:VNAPort?**

Description: Sets the VNA port to be used to set the post calibration standard command:

**:SENSe{1-16}:CORRection:COLLect:ECAL:PCSTandard <char>**

Returns the VNA port number that will apply the SmartCal standard (open, short, load or thru) after a cal for a given channel. (AutoCal assigns both ports with previous PCSTandard command.)

**Note:** PCStandard refers to Post-Calibration Standard.

Cmd Parameters: <char> PORT1 | PORT2

Query Parameters: NA

Query Output: <char> PORT1 | PORT2

Range: NA

Default: PORT1

Syntax Example: **:SENS1:CORR:COLL:ECAL:PCST:VNAP PORT1**

**:SENS1:CORR:COLL:ECAL:PCST:VNAP?**

**:SENSe{1-16}:CORRection:COLLect:ECAL:RF:CONNnection[:STATE]**  
**:SENSe{1-16}:CORRection:COLLect:ECAL:RF:CONNnection[:STATE]?**

Description: Turns the RF Connection checks during Autocal on/off for the given channel.

Returns the on/off status of the RF Connection checks during Autocal on the given channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default: 0

Syntax Example: **:SENS1:CORR:COLL:ECAL:RF:CONN 1**

**:SENS1:CORR:COLL:ECAL:RF:CONN?**

**:SENSe{1-16}:CORRection:COLLect:ECAL[:CALa]:TRUEthru <char>**  
**:SENSe{1-16}:CORRection:COLLect:ECAL[:CALa]:TRUEthru?**

Description: Turns on/off the use of TrueThru during AutoCal CALA Calibration on the given channel.

Returns the state of the use of True Through during AutoCal CALA.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default: 0

Syntax Example: **:SENS1:CORR:COLL:ECAL:TRUE ON**

**:SENS1:CORR:COLL:ECAL:TRUE?**

**:SENSe{1-16}:CORRection:COLLect:ECAL:CALB:TRUEthru <char>**

Applicability: MS46524

Description: Turns on/off the use of TrueThrus during AutoCal CALB Calibrations on the given channel.

No query.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Range: NA

Default: 0

Syntax Example: :SENS1:CORR:COLL:ECAL:CALB:TRUE ON

:SENSe{1-16}:CORRection:COLLect:ECAL:PORT{12 | 13 | 14 | 23 | 24 | 34} :FULL4

Applicability: MS46524

Description: Sets FULL4 calibration type with the given CALA portset and indicated channel.

No query.

Cmd Parameters: <char> 12|13|14|23|24|34

Query Parameters: NA

Range: NA

Default: NA

Syntax Example: :SENSe1:CORR:COLL:ECAL:PORT12:FULL4

## 5-62 :SENSe{1-16}:CORRection:COLLect:EXISTing Subsystem

The :SENSe{1-16}:CORRection:COLLect:EXISTing subsystem returns RF calibration information.

### :SENSe{1-16}:CORRection:COLLect:EXISTing:CALibration:INFO?

Description: Query only.

Returns the existing user RF calibration information of the given channel number if there is an existing cal.

Cmd Parameters: NA

Query Parameters: NA

Query Output: <char> The existing user RF calibration information of the given channel number if there is an existing cal.

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:EXIS:CAL:INFO?

### :SENSe{1-16}:CORRection:COLLect:EXISTing:CALibration:TIME?

Description: Query only.

Returns the existing user RF calibration time stamp of the given channel number if there is an existing cal.

Cmd Parameters: NA

Query Parameters: NA

Query Output: <char> The existing user RF calibration time stamp of the given channel number if there is an existing cal.

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:EXIS:CAL:TIME?

## 5-63 :SENSe{1-16}:CORRection:COLLect:HYBRid Subsystem

The :SENSe{1-16}:CORRection:COLLect:HYBRid subsystem commands configure, control, and execute hybrid calibration on 2-port VNA instruments.

### Calibration Option Subsystems

Related calibration option configuration and control subsystems are:

- “:CALCulate{1-16}:CORRection Subsystem” on page 5-6
- “:CALCulate{1-16}:EXTRaction Subsystem” on page 5-8
- “:SENSe{1-16}:CORRection:COLLect:HYBRid Subsystem” on page 5-349

### Calibration Type Abbreviations

The calibration abbreviations and their calibration types are

- :FULL2 refers to a Full 2-Port Calibration

**:SENSe{1-16}:CORRection:COLLect:HYBRid:FILE{1-4} <string>**  
**:SENSe{1-16}:CORRection:COLLect:HYBRid:FILE{1-4}?**

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the file path of the indicated calibration file needed to hybridize calcs on the indicated channel.

Returns the file path of the indicated calibration file needed to hybridize calcs on the indicated channel.

Cmd Parameters: <string> Filename and path in the form 'x:\directory\filename.xxx' where x:\directory\ must exist. See definition of “<string>” on page 2-10.

Query Parameters: <string> Filename and path in the form 'x:\directory\filename.xxx'.

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:HYBR:FIL1 'C:\directory\filename.xxx'  
:SENS1:CORR:COLL:HYBR:FIL1?

**:SENSe{1-16}:CORRection:COLLect:HYBRid:FULL2**

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Begins a Hybrid FULL2 port calibration using two FULL1 calibrations on all ports and the channel indicated.

No query. To query the resultant cal type, use:

:SENSe{1-16}:CORRection:COLLect[:METHOD]:TYPE?

Cmd Parameters: NA

Query Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:HYBR:FULL2

**:SENSe{1-16}:CORRection:COLLect:HYBRid:FULL4**

Applicability: MS46524

Description: Begins a Hybrid FULL4 port calibration using four FULL1 calibrations on all ports and the channel indicated.

No query. To query the state once cal is performed, use this command:

**:SENSe{1-16}:CORRection:COLLect[:METHOD]:TYPE?**

Cmd Parameters: NA

Query Parameters: NA

Range: NA

Default Value: NA

Syntax Example: **:SENS1:CORR:COLL:HYBR:FULL4**

**:SENSe{1-16}:CORRection:COLLect:HYBRid:MULTiple:THRu**  
**<char>{,<char>,...,<char>}****:SENSe{1-16}:CORRection:COLLect:HYBRid:MULTiple:THRu?**

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

Description: Adds one or more Transmission Throughs (Thrus) to the Hybrid Calibration process on the indicated channel, where:

**2-Port VNAs:**

- THRu12 or THR12 = Sets the through line between Port 1 and Port 2.

**4-Port VNAs:**

- THRu12 or THR12 = Sets the through line between Port 1 and Port 2.
- THRu13 or THR13 = Sets the through line between Port 1 and Port 3.
- THRu14 or THR14 = Sets the through line between Port 1 and Port 4.
- THRu23 or THR23 = Sets the through line between Port 2 and Port 3.
- THRu24 or THR24 = Sets the through line between Port 2 and Port 4.
- THRu34 or THR34 = Sets the through line between Port 3 and Port 4.
- Returns the Transmission Thru for the Hybrid Calibration process on the indicated channel.

Cmd Parameters: **2-Port VNAs:**

**<char>THRu12**

**4-Port VNAs:**

**<char>THRu12 | THRu13 | THRu14 | THRu23 | THRu24 | THRu34**

Query Parameters: **2-Port VNAs:**

**<char>THRu12**

**4-Port VNAs:**

**<char>THRu12 | THRu13 | THRu14 | THRu23 | THRu24 | THRu34**

Range: NA

Default Value: NA

Syntax Example: **:SENS1:CORR:COLL:HYBR:MULT:THR THR12**

**:SENS1:CORR:COLL:HYBR:MULT:THR?**

```
:SENSe{1-16}:CORRection:COLLect:HYBRid:PORT{12 | 13 | 14 | 23 | 24 | 34} :FULL2
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

Description: Begins a Hybrid FULL2 calibration using two FULL1 calibrations on the indicated port pair and channel.

No query. To query the resultant cal type, use:

```
:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPE?
```

#### 2-Port VNAs:

- Use Port Pair 12.

#### 4-Port VNAs:

There are six possible FULL2 port-pair combinations available on a 4-port VNA:

- 12 = Port Pair 1-2
- 13 = Port Pair 1-3
- 14 = Port Pair 1-4
- 23 = Port Pair 2-3
- 24 = Port Pair 2-4
- 34 = Port Pair 3-4.

Prepare for this command by specifying the Full2 calibration file name for each port. For example, if Port Pair 2-4 is to be calibrated on channel 3, issue the two commands as:

```
:SENSe3:CORRection:COLLect:HYBRid:FILE1'C:\filename1.xxx'
```

```
:SENSe3:CORRection:COLLect:HYBRid:FILE2'C:\filename2.xxx'
```

Use filename1 for the first number in the pair and use filename2 for the second number in the pair.

Cmd Parameters: <char> 12

Query Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:HYBR:PORT12:FULL2

```
:SENSe{1-16}:CORRection:COLLect:HYBRid:PORT{123 | 124 | 134 |  
234}:FULL3
```

Applicability: MS46524

Description: Begins a Hybrid FULL3 calibration using three FULL1 calibrations on the triport and channel indicated.

No query. To query the resultant cal type, use:

```
:SENSe{1-16}:CORRection:COLLect[:METHOD]:TYPE?
```

There are four possible FULL3 port triplet variations available on a 4-port test set:

- 123 = Port Triplet 1-2-3
- 124 = Port Triplet 1-2-4
- 134 = Port Triplet 1-3-4
- 234 = Port Triplet 2-3-4.

Prepare for this command by specifying the Full1 (Full One) calibration file name for each port. For example, if port triplet 123 is to be calibrated on Channel 4, issue the three commands as:

```
:SENSe4:CORRection:COLLect:HYBRid:FILE1'C:\filename1.xxx'  
:SENSe4:CORRection:COLLect:HYBRid:FILE2'C:\filename2.xxx'  
:SENSe4:CORRection:COLLect:HYBRid:FILE3'C:\filename3.xxx'
```

Use filename1 for the first number in the port triplet set, use filename2 for the second number in the port triplet set, and filename3 for the third number in the port triplet set.

Cmd Parameters: NA

Query Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:HYBR:PORT123:FULL3

```
:SENSe{1-16}:CORRection:COLLect:HYBRid:PORT{12 | 13 | 14 | 23 | 24 | 34}:FULL4
```

Applicability: MS46524

Description: Begins a Hybrid FULL4 calibration using two FULL2 calibrations on the channel indicated.

No query. To query the resultant cal type, use:

```
:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPE?
```

There are six possible FULL2 port pair combinations available on a 4-port test set:

- 12 = Port Pair 1-2
- 13 = Port Pair 1-3
- 14 = Port Pair 1-4
- 23 = Port Pair 2-3
- 24 = Port Pair 2-4
- 34 = Port Pair 3-4

Prepare for this command by specifying the Full2 calibration file name for each port.

The port pair for calibration file 1 needs to be specified in the command. For instance, if file 1 is a FULL2 calibration on Ports 1-3 and file 2 is a FULL2 calibration on Ports 2-4, the following command is to be issued for hybrid cal being done on channel 1:

```
:SENS1:CORR:COLL:HYBR:PORT13:FULL4
```

The two FULL2 calibration files needs to be specified using separate commands.

```
:SENSe1:CORRection:COLLect:HYBRid:FILE1 'C:\filename1.chx'
```

```
:SENSe1:CORRection:COLLect:HYBRid:FILE2 'C:\filename2.chx'
```

Cmd Parameters: NA

Query Output: NA

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COLL:HYBR:PORT12:FULL4

```
:SENSe{1-16}:CORRection:COLLect:HYBRid:PORT{12 | 13 | 14 | 23 | 24 | 34}:LSELection <char>
:SENSe{1-16}:CORRection:COLLect:HYBRid:PORT{12 | 13 | 14 | 23 | 24 | 34}:LSELection?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

Description: Sets the calibration line selection for hybrid cal on the selected port-pair of the indicated channel.

Returns the line selection for hybrid cal on the selected port-pair of the indicated channel.

:Cmd Parameters: <char> THRu | RECiprocal | S2PThru

Query Parameters: NA

Query Output: <char> THR | REC | S2PT

Range: NA

Default Value: THR

Syntax Example: :SENS1:CORR:COLL:HYBR:PORT12:LSEL S2PT

```
:SENS1:CORR:COLL:HYBR:PORT12:LSEL?
```

```
:SENSe{1-16}:CORRection:COLLect:HYBRid:PORT{12 | 13 | 14 | 23 | 24 | 34}:S2PThru:FILE <string>
:SENSe{1-16}:CORRection:COLLect:HYBRid:PORT{12 | 13 | 14 | 23 | 24 | 34}:S2PThru:FILE?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

Description: Loads an s2p file for thru in hybrid cal and saves the loaded file in the default location: 'C\AnritsuVNA\Data\S2PThruCal'.

Returns the loaded s2p file path.

:Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.s2p' where x:\directory\filename.s2p must exist.

Query Parameters: NA

Query Output: <char> Filename and path in the form: x:\directory\filename.s2p

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:HYBR:PORT12:S2PT:FIL 'C:\test.s2p'

```
:SENS1:CORR:COLL:HYBR:PORT12:S2PT:FIL?
```

```
:SENSe{1-16}:CORRection:COLLect:HYBRid:PORT{12 | 13 | 14 | 23 | 24 |
34}:THRu
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

Description: Initiates collection of the through standard data for the Hybrid Calibration on the indicated port pair and channel.

No query.

#### 2-Port VNAs:

- Use Port Pair 12

#### 4-Port VNAs:

There are six possible port-pair combinations available on a 4-port VNA:

- 12 = Port Pair 1-2
- 13 = Port Pair 1-3
- 14 = Port Pair 1-4
- 23 = Port Pair 2-3
- 24 = Port Pair 2-4
- 34 = Port Pair 3-4

Cmd Parameters: NA

Query Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:HYBR:PORT12:THR

```
:SENSe{1-16}:CORRection:COLLect:HYBRid:PORT{12 | 13 | 14 | 23 | 24 |
34}:THRu:RECIProcal[:STATE] <char>
```

```
:SENSe{1-16}:CORRection:COLLect:HYBRid:PORT{12 | 13 | 14 | 23 | 24 |
34}:THRu:RECIProcal[:STATE]?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

Description: Sets the thru-line use reciprocal flag on the selected port-pair of the indicated channel.

Returns the thru-line use reciprocal flag on the selected port-pair of the indicated channel.

After configuring the hybrid cal parameters and taking the Thru/Reciprocal measurements, the correction coefficients must be calculated and the calibration corrections must be applied. This is done using the command:

:SENSe{1-16}:CORRection:COLLect:SAVE

Cmd Parameters: <char> ON | OFF | 1 | 0

Query Parameters: NA

Range: NA

Default Value: 0

Syntax Example: :SENS1:CORR:COLL:HYBR:PORT12:THR:RECIP ON

:SENS1:CORR:COLL:HYBR:PORT12:THR:RECIP?

## 5-64 :SENSe{1-16}:CORRection:COLLect:LRL:DEViCe{1-10} Subsystem

The :SENSe{1-16}:CORRection:COLLect:LRL:DEViCe{1-10} subsystem commands provide control of Line-Reflect-Line device parameters, configuration, execution, and output reporting.

### LRL Calibration Subsystems

The LRL-related calibration commands are organized into two subsystems in the following sections:

- [Section 5-64 :SENSe{1-16}:CORRection:COLLect:LRL:DEViCe{1-10} Subsystem on page 5-356](#)

```
:SENSe{1-16}:CORRection:COLLect:LRL:DEViCe{2 | 4 | 6 | 8 |  
10}:MATCH:PORT <char>  
:SENSe{1-16}:CORRection:COLLect:LRL:DEViCe{2 | 4 | 6 | 8 |  
10}:MATCH:PORT?
```

**Applicability:** Match parameters are only applicable to the 2nd device in the band, i.e., the even devices.

**Description:** Selects the match to measure for the given device and channel.

Returns the match selected for the given device and channel.

**Cmd Parameters:** <char> MATCH1 | MATCH2

**Query Parameters:** <char> MATCH1 | MATCH2

Range: NA

Default Value: MATCH1

**Syntax Example:** :SENS1:CORR:COLL:LRL:DEV2:MATCH:PORT MATCH1  
:SENS1:CORR:COLL:LRL:DEV2:MATCH:PORT?

```
:SENSe{1-16}:CORRection:COLLect:LRL:DEViCe{1-10}:PORT{1-4}:MATCH
```

**Applicability:** The use of Port 3 and/or Port 4 requires a 4-port VNA.

**Description:** Initiates collection of the indicated device match standard data for the LRL calibration on the given channel and port.

No query.

**Cmd Parameters:** NA

Range: NA

Default Value: NA

**Syntax Example:** :SENS1:CORR:COLL:LRL:DEV1:PORT1:MATCH

```
:SENSe{1-16}:CORRection:COLLect:LRL:DEViCe{1-10}:PORT12:LINE
```

**Description:** Initiates collection of the indicated device line standard data for the LRL calibration on the given channel and port-pair. The available port pair is 12 where it is fixed as Port 1 and Port 2.

No query.

**Cmd Parameters:** NA

Range: NA

Default Value: NA

**Syntax Example:** :SENS1:CORR:COLL:LRL:DEV1:PORT12:LINE

:SENSe{1-16}:CORRection:COLLect:LRL:DEViCe{1-10}:PORT12:LINE:DELay  
<NRf>

:SENSe{1-16}:CORRection:COLLect:LRL:DEViCe{1-10}:PORT12:LINE:DELay?

Description: Sets the line delay of the given device for LRL calibration on the given channel.

The available port pair is 12 where it is fixed as Port 1 and Port 2.

Returns the line delay of the given device of the LRL calibration on the given channel.

Cmd Parameters: <NRf> The input parameter is in seconds.

Query Parameters: <NR3> The output parameter is in seconds.

Range: MPND

Default Value: Default value is dependent on the default dielectric of the substrate and the effective length default value.

Syntax Example: :SENSe:CORR:COLL:LRL:DEV3:PORT12:LINE:DEL 20E-3

:SENSe:CORR:COLL:LRL:DEV3:PORT12:LINE:DEL?

:SENSe{1-16}:CORRection:COLLect:LRL:DEViCe{1 | 3 | 5 | 7 |  
9}:PORT12:LINE:FREQuency <NRf>

:SENSe{1-16}:CORRection:COLLect:LRL:DEViCe{1 | 3 | 5 | 7 |  
9}:PORT12:LINE:FREQuency?

Applicability: Command is per-band, rather than per device. Device numbers are used to calculate band numbers.

The available port pair is 12, where it is fixed as Port 1 and Port 2.

Description: Sets the reference frequency for loss of the given device on the given port-pair of the LRL calibration on the given channel.

Returns the reference frequency for loss of the given device on the given port-pair of the LRL calibration on the given channel. The available port pair is 12.

**Use of the following command to set the Reference Frequency per Band is recommended:**

:SENSe{1-16}:CORRection:COLLect:LRL:BAND{1-5}:PORT12:FREQuency  
<NRf>

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: 7E4 to 7E10

Default Value: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:LRL:DEV1:PORT12:LINE:FREQ 1.0E9

:SENS1:CORR:COLL:LRL:DEV1:PORT12:LINE:FREQ?

**:SENSe{1-16}:CORRection:COLLect:LRL:DEViCe{1-10}:PORT12:LINE:LENGth  
<NRf>**

**:SENSe{1-16}:CORRection:COLLect:LRL:DEViCe{1-10}:PORT12:LINE:LENGth?**

**Applicability:** Command is per-band, rather than per device. Device numbers are used to calculate band numbers.

The available port pair is 12, where it is fixed as Port 1 and Port 2.

**Description:** Sets the effective (air-equivalent) line length of the given device on the given port-pair of the LRL calibration on the given channel.

Returns the effective (air-equivalent) line length of the given device on the given port-pair of the LRL calibration on the given channel.

**Cmd Parameters:** <NRf> The input parameter is in Meters.

**Query Parameters:** <NR3> The output parameter is in Meters.

**Range:** MPND

**Default Values:** Dev X defaults of each band = 0

Dev Y defaults of each band:

Band 1: 5

Band 2: 4

Band 3: 3

Band 4: 2

Band 5: 1

**Syntax Example:** :SENS1:CORR:COLL:LRL:DEV1:PORT12:LINE:LENG 2.0E-3

:SENS1:CORR:COLL:LRL:DEV1:PORT12:LINE:LENG?

**:SENSe{1-16}:CORRection:COLLect:LRL:DEViCe{1 | 3 | 5 | 7 | 9}:PORT12:LINE:LOSS <NRf>**

**:SENSe{1-16}:CORRection:COLLect:LRL:DEViCe{1 | 3 | 5 | 7 | 9}:PORT12:LINE:LOSS?**

**Applicability:** Command is per-band, rather than per device. Device numbers are used to calculate band numbers.

The available port pair is 12, where it is fixed as Port 1 and Port 2.

**Description:** Sets the line loss of the given device on the given port-pair of the LRL calibration on the given channel.

Returns the line loss of the given device on the given port-pair of the LRL calibration on the given channel.

**Use of the following command to set the Reference Frequency per Band is recommended:**

:SENSe{1-16}:CORRection:COLLect:LRL:BAND{1-5}:PORT12:LOSS <NRf>

**Cmd Parameters:** <NRf> The input parameter is in dB/mm.

**Query Parameters:** <NR3> The output parameter is in dB/mm.

**Range:** NA

**Default Value:** 0.0000000000E+000

**Syntax Example:** :SENS1:CORR:COLL:LRL:DEV1:PORT12:LINE:LOSS 3.0E0

:SENS1:CORR:COLL:LRL:DEV1:PORT12:LINE:LOSS?

**:SENSe{1-16}:CORRection:COLLect:LRL:DEViCe{1-10}:PORT12:LINE:PLENgtH  
<NRf>**  
**:SENSe{1-16}:CORRection:COLLect:LRL:DEViCe{1-10}:PORT12:LINE:PLENgtH?**

Description: Sets the physical line length of the given device of the LRL calibration on the given channel.

Returns the physical line length of the given device of the LRL calibration on the given channel.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default Value: Default value is dependent on effective length default value.

Syntax Example: :SENSe:CORR:COLL:LRL:DEV3:PORT12:LINE:PLEN 20E-3

:SENSe:CORR:COLL:LRL:DEV3:PORT12:LINE:PLEN?

## 5-65 :SENSe{1-16}:CORRection:COLLect:LRL:PORT Subsystem – 4-Port

The :SENSe{1-16}:CORRection:COLLect:LRL:PORT subsystem commands provide control of Line-Reflect-Line port assignments for FULL3 or FULL4 calibrations. The :LRL:PORT commands require a 4-port VNA.

### LRL Calibration Subsystems

The LRL-related calibration commands are organized into five (5) subsystems in the following sections:

- “:SENSe{1-16}:CORRection:COLLect:LRL:CALB Subsystem” on page 5-377
- “:SENSe{1-16}:CORRection:COLLect:LRL:DEVice{1-10} Subsystem” on page 5-356
- “:SENSe{1-16}:CORRection:COLLect:LRL:PORT Subsystem – 4-Port” on page 5-360
- “:SENSe{1-16}:CORRection:COLLect:LRL:SINGleton Subsystem – 4-Port” on page 5-391
- “:SENSe{1-16}:CORRection:COLLect:LRL[:CALa] Subsystem” on page 5-363

**:SENSe{1-16}:CORRection:COLLect:LRL:PORT{12 | 13 | 14 | 23 | 24 | 34}:FULL3 <char>**

Applicability: MS46524

Description: Sets the calibration type to a Full 3-Port LRL for the indicated channel using either two 2-Port LRL Calibrations or one LRL 2-Port Calibration with One Singleton.

No query.

### Full 3-Port LRL Method #1 – Use Two 2-Port Calibrations

The first method requires two LRL FULL2 port calibrations where the calibrations share one common port. The two calibrations must share a common port or the command results in an error. Valid port pair combinations are:

- Port Pair 1-2 with Port Pair 1-3
- Port Pair 1-3 with Port Pair 1-4
- Port Pair 1-3 with Port Pair 2-3
- Port Pair 1-4 with Port Pair 1-3
- Port Pair 1-4 with Port Pair 2-4
- Port Pair 2-3 with Port Pair 2-4
- Port Pair 2-3 with Port Pair 1-3
- Port Pair 2-4 with Port Pair 1-4
- Port Pair 2-4 with Port Pair 2-3
- Port Pair 3-4 with Port Pair 2-4

The first calibration is referred to as :CALA; the second calibration referred to as :CALB.

The CALA port pair is assigned with the :PORT{12 | 13 | 14 | 23 | 24 | 34} keyword parameter.

The CALB port pair is assigned with the command <char> parameter with arguments of:

- PORT1 | PORT2 | PORT3 | PORT4 | PORT13 | PORT14 | PORT23 | PORT24

For example, the command for an LRL FULL3 calibration with the first LRL FULL2 (CALA) on port pair PORT13 and the second LRL FULL2 (CALB) on port pair PORT23 is shown below:

:SENS1:CORR:COLL:LRL:PORT13:FULL3 PORT23

**Full 3-Port LRL Method #2 – Use One 2-Port Cal and One Singleton**

The second way to perform an LRL FULL3 calibration is to include one LRL FULL2 calibration, a singleton reflection calibration on a different port. The method concludes with measuring a short or an open on the singleton port and one or two through lines on the port pair. The Port Pair assignments MUST NOT include the common singleton port. Valid port pairs, singleton, and through line combinations are:

- Port Pair 1-2 and Singleton 3 (and a through line cal between Ports 1-3 or 1-4)
- Port Pair 1-3 and Singleton 2 (and a through line cal between Ports 1-2 or 2-3)
- Port Pair 1-3 and Singleton 4 (and a through line cal between Ports 1-4 or 3-4)
- Port Pair 1-4 and Singleton 2 (and a through line cal between Ports 1-2 or 2-4)
- Port Pair 1-4 and Singleton 3 (and a through line cal between Ports 1-3 or 3-4)
- Port Pair 2-3 and Singleton 1 (and a through line cal between Ports 1-2 or 1-3)
- Port Pair 2-3 and Singleton 4 (and a through line cal between Ports 2-4 or 3-4)
- Port Pair 2-4 and Singleton 1 (and a through line cal between Ports 1-2 or 1-4)
- Port Pair 2-4 and Singleton 3 (and a through line cal between Ports 2-3 or 3-4)
- Port Pair 3-4 and Singleton 2 (and a through line cal between Ports 1-2 or 2-3)

An example of an LRL FULL2 calibration on port pair PORT23 and a singleton on PORT4 is shown below. The required through (thru) can be between port 2-4 or 3-4. The through line is thus configured between port 3 and 4:

```
:SENSe1:CORRection:COLLect:LRL:PORT23:FULL3 PORT4  
:SENSe{1-16}:CORRections:COLLect:LRL:SINGLETON:REFlection:TYPE  
:SENSe{1-16}:CORRection:COLLect:THRu:CLEar  
:SENSe{1-16}:CORRection:COLLect:THRu:ADD PORT34
```

For additional information, also see the instrument menu for this method under:

- MAIN | Calibration | CALIBRATION | Calibrate | CALIBRATE | Manual Cal | MANUAL CAL | 3-Port Cal | THREE PORT CAL

From there, set the following:

- Cal Method = LRL/LRM
- Edit Cal Parameters | THREE PORT CAL SETUP | Cal Type = LRL/LRM+Singleton

Cmd Parameters: <char> PORT1 | PORT2 | PORT3 | PORT4 | PORT13 | PORT14 | PORT23 | PORT24

Range: NA

Default: PORT13

Syntax Example: :SENS1:CORR:COLL:LRL:PORT23:FULL3 PORT13

```
:SENSe{1-16}:CORRection:COLLect:LRL:PORT{12 | 13 | 14 | 23 | 24 | 34}:FULL4
```

Applicability: MS46524

Description: Sets the calibration type to Full 4-Port LRL for the indicated channel. In order to achieve a Full4 calibration using LRL techniques, it is necessary to perform two Full2 LRL calibrations on independent port pairs. The port number specified in this command is the port pair for the first LRL calibration. The port pair of the second LRL calibration is made up of the other ports.

No query.

Cmd Parameters: NA

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COLL:LRL:PORT13:FULL4

## 5-66 :SENSe{1-16}:CORRection:COLLect:LRL[:CALa] Subsystem

The :SENSe{1-16}:CORRection:COLLect:LRL[:CALa] subsystem commands provide control of Line-Reflect-Line first calibration (or CALA) configuration parameters, execution, and output reporting. The :CALA keyword is optional for 2-port VNA instruments.

### LRL Calibration Subsystems

- The LRL-related calibration commands are organized into one subsystem in the following section:  
[Section 5-66 :SENSe{1-16}:CORRection:COLLect:LRL\[:CALa\] Subsystem on page 5-363](#) (this subsystem)

**:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:BAND:COUNT <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:BAND:COUNT?**

Description: Sets the number of bands to use in the LRL CALA calibration.

Returns the number of bands to use in the LRL CALA calibration.

Cmd Parameters: <NRf> The input parameter is an integer.

Query Parameters: <NR1> The output parameter is an integer.

Range: **For 4-port Instruments:**

1 to 5

**For 2-port Instruments:**

1 to 2

Default: 1

Syntax Example: **:SENS1:CORR:COLL:LRL:BAND:COUN 2**

**:SENS1:CORR:COLL:LRL:BAND:COUN?**

**:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:BAND{1-5}:FREQuency <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:BAND{1-5}:FREQuency?**

Description: Sets the reference frequency for loss of the given band of the LRL CALA calibration on the indicated channel.

Returns the reference frequency for loss of the given band of the LRL CALA calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Output: <NR3> The output parameter is in Hertz.

Range: 7E4 to 7E10

Default: 0.0000000000E+000

Syntax Example: **:SENS1:CORR:COLL:LRL:BAND1:FREQ 1.0E9**

**:SENS1:CORR:COLL:LRL:BAND1:FREQ?**

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:BAND{1-5}:LOSS <NRf>
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:BAND{1-5}:LOSS?
```

Description: Sets the line loss of the given band of the LRL CALA calibration on the indicated channel.

Returns the line loss of the given band of the LRL CALA calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in dB/mm.

Query Output: <NR3> The output parameter is in dB/mm.

Range: NA

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:LRL:BAND1:LOSS 3.0E0

```
:SENS1:CORR:COLL:LRL:BAND1:LOSS?
```

```
:SENSe{1-16}:CORRection:COLLect:LRL:BAND{1-5}:PORT12:FREQuency <NRf>
:SENSe{1-16}:CORRection:COLLect:LRL:BAND{1-5}:PORT12:FREQuency?
```

Applicability: MS46122, MS46131, MS46322, MS46522

Description: Sets the reference frequency for loss of the given band on the indicated port-pair of the LRL calibration on the indicated channel. The available port pair is 12, where it is fixed as Port 1 and Port 2.

Returns the reference frequency for loss of the given band on the indicated port-pair of the LRL calibration on the indicated channel. The available port pair is 12.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Output: <NR3> The output parameter is in Hertz.

Range: NA

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:LRL:BAND1:PORT12:FREQ 1.0E9

```
:SENS1:CORR:COLL:LRL:BAND1:PORT12:FREQ?
```

```
:SENSe{1-16}:CORRection:COLLect:LRL:BAND{1-5}:PORT12:LOSS <NRf>
:SENSe{1-16}:CORRection:COLLect:LRL:BAND{1-5}:PORT12:LOSS?
```

Applicability: MS46122, MS46131, MS46322, MS46522

Description: Sets the line loss of the given band on the indicated port-pair of the LRL calibration on the indicated channel. The available port pair is 12.

Returns the line loss of the given band on the indicated of the LRL calibration on the indicated channel. The available port-pair is 12.

Cmd Parameters: <NRf> The input parameter is in dB/mm.

Query Output: <NR3> The output parameter is in dB/mm.

Range: NA

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:LRL:BAND1:PORT12:LOSS 3.0E0

```
:SENS1:CORR:COLL:LRL:BAND1:PORT12:LOSS?
```

**:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:BAND{1-5}:REFlection:TYPE <char>**  
**:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:BAND{1-5}:REFlection:TYPE?**

Description: Sets the Band reflection type of the LRL CALA calibration on the indicated channel, where:

- OPENlike = The reflection type is more like an open.
- SHORTlike = The reflection type is more like a short.

Returns the reflection type of the LRL CALA calibration on the indicated channel for a given band.

Cmd Parameters: <char> OPENlike | SHORTlike

Query Output: <char> OPEN | SHORT

Range: NA

Default: OPEN

Syntax Example: :SENS1:CORR:COLL:LRL:BAND1:REFL:TYP OPEN  
:SENS1:CORR:COLL:LRL:BAND1:REFL:TYP?

**:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:CKIT:LOAD <string>**

Description: Loads an LRL /TRL cal kit file into CALA LRL calibration on the indicated channel.

No query.

Cmd Parameters: <string> Filename and path to the file in the form 'x:\directory\filename.lcf'  
where x:\directory\filename.lcf exists and filename.lcf is a valid LRL/TRL cal kit file.

Query Parameters: NA

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COLL:LRL:CKIT:LOAD 'c:\filename.lcf'

**:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:CKIT:NAMe <string>**

**:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:CKIT:NAMe?**

Description: Sets the name that will be stored in the LRL/TRL cal kit file.

Returns the name that was last set for the currently loaded file.

Cmd Parameters: <string> A name that will be associated with the current cal kit file.

Query Parameters: NA

Query Output: <string> The name that is currently associated with the current cal kit file.

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COLL:LRL:CKIT:NAM 'mylrlcalkitfile'  
:SENS1:CORR:COLL:LRL:CKIT:NAM?

**:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:CKIT:SAVe <string>**

Description: Saves an LRL cal kit file into CALA LRL calibration on the indicated channel.

No query.

Cmd Parameters: <string> Filename and path to the file in the form: 'x:\directory\filename.lcf'

Query Parameters: NA

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COLL:LRL:CKIT:SAV 'c:\filename.lcf'

**:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{1-10}:LINE**

Description: Initiates collection of the indicated Device Line Standard data for the CALA calibration.

No query

Cmd Parameters: <NRf> The input parameter is in Hertz.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:LRL:DEV1:LINE

**:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{1 | 3 | 5 | 7 | 9}:LINE:FREQuency <NRf>****:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{1 | 3 | 5 | 7 | 9}:LINE:FREQuency?**

Applicability: Command is per-band, rather than per device. Device numbers are used to calculate band numbers.

Description: Sets the reference frequency for loss of the given device of the LRL CALA calibration.

Returns the reference frequency for loss of the given device of the LRL CALA calibration.

Cmd Parameters: <NRf> The input parameter is in Hertz.

**Use of the following command to set the Reference Frequency per Band is recommended:**

```
:SENSe{1-16}:CORRection:COLLect:LRL:BAND{1-5}:PORT12:FREQuency
<NRf>
```

Query Parameters: <NR3> The output parameter is in Hertz.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:LRL:DEV1:LINE:FREQ 1.0E7

```
:SENS1:CORR:COLL:LRL:DEV1:LINE:FREQ?
```

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{1-10}:LINE:LENGth  
<NRf>  
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{1-10}:LINE:LENGth?
```

Description: Sets the line length of the given device of the LRL CALA calibration.

Returns the line length of the given device of the LRL CALA calibration.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:LRL:DEV1:LINE:LENG 1.0E0

```
:SENS1:CORR:COLL:LRL:DEV1:LINE:LENG?
```

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{1 | 3 | 5 | 7 |  
9}:LINE:LOSS <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{1 | 3 | 5 | 7 |  
9}:LINE:LOSS?
```

Applicability: Command is per-band, rather than per device. Device numbers are used to calculate band numbers.

Description: Sets the line loss of the given device of the LRL CALA calibration.

Returns the line loss of the given device of the LRL CALA calibration.

**Use of the following command to set the Reference Frequency per Band is recommended:**

```
:SENSe{1-16}:CORRection:COLLect:LRL:BAND{1-5}:PORT12:LOSS <NRf>
```

Cmd Parameters: <NRf> The input parameter is in dB/mm.

Query Parameters: <NR3> The output parameter is in dB/mm.

Range: MPND/1000 (MPND divided by 1000)

Default: 0

Syntax Example: :SENS1:CORR:COLL:LRL:DEV1:LINE:LOSS 3.0E0

```
:SENS1:CORR:COLL:LRL:DEV1:LINE:LOSS?
```

```
2 | 4 | 6 | 8 | 10}:PORT{1-4}:MATCH:C0 <NRf>
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{2 | 4 | 6 | 8 |
10}:PORT{1-4}:MATCH:C0?
```

**Applicability:** Match parameters are only applicable to the 2nd device in the band, i.e, the even devices.  
The use of Port 3 and/or Port 4 requires a 4-port VNA.

**Description:** Sets capacitance of the match device on the given port of the LRL CALA calibration. The C0 (C zero) coefficient is in Farads.

Returns capacitance of the match device on the given port of the LRL CALA calibration.

**Cmd Parameters:** <NRf> The input parameter is in Farads.

**Query Parameters:** <NR3> The output parameter is in Farads.

Range: MPND

Default: 0

**Syntax Example:** :SENS1:CORR:COLL:LRL:DEV2:PORT1:MATCH:C0 3.01E-12
:SENS1:CORR:COLL:LRL:DEV2:PORT1:MATCH:C0?

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{2 | 4 | 6 | 8 |
10}:PORT{1-4}:MATCH:C1 <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{2 | 4 | 6 | 8 |
10}:PORT{1-4}:MATCH:C1?
```

**Applicability:** Match parameters are only applicable to the 2nd device in the band, i.e, the even devices.  
The use of the optional :CALa parameter requires a 4-port VNA.

The use of Port 3 and/or Port 4 requires a 4-port VNA.

**Description:** Sets the C1 (C one) coefficient of the match device on the given port of the LRL CALA calibration. The C1 coefficient is in Farads/Hertz.

Returns the C1 coefficient of the match device on the given port of the LRL CALA calibration.

**Cmd Parameters:** <NRf> The input parameter is in Farads/Hertz.

**Query Parameters:** <NR3> The output parameter is in Farads/Hertz.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

**Syntax Example:** :SENS1:CORR:COLL:LRL:DEV2:PORT1:MATCH:C1 2.0E0

```
:SENS1:CORR:COLL:LRL:DEV2:PORT1:MATCH:C1?
```

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:C2 <NRf>  
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:C2?
```

**Applicability:** Match parameters are only applicable to the 2nd device in the band, i.e., the even devices.  
The use of the optional :CALa parameter requires a 4-port VNA.  
The use of Port 3 and/or Port 4 requires a 4-port VNA.

**Description:** Sets the C2 coefficient of the match device on the given port of the LRL CALA calibration.  
The C2 coefficient is in Farads/Hertz^2.  
Returns the C2 coefficient of the match device on the given port of the LRL CALA calibration.

**Cmd Parameters:** <NRf> The input parameter is in Farads/Hertz^2.

**Query Parameters:** <NR3> The output parameter is in Farads/Hertz^2.

**Range:** MPND

**Default Value:** See “Calibration Component Parameters” on page 2-31.

**Syntax Example:** :SENS1:CORR:COLL:LRL:DEV2:PORT1:MATCH:C2 2.0E0  
:SENS1:CORR:COLL:LRL:DEV2:PORT1:MATCH:C2?

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:C3 <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:C3?
```

**Applicability:** Match parameters are only applicable to the 2nd device in the band, i.e., the even devices.  
The use of the optional :CALa parameter requires a 4-port VNA.  
The use of Port 3 and/or Port 4 requires a 4-port VNA.

**Description:** Sets the C3 coefficient of the match device on the given port of the LRL CALA calibration.  
The C3 coefficient is in Farads/Hertz^3.  
Returns the C3 coefficient of the match device on the given port of the LRL CALA calibration.

**Cmd Parameters:** <NRf> The input parameter is in Farads/Hertz^3.

**Query Parameters:** <NR3> The output parameter is in Farads/Hertz^3.

**Range:** MPND

**Default Value:** See “Calibration Component Parameters” on page 2-31.

**Syntax Example:** :SENS1:CORR:COLL:LRL:DEV2:PORT1:MATCH:C3 2.0E0  
:SENS1:CORR:COLL:LRL:DEV2:PORT1:MATCH:C3?

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:L0 <NRf>  
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:L0?
```

**Applicability:** Match parameters are only applicable to the 2nd device in the band, i.e, the even devices.

The use of the optional :CALa parameter requires a 4-port VNA.

The use of Port 3 and/or Port 4 requires a 4-port VNA.

**Description:** Sets inductance of the match device on the given port of the LRL CALA calibration. The L0 (zero) coefficient is in Henrys.

Returns inductance of the match device on the given port of the LRL CALA calibration.

**Cmd Parameters:** <NRf> The input parameter is in Henrys.

**Query Parameters:** <NR3> The output parameter is in Henrys.

Range: MPND

Default: 0

**Syntax Example:** :SENS1:CORR:COLL:LRL:DEV2:PORT1:MATCH:L0 2.0E-6  
:SENS1:CORR:COLL:LRL:DEV2:PORT1:MATCH:L0?

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:L1 <NRf>  
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:L1?
```

**Applicability:** Match parameters are only applicable to the 2nd device in the band, i.e, the even devices.

The use of the optional :CALa parameter requires a 4-port VNA.

The use of Port 3 and/or Port 4 requires a 4-port VNA.

**Description:** Sets the L1 (L one) coefficient of the match device on the given port of the LRL CALA calibration. The L1 coefficient is in Henrys/Hertz.

Returns the L1 coefficient of the match device on the given port of the LRL CALA calibration.

**Cmd Parameters:** <NRf> The input parameter is in Henrys/Hertz.

**Query Parameters:** <NR3> The output parameter is in Henrys/Hertz.

Range: MPND

Default: 0

**Syntax Example:** :SENS1:CORR:COLL:LRL:DEV2:PORT1:MATCH:L1  
:SENS1:CORR:COLL:LRL:DEV2:PORT1:MATCH:L1?

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:L2 <NRf>  
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:L2?
```

**Applicability:** Match parameters are only applicable to the 2nd device in the band, i.e, the even devices.

The use of the optional :CALa parameter requires a 4-port VNA.

The use of Port 3 and/or Port 4 requires a 4-port VNA.

**Description:** Sets the L2 coefficient of the match device on the given port of the LRL CALA calibration.  
The L2 coefficient is in Henrys/Hertz^2.

Returns the L2 coefficient of the match device on the given port of the LRL CALA calibration.

**Cmd Parameters:** <NRf> The input parameter is in Henrys/Hertz^2.

**Query Parameters:** <NR3> The output parameter is in Henrys/Hertz^2.

Range: MPND

Default: 0

**Syntax Example:** :SENS1:CORR:COLL:LRL:DEV2:PORT1:MATCH:L2 2.0E0

```
:SENS1:CORR:COLL:LRL:DEV2:PORT1:MATCH:L2?
```

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:L3 <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:L3?
```

**Applicability:** Match parameters are only applicable to the 2nd device in the band, i.e, the even devices.

The use of the optional :CALa parameter requires a 4-port VNA.

The use of Port 3 and/or Port 4 requires a 4-port VNA.

**Description:** Sets the L3 coefficient of the match device on the given port of the LRL CALA calibration.  
The L3 coefficient is in Henrys/Hertz^3.

Returns the L3 coefficient of the match device on the given port of the LRL CALA calibration.

**Cmd Parameters:** <NRf> The input parameter is in Henrys/Hertz^3.

**Query Parameters:** <NR3> The output parameter is in Henrys/Hertz^3.

Range: MPND

Default: 0

**Syntax Example:** :SENS1:CORR:COLL:LRL:DEV2:PORT1:MATCH:L3 2.0E0

```
:SENS1:CORR:COLL:LRL:DEV2:PORT1:MATCH:L3?
```

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:OFF1 <NRf>  
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:OFF1?
```

**Applicability:** Match parameters are only applicable to the 2nd device in the band, i.e, the even devices.

The use of the optional :CALa parameter requires a 4-port VNA.

The use of Port 3 and/or Port 4 requires a 4-port VNA.

**Description:** Sets the offset Length1 coefficient of the match device on the given port of the LRL CALA calibration. The OFF1 coefficient is measured in Meters/Hertz.

Returns the offset Length1 coefficient of the match device on the given port of the LRL CALA calibration.

**Cmd Parameters:** <NRf> The input parameter is in Meters/Hertz.

**Query Parameters:** <NR3> The output parameter is in Meters/Hertz.

Range: MPND

Default: 0

**Syntax Example:** :SENS1:CORR:COLL:LRL:DEV2:PORT1:MATCH:OFF1 2.0E0  
:SENS1:CORR:COLL:LRL:DEV2:PORT1:MATCH:OFF1?

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:OFF2 <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:OFF2?
```

**Applicability:** Match parameters are only applicable to the 2nd device in the band, i.e, the even devices.

The use of the optional :CALa parameter requires a 4-port VNA.

The use of Port 3 and/or Port 4 requires a 4-port VNA.

**Description:** Sets the offset Length2 coefficient of the match device on the given port of the LRL CALA calibration. The OFF2 coefficient is measured in Meters/Hertz^2.

Returns the offset Length2 coefficient of the match device on the given port of the LRL CALA calibration.

**Cmd Parameters:** <NRf> The input parameter is in Meters/Hertz^2.

**Query Parameters:** <NR3> The output parameter is in Meters/Hertz^2.

Range: MPND

Default: 0

**Syntax Example:** :SENS1:CORR:COLL:LRL:DEV2:PORT1:MATCH:OFF2 2.0E0  
:SENS1:CORR:COLL:LRL:DEV2:PORT1:MATCH:OFF2?

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:OFF3 <NRf>  
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:OFF3?
```

**Applicability:** Match parameters are only applicable to the 2nd device in the band, i.e, the even devices.  
The use of the optional :CALa parameter requires a 4-port VNA.  
The use of Port 3 and/or Port 4 requires a 4-port VNA.

**Description:** Sets the offset Length3 coefficient of the match device on the given port of the LRL CALA calibration. The OFF3 coefficient is measured in Meters/Hertz^3.  
Returns the offset Length3 coefficient of the match device on the given port of the LRL CALA calibration.

**Cmd Parameters:** <NRf> The input parameter is in Meters/Hertz^3.

**Query Parameters:** <NR3> The output parameter is in Meters/Hertz^3.

Range: MPND

Default: 0

**Syntax Example:** :SENS1:CORR:COLL:LRL:DEV2:PORT1:MATCH:OFF3 2.0E0  
:SENS1:CORR:COLL:LRL:DEV2:PORT1:MATCH:OFF3?

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:OFFS <NRf>  
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:OFFS?
```

**Applicability:** Match parameters are only applicable to the 2nd device in the band, i.e, the even devices.  
The use of the optional :CALa parameter requires a 4-port VNA.  
The use of Port 3 and/or Port 4 requires a 4-port VNA.

**Description:** Sets offset length of the match device on the given port of the LRL CALA calibration.  
Returns offset length of the match device on the given port of the LRL CALA calibration.

**Cmd Parameters:** <NRf> The input parameter is in Meters.

**Query Parameters:** <NR3> The output parameter is in Meters.

Range: MPND

Default: 0

**Syntax Example:** :SENS1:CORR:COLL:LRL:DEV2:PORT1:MATCH:OFFS 1.0E0  
:SENS1:CORR:COLL:LRL:DEV2:PORT1:MATCH:OFFS?

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:R <NRf>  
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:R?
```

**Applicability:** Match parameters are only applicable to the 2nd device in the band, i.e, the even devices.

The use of the optional :CALa parameter requires a 4-port VNA.

The use of Port 3 and/or Port 4 requires a 4-port VNA.

**Description:** Sets resistance of the match device on the given port of the LRL CALA calibration.

Returns resistance of the match device on the given port of the LRL CALA calibration.

**Cmd Parameters:** <NRf> The input parameter is in Ohms.

**Query Parameters:** <NR3> The output parameter is in Ohms.

Range: MPND

Default: 5.00000000000E+001

**Syntax Example:** :SENS1:CORR:COLL:LRL:DEV2:PORT1:MATCH:R 7.5E1  
:SENS1:CORR:COLL:LRL:DEV2:PORT1:MATCH:R?

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:Z0 <NRf>  
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:Z0?
```

**Applicability:** Match parameters are only applicable to the 2nd device in the band, i.e, the even devices.

The use of the optional :CALa parameter requires a 4-port VNA.

The use of Port 3 and/or Port 4 requires a 4-port VNA.

**Description:** Sets impedance of the match device on the given port of the LRL CALA calibration.

Returns impedance of the match device on the given port of the LRL CALA calibration.

**Cmd Parameters:** <NRf> The input parameter is in Ohms.

**Query Parameters:** <NR3> The output parameter is in Ohms.

Range: MPND

Default: 5.00000000000E+001

**Syntax Example:** :SENS1:CORR:COLL:LRL:DEV2:PORT1:MATCH:Z0 7.5E1  
:SENS1:CORR:COLL:LRL:DEV2:PORT1:MATCH:Z0?

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{1-10}:TYPe <char>
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:DEViCe{1-10}:TYPe?
```

Description: Sets the type of the given device in the LRL CALA calibration.

Returns the type of the given device in the LRL CALA calibration.

Cmd Parameters: <char> LINE | MATCH | DEVICE1 | DEVICE2

Query Parameters: <char> LINE | MATCH | DEVICE1 | DEVICE2

Range: NA

Default: LINE

Syntax Example: :SENS1:CORR:COLL:LRL:DEV1:TYP LINE  
                  :SENS1:CORR:COLL:LRL:DEV1:TYP?

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:FREQuency:BREAKpoint <NRf>
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:FREQuency:BREAKpoint?
```

Description: Sets the breakpoint frequency of the LRL CALA calibration.

Returns the breakpoint frequency of the LRL CALA calibration.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: MPND

Default: 3.0000000000E+009

Syntax Example: :SENS1:CORR:COLL:LRL:FREQ:BRE 1.0E7  
                  :SENS1:CORR:COLL:LRL:FREQ:BRE?

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:FREQuency:BREAKpoint{1-4}
<NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:FREQuency:BREAKpoint{1-4}?
```

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description: Sets the breakpoint frequency between bands of LRL calibration on a indicated channel.

Returns the breakpoint frequency between bands of LRL calibration on a indicated channel.

For a 4-port system, the command is meant for CAL A of LRL.

In the command, the number next to BREAKpoint has the following correspondence:

- BREAKpoint1: Breakpoint frequency between bands 2 and 1
- BREAKpoint2: Breakpoint frequency between bands 3 and 2
- BREAKpoint3: Breakpoint frequency between bands 4 and 3
- BREAKpoint4: Breakpoint frequency between bands 5 and 4

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: MPND

Default: 3E09

Syntax Example: :SENS1:CORR:COLL:LRL:FREQ:BRE1 4E09  
                  :SENS1:CORR:COLL:LRL:FREQ:BRE1?

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:OPEN:OFFS <NRf>
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:OPEN:OFFS?
```

Description: Sets the offset length of the open-like reflection of the LRL CALA calibration.

Returns the offset length of the open-like reflection of the LRL CALA calibration.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:LRL:OPEN:OFFS 1.0E0  
                  :SENS1:CORR:COLL:LRL:OPEN:OFFS?

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:REFPlane <char>
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:REFPlane?
```

Description: Sets the location of the reference plane in the LRL CALA calibration, where:

- MIDdle = the middle of the transmission line
- END = the end of the transmission line

Returns the location of the reference plane in the LRL CALA calibration.

Cmd Parameters: <char> MIDdle | END

Query Parameters: <char> MID | END

Range: NA

Default: END

Syntax Example: :SENS1:CORR:COLL:LRL:REFP MID  
                  :SENS1:CORR:COLL:LRL:REFP?

```
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:SHORT:OFFS <NRf>
:SENSe{1-16}:CORRection:COLLect:LRL[:CALa]:SHORT:OFFS?
```

Description: Sets the offset length of the short-like reflection of the LRL CALA calibration.

Returns the offset length of the short-like reflection of the LRL CALA calibration.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:LRL:SHORT:OFFS 1.0E0  
                  :SENS1:CORR:COLL:LRL:SHORT:OFFS?

## 5-67 :SENSe{1-16}:CORRection:COLLect:LRL:CALB Subsystem

The :SENSe{1-16}:CORRection:COLLect:LRL:CALB subsystem commands provide control of Line-Reflect-Line second calibration (or CALB) configuration parameters, execution, and output reporting. The :LRL:CALB commands require a 4-port VNA.

### LRL Calibration Subsystems

The LRL-related calibration commands are organized into five subsystems in the following sections:

- “:SENSe{1-16}:CORRection:COLLect:LRL:CALB Subsystem” on page 5-377 (this subsystem)
- “:SENSe{1-16}:CORRection:COLLect:LRL:DEvice{1-10} Subsystem” on page 5-356
- “:SENSe{1-16}:CORRection:COLLect:LRL:PORT Subsystem – 4-Port” on page 5-360
- “:SENSe{1-16}:CORRection:COLLect:LRL:SINGleton Subsystem – 4-Port” on page 5-391
- “:SENSe{1-16}:CORRection:COLLect:LRL[:CALa] Subsystem” on page 5-363

**:SENSe{1-16}:CORRection:COLLect:LRL:CALB:BAND:COUNt <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:LRL:CALB:BAND:COUN?**

Applicability: MS46524

Description: Sets the number of bands to use in the LRL CALB calibration on the indicated channel.

Returns the number of bands to use in the LRL CALB calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is an integer.

Query Parameters: <NR1> The output parameter is an integer.

Range: 1 to 5

Default: 1

Syntax Example: :SENS1:CORR:COLL:LRL:CALB:BAND:COUN 2  
                  :SENS1:CORR:COLL:LRL:CALB:BAND:COUN?

**:SENSe{1-16}:CORRection:COLLect:LRL:CALB:BAND{1-5}:FREQuency <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:LRL:CALB:BAND{1-5}:FREQuency?**

Applicability: MS46524

Description: Sets the reference frequency for loss of the given band of the LRL CALB calibration on the indicated channel.

Returns the reference frequency for loss of the given band of the LRL CALB calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Output: <NR3> The output parameter is in Hertz.

Range: 7E4 to 7E10

Default: 0.00000000000E+000

Syntax Example: :SENS1:CORR:COLL:LRL:CALB:BAND1:FREQ 1.0E9  
                  :SENS1:CORR:COLL:LRL:CALB:BAND1:FREQ?

```
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:BAND{1-5}:LOSS <NRf>
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:BAND{1-5}:LOSS?
```

Applicability: MS46524

Description: Sets the line loss of the given band of the LRL CALB calibration on the indicated channel.

Returns the line loss of the given band of the LRL CALB calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in dB/mm.

Query Output: <NR3> The output parameter is in dB/mm.

Range: NA

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:LRL:CALB:BAND1:LOSS 3.0E0

```
:SENS1:CORR:COLL:LRL:CALB:BAND1:LOSS?
```

```
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:BAND{1-5}:REFLection:TYPe
<char>
```

```
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:BAND{1-5}:REFLection:TYPe?
```

Applicability: MS46524

Description: Sets the Band reflection type of the LRL CALB calibration on the indicated channel where the type can be set as:

- OPENlike = The reflection type is more like an Open.
- SHORTlike = The reflection type is more like a Short.

Returns the reflection type of the LRL CALB calibration on the indicated channel for a given band.

Cmd Parameters: <char> OPENlike | SHORTlike

Query Output: <char> OPEN | SHORT

Range: NA

Default: OPEN

Syntax Example: :SENS1:CORR:COLL:LRL:CALB:BAND1:REFL:TYP OPENlike

```
:SENS1:CORR:COLL:LRL:CALB:BAND1:REFL:TYP?
```

```
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:CKIT:LOAD <string>
```

Applicability: MS46524

Description: Loads an LRL/TRL cal kit file into CALB LRL calibration on the indicated channel.

No query.

Cmd Parameters: <string> Filename and path to the file in the form 'x:\directory\filename.lcf' where x:\directory\filename.lcf exist and filename.lcf is a valid LRL/TRL cal kit file.

Query Parameters: NA

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COLL:LRL:CALB:CKIT:LOAD 'c:\filename.lcf'

**:SENSe{1-16}:CORRection:COLLect:LRL:CALB:CKIT:NAME <string>**  
**:SENSe{1-16}:CORRection:COLLect:LRL:CALB:CKIT:NAME?**

Applicability: MS46524

Description: Sets the name that will be stored in the LRL/TRL cal kit file.

Returns the name that was last set for the currently loaded file.

Cmd Parameters: <string> A name that will be associated with the current cal kit file.

Query Output: <char> The name that is currently associated with the current cal kit file.

Range: NA

Default: NA

Syntax Example: **:SENS1:CORR:COLL:LRL:CALB:CKIT:NAM 'mylrlcalkit'**  
**:SENS1:CORR:COLL:LRL:CKIT:NAM?**

**:SENSe{1-16}:CORRection:COLLect:LRL:CALB:CKIT:SAVE <string>**

Applicability: MS46524

Description: Saves an LRL cal kit file in the CALB LRL calibration on the indicated channel.

No query.

Cmd Parameters: <string> Filename and path to the file in the form: 'x:\directory\filename.lcf'

Query Parameters: NA

Range: NA

Default: NA

Syntax Example: **:SENS1:CORR:COLL:LRL:CALB:CKIT:SAV 'c:\filename.lcf'**

**:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEVICE{1-10}:LINE**

Applicability: MS46524

Description: Initiates collection of the indicated Device Line Standard data for the CALB calibration on the indicated channel.

No query.

Cmd Parameters: NA

Range: MPND

Default: 0

Syntax Example: **:SENS1:CORR:COLL:LRL:CALB:DEV1:LINE**

```
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{1 | 3 | 5 | 7 | 9}:LINE:FREQuency <NRf>
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{1 | 3 | 5 | 7 | 9}:LINE:FREQuency?
```

Applicability: MS46524

Command is per-band, rather than per device. Device numbers are used to calculate band numbers.

Description: Sets the reference frequency for loss of the given device of the LRL CALB calibration on the indicated channel.

Returns the reference frequency for loss of the given device of the LRL CALB calibration on the indicated channel.

**Use of the following command to set the Reference Frequency per Band is recommended:**

```
:SENSe{1-16}:CORRection:COLLect:LRL:BAND{1-5}:PORT12:FREQuency
<NRf>
```

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:LRL:CALB:DEV1:LINE:FREQ 1.0E7

```
:SENS1:CORR:COLL:LRL:CALB:DEV1:LINE:FREQ?
```

```
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{1-10}:LINE:LENGth <NRf>
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{1-10}:LINE:LENGth?
```

Applicability: MS46524

Description: Sets the line length of the given device of the LRL CALB calibration on the indicated channel.

Returns the line length of the given device of the LRL CALB calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:LRL:CALB:DEV1:LINE:LENG 2.5E-2

```
:SENS1:CORR:COLL:LRL:CALB:DEV1:LINE:LENG?
```

```
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{1 | 3 | 5 | 7 | 9}:LINE:LOSS <NRf>
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{1 | 3 | 5 | 7 | 9}:LINE:LOSS?
```

Applicability: MS46524

Command is per-band, rather than per device. Device numbers are used to calculate band numbers.

Description: Sets the line loss of the given device of the LRL CALB calibration on the indicated channel.

Returns the line loss of the given device of the LRL CALB calibration on the indicated channel.

**Use of the following command to set the Reference Frequency per Band is recommended:**

```
:SENSe{1-16}:CORRection:COLLect:LRL:BAND{1-5}:PORT12:LOSS <NRf>
```

Cmd Parameters: <NRf> The input parameter is in dB/mm.

Query Parameters: <NR3> The output parameter is in dB/mm.

Range: MPND/1000 (MPND divided by 1000)

Default: 0

Syntax Example: :SENS1:CORR:COLL:LRL:CALB:DEV1:LINE:LOSS 3.0E0
:SENS1:CORR:COLL:LRL:CALB:DEV1:LINE:LOSS?

```
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{2 | 4 | 6 | 8 | 10}:PORT{1-4}:MATCH:C0 <NRf>
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{2 | 4 | 6 | 8 | 10}:PORT{1-4}:MATCH:C0?
```

Applicability: MS46524

Match parameters are only applicable to the 2nd device in the band, i.e, the even devices.

Description: Sets the capacitance of the match device on the indicated port of the LRL CALB calibration on the indicated channel.

Returns the capacitance of the match device on the indicated port of the LRL CALB calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Farads.

Query Parameters: <NR3> The output parameter is in Farads.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:LRL:CALB:DEV2:PORT1:MATCH:C0 3.01E-12
:SENS1:CORR:COLL:LRL:CALB:DEV2:PORT1:MATCH:C0?

```
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{2 | 4 | 6 | 8 | 10}:PORT{1-4}:MATCH:C1 <NRf>
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{2 | 4 | 6 | 8 | 10}:PORT{1-4}:MATCH:C1?
```

Applicability: MS46524

Match parameters are only applicable to the 2nd device in the band, i.e, the even devices.

Description: Sets the C1 coefficient of the match device on the indicated port of the LRL CALB calibration on the indicated channel.

Returns the C1 coefficient of the match device on the indicated port of the LRL CALB calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Farads/Hertz.

Query Parameters: <NR3> The output parameter is in Farads/Hertz.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:LRL:CALB:DEV2:PORT1:MATCH:C1 2.0E0
:SENS1:CORR:COLL:LRL:CALB:DEV2:PORT1:MATCH:C1?

```
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{2 | 4 | 6 | 8 | 10}:PORT{1-4}:MATCH:C2 <NRf>
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{2 | 4 | 6 | 8 | 10}:PORT{1-4}:MATCH:C2?
```

Applicability: MS46524

Match parameters are only applicable to the 2nd device in the band, i.e, the even devices.

Description: Sets the C2 coefficient of the match device on the indicated port of the LRL CALB calibration on the indicated channel.

Returns the C2 coefficient of the match device on the indicated port of the LRL CALB calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Farads/Hertz^2.

Query Parameters: <NR3> The output parameter is in Farads/Hertz^2.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:LRL:CALB:DEV2:PORT1:MATCH:C2 2.0E0
:SENS1:CORR:COLL:LRL:CALB:DEV2:PORT1:MATCH:C2?

```
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:C3 <NRf>  
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:C3?
```

Applicability: MS46524

Match parameters are only applicable to the 2nd device in the band, i.e, the even devices.

Description: Sets the C3 coefficient of the match device on the indicated port of the LRL CALB calibration on the indicated channel.

Returns the C3 coefficient of the match device on the indicated port of the LRL CALB calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Farads/Hertz^3.

Query Parameters: <NR3> The output parameter is in Farads/Hertz^3.

Range: MPND

Default Value: See “Calibration Component Parameters” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:LRL:CALB:DEV2:PORT1:MATCH:C3 2.0E0  
:SENS1:CORR:COLL:LRL:CALB:DEV2:PORT1:MATCH:C3?

```
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:L0 <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:L0?
```

Applicability: MS46524

Use of Port 3 or Port 4 requires a four-port instrument.

Match parameters are only applicable to the 2nd device in the band, i.e, the even devices.

Description: Sets the inductance of the match device on the indicated port of the LRL CALB calibration on the indicated channel.

Returns inductance of the match device on the indicated port of the LRL CALB calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Henrys.

Query Parameters: <NR3> The output parameter is in Henrys.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:LRL:CALB:DEV2:PORT1:MATCH:L0 2.0E-6  
:SENS1:CORR:COLL:LRL:CALB:DEV2:PORT1:MATCH:L0?

```
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{2 | 4 | 6 | 8 | 10}:PORT{1-4}:MATCH:L1 <NRf>
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{2 | 4 | 6 | 8 | 10}:PORT{1-4}:MATCH:L1?
```

Applicability: MS46524

Match parameters are only applicable to the 2nd device in the band, i.e, the even devices.

Description: Sets the L1 coefficient of the match device on the indicated port of the LRL CALB calibration on the indicated channel.

Returns the L1 coefficient of the match device on the indicated port of the LRL CALB calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz.

Query Parameters: <NR3> The output parameter is in Henrys/Hertz.

Range: MPND

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:LRL:CALB:DEV2:PORT1:MATCH:L1 1.4
:SENS1:CORR:COLL:LRL:CALB:DEV2:PORT1:MATCH:L1?

```
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{2 | 4 | 6 | 8 | 10}:PORT{1-4}:MATCH:L2 <NRf>
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{2 | 4 | 6 | 8 | 10}:PORT{1-4}:MATCH:L2?
```

Applicability: MS46524

Match parameters are only applicable to the 2nd device in the band, i.e, the even devices.

Description: Sets the L2 coefficient of the match device on the indicated port of the LRL CALB calibration on the indicated channel.

Returns the L2 coefficient of the match device on the indicated port of the LRL CALB calibration on the indicated channel.

Cmd Parameters: <NRf> in units of Meters/Hertz^2 (Meters per Hertz squared)

Query Parameters: <NR3> in units of Meters/Hertz^2

Range: MPND with units of Meters/Hertz^2

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:LRL:CALB:DEV2:PORT1:MATCH:L2 10.3E-10
:SENS1:CORR:COLL:LRL:CALB:DEV2:PORT1:MATCH:L2?

```
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:L3 <NRf>  
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:L3?
```

Applicability: MS46524

Match parameters are only applicable to the 2nd device in the band, i.e, the even devices.

Description: Sets the L3 coefficient of the match device on the indicated port of the LRL CALB calibration on the indicated channel.

Returns the L3 coefficient of the match device on the indicated port of the LRL CALB calibration on the indicated channel.

Cmd Parameters: <NRf> in Henrys/Hertz^3 (Meters per Hertz cubed)

Query Parameters: <NR3> in Henrys/Hertz^3

Range: MPND

Default Value: 0

Syntax Example: :SENS1:CORR:COLL:LRL:CALB:DEV2:PORT1:MATCH:L3 1.32E-25  
:SENS1:CORR:COLL:LRL:CALB:DEV2:PORT1:MATCH:L3?

```
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:OFF1 <NRf>  
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:OFF1?
```

Applicability: MS46524

Match parameters are only applicable to the 2nd device in the band, i.e, the even devices.

Description: Sets the offset length coefficient1 of the match device on the indicated port of the LRL CALB calibration on the indicated channel.

Returns the offset length coefficient1 of the match device on the indicated port of the LRL CALB calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:LRL:CALB:DEV2:PORT1:MATCH:OFF1 1.0E0  
:SENS1:CORR:COLL:LRL:CALB:DEV2:PORT1:MATCH:OFF1?

```
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEvice{2 | 4 | 6 | 8 |
10}:PORT{1-4}:MATCH:OFF2 <NRf>
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEvice{2 | 4 | 6 | 8 |
10}:PORT{1-4}:MATCH:OFF2?
```

Applicability: MS46524

Match parameters are only applicable to the 2nd device in the band, i.e, the even devices.

Description: Sets the offset length coefficient2 of the match device on the indicated port of the LRL CALB calibration on the indicated channel.

Returns the offset length coefficient2 of the match device on the indicated port of the LRL CALB calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:LRL:CALB:DEV2:PORT1:MATCH:OFF2 1.0E0
:SENS1:CORR:COLL:LRL:CALB:DEV2:PORT1:MATCH:OFF2?

```
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEvice{2 | 4 | 6 | 8 |
10}:PORT{1-4}:MATCH:OFF3 <NRf>
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEvice{2 | 4 | 6 | 8 |
10}:PORT{1-4}:MATCH:OFF3?
```

Applicability: MS46524

Match parameters are only applicable to the 2nd device in the band, i.e, the even devices.

Description: Sets the offset length coefficient3 of the match device on the indicated port of the LRL CALB calibration on the indicated channel.

Returns the offset length coefficient3 of the match device on the indicated port of the LRL CALB calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:LRL:CALB:DEV2:PORT1:MATCH:OFF3 1.0E0
:SENS1:CORR:COLL:LRL:CALB:DEV2:PORT1:MATCH:OFF3?

```
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:OFFS <NRf>  
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:OFFS?
```

Applicability: MS46524

Match parameters are only applicable to the 2nd device in the band, i.e, the even devices.

Description: Sets the offset length of the match device on the indicated port of the LRL CALB calibration on the indicated channel.

Use of Port 3 or Port 4 requires a four-port instrument.the offset length of the match device on the indicated port of the LRL CALB calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default: 0.000000000E+000

Syntax Example: :SENS1:CORR:COLL:LRL:CALB:DEV2:PORT1:MATCH:OFFS 1.0E0  
:SENS1:CORR:COLL:LRL:CALB:DEV2:PORT1:MATCH:OFFS?

```
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:R <NRf>  
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{2 | 4 | 6 | 8 |  
10}:PORT{1-4}:MATCH:R?
```

Applicability: MS46524

Match parameters are only applicable to the 2nd device in the band, i.e, the even devices.

Description: Sets the resistance of the match device on the indicated port of the LRL CALB calibration on the indicated channel.

Returns resistance of the match device on the indicated port of the LRL CALB calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Ohms.

Query Parameters: <NR3> The output parameter is in Ohms.

Range: MPND

Default: 5.00000000000E+001

Syntax Example: :SENS1:CORR:COLL:LRL:CALB:DEV2:PORT1:MATCH:R 7.5E1  
:SENS1:CORR:COLL:LRL:CALB:DEV2:PORT1:MATCH:R?

```
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{2 | 4 | 6 | 8 | 10}:PORT{1-4}:MATCH:Z0 <NRf>
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{2 | 4 | 6 | 8 | 10}:PORT{1-4}:MATCH:Z0?
```

Applicability: MS46524

Match parameters are only applicable to the 2nd device in the band, i.e, the even devices.

Description: Sets the impedance of the match device on the indicated port of the LRL CALB calibration on the indicated channel.

Returns the impedance of the match device on the indicated port of the LRL CALB calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Ohms.

Query Parameters: <NR3> The output parameter is in Ohms.

Range: MPND

Default: 5.0000000000E+001

Syntax Example: :SENS1:CORR:COLL:LRL:CALB:DEV2:PORT1:MATCH:Z0 7.5E1  
:SENS1:CORR:COLL:LRL:CALB:DEV2:PORT1:MATCH:Z0?

```
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{1-10}:TYPe <char>
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:DEViCe{1-10}:TYPe?
```

Applicability: MS46524

Description: Sets the type of the given device in the LRL CALB calibration on the indicated channel.

Returns the type of the given device in the LRL CALB calibration on the indicated channel.

Cmd Parameters: <char> LINE | MATCH | DEVICE1 | DEVICE2

Query Parameters: <char> LINE | MATCH | DEVICE1 | DEVICE2

Range: NA

Default: LINE

Syntax Example: :SENS1:CORR:COLL:LRL:CALB:DEV1:TYP LINE  
:SENS1:CORR:COLL:LRL:CALB:DEV1:TYP?

```
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:FREQuency:BREAKpoint <NRf>
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:FREQuency:BREAKpoint?
```

Applicability: MS46524

Description: Sets the breakpoint frequency of the LRL CALB calibration on the indicated channel.

Returns the breakpoint frequency of the LRL CALB calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: MPND

Default: 3.000000000E+009

Syntax Example: :SENS1:CORR:COLL:LRL:CALB:FREQ:BRE 1.0E7  
:SENS1:CORR:COLL:LRL:CALB:FREQ:BRE?

```
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:FREQuency:BREAKpoint{1-4}
    <NRf>
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:FREQuency:BREAKpoint{1-4}?
```

Applicability: MS46524

Description: Sets the breakpoint frequency between bands of LRL CALB calibration on the indicated channel.

Returns the breakpoint frequency between bands of LRL CALB calibration on the indicated channel.

In the command, the number next to BREAKpoint has the following correspondence:

- BREAKpoint1: Breakpoint frequency between bands 2 and 1
- BREAKpoint2: Breakpoint frequency between bands 3 and 2
- BREAKpoint3: Breakpoint frequency between bands 4 and 3
- BREAKpoint4: Breakpoint frequency between bands 5 and 4

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: MPND

Default: 3E09

Syntax Example: :SENS1:CORR:COLL:LRL:CALB:FREQ:BRE1 4E09  
:SENS1:CORR:COLL:LRL:CALB:FREQ:BRE1?

```
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:OPEN:OFFS <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:LRL:CALB:OPEN:OFFS?
```

Applicability: MS46524

Description: Sets the offset length of the open like reflection of the LRL CALB calibration on the indicated channel.

Returns the offset length of the open like reflection of the LRL CALB calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default: 0.000000000E+000

Syntax Example: :SENS1:CORR:COLL:LRL:CALB:OPEN:OFFS 1.0E0  
:SENS1:CORR:COLL:LRL:CALB:OPEN:OFFS?

**:SENSe{1-16}:CORRection:COLLect:LRL:CALB:REFPlane <char>**

**:SENSe{1-16}:CORRection:COLLect:LRL:CALB:REFPlane?**

Applicability: MS46524

Description: Sets the location of the reference plane in the LRL CALB calibration on the indicated channel to either the middle or the end of the calibration line.

Returns the location of the reference plane in the LRL CALB calibration on the indicated channel.

Cmd Parameters: <char> MIDdle | END

Query Parameters: <char> MID | END

Range: NA

Default: END

Syntax Example: **:SENS1:CORR:COLL:LRL:CALB:REFP MID**

**:SENS1:CORR:COLL:LRL:CALB:REFP?**

**:SENSe{1-16}:CORRection:COLLect:LRL:CALB:SHORT:OFFS <NRf>**

**:SENSe{1-16}:CORRection:COLLect:LRL:CALB:SHORT:OFFS?**

Applicability: MS46524

Description: Sets the offset length of the short like reflection of the LRL CALB calibration on the indicated channel.

Returns the offset length of the short like reflection of the LRL CALB calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default: 0

Syntax Example: **:SENS1:CORR:COLL:LRL:CALB:SHORT:OFFS 1.0E0**

**:SENS1:CORR:COLL:LRL:CALB:SHORT:OFFS?**

## 5-68 :SENSe{1-16}:CORRection:COLLect:LRL:SINGleton Subsystem – 4-Port

The :SENSe{1-16}:CORRection:COLLect:LRL:SINGleton subsystem commands provide configuration control of the Line-Reflect-Line calibration using singletons in different configurations. The commands provide control of singleton configuration parameters and output reporting. The use of the :LRL:SINGleton commands require a 4-port VNA.

### LRL Calibration Subsystems

The LRL-related calibration commands are organized into five (5) subsystems in the following sections:

- “:SENSe{1-16}:CORRection:COLLect:LRL:CALB Subsystem” on page 5-377
- “:SENSe{1-16}:CORRection:COLLect:LRL:DEViCe{1-10} Subsystem” on page 5-356
- “:SENSe{1-16}:CORRection:COLLect:LRL:PORT Subsystem – 4-Port” on page 5-360
- “:SENSe{1-16}:CORRection:COLLect:LRL:SINGleton Subsystem – 4-Port” on page 5-391 (this subsystem)
- “:SENSe{1-16}:CORRection:COLLect:LRL[:CALa] Subsystem” on page 5-363

#### :SENSe{1-16}:CORRection:COLLect:LRL:SINGleton:CKIT:LOAD <string>

Applicability: MS46524

Description: Loads an LRL/TRL cal kit file into the Singleton LRL calibration on the indicated channel.

No query.

Cmd Parameters: <string> Filename and path to the file in the form:

x:\directory\filename.lcf

where x:\directory\filename.lcf exist and filename.lcf is a valid LRL/TRL cal kit file.

Query Parameters: NA

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COLL:LRL:SING:CKIT:LOAD 'c:\filename.lcf'

#### :SENSe{1-16}:CORRection:COLLect:LRL:SINGleton:CKIT:NAMe <string>

#### :SENSe{1-16}:CORRection:COLLect:LRL:SINGleton:CKIT:NAMe?

Applicability: MS46524

Description: Sets the name that will be stored in the Singleton LRL/TRL cal kit file.

Returns the name that was last set for the currently loaded file.

Cmd Parameters: <char> A name that will be associated with the current cal kit file.

Query Output: <char> The name that is currently associated with the current cal kit file.

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COLL:LRL:SING:CKIT:NAM 'mylrlcalkit'

:SENS1:CORR:COLL:LRL:SING:CKIT:NAM?

**:SENSe{1-16}:CORRection:COLLect:LRL:SINGleton:CKIT:SAVE <string>**

Applicability: MS46524

Description: Saves an LRL cal kit file into the Singleton calibration on the indicated channel.

No query.

Cmd Parameters: <string> Filename and path to the file in the form:

x:\directory\filename.lcf

Query Parameters: NA

Range: NA

Default: NA

Syntax Example: SENS1:CORR:COLL:LRL:SING:CKIT:SAV 'c:\filename.lcf'

**:SENSe{1-16}:CORRection:COLLect:LRL:SINGleton:OPEN:C0 <NRf>****:SENSe{1-16}:CORRection:COLLect:LRL:SINGleton:OPEN:C0?**

Applicability: MS46524

Description: Sets the capacitance of the LRL singleton open on the indicated channel. The C0 (zero) coefficient is measured in Farads.

Returns the capacitance of the LRL singleton open on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Farads.

Query Parameters: <NR3> The output parameter is in Farads.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:LRL:SING:OPEN:C0 3.01E-12

:SENS1:CORR:COLL:LRL:SING:OPEN:C0?

**:SENSe{1-16}:CORRection:COLLect:LRL:SINGleton:OPEN:C1 <NRf>****:SENSe{1-16}:CORRection:COLLect:LRL:SINGleton:OPEN:C1?**

Applicability: MS46524

Description: Sets the C1 (C one) coefficient of the LRL singleton open on the indicated channel. The C1 coefficient is measured in Farads/Hertz.

Returns the C1 coefficient of the LRL singleton open on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Farads/Hertz.

Query Parameters: <NR3> The output parameter is in Farads/Hertz.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:LRL:SING:OPEN:C1 2.0E0

:SENS1:CORR:COLL:LRL:SING:OPEN:C1?

**:SENSe{1-16}:CORRection:COLLect:LRL:SINGleton:OPEN:C2 <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:LRL:SINGleton:OPEN:C2?**

Applicability: MS46524

Description: Sets the C2 coefficient of the LRL singleton open on the indicated channel. The C2 coefficient is measured in Farads/Hertz<sup>2</sup>.

Returns the C2 coefficient of the LRL singleton open on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Farads/Hertz<sup>2</sup> (Farads per Hertz squared).

Query Parameters: <NR3> The output parameter is in Farads/Hertz<sup>2</sup>.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:LRL:SING:OPEN:C2 2.0E0  
:SENS1:CORR:COLL:LRL:SING:OPEN:C2?

**:SENSe{1-16}:CORRection:COLLect:LRL:SINGleton:OPEN:C3 <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:LRL:SINGleton:OPEN:C3?**

Applicability: MS46524

Description: Sets the C3 coefficient of the LRL singleton open on the indicated channel. The C3 coefficient is measured in Farads/Hertz<sup>3</sup>.

Returns the C3 coefficient of the LRL singleton open on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Farads/Hertz<sup>3</sup> (Farads per Hertz cubed).

Query Parameters: <NR3> The output parameter is in Farads/Hertz<sup>3</sup>.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:LRL:SING:OPEN:C3 2.0E0  
:SENS1:CORR:COLL:LRL:SING:OPEN:C3?

```
:SENSe{1-16}:CORRection:COLLect:LRL:SINGleton:OPEN:OFFSet <NRf>
:SENSe{1-16}:CORRection:COLLect:LRL:SINGleton:OPEN:OFFSet?
```

Applicability: MS46524

Description: On 4-port VNAs, sets the offset length of the LRL singleton open on the indicated channel for a three-port LRL calibration. A prior command defined the singleton as open or short. This command then defines open/short nature of that singleton. For port-pair and singleton LRL calibrations, the following combinations are allowed:

- Port Pair 1-2 with singleton 3 or 4
- Port Pair 1-3 with singleton 2 or 4
- Port Pair 1-4 with singleton 2 or 3
- Port Pair 2-3 with singleton 1 or 2
- Port Pair 2-4 with singleton 1 or 3
- Port Pair 3-4 with singleton 1 or 2

Returns the offset length of the LRL singleton open on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:LRL:SING:OPEN:OFFS 1.0E0  
                  :SENS1:CORR:COLL:LRL:SING:OPEN:OFFS?

```
:SENSe{1-16}:CORRection:COLLect:LRL:SINGleton:REFlection:TYPe <char>
:SENSe{1-16}:CORRection:COLLect:LRL:SINGleton:REFlection:TYPe?
```

Applicability: MS46524

Description: Assigns the LRL Singleton reflection type on the indicated channel.

Returns the LRL Singleton reflection type on the indicated channel.

Cmd Parameters: <char> OPEN | SHORt

Query Parameters: <char> OPEN | SHOR

Range: NA

Default: OPEN

Syntax Example: :SENS1:CORR:COLL:LRL:SING:REFL:TYP SHOR  
                  :SENS1:CORR:COLL:LRL:SING:REFL:TYP?

**:SENSe{1-16}:CORRection:COLLect:LRL:SINGleton:SHORT:L0 <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:LRL:SINGleton:SHORT:L0?**

Applicability: MS46524

Description: Sets the inductance of the LRL singleton short on the indicated channel. The L0 (zero) coefficient is measured in Henrys.

Returns the inductance of the LRL singleton short on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Henrys.

Query Parameters: <NR3> The output parameter is in Henrys.

Range: MPND

Default: 0

Syntax Example: **:SENS1:CORR:COLL:LRL:SING:SHOR:L0 2.0E-6**  
**:SENS1:CORR:COLL:LRL:SING:SHOR:L0?**

**:SENSe{1-16}:CORRection:COLLect:LRL:SINGleton:SHORT:L1 <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:LRL:SINGleton:SHORT:L1?**

Applicability: MS46524

Description: Sets the L1 (L one) coefficient of the LRL singleton short on the indicated channel. The L1 coefficient is measured in Henrys/Hertz.

Returns the L1 coefficient of the LRL singleton short on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz.

Query Parameters: <NR3> The output parameter is in Henrys/Hertz.

Range: MPND

Default: 0

Syntax Example: **:SENS1:CORR:COLL:LRL:SING:SHOR:L1 2.0E0**  
**:SENS1:CORR:COLL:LRL:SING:SHOR:L1?**

**:SENSe{1-16}:CORRection:COLLect:LRL:SINGleton:SHORT:L2 <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:LRL:SINGleton:SHORT:L2?**

Applicability: MS46524

Description: Sets the L2 coefficient of the LRL singleton short on the indicated channel. The L2 coefficient is measured in Henrys/Hertz<sup>2</sup>.

Returns the L2 coefficient of the LRL singleton short on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz<sup>2</sup> (Henry per Hertz squared).

Query Parameters: <NR3> The output parameter is in Henrys/Hertz<sup>2</sup>.

Range: MPND

Default: 0

Syntax Example: **:SENS1:CORR:COLL:LRL:SING:SHOR:L2 2.0E0**  
**:SENS1:CORR:COLL:LRL:SING:SHOR:L2?**

```
:SENSe{1-16}:CORRection:COLLect:LRL:SINGleton:SHORT:L3 <NRf>
:SENSe{1-16}:CORRection:COLLect:LRL:SINGleton:SHORT:L3?
```

Applicability: MS46524

Description: Sets the L3 coefficient of the LRL singleton short on the indicated channel. The L3 coefficient is measured in Henrys/Hertz<sup>3</sup>.

Returns the L3 coefficient of the LRL singleton short on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz<sup>3</sup> (Henrys per Hertz cubed).

Query Parameters: <NR3> The output parameter is in Henrys/Hertz<sup>3</sup>.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:LRL:SING:SHOR:L3 2.0E0

```
:SENS1:CORR:COLL:LRL:SING:SHOR:L3?
```

```
:SENSe{1-16}:CORRection:COLLect:LRL:SINGleton:SHORT:OFFSet <NRf>
:SENSe{1-16}:CORRection:COLLect:LRL:SINGleton:SHORT:OFFSet?
```

Applicability: MS46524

Description: Sets the offset length of the LRL singleton short on the indicated channel.

Returns the offset length of the LRL singleton short on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:LRL:SING:SHOR:OFFS 1.0E0

```
:SENS1:CORR:COLL:LRL:SING:SHOR:OFFS?
```

## 5-69 :SENSe{1-16}:CORRection:COLLect:LRL:WAveguide Subsystem

The :SENSe{1-16}:CORRection:COLLect:LRL:WAveguide subsystem commands provide control of the waveguide Line-Reflect-Line parameters for dielectric and cutoff frequency values.

### LRL Calibration Subsystems

The LRL-related calibration commands are organized into four (4) subsystems in the following section:

- [Section 5-66 :SENSe{1-16}:CORRection:COLLect:LRL\[:CALa\] Subsystem on page 5-363](#)

**:SENSe{1-16}:CORRection:COLLect:LRL:WAveguide:DIElectric <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:LRL:WAveguide:DIElectric?**

Description: Sets the LRL waveguide calibration dielectric for the given channel.

Returns the LRL waveguide calibration dielectric for the given channel.

Cmd Parameters: <NRf>

Query Parameters: NA

Output: <NR3>

Range: MPND

Default: NA

Syntax Example: :SENS1:CORR:COLL:LRL:WAV:DIEL <NRf>  
:SENS1:CORR:COLL:LRL:WAV:DIEL?

**:SENSe{1-16}:CORRection:COLLect:LRL:WAveguide:FREQuency <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:LRL:WAveguide:FREQuency?**

Description: Sets the LRL waveguide calibration cutoff frequency for the given channel.

Returns the LRL waveguide calibration dielectric for the given channel.

Cmd Parameters: <NRf>

Query Parameters: NA

Output: <NR3>

Range: MPND

Default: NA

Syntax Example: :SENS1:CORR:COLL:LRL:WAV:FREQ <NRf>  
:SENS1:CORR:COLL:LRL:WAV:FREQ?

**5-70 :SENSe{1-16}:CORRection:COLLect Subsystem**

## 5-71 :SENSe{1-16}:CORRection:COLLect:METHod Subsystem

The :SENSe{1-16}:CORRection:COLLect:METHod subsystem command sets the calibration method. When configuring the instrument calibration this option must be set first, generally followed by line type, and finally calibration type. Optionally, these commands are followed by coefficient and characterization commands for user-defined calibration devices and kits.

### Calibration Setup Subsystems

These subsystems are used during various phases of calibration configuration setup:

- “:CALCulate{1-16}:REFerence Subsystem” on page 5-144
- “:SENSe{1-16}:CORRection:COLLect:METHod Subsystem” on page 5-399
- “:SENSe{1-16}:CORRection:COLLect:MULTIple Subsystem” on page 5-405
- “:SENSe{1-16}:CORRection:COLLect[:CALa]:PORT Subsystem” on page 5-450
- “:SENSe{1-16}:CORRection:COLLect:SOLX:CALKit Subsystem” on page 5-470
- “:SENSe{1-16}:CORRection:INTerpolation Subsystem” on page 5-507
- “:SENSe{1-16}:CORRection:ISOLation Subsystem” on page 5-508
- “:SENSe{1-16}:CORRection:STATe Subsystem” on page 5-509

**:SENSe{1-16}:CORRection:COLLect:METHod <char>**  
**:SENSe{1-16}:CORRection:COLLect:METHod?**

**Description:** Sets the calibration method for the indicated channel. The following calibration methods are available:

- AUTOcal = Automatic Calibrator (AutoCal) Module calibration method using Anritsu 36585-Series Precision AutoCal Modules
- SMARTcal = USB SmartCal Module calibration method using Anritsu MN25xxx Series SmartCal Modules
- SMAR4 = USB SmartCal Module calibration method using MN254XX SmartCal Modules
- ACLight = Automatic Calibrator (AutoCal) Module calibration method using Anritsu 36581-Series Standard AutoCal Modules.
- LRL = Line-Reflect-Line calibration method
- LRM = Line Reflect-Match calibration method
- SOLR = Short-Open-Load-Reciprocal calibration method
- SOLT = Short-Open-Load-Through calibration method
- SSLT = Short-Short-Load-Through calibration method
- SSST = Short-Short-Short-Through calibration method
- TRX = Thru-Reflect-Line/Match calibration method

Returns the calibration method for the indicated channel.

**Cmd Parameters:** <char> AUTOcal | ACLight | LRL | LRM | SMARTcal | SMAR4 | SOLR | SOLT | SSLT | SSST | TRX

**Query Parameters:** <char> AUTO | ACLI | LRL | LRM | SMAR | SMAR4 | SOLR | SOLT | SSLT | SSST | TRX

**Range:** NA

**Default Value:** SOLT

**Syntax Example:** :SENS1:CORR:COLL:METH AUTO

:SENS1:CORR:COLL:METH?

## 5-72 :SENSe{1-16}:CORRection:COLLect:MICrostrip Subsystem

The :SENSe{1-16}:CORRection:COLLect:MICrostrip subsystem commands set the parameter values for dielectric, kit type, and port assigned for microstrip substrate values.

### Calibration Setup Subsystems

These subsystems are used during various phases of calibration configuration setup:

- “:CALCulate{1-16}:IMPedance:TRANsformation Subsystem” on page 5-68
- “:CALCulate{1-16}:REFerence Subsystem” on page 5-144
- “:SENSe{1-16}:CORRection:COLLect:METHod Subsystem” on page 5-399
- “:SENSe{1-16}:CORRection:COLLect:MICrostrip Subsystem” on page 5-400
- “:SENSe{1-16}:CORRection:COLLect:MULTIple Subsystem” on page 5-405
- “:SENSe{1-16}:CORRection:COLLect:WAVeguide Subsystem” on page 5-463
- “:SENSe{1-16}:CORRection:COLLect[:CALa]:PORT Subsystem” on page 5-450
- “:SENSe{1-16}:CORRection:ISOLation Subsystem” on page 5-508
- “:SENSe{1-16}:CORRection:STATE Subsystem” on page 5-509

**:SENSe{1-16}:CORRection:COLLect:MICrostrip:DIElectric <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:MICrostrip:DIElectric?**

Description: Sets the microstrip substrate dielectric value for calibration on the indicated channel. See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their command parameters.

Returns the microstrip substrate dielectric value for calibration on the indicated channel. See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their query parameters.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR3> The output parameter is a unitless number.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:MIC:DIEL 1.2E0

:SENS1:CORR:COLL:MIC:DIEL?

```
:SENSe{1-16}:CORRection:COLLect:MICrostrip:EFFective <NRf>
:SENSe{1-16}:CORRection:COLLect:MICrostrip:EFFective?
```

Description: Sets the microstrip effective dielectric value for calibration on the indicated channel. See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their command parameters.

Returns the microstrip effective dielectric value for calibration on the indicated channel. See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their query parameters.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR3> The output parameter is a unitless number.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:MIC:EFF 1.2E0

```
:SENS1:CORR:COLL:MIC:EFF?
```

```
:SENSe{1-16}:CORRection:COLLect:MICrostrip:KIT <char>
:SENSe{1-16}:CORRection:COLLect:MICrostrip:KIT?
```

Description: Selects the microstrip kit to use for calibration on the indicated channel. See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their command parameters.

### Available Microstrip Kits

The available microstrip kit parameters are:

- MIL10 = Standard 10-mil (0.010” or 0.25400 mm thick) microstrip
- MIL15 = Standard 15-mil (0.015” or 0.38100 mm thick) microstrip
- MIL25 = Standard 10-mil (0.025” or 0.63500 mm thick) microstrip
- USERx = User-defined microstrip 1 through 32 (e.g., USER5, USER23)

### Using User-Defined Microstrip Kits

User-defined microstrips (USER1 through USER32 above) can be defined through the menu-driven user interface by entering six values:

- Microstrip Kit Label = Defaults as “User-DefinedN” (where N = 1 to 32) and can be changed as required. Programmatically, the each user-defined microstrip kit name must be still referred to as the appropriate “USERx” parameter.
- Strip Width (mm). Programmatically, the width is entered in Meters.
- Impedance (Ohms)
- Substrate Thickness (mm). Programmatically, the thickness is entered in Meters.
- Substrate Dielectric Value
- Effective Dielectric Value

### Query Output

Returns the microstrip kit selected for calibration on the indicated channel.

See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

Cmd Parameters: <char> MIL10 | MIL15 | MIL25 | USER1 | USER2 | USER3 | USER4 | USER5 | USER6 | USER7 | USER8 | USER9 | USER10 | USER11 | USER12 | USER13 | USER14 | USER15 | USER16 | USER17 | USER18 | USER19 | USER20 | USER21 | USER22 | USER23 | USER24 | USER25 | USER26 | USER27 | USER28 | USER29 | USER30 | USER31 | USER32

Query Parameters: <char> MIL10 | MIL15 | MIL25 | USER1 | USER2 | USER3 | USER4 | USER5 | USER6 | USER7 | USER8 | USER9 | USER10 | USER11 | USER12 | USER13 | USER14 | USER15 | USER16 | USER17 | USER18 | USER19 | USER20 | USER21 | USER22 | USER23 | USER24 | USER25 | USER26 | USER27 | USER28 | USER29 | USER30 | USER31 | USER32

Range: NA

Default Value: MIL10

Syntax Example: **:SENS1:CORR:COLL:MIC:KIT MIL15**  
**:SENS1:CORR:COLL:MIC:KIT?**

```
:SENSe{1-16}:CORRection:COLLect:MICrostrip:PORT{1-4}:CONNector <char>
:SENSe{1-16}:CORRection:COLLect:MICrostrip:PORT{1-4}:CONNector?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the microstrip kit connector type for the indicated port on the indicated channel to where only user-defined microstrips can be used in the <char> parameter as:

- USERx = User-defined microstrip 1 through 32 (e.g., USER5, USER23)

See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their command parameters.

### User-Defined Microstrips

In the menu-driven user interface, user-defined microstrips are set with six values:

- Microstrip Kit Label = Defaults as “User-DefinedN” (where N = 1 to 32) and can be changed as required.
- Strip Width (mm). Programmatically, the width is entered in Meters.
- Impedance (Ohms)
- Substrate Thickness (mm). Programmatically, the thickness is entered in Meters.
- Substrate Dielectric Value
- Effective Dielectric Value

Returns the microstrip kit connector type for the indicated port on the indicated channel. See [Table 2-16, “Connector Type Abbreviations and Descriptions”](#) on page 2-36 for a complete listing of calibration components, connectors, and their parameters.

Cmd Parameters: <char> MIL10 | MIL15 | MIL25 | USER1 | USER2 | USER3 | USER4 | USER5 | USER6 | USER7 | USER8 | USER9 | USER10 | USER11 | USER12 | USER13 | USER14 | USER15 | USER16 | USER17 | USER18 | USER19 | USER20 | USER21 | USER22 | USER23 | USER24 | USER25 | USER26 | USER27 | USER28 | USER29 | USER30 | USER31 | USER32

Query Parameters: <char> MIL10 | MIL15 | MIL25 | USER1 | USER2 | USER3 | USER4 | USER5 | USER6 | USER7 | USER8 | USER9 | USER10 | USER11 | USER12 | USER13 | USER14 | USER15 | USER16 | USER17 | USER18 | USER19 | USER20 | USER21 | USER22 | USER23 | USER24 | USER25 | USER26 | USER27 | USER28 | USER29 | USER30 | USER31 | USER32

Range: NA

Default Value: MIL10

Syntax Example: :SENS1:CORR:COLL:MIC:PORT1:CONN USER2  
:SENS1:CORR:COLL:MIC:PORT1:CONN?

```
:SENSe{1-16}:CORRection:COLLect:MICrostrip:THICKness <NRf>
:SENSe{1-16}:CORRection:COLLect:MICrostrip:THICKness?
```

Description: Sets the microstrip substrate thickness for calibration on the indicated channel.

Returns the microstrip substrate thickness for calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:MIC:THICK 1.2E-5

```
:SENS1:CORR:COLL:MIC:THICK?
```

```
:SENSe{1-16}:CORRection:COLLect:MICrostrip:WIDth <NRf>
:SENSe{1-16}:CORRection:COLLect:MICrostrip:WIDth?
```

Description: Sets the microstrip width for calibration on the indicated channel.

Returns the microstrip width for calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:MIC:WID 1.2E-4

```
:SENS1:CORR:COLL:MIC:WID?
```

```
:SENSe{1-16}:CORRection:COLLect:MICrostrip:Z0 <NRf>
:SENSe{1-16}:CORRection:COLLect:MICrostrip:Z0?
```

Description: Sets the microstrip impedance (Z zero) for calibration on the indicated channel.

Returns the microstrip impedance for calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Ohms.

Query Parameters: <NR3> The output parameter is in Ohms.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:MIC:Z0 7.5E1

```
:SENS1:CORR:COLL:MIC:Z0?
```

## 5-73 :SENSe{1-16}:CORRection:COLLect:MULTIple Subsystem

The :SENSe{1-16}:CORRection:COLLect:MULTIple subsystem command sets transmission through (thru) lines between one or more port pairs.

### Calibration Setup Subsystems

These subsystems are used during various phases of calibration configuration setup:

- “:CALCulate{1-16}:REFerence Subsystem” on page 5-144
- “:SENSe{1-16}:CORRection:COLLect:METHod Subsystem” on page 5-399
- “:SENSe{1-16}:CORRection:COLLect:MULTIple Subsystem” on page 5-405
- “:SENSe{1-16}:CORRection:COLLect[:CALa]:PORT Subsystem” on page 5-450
- “:SENSe{1-16}:CORRection:COLLect:WAVeguide Subsystem” on page 5-463
- “:SENSe{1-16}:CORRection:COLLect:SOLX:CALKit Subsystem” on page 5-470
- “:SENSe{1-16}:CORRection:INTerpolation Subsystem” on page 5-507
- “:SENSe{1-16}:CORRection:ISOLation Subsystem” on page 5-508
- “:SENSe{1-16}:CORRection:STATe Subsystem” on page 5-509

```
:SENSe{1-16}:CORRection:COLLect:MULTIple:THRu
    <char>{,<char>,<char>,<char>,<char>,<char>}
:SENSe{1-16}:CORRection:COLLect:MULTIple:THRu?
```

**Applicability:** The use of Port 3 and/or Port 4 requires a 4-port VNA.

**Description:** Adds one or more Transmission Throughs (Thrus) to the calibration process.

Returns the calibration process list of Transmission Throughs.

#### 2-Port VNAs:

The available through is:

- THR12 = Through line between Port 1 and Port 2. The short-form is THR12.

#### 4-Port VNAs:

The available throughs are:

- THR12 = Through line between Port 1 and Port 2. The short-form is THR12.
- THR13 = Through line between Port 1 and Port 3. The short-form is THR13.
- THR14 = Through line between Port 1 and Port 4. The short-form is THR14.
- THR23 = Through line between Port 2 and Port 3. The short-form is THR23.
- THR24 = Through line between Port 2 and Port 4. The short-form is THR24.
- THR34 = Through line between Port 3 and Port 4. The short-form is THR34.

**Cmd Parameters:** <char> THR12 | THR13 | THR14 | THR23 | THR24 | THR34

**Query Parameters:** <char> THR12 | THR13 | THR14 | THR23 | THR24 | THR34

**Range:** NA

**Default Value:** NA

**Syntax Example:** :SENS1:CORR:COLL:MULT:THR THR12  
:SENS1:CORR:COLL:MULT:THR?

## 5-74 :SENSe{1-16}:CORRection:COLLect:PORT Subsystem

The :SENSe{1-16}:CORRection:COLLect:PORT subsystem commands start an actual instrument calibration.

### Calibration Subsystems with Actual Calibrations

Related calibration subsystems that perform actual calibrations are:

- “:SENSe{1-16}:ABORTcal Subsystem” on page 5-319
- “:SENSe{1-16}:CORRection:COLLect:LRL[:CALa] Subsystem” on page 5-363
- “:SENSe{1-16}:CORRection:COLLect:PORT Subsystem” on page 5-406
- “:SENSe{1-16}:CORRection:COLLect[:CALa]:PORT Subsystem” on page 5-450
- “:SENSe{1-16}:CORRection:COLLect:SOLX:CALKit Subsystem” on page 5-470

### Calibration Type Abbreviations

The commands in this subsystem use the following abbreviations for different calibration methods:

- 1P2PF = One-path two-port calibration, forward direction
- 1P2PR = One path two port calibration, reverse direction
- FULL1 = Full one port calibration
- FULL2 = Full two port calibration
- FULLB = Full one port reflection calibration, both ports
- RESP1 = One port response calibration
- RESPB = One port response calibration, both ports
- TFRB = Transmission frequency response calibration, both directions
- TFRF = Transmission frequency response calibration, forward direction
- TFRR = Transmission frequency response calibration, reverse direction

**Note** The coefficients must have the exponential magnitude set relative to the coefficient magnitude. For example, if C0 is set to 1E-15, then the number 1 will appear, however, if it is just set to 1, then the value will become 1E15.

```
:SENSe{1-16}:CORRection:COLLect:PORT{1 | 2 | 3 | 4 | 12 | 13 | 14 | 23  
| 24 | 34 | 123 | 124 | 134 | 234 | 1234}:FULL1
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Selects Full 1-port Calibration as the calibration type on the indicated ports selected.

No query.

The Full 1-Port Calibration can be performed on any combination of ports by listing them using as PORTw | wx | wxy | wxyz where:

- w = the first port
- x = the second port
- y = the third port
- z = the fourth port

For example, to perform a FULL1 calibration on Channel 1 and Port 1, 2, and 4, the command is:

```
SENS1:CORR:COLL:PORT124:FULL1
```

Cmd Parameters: NA

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COLL:PORT124:FULL1

```
:SENSe{1-16}:CORRection:COLLect:PORT{123 | 124 | 134 | 234}:FULL3
```

Applicability: MS46524

Description: Sets the calibration type to Full Three Port for the indicated channel and port triplet where:

- 123 = Port Triplet of Port 1, Port 2, and Port 3
- 124 = Port Triplet of Port 1, Port 2, and Port 4
- 134 = Port Triplet of Port 1, Port 3, and Port 4
- 234 = Port Triplet of Port 2, Port 3, and Port 4

No query.

Cmd Parameters: NA

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COLL:PORT234:FULL3

```
:SENSe{1-16}:CORRection:COLLect:PORT{1 | 2 | 3 | 4 | 12 | 13 | 14 | 23  
| 24 | 34 | 123 | 124 | 134 | 234 | 1234}:RESP1
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Selects 1-port Response Calibration as the calibration type on the indicated ports selected.

No query.

The response calibration can be performed on one or more ports by listing them using as PORTw | wx | wxy | wxyz where:

- w = the first port
- x = the second port
- y = the third port
- z = the fourth port

For example, to perform a response calibration on Ports 1, 2 use:

```
SENS1:CORR:COLL:PORT12:RESP1
```

Cmd Parameters: NA

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COLL:PORT12:RESP1

```
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 | 34}:ISOL
```

Applicability: The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

#### 2-Port VNAs:

- The available port pair is 12.

Description: Initiates collection of the isolation standard data for the calibration.

Cmd Parameters: No query.

NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT12:ISOL

```
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 |  
34}:LSELection <char>  
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 |  
34}:LSELection?
```

**Applicability:** The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

#### 2-Port VNAs:

The available port pair is 12.

**Description:** Sets the calibration line selection on the selected port-pair of the indicated channel.

Returns the line selection on the selected port-pair of the indicated channel.

**Cmd Parameters:** <char> THRu | RECiprocal | S2PThru

**Query Parameters:** NA

Query Output: <char> THR | REC | S2PT

Range: NA

Default Value: THR

**Syntax Example:** :SENS1:CORR:COLL:PORT12:LSEL REC  
:SENS1:CORR:COLL:PORT12:LSEL?

```
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 |  
34}:S2PThru:FILE <string>  
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 |  
34}:S2PThru:FILE?
```

**Applicability:** The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

#### 2-Port VNAs:

The available port pair is 12.

**Description:** Loads an s2p file for thru and saves the loaded file in the default location:  
'C:\AnritsuVNA\Data\S2PThruCal'

Returns the loaded s2p file path.

**Cmd Parameters:** <string> Filename and path in the form: 'x:\directory\filename.s2p' where  
x:\directory\filename.s2p must exist.

**Query Parameters:** NA

Query Output: <char> Filename and path in the form: x:\directory\filename.s2p

Range: NA

Default Value: NA

**Syntax Example:** :SENS1:CORR:COLL:PORT12:S2PT:FIL 'C:\AnritsuVNA\Data\S2PThruCal.s2p'  
:SENS1:CORR:COLL:PORT12:S2PT:FIL?

**:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 | 34}:TFRB**

Applicability: The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

**2-Port VNAs:**

The available port pair is 12.

Description: Adds Transmission Frequency Response Calibration Both directions on the indicated port pair. The Transmission Frequency Response calibration can be any combination of port pairs, and any combination of Forward only (TFRF), Reverse only (TFRR) or both (TFRB).

No query.

Cmd Parameters: NA

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COLL:PORT12:TFRB

**:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 | 34}:TFRF**

Applicability: The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

**2-Port VNAs:**

The available port pair is 12.

Description: Adds Transmission Frequency Response Calibration Forward direction on the indicated port pair. The Transmission Frequency Response calibration can be any combination of port pairs, and any combination of Forward only (TFRF), Reverse only (TFRR) or both (TFRB).

No query.

Cmd Parameters: NA

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COLL:PORT12:TFRF

**:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 | 34}:TFRR**

Applicability: The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

**2-Port VNAs:**

The available port pair is 12.

Description: Adds Transmission Frequency Response Calibration Reverse direction on the indicated port pair. The Transmission Frequency Response calibration can be any combination of port pairs, and any combination of Forward only (TFRF), Reverse only (TFRR) or both (TFRB).

No query.

Cmd Parameters: NA

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COLL:PORT12:TFRR

**:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 | 34}:THRu**

Applicability: The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

**2-Port VNAs:**

The available port pair is 12.

Description: Initiates collection of the through (thru) standard data for the calibration.

No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT12:THR

**:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 | 34}:THRu:FREQuency <NRf>**

**:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 | 34}:THRu:FREQuency?**

Applicability: The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

**2-Port VNAs:**

The available port pair is 12.

Description: Sets the through-line (thru-line) reference frequency of the loss on the selected port-pair.

Returns the thru-line reference frequency of the loss on the selected port-pair.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:PORT12:THR:FREQ 1.0E6

:SENS1:CORR:COLL:PORT12:THR:FREQ?

```
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 |  
34}:THRu:LABEL <string>  
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 |  
34}:THRu:LABEL?
```

**Applicability:** The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

#### 2-Port VNAs:

The available port pair is 12.

**Description:** Sets the through-line (thru-line) label on the selected port-pair. On 3-port VNAs, the available port pair is 12.

Returns the thru-line label on the selected port-pair.

**Cmd Parameters:** <string> The input parameter is any combination of numbers and letters.

See definition of “<string>” on page 2-10.

**Query Parameters:** <char> The output parameter can be any combination of numbers and letters.

See definition of “<char>” on page 2-11.

**Range:** NA

**Default Value:** NA

**Syntax Example:** :SENS1:CORR:COLL:PORT12:THR:LABEL 'IC7000'  
:SENS1:CORR:COLL:PORT12:THR:LABEL?

```
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 |  
34}:THRu:LENGth <NRf>  
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 |  
34}:THRu:LENGth?
```

**Applicability:** The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

#### 2-Port VNAs:

The available port pair is 12.

**Description:** Sets the through-line (thru-line) length on the selected port-pair.

Returns the thru-line length on the selected port-pair.

**Cmd Parameters:** <NRf> The input parameter is in Meters.

**Query Parameters:** <NR3> The output parameter is in Meters.

**Range:** MPND

**Default Value:** See “Calibration Component Parameters” on page 2-31.

**Syntax Example:** :SENS1:CORR:COLL:PORT12:THR:LENG 1.0E0  
:SENS1:CORR:COLL:PORT12:THR:LENG?

```
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 |  
34}:THRu:LOSS <NRf>  
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 |  
34}:THRu:LOSS?
```

Applicability: The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

**2-Port VNAs:**

The available port pair is 12.

Description: Sets the through-line (thru-line) loss on the selected port-pair.

Returns the thru-line loss on the selected port-pair.

Cmd Parameters: <NRf> The input parameter is in dB/mm.

Query Parameters: <NR3> The output parameter is in dB/mm.

Range: MPND

Default Value: See “Calibration Component Parameters” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:PORT12:THR:LOSS 3.0E0  
:SENS1:CORR:COLL:PORT12:THR:LOSS?

```
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 |  
34}:THRu:RECIPocal <char>  
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 |  
34}:THRu:RECIPocal?
```

Applicability: The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

**2-Port VNAs:**

The available port pair is 12.

Description: Sets the through-line (thru-line) use reciprocal flag on the selected port-pair.

Returns the thru-line use reciprocal flag on the selected port-pair.

When the thru reciprocal is changed to ON, the thru length is automatically changed to 0. When the thru reciprocal is changed to OFF, the thru length is automatically changed to the Cal Kit's thru length.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA>

Default Value: 0

Syntax Example: :SENS1:CORR:COLL:PORT12:THR:RECIP ON  
:SENS1:CORR:COLL:PORT12:THR:RECIP?

```
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 |  
34}:THRu:SERial <string>  
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 |  
34}:THRu:SERial?
```

Applicability: The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

**2-Port VNAs:**

The available port pair is 12.

Description: Sets the through-line (thru-line) serial number on the selected port-pair.

Returns the thru-line serial number on the selected port-pair.

Cmd Parameters: <string> The input parameter is any combination of numbers and letters. See definition of "[“<string>” on page 2-10](#)".

Query Parameters: <char> The output parameter can be any combination of numbers and letters.

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT12:THR:SER '123456'  
:SENS1:CORR:COLL:PORT12:THR:SER?

```
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 |  
34}:THRu:UPDate
```

Applicability: The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

**2-Port VNAs:**

The available port pair is 12.

Description: Updates the collection of the through (thru) standard data for the calibration.

No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT12:THR:UPD

```
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 |  
34}:THRu:Z0 <NRf>  
:SENSe{1-16}:CORRection:COLLect:PORT{12 | 13 | 14 | 23 | 24 |  
34}:THRu:Z0?
```

**Applicability:** The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

#### 2-Port VNAs:

The available port pair is 12.

**Description:** Sets the through-line (thru-line) impedance on the selected port-pair.

Returns the thru-line impedance on the selected port-pair.

**Cmd Parameters:** <NRf> The input parameter is in Ohms.

**Query Parameters:** <NR3> The output parameter is in Ohms.

Range: 1E-4 to 1E10

**Default Value:** See “Calibration Component Parameters” on page 2-31.

**Syntax Example:** :SENS1:CORR:COLL:PORT12:THR:Z0 7.5E1

```
:SENS1:CORR:COLL:PORT12:THR:Z0?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:CONNector <char>  
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:CONNector?
```

**Applicability:** The use of Port 3 and/or Port 4 requires a 4-port VNA.

**Description:** Sets the connector type for the indicated port. The connector types are:

- CF1 = 1 mm (female)
- CF2 = 2.4 mm (female) \*
- CF3 = GPC 3.5 (female) \*
- CF716 = 7/16 (female)
- CFK = K (female)
- CFKT = K (female) TOSLKF Cal Kit
- CFNT = N (female) TOSLNF Cal Kit
- CFN = N (female)
- CFN75 = N 75 Ohm (female)
- CFC = TNC (female)
- CFS = SMA (female)
- CFV = V (female)
- CFUn = User-defined female connector from 1 to 8, where: CFU1 = User-defined female 1, CFU2 = User-defined female 2, CFU3 = User-defined female 3, CFU4 = User-defined female 4, CFU5 = User-defined female 5, CFU6 = User-defined female 6, CFU7 = User-defined female 7, CFU8 = User-defined female 8
- CM1 = 1 mm (male)
- CM2 = 2.4 mm (male)
- CM3 = GPC 3.5 (male)
- CM716 = 7/16 (male)
- CMC = TNC (male)
- CMK = K (male)
- CMKT = K (male) TOSLK Cal Kit
- CMNT = N (male) TOSLN Cal Kit

- CMN = N (male)
- CMN75 = N 75 Ohm (male)
- CMS = SMA (male)
- CMV = V (male)
- CMUn = User-defined male connector from 1 to 8, where: CMU1 = User-defined male 1, CMU2 = User-defined male 2, CMU3 = User-defined male 3, CMU4 = User-defined male 4, CMU5 = User-defined male 5, CMU6 = User-defined male 6, CMU7 = User-defined male 7, CMU8 = User-defined male 8.
- CNG = GPC7 (none)

Returns the connector type for the indicated port.

See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

**Cmd Parameters:** <char> CF1 | CF2 | CF3 | CF716 | CFK | CFKT | CFNT | CFN | CFN75 | CFC | CFS | CFV | CFU1 | CFU2 | CFU3 | CFU4 | CFU5 | CFU6 | CFU7 | CFU8 | CM1 | CM2 | CM3 | CM716 | CMC | CMK | CMKT | CMNT | CMN | CMN75 | CMS | CMV | CMU1 | CMU2 | CMU3 | CMU4 | CMU5 | CMU6 | CMU7 | CMU8 | CNG

**Query Parameters:** <char> CF1 | CF2 | CF3 | CF716 | CFK | CFKT | CFNT | CFN | CFN75 | CFC | CFS | CFV | CFU1 | CFU2 | CFU3 | CFU4 | CFU5 | CFU6 | CFU7 | CFU8 | CM1 | CM2 | CM3 | CM716 | CMC | CMK | CMKT | CMNT | CMN | CMN75 | CMS | CMV | CMU1 | CMU2 | CMU3 | CMU4 | CMU5 | CMU6 | CMU7 | CMU8 | CNG

**Range:** NA

**Default Value:** See “[Calibration Component Parameters](#)” on page 2-31.

**Syntax Example:**

```
:SENS1:CORR:COLL:PORT1:CONN CMN
:SENS1:CORR:COLL:PORT1:CONN?
```

## :SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD

**Applicability:** The use of Port 3 and/or Port 4 requires a 4-port VNA.

**Description:** Initiates collection of the Load Standard data for the calibration on the given port.

No query.

**Cmd Parameters:** NA

**Range:** NA

**Default Value:** NA

**Syntax Example:**

```
:SENS1:CORR:COLL:PORT1:LOAD
```

**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD:SEL <char>**  
**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD:SEL?**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Selects the load standard of LOAD1 or LOAD2 to be used for calibration on the indicated port.

Returns the selected load standard of LOAD1 or LOAD2 to be used for calibration on the indicated port.

Cmd Parameters: <char> LOAD1 | LOAD2

Query Parameters: <char> LOAD1 | LOAD2

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD:SEL LOAD2  
:SENS1:CORR:COLL:PORT1:LOAD:SEL?

**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD:TYPe <char>**  
**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD:TYPe?**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Selects the Broadband Load Type as Fixed or Sliding for calibration on the indicated port.

Returns the Broadband Load Type selection on the indicated port.

Cmd Parameters: <char> FIXed | SLIDing

Query Parameters: <char> FIX | SLID

Range: NA

Default: FIX

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD:TYP FIX  
:SENS1:CORR:COLL:PORT1:LOAD:TYP?

**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:C0 <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:C0?**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load1 standard C0 (C zero) capacitance on the selected port. The C0 coefficient is measured in Farads.

Returns the Load1 standard C0 capacitance on the selected port.

See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

Cmd Parameters: <NRf> The input parameter is in Farads.

Cmd Parameters: <NR3> The output parameter is in Farads.

Range: 0 to 1E12

Default Value: 0.00000000000E+000

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD1:C0 3.0E-11  
:SENS1:CORR:COLL:PORT1:LOAD1:C0?

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:C1 <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:C1?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load1 Standard C1 (C one) Coefficient on the selected port. The C1 coefficient is measured in Farads/Hertz.

Returns the Load1 Standard C1 Coefficient on the Selected port

Cmd Parameters: <NRf> The input parameter is in Farads/Hertz.

Query Parameters: <NR3> The output parameter is in Farads/Hertz.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD1:C1 2.0E0

```
:SENS1:CORR:COLL:PORT1:LOAD1:C1?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:C2 <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:C2?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load1 Standard C2 Coefficient on the selected port. The C2 coefficient is measured in Farads/Hertz^2.

Returns the Load1 Standard C2 Coefficient on the selected port.

Cmd Parameters: <NRf> The input parameter is in Farads/Hertz^2 (Hertz E2).

Query Parameters: <NR3> The output parameter is in Farads/Hertz^2.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD1:C2 2.0E0

```
:SENS1:CORR:COLL:PORT1:LOAD1:C2?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:C3 <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:C3?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load1 Standard C3 Coefficient on the selected port. The C3 coefficient is measured in Farads/Hertz^3.

Returns the Load1 Standard C3 Coefficient on the selected port.

Cmd Parameters: <NRf> The input parameter is in Farads/Hertz^3 (Hertz E3).

Query Parameters: <NR3> The output parameter is in Farads/Hertz^3.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD1:C3 2.0E0

```
:SENS1:CORR:COLL:PORT1:LOAD1:C3?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:L0 <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:L0?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load1 standard L0 (L zero) inductance on the selected port. The L0 coefficient is measured in Henrys.

Returns the Load1 standard L0 inductance on the selected port.

See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

Cmd Parameters: <NRf> The input parameter is in Henrys.

Query Parameters: <NR3> The output parameter is in Henrys.

Range: MPND

Default Value: 0.00000000000E+000

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD1:L0 2.0E0  
:SENS1:CORR:COLL:PORT1:LOAD1:L0?

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:L1 <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:L1?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load1 standard L1 (L one) inductance coefficient on the selected port. The L1 coefficient is measured in Henrys/Hertz.

Returns the Load1 standard L1 inductance coefficient on the selected port.

See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz.

Query Parameters: <NR3> The output parameter is in Henrys/Hertz.

Range: MPND

Default Value: 0.00000000000E+000

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD1:L1 2.0E0  
:SENS1:CORR:COLL:PORT1:LOAD1:L1?

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:L2 <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:L2?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load1 standard L2 inductance coefficient on the selected port. The L2 coefficient is measured in Henrys/Hertz^2.

Returns the Load1 standard L2 inductance coefficient on the selected port.

See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz^2.

Query Parameters: <NR3> The output parameter is in Henrys/Hertz^2.

Range: MPND

Default Value: 0.00000000000E+000

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD1:L2 2.0E0

```
:SENS1:CORR:COLL:PORT1:LOAD1:L2?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:L3 <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:L3?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load1 standard L3 inductance coefficient on the selected port. The L3 coefficient is measured in Henrys/Hertz^3.

Returns the Load1 standard L3 inductance coefficient on the selected port.

See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz^3.

Query Parameters: <NR3> The output parameter is in Henrys/Hertz^3.

Range: MPND

Default Value: 0.00000000000E+000

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD1:L3 2.0E0

```
:SENS1:CORR:COLL:PORT1:LOAD1:L3?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:LABEL <string>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:LABEL?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load1 standard label on the selected port.

Returns the Load1 standard label on the selected port.

See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

Cmd Parameters: <string> The input parameter is any combination of numbers and letters. See definition of “[<string>](#)” on page 2-10.

Query Parameters: <char> The output parameter can be any combination of numbers and letters.

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD1:LABEL 'IC7000'
:SENS1:CORR:COLL:PORT1:LOAD1:LABEL?

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:OFF1 <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:OFF1?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load1 Standard Offset length1 coefficient on the selected port.

Returns the Load1 Standard Offset length1 coefficient on the Selected port.

Cmd Parameters: <NRf> The input parameter is in Meters/Hertz.

Query Parameters: <NR3> The output parameter is in Meters/Hertz.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD1:OFF1 2.0E0
:SENS1:CORR:COLL:PORT1:LOAD1:OFF1?

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:OFF2 <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:OFF2?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load1 Standard Offset length2 coefficient on the Selected port.

Returns the Load1 Standard Offset length2 coefficient on the Selected port.

Cmd Parameters: <NRf> The input parameter is in Meters/Hertz^2.

Query Parameters: <NR3> The output parameter is in Meters/Hertz^2.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD1:OFF2 2.0E0
:SENS1:CORR:COLL:PORT1:LOAD1:OFF2?

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:OFF3 <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:OFF3?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load1 Standard Offset length3 coefficient on the Selected port.

Returns the Load1 Standard Offset length3 coefficient on the Selected port.

Cmd Parameters: <NRf> The input parameter is in Meters/Hertz<sup>3</sup>.

Query Parameters: <NR3> The output parameter is in Meters/Hertz<sup>3</sup>.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD1:OFF3 2.0E0

```
:SENS1:CORR:COLL:PORT1:LOAD1:OFF3?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:OFFS <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:OFFS?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load1 (Load one) standard offset on the selected port.

Returns the Load1 standard offset on the selected port.

See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default Value: 0.00000000000E+000

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD1:OFFS 2.5E1

```
:SENS1:CORR:COLL:PORT1:LOAD1:OFFS?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:R <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:R?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load1 (Load one) standard resistance on the selected port.

Returns the Load1 standard resistance on the selected port.

Cmd Parameters: <NRf> The input parameter is in Ohms.

Query Parameters: <NR3> The output parameter is in Ohms.

Range: 0 to 1E10

Default Value: 5.00000000000E+001

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD1:R 7.5E1

```
:SENS1:CORR:COLL:PORT1:LOAD1:R?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:S1P:FILE <string>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:S1P:FILE?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the LOAD1 Standard S1P file on the selected port of the indicated channel.

Returns the LOAD1 Standard S1P file on the selected port of the indicated channel.

Cmd Parameters: <string> s1p file path

See definition of “<string>” on page 2-10.

Query Parameters: NA

Query Output: <char> s1p file path

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD1:S1P:FIL 'C:\Test\Load1.s1p'
:SENS1:CORR:COLL:PORT1:LOAD1:S1P:FIL?

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:S1P[:STATE] <char>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:S1P[:STATE]?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the LOAD1 S1P file settings ON/OFF on the selected port of the indicated channel. ON means that the S1P file data will be used, OFF means the Circuit Model data will be used.

Returns the LOAD1 S1P file settings on the selected port of the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

See definition of “<string>” on page 2-10.

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD1:S1P 1
:SENS1:CORR:COLL:PORT1:LOAD1:S1P?

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:SERial <string>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:SERial?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load1 (Load one) standard serial number on the selected port.

Returns the Load1 standard serial number on the selected port.

Cmd Parameters: <string> The input parameter is any combination of numbers and letters. See definition of “<string>” on page 2-10.

Query Parameters: <char> The output parameter can be any combination of numbers and letters.

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD1:SER '123456'
:SENS1:CORR:COLL:PORT1:LOAD1:SER?

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:Z0 <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD1:Z0?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load1 (Load one) standard Impedance on the selected port.

Returns the Load1 standard Impedance on the selected port.

Cmd Parameters: <NRf> The input parameter is in Ohms.

Query Parameters: <NR3> The output parameter is in Ohms.

Range: 1E-4 to 1E10

Default Value: 5.00000000000E+001

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD1:Z0 7.5E1

```
:SENS1:CORR:COLL:PORT1:LOAD1:Z0?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:C0 <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:C0?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load2 standard C0 (C zero) capacitance on the selected port. The C0 coefficient is measured in Farads.

Returns the Load2 standard C0 capacitance on the selected port.

Cmd Parameters: <NRf> The input parameter is in Farads.

Query Parameters: <NR3> The output parameter is in Farads.

Range: 0 to 1E12

Default Value: 0.00000000000E+000

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD2:C0 2.0E-11

```
:SENS1:CORR:COLL:PORT1:LOAD2:C0?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:C1 <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:C1?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load2 Standard C1 (C one) Coefficient on the Selected port. The C1 coefficient is measured in Farads/Hertz.

Returns the Load2 Standard C1 Coefficient on the Selected port.

Cmd Parameters: <NRf> The input parameter is in Farads/Hertz.

Query Parameters: <NR3> The output parameter is in Farads/Hertz.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD2:C1 2.0E0

```
:SENS1:CORR:COLL:PORT1:LOAD2:C1?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:C2 <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:C2?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load2 Standard C2 Coefficient on the selected port. The C2 coefficient is measured in Farads/Hertz^2.

Returns the Load2 Standard C2 Coefficient on the selected port.

Cmd Parameters: <NRf> The input parameter is in Farads/Hertz^2.

Query Parameters: <NR3> The output parameter is in Farads/Hertz^2.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD2:C2 2.0E0

```
:SENS1:CORR:COLL:PORT1:LOAD2:C2?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:C3 <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:C3?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load2 Standard C3 Coefficient on the selected port. The C3 coefficient is measured in Farads/Hertz^3.

Returns the Load2 Standard C3 Coefficient on the Selected port.

Cmd Parameters: <NRf> The input parameter is in Farads/Hertz^3.

Query Parameters: <NR3> The output parameter is in Farads/Hertz^3.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD2:C3 2.0E0

```
:SENS1:CORR:COLL:PORT1:LOAD2:C3?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:L0 <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:L0?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load2 standard L0 (L zero) inductance on the selected port. The L0 coefficient is measured in Henrys.

Returns the Load2 standard L0 inductance on the selected port.

Cmd Parameters: <NRf> The input parameter is in Henrys.

Query Parameters: <NR3> The output parameter is in Henrys.

Range: MPND

Default Value: 0.00000000000E+000

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD2:L0 2.0E-6

```
:SENS1:CORR:COLL:PORT1:LOAD2:L0?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:L1 <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:L1?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load2 standard L1 (L one) inductance coefficient on the selected port. The L1 coefficient is measured in Henrys/Hertz.

Returns the Load2 standard L1 inductance coefficient on the selected port.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz.

Query Parameters: <NR3> The output parameter is in Henrys/Hertz.

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD2:L1 2.0E0

```
:SENS1:CORR:COLL:PORT1:LOAD2:L1?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:L2 <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:L2?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load2 standard L2 inductance coefficient on the selected port. The L2 coefficient is measured in Henrys/Hertz^2.

Returns the Load2 standard L2 inductance coefficient on the selected port.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz^2.

Query Parameters: <NR3> The output parameter is in Henrys/Hertz^2.

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD2:L2 2.0E0

```
:SENS1:CORR:COLL:PORT1:LOAD2:L2?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:L3 <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:L3?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load2 standard L3 inductance coefficient on the selected port. The L3 coefficient is measured in Henrys/Hertz^3.

Returns the Load2 standard L3 inductance coefficient on the selected port.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz^3.

Query Parameters: <NR3> The output parameter is in Henrys/Hertz^3.

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD2:L3 2.0E0

```
:SENS1:CORR:COLL:PORT1:LOAD2:L3?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:LABEL <string>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:LABEL?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load2 standard label on the selected port.

Returns the Load2 standard label on the selected port.

Cmd Parameters: <string> The input parameter is any combination of numbers and letters. See definition of "[<string>](#)" on page 2-10.

Query Parameters: <char> The output parameter can be any combination of numbers and letters.

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD2:LABEL 'IC7000'
:SENS1:CORR:COLL:PORT1:LOAD2:LABEL?

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:OFF1 <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:OFF1?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load2 Standard Offset length1 (length one) coefficient on the selected port.

Returns the Load2 Standard Offset length1 coefficient on the selected port.

Cmd Parameters: <NRf> The input parameter is in Meters/Hertz.

Query Parameters: <NR3> The output parameter is in Meters/Hertz.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD2:OFF1 2.0E0
:SENS1:CORR:COLL:PORT1:LOAD2:OFF1?

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:OFF2 <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:OFF2?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load2 Standard Offset length2 coefficient on the selected port.

Returns the Load2 Standard Offset length2 coefficient on the selected port.

Cmd Parameters: <NRf> The input parameter is in Meters/Hertz^2.

Query Parameters: <NR3> The output parameter is in Meters/Hertz^2.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD2:OFF2 2.0E0
:SENS1:CORR:COLL:PORT1:LOAD2:OFF2?

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:OFF3 <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:OFF3?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load2 Standard Offset length3 coefficient on the selected port. The OFF3 coefficient is measured in Meters/Hertz<sup>3</sup>.

Returns the Load2 Standard Offset length3 coefficient on the selected port.

Cmd Parameters: <NRf> The input parameter is in Meters/Hertz<sup>3</sup>.

Query Parameters: <NR3> The output parameter is in Meters/Hertz<sup>3</sup>.

Range: MPND

Default: 0

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD2:OFF3 2.0E0

```
:SENS1:CORR:COLL:PORT1:LOAD2:OFF3?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:OFFS <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:OFFS?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load2 standard offset on the selected port.

Returns the Load2 standard offset on the selected port.

Query Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default Value: 0.00000000000E+000

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD2:OFFS 2.5E1

```
:SENS1:CORR:COLL:PORT1:LOAD2:OFFS?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:R <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:R?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load2 standard resistance on the selected port.

Returns the Load2 standard resistance on the selected port.

Cmd Parameters: <NRf> The input parameter is in Ohms.

Query Parameters: <NR3> The output parameter is in Ohms.

Range: 0 to 1E10

Default Value: 5.00000000000E+001

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD2:R 7.5E1

```
:SENS1:CORR:COLL:PORT1:LOAD2:R?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:S1P:FILE <string>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:S1P:FILE?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the LOAD2 Standard S1P file on the selected port of the indicated channel.

Returns the LOAD2 Standard S1P file on the selected port of the indicated channel.

Cmd Parameters: <string> s1p file path

See definition of “<string>” on page 2-10.

Query Parameters: NA

Query Output: <char> s1p file path

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD2:S1P:FIL 'C:\Test\Load1.s1p'
:SENS1:CORR:COLL:PORT1:LOAD2:S1P:FIL?

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:S1P[:STATE] <char>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:S1P[:STATE]?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the LOAD2 S1P file settings ON/OFF on the selected port of the indicated channel. ON means that the S1P file data will be used, OFF means the Circuit Model data will be used.

Returns the LOAD2 S1P file settings on the selected port of the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

See definition of “<string>” on page 2-10.

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD2:S1P 1
:SENS1:CORR:COLL:PORT1:LOAD2:S1P?

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:SERial <string>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:SERial?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load2 standard serial number on the selected port.

Returns the Load2 standard serial number on the selected port.

Cmd Parameters: <string> The input parameter is any combination of numbers and letters. See definition of “<string>” on page 2-10.

Query Parameters: <char> The output parameter can be any combination of numbers and letters.

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD2:SER '123456'
:SENS1:CORR:COLL:PORT1:LOAD2:SER?

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:Z0 <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:LOAD2:Z0?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Load2 standard Impedance on the selected port.

Returns the Load2 standard Impedance on the selected port.

Cmd Parameters: <NRf> The input parameter is in Ohms.

Query Parameters: <NR3> The output parameter is in Ohms.

Range: 1E-4 to 1E10

Default Value: 5.00000000000E+001

Syntax Example: :SENS1:CORR:COLL:PORT1:LOAD2:Z0 7.5E1

```
:SENS1:CORR:COLL:PORT1:LOAD2:Z0?
```

#### **:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:OPEN**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Initiates collection of the open standard data for the calibration on the given port.

No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:OPEN

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:OPEN:C0 <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:OPEN:C0?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the open standard C0 (C zero) capacitance on the selected port. The C0 coefficient is measured in Farads.

Returns the open standard C0 capacitance on the selected port.

Cmd Parameters: <NRf> The input parameter is in Farads.

Query Parameters: <NR3> The output parameter is in Farads.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:PORT1:OPEN:C0 2.0E-11

```
:SENS1:CORR:COLL:PORT1:OPEN:C0?
```

**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:OPEN:C1 <NRf>**

**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:OPEN:C1?**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the open standard C1 (C one) capacitance coefficient on the selected port. The C1 coefficient is measured in Farads/Hertz.

Returns the open standard C1 capacitance coefficient on the selected port.

Cmd Parameters: <NRf> The input parameter is in Farads/Hertz.

Query Parameters: <NR3> The output parameter is in Farads/Hertz.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: **:SENS1:CORR:COLL:PORT1:OPEN:C1 2.0E0**

**:SENS1:CORR:COLL:PORT1:OPEN:C1?**

**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:OPEN:C2 <NRf>**

**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:OPEN:C2?**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the open standard C2 capacitance coefficient on the selected port. The C2 coefficient is measured in Farads/Hertz<sup>2</sup>.

Returns the open standard C2 capacitance coefficient on the selected port.

Cmd Parameters: <NRf> The input parameter is in Farads/Hertz<sup>2</sup>.

Query Parameters: <NR3> The output parameter is in Farads/Hertz<sup>2</sup>.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: **:SENS1:CORR:COLL:PORT1:OPEN:C2 2.0E0**

**:SENS1:CORR:COLL:PORT1:OPEN:C2?**

**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:OPEN:C3 <NRf>**

**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:OPEN:C3?**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the open standard C3 capacitance coefficient on the selected port. The C3 coefficient is measured in Farads/Hertz<sup>3</sup>.

Returns the open standard C3 capacitance coefficient on the selected port.

Cmd Parameters: <NRf> The input parameter is in Farads/Hertz<sup>3</sup>.

Query Parameters: <NR3> The output parameter is in Farads/Hertz<sup>3</sup>.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: **:SENS1:CORR:COLL:PORT1:OPEN:C3 2.0E0**

**:SENS1:CORR:COLL:PORT1:OPEN:C3?**

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:OPEN:LABEL <string>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:OPEN:LABEL?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the open standard label on the selected port.

Returns the open standard label on the selected port.

Cmd Parameters: <string> The input parameter is any combination of numbers and letters.

See definition of “<string>” on page 2-10.

Query Parameters: <char> The output parameter can be any combination of numbers and letters.

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:OPEN:LABEL 'IC7000'
:SENS1:CORR:COLL:PORT1:OPEN:LABEL?

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:OPEN:OFFS <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:OPEN:OFFS?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the open standard offset on the selected port. The OFFS parameter is measured in Meters.

Returns the open standard offset on the selected port.

See “Calibration Component Parameters” on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default Value: See “Calibration Component Parameters” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:PORT1:OPEN:OFFS 2.5E1
:SENS1:CORR:COLL:PORT1:OPEN:OFFS?

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:OPEN:S1P:FILE <string>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:OPEN:S1P:FILE?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the OPEN Standard S1P file on the selected port of the indicated channel.

Returns the OPEN Standard S1P file on the selected port of the indicated channel.

Cmd Parameters: <string> s1p file path

See definition of “<string>” on page 2-10.

Query Parameters: NA

Query Output: <char> s1p file path

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:OPEN:S1P:FILE 'C:\Test\Open.s1p'
:SENS1:CORR:COLL:PORT1:OPEN:S1P:FILE?

**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:OPEN:S1P[:STATE] <char>**  
**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:OPEN:S1P[:STATE]?**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the OPEN S1P file settings ON/OFF on the selected port of the indicated channel. ON means that the S1P file data will be used, OFF means the Circuit Model data will be used.

Returns the OPEN S1P file settings on the selected port of the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

See definition of “[“<string>” on page 2-10](#).

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :SENS1:CORR:COLL:PORT1:OPEN:S1P 1  
:SENS1:CORR:COLL:PORT1:OPEN:S1P?

**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:OPEN:SERial <string>**  
**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:OPEN:SERial?**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the open standard serial number on the selected port.

Returns the open standard serial number on the selected port.

Cmd Parameters: <string> The input parameter is any combination of numbers and letters. See definition of “[“<string>” on page 2-10](#).

Query Parameters: <char> The output parameter can be any combination of numbers and letters.

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:OPEN:SER '123456'  
:SENS1:CORR:COLL:PORT1:OPEN:SER?

**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:REFlection:COMPonent <char>**  
**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:REFlection:COMPonent?**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Selects the reflection standard to use for the reflection calibration on the indicated port where the reflection standard types can be:

- OPEN = Open
- SHORt = Short
- NONE = Only returned by the query if no reflection component has been defined.

Returns the reflect standard to use for the reflection calibration on the indicated port.

Cmd Parameters: <char> OPEN | SHORt

Query Parameters: <char> OPEN | SHORt | NONE

Range: NA

Default: OPEN

Syntax Example: :SENS1:CORR:COLL:PORT1:REFL:COMP OPEN  
                  :SENS1:CORR:COLL:PORT1:REFL:COMP?

#### **:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Initiates collection of the short standard data for the calibration on the given port.

No query.

See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their command parameters.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT

#### **:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT:L0 <NRf>**

#### **:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT:L0?**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the short standard L0 (L zero) inductance on the selected port. The L0 coefficient is measured in Henrys.

Returns the short standard L0 inductance on the selected port.

See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

Cmd Parameters: <NRf> The input parameter is in Henrys.

Query Parameters: <NR3> The output parameter is in Henrys.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT:L0 2.0E0

:SENS1:CORR:COLL:PORT1:SHORT:L0?

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT:L1 <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT:L1?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the short standard L1 (L one) inductance coefficient on the selected port. The L1 coefficient is measured in Henrys/Hertz.

Returns the short standard L1 inductance coefficient on the selected port.

See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their command parameters.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz.

Query Parameters: <NR3> The output parameter is in Henrys/Hertz.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT:L1 2.0E0

```
:SENS1:CORR:COLL:PORT1:SHORT:L1?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT:L2 <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT:L2?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the short standard L2 inductance coefficient on the selected port. The L2 coefficient is measured in Henrys/Hertz^2.

Returns the short standard L2 inductance coefficient on the selected port.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz^2.

Query Parameters: <NR3> The output parameter is in Henrys/Hertz^2.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT:L2 2.0E0

```
:SENS1:CORR:COLL:PORT1:SHORT:L2?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT:L3 <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT:L3?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the short standard L3 inductance coefficient on the selected port. The L3 coefficient is measured in Henrys/Hertz^3.

Returns the short standard L3 inductance coefficient on the selected port.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz^3.

Query Parameters: <NR3> The output parameter is in Henrys/Hertz^3.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT:L3 2.0E0

```
:SENS1:CORR:COLL:PORT1:SHORT:L3?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT:LABEL <string>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT:LABEL?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the short standard label on the selected port.

Returns the short standard label on the selected port.

Cmd Parameters: <string> The input parameter is any combination of numbers and letters.

See definition of “<string>” on page 2-10.

Query Parameters: <char> The output parameter can be any combination of numbers and letters.

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT:LABEL 'IC7000'
:SENS1:CORR:COLL:PORT1:SHORT:LABEL?

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT:OFFS <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT:OFFS?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the short standard offset on the selected port.

Returns the short standard offset on the selected port.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default Value: See “Calibration Component Parameters” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT:OFFS 2.5E1
:SENS1:CORR:COLL:PORT1:SHORT:OFFS?

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT:S1P[:STATE] <char>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT:S1P[:STATE]?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the SHORT S1P file settings ON/OFF on the selected port of the indicated channel. ON means that the S1P file data will be used, OFF means the Circuit Model data will be used.

Returns the SHORT S1P file settings on the selected port of the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

See definition of “<string>” on page 2-10.

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT:S1P 1
:SENS1:CORR:COLL:PORT1:SHORT:S1P?

**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT:S1P:FILE <string>**  
**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT:S1P:FILE?**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the SHORT Standard S1P file on the selected port of the indicated channel.

Returns the SHORT Standard S1P file on the selected port of the indicated channel.

Cmd Parameters: <string> s1p file path

See definition of “[“<string>” on page 2-10.](#)

Query Parameters: NA

Query Output: <char> s1p file path

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT:S1P:FIL 'C:\Test\SHORT.s1p'  
:SENS1:CORR:COLL:PORT1:SHORT:S1P:FIL?

**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT:SERial <string>**  
**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT:SERial?**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the short standard serial number on the selected port.

Returns the short standard serial number on the selected port.

Cmd Parameters: <string> The input parameter is any combination of numbers and letters.

See definition of “[“<string>” on page 2-10.](#)

Query Parameters: <char> The output parameter can be any combination of numbers and letters.

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT:SER '123456'  
:SENS1:CORR:COLL:PORT1:SHORT:SER?

**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT1**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Initiates collection of the Offset Short1 (Short one) standard data for the calibration on the given channel and port. See “[Calibration Component Parameters](#)” on page 2-31. for a complete listing of calibration components, connectors, and their Command Parameters.

No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT1

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT1:L0 <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT1:L0?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Short1 standard L0 (L zero) inductance on the selected port of the indicated channel.

Returns the Short1 standard L0 inductance on the selected port of the indicated channel.

See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

Cmd Parameters: <NRf> The input parameter is in Henrys.

Query Parameters: <NR3> The output parameter is in Henrys.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT1:L0 2.0E0

```
:SENS1:CORR:COLL:PORT1:SHORT1:L0?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT1:L1 <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT1:L1?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Short1 standard L1 (L one) inductance coefficient on the selected port of the indicated channel.

Returns the Short1 standard L1 inductance coefficient on the selected port of the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz.

Query Parameters: <NR3> The output parameter is in Henrys/Hertz.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT1:L1 2.0E0

```
:SENS1:CORR:COLL:PORT1:SHORT1:L1?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT1:L2 <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT1:L2?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Short1 standard L2 inductance coefficient on the selected port of the indicated channel.

Returns the Short1 standard L2 inductance coefficient on the selected port of the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz^2.

Query Parameters: <NR3> The output parameter is in Henrys/Hertz^2.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT1:L2 2.0E0

```
:SENS1:CORR:COLL:PORT1:SHORT1:L2?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT1:L3 <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT1:L3?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Short1 standard L3 inductance coefficient on the selected port of the indicated channel.

Returns the Short1 standard L3 inductance coefficient on the selected port of the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz<sup>3</sup>.

Query Parameters: <NR3> The output parameter is in Henrys/Hertz<sup>3</sup>.

Range: MPND

Default Value: See “Calibration Component Parameters” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT1:L3 2.0E0

```
:SENS1:CORR:COLL:PORT1:SHORT1:L3?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT1:LABEL <string>
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT1:LABEL?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Short1 (Short one) standard label on the selected port of the indicated channel.

Returns the Short1 standard label on the selected port of the indicated channel.

See “Calibration Component Parameters” on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

Cmd Parameters: <string> The input parameter is any combination of numbers and letters.

See definition of “<string>” on page 2-10.

Query Parameters: <char> The output parameter can be any combination of numbers and letters.

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT1:LABEL 'IC7000'

```
:SENS1:CORR:COLL:PORT1:SHORT1:LABEL?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT1:OFFS <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT1:OFFS?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Short1 (Short 1) standard offset on the selected port of the indicated channel.

Returns the Short1 standard offset on the selected port of the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default Value: See “Calibration Component Parameters” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT1:OFFS 2.5E1

```
:SENS1:CORR:COLL:PORT1:SHORT1:OFFS?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT1:S1P[:STATe] <char>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT1:S1P[:STATe]?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the SHORT1 S1P file settings ON/OFF on the selected port of the indicated channel. ON means that the S1P file data will be used, OFF means the Circuit Model data will be used.

Returns the SHORT1 S1P file settings on the selected port of the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT1:S1P 1  
:SENS1:CORR:COLL:PORT1:SHORT1:S1P?

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT1:S1P:FILE <string>
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT1:S1P:FILE?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the SHORT1 Standard S1P file on the selected port of the indicated channel.

Returns the SHORT1 Standard S1P file on the selected port of the indicated channel.

Cmd Parameters: <string> s1p file path

See definition of "[“<string>” on page 2-10](#).

Query Parameters: NA

Query Output: <char> s1p file path

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT1:S1P:FIL 'C:\Test\SHORT1.s1p'  
:SENS1:CORR:COLL:PORT1:SHORT1:S1P:FIL?

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT1:SERial <string>
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT1:SERial?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Short1 (Short 1) standard serial number on the selected port of the indicated channel.

Returns the Short1 standard serial number on the selected port of the indicated channel.

Cmd Parameters: <string> The input parameter is any combination of numbers and letters. See definition of "[“<string>” on page 2-10](#)".

Query Parameters: <char> The output parameter can be any combination of numbers and letters.

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT1:SER '123456'  
:SENS1:CORR:COLL:PORT1:SHORT1:SER?

**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT2**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Initiates collection of the Offset Short2 standard data for the calibration on the given channel and port.

No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT2

**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT2:L0 <NRf>****:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT2:L0?**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Short2 standard L0 (L zero) inductance on the selected port of the indicated channel. The L0 (zero) coefficient is measured in Henrys.

Returns the Short2 standard L0 inductance on the selected port of the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Henrys.

Query Parameters: <NR3> The output parameter is in Henrys.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT2:L0 2.0E0

:SENS1:CORR:COLL:PORT1:SHORT2:L0?

**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT2:L1 <NRf>****:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT2:L1?**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Short2 standard L1 (L one) inductance coefficient on the selected port of the indicated channel. The L1 coefficient is measured in Henrys/Hertz.

Returns the Short2 standard L1 inductance coefficient on the selected port of the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz.

Query Parameters: <NR3> The output parameter is in Henrys/Hertz.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT2:L1 2.0E0

:SENS1:CORR:COLL:PORT1:SHORT2:L1?

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT2:L2 <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT2:L2?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Short2 standard L2 inductance coefficient on the selected port of the indicated channel.

Returns the Short2 standard L2 inductance coefficient on the selected port of the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz<sup>2</sup>.

Query Parameters: <NR3> The output parameter is in Henrys/Hertz<sup>2</sup>.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT2:L2 2.0E0

```
:SENS1:CORR:COLL:PORT1:SHORT2:L2?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT2:L3 <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT2:L3?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Short2 standard L3 inductance coefficient on the selected port of the indicated channel.

Returns the Short2 standard L3 inductance coefficient on the selected port of the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz<sup>3</sup>.

Query Parameters: <NR3> The output parameter is in Henrys/Hertz<sup>3</sup>.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT2:L3 2.0E0

```
:SENS1:CORR:COLL:PORT1:SHORT2:L3?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT2:LABEL <string>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT2:LABEL?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Short2 standard label on the selected port of the indicated channel.Returns the Short2 standard label on the selected port of the indicated channel.

Cmd Parameters: <string> The input parameter is any combination of numbers and letters.

See definition of “[<string>](#)” on page 2-10.

Query Parameters: <char> The output parameter can be any combination of numbers and letters.

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT2:LABEL 'IC7000'

```
:SENS1:CORR:COLL:PORT1:SHORT2:LABEL?
```

**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT2:OFFS <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT2:OFFS?**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Short2 standard offset on the selected port of the indicated channel.

Returns the Short2 standard offset on the selected port of the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT2:OFFS 2.5E1

:SENS1:CORR:COLL:PORT1:SHORT2:OFFS?

**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT2:S1P:FILE <string>**  
**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT2:S1P:FILE?**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the SHORT2 Standard S1P file on the selected port of the indicated channel.

Returns the SHORT2 Standard S1P file on the selected port of the indicated channel.

Cmd Parameters: <string> s1p file path

See definition of “[<string>](#)” on page 2-10.

Query Parameters: NA

Query Output: <char> s1p file path

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT2:S1P:FIL 'C:\Test\SHORT2.s1p'

:SENS1:CORR:COLL:PORT1:SHORT2:S1P:FIL?

**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT2:S1P[:STATE] <char>**  
**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT2:S1P[:STATE]?**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the SHORT2 S1P file settings ON/OFF on the selected port of the indicated channel. ON means that the S1P file data will be used, OFF means the Circuit Model data will be used.

Returns the SHORT2 S1P file settings on the selected port of the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT2:S1P 1

:SENS1:CORR:COLL:PORT1:SHORT2:S1P?

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT2:SERial <string>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT2:SERial?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Short2 standard serial number on the selected port of the indicated channel.

Returns the Short2 standard serial number on the selected port of the indicated channel.

Cmd Parameters: <string> The input parameter is any combination of numbers and letters. See definition of “<string>” on page 2-10.

Query Parameters: <char> The output parameter can be any combination of numbers and letters.

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT2:SER '123456'
:SENS1:CORR:COLL:PORT1:SHORT2:SER?

#### **:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT3**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Initiates collection of the Offset Short3 standard data for the calibration on the given channel and port.

No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT3

#### **:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT3:L0 <NRf>**

#### **:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT3:L0?**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Short3 standard L0 (L zero) inductance on the selected port of the indicated channel. The L0 coefficient is measured in Henrys.

Returns the Short3 standard L0 inductance on the selected port of the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Henrys.

Query Parameters: <NR3> The output parameter is in Henrys.

Range: MPND

Default Value: See “Calibration Component Parameters” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT3:L0 2.0E0

:SENS1:CORR:COLL:PORT1:SHORT3:L0?

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT3:L1 <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT3:L1?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Short3 standard L1 (L one) inductance coefficient on the selected port of the indicated channel.

Returns the Short3 standard L1 inductance coefficient on the selected port of the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz.

Query Parameters: <NR3> The output parameter is in Henrys/Hertz.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT3:L1 2.0E0

```
:SENS1:CORR:COLL:PORT1:SHORT3:L1?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT3:L2 <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT3:L2?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Short3 standard L2 inductance coefficient on the selected port of the indicated channel. The L2 coefficient is measured in Henrys/Hertz^2.

Returns the Short3 standard L2 inductance coefficient on the selected port of the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz^2.

Query Parameters: <NR3> The output parameter is in Henrys/Hertz^2.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT3:L2 2.0E0

```
:SENS1:CORR:COLL:PORT1:SHORT3:L2?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT3:L3 <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT3:L3?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Short3 standard L3 inductance coefficient on the selected port of the indicated channel.

Returns the Short3 standard L3 inductance coefficient on the selected port of the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz^3.

Query Parameters: <NR3> The output parameter is in Henrys/Hertz^3.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT3:L3 2.0E0

```
:SENS1:CORR:COLL:PORT1:SHORT3:L3?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT3:LABEL <string>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT3:LABEL?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Short3 standard label on the selected port of the indicated channel.

Returns the Short1 standard label on the selected port of the indicated channel.

Cmd Parameters: <string> The input parameter is any combination of numbers and letters.

See definition of “<string>” on page 2-10.

Query Parameters: <char> The output parameter can be any combination of numbers and letters.

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT3:LABEL 'IC7000'
:SENS1:CORR:COLL:PORT1:SHORT3:LABEL?

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT3:OFFS <NRf>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT3:OFFS?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Short3 standard offset on the selected port of the indicated channel.

Returns the Short3 standard offset on the selected port of the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default Value: See “Calibration Component Parameters” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT3:OFFS 2.5E1
:SENS1:CORR:COLL:PORT1:SHORT3:OFFS?

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT3:S1P:FILE <string>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT3:S1P:FILE?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the SHORT3 Standard S1P file on the selected port of the indicated channel.

Returns the SHORT3 Standard S1P file on the selected port of the indicated channel.

Cmd Parameters: <string> s1p file path

See definition of “<string>” on page 2-10.

Query Parameters: NA

Query Output: <char> s1p file path

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT3:S1P:FIL 'C:\Test\SHORT3.s1p'
:SENS1:CORR:COLL:PORT1:SHORT3:S1P:FIL?

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT3:S1P[:STATE] <char>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT3:S1P[:STATE]?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the SHORT3 S1P file settings ON/OFF on the selected port of the indicated channel. ON means that the S1P file data will be used, OFF means the Circuit Model data will be used.

Returns the SHORT3 S1P file settings on the selected port of the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

See definition of “[<string>](#)” on page 2-10.

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT3:S1P 1

```
:SENS1:CORR:COLL:PORT1:SHORT3:S1P?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT3:SERial <string>
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT3:SERial?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the Short3 standard serial number on the selected port of the indicated channel.

Returns the Short1 standard serial number on the selected port of the indicated channel.

Cmd Parameters: <string> The input parameter is any combination of numbers and letters. See definition of “[<string>](#)” on page 2-10.

Query Parameters: <char> The output parameter can be any combination of numbers and letters.

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:SHORT3:SER '123456'

```
:SENS1:CORR:COLL:PORT1:SHORT3:SER?
```

```
:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SLOAD1
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Initiates collection of the Sliding Load1 standard data for the calibration on the given port.

No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:SLOAD1

**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SLOAD2**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Initiates collection of the Sliding Load2 standard data for the calibration on the given port.

No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:SLOAD2

**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SLOAD3**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Initiates collection of the Sliding Load3 standard data for the calibration on the given port. No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:SLOAD3

**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SLOAD4**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Initiates collection of the Sliding Load4 standard data for the calibration on the given port.

No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:SLOAD4

**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SLOAD5**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Initiates collection of the Sliding Load5 standard data for the calibration on the given port.

No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:SLOAD5

**:SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SLOAD6**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Initiates collection of the Sliding Load6 standard data for the calibration on the given port.

No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:PORT1:SLOAD6

## 5-75 :SENSe{1-16}:CORRection:COLLect[:CALa]:PORT Subsystem

### Calibration Subsystems with Actual Calibration

Related calibration subsystems that perform actual calibrations are:

- “:SENSe{1-16}:ABORtcal Subsystem” on page 5-319
- “:CALCulate{1-16}:REFerence Subsystem” on page 5-144
- “:SENSe{1-16}:CORRection:COLLect:METHod Subsystem” on page 5-399
- “:SENSe{1-16}:CORRection:COLLect:MULTIple Subsystem” on page 5-405
- “:SENSe{1-16}:CORRection:COLLect[:CALa]:PORT Subsystem” on page 5-450
- “:SENSe{1-16}:CORRection:INTERpolation Subsystem” on page 5-507
- “:SENSe{1-16}:CORRection:ISOLation Subsystem” on page 5-508
- “:SENSe{1-16}:CORRection:STATE Subsystem” on page 5-509

### Calibration Abbreviations

The calibration abbreviations and their calibration types are:

- :1P2PF refers to a one-path two-port calibration forward direction
- :1P2PR refers to a one path two port calibration reverse direction
- :FULL1 refers to a full one port calibration
- :FULL2 refers to a full two port calibration
- :FULLB refers to a full one port reflection calibration on both ports
- :RESP1 refers to a one port response calibration
- :RESPB refers to a one port response calibration both ports
- :TFRB refers to a transmission frequency response calibration both directions
- :TFRF refers to a transmission frequency response calibration forward direction
- :TFRR refers to a transmission frequency response calibration reverse direction

Each calibration simulation type command is described in greater detail in the individual command descriptions in this subsection.

Most calibration commands of this type do not have a directly related query. To query the state of these commands, use:

```
:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPE?
```

The :SENSe{1-16}:CORRection:COLLect:PORT subsystem commands start an actual instrument calibration.

```
:SENSe{1-16}:CORRection:COLLect[:CALa]:PORT{12 | 13 | 14 | 23 | 24 | 34}:1P2PF
```

Applicability: The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

Description: Sets the first calibration (:CALa) to One-Path 2-Port Forward Calibration.

No query.

If a second 2-Port Calibration (:CALB) is required, use the following command:

```
:SENSe:CORRection:COLLect:AUTobot:PORT:ORIentation?
```

Cmd Parameters: NA

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COLL:PORT12:1P2PF

```
:SENSe{1-16}:CORRection:COLLect[:CALa]:PORT{12 | 13 | 14 | 23 | 24 | 34}:1P2PR
```

Applicability: The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

Description: Sets the first 2-port calibration to One-Path 2-Port Reverse on the indicated port pair.

No query

Cmd Parameters: NA

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COLL:PORT12:1P2PR

```
:SENSe{1-16}:CORRection:COLLect[:CALa]:PORT{12 | 13 | 14 | 23 | 24 | 34}:FULL2
```

Applicability: The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

Description: Sets the first 2-port calibration to Full 2-Port on the indicated port pair. No query

Cmd Parameters: NA

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COLL:PORT12:FULL2

## 5-76 :SENSe{1-16}:CORRection:COLLect Subsystem

The :SENSe{1-16}:CORRection:COLLect subsystem commands set various coefficients and parameters for a pending calibration and start an actual calibration; they are limited to Port1 and/or Port 2.

### Calibration Setup Subsystems

These subsystems are used during various phases of calibration configuration setup:

- “:CALCulate{1-16}:REFERENCE Subsystem” on page 5-144
- “:SENSe{1-16}:CORRection:COLLect:LRL:WAVeguide Subsystem” on page 5-397
- “:SENSe{1-16}:CORRection:COLLect:METHod Subsystem” on page 5-399
- “:SENSe{1-16}:CORRection:COLLect:MULTIple Subsystem” on page 5-405
- “:SENSe{1-16}:CORRection:COLLect[:CALa]:PORT Subsystem” on page 5-450
- “:SENSe{1-16}:CORRection:COLLect:SOLX:CALKit Subsystem” on page 5-470
- “:SENSe{1-16}:CORRection:INTERpolation Subsystem” on page 5-507
- “:SENSe{1-16}:CORRection:ISOLation Subsystem” on page 5-508
- “:SENSe{1-16}:CORRection:STATE Subsystem” on page 5-509

### Related Command Subsystems

These commands are similar to those in the :SENSe{1-16}:CORRection:COLLect[:CALa]:PORT subsystem above where any port pair on a 2-port VNA can be specified.

- “:SENSe{1-16}:CORRection:COLLect[:CALa]:PORT Subsystem” on page 5-450

### Calibration Method Names

Related calibration types use the same command structure of:

:SENSe{1-16}:CORRection:COLLect[:METHOD]:XXX

where the calibration XXX type is one of the following:

- 1P2PF = One-path two-port calibration, forward direction
- 1P2PR = One path two-port calibration, reverse direction
- FULL1 = Full one-port calibration
- FULL2 = Full two-port calibration
- FULL4 = Full four-port calibration
- FULLB = Full one-port reflection calibration, both ports
- RESP1 = One-port response calibration
- RESPB = One-port response calibration, both ports
- TFRB = Transmission frequency response calibration, both directions
- TFRF = Transmission frequency response calibration, forward direction
- TFRR = Transmission frequency response calibration, reverse direction

Each calibration type command is described in greater detail in the following sections. Related to the calibration commands are calibration simulation commands in the general form of :SENSe{1-16}:CORRection:COEFFicient[:METHOD]:XXX that use the same abbreviations above.

To query the state of this calibration command, use:

:SENSe{1-16}:CORRection:COLLect[:METHOD]:TYPE? on page 5-460

To simulate this calibration, use the following commands with the appropriate abbreviation above:

- :SENSe{1-16}:CORRection:COEFFicient Subsystem on page 5-331
- :SENSe{1-16}:CORRection:COLLect:PORT{1-4}:SHORT1:SERial? on page 5-440

#### **:SENSe{1-16}:CORRection:COLLect[:METHod]:1P2PF**

Description: Selects One-Path 2-Port Forward Calibration (1P2PF) as the calibration type. After the method is set, the calibration must be performed.

No query. To query the state of this calibration command, use:

```
:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPE?
```

To simulate this calibration, use:

```
:SENSe{1-16}:CORRection:COEFFicient[:METHod]:1P2PF
```

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:1P2PF

#### **:SENSe{1-16}:CORRection:COLLect[:METHod]:1P2PR**

Description: Selects One-Path 2-Port Reverse Calibration (1P2PR) as the calibration type. After the method is set, the calibration must be performed.

No query. To query the state of this command, use:

```
:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPE?
```

To simulate this calibration, use:

```
:SENSe{1-16}:CORRection:COEFFicient[:METHod]:1P2PR
```

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:1P2PR

#### **:SENSe{1-16}:CORRection:COLLect[:METHod]:FULL1**

Prerequisites: Before sending this command, the simulation port must be specified using:

```
:SENSe{1-16}:CORRection:COLLect[:METHod]:PORT <char>
```

Description: Selects Full 1-Port Reflection Calibration as the calibration type. After the method is set, the calibration must be performed.

No query. To query the state of this command, use:

```
:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPE?
```

To simulate this calibration, use:

```
:SENSe{1-16}:CORRection:COEFFicient[:METHod]:FULL1
```

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:FULL1

**:SENSe{1-16}:CORRection:COLLect[:METHOD]:FULL2**

Description: Selects full two port calibration as the calibration type. After the method is set, the calibration must be performed.

No query. To query the state of this command, use:

**:SENSe{1-16}:CORRection:COLLect[:METHOD]:TYPE?**

To simulate this calibration, use:

**:SENSe{1-16}:CORRection:COEFFcient[:METHOD]:FULL2**

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: **:SENS1:CORR:COLL:FULL2**

**:SENSe{1-16}:CORRection:COLLect[:METHOD]:FULLB**

Description: Select full one port reflection calibration both ports as the calibration type. After the method is set, the calibration must be performed.

No query. To query the state of this command, use:

**:SENSe{1-16}:CORRection:COLLect[:METHOD]:TYPE?**

To simulate this calibration, use:

**:SENSe{1-16}:CORRection:COEFFcient[:METHOD]:FULLB**

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: **:SENS1:CORR:COLL:FULLB**

**:SENSe{1-16}:CORRection:COLLect:FULL4**

Applicability: MS46524

Description: Sets the calibration type to Full Four Port.

No query. To query the state of this command use:

**:SENSe{1-16}:CORRection:COLLect[:METHOD]:TYPE?**

Cmd Parameters: NA

Range: NA

Default: NA

Syntax Example: **:SENS1:CORR:COLL:FULL4**

```
:SENSe{1-16}:CORRection:COLLect[:METHOD]:LINE <char>
```

```
:SENSe{1-16}:CORRection:COLLect[:METHOD]:LINE?
```

Description: Select the line type for calibration.

Returns the line type for calibration.

See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their command parameters.

Cmd Parameters: <char> COAXial | MICROstrip | NONDISpersive | WAVEguide

Query Parameters: <char> COAX | MICRO | NONDIS | WAVE

Range: NA

Default Value: COAX

Syntax Example: **:SENS1:CORR:COLL:LINE COAX**

```
:SENS1:CORR:COLL:LINE?
```

```
:SENSe{1-16}:CORRection:COLLect[:METHOD]:LOAD <char>
```

```
:SENSe{1-16}:CORRection:COLLect[:METHOD]:LOAD?
```

Description: Selects the load type broadband/sliding for calibration.

Returns the load type selection broadband/sliding for calibration.

Cmd Parameters: <char> FIXed | SLIDing

Query Parameters: <char> FIX | SLID

Range: NA

Default Value: FIX

Syntax Example: **:SENS1:CORR:COLL:LOAD FIX**

```
:SENS1:CORR:COLL:LOAD?
```

```
:SENSe{1-16}:CORRection:COLLect[:METHOD]:PORT <char>
```

```
:SENSe{1-16}:CORRection:COLLect[:METHOD]:PORT?
```

Applicability: The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

Description: Sets the calibration port for a RESP1 or FULL1 calibration.

Returns the calibration ports or port pairs as character data for the port combinations. Several examples of various calibration setups are described in the subsections below.

### Reflection Frequency Response Calibration

A Reflection Frequency Response Calibration can have up to four reflection frequency response calibrations in one session.

### Transmission Frequency Response Calibration

A Transmission Frequency Response Calibration can have up to six transmission frequency response calibrations picked from these types: TFRF, TFRR, and TFRB.

### One-Port Calibration

A 1-port Calibration can consist of up to four, FULL1 calibrations in one session.

### Two-Port Calibration

A 2-port Calibration can consist of one or two calibrations picked from the following types:

- FULL2, 1P2PF, and 1P2PR.
- The port pair assignments must be independent.
- Both Reflection and Thru measurements can provide FULL2, 1P2PF, and 1P2PR.

### Three-Port Calibration

A 3-Port Calibration can be accomplished using one of the following techniques:

- Reflection and Thru measurements or two LRL/LRM calibrations.
- PORT12 and PORT34 are excluded from LRL/LRM calibrations.

### Four-Port Calibration

A 4-Port Calibration can be accomplished using one of the following techniques:

- Reflection and Thru measurements.
- Two LRL/LRM calibrations
- Two FULL2 AutoCal calibrations.
- PORT12 and PORT34 are excluded from LRL/LRM calibrations.

Cmd Parameters: **2-Port VNAs:**

<char> PORT1 | PORT2 | PORT12

**4-Port VNAs:**

<char> PORT1 | PORT2 | PORT3 | PORT4 | PORT12 | PORT13 | PORT14 | PORT23  
| PORT24 | PORT34 | PORT123 | PORT124 | PORT134 | PORT234 | PORT1234

Query Parameters: **2-Port VNAs:**

<char> PORT1 | PORT2 | PORT12

**4-Port VNAs:**

<char> PORT1 | PORT2 | PORT3 | PORT4 | PORT12 | PORT13 | PORT14 | PORT23  
| PORT24 | PORT34 | PORT123 | PORT124 | PORT134 | PORT234 | PORT1234

Range: NA

Default Value: PORT12

Syntax Example: **:SENS1:CORR:COLL:PORT PORT2**

**:SENS1:CORR:COLL:PORT?**

**:SENSe{1-16}:CORRection:COLLect[:METHod]:REFTHru**

Applicability: MS46121

Description: Selects the Reflection and Scalar Thru calibration as the calibration type (MS46121A/B only). After the method is set, the calibration must be performed.

No query. To query the state of this command, use:

**:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPE?**

To simulate this calibration, use:

**:SENSe{1-16}:CORRection:COEFFicient[:METHod]:RESPB**

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: **:SENS1:CORR:COLL:REFTH**

**:SENSe{1-16}:CORRection:COLLect[:METHod]:RESP1**

Prerequisites: Before sending this command, the simulation port must be specified using:

**:SENSe{1-16}:CORRection:COLLect[:METHod]:PORT <char>**

Description: Selects 1-Port Response Calibration as the calibration type. After the method is set, the calibration must be performed.

No query.

To query the state of this command, use:

**:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPE?**

To simulate this calibration, use:

**:SENSe{1-16}:CORRection:COEFFicient[:METHod]:RESP1**

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: **:SENS1:CORR:COLL:RESP1**

**:SENSe{1-16}:CORRection:COLLect[:METHod]:RESPB**

Description: Selects one port response calibration on both ports as the calibration type. After the method is set, the calibration must be performed.

No query. To query the state of this command, use:

**:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPE?**

To simulate this calibration, use:

**:SENSe{1-16}:CORRection:COEFFicient[:METHod]:RESPB**

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: **:SENS1:CORR:COLL:RESPB**

```
:SENSe{1-16}:CORRection:COLLect:REFerence:Z0 <NRf>
:SENSe{1-16}:CORRection:COLLect:REFerence:Z0?
```

Description: Sets the Z0 (Z zero) reference impedance to use for the calibration.

Returns the reference impedance to use for the calibration.

Cmd Parameters: <NRf> The input parameter is in Ohms.

Query Parameters: <NR3> The output parameter is in Ohms.

Range: 1E-4 to 1E10

Default Value: 5.00000000000E+001

Syntax Example: :SENS1:CORR:COLL:REF:Z0 7.5E1  
:SENS1:CORR:COLL:REF:Z0?

### **:SENSe{1-16}:CORRection:COLLect:SAVE**

Prerequisites: If the command is issued before all measurements are completed, an error is generated.

The command should only be initiated if all required measurements have been collected.

Description: Initiates calculation of correction coefficients for the programmed calibration type.

No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:SAV

```
:SENSe{1-16}:CORRection:COLLect:SMCorreCTION[:STATe] <char>
:SENSe{1-16}:CORRection:COLLect:SMCorreCTION[:STATe]?
```

Applicability: MS46122, MS46131, MS46322, MS46522

Description: Sets whether the secondary match correction for calibration will be used.

Returns whether the secondary match correction for calibration will be used.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Output: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :SENS1:CORR:COLL:SMC ON

:SENS1:CORR:COLL:SMC?

### **:SENSe{1-16}:CORRection:COLLect:TFR:CLEar**

Description: Clears the list of Transmission Frequency Response calibrations.

No query.

Cmd Parameters: NA

Range: NA

Default: NA

Syntax Example: :SENS1:CORR:COLL:TFR:CLE

**:SENSe{1-16}:CORRection:COLLect[:METHod]:TFRB**

Description: Selects transmission frequency response calibration both directions as the calibration type. After the method is set, the calibration must be performed. No query.

To query the state of this command, use:

**:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPE?**

To simulate this calibration, use:

**:SENSe{1-16}:CORRection:COEFFcient[:METHod]:TFRB**

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: **:SENS1:CORR:COLL:TFRB**

**:SENSe{1-16}:CORRection:COLLect[:METHod]:TFRF**

Description: Selects transmission frequency response calibration forward direction as the calibration type. After the method is set, the calibration must be performed. No query.

To query the state of this command, use:

**:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPE?**

To simulate this calibration, use:

**:SENSe{1-16}:CORRection:COEFFcient[:METHod]:TFRF**

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: **:SENS1:CORR:COLL:TFRF**

**:SENSe{1-16}:CORRection:COLLect[:METHod]:TFRR**

Description: Selects transmission frequency response calibration reverse direction as the calibration type. After the method is set, the calibration must be performed. No query.

To query the state of this command, use:

**:SENSe{1-16}:CORRection:COLLect[:METHod]:TYPE?**

To simulate this calibration, use:

**:SENSe{1-16}:CORRection:COEFFcient[:METHod]:TFRR**

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: **:SENS1:CORR:COLL:TFRR**

**:SENSe{1-16}:CORRection:COLLect:THRu:ADD <char>**

**Applicability:** The use of Port 3 and/or Port 4 in the port pair parameter requires a 4-port VNA.

**Description:** Adds Transmission Throughs (Thrus) to the selected 2-port calibration on the indicated channel. Adds Scalar Throughs (Thrus) to the selected Reflection and Scalar Thru Calibration on the indicated channel. The available throughs (thrus) are:

- THR<sub>u12</sub> = Through line between Port 1 and Port 2; short form is THR12.
- THR<sub>u13</sub> = Through line between Port 1 and Port 3; short form is THR13.
- THR<sub>u14</sub> = Through line between Port 1 and Port 4; short form is THR14.
- THR<sub>u23</sub> = Through line between Port 2 and Port 3; short form is THR23.
- THR<sub>u24</sub> = Through line between Port 2 and Port 4; short form is THR24.
- THR<sub>u34</sub> = Through line between Port 3 and Port 4; short form is THR34.

No query.

**Cmd Parameters:** <char> THR<sub>u12</sub>

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:THR:ADD THR12

**:SENSe{1-16}:CORRection:COLLect:THRu:CLEAR**

**Description:** Clears the Transmission Thrus of the selected calibration on the indicated channel.

No Query.

**Cmd Parameters:** NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:THR:CLE

**:SENSe{1-16}:CORRection:COLLect[:METHOD]:TYPE?**

**Description:** Query only.

Returns the calibration types. Several examples of various calibration setups are described in the following subsections.

**Reflection Frequency Response Calibration**

A Reflection Frequency Response Calibration can have up to four reflection frequency response calibrations in one session. The following is a return for the calibration type query for a response calibration on port 2:

RESP1,RESP1,RESP1

**Transmission Frequency Response Calibration**

A Transmission Frequency Response Calibration can have up to six transmission frequency response calibrations picked from these types: TFRF, TFRR, and TFRB. The following is the return for the calibration type query for a mix of transmission response calibrations on all possible port pairs:

TFRF,TFRR,TFRB,TFRR,TFRF,TFRB

### One-Port Calibration

A 1-Port Calibration can consist of up to four FULL1 calibrations in one session. The following is a return for the calibration type query for a FULL1 calibration:

```
FULL1,FULL1,FULL1
```

### Two-Port Calibration

A 2-Port Calibration can consist of one or two calibrations picked from the following types: FULL2, 1P2PF, and 1P2PR. The port pair assignments must be independent. The Calibration Methods can be Reflection and Thru measurements, Both Reflection and Thru measurements can provide FULL2, 1P2PF, and 1P2PR. LRL/LRM calibrations provides FULL2 only. The following is a typical return for the calibration type query:

```
1P2PF,FULL2
```

### Three Port Calibration

A 3-Port Calibration can be accomplished using either Reflection and Thru measurements or two LRL/LRM calibrations. PORT12 and PORT34 are excluded from LRL/LRM calibrations. The following is a return for the calibration type query for each technique:

```
FULL3 | FULL3
```

### Four Port Calibration

A 4-Port Calibration can be accomplished using Reflection and Thru measurements, two LRL/LRM calibrations, or two FULL2 AutoCal calibrations. PORT12 and PORT34 are excluded from LRL/LRM calibrations. The following is a typical return for the calibration type query for each technique:

```
FULL4 | FULL4
```

### Response Calibration Both and Full Calibration Both

The RESPB and FULLB calibration types return the command arguments shown in the following subsections:

- RESPB returns RESP1,RESP1
- FULLB returns FULL1,FULL1

### Set of Query Calibration Ports

Use the following commands to set or query the calibration ports:

- :SENSe{1-16}:CORRection:COLLect[:METHOD]:PORT <char>
- :SENSe{1-16}:CORRection:COLLect[:METHOD]:PORT?

Query Parameters: <char>{, <char2>}{{, <char3>, <char4>, <char5>, <char6>}

Where the <char> values are combinations of:

- RESP1
- FULL1
- FULL2
- FULL3
- FULL4
- TFRF
- TFRR
- TFRB
- 1P2PF

- 1P2PR

Range: NA

Default Value: FULL2

Syntax Example: :SENS1:CORR:COLL:TYP?

## 5-77 :SENSe{1-16}:CORRection:COLLect:WAVeguide Subsystem

The :SENSe{1-16}:CORRection:COLLect:WAVeguide subsystem sets the calibration parameters and coefficients for waveguide line types. Use this subsystem to set waveguide parameters before starting a calibration.

### Calibration Setup Subsystems

These subsystems are used during various phases of calibration configuration setup:

- “:CALCulate{1-16}:REFerence Subsystem” on page 5-144
- “:SENSe{1-16}:CORRection:COLLect:METHod Subsystem” on page 5-399
- “:SENSe{1-16}:CORRection:COLLect:MICrostrip Subsystem” on page 5-400
- “:SENSe{1-16}:CORRection:COLLect:MULTiple Subsystem” on page 5-405
- “:SENSe{1-16}:CORRection:COLLect:LRL:WAVeguide Subsystem” on page 5-397
- “:SENSe{1-16}:CORRection:COLLect[:CALa]:PORT Subsystem” on page 5-450
- “:SENSe{1-16}:CORRection:ISOLation Subsystem” on page 5-508
- “:SENSe{1-16}:CORRection:STATe Subsystem” on page 5-509

**:SENSe{1-16}:CORRection:COLLect:WAVeguide:DIElectric <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:WAVeguide:DIElectric?**

Description: Sets the waveguide calibration kit dielectric value on the indicated channel.

Returns the waveguide calibration kit dielectric value on the indicated channel. See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR3> The output parameter is a unitless number.

Range: MPND

Default Value: 1.00000000000E+000

Syntax Example: :SENS1:CORR:COLL:WAV:DIEL 1.2E0  
                  :SENS1:CORR:COLL:WAV:DIEL?

**:SENSe{1-16}:CORRection:COLLect:WAVeguide:FREQuency <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:WAVeguide:FREQuency?**

Description: Sets the waveguide calibration kit cutoff frequency on the indicated channel.

Returns the waveguide calibration kit cutoff frequency on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:WAV:FREQ 5.0E9  
                  :SENS1:CORR:COLL:WAV:FREQ?

```
:SENSe{1-16}:CORRection:COLLect:WAVeguide:KIT <char>
:SENSe{1-16}:CORRection:COLLect:WAVeguide:KIT?
```

Description: Sets the waveguide kit type on the indicated channel.

Returns the waveguide kit type on the indicated channel. See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

Cmd Parameters: <char> WR10 | WR12 | WR15 | WR28 | WR42 | WR64 | WR75 | WR90 | WR112 | WR137 | WR159 | WR187 | WR229 | USER1 | USER2 | USER3 | USER4 | USER5 | USER6 | USER7 | USER8 | USER9 | USER10 | USER11 | USER12 | USER13 | USER14 | USER15 | USER16 | USER17 | USER18 | USER19 | USER20 | USER21 | USER22 | USER23 | USER24 | USER25 | USER26 | USER27 | USER28 | USER29 | USER30 | USER31 | USER32

Where:

- WR10 = Typical WR-10 RF waveguide
- WR12 = Typical WR-12 RF waveguide
- WR15 = Typical WR-15 RF waveguide
- WR28 = Typical WR-28 RF waveguide
- WR42 = Typical WR-42 RF waveguide
- WR64 = Typical WR-64 RF waveguide
- WR75 = Typical WR-75 RF waveguide
- WR90 = Typical WR-90 RF waveguide
- WR112 = Typical WR-112 RF waveguide
- WR137 = Typical WR-137 RF waveguide
- WR159 = Typical WR-159 RF waveguide
- WR187 = Typical WR-187 RF waveguide
- WR229 = Typical WR-229 RF waveguide
- USERx = User-defined waveguide x. The device can be renamed by the user but programmatically is always referred to as “USERx”, where x is any number between 1 and 32.

Query Parameters: <char> WR10 | WR12 | WR15 | WR28 | WR42 | WR64 | WR75 | WR90 | WR112 | WR137 | WR159 | WR187 | WR229 | USER1 | USER2 | USER3 | USER4 | USER5 | USER6 | USER7 | USER8 | USER9 | USER10 | USER11 | USER12 | USER13 | USER14 | USER15 | USER16 | USER17 | USER18 | USER19 | USER20 | USER21 | USER22 | USER23 | USER24 | USER25 | USER26 | USER27 | USER28 | USER29 | USER30 | USER31 | USER32

Range: NA

Default Value: USER 1

Syntax Example: **:SENS1:CORR:COLL:WAV:KIT WR28**  
**:SENS1:CORR:COLL:WAV:KIT?**

**:SENSe{1-16}:CORRection:COLLect:WAVeguide:LABEL <string>**

**:SENSe{1-16}:CORRection:COLLect:WAVeguide:LABEL?**

Description: Sets the waveguide calibration kit label on the indicated channel.

Returns the waveguide calibration kit label on the indicated channel. See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

Cmd Parameters: <string> The input parameter is any combination of numbers and letters.

See definition of “[<string>](#)” on page 2-10.

Query Parameters: <char> The output parameter can be any combination of numbers and letters.

Range: NA

Default Value: WR10

Syntax Example: :SENS1:CORR:COLL:WAV:LAB 'wave1'

:SENS1:CORR:COLL:WAV:LAB?

**:SENSe{1-16}:CORRection:COLLect:WAVeguide:LOAD:L0 <NRf>**

**:SENSe{1-16}:CORRection:COLLect:WAVeguide:LOAD:L0?**

Description: Sets the waveguide calibration kit L0 (L zero) load inductance on the indicated channel.

Returns the waveguide calibration kit load inductance on the indicated channel.

See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

Cmd Parameters: <NRf> The input parameter is in Henrys.

Cmd Parameters: <NR3> The output parameter is in Henrys.

Range: MPND

Default Value: 0.00000000000E+000

Syntax Example: :SENS1:CORR:COLL:WAV:LOAD:L0 7.5E1

:SENS1:CORR:COLL:WAV:LOAD:L0?

**:SENSe{1-16}:CORRection:COLLect:WAVeguide:LOAD:OFFSet <NRf>**

**:SENSe{1-16}:CORRection:COLLect:WAVeguide:LOAD:OFFSet?**

Description: Sets the waveguide calibration kit load offset on the indicated channel.

Returns the waveguide calibration kit load offset on the indicated channel.

See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default Value: 0.00000000000E+000

Syntax Example: :SENS1:CORR:COLL:WAV:LOAD:OFFS 2.5E1

:SENS1:CORR:COLL:WAV:LOAD:OFFS?

**:SENSe{1-16}:CORRection:COLLect:WAVeguide:LOAD:R <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:WAVeguide:LOAD:R?**

Description: Sets the waveguide calibration kit load resistance on the indicated channel.  
 Returns the waveguide calibration kit load resistance on the indicated channel.  
 See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

Cmd Parameters: <NRf> The input parameter is in Ohms.

Query Parameters: <NR3> The output parameter is in Ohms.

Range: MPND

Default Value: 5.00000000000E+001

Syntax Example: **:SENS1:CORR:COLL:WAV:LOAD:R 7.5E1**  
**:SENS1:CORR:COLL:WAV:LOAD:R?**

**:SENSe{1-16}:CORRection:COLLect:WAVeguide:OPEN:C0 <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:WAVeguide:OPEN:C0?**

Description: Sets the waveguide calibration kit open capacitance C0 (C zero) value on the indicated channel. The C0 coefficient is measured in Farads.  
 Returns the waveguide calibration kit open capacitance C0 value on the indicated channel.  
 See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

Cmd Parameters: <NRf> The input parameter is in Farads.

Query Parameters: <NR3> The output parameter is in Farads.

Range: MPND

Default Value: 0.00000000000E+000

Syntax Example: **:SENS1:CORR:COLL:WAV:OPEN:C0 3.0E-12**  
**:SENS1:CORR:COLL:WAV:OPEN:C0?**

**:SENSe{1-16}:CORRection:COLLect:WAVeguide:OPEN:C1 <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:WAVeguide:OPEN:C1?**

Description: Sets the waveguide calibration kit open capacitance C1 (C one) term on the indicated channel. The C1 coefficient is measured in Farads/Hertz.  
 Returns the waveguide calibration kit open capacitance1 term on the indicated channel.  
 See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

Cmd Parameters: <NRf> The input parameter is in Farads/Hertz.

Query Parameters: <NR3> The output parameter is in Farads/Hertz.

Range: MPND

Default Value: 0.00000000000E+000

Syntax Example: **:SENS1:CORR:COLL:WAV:OPEN:C1 3.0E-12**  
**:SENS1:CORR:COLL:WAV:OPEN:C1?**

:SENSe{1-16}:CORRection:COLLect:WAVeguide:OPEN:C2 <NRf>  
:SENSe{1-16}:CORRection:COLLect:WAVeguide:OPEN:C2?

Description: Sets the waveguide calibration kit open capacitance C2 term on the indicated channel.  
The C2 coefficient is measured in Farads/Hertz^2.

Returns the waveguide calibration kit open capacitance C2 term on the indicated channel.

See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

Cmd Parameters: <NRf> The input parameter is in Farads/Hertz^2.

Query Parameters: <NR3> The output parameter is in Farads/Hertz^2.

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:WAV:OPEN:C2 3.0E-12  
:SENS1:CORR:COLL:WAV:OPEN:C2?

:SENSe{1-16}:CORRection:COLLect:WAVeguide:OPEN:C3 <NRf>  
:SENSe{1-16}:CORRection:COLLect:WAVeguide:OPEN:C3?

Description: Sets the waveguide calibration kit open capacitance C3 term on the indicated channel.  
The C3 coefficient is measured in Farads/Hertz^3.

Returns the waveguide calibration kit open capacitance C3 term on the indicated channel.

See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

Cmd Parameters: <NRf> The input parameter is in Farads/Hertz^3.

Query Parameters: <NR3> The output parameter is in Farads/Hertz^3.

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:WAV:OPEN:C3 3.0E-12  
:SENS1:CORR:COLL:WAV:OPEN:C3?

:SENSe{1-16}:CORRection:COLLect:WAVeguide:OPEN:OFFSet <NRf>  
:SENSe{1-16}:CORRection:COLLect:WAVeguide:OPEN:OFFSet?

Description: Sets the waveguide calibration kit open offset on the indicated channel.

Returns the waveguide calibration kit open offset on the indicated channel.

See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:WAV:OPEN:OFFS 1.2E-4  
:SENS1:CORR:COLL:WAV:OPEN:OFFS?

```
:SENSe{1-16}:CORRection:COLLect:WAVeguide:SERial <string>
:SENSe{1-16}:CORRection:COLLect:WAVeguide:SERial?
```

Description: Sets the waveguide calibration kit serial number on the indicated channel.

Returns the waveguide calibration kit serial number on the indicated channel.

Cmd Parameters: <string> The input parameter is any combination of numbers and letters. See definition of "[<string>](#)" on page 2-10.

Query Parameters: <char> The output parameter can be any combination of numbers and letters.

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:WAV:SER '12012008'
:SENS1:CORR:COLL:WAV:SER?

```
:SENSe{1-16}:CORRection:COLLect:WAVeguide:SHORT1:OFFSet <NRf>
:SENSe{1-16}:CORRection:COLLect:WAVeguide:SHORT1:OFFSet?
```

Description: Sets the waveguide calibration kit short1 offset on the indicated channel.

Returns the waveguide calibration kit short1 offset on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default Value: See "[Calibration Component Parameters](#)" on page 2-31.

Syntax Example: :SENS1:CORR:COLL:WAV:SHORT1:OFFS 1.2E-4
:SENS1:CORR:COLL:WAV:SHORT1:OFFS?

```
:SENSe{1-16}:CORRection:COLLect:WAVeguide:SHORT2:OFFSet <NRf>
:SENSe{1-16}:CORRection:COLLect:WAVeguide:SHORT2:OFFSet?
```

Description: Sets the waveguide calibration kit short2 offset on the indicated channel.

Returns the waveguide calibration kit label short2 offset on the indicated channel.

See "[Calibration Component Parameters](#)" on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default Value: See "[Calibration Component Parameters](#)" on page 2-31.

Syntax Example: :SENS1:CORR:COLL:WAV:SHORT2:OFFS 5.0E-9
:SENS1:CORR:COLL:WAV:SHORT2:OFFS?

**:SENSe{1-16}:CORRection:COLLect:WAVeguide:SHORT3:OFFSet <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:WAVeguide:SHORT3:OFFSet?**

Description: Sets the waveguide calibration kit short3 offset length on the indicated channel.

Returns the waveguide calibration kit short3 offset length on the indicated channel.

See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:WAV:SHORT3:OFFS 5.0E9

:SENS1:CORR:COLL:WAV:SHORT3:OFFS?

**:SENSe{1-16}:CORRection:COLLect:WAVeguide:SLOAD:MINF <NRf>**

**:SENSe{1-16}:CORRection:COLLect:WAVeguide:SLOAD:MINF?**

Description: Sets the waveguide calibration kit sliding load minimum frequency on the indicated channel.

Returns the waveguide calibration kit sliding load minimum frequency on the indicated channel.

See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: MPND

Default Value: 2.00000000000E+009

Syntax Example: :SENS1:CORR:COLL:WAV:SLOAD:MINF 10.0E7

:SENS1:CORR:COLL:WAV:SLOAD:MINF?

## 5-78 :SENSe{1-16}:CORRection:COLLect:SOLX:CALKit Subsystem

The :SENSe{1-16}:CORRection:COLLect:SOLX:CALKit subsystem sets various SOLX coefficients and parameters for a pending calibration.

### Calibration Setup Subsystems

These subsystems are used during various phases of calibration configuration setup:

- “:CALCulate{1-16}:REFERENCE Subsystem” on page 5-144
- “:SENSe{1-16}:CORRection:COLLect:MULTIple Subsystem” on page 5-405
- “:SENSe{1-16}:CORRection:COLLect[:CALa]:PORT Subsystem” on page 5-450
- “:SENSe{1-16}:CORRection:COLLect:SOLX:CALKit Subsystem” on page 5-470
- “:SENSe{1-16}:CORRection:ISOLation Subsystem” on page 5-508
- “:SENSe{1-16}:CORRection:STATe Subsystem” on page 5-509

**:SENSe:CORRection:COLLect:SOLX:CKIT{1-32}:SERial <string>**  
**:SENSe:CORRection:COLLect:SOLX:CKIT{1-32}:SERial?**

Description : Sets the serial number of the User-defined cal kit.

Returns the serial number of the User-defined cal kit

Cmd Parameters : <string> The input parameter is any combination of numbers and letters. See definition of “<block> or <arbitrary block>” on page 2-10.

Query Output : The output parameter can be any combination of numbers and letters. See definition of “<char>” on page 2-11.

Range : NA

Default : 'XXXXXX'

Syntax Example : **:SENS:CORR:COLL:SOLX:CKIT1:SER '28932df3'**  
**:SENS:CORR:COLL:SOLX:CKIT1:SER?**

**:SENSe:CORRection:COLLect:SOLX:CKIT{1-32}:LABEL <string>**  
**:SENSe:CORRection:COLLect:SOLX:CKIT{1-32}:LABEL?**

Applicability: MS46122, MS46131, MS46322, MS46522, MS46524

Description : Sets the label/connector name of the User-defined cal kit.

Returns the label/connector name of the User-defined cal kit

Cmd Parameters : <string> The input parameter is any combination of numbers and letters. See definition of “<block> or <arbitrary block>” on page 2-10.

Query Output : The output parameter can be any combination of numbers and letters. See definition of “<char>” on page 2-11.

Range : NA

Default : User-defined <1-32>

Syntax Example : **:SENS:CORR:COLL:SOLX:CKIT1:LABEL 'MyLabel'**  
**:SENS:CORR:COLL:SOLX:CKIT1:LABEL?**

## 5-79 :SENSe{1-16}:CORRection:COLLect:TRL[:CALa] Subsystem

The :SENSe{1-16}:CORRection:COLLect:TRL[:CALa] subsystem commands control setup and data collection for the TRL calibration. These calibrations are similar to the LRL/LRM family, except one line must be of zero length (hence the term 'thru' in thru-reflect-line).

### Calibration Setup Subsystems

These subsystems are used during various phases of TRL calibration configuration setup:

- Section 5-79 “:SENSe{1-16}:CORRection:COLLect:TRL[:CALa] Subsystem” on page 5-471
- Section 5-80 “:SENSe{1-16}:CORRection:COLLect:TRL:CALB Subsystem” on page 5-485
- Section 5-81 “:SENSe{1-16}:CORRection:COLLect:TRL:SINGleton Subsystem – 4-Port VNAs” on page 5-499
- Section 5-82 “:SENSe{1-16}:CORRection:COLLect:TRL:WAveguide Subsystem” on page 5-505

**:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND:COUNT <NRf>**

**:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND:COUNT?**

Description: Sets the number of bands to use in the TRL CALA calibration on the indicated channel.

Returns the number of bands to be used the TRL CALA calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is an integer.

Query Parameters: NA

Query Output: <NR1> The input parameter is an integer.

Range: 1 to 5

Default Value: 1

Syntax Example: :SENS1:CORR:COLL:TRL:BAND:COUN 5

:SENS1:CORR:COLL:TRL:BAND:COUN?

**:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:CKIT:LOAD <string>**

Description: Loads a TRL cal kit file into CALA TRL calibration on the indicated channel.

No query.

Cmd Parameters: <string> Filename and path to the file in the form: 'x:\directory\filename.lcf', where x:\directory\filename.lcf exists and filename.lcf is a valid TRL cal kit file.

Query Parameters: NA

Query Output: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:TRL:CKIT:LOAD 'c:\filename.lcf'

**:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:CKIT:NAME <string>****:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:CKIT:NAME?**

Description: Sets the name that will be stored for the CALA TRL cal kit file on the indicated channel.

Returns the name that was last set for the currently loaded CALA TRL cal kit file on the indicated channel.

Cmd Parameters: <string> A name that will be associated with the current cal kit file.

Query Parameters: NA

Query Output: <string> The name that is currently associated with the current cal kit file.

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:TRL:CKIT:NAME 'mytrlcalkit'

:SENS1:CORR:COLL:TRL:CKIT:NAME?

**:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:CKIT:SAVE <string>**

Description: Saves a TRL cal kit file of a CALA TRL calibration on the indicated channel.

No query.

Cmd Parameters: <string> Filename and path to the file in the form: 'x:\directory\filename.lcf'

Query Parameters: NA

Query Output: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:TRL:CKIT:SAVE 'c:\filename.lcf'

```
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{2-5}:FREQuency:BREAKpo
    int <NRf>
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{2-5}:FREQuency:BREAKpo
    int?
```

Description: Sets the breakpoint frequency between bands of TRL calibration on the indicated channel, where

- BAND2: denotes breakpoint frequency between bands 2 and 1
- BAND3: denotes breakpoint frequency between bands 3 and 2
- BAND4: denotes breakpoint frequency between bands 4 and 3
- BAND5: denotes breakpoint frequency between bands 5 and 4

Returns the breakpoint frequency between bands of TRL calibration on the indicated channel.

Cmd Parameters: <NRf> The breakpoint frequency input parameter is in Hertz.

Query Parameters: NA

Query Output: <NR1> The breakpoint frequency output parameter is in Hertz.

Range: MPND

Default Value: MPND

Syntax Example: :SENS1:CORR:COLL:TRL:BAND2:FREQ:BRE 4E09  
:SENS1:CORR:COLL:TRL:BAND2:FREQ:BRE?

```
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:LINE
```

Description: Initiates collection of the indicated Band Line Standard data for the CALA calibration on the indicated channel, where

- BAND1: denotes the Band1 Cal Device
- BAND2: denotes the Band2 Cal Device
- BAND3: denotes the Band3 Cal Device
- BAND4: denotes the Band4 Cal Device
- BAND5: denotes the Band5 Cal Device

No query.

Cmd Parameters: NA

Query Parameters: NA

Query Output: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:TRL:BAND1:LINE

**:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:REFLection:TYPE <char>**  
**:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:REFLection:TYPE?**

Description: Sets the specified band's reflection type of the TRL CALA calibration on the indicated channel, where:

- OPENlike = The reflection type is more like an open.
- SHORTlike = The reflection type is more like a short.

Returns the specified band's reflection type of the TRL CALA calibration on the indicated channel.

Cmd Parameters: <char> OPEN | SHORT

Query Parameters: NA

Query Output: <char> OPEN | SHORT

Range: NA

Default Value: SHORT

Syntax Example: :SENS1:CORR:COLL:TRL:BAND1:REFL:TYPE OPEN  
:SENS1:CORR:COLL:TRL:BAND1:REFL:TYPE?

**:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:OPEN:OFFSet <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:OPEN:OFFSet?**

Description: Sets the electrical offset length of the open-like reflection of the TRL CALA calibration on the indicated channel.

Returns the electrical offset length of the open-like reflection of the TRL CALA calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: NA

Query Output: <NRf> The output parameter is in Meters.

Range: MPND

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:OPEN:OFFS 5.9  
:SENS1:CORR:COLL:TRL:OPEN:OFFS?

**:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:SHORT:OFFSet <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:SHORT:OFFSet?**

Description: Sets the offset length of the short-like reflection of the TRL CALA calibration on the indicated channel.

Returns the offset length of the short-like reflection of the TRL CALA calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: NA

Query Output: <NR3> The output parameter is in Meters.

Range: MPND

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:SHORT:OFFS 5.9

:SENS1:CORR:COLL:TRL:SHORT:OFFS?

**:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:LINE:DELay <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:LINE:DELay?**

Description: Sets the delay of the given band for CALA of the TRL calibration of the indicated channel.

Returns the delay of the given band for CALA of the TRL calibration of the indicated channel.

Cmd Parameters: <NRf> The input parameter is in seconds.

Query Parameters: NA

Query Output: <NR3> The output parameter is in seconds.

Range: MPND

Default: Default value is dependent on the default dielectric of the substrate and the effective length default value.

Syntax Example: :SENS1:CORR:COLL:TRL:BAND2:LINE:DEL 19.6782

:SENS1:CORR:COLL:TRL:BAND2:LINE:DEL?

**:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:LINE:LENGTH <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:LINE:LENGTH?**

Description: Sets the electrical line length of the given band of the TRL CALA calibration on the indicated channel.

Returns the electrical line length of the given band of the TRL CALA calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Query Output: NA

Range: MPND

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:BAND1:LINE:LENG 6

:SENS1:CORR:COLL:TRL:BAND1:LINE:LENG?

```
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:LINE:PLENgt <NRf>
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:LINE:PLENgt?
```

Description: Sets the physical length of the given band for CALA of the TRL calibration of the indicated channel.

Returns the physical length of the given band for CALA of the TRL calibration of the indicated channel.

Cmd Parameters: <NRf> The input parameter is in meters.

Query Parameters: NA

Query Output: <NR3> The output parameter is in meters.

Range: MPND

Default: Default value is dependent on the effective length default value.

Syntax Example: :SENS1:CORR:COLL:TRL:BAND2:LINE:PLEN 5.6

```
:SENS1:CORR:COLL:TRL:BAND2:LINE:PLEN?
```

```
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH
```

Applicability: The use of Port 3 or Port 4 requires a 4-port VNA instrument.

Description: Initiates collection of match standard data for the TRL calibration on the indicated channel and port.

No query.

Cmd Parameters: NA

Query Parameters: NA

Query Output: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:TRL:BAND2:PORT1:MATCH

```
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:C
0 <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:C
0?
```

Applicability: The use of Port 3 or Port 4 requires a 4-port VNA instrument.

Description: Sets capacitance of the match device on the indicated channel, band, and port of the TRL CALA calibration. The C0 (C zero) coefficient is in Farads.

Returns capacitance of the match device on the indicated channel, band, and port of the TRL CALA calibration.

Cmd Parameters: <NRf> The input parameter is in Farads.

Query Parameters: NA

Query Output: <NR3> The output parameter is in Farads.

Range: MPND

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:BAND1:PORT1:MATCH:C0 36

```
:SENS1:CORR:COLL:TRL:BAND1:PORT1:MATCH:C0?
```

```
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:C  
    1 <NRf>  
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:C  
    1?
```

Applicability: The use of Port 3 or Port 4 requires a 4-port VNA instrument.

Description: Sets the C1 (C one) coefficient of the match device on the indicated channel, band, and port of the TRL CALA calibration. The C1 coefficient is in Farads/Hertz.

Returns the C1 coefficient of the match device on the indicated channel, band, and port of the TRL CALA calibration.

Cmd Parameters: <NRf> The input parameter is in Farads/Hertz.

Query Parameters: <NR3> The output parameter is in Farads/Hertz.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:TRL:BAND1:PORT1:MATCH:C1 18  
 :SENS1:CORR:COLL:TRL:BAND1:PORT1:MATCH:C1?

```
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:C  
    2 <NRf>  
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:C  
    2?
```

Applicability: The use of Port 3 or Port 4 requires a 4-port VNA instrument.

Description: Sets the C2 coefficient of the match device on the indicated channel, band, and port of the TRL CALA calibration. The C2 coefficient is in Farads/Hertz^2.

Returns the C2 coefficient of the match device on the indicated channel, band, and port of the TRL CALA calibration.

Cmd Parameters: <NRf> The input parameter is in Farads/Hertz^2.

Query Parameters: <NR3> The output parameter is in Farads/Hertz^2.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:TRL:BAND2:PORT1:MATCH:C2 9  
 :SENS1:CORR:COLL:TRL:BAND2:PORT1:MATCH:C2?

```
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:C3 <NRf>
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:C3?
```

**Applicability:** The use of Port 3 or Port 4 requires a 4-port VNA instrument.

**Description:** Sets the C3 coefficient of the match device on the indicated channel, band, and port of the TRL CALA calibration. The C3 coefficient is in Farads/Hertz<sup>3</sup>.

Returns the C3 coefficient of the match device on the indicated channel, band, and port of the TRL CALA calibration.

**Cmd Parameters:** <NRf> The input parameter is in Farads/Hertz<sup>3</sup>.

**Query Parameters:** <NR3> The output parameter is in Farads/Hertz<sup>3</sup>.

**Range:** MPND

**Default Value:** See “[Calibration Component Parameters](#)” on page 2-31.

**Syntax Example:** :SENS1:CORR:COLL:TRL:BAND2:PORT1:MATCH:C3 27

```
:SENS1:CORR:COLL:TRL:BAND2:PORT1:MATCH:C3?
```

```
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:L0 <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:L0?
```

**Applicability:** The use of Port 3 or Port 4 requires a 4-port VNA instrument.

**Description:** Sets inductance of the match device on the indicated channel, band, and port of the TRL CALA calibration. The L0 (zero) coefficient is in Henrys.

Returns inductance of the match device on the indicated channel, band, and port of the TRL CALA calibration.

**Cmd Parameters:** <NRf> The input parameter is in Henrys.

**Query Parameters:** <NR3> The output parameter is in Henrys.

**Range:** MPND

**Default:** 0.0000000000E+000

**Syntax Example:** :SENS1:CORR:COLL:TRL:BAND2:PORT1:MATCH:L0 12

```
:SENS1:CORR:COLL:TRL:BAND2:PORT1:MATCH:L0?
```

```
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:L  
    1 <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:L  
    1?
```

Applicability: The use of Port 3 or Port 4 requires a 4-port VNA instrument.

Description: Sets the L1 (L one) coefficient of the match device on the indicated channel, band, and port of the TRL CALA calibration. The L1 coefficient is in Henrys/Hertz.

Returns the L1 coefficient of the match device on the indicated channel, band, and port of the TRL CALA calibration.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz.

Query Parameters: <NR3> The output parameter is in Henrys/Hertz.

Range: MPND

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:BAND2:PORT1:MATCH:L1 36  
 :SENS1:CORR:COLL:TRL:BAND2:PORT1:MATCH:L1?

```
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:L  
    2 <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:L  
    2?
```

Applicability: The use of Port 3 or Port 4 requires a 4-port VNA instrument.

Description: Sets the L2 coefficient of the match device on the indicated channel, band, and port of the TRL CALA calibration. The L2 coefficient is in Henrys/Hertz^2.

Returns the L2 coefficient of the match device on the indicated channel, band, and port of the TRL CALA calibration.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz^2.

Query Parameters: <NR3> The output parameter is in Henrys/Hertz^2.

Range: MPND

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:BAND2:PORT1:MATCH:L2 36  
 :SENS1:CORR:COLL:TRL:BAND2:PORT1:MATCH:L2?

```
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:L
    3 <NRf>
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:L
    3?
```

**Applicability:** The use of Port 3 or Port 4 requires a 4-port VNA instrument.

**Description:** Sets the L3 coefficient of the match device on the indicated channel, band, and port of the TRL CALA calibration. The L3 coefficient is in Henrys/Hertz<sup>3</sup>.

Returns the L3 coefficient of the match device on the indicated channel, band, and port of the TRL CALA calibration.

**Cmd Parameters:** <NRf> The input parameter is in Henrys/Hertz<sup>3</sup>.

**Query Parameters:** <NR3> The output parameter is in Henrys/Hertz<sup>3</sup>.

**Range:** MPND

**Default:** 0.0000000000E+000

**Syntax Example:** :SENS1:CORR:COLL:TRL:BAND2:PORT1:MATCH:L3 25.3690000000E-042
 :SENS1:CORR:COLL:TRL:BAND2:PORT1:MATCH:L3?

```
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:O
    FF1set <NRf>
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:O
    FF1set?
```

**Applicability:** The use of Port 3 or Port 4 requires a 4-port VNA instrument.

**Description:** Sets the offset Length1 coefficient of the match device on the indicated channel, band, and port of the TRL CALA calibration. The OFF1 coefficient is measured in Meters/Hertz.

Returns the offset Length1 coefficient of the match device on the indicated channel, band, and port of the TRL CALA calibration.

**Cmd Parameters:** <NRf> The input parameter is in Meters/Hertz.

**Query Parameters:** <NR3> The output parameter is in Meters/Hertz.

**Range:** MPND

**Default:** 0.0000000000E+000

**Syntax Example:** :SENS1:CORR:COLL:TRL:BAND2:PORT1:MATCH:OFF1 5.8480000000E-011
 :SENS1:CORR:COLL:TRL:BAND2:PORT1:MATCH:OFF1?

```
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:OFF2set <NRf>
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:OFF2set?
```

Applicability: The use of Port 3 or Port 4 requires a 4-port VNA instrument.

Description: Sets the offset Length2 coefficient of the match device on the indicated channel, band, and port of the TRL CALA calibration. The OFF2 coefficient is measured in Meters/Hertz^2.

Returns the offset Length2 coefficient of the match device on the indicated channel, band, and port of the TRL CALA calibration.

Cmd Parameters: <NRf> The input parameter is in Meters/Hertz^2.

Query Parameters: <NR3> The output parameter is in Meters/Hertz^2.

Range: MPND

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:BAND2:PORT1:MATCH:OFF2 5.8480000000E-011
:SENS1:CORR:COLL:TRL:BAND2:PORT1:MATCH:OFF2?

```
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:OFF3 <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:OFF3?
```

Applicability: The use of Port 3 or Port 4 requires a 4-port VNA instrument.

Description: Sets the offset Length3 coefficient of the match device on the indicated channel, band, and port of the TRL CALA calibration. The OFF3 coefficient is measured in Meters/Hertz^3.

Returns the offset Length3 coefficient of the match device on the indicated channel, band, and port of the TRL CALA calibration.

Cmd Parameters: <NRf> The input parameter is in Meters/Hertz^3.

Query Parameters: <NR3> The output parameter is in Meters/Hertz^3.

Range: MPND

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:BAND2:PORT1:MATCH:OFF3 5.698
:SENS1:CORR:COLL:TRL:BAND2:PORT1:MATCH:OFF3?

```
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:O
    FFSet <NRf>
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:O
    FFSet?
```

**Applicability:** The use of Port 3 or Port 4 requires a 4-port VNA instrument.

**Description:** Sets offset length of the match device on the indicated channel, band, and port of the TRL CALA calibration.

Returns offset length of the match device on the indicated channel, band, and port of the TRL CALA calibration.

**Cmd Parameters:** <NRf> The input parameter is in Meters.

**Query Parameters:** <NR3> The output parameter is in Meters.

Range: MPND

Default: 0.0000000000E+000

**Syntax Example:** :SENS1:CORR:COLL:TRL:BAND2:PORT1:MATCH:OFFS 10.0560000000E-003
:SENS1:CORR:COLL:TRL:BAND2:PORT1:MATCH:OFFS?

```
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:R
    <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:R
    ?
```

**Applicability:** The use of Port 3 or Port 4 requires a 4-port VNA instrument.

**Description:** Sets resistance of the match device on the indicated channel, band, and port of the TRL CALA calibration.

Returns resistance of the match device on the indicated channel, band, and port of the TRL CALA calibration.

**Cmd Parameters:** <NRf> The input parameter is in Ohms.

**Query Parameters:** <NR3> The output parameter is in Ohms.

Range: MPND

Default: 5.0000000000E+001

**Syntax Example:** :SENS1:CORR:COLL:TRL:BAND2:PORT1:MATCH:R 15.256
:SENS1:CORR:COLL:TRL:BAND2:PORT1:MATCH:R?

```
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:S  
    1P:FILE <string>  
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:S  
    1P:FILE?
```

**Applicability:** The use of Port 3 or Port 4 requires a 4-port VNA instrument.

**Description:** Sets the MATCH S1P file on the indicated channel, band, and port for the TRL CALA calibration.

Returns the MATCH S1P file on the selected port of the selected device for the TRL CALA calibration for the indicated channel.

**Cmd Parameters:** <string> s1p file path

**Query Parameters:** NA

**Query Output:** <char> s1p file path

**Range:** NA

**Default:** NA

**Syntax Example:** :SENS1:CORR:COLL:TRL:BAND1:PORT1:MATCH:S1P:FILE  
    'x:\directory\filename.s1p'  
    :SENS1:CORR:COLL:TRL:BAND1:PORT1:MATCH:S1P:FILE?

```
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:S  
    1P[:STATE] <char>  
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:S  
    1P[:STATE]?
```

**Applicability:** The use of Port 3 or Port 4 requires a 4-port VNA instrument.

**Description:** Sets the MATCH S1P file settings ON/OFF on the indicated channel, band, and port for the TRL CALA calibration. ON means that the S1P file data will be used, OFF means the Circuit Model data will be used.

Returns the MATCH S1P file settings on the selected port of the indicated channel, band, and port for the TRL CALA calibration.

**Cmd Parameters:** <char> 1 | 0 | ON | OFF

**Query Parameters:** NA

**Query Output:** <char> 1 | 0

**Range:** NA

**Default:** NA

**Syntax Example:** :SENS1:CORR:COLL:TRL:BAND1:PORT1:MATCH:S1P 1  
    :SENS1:CORR:COLL:TRL:BAND1:PORT1:MATCH:S1P?

```
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:Z
    0 <NRf>
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:PORT{1-4}:MATCH:Z
    0?
```

**Applicability:** The use of Port 3 or Port 4 requires a 4-port VNA instrument.

**Description:** Sets impedance of the match device on the indicated channel, band, and port of the TRL CALA calibration.

Returns impedance of the match device on the indicated channel, band, and port of the TRL CALA calibration.

**Cmd Parameters:** <NRf> The input parameter is in Ohms.

**Query Parameters:** <NR3> The output parameter is in Ohms.

Range: MPND

Default: 5.00000000000E+001

**Syntax Example:** :SENS1:CORR:COLL:TRL:BAND1:PORT1:MATCH:Z0 87.265412
:SENS1:CORR:COLL:TRL:BAND1:PORT1:MATCH:Z0?

```
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:TYPE <char>
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:BAND{1-5}:TYPE?
```

**Description:** Sets the type of the given band's device in the TRL CALA calibration on the indicated channel.

Returns the type of the given band's device in the TRL CALA calibration on the indicated channel.

**Cmd Parameters:** <char> LINE | MATCH

**Query Parameters:** NA

Query Output: <char> LINE | MATCH

Range: NA

Default: LINE

**Syntax Example:** :SENS1:CORR:COLL:TRL:BAND1:TYPE LINE
:SENS1:CORR:COLL:TRL:BAND1:TYPE?

```
:SENSe{1-16}:CORRection:COLLect:TRL[:CALa]:THRU
```

**Description:** Initiates collection of the THRU data for the CALA calibration on the indicated channel, where the thru length is 0 m.

No query.

**Cmd Parameters:** NA

**Query Parameters:** NA

Query Output: NA

Range: NA

Default Value: NA

**Syntax Example:** :SENS1:CORR:COLL:TRL:THRU

## 5-80 :SENSe{1-16}:CORRection:COLLect:TRL:CALB Subsystem

The :SENSe{1-16}:CORRection:COLLect:TRL:CALB subsystem commands control setup and data collection for the TRL calibration. These calibrations are similar to the LRL/LRM family except one line must be of zero length (hence the term 'thru' in thru-reflect-line).

The :SENSe{1-16}:CORRection:COLLect:TRL:CALB commands require a 4-port VNA instrument.

### Calibration Setup Subsystems

These subsystems are used during various phases of calibration configuration setup:

- [Section 5-79 “:SENSe{1-16}:CORRection:COLLect:TRL\[:CALa\] Subsystem” on page 5-471](#)
- [Section 5-80 “:SENSe{1-16}:CORRection:COLLect:TRL:CALB Subsystem” on page 5-485](#)
- [Section 5-81 “:SENSe{1-16}:CORRection:COLLect:TRL:SINGleton Subsystem – 4-Port VNAs” on page 5-499](#)
- [Section 5-82 “:SENSe{1-16}:CORRection:COLLect:TRL:WAveguide Subsystem” on page 5-505](#)

**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND:COUNT <NRf>**

**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND:COUNT?**

Description: Sets the number of bands to use in the TRL CALB calibration on the indicated channel.

Returns the number of bands to be used the TRL CALB calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is an integer.

Query Parameters: NA

Query Output: <NR1> The input parameter is an integer.

Range: 1 to 5

Default Value: 1

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:BAND:COUN 5

:SENS1:CORR:COLL:TRL:CALB:BAND:COUN?

**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:CKIT:LOAD <string>**

Description: Loads a TRL/LRL cal kit file into CALB TRL calibration on the indicated channel.

No query.

Cmd Parameters: <string> Filename and path to the file in the form: 'x:\directory\filename.lcf', where x:\directory\filename.lcf exists and filename.lcf is a valid TRL cal kit file.

Query Parameters: NA

Query Output: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:CKIT:LOAD 'c:\filename.lcf'

**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:CKIT:NAME <string>****:SENSe{1-16}:CORRection:COLLect:TRL:CALB:CKIT:NAME?**

Description: Sets the name that will be stored in the CALB TRL cal kit file on the indicated channel.

Returns the name that was last set for the currently loaded CALB TRL cal kit file on the indicated channel.

Cmd Parameters: <string> A name that will be associated with the current cal kit file.

Query Parameters: NA

Query Output: <string> The name that is currently associated with the current cal kit file.

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:CKIT:NAME 'mytricalkit'

:SENS1:CORR:COLL:TRL:CALB:CKIT:NAME?

**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:CKIT:SAVE <string>**

Description: Saves a TRL cal kit file into CALB TRL calibration on the indicated channel.

No query.

Cmd Parameters: <string> Filename and path to the file in the form: 'x:\directory\filename.lcf'

Query Parameters: NA

Query Output: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:CKIT:SAVE 'c:\filename.lcf'

```
:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{2-5}:FREQuency:BREAKpoint  
    t <NRf>  
:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{2-5}:FREQuency:BREAKpoint  
    t?
```

Description: Sets the breakpoint frequency between bands of TRL calibration on the indicated channel, where

- BAND2: denotes breakpoint frequency between bands 2 and 1
- BAND3: denotes breakpoint frequency between bands 3 and 2
- BAND4: denotes breakpoint frequency between bands 4 and 3
- BAND5: denotes breakpoint frequency between bands 5 and 4

Returns the breakpoint frequency between bands of TRL calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: NA

Query Output: <NR1> The output parameter is in Hertz.

Range: MPND

Default Value: MPND

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:BAND2:FREQ:BRE 4E09  
:SENS1:CORR:COLL:TRL:CALB:BAND2:FREQ:BRE?

### :SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:LINE

Description: Initiates collection of the indicated Band Line Standard data for the CALB calibration on the indicated channel, where

- BAND1: denotes the Band1 Cal Device
- BAND2: denotes the Band2 Cal Device
- BAND3: denotes the Band3 Cal Device
- BAND4: denotes the Band4 Cal Device
- BAND5: denotes the Band5 Cal Device

No query.

Cmd Parameters: NA

Query Parameters: NA

Query Output: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:BAND1:LINE

```
:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:REFlection:TYPE
<char>
:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:REFlection:TYPE?
```

Description: Sets the reflection type of the TRL CALB calibration on the indicated channel and band, where:

- OPENlike = The reflection type is more like an open.
- SHORTlike = The reflection type is more like a short.

Returns the reflection type of the TRL CALB calibration on the indicated channel and band.

Cmd Parameters: <char> OPENlike | SHORTlike

Query Parameters: NA

Query Output: <char> OPEN | SHORT

Range: NA

Default Value: SHORT

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:BAND1:REFL:TYPE OPEN  
:SENS1:CORR:COLL:TRL:CALB:BAND1:REFL:TYPE?

```
:SENSe{1-16}:CORRection:COLLect:TRL:CALB:OPEN:OFFSet <NRf>
:SENSe{1-16}:CORRection:COLLect:TRL:CALB:OPEN:OFFSet?
```

Description: Sets the electrical offset length of the open-like reflection of the TRL CALB calibration on the indicated channel.

Returns the electrical offset length of the open-like reflection of the TRL CALB calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: NA

Query Output: <NR3> The output parameter is in Meters.

Range: MPND

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:OPEN:OFFS 38.23  
:SENS1:CORR:COLL:TRL:CALB:OPEN:OFFS?

**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:SHORT:OFFSet <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:SHORT:OFFSet?**

Description: Sets the offset length of the short-like reflection of the TRL CALB calibration on the indicated channel.

Returns the offset length of the short-like reflection of the TRL CALB calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: NA

Query Output: <NR3> The output parameter is in Meters.

Range: MPND

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:SHORT:OFFS 4.5800000000E-003  
:SENS1:CORR:COLL:TRL:CALB:SHORT:OFFS?

**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:LINE:DELay <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:LINE:DELay?**

Description: Sets the line delay of the given band for CALB of the TRL calibration of the indicated channel.

Returns the line delay of the given band for CALB of the TRL calibration of the indicated channel.

Cmd Parameters: <NRf> The input parameter is in seconds.

Query Parameters: NA

Query Output: <NR3> The output parameter is in seconds.

Range: MPND

Default: Default value is dependent on the default dielectric of the substrate and the effective length default value.

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:BAND2:LINE:DEL 1.56498306726E-008  
:SENS1:CORR:COLL:TRL:CALB:BAND2:LINE:DEL?

**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:LINE:LENGth <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:LINE:LENGth?**

Description: Sets the electrical line length of the given band of the TRL CALB calibration on the indicated channel.

Returns the electrical line length of the given band of the TRL CALB calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Query Output: NA

Range: MPND

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:BAND1:LINE:LENG 5.369  
:SENS1:CORR:COLL:TRL:CALB:BAND1:LINE:LENG?

**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:LINE:PLength <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:LINE:PLength?**

Description: Sets the physical line length of the given band for CALB of the TRL calibration of the indicated channel.

Returns the physical line length of the given band for CALB of the TRL calibration of the indicated channel.

Cmd Parameters: <NRf> The input parameter is in meters.

Query Parameters: NA

Query Output: <NR3> The output parameter is in meters.

Range: MPND

Default: Default value is dependent on the effective length default value.

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:BAND2:LINE:PLEN 5.85

:SENS1:CORR:COLL:TRL:CALB:BAND2:LINE:PLEN?

**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH**

Applicability: The use of Port 3 or Port 4 requires a 4-port VNA instrument.

Description: Initiates collection of match standard data for the TRL CALB calibration on the indicated channel, band, and port.

No query.

Cmd Parameters: NA

Query Parameters: NA

Query Output: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:BAND2:PORT1:MATCH

**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:C0 <NRf>**

**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:C0?**

Applicability: The use of Port 3 or Port 4 requires a 4-port VNA instrument.

Description: Sets capacitance of the match device on the indicated channel, band, and port of the TRL CALB calibration. The C0 (C zero) coefficient is in Farads.

Returns capacitance of the match device on the indicated channel, band, and port of the TRL CALB calibration.

Cmd Parameters: <NRf> The input parameter is in Farads.

Query Parameters: NA

Query Output: <NR3> The output parameter is in Farads.

Range: MPND

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:BAND1:PORT1:MATCH:C0 3.01E-12

:SENS1:CORR:COLL:TRL:CALB:BAND1:PORT1:MATCH:C0?

```
:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:C1
    <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:C1?
```

Applicability: The use of Port 3 or Port 4 requires a 4-port VNA instrument.

Description: Sets the C1 (C one) coefficient of the match device on the indicated channel, band, and port of the TRL CALB calibration. The C1 coefficient is in Farads/Hertz.

Returns the C1 coefficient of the match device on the indicated channel, band, and port of the TRL CALB calibration.

Cmd Parameters: <NRf> The input parameter is in Farads/Hertz.

Query Parameters: <NR3> The output parameter is in Farads/Hertz.

Range: MPND

Default Value: See “Calibration Component Parameters” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:BAND1:PORT1:MATCH:C1 2.0E0

```
:SENS1:CORR:COLL:TRL:CALB:BAND1:PORT1:MATCH:C1?
```

```
:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:C2
    <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:C2?
```

Applicability: The use of Port 3 or Port 4 requires a 4-port VNA instrument.

Description: Sets the C2 coefficient of the match device on the indicated channel, band, and port of the TRL CALB calibration. The C2 coefficient is in Farads/Hertz<sup>2</sup>.

Returns the C2 coefficient of the match device on the indicated channel, band, and port of the TRL CALB calibration.

Cmd Parameters: <NRf> The input parameter is in Farads/Hertz<sup>2</sup>.

Query Parameters: <NR3> The output parameter is in Farads/Hertz<sup>2</sup>.

Range: MPND

Default Value: See “Calibration Component Parameters” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:BAND2:PORT1:MATCH:C2 7.548

```
:SENS1:CORR:COLL:TRL:CALB:BAND2:PORT1:MATCH:C2?
```

**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:C3  
<NRf>**

**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:C3?**

Applicability: The use of Port 3 or Port 4 requires a 4-port VNA instrument.

Description: Sets the C3 coefficient of the match device on the indicated channel, band, and port of the TRL CALB calibration. The C3 coefficient is in Farads/Hertz<sup>3</sup>.

Returns the C3 coefficient of the match device on the indicated channel, band, and port of the TRL CALB calibration.

Cmd Parameters: <NRf> The input parameter is in Farads/Hertz<sup>3</sup>.

Query Parameters: <NR3> The output parameter is in Farads/Hertz<sup>3</sup>.

Range: MPND

Default Value: See “Calibration Component Parameters” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:BAND2:PORT1:MATCH:C3 25.3698

:SENS1:CORR:COLL:TRL:CALB:BAND2:PORT1:MATCH:C3?

**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:L0  
<NRf>**

**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:L0?**

Applicability: The use of Port 3 or Port 4 requires a 4-port VNA instrument.

Description: Sets inductance of the match device on the indicated channel, band, and port of the TRL CALB calibration. The L0 (zero) coefficient is in Henrys.

Returns inductance of the match device on the indicated channel, band, and port of the TRL CALB calibration.

Cmd Parameters: <NRf> The input parameter is in Henrys.

Query Parameters: <NR3> The output parameter is in Henrys.

Range: MPND

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:BAND2:PORT1:MATCH:L0 5.25

:SENS1:CORR:COLL:TRL:CALB:BAND2:PORT1:MATCH:L0?

:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:L1  
<NRf>  
:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:L1?

Applicability: The use of Port 3 or Port 4 requires a 4-port VNA instrument.

Description: Sets the L1 (L one) coefficient of the match device on the indicated channel, band, and port of the TRL CALB calibration. The L1 coefficient is in Henrys/Hertz.

Returns the L1 coefficient of the match device on the indicated channel, band, and port of the TRL CALB calibration.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz.

Query Parameters: <NR3> The output parameter is in Henrys/Hertz.

Range: MPND

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:BAND2:PORT1:MATCH:L1 41.256  
:SENS1:CORR:COLL:TRL:CALB:BAND2:PORT1:MATCH:L1?

:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:L2  
<NRf>

:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:L2?

Applicability: The use of Port 3 or Port 4 requires a 4-port VNA instrument.

Description: Sets the L2 coefficient of the match device on the indicated channel, band, and port of the TRL CALB calibration. The L2 coefficient is in Henrys/Hertz<sup>2</sup>.

Returns the L2 coefficient of the match device on the indicated channel, band, and port of the TRL CALB calibration.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz<sup>2</sup>.

Query Parameters: <NR3> The output parameter is in Henrys/Hertz<sup>2</sup>.

Range: MPND

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:BAND2:PORT1:MATCH:L2 4.0000000000E-033  
:SENS1:CORR:COLL:TRL:CALB:BAND2:PORT1:MATCH:L2?

**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:L3 <NRf>**

**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:L3?**

Applicability: The use of Port 3 or Port 4 requires a 4-port VNA instrument.

Description: Sets the L3 coefficient of the match device on the indicated channel, band, and port of the TRL CALB calibration. The L3 coefficient is in Henrys/Hertz<sup>3</sup>.

Returns the L3 coefficient of the match device on the indicated channel, band, and port of the TRL CALB calibration.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz<sup>3</sup>.

Query Parameters: <NR3> The output parameter is in Henrys/Hertz<sup>3</sup>.

Range: MPND

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:BAND2:PORT1:MATCH:L3 4.0000000000E-033

:SENS1:CORR:COLL:TRL:CALB:BAND2:PORT1:MATCH:L3?

**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:OFF1 <NRf>**

**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:OFF1? <NR3>**

Applicability: The use of Port 3 or Port 4 requires a 4-port VNA instrument.

Description: Sets the offset Length1 coefficient of the match device on the indicated channel, band, and port of the TRL CALB calibration. The OFF1 coefficient is measured in Meters/Hertz.

Returns the offset Length1 coefficient of the match device on the indicated channel, band, and port of the TRL CALB calibration.

Cmd Parameters: <NRf> The input parameter is in Meters/Hertz.

Query Parameters: <NR3> The output parameter is in Meters/Hertz.

Range: MPND

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:BAND2:PORT1:MATCH:OFF1 2.0000000000E+000

:SENS1:CORR:COLL:TRL:CALB:BAND2:PORT1:MATCH:OFF1?

```
:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:OFF  
    2set <NRf>  
:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:OFF  
    2set?
```

Applicability: The use of Port 3 or Port 4 requires a 4-port VNA instrument.

Description: Sets the offset Length2 coefficient of the match device on the indicated channel, band, and port of the TRL CALB calibration. The OFF2 coefficient is measured in Meters/Hertz^2.

Returns the offset Length2 coefficient of the match device on the indicated channel, band, and port of the TRL CALB calibration.

Cmd Parameters: <NRf> The input parameter is in Meters/Hertz^2.

Query Parameters: <NR3> The output parameter is in Meters/Hertz^2.

Range: MPND

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:BAND2:PORT1:MATCH:OFF2 2.0000000000E+000  
:SENS1:CORR:COLL:TRL:CALB:BAND2:PORT1:MATCH:OFF2?

```
:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:OFF  
    3set <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:OFF  
    3set?
```

Applicability: The use of Port 3 or Port 4 requires a 4-port VNA instrument.

Description: Sets the offset Length3 coefficient of the match device on the indicated channel, band, and port of the TRL CALB calibration. The OFF3 coefficient is measured in Meters/Hertz^3.

Returns the offset Length3 coefficient of the match device on the indicated channel, band, and port of the TRL CALB calibration.

Cmd Parameters: <NRf> The input parameter is in Meters/Hertz^3.

Query Parameters: <NR3> The output parameter is in Meters/Hertz^3.

Range: MPND

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:BAND2:PORT1:MATCH:OFF3 3.0000000000E+000  
:SENS1:CORR:COLL:TRL:CALB:BAND2:PORT1:MATCH:OFF3?

```
:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:OFF
    Set <NRf>
:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:OFF?
    Set?
```

**Applicability:** The use of Port 3 or Port 4 requires a 4-port VNA instrument.

**Description:** Sets offset length of the match device on the indicated channel, band, and port of the TRL CALB calibration.

Returns offset length of the match device on the indicated channel, band, and port of the TRL CALB calibration.

**Cmd Parameters:** <NRf> The input parameter is in Meters.

**Query Parameters:** <NR3> The output parameter is in Meters.

Range: MPND

Default: 0.0000000000E+000

**Syntax Example:** :SENS1:CORR:COLL:TRL:CALB:BAND2:PORT1:MATCH:OFFS 2.0000000000E+000
:SENS1:CORR:COLL:TRL:CALB:BAND2:PORT1:MATCH:OFFS?

```
:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:R
    <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:R?
```

**Applicability:** The use of Port 3 or Port 4 requires a 4-port VNA instrument.

**Description:** Sets resistance of the match device on the indicated channel, band, and port of the TRL CALB calibration.

Returns resistance of the match device on the indicated channel, band, and port of the TRL CALB calibration.

**Cmd Parameters:** <NRf> The input parameter is in Ohms.

**Query Parameters:** <NR3> The output parameter is in Ohms.

Range: MPND

Default: 5.0000000000E+001

**Syntax Example:** :SENS1:CORR:COLL:TRL:CALB:BAND2:PORT1:MATCH:R 6.0000000000E+001
:SENS1:CORR:COLL:TRL:CALB:BAND2:PORT1:MATCH:R?

```
:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:S1P
    :FILE <string>
:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:S1P
    :FILE?
```

Applicability: The use of Port 3 or Port 4 requires a 4-port VNA instrument.

Description: Sets the MATCH S1P file on the indicated channel, band, and port for the TRL CALB calibration.

Returns the MATCH S1P file on the selected port of the selected device for the TRL CALB calibration for the indicated channel.

Cmd Parameters: <string> s1p file path

Query Parameters: NA

    Query Output: <char> s1p file path

    Range: NA

    Default: NA

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:BAND1:PORT1:MATCH:S1P:FILE
 'x:\directory\filename.s1p'
 :SENS1:CORR:COLL:TRL:CALB:BAND1:PORT1:MATCH:S1P:FILE?

```
:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:S1P
    [:STATE] <char>
:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:S1P
    [:STATE]?
```

Applicability: The use of Port 3 or Port 4 requires a 4-port VNA instrument.

Description: Sets the MATCH S1P file settings ON/OFF on the indicated channel, band, and port for the TRL CALB calibration. ON means that the S1P file data will be used, OFF means the Circuit Model data will be used.

Returns the MATCH S1P file settings on the selected port of the indicated channel, band, and port for the TRL CALB calibration.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

    Query Output: <char> 1 | 0

    Range: NA

    Default: NA

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:BAND1:PORT1:MATCH:S1P 1
 :SENS1:CORR:COLL:TRL:CALB:BAND1:PORT1:MATCH:S1P?

**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:Z0  
<NRf>**

**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:PORT{1-4}:MATCH:Z0?**

Applicability: The use of Port 3 or Port 4 requires a 4-port VNA instrument.

Description: Sets impedance of the match device on the indicated channel, band, and port of the TRL CALB calibration.

Returns impedance of the match device on the indicated channel, band, and port of the TRL CALB calibration.

Cmd Parameters: <NRf> The input parameter is in Ohms.

Query Parameters: <NR3> The output parameter is in Ohms.

Range: MPND

Default: 5.0000000000E+001

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:BAND1:PORT1:MATCH:Z0 6.0000000000E+001  
:SENS1:CORR:COLL:TRL:CALB:BAND1:PORT1:MATCH:Z0?

**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:TYPE <char>**

**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:BAND{1-5}:TYPE?**

Description: Sets the type of the given band's device in the TRL CALB calibration on the indicated channel.

Returns the type of the given band's device in the TRL CALB calibration on the indicated channel.

Cmd Parameters: <char> LINE | MATCH

Query Parameters: NA

Query Output: <char> LINE | MATCH

Range: NA

Default: LINE

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:BAND1:TYPE LINE  
:SENS1:CORR:COLL:TRL:CALB:BAND1:TYPE?

**:SENSe{1-16}:CORRection:COLLect:TRL:CALB:THRU**

Description: Initiates collection of the THRU data for the CALB calibration on the indicated channel, where the thru length is 0 m.

No query.

Cmd Parameters: NA

Query Parameters: NA

Query Output: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:CORR:COLL:TRL:CALB:THRU

## 5-81 :SENSe{1-16}:CORRection:COLLect:TRL:SINGleton Subsystem – 4-Port VNAs

The :SENSe{1-16}:CORRection:COLLect:TRL:SINGleton subsystem commands provide configuration control of the Thru-Reflect-Line calibration using singletons in different configurations. The commands provide control of singleton configuration parameters and output reporting. The use of the :TRL:SINGleton commands require a 4-port VNA instrument.

### TRL Calibration Subsystems

The TRL-related calibration commands are organized into subsystems in the following sections:

- [Section 5-79 “:SENSe{1-16}:CORRection:COLLect:TRL\[:CALa\] Subsystem” on page 5-471](#)
- [Section 5-80 “:SENSe{1-16}:CORRection:COLLect:TRL:CALB Subsystem” on page 5-485](#)
- [Section 5-81 “:SENSe{1-16}:CORRection:COLLect:TRL:SINGleton Subsystem – 4-Port VNAs” on page 5-499](#)
- [Section 5-82 “:SENSe{1-16}:CORRection:COLLect:TRL:WAveguide Subsystem” on page 5-505](#)

**:SENSe{1-16}:CORRection:COLLect:TRL:SINGleton:OPEN:C0 <NRf>**

**:SENSe{1-16}:CORRection:COLLect:TRL:SINGleton:OPEN:C0?**

Description: Sets the capacitance of the open-like reflection of the TRL singleton calibration on the indicated channel. The C0 (zero) coefficient is measured in Farads

Returns the capacitance of the open-like reflection of the TRL singleton calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Farads.

Query Parameters: <NR3> The output parameter is in Farads.

Range: MPND

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:SING:OPEN:C0 2.0000000000E+000

:SENS1:CORR:COLL:TRL:SING:OPEN:C0?

**:SENSe{1-16}:CORRection:COLLect:TRL:SINGleton:OPEN:C1 <NRf>**

**:SENSe{1-16}:CORRection:COLLect:TRL:SINGleton:OPEN:C1?**

Description: Sets the C1 (C one) coefficient of the open-like reflection of the TRL singleton calibration on the indicated channel. The C1 coefficient is measured in Farads/Hertz.

Returns the C1 coefficient of the open-like reflection of the TRL singleton calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Farads/Hertz.

Query Parameters: <NR3> The output parameter is in Farads/Hertz.

Range: MPND

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:SING:OPEN:C1 2.0000000000E+000

:SENS1:CORR:COLL:TRL:SING:OPEN:C1?

```
:SENSe{1-16}:CORRection:COLLect:TRL:SINGleton:OPEN:C2 <NRf>
:SENSe{1-16}:CORRection:COLLect:TRL:SINGleton:OPEN:C2?
```

Description: Sets the C2 coefficient of the open-like reflection of the TRL singleton calibration on the indicated channel. The C2 coefficient is measured in Farads/Hertz<sup>2</sup>.

Returns the C2 coefficient of the open-like reflection of the TRL singleton calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Farads/Hertz<sup>2</sup> (Farads per Hertz squared).

Query Parameters: <NR3> The output parameter is in Farads/Hertz<sup>2</sup>.

Range: MPND

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:SING:OPEN:C2 2.0000000000E+000

```
:SENS1:CORR:COLL:TRL:SING:OPEN:C2?
```

```
:SENSe{1-16}:CORRection:COLLect:TRL:SINGleton:OPEN:C3 <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:TRL:SINGleton:OPEN:C3?
```

Description: Sets the C3 coefficient of the open-like reflection of the TRL singleton calibration on the indicated channel. The C3 coefficient is measured in Farads/Hertz<sup>3</sup>.

Returns the C3 coefficient of the open-like reflection of the TRL singleton calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Farads/Hertz<sup>3</sup> (Farads per Hertz cubed).

Query Parameters: <NR3> The output parameter is in Farads/Hertz<sup>3</sup>.

Range: MPND

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:SING:OPEN:C3 3.0000000000E+000

```
:SENS1:CORR:COLL:TRL:SING:OPEN:C3?
```

```
:SENSe{1-16}:CORRection:COLLect:TRL:SINGleton:OPEN:OFFSet <NRf>
```

```
:SENSe{1-16}:CORRection:COLLect:TRL:SINGleton:OPEN:OFFSet?
```

Description: Sets the electrical offset length of the open-like reflection of the TRL singleton calibration on the indicated channel.

Returns the electrical offset length of the open-like reflection of the TRL singleton calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:SING:OPEN:OFFS 4.0000000000E+000

```
:SENS1:CORR:COLL:TRL:SING:OPEN:OFFS?
```

```
:SENSe{1-16}:CORRection:COLLect:TRL:SINGleton:PORT{13 | 14 | 23 |  
24}:SELECTION <char>  
:SENSe{1-16}:CORRection:COLLect:TRL:SINGleton:PORT{13 | 14 | 23 |  
24}:SELECTION?
```

Description: Sets the Singleton Port for the given port pair for 3-port TRL TRL/M + Singleton calibration on the indicated channel, where:

- Port Pair 1-2 not allowed
- Port Pair 1-3 and Singleton 2 (and a through line cal between Ports 1-2 or 2-3)
- Port Pair 1-3 and Singleton 4 (and a through line cal between Ports 1-4 or 3-4)
- Port Pair 1-4 and Singleton 2 (and a through line cal between Ports 1-2 or 2-4)
- Port Pair 1-4 and Singleton 3 (and a through line cal between Ports 1-3 or 3-4)
- Port Pair 2-3 and Singleton 1 (and a through line cal between Ports 1-2 or 1-3)
- Port Pair 2-3 and Singleton 4 (and a through line cal between Ports 2-4 or 3-4)
- Port Pair 2-4 and Singleton 1 (and a through line cal between Ports 1-2 or 1-4)
- Port Pair 2-4 and Singleton 3 (and a through line cal between Ports 2-3 or 3-4)
- Port Pair 3-4 not allowed

Returns the Singleton Port for the given port pair for 3-port TRL calibration on the indicated channel.

Cmd Parameters: <char> PORT1 | PORT2 | PORT3 | PORT4

Query Parameters: NA

Query Output: <char> PORT1 | PORT2 | PORT3 | PORT4

Range: MPND

Default: PORT2

Syntax Example: :SENS1:CORR:COLL:TRL:SING:PORT13:SEL PORT2

```
:SENS1:CORR:COLL:TRL:SING:PORT13:SEL?
```

```
:SENSe{1-16}:CORRection:COLLect:TRL:SINGleton:REFLection:TYPE <char>
:SENSe{1-16}:CORRection:COLLect:TRL:SINGleton:REFLection:TYPE?
```

Description: Assigns the TRL singleton reflection type on the indicated channel, where:

- OPENlike = The reflection type is more like an open.
- SHORTlike = The reflection type is more like a short.

Returns the TRL singleton reflection type on the indicated channel.

Cmd Parameters: <char> OPENlike | SHORTlike

Query Parameters: NA

Query Output: <char> OPEN | SHORT

Range: NA

Default: OPEN

Syntax Example: :SENS1:CORR:COLL:TRL:SING:REFL:TYPE SHORT  
                  :SENS1:CORR:COLL:TRL:SING:REFL:TYPE?

```
:SENSe{1-16}:CORRection:COLLect:TRL:SINGleton:SHORT:L0 <NRf>
:SENSe{1-16}:CORRection:COLLect:TRL:SINGleton:SHORT:L0?
```

Description: Sets the inductance of the TRL singleton short on the indicated channel.

Returns the inductance of the TRL singleton short on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Henrys.

Query Parameters: <NR3> The output parameter is in Henrys.

Range: MPND

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:SING:SHOR:L0 3.0000000000E+000  
                  :SENS1:CORR:COLL:TRL:SING:SHOR:L0?

```
:SENSe{1-16}:CORRection:COLLect:TRL:SINGleton:SHORT:L1 <NRf>
:SENSe{1-16}:CORRection:COLLect:TRL:SINGleton:SHORT:L1?
```

Description: Sets the L1 (L one) coefficient of the TRL singleton short on the indicated channel.

Returns the L1 coefficient of the TRL singleton short on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz.

Query Parameters: <NR3> The output parameter is in Henrys/Hertz.

Range: MPND

Default: 0.0000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:SING:SHOR:L1 2.0000000000E+000  
                  :SENS1:CORR:COLL:TRL:SING:SHOR:L1?

:SENSe{1-16}:CORRection:COLLect:TRL:SINGleton:SHORT:L2 <NRf>

:SENSe{1-16}:CORRection:COLLect:TRL:SINGleton:SHORT:L2?

Description: Sets the L2 coefficient of the TRL singleton short on the indicated channel.

Returns the L2 coefficient of the TRL singleton short on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz<sup>2</sup> (Henrys per Hertz squared).

Query Parameters: <NR3> The output parameter is in Henrys/Hertz<sup>2</sup>.

Range: MPND

Default: 0.00000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:SING:SHOR:L2 2.00000000000E+000

:SENS1:CORR:COLL:TRL:SING:SHOR:L2?

:SENSe{1-16}:CORRection:COLLect:TRL:SINGleton:SHORT:L3 <NRf>

:SENSe{1-16}:CORRection:COLLect:TRL:SINGleton:SHORT:L3?

Description: Sets the L3 coefficient of the TRL singleton short on the indicated channel.

Returns the L3 coefficient of the TRL singleton short on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Henrys/Hertz<sup>3</sup> (Henrys per Hertz cubed).

Query Parameters: <NR3> The output parameter is in Henrys/Hertz<sup>3</sup>.

Range: MPND

Default: 0.00000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:SING:SHOR:L3 2.00000000000E+000

:SENS1:CORR:COLL:TRL:SING:SHOR:L3?

:SENSe{1-16}:CORRection:COLLect:TRL:SINGleton:SHORT:OFFSet <NRf>

:SENSe{1-16}:CORRection:COLLect:TRL:SINGleton:SHORT:OFFSet?

Description: Sets the offset length short-like reflection of the TRL singleton calibration on the indicated channel.

Returns the offset length of the short-like reflection of the TRL singleton calibration on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Meters.

Query Parameters: <NR3> The output parameter is in Meters.

Range: MPND

Default: 0.00000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:SING:SHORT:OFFS 263.354

:SENS1:CORR:COLL:TRL:SING:SHORT:OFFS?

```
:SENSe{1-16}:CORRection:COLLect:TRL:FULL3:CALibration:TYPE <char>
:SENSe{1-16}:CORRection:COLLect:TRL:FULL3:CALibration:TYPE?
```

Description: Sets the calibration type for the 3-port TRL calibration on the indicated channel, where:

- SINGleton = TRL/M + Singleton
- TWOTrx = Two TRL/Ms

Returns the calibration type for the 3-port TRL Singleton calibration on the indicated channel.

Cmd Parameters: <char> SINGleton | TWOTrx

Query Parameters: <char> SING | TWOT

Range: NA

Default: TWOT

Syntax Example: :SENS1:CORR:COLL:TRL:FULL3:CAL:TYPE SING

```
:SENS1:CORR:COLL:TRL:FULL3:CAL:TYPE?
```

## 5-82 :SENSe{1-16}:CORRection:COLLect:TRL:WAVeguide Subsystem

The :SENSe{1-16}:CORRection:COLLect:TRL:WAVeguide subsystem sets the calibration parameters and coefficients for waveguide line types. Use this subsystem to set waveguide parameters before starting a calibration.

### Calibration Setup Subsystems

These subsystems are used during various phases of TRL calibration configuration setup:

- Section 5-79 “:SENSe{1-16}:CORRection:COLLect:TRL[:CALa] Subsystem” on page 5-471
- Section 5-80 “:SENSe{1-16}:CORRection:COLLect:TRL:CALB Subsystem” on page 5-485
- Section 5-81 “:SENSe{1-16}:CORRection:COLLect:TRL:SINGleton Subsystem – 4-Port VNAs” on page 5-499
- Section 5-82 “:SENSe{1-16}:CORRection:COLLect:TRL:WAVeguide Subsystem” on page 5-505

**:SENSe{1-16}:CORRection:COLLect:TRL:WAVeguide:DIElectric <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:TRL:WAVeguide:DIElectric?**

Description: Sets the TRL waveguide calibration kit dielectric value on the indicated channel.

Returns the TRL waveguide calibration kit dielectric value on the indicated channel.

See “[Calibration Component Parameters](#)” on page 2-31 for a complete listing of calibration components, connectors, and their Command Parameters.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: NA

Query Output: <NR3> The output parameter is a unitless number.

Range: MPND

Default Value: 1.00000000000E+000

Syntax Example: :SENS1:CORR:COLL:TRL:WAV:DIEL 4.56321  
:SENS1:CORR:COLL:TRL:WAV:DIEL?

**:SENSe{1-16}:CORRection:COLLect:TRL:WAVeguide:FREQuency <NRf>**  
**:SENSe{1-16}:CORRection:COLLect:TRL:WAVeguide:FREQuency?**

Description: Sets the TRL waveguide calibration kit cutoff frequency on the indicated channel.

Returns the TRL waveguide calibration kit cutoff frequency on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: NA

Query Output: <NR3> The output parameter is in Hertz.

Range: MPND

Default Value: See “[Calibration Component Parameters](#)” on page 2-31.

Syntax Example: :SENS1:CORR:COLL:TRL:WAV:FREQ 4.5632  
:SENS1:CORR:COLL:TRL:WAV:FREQ?

## 5-83 :SENSe{1-16}:CORRection:EXTension Subsystem

The :SENSe{1-16}:CORRection:EXTension subsystem commands control the reference plane extension from the test ports.

### Time Domain, Group Delay, and Reference Plane Subsystems

Related time domain, group delay, and reference place subsystems are:

- [Section 5-28 :CALCulate{1-16}:REFERENCE Subsystem on page 5-144](#)
- [Section 5-42 :CALCulate{1-16}\[{:SElected}\]:TRANSform:TIME Subsystem on page 5-225](#)
- [Section 5-83 :SENSe{1-16}:CORRection:EXTension Subsystem on page 5-506](#)

**:SENSe{1-16}:CORRection:EXTension:PORT{1-4} <NRf>**

**:SENSe{1-16}:CORRection:EXTension:PORT{1-4}?**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the reference plane extension for the indicated port.

Returns the reference plane extension for the indicated port. Also computes the distance value and shows it in the Distance field in the Reference Plane menu in the user interface

Cmd Parameters: <NRf> The input parameter is in seconds.

Query Parameters: <NR3> The output parameter is in seconds.

Range: MPND

Default Value: 0.0000000000E+000

Syntax Example: **:SENS1:CORR:EXT:PORT1 3.0E-3**

**:SENS1:CORR:EXT:PORT1?**

## 5-84 :SENSe{1-16}:CORRection:INTerpolation Subsystem

The :SENSe{1-16}:CORRection:INTerpolation subsystem command controls the interpolation state of RF calibration.

### Calibration Setup Subsystems

These subsystems are used during various phases of calibration configuration setup:

- “:CALCulate{1-16}:REFerence Subsystem” on page 5-144
- “:SENSe{1-16}:CORRection:COLLect:METHod Subsystem” on page 5-399
- “:SENSe{1-16}:CORRection:COLLect:MULTIple Subsystem” on page 5-405
- “:SENSe{1-16}:CORRection:COLLect[:CALa]:PORT Subsystem” on page 5-450
- “:SENSe{1-16}:CORRection:INTerpolation Subsystem” on page 5-507
- “:SENSe{1-16}:CORRection:ISOLation Subsystem” on page 5-508
- “:SENSe{1-16}:CORRection:STATE Subsystem” on page 5-509

**:SENSe{1-16}:CORRection:INTerpolation:STATE <char>**

**:SENSe{1-16}:CORRection:INTerpolation:STATE?**

Description: Turns RF interpolation on/off for the indicated Channel.

Returns the RF interpolation on/off status of the indicated Channel.

Cmd Parameters: <char> ON|OFF|1|0

Query Parameters: NA

Range: NA

Default Value: 0

Syntax Example: :SENS1:CORR:INT:STAT ON

:SENS1:CORR:INT:STAT?

## 5-85 :SENSe{1-16}:CORRection:ISOLation Subsystem

The :SENSe{1-16}:CORRection:ISOLation subsystem command controls the use of the isolation data during calibration.

### Calibration Setup Subsystems

These subsystems are used during various phases of calibration configuration setup:

- “:CALCulate{1-16}:REFERENCE Subsystem” on page 5-144
- “:SENSe{1-16}:CORRection:COLLect:METHod Subsystem” on page 5-399
- “:SENSe{1-16}:CORRection:COLLect:MULTIple Subsystem” on page 5-405
- “:SENSe{1-16}:CORRection:COLLect[:CALa]:PORT Subsystem” on page 5-450
- “:SENSe{1-16}:CORRection:COLLect:SOLX:CALKit Subsystem” on page 5-470
- “:SENSe{1-16}:CORRection:INTERpolation Subsystem” on page 5-507
- “:SENSe{1-16}:CORRection:ISOLation Subsystem” on page 5-508
- “:SENSe{1-16}:CORRection:STATE Subsystem” on page 5-509

**:SENSe{1-16}:CORRection:ISOLation:STATe <char>**

**:SENSe{1-16}:CORRection:ISOLation:STATe?**

Description: Toggles the use of the isolation coefficient data on/off during correction.

Returns the on/off status of the use of the isolation coefficients during correction.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :SENS1:CORR:ISOL:STAT ON

:SENS1:CORR:ISOL:STAT?

## 5-86 :SENSe{1-16}:CORRection:STATe Subsystem

The :SENSe{1-16}:CORRection:STATe subsystem commands controls the RF correction.

### Calibration Setup Subsystems

These subsystems are used during various phases of calibration configuration setup:

- “:CALCulate{1-16}:REFerence Subsystem” on page 5-144
- “:SENSe{1-16}:CORRection:COLLect:METHod Subsystem” on page 5-399
- “:SENSe{1-16}:CORRection:COLLect:MULTIple Subsystem” on page 5-405
- “:SENSe{1-16}:CORRection:COLLect[:CALa]:PORT Subsystem” on page 5-450
- “:SENSe{1-16}:CORRection:COLLect:SOLX:CALKit Subsystem” on page 5-470
- “:SENSe{1-16}:CORRection:INTerpolaration Subsystem” on page 5-507
- “:SENSe{1-16}:CORRection:ISOLation Subsystem” on page 5-508
- “:SENSe{1-16}:CORRection:STATe Subsystem” on page 5-509

**:SENSe{1-16}:CORRection:STATe <char>**

**:SENSe{1-16}:CORRection:STATe?**

Description: Toggles RF correction on/off.

Returns the RF correction on/off status.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :SENS1:CORR:STAT ON

:SENS1:CORR:STAT?

## 5-87 :SENSe{1-16}:FREQuency Subsystem

The :SENSe{1-16}:FREQuency subsystem commands control the various instrument frequencies.

### Sweep Subsystems

Related sweep configuration and control subsystems are:

- [Section 5-53 :SENSe{1-16}:AVERage Subsystem on page 5-320](#)
- [Section 5-87 :SENSe{1-16}:FREQuency Subsystem on page 5-510](#)
- [Section 5-98 :SENSe{1-16}:SWEep Subsystem on page 5-567](#)

### Frequency Limits

The frequency limits for the :SENSe{1-16}:FREQuency subsystem and other commands are described in detail in [Chapter 1 “General Information”, “Minimum/Maximum Instrument Frequency and Related Parameters” on page 1-22](#) and the related tables in that section. In general, the frequency default values and limits are affected by the instrument model number.

**:SENSe:FREQuency:REFerence:SOURce <char>**

**:SENSe:FREQuency:REFerence:SOURce?**

Applicability: MS46522, MS46524

Description: Sets the source of the reference frequency.

Returns the source of the reference frequency.

Cmd Parameters: <char> INTernal | EXTernal

Query Parameters: <char> INT | EXT

Range: NA

Default Value: EXT

Syntax Example: :SENS:FREQ:REF:SOUR INT

:SENS:FREQ:REF:SOUR?

**:SENSe{1-16}:FREQuency:CENTER <NRf>**

**:SENSe{1-16}:FREQuency:CENTER?**

Description: Sets the center value of the sweep range.

Returns the center value of the sweep range.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: See [“Minimum/Maximum Instrument Frequency and Related Parameters” on page 1-22](#).

Default Value: See [“Minimum/Maximum Instrument Frequency and Related Parameters” on page 1-22](#).

Syntax Example: :SENS1:FREQ:CENT 2.0E9

:SENS1:FREQ:CENT?

**:SENSe{1-16}:FREQuency:CW <NRf>**  
**:SENSe{1-16}:FREQuency:CW?**

Description: Sets the CW frequency.

Returns the CW frequency.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22

Default Value: See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22.

Syntax Example: **:SENS1:FREQ:CW 1.0E9**  
                 **:SENS1:FREQ:CW?**

**:SENSe{1-16}:FREQuency:DATA <block>**  
**:SENSe{1-16}:FREQuency:DATA?**

Description: Enters a new frequency list.

Returns the frequency list.

Cmd Parameters: See definition of “[<block> or <arbitrary block>](#)” on page 2-10.

Query Parameters: See definition of “[<block> or <arbitrary block>](#)” on page 2-10.

Range: NA

Default Value: NA

Syntax Example: **:SENS1:FREQ:DATA <block>**  
                 **:SENS1:FREQ:DATA?**

**:SENSe{1-16}:FREQuency:INDEXed:DISCrete <block>**

Description: Enters a new frequency list for the indicated channel and sets the sweep type to indexed-based segmented sweep. This command allows the entry of a single frequency list (up to maximum points allowed) that can be in any order. The values must be comma-delimited in the ASCII entry format.

No query.

Cmd Parameters: See definition of “[<block> or <arbitrary block>](#)” on page 2-10.

Query Parameters: NA

Range: NA

Default Value: NA

Syntax Example: **:SENS1:FREQ:IND:DISC <block>**

Example Entry: **:SENS1:FREQ:IND:DISC #0 3.0GHz,3.0GHz,5.0GHz**

**:SENSe{1-16}:FREQuency:REFERENCE:SOURce <char>**  
**:SENSe{1-16}:FREQuency:REFERENCE:SOURce?**

Applicability: MS46522, MS46524

Description: Sets the source of the reference frequency.

Returns the source of the reference frequency.

Cmd Parameters: INTernal | EXTernal

Query Parameters: INT | EXT

Range: NA

Default Value: EXT

Syntax Example: :SENS1:FREQ:REF:SOUR INT

:SENS1:FREQ:REF:SOUR?

**:SENSe{1-16}:FREQuency:SPAN <NRf>**

**:SENSe{1-16}:FREQuency:SPAN?**

Description: Sets the span value of the sweep range.

Returns the span value of the sweep range.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22.

Default Value: See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22.

Syntax Example: **:SENS1:FREQ:SPAN 5.0E9**

**:SENS1:FREQ:SPAN?**

**:SENSe{1-16}:FREQuency:START <NRf>**

**:SENSe{1-16}:FREQuency:START?**

Description: Sets the start value of the sweep range.

Returns the start value of the sweep range.

Cmd Parameters: <NRf> The input parameter is in Hertz, Meters, or Seconds.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22.

Default Value: See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22.

Syntax Example: **:SENS1:FREQ:STAR 2.0E9**

**:SENS1:FREQ:STAR?**

**:SENSe{1-16}:FREQuency:STOP <NRf>**

**:SENSe{1-16}:FREQuency:STOP?**

Description: Sets the stop value of the sweep range.

Returns the stop value of the sweep range.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz, Meters, or Seconds.

Range: See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22.

Default Value: See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22.

Syntax Example: **:SENS1:FREQ:STOP 8.0E9**

**:SENS1:FREQ:STOP?**

## 5-88 :SENSe{1-16}:FSEGMENT Subsystem

The :SENSe{1-16}:FSEGMENT subsystem commands are used to configure the active frequency-based segment.

### Limit Line and Segment Subsystems

Related limit line and segment configuration and control subsystems are:

- “:CALCulate{1-16}[;SElected]:LIMit Subsystem” on page 5-160
- “:DISPlay Subsystem” on page 5-281
- “:SENSe{1-16}:FSEGMENT Subsystem” on page 5-514.
- “:SENSe{1-16}:FSEGMENT{1-100} Subsystem” on page 5-526.
- “:SENSe{1-16}:ISEGMent Subsystem” on page 5-538.
- “:SENSe{1-16}:ISEGMEnt{1-100} Subsystem” on page 5-548.
- “:SENSe{1-16}:ISEGMEnt{1-100} Subsystem” on page 5-548
- “:SENSe{1-16}:SEGMENT Subsystem” on page 5-565

### :SENSe{1-16}:FSEGMENT:ADD

Description: Adds a new frequency-sweep segment at the end of the frequency-based segment table. The Minimum Instrument Frequency ( $F_{min}$ ) depends on the instrument installed options. The Maximum Instrument Frequency ( $F_{max}$ ) depends on the instrument model. The Minimum Frequency Step Size is equal to 1 Hz.

No query.

See “Minimum/Maximum Instrument Frequency and Related Parameters” on page 1-22 for frequency limits for combinations of instrument model and available options.

Cmd Parameters: NA

Range: The range depends on the segment sequence and location:

- Minimum Segment Range = 2 Hz
- Minimum Segment Points = 2 points
- For first segment, Minimum Segment Frequency = Minimum Instrument Frequency.
- For highest frequency entered, Maximum Segment Frequency = Maximum Instrument Frequency.
- For the first segment entered, the Maximum Segment Range = Maximum Instrument Range = (Maximum Instrument Frequency minus Minimum Instrument Frequency).

Default Value: NA

Syntax Example: :SENS1:FSEGM:ADD

**:SENSe{1-16}:FSEGMENT:AVERage:COUNT <NRf>**  
**:SENSe{1-16}:FSEGMENT:AVERage:COUNT?**

Description: Sets the sweep averaging count in the last frequency-based segment being defined.  
Returns the sweep averaging count in the last frequency-based segment being defined.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR1> The output parameter is an integer.

Range: 1 to 1024

Default Value: 1

Syntax Example: :SENS1:FSEGM:AVER:COUN 1.01E2  
:SENS1:FSEGM:AVER:COUN?

**:SENSe{1-16}:FSEGMENT:BWIDth[:RESolution] <NRf>**

**:SENSe{1-16}:FSEGMENT:BWIDth[:RESolution]?**

Description: Sets the IF bandwidth in the last frequency-based segment being defined. The system will automatically select the closest IF bandwidth from the following:

- 10, 30, 50, 70, 100, 300, 500, 700 Hz
- 1, 3, 5, 7, 10, 30, 50, 70, 100, 300, 500 kHz

Note: This will set all of the ports IFBW for the currently defined segment and indicated channel when used on MS46522B or MS46524B.

Returns the IF bandwidth in the last frequency-based segment being defined. Cmd Parameters

<NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: 1 to 5E5

Default Value: 1.00000000000E+005

Syntax Example: :SENS1:FSEGM:BWID 3.0E3  
:SENS1:FSEGM:BWID?

**:SENSe{1-16}:FSEGMENT:CLEar**

Description: Clears all currently defined segments from the frequency-based segment table, leaving a default segment.

No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:FSEGM:CLE

**:SENSe{1-16}:FSEGMENT:COUNT?**

Description: Query only.

Returns the number of segments in the frequency-based segmented sweep.

Query Parameters: <NR1> The output parameter is an integer.

Range: 1 to 50

Default Value: 1

Syntax Example: :SENS1:FSEGM:COUN?

**:SENSe{1-16}:FSEGMENT:CWMODE[:STATE] <char>****:SENSe{1-16}:FSEGMENT:CWMODE[:STATE]?**

Description: Sets the CW mode on/off state in the last frequency-based segment being defined. If CW mode is set, segment has only 1 point.

Returns the CW mode on/off state in the last frequency-based segment being defined.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :SENS1:FSEGM:CWMOD ON

:SENS1:FSEGM:CWMOD?

**:SENSe{1-16}:FSEGMENT:DATA?**

Description: Query only.

Returns the frequency-based segmented sweep table.

Query Parameters: See definition of “<block> or <arbitrary block>” on page 2-10.

Range: NA

Default Value: NA

Syntax Example: :SENS1:FSEGM:DATA?

**:SENSe{1-16}:FSEGMENT:DISPLAY <char>****:SENSe{1-16}:FSEGMENT:DISPLAY?**

Description: Sets the frequency/index display mode for the frequency-based segmented sweep.

Returns the frequency/index display mode for the frequency-based segmented sweep.

Cmd Parameters: <char> FREQbase | INDEXbase

Query Parameters: <char> FREQ | INDEX

Range: NA

Default Value: FREQ

Syntax Example: :SENS1:FSEGM:DISP FREQ

:SENS1:FSEGM:DISP?

**:SENSe{1-16}:FSEGMENT:DISPLAY:AVERaging[:STATE] <char>**  
**:SENSe{1-16}:FSEGMENT:DISPLAY:AVERaging[:STATE]?**

Description: Turns on/off the display of the averaging number in all segment tables of the indicated channel.

Returns the on/off state of the display of the averaging number in all segment tables of the indicated channel

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: ON

Syntax Example: :SENS1:FSEGM:DISP:AVER OFF

:SENS1:FSEGM:DISP:AVER?

**:SENSe{1-16}:FSEGMENT:DISPLAY:IFBW[:STATE] <char>**

**:SENSe{1-16}:FSEGMENT:DISPLAY:IFBW[:STATE]?**

Description: Turns on/off the display of the IF Bandwidth in all segment tables of the indicated channel.

Returns the on/off state of the display of the IF Bandwidth in all segment tables of the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: ON

Syntax Example: :SENS1:FSEGM:DISP:IFBW ON

:SENS1:FSEGM:DISP:IFBW?

**:SENSe{1-16}:FSEGMENT:DISPLAY:POWeR[:STATE] <char>**

**:SENSe{1-16}:FSEGMENT:DISPLAY:POWeR[:STATE]?**

Description: Turns on/off the display of the Port Power in all segment tables of the indicated channel.

Returns the on/off state of the display of the Port Power in all segment tables of the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: ON

Syntax Example: :SENS1:FSEGM:DISP:POW ON

:SENS1:FSEGM:DISP:POW?

**:SENSe{1-16}:FSEGMENT:FREQuency:ACTive:STARt?**

Description: Query only.

Returns the start frequency of the first active frequency-based segment. The result is affected by segment on/off status. The Minimum Instrument Frequency ( $F_{min}$ ) depends on the instrument installed options. The Maximum Instrument Frequency ( $F_{max}$ ) depends on the instrument model. The Minimum Frequency Step Size is equal to 1 Hz.

See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22 for frequency limits for combinations of instrument model and available options.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: Minimum Instrument Frequency to (Maximum Instrument Frequency minus Minimum Frequency Step Size)

Default Value: The default value depends on the installed options.

Syntax Example: :SENS1:FSEGM:FREQ:ACT:STAR?

**:SENSe{1-16}:FSEGMENT:FREQuency:ACTive:STOP?**

Description: Query only.

Returns the stop frequency of the last active frequency-based segment. The output result is affected by segment on/off status. The Minimum Instrument Frequency ( $F_{min}$ ) depends on the instrument installed options. The Maximum Instrument Frequency ( $F_{max}$ ) depends on the instrument model. The Minimum Frequency Step Size is equal to 1 Hz.

See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22 for frequency limits for combinations of instrument model and available options.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: (Minimum Instrument Frequency + Minimum Frequency Step Size) to Maximum Instrument Frequency

Default Value: Maximum Instrument Frequency

Syntax Example: :SENS1:FSEGM:FREQ:ACT:STOP?

**:SENSe{1-16}:FSEGMENT:FREQuency:FSTArt <NRf>**  
**:SENSe{1-16}:FSEGMENT:FREQuency:FSTArt?**

Description: Sets the start frequency in the last frequency-based segment being defined.

Returns the Segment Start Frequency in the last frequency-based segment being defined. The Minimum Instrument Frequency ( $F_{min}$ ) depends on the instrument installed options. The Maximum Instrument Frequency ( $F_{max}$ ) depends on the instrument model. The Minimum Frequency Step Size is equal to 1 Hz.

See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22 for frequency limits for combinations of instrument model and available options.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: Minimum Instrument Frequency to (Maximum Instrument Frequency minus Minimum Frequency Step Size)

Default Value: 3.00000000000E+005

Syntax Example: :SENS1:FSEGM:FREQ:FSTA 2.0E9

:SENS1:FSEGM:FREQ:FSTA?

**:SENSe{1-16}:FSEGMENT:FREQuency:FSTEP <NRf>**

**:SENSe{1-16}:FSEGMENT:FREQuency:FSTEP?**

Description: Sets the Segment Frequency Step Size in the last frequency-based segment being defined.

Returns the Segment Frequency Step Size in the last frequency-based segment being defined. The Minimum Instrument Frequency ( $F_{min}$ ) depends on the instrument installed options. The Maximum Instrument Frequency ( $F_{max}$ ) depends on the instrument model. The Minimum Frequency Step Size is equal to 1 Hz.

See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22 for frequency limits for combinations of instrument model and available options.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: Minimum Frequency Step Size to (Maximum Instrument Frequency minus Minimum Instrument Frequency)

Default Value: The default value depends on installed options.

Syntax Example: :SENS1:FSEGM:FREQ:FSTE 10.0E3

:SENS1:FSEGM:FREQ:FSTE?

```
:SENSe{1-16}:FSEGMENT:FREQuency:FSTOp <NRf>
:SENSe{1-16}:FSEGMENT:FREQuency:FSTOp?
```

Description: Sets the Segment Stop Frequency in the last frequency-based segment being defined.

Returns the Segment Stop Frequency in the frequency-based segment being defined. The Minimum Instrument Frequency ( $F_{min}$ ) depends on the instrument installed options. The Maximum Instrument Frequency ( $F_{max}$ ) depends on the instrument model. The Minimum Frequency Step Size is equal to 1 Hz.

See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22 for frequency limits for combinations of instrument model and available options.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: (Minimum Instrument Frequency + Minimum Frequency Step Size) to Maximum Instrument Frequency

Default Value: Maximum Instrument Frequency

Syntax Example: :SENS1:FSEGM:FREQ:FSTO 10.0E9

```
:SENS1:FSEGM:FREQ:FSTO?
```

```
:SENSe{1-16}:FSEGMENT:FREQuency:STARt <NRf>
:SENSe{1-16}:FSEGMENT:FREQuency:STARt?
```

Description: Sets the Segment Start Frequency of the frequency-based segmented sweep.

Returns the Segment Start Frequency of the frequency-based segmented sweep. The Minimum Instrument Frequency ( $F_{min}$ ) depends on the instrument installed options. The Maximum Instrument Frequency ( $F_{max}$ ) depends on the instrument model. The Minimum Frequency Step Size is equal to 1 Hz.

See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22 for frequency limits for combinations of instrument model and available options.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: Minimum Instrument Frequency to (Maximum Instrument Frequency minus Minimum Frequency Step Size)

Default Value: Default Start Frequency (for normal sweeps, i.e. 300kHz here)

Syntax Example: :SENS1:FSEGM:FREQ:STAR 10.0E9

```
:SENS1:FSEGM:FREQ:STAR?
```

```
:SENSe{1-16}:FSEGMENT:FREQuency:STOP <NRf>
:SENSe{1-16}:FSEGMENT:FREQuency:STOP?
```

Description: Sets the Segment Stop Frequency of the frequency-based segmented sweep.

Returns the Segment Stop Frequency of the frequency-based segmented sweep. Available range is limited by the range of the existing segments. The Minimum Instrument Frequency ( $F_{min}$ ) depends on the instrument installed options. The Maximum Instrument Frequency ( $F_{max}$ ) depends on the instrument model. The Minimum Frequency Step Size is equal to 1 Hz.

See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22 for frequency limits for combinations of instrument model and available options.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: (Minimum Instrument Frequency + Minimum Frequency Step Size) to Maximum Instrument Frequency

Default Value: Maximum Instrument Frequency

Syntax Example: :SENS1:FSEGM:FREQ:STOP 20.0E9

```
:SENS1:FSEGM:FREQ:STOP?
```

```
:SENSe{1-16}:FSEGMENT:FREQuency[:CW][:FIXed] <NRf>
```

```
:SENSe{1-16}:FSEGMENT:FREQuency[:CW][:FIXed]?
```

Description: Sets the CW Segment Frequency in the last frequency-based segment being defined.

Returns the CW Segment Frequency in the frequency-based segment being defined. The Minimum Instrument Frequency ( $F_{min}$ ) depends on the instrument installed options. The Maximum Instrument Frequency ( $F_{max}$ ) depends on the instrument model. The Minimum Frequency Step Size is equal to 1 Hz.

See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22 for frequency limits for combinations of instrument model and available options.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR1> The output parameter is in Hertz.

Range: Minimum Instrument Frequency to Maximum Instrument Frequency

Default Value: 70000

Syntax Example: :SENS1:FSEGM:FREQ 10.0E6

```
:SENS1:FSEGM:FREQ?
```

**:SENSe{1-16}:FSEGMENT:MAXPoints?**

Description: Query only.

Returns the total number of sweep points in the frequency-based segments. For MS46522B/MS46524B Series VNAs, the Maximum Instrument Points (MIP) is 20,001.

Query Parameters: <NR1> The output parameter is an integer.

Range: Range depends on if CW mode is set:

- If CW is set, range equals 1 (one) point.
- If in sweep mode or non-CW mode, range is from 2 (two) points to Maximum Instrument Points.

Default Value: 15

Syntax Example: :SENS1:FSEGM:MAXP?

**:SENSe{1-16}:FSEGMENT:POINT?**

Description: Query only.

Returns the total number of sweep points in the frequency-based segments.

For MS46522B/MS46524B Series VNAs, the Maximum Instrument Points (MIP) is 21,001.

Query Parameters: <NR1> The output parameter is an integer.

Range: The range depends on if CW mode is set:

- If CW is set, range equals 1 (one) point.
- If in sweep mode or non-CW mode is set, range is from 2 (two) points to Maximum Instrument Points.

Default Value: 15

Syntax Example: :SENS1:FSEGM:POIN?

```
:SENSe{1-16}:FSEGMENT:PORT{1-4}:BWIDth[:RESolution]
:SENSe{1-16}:FSEGMENT:PORT{1-4}:BWIDth[:RESolution]?
```

Applicability: MS4652x

The use of Port 3 and/or Port 4 requires a 4-port VNA. The system will automatically select the closest IF bandwidth from the following options:

- 10, 30, 50, 70, 100, 300, 500, 700 Hz
- 1, 3, 5, 7, 10, 30, 50, 70, 100, 300, 500 kHz

Description: Sets the IF bandwidth in the last frequency-based segment being defined on the indicated channel and port.

Returns the IF bandwidth in the last frequency-based segment being defined on the indicated channel and port.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: 1 to 5E5

Default Value: 1.00000000000E+005

Syntax Example: :SENS1:FSEGM:PORT1:BWID 3.0E4

```
:SENS1:FSEGM:PORT1:BWID?
```

```
:SENSe{1-16}:FSEGMENT{1-100}:PORT{1-4}:BWIDth[:RESolution]
```

```
:SENSe{1-16}:FSEGMENT{1-100}:PORT{1-4}:BWIDth[:RESolution]?
```

Applicability: MS4652x

The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the IF bandwidth for the frequency-based segment being defined on the indicated channel, port, and segment. The system will automatically select the closest IF bandwidth from the following options:

- 10, 30, 50, 70, 100, 300, 500, 700 Hz
- 1, 3, 5, 7, 10, 30, 50, 70, 100, 300, 500 kHz

Returns the IF bandwidth for the frequency-based segment being defined on the indicated channel, port, and segment.Cmd Parameters

<NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: 1 to 5E5

Default Value: 1.00000000000E+005

Syntax Example: :SENS1:FSEGM1:PORT1:BWID 3.0E3

```
:SENS1:FSEGM1:PORT1:BWID?
```

**:SENSe{1-16}:FSEGMENT:POWeR:PORT{1-4}[:LEVel][:IMMEDIATE][:AMPLitude]<NRf>**  
**:SENSe{1-16}:FSEGMENT:POWeR:PORT{1-4}[:LEVel][:IMMEDIATE][:AMPLitude]?**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: On the indicated port, sets the power level on the last frequency-based segment being defined.

On the indicated port, returns the power level in the last frequency-based segment being defined.

Cmd Parameters: <NRf> The input parameter is in dBm.

Query Parameters: <NR3> The output parameter is in dBm.

Range: -30 to +15

Default Value: +5

Syntax Example: **:SENS1:FSEGM:POW:PORT1 3.0E0**  
**:SENS1:FSEGM:POW:PORT1?**

**:SENSe{1-16}:FSEGMENT:SPAntype <char>**

**:SENSe{1-16}:FSEGMENT:SPAntype?**

Description: Sets the Segment Span Type of the last frequency-based segment being defined to the specified span type.

Returns the Segment Span Type of the last frequency-based segment being defined.

### STARTSTOP Selected

If STARTSTOP is selected, each segment is defined by the:

- Segment Start Frequency
- Segment Stop Frequency
- Number of Segment Points

### STARTSTEP Selected

If STARTSTEP is selected, each segment is defined by the:

- Start Segment Frequency
- Frequency Step Size
- Number of Segment Points

Cmd Parameters: <char> STARTSTOP | STARTSTEP

Query Parameters: <char> STARTSTOP | STARTSTEP

Range: NA

Default Value: STARTSTOP

Syntax Example: **:SENS1:FSEGM:SPA STARTSTOP**  
**:SENS1:FSEGM:SPA?**

**:SENSe{1-16}:FSEGMENT:SWEep:MAXimize**

Description: Maximizes the frequency range of the frequency-based segmented sweep.

No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:FSEGM:SWE:MAX

**:SENSe{1-16}:FSEGMENT:SWEep:POINT <NR1>****:SENSe{1-16}:FSEGMENT:SWEep:POINT?**

Description: Sets the number of Segment Sweep Points in the last frequency-based segment being defined.

Returns the number of sweep points in the last frequency-based segment being defined. If frequency-sweep is set, the range is from 2 (two) points to the Maximum Instrument Points. If the separation between the segment start and stop frequencies is 1 Hz, the number of points is 2 (two). If CW is set, the number of points is 1 (one), the Maximum Instrument Points (MIP) is:

- For models MS46122, MS46131, MS46322: 16,001
- For models MS46121, MS46524, MS46522: 20,001

Cmd Parameters: <NR1> The input parameter is an integer.

Query Parameters: <NR1> The output parameter is an integer.

Range: The range depends on whether the CW mode is set:

- If CW is set, range = 1 (one) point.
- If in sweep mode or non-CW mode) range = from 2 (two) points to Maximum Instrument Points.

Default Value: 15 or 1 depending on span type.

Syntax Example: :SENS1:FSEGM:SWE:POIN 1.01E2

:SENS1:FSEGM:SWE:POIN?

**:SENSe{1-16}:FSEGMENT[:STATE] <char>****:SENSe{1-16}:FSEGMENT[:STATE]?**

Description: Toggles the on/off state of the last frequency-based segment being defined.

Returns the on/off state of the last frequency-based segment being defined.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 1

Syntax Example: :SENS1:FSEGM ON

:SENS1:FSEGM?

## 5-89 :SENSe{1-16}:FSEGMENT{1-100} Subsystem

The :SENSe{1-16}:FSEGMENT{1-100} subsystem commands are used to configure the indicated frequency-based segment.

### Limit Line and Segment Subsystems

Related limit line and segment configuration and control subsystems are:

- “:CALCulate{1-16}[;SElected]:LIMit Subsystem” on page 5-160
- “:CALCulate{1-16}[;SElected]:RLIMit Subsystem” on page 5-208
- “:DISPlay Subsystem” on page 5-281
- “:SENSe{1-16}:FSEGMENT Subsystem” on page 5-514.
- “:SENSe{1-16}:FSEGMENT{1-100} Subsystem” on page 5-526.
- “:SENSe{1-16}:ISEGMent Subsystem” on page 5-538.
- “:SENSe{1-16}:ISEGMEnt{1-100} Subsystem” on page 5-548.
- “:SENSe{1-16}:ISEGMEnt{1-100} Subsystem” on page 5-548
- “:SENSe{1-16}:SEGMENT Subsystem” on page 5-565

**:SENSe{1-16}:FSEGMENT{1-100}:AVERage:COUNt <NRf>**

**:SENSe{1-16}:FSEGMENT{1-100}:AVERage:COUNt?**

Description: Sets the Sweep Averaging Count in the indicated frequency-based segment.

Returns the Sweep Averaging Count in the indicated frequency-based segment.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR1> The output parameter is an integer.

Range: 1 to 1024

Default Value: 1

Syntax Example: :SENS1:FSEGM1:AVER:COUN 3

:SENS1:FSEGM1:AVER:COUN?

```
:SENSe{1-16}:FSEGMENT{1-100}:BWIDth[:RESolution] <NRf>
:SENSe{1-16}:FSEGMENT{1-100}:BWIDth[:RESolution]?
```

Description: Sets the Segment IF Bandwidth for the indicated frequency-based segment.

The system will automatically select the closest IF bandwidth from the following options:

- 10, 30, 50, 70, 100, 300, 500, 700 Hz
- 1, 3, 5, 7, 10, 30, 50, 70, 100, 300, 500 kHz

Returns the Segment IF Bandwidth for the indicated frequency-based segment.

Note: This will set all of the ports IFBW for the currently defined segment and indicated channel when used on MS46522B or MS46524B.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: 1 to 5E5

Default Value: 1.000000000000E+005

Syntax Example: :SENS1:FSEGM1:BWID 3.0E3  
:SENS1:FSEGM1:BWID?

```
:SENSe{1-16}:FSEGMENT{1-100}:CWMODe[:STATe] <char>
:SENSe{1-16}:FSEGMENT{1-100}:CWMODe[:STATe]?
```

Description: Sets the CW mode on/off state in the indicated frequency-based segment.

Returns the CW mode on/off state in the indicated frequency-based segment.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :SENS1:FSEGM1:CWMOD ON  
:SENS1:FSEGM1:CWMOD?

```
:SENSe{1-16}:FSEGMENT{1-100}:FREQuency:FSTArt <NRf>
:SENSe{1-16}:FSEGMENT{1-100}:FREQuency:FSTArt?
```

Description: Sets the Segment Start Frequency in the indicated frequency-based segment.

Returns the Segment Start Frequency in the indicated frequency-based segment.

The Minimum Instrument Frequency ( $F_{min}$ ) depends on the instrument installed options. The Maximum Instrument Frequency ( $F_{max}$ ) depends on the instrument model. The Minimum Frequency Step Size is equal to 1 Hz. See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22 for frequency limits for combinations of instrument model and available options.

Query Parameters: <NRf> The input parameter is in Hertz.

Cmd Parameters: <NR3> The output parameter is in Hertz.

Range: Minimum Instrument Frequency to (Maximum Instrument Frequency minus Minimum Frequency Step Size)

Default Value: Default Start Frequency (for normal sweeps, i.e. 300kHz here)

Syntax Example: :SENS1:FSEGM1:FREQ:FSTA 3.0E9  
:SENS1:FSEGM1:FREQ:FSTA?

```
:SENSe{1-16}:FSEGMENT{1-100}:FREQuency:FSTEP <NRf>
:SENSe{1-16}:FSEGMENT{1-100}:FREQuency:FSTEP?
```

Description: Sets the Segment Step Size in the indicated frequency-based segment.

Returns the frequency step size (Fstep) in the indicated frequency-based segment.

The Minimum Instrument Frequency ( $F_{min}$ ) depends on the instrument installed options. The Maximum Instrument Frequency ( $F_{max}$ ) depends on the instrument model. The Minimum Frequency Step Size is equal to 1 Hz.

See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22 for frequency limits for combinations of instrument model and available options.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: Minimum Frequency Step Size to (Maximum Instrument Frequency minus Minimum Instrument Frequency)

Default Value: The default value depends on the installed options.

Syntax Example: :SENS1:FSEGM1:FREQ:FSTE 1.00E4

```
:SENS1:FSEGM1:FREQ:FSTE?
```

```
:SENSe{1-16}:FSEGMENT{1-100}:FREQuency:FSTOP <NRf>
```

```
:SENSe{1-16}:FSEGMENT{1-100}:FREQuency:FSTOP?
```

Description: Sets the Segment Stop Frequency in the indicated frequency-based segment.

Returns the Segment Stop Frequency in the indicated frequency-based segment.

The Minimum Instrument Frequency ( $F_{min}$ ) depends on the instrument installed options. The Maximum Instrument Frequency ( $F_{max}$ ) depends on the instrument model. The Minimum Frequency Step Size is equal to 1 Hz.

See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22 for frequency limits for combinations of instrument model and available options.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: (Minimum Instrument Frequency + Minimum Frequency Step) to Maximum Instrument Frequency

Default Value: Maximum Instrument Frequency

Syntax Example: :SENS1:FSEGM1:FREQ:FSTO 10.0E9

```
:SENS1:FSEGM1:FREQ:FSTO?
```

```
:SENSe{1-16}:FSEGMENT{1-100}:FREQuency[:CW][:FIXed] <NRf>
:SENSe{1-16}:FSEGMENT{1-100}:FREQuency[:CW][:FIXed]?
```

Description: Sets the Segment CW Frequency in the indicated frequency-based segment.

Returns the Segment CW Frequency in the indicated frequency-based segment.

The Minimum Instrument Frequency ( $F_{min}$ ) depends on the instrument installed options. The Maximum Instrument Frequency ( $F_{max}$ ) depends on the instrument model. The Minimum Frequency Step Size is equal to 1 Hz.

See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22 for frequency limits for combinations of instrument model and available options.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: Minimum Instrument Frequency to Maximum Instrument Frequency

Default Value: Default Start Frequency (for normal sweeps, i.e. 300kHz here)

Syntax Example: :SENS1:FSEGM1:FREQ 5.0E9  
:SENS1:FSEGM1:FREQ?

```
:SENSe{1-16}:FSEGMENT{1-100}:POWer:PORT{1-4}[:LEVel][:IMMEDIATE][:AMPLitude] <NRf>
```

```
:SENSe{1-16}:FSEGMENT{1-100}:POWer:PORT{1-4}[:LEVel][:IMMEDIATE][:AMPLitude]?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the power level for the indicated frequency-based segment on the indicated port.

Returns the power level for the indicated frequency-based segment on the indicated port.

Cmd Parameters: <NRf> The input parameter is in dBm.

Query Parameters: <NR3> The output parameter is in dBm.

Range: -30 to +30

Default Value: +30

Syntax Example: :SENS1:FSEGM1:POW:PORT1 3.0  
:SENS1:FSEGM1:POW:PORT1?

```
:SENSe{1-16}:FSEGMENT{1-100}:SPAntype <char>
:SENSe{1-16}:FSEGMENT{1-100}:SPAntype?
```

Description: Sets the Segment Span Type of the indicated frequency-based segment.

Returns the Segment Span Type of the indicated frequency-based segment.

If STARTSTOP is selected, each segment is defined by the:

- Segment Start Frequency
- Segment Stop Frequency
- Number of Segment Points

If STARTSTEP is selected, each segment is defined by the:

- Start Segment Frequency
- Frequency Step Size
- Number of Segment Points

Cmd Parameters: <char> STARTSTOP | STARTSTEP

Query Parameters: <char> STARTSTOP | STARTSTEP

Range: NA

Default Value: STARTSTOP

Syntax Example: :SENS1:FSEGM1:SPA STARTSTOP

```
:SENS1:FSEGM1:SPA?
```

```
:SENSe{1-16}:FSEGMENT{1-100}:SWEep:POINT <NR1>
```

```
:SENSe{1-16}:FSEGMENT{1-100}:SWEep:POINT?
```

Description: Sets the Number of Segment Sweep Points in the indicated frequency-based segment.

Returns the number of sweep points in the indicated frequency-based segment.

The Maximum Instrument Points (MIP) is 20,001.

Cmd Parameters: <NR1> The input parameter is an integer.

Query Parameters: <NR1> The output parameter is an integer.

Range: Range depends on whether CW mode is set.

- If CW is set, 1 point.
- If frequency-sweep is set, range is from 2 (two) points to Maximum Instrument Points.

Default Value: 15 or 1, depending on CW mode.

Syntax Example: :SENS1:FSEGM1:SWE:POIN 5.01E2

```
:SENS1:FSEGM1:SWE:POIN?
```

**:SENSe{1-16}:FSEGMENT{1-100}[:STATE] <char>**

**:SENSe{1-16}:FSEGMENT{1-100}[:STATE]?**

Description Turns the indicated frequency-based segment on/off.

Returns the indicated frequency-based segment on/off state.

Cmd Parameters <char> 1 | 0 | ON | OFF

Query Parameters <char> 1 | 0

Range NA

Default Value 0

Syntax Example :SENS1:FSEGM1

:SENS1:FSEGM1?

## 5-90 :SENSe:HOLD Subsystem

The :SENSe:HOLD subsystem command sets the hold function for all channels on a per-instrument basis.

### Trigger, Hold, and External Source Subsystems

Related trigger, hold, and external source subsystems are:

- “:SENSe{1-16}:ABORtcal Subsystem” on page 5-319
- “:SENSe:HOLD Subsystem” on page 5-532
- “:SENSe{1-16}:HOLD Subsystem” on page 5-535
- “:SENSe{1-16}:ISEGMent Subsystem” on page 5-538

### :SENSe:HOLD:FUNCTION <char>

Description: Sets the hold function for all channels where the following hold options are available:

- CONTinuous = Perform continuous sweeps on all channels
- HOLD = Hold the sweep on all channels
- SINGle = Perform a single sweep and then hold all channels

The operation of this command depends on the settings of the

:SENSe{1-16}:HOLD:FUNCTION <char> and

:TRIGger[:SEQUence][:REmote]:SINGle commands. Each setting combination is described in the following sections.

### :SENSe:HOLD:FUNC CONT and :TRIG

```
:SENSe:HOLD:FUNCTION CONTinuous
// Sweep State = The sweep is sweeping continuously
// Command Execution = The parser is ready for a command right
away.

:TRIGger[:SEQUence][:IMMediate][:REmote]
// Sweep State = The sweep restarts and sweeps continuously. When
the sweep gets to the end of the sweep, it continues to sweep.
There is NO STATUS information that the end of the sweep has been
reached.

// Command Execution = The parser is ready for a command right away
```

### :SENSe:HOLD:FUNC CONT and :TRIG:SING

```
:SENSe:HOLD:FUNCTION CONTinuous
// Sweep State = The sweep is sweeping continuously.
// Command Execution = The parser is ready for a command right away

:TRIGger[:SEQUence][:REmote]:SINGle
// Sweep State = The sweep restarts and sweeps continuously. When
the sweep gets to the end of the sweep, it sets the end of sweep
status bit and continues to sweep.

// Command Execution = Further execution is blocked until the end
of the sweep.

// Command Execution resumes when the sweep has reached the end of
the sweep.
```

**:SENSe:HOLD:FUNC HOLD and :TRIG**

```
:SENSe:HOLD:FUNCTION HOLD
// Sweep State = The sweep is stopped.
// Command Execution = The parser is ready for a command right away
:TRIGger[:SEQUence][:IMMEDIATE][:REMote]
// Sweep State = The command has no effect. The sweep is stopped.
// Command Execution = The parser is ready for a command right away
```

**:SENSe:HOLD:FUNC HOLD and :TRIG:SING**

```
:SENSe:HOLD:FUNCTION HOLD
// Sweep State = The sweep is stopped
// Command Execution = The parser is ready for a command right away.
:TRIGger[:SEQUence][:REMote]:SINGle
// Sweep State = The sweep restarts and sweeps until the end of the sweep,
at which point it sets the end of sweep status bit and stops.
// Command Execution = Further execution is blocked until the end of the sweep.
// Command Execution resumes when the sweep has reached the end of the sweep.
```

**:SENSe:HOLD:FUNC SING and :TRIG**

```
:SENSe:HOLD:FUNCTION SINGLE
// Sweep State = The sweep does one complete sweep, goes into hold and stops.
// Command Execution = The parser is ready for a command.
:TRIGger[:SEQUence][:IMMEDIATE][:REMote]
// Sweep State = The command has no effect. The sweep is stopped.
// Command Execution = The parser is ready for a command.
```

**:SENSe:HOLD:FUNC SING and :TRIG:SING**

```
:SENSe:HOLD:FUNCTION SINGLE
// Sweep State = The sweep does one complete sweep, goes into hold
and stops.

// Command Execution = The parser is ready for a command right
away.

:TRIGger[:SEQUence][:REMote]:SINGLE
// Sweep State = The sweep restarts and sweeps until the end of the
sweep, at which point it sets the end of sweep status bit and
stops.

// Command Execution = Further execution is blocked until the end
of the sweep.

// Command Execution resumes when the sweep has reached the end of
the sweep.
```

Cmd Parameters: <char> CONTinuous | HOLD | SINGLE

Query Parameters: <char> CONT | HOLD | SING

Range: NA

Default Value: NA

Syntax Example: :SENS:HOLD:FUNC CONT

## 5-91 :SENSe{1-16}:HOLD Subsystem

The :SENSe{1-16} :HOLD subsystem command sets the hold function on a per-instrument basis. If a channel number is not included in this command, the command will be applied to ALL channels.

### Trigger, Hold, and External Source Subsystems

Related trigger, hold, and external source subsystems are:

- “:SENSe{1-16}:ABORtcal Subsystem” on page 5-319
- “:SENSe:HOLD Subsystem” on page 5-532
- “:SENSe{1-16}:HOLD Subsystem” on page 5-535
- “:SENSe{1-16}:ISEGMent Subsystem” on page 5-538

**:SENSe{1-16} :HOLD :FUNCTION <char>**

**:SENSe{1-16} :HOLD :FUNCTION?**

Description: Sets the hold function and provides these available options:

- CONTinuous = Perform continuous sweeps
- HOLD = Hold the sweep
- SINGLE = Perform a single sweep and then hold

Returns the hold status.

The operation of this command depends on the settings of the

:SENSe{1-16} :HOLD:FUNCTION, :TRIGger[:SEQUence] [:REmote], and  
:TRIGger[:SEQUence] [:IMMediate] [:REmote] commands. Each setting  
combination is described in the following sections.

### :SENSe{1-16}:HOLD:FUNC CONT and :TRIG

```
:SENSe{1-16} :HOLD:FUNCTION CONTinuous
// Sweep State = The sweep is sweeping continuously
// Command Execution = The parser is ready for a command right
away.
:TRIGger[:SEQUence] [:IMMediate] [:REmote]
// Sweep State = The sweep restarts and sweeps continuously. When
the sweep gets to the end of the sweep, it continues to sweep.
There is NO STATUS information that the end of the sweep has been
reached.
// Command Execution = The parser is ready for a command right away
```

**:SENSe{1-16}:HOLD:FUNC CONT and :TRIG:SING**

```
:SENSe{1-16}:HOLD:FUNCTION CONTinuous
// Sweep State = The sweep is sweeping continuously.
// Command Execution = The parser is ready for a command right away
:TRIGger[:SEQUence][:REmote]:SINGle
// Sweep State = The sweep restarts and sweeps continuously. When
the sweep gets to the end of the sweep, it sets the end of sweep
status bit and continues to sweep.
// Command Execution = Further execution is blocked until the end
of the sweep.
// Command Execution resumes when the sweep has reached the end of
the sweep.
```

**:SENSe{1-16}:HOLD:FUNC HOLD and :TRIG**

```
:SENSe{1-16}:HOLD:FUNCTION HOLD
// Sweep State = The sweep is stopped.
// Command Execution = The parser is ready for a command right away
:TRIGger[:SEQUence][:IMMEDIATE][:REmote]
// Sweep State = The command has no effect. The sweep is stopped.
// Command Execution = The parser is ready for a command right away
```

**:SENSe{1-16}:HOLD:FUNC HOLD and :TRIG:SING**

```
:SENSe{1-16}:HOLD:FUNCTION HOLD
// Sweep State = The sweep is stopped
// Command Execution = The parser is ready for a command right
away.
:TRIGger[:SEQUence][:REmote]:SINGle
// Sweep State = The sweep restarts and sweeps until the end of the
sweep, at which point it sets the end of sweep status bit and
stops.
// Command Execution = Further execution is blocked until the end
of the sweep.
// Command Execution resumes when the sweep has reached the end of
the sweep.
```

**:SENSe{1-16}:HOLD:FUNC SING and :TRIG**

```
:SENSe{1-16}:HOLD:FUNCTION SINGLE
// Sweep State = The sweep does one complete sweep, goes into hold
and stops.
// Command Execution = The parser is ready for a command.
:TRIGger[:SEQUence][:IMMEDIATE][:REmote]
// Sweep State = The command has no effect. The sweep is stopped.
// Command Execution = The parser is ready for a command.
```

**:SENSe{1-16}:HOLD:FUNC SING and :TRIG:SING**

```
:SENSe{1-16}:HOLD:FUNCTION SINGLE
```

```
// Sweep State = The sweep does one complete sweep, goes into hold  
and stops.  
// Command Execution = The parser is ready for a command right  
away.  
:TRIGger[:SEQUence][:REmote]:SINGle  
// Sweep State = The sweep restarts and sweeps until the end of the  
sweep, at which point it sets the end of sweep status bit and  
stops.  
// Command Execution = Further execution is blocked until the end  
of the sweep.  
// Command Execution resumes when the sweep has reached the end of  
the sweep.
```

Cmd Parameters: <char> CONTinuous | HOLD | SINGLE

Query Parameters: <char> CONT | HOLD | SING

Range: NA

Default Value: NA

Syntax Example: :SENSe1:HOLD:FUNC CONT

:SENSe1:HOLD:FUNC?

:SENSe{1-16}:HOLD:FUNCTION:RF[:STATE] <char>

:SENSe{1-16}:HOLD:FUNCTION:RF[:STATE]?

Applicability: MS46121

Description: Turns on/off port RF, per channel when the system is put in the hold mode.

Returns the per channel Hold mode setting of the RF port power.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENSe11:HOLD:FUNC:RF ON

:SENSe11:HOLD:FUNC:RF?

## 5-92 :SENSe{1-16}:ISEGMent Subsystem

The :SENSe{1-16}:ISEGMent subsystem commands are used to configure the active index-based segment.

To configure the index-based segments by segment number, use:

- “:SENSe{1-16}:ISEGMent{1-100} Subsystem” on page 5-548.

### Limit Line and Segment Subsystems

Related limit line and segment configuration and control subsystems are:

- “:CALCulate{1-16}[;SElected]:LIMit Subsystem” on page 5-160
- “:CALCulate{1-16}[;SElected]:RLIMit Subsystem” on page 5-208
- “:DISPlay Subsystem” on page 5-281
- “:SENSe{1-16}:FSEGMENT Subsystem” on page 5-514.
- “:SENSe{1-16}:FSEGMENT{1-100} Subsystem” on page 5-526.
- “:SENSe{1-16}:ISEGMent Subsystem” on page 5-538.
- “:SENSe{1-16}:ISEGMent{1-100} Subsystem” on page 5-548.
- “:SENSe{1-16}:ISEGMent{1-100} Subsystem” on page 5-548
- “:SENSe{1-16}:SEGMENT Subsystem” on page 5-565

### Trace Subsystems

Related trace subsystems are:

- “:CALCulate{1-16}:PARameter and :PARameter{1-16} Subsystem” on page 5-111
- “:CALCulate{1-16}:PARameter{1-16}:SELect Subsystem” on page 5-140
- “:CALCulate{1-16}[;SElected]:DATA Subsystem” on page 5-156
- “:CALCulate{1-16}[;SElected]:FORmat Subsystem” on page 5-158
- “:CALCulate{1-16}[;SElected]:MDATA Subsystem” on page 5-206
- “:CALCulate{1-16}[;SElected]:SMOothing Subsystem” on page 5-222
- “:CALCulate{1-16}[;SElected]:TDATA Subsystem” on page 5-223
- “:DISPlay Subsystem” on page 5-281

### :SENSe{1-16}:ISEGMent:ADD

Description: Adds a new segment at the end of the index-based segment table. No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENSe1:ISEGM:ADD

**:SENSe{1-16}:ISEGMent:AVERage:COUNT <NRf>**

**:SENSe{1-16}:ISEGMent:AVERage:COUNT?**

Description: Sets the sweep averaging count in the index-based segment being defined.

Returns the sweep averaging count in the index-based segment being defined.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR1> The output parameter is an integer.

Range: 1 to 1024

Default Value: 1

Syntax Example: **:SENS1:ISEGM:AVER:COUN?**

**:SENS1:ISEGM:AVER:COUN 1.01E2**

**:SENSe{1-16}:ISEGMent:BWIDth[:RESolution] <NRf>**

**:SENSe{1-16}:ISEGMent:BWIDth[:RESolution]?**

Description: Sets the IF bandwidth for the index-based segment being defined.

Returns the IF bandwidth for the index-based segment being defined. The system will automatically select the closest IF bandwidth from the following options:

- 10, 30, 50, 70, 100, 300, 500, 700 Hz
- 1, 3, 5, 7, 10, 30, 50, 70, 100, 300, 500 kHz

Note: This will set all of the ports IFBW for the currently defined segment and indicated channel when used on MS46522B or MS46524B.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: 1 to 5E5

Default Value: 1.000000000000E+005

Syntax Example: **:SENS1:ISEGM:BWID 3.0E4**

**:SENS1:ISEGM:BWID?**

**:SENSe{1-16}:ISEGMent:CLEar**

Description: Clears all currently defined segments from the index-based segment table and adds a blank segment.

No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: **:SENS1:ISEGM:CLE**

**:SENSe{1-16}:ISEGMent:COUNt?**

Description: Query only.

Returns the number of segments in the index-based segmented sweep.

Query Parameters: <NR1> The output parameter is an integer.

Range: NA

Default Value: 1

Syntax Example: :SENS1:ISEGM:COUN?

**:SENSe{1-16}:ISEGMent:CWMODe[:STATE] <char>****:SENSe{1-16}:ISEGMent:CWMODe[:STATE]?**

Description: Sets the CW mode on/off state in the index-based segment being defined.

Returns the CW mode on/off state in the index-based segment being defined.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :SENS1:ISEGM:CWMOD ON

:SENS1:ISEGM:CWMOD?

**:SENSe{1-16}:ISEGMent:DATA?**

Description: Query only.

Returns the index-based segmented sweep table.

Query Parameters: See definition of “<block> or <arbitrary block>” on page 2-10.

Range: NA

Default Value: NA

Syntax Example: :SENS1:ISEGM:DATA?

**:SENSe{1-16}:ISEGMent:DISPLAY:AVERaging[:STATE] <char>****:SENSe{1-16}:ISEGMent:DISPLAY:AVERaging[:STATE]?**

Description: Turns on/off the display of the averaging number in all segment tables of the indicated channel.

Returns the on/off state of the display of the averaging number in all segment tables of the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value:

Syntax Example: :SENS1:ISEGM:DISP:AVER ON

:SENS1:ISEGM:DISP:AVER?

**:SENSe{1-16}:ISEGMent:DISPlay:IFBW[:STATE] <char>**  
**:SENSe{1-16}:ISEGMent:DISPlay:IFBW[:STATE]?**

Applicability: MS46524

Description: Turns on/off the display of the IF Bandwidth in all segment tables of the indicated channel.

Returns the on/off state of the display of the IF Bandwidth in all segment tables of the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: OFF

Syntax Example: **:SENS1:ISEGM:DISP:IFBW ON**  
**:SENS1:ISEGM:DISP:IFBW?**

**:SENSe{1-16}:ISEGMent:DISPlay:POWeR[:STATE] <char>**  
**:SENSe{1-16}:ISEGMent:DISPlay:POWeR[:STATE]?**

Description: Turns on/off the display of the Port Power in all segment tables of the indicated channel.

Returns the on/off state of the display of the Port Power in all segment tables of the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: OFF

Syntax Example: **:SENS1:ISEGM:DISP:POW ON**  
**:SENS1:ISEGM:DISP:POW?**

**:SENSe{1-16}:ISEGMent:FREQuency:FSTArt <NRf>**  
**:SENSe{1-16}:ISEGMent:FREQuency:FSTArt?**

Description: Sets the start frequency in the index-based segment being defined.

Returns the start frequency in the index-based segment being defined.

The Minimum Instrument Frequency ( $F_{min}$ ) depends on the instrument installed options. The Maximum Instrument Frequency ( $F_{max}$ ) depends on the instrument model. The Minimum Frequency Step Size is equal to 1 Hz. See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22 for frequency limits for combinations of instrument model and available options.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: Minimum Instrument Frequency to Maximum Instrument Frequency. Step Size = 0 Hz to Maximum Instrument Frequency.

Default Value: Default Start Frequency (for normal sweeps, i.e. 300kHz here)

Syntax Example: **:SENS1:ISEGM:FREQ:FSTA 3.0E9**  
**:SENS1:ISEGM:FREQ:FSTA?**

```
:SENSe{1-16}:ISEGMent:FREQuency:FSTEp <NRf>
:SENSe{1-16}:ISEGMent:FREQuency:FSTEp?
```

Description: Sets the frequency step size in the index-based segment being defined.

Returns the frequency step size in the index-based segment being defined.

The Minimum Instrument Frequency ( $F_{\min}$ ) depends on the instrument installed options. The Maximum Instrument Frequency ( $F_{\max}$ ) depends on the instrument model. The Minimum Frequency Step Size is equal to 1 Hz.

See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22 for frequency limits for combinations of instrument model and available options.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: 0 Hz to Maximum Instrument Frequency

Syntax Example: :SENS1:ISEGM:FREQ:FSTE 1.0E9

```
:SENS1:ISEGM:FREQ:FSTE?
```

```
:SENSe{1-16}:ISEGMent:FREQuency:FSTOp <NRf>
```

```
:SENSe{1-16}:ISEGMent:FREQuency:FSTOp?
```

Description: Sets the stop frequency in the index-based segment being defined.

Returns the stop frequency in the index-based segment being defined.

The Minimum Instrument Frequency ( $F_{\min}$ ) depends on the instrument installed options. The Maximum Instrument Frequency ( $F_{\max}$ ) depends on the instrument model. The Minimum Frequency Step Size is equal to 1 Hz.

See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22 for frequency limits for combinations of instrument model and available options.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: Minimum Instrument Frequency to Maximum Instrument Frequency.

Step Size = 0 Hz to Maximum Instrument Frequency.

Default Value: Maximum Instrument Frequency

Syntax Example: :SENS1:ISEGM:FREQ:FSTO 9.0E9

```
:SENS1:ISEGM:FREQ:FSTO?
```

**:SENSe{1-16}:ISEGMent:FREQuency[:CW][:FIXed] <NRf>**  
**:SENSe{1-16}:ISEGMent:FREQuency[:CW][:FIXed]?**

Description: Sets the CW frequency in the indicated index-based segment.

Returns the CW frequency in the indicated index-based segment. The Minimum Instrument Frequency ( $F_{\min}$ ) depends on the instrument installed options. The Maximum Instrument Frequency ( $F_{\max}$ ) depends on the instrument model. The Minimum Frequency Step Size is equal to 1 Hz.

See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22 for frequency limits for combinations of instrument model and available options.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: Minimum Instrument Frequency to Maximum Instrument Frequency

Default Value: 7.00000000000E+004

Syntax Example: :SENS1:ISEGM:FREQ 1.00E8  
:SENS1:ISEGM:FREQ?

**:SENSe{1-16}:ISEGMent:INDex:ACTive:STAR?**

Description: Query only.

Returns the start index of the first active index-based segment. The Maximum Instrument Points (MIP) setting is 20,001.

Cmd Parameters: <NR1> The output parameter is an integer.

Range: 0 to 20,000

Default Value: 0

Syntax Example: :SENS1:ISEGM:IND:ACT:STAR?

**:SENSe{1-16}:ISEGMent:INDex:ACTive:STOP?**

Description: Query only.

Returns the stop index of the last active index-based segment. The Maximum Instrument Points (MIP) setting is 20,001.

Query Parameters: <NR1> The output parameter is an integer.

Range: 0 to 20,000

Default Value: 14

Syntax Example: :SENS1:ISEGM:IND:ACT:STOP?

**:SENSe{1-16}:ISEGMent:INDeX:START <NRf>**

**:SENSe{1-16}:ISEGMent:INDeX:START?**

Description: Sets the start index of the index-based segmented sweep.

Returns the start index of the index-based segmented sweep. The Maximum Instrument Points (MIP) setting is 20,001.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR1> The output parameter is an integer.

Range: 0 to 20,000

Default Value: 0

Syntax Example: **:SENS1:ISEGM:IND:STAR 0**

**:SENS1:ISEGM:IND:STAR?**

**:SENSe{1-16}:ISEGMent:INDeX:STOP <NRf>**

**:SENSe{1-16}:ISEGMent:INDeX:STOP?**

Description: Sets the stop index of the index-based segmented sweep.

Returns the stop index of the index-based segmented sweep. The Maximum Instrument Points (MIP) setting is 20,001.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR1> The output parameter is an integer.

Range: 0 to 14

Default Value: 14

Syntax Example: **:SENS1:ISEGM:IND:STOP?**

**:SENS1:ISEGM:IND:STOP 1**

**:SENSe{1-16}:ISEGMent:MAXPoints?**

Description: Query only.

Returns the total number of sweep points in the index-based segments. The number of ISEGMENT total points can range from 1 to the Maximum Instrument Points. The Maximum Instrument Points (MIP) setting is 20,001.

Query Parameters: <NR1> The output parameter is an integer.

Range: 1 to Maximum Instrument Points

Default Value: 15

Syntax Example: **:SENS1:ISEGM:MAXP?**

**:SENSe{1-16}:ISEGMent:POINT?**

Description: Query only.

Returns the displayed number of sweep points in the index-based segments. For all other models the Maximum Instrument Points (MIP) setting is 20,001.

Query Parameters: <NR1> The output parameter is an integer.

Range: NA

Default Value: 15

Syntax Example: **:SENS1:ISEGM:POIN?**

```
:SENSe{1-16}:ISEGMent:PORT{1-4}:BWIDth[:RESolution]
:SENSe{1-16}:ISEGMent:PORT{1-4}:BWIDth[:RESolution]?
```

Applicability: MS4652x

The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the IF bandwidth for the index-based segment for the indicated channel and port.

Returns the IF bandwidth for the index-based segment for the indicated channel and port. The system will automatically select the closest IF bandwidth from the following options:

- 10, 30, 50, 70, 100, 300, 500, 700 Hz
- 1, 3, 5, 7, 10, 30, 50, 70, 100, 300, 500 kHz

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: 1 to 5E5

Default Value: 1.00000000000E+005

Syntax Example: :SENSe1:ISEGM:PORT1:BWID 3.0E4

```
:SENSe1:ISEGM:PORT1:BWID?
```

```
:SENSe{1-16}:ISEGMent{1-100}:PORT{1-4}:BWIDth[:RESolution]
```

```
:SENSe{1-16}:ISEGMent{1-100}:PORT{1-4}:BWIDth[:RESolution]?
```

Applicability: MS4652x

The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the IF bandwidth for the index-based segment for the indicated channel, port, and segment.

Returns the IF bandwidth for the index-based segment for the indicated channel, port, and segment. The system will automatically select the closest IF bandwidth from the following options:

- 10, 30, 50, 70, 100, 300, 500, 700 Hz
- 1, 3, 5, 7, 10, 30, 50, 70, 100, 300, 500 kHz

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: 1 to 5E5

Default Value: 1.00000000000E+005

Syntax Example: :SENSe1:ISEGM1:PORT1:BWID 3.0E4

```
:SENSe1:ISEGM1:PORT1:BWID?
```

**:SENSe{1-16} : ISEGMENT:POWER:PORT{1-4}[:LEVEL][:IMMEDIATE][:AMPLITUDE]<NRf>**

**:SENSe{1-16} : ISEGMENT:POWER:PORT{1-4}[:LEVEL][:IMMEDIATE][:AMPLITUDE]?**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the power level of the index-based segment being defined.

Returns the power level of the index-based segment being defined on the indicated port.

Cmd Parameters: <NRf> The input parameter is in dBm.

Query Parameters: <NR3> The output parameter is in dBm.

Range: -30 to +30

Default Value: +5

Syntax Example: **:SENS1:ISEGM:POW:PORT1 3.0E0**

**:SENS1:ISEGM:POW:PORT1?**

**:SENSe{1-16} : ISEGMENT:SPAntype <char>**

**:SENSe{1-16} : ISEGMENT:SPAntype?**

Description: Sets the span type of the index-based segment being defined as STARTSTOP or STARTSTEP.

Returns the span type as STARTSTOP or STARTSTEP of the index-based segment being defined.

### STARTSTOP Selected

If STARTSTOP is selected, each segment is defined by the:

- Segment Start Frequency
- Segment Stop Frequency
- Number of Segment Points

### STARTSTEP Selected

If STARTSTEP is selected, each segment is defined by the:

- Start Segment Frequency
- Frequency Step Size
- Number of Segment Points

Cmd Parameters: <char> STARTSTOP | STARTSTEP

Query Parameters: <char> STARTSTOP | STARTSTEP

Range: NA

Default Value: STARTSTOP

Syntax Example: **:SENS1:ISEGM:SPA STARTSTOP**

**:SENS1:ISEGM:SPA?**

**:SENSe{1-16} : ISEGMENT:SWEep:MAXImize**

Description: Maximizes the index range of the index-based segmented sweep. No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: **:SENS1:ISEGM:SWE:MAX**

**:SENSe{1-16}:ISEGMent:SWEep:POINT <NR1>**  
**:SENSe{1-16}:ISEGMent:SWEep:POINT?**

Description: Sets the number of sweep points in the index-based segment being defined.

Returns the number of sweep points in the index-based segment being defined.

The Maximum Instrument Points (MIP) setting is 20,001.

Cmd Parameters: <NR1> The input parameter is an integer.

Query Parameters: <NR1> The output parameter is an integer.

Range: 0 to 20,001

Default Value: 15

Syntax Example: **:SENS1:ISEGM:SWE:POIN 15**  
**:SENS1:ISEGM:SWE:POIN?**

**:SENSe{1-16}:ISEGMent[:STATE] <char>**  
**:SENSe{1-16}:ISEGMent[:STATE]?**

Description: Toggles the index-based segment being defined on and off.

Returns the on/off state of the index-based segment being defined.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 1

Syntax Example: **:SENS1:ISEGM ON**  
**:SENS1:ISEGM?**

## 5-93 :SENSe{1-16}:ISEGMent{1-100} Subsystem

The :SENSe{1-16}:ISEGMent{1-100} subsystem commands are used to configure the indicated index-based segment. To configure only the active index-based segment, use:

- “:SENSe{1-16}:ISEGMent Subsystem” on page 5-538

### Limit Line and Segment Subsystems

Related limit line and segment configuration and control subsystems are:

- “:CALCulate{1-16}[{:SELected}]:LIMit Subsystem” on page 5-160
- “:CALCulate{1-16}[{:SELected}]:RLIMit Subsystem” on page 5-208
- “:DISPlay Subsystem” on page 5-281
- “:SENSe{1-16}:FSEGMENT Subsystem” on page 5-514.
- “:SENSe{1-16}:FSEGMENT{1-100} Subsystem” on page 5-526.
- “:SENSe{1-16}:ISEGMent Subsystem” on page 5-538.
- “:SENSe{1-16}:ISEGMent{1-100} Subsystem” on page 5-548.
- “:SENSe{1-16}:SEGMENT Subsystem” on page 5-565

**:SENSe{1-16}:ISEGMent{1-100}:AVERage:COUNt <NRf>**  
**:SENSe{1-16}:ISEGMent{1-100}:AVERage:COUNt?**

Description: Sets the sweep averaging count in the indicated index-based segment.

Returns the sweep averaging count in the indicated index-based segment.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR1> The output parameter is an integer.

Range: 1 to 1024

Default Value: 1

Syntax Example: :SENS1:ISEGM1:AVER:COUN 99E0  
                  :SENS1:ISEGM1:AVER:COUN?

**:SENSe{1-16}:ISEGMent{1-100}:BWIDth[:RESolution] <NRf>**  
**:SENSe{1-16}:ISEGMent{1-100}:BWIDth[:RESolution]?**

Description: Sets the IF bandwidth for the indicated index-based segment.

The system will automatically select the closest IF bandwidth from the following options:

- 10, 30, 50, 70, 100, 300, 500, 700 Hz
- 1, 3, 5, 7, 10, 30, 50, 70, 100, 300, 500 kHz

Note: This will set all of the ports IFBW for the currently defined segment and indicated channel when used on MS46522B or MS46524B.

Returns the IF bandwidth for the indicated index-based segment.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: 1 to 5E5

Default Value: 1.00000000000E+005

Syntax Example: :SENS1:ISEGM1:BWID 3.0E3  
                  :SENS1:ISEGM1:BWID?

**:SENSe{1-16}:ISEGMent{1-100}:CWMODe[:STATe] <char>**  
**:SENSe{1-16}:ISEGMent{1-100}:CWMODe[:STATe]?**

Description: Sets the CW mode on/off state in the indicated index-based segment.

Returns the CW mode on/off state in the indicated index-based segment.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: **:SENS1:ISEGM1:CWMOD ON**  
**:SENS1:ISEGM1:CWMOD?**

**:SENSe{1-16}:ISEGMent{1-100}:FREQuency:FSTArt <NRf>**  
**:SENSe{1-16}:ISEGMent{1-100}:FREQuency:FSTArt?**

Description: Sets the start frequency in the indicated index-based segment.

Returns the start frequency in the indicated index-based segment.

The Minimum Instrument Frequency ( $F_{min}$ ) depends on the instrument installed options.  
The Maximum Instrument Frequency ( $F_{max}$ ) depends on the instrument model. The Minimum Frequency Step Size is equal to 1 Hz.

See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22 for frequency limits for combinations of instrument model and available options.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: Minimum Instrument Frequency to Maximum Instrument Frequency  
Step Size = 0 Hz to Maximum Instrument Frequency

Default Value: Default Start Frequency (for normal sweeps, i.e. 300kHz here)

Syntax Example: **:SENS1:ISEGM1:FREQ:FSTA 5.0E9**

**:SENS1:ISEGM1:FREQ:FSTA?**

**:SENSe{1-16}:ISEGMent{1-100}:FREQuency:FSTEp <NRf>**  
**:SENSe{1-16}:ISEGMent{1-100}:FREQuency:FSTEp?**

Description: Sets the frequency step size in the indicated index-based segment.

Returns the frequency step size in the indicated index-based segment.

The Minimum Instrument Frequency ( $F_{min}$ ) depends on the instrument installed options.  
The Maximum Instrument Frequency ( $F_{max}$ ) depends on the instrument model. The Minimum Frequency Step Size is equal to 1 Hz.

See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22 for frequency limits for combinations of instrument model and available options.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: Minimum Frequency Step Size to (Maximum Instrument Frequency minus Minimum Instrument Frequency)

Syntax Example: **:SENS1:ISEGM1:FREQ:FSTE 1.00E4**

**:SENS1:ISEGM1:FREQ:FSTE?**

```
:SENSe{1-16}:ISEGMent{1-100}:FREQuency:FSTOp <NRf>
:SENSe{1-16}:ISEGMent{1-100}:FREQuency:FSTOp?
```

Description: Sets the stop frequency in the indicated index-based segment.

Returns the stop frequency in the indicated index-based segment.

The Minimum Instrument Frequency ( $F_{min}$ ) depends on the instrument installed options. The Maximum Instrument Frequency ( $F_{max}$ ) depends on the instrument model. The Minimum Frequency Step Size is equal to 1 Hz.

See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22 for frequency limits for combinations of instrument model and available options.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: Range = Minimum Instrument Frequency to Maximum Instrument Frequency.  
Step Size = 0 Hz to Maximum Instrument Frequency.

Default Value: Maximum Instrument Frequency

Syntax Example: :SENS1:ISEGM1:FREQ:FSTO 9.0E9

```
:SENS1:ISEGM1:FREQ:FSTO?
```

```
:SENSe{1-16}:ISEGMent{1-100}:FREQuency[:CW][:FIXed] <NRf>
:SENSe{1-16}:ISEGMent{1-100}:FREQuency[:CW][:FIXed]?
```

Description: Sets the start frequency for the indicated index-based segment.

Returns the start frequency for the indicated index-based segment.

The Minimum Instrument Frequency ( $F_{min}$ ) depends on the instrument installed options. The Maximum Instrument Frequency ( $F_{max}$ ) depends on the instrument model. The Minimum Frequency Step Size is equal to 1 Hz.

See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22 for frequency limits for combinations of instrument model and available options.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: Minimum Instrument Frequency to Maximum Instrument Frequency

Default Value: Default Start Frequency

Syntax Example: :SENS1:ISEGM1:FREQ 2.0E9

```
:SENS1:ISEGM1:FREQ?
```

```
:SENSe{1-16}:ISEGMent{1-100}:POWeR:PORT{1-4}[:LEVel][:IMMEDIATE][:AMPLi
tude] <NRf>
```

```
:SENSe{1-16}:ISEGMent{1-100}:POWeR:PORT{1-4}[:LEVel][:IMMEDIATE][:AMPLi
tude]?
```

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: For the indicated port, sets the power level in dBm for the indicated index-based segment.

Returns the power level in dBm for the indicated index-based segment for the indicated port.

Cmd Parameters: <NRf> The input parameter is in dBm.

Query Parameters: <NR3> The output parameter is in dBm.

Range: -30 to +30

Default Value: +5

Syntax Example: :SENS1:ISEGM1:POW:PORT1 3.3E0

:SENS1:ISEGM1:POW:PORT1?

:SENSe{1-16}:ISEGMent{1-100}:SPAntype <char>

:SENSe{1-16}:ISEGMent{1-100}:SPAntype?

Description: Sets the span type of the indicated index-based segment.

Returns the span type of the indicated index-based segment.

### STARTSTOP Selected

If STARTSTOP is selected, each segment is defined by the:

- Segment Start Frequency
- Segment Stop Frequency
- Number of Segment Points

### STARTSTEP Selected

If STARTSTEP is selected, each segment is defined by the:

- Start Segment Frequency
- Frequency Step Size
- Number of Segment Points

Cmd Parameters: <char> STARTSTOP | STARTSTEP

Query Parameters: <char> STARTSTOP | STARTSTEP

Range: NA

Default Value: STARTSTOP

Syntax Example: :SENS1:ISEGM1:SPA STARTSTOP

:SENS1:ISEGM1:SPA?

```
:SENSe{1-16}:ISEGMent{1-100}:SWEep:POINT <NR1>
:SENSe{1-16}:ISEGMent{1-100}:SWEep:POINT?
```

Description: Sets the number of sweep points in the indicated index-based segment.

Returns the number of sweep points in the indicated index-based segment.

The Maximum Instrument Points (MIP) is 20,001.

Cmd Parameters: <NR1> The input parameter is an integer.

Query Parameters: <NR1> The output parameter is an integer.

Range: 1 to maximum number of instrument points depending on CW mode.

Default Value: 15

Syntax Example: :SENS1:ISEGM1:SWE:POIN 1.01E2

```
:SENS1:ISEGM1:SWE:POIN?
```

```
:SENSe{1-16}:ISEGMent{1-100}[:STATe] <char>
:SENSe{1-16}:ISEGMent{1-100}[:STATe]?
```

Description: Query only.

Turns the indicated index-based segment on/off.

Returns the indicated index-based segment on/off state.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :SENS1:ISEGM1

```
:SENS1:ISEGM1?
```

## 5-94 :SENSe{1-16}:OFFSet Subsystem

The :SENSe{1-16}:OFFSet subsystem commands are used to configure the frequency offsets for external sources, internal receivers, and related functions for the currently active device or function.

Power Sweep is not supported when Multiple Source mode is active for MS465xx instruments.

### Trigger, Hold Subsystems

Related trigger and hold subsystems are:

- “:SENSe{1-16}:ABORtcal Subsystem” on page 5-319
- “:SENSe{1-16}:ISEGMent Subsystem” on page 5-538

### General Procedure

#### :SENSe{1-16}:OFFset Commands

Use the :SENSe{1-16}:OFFSet commands to create and setup the source band. The relative sequence is:

- Configure Band
  - When started, Band exists with a starting frequency of the lowest instrument frequency, and a top ending frequency of the highest instrument frequency.
  - Change the Band top frequency to something lower than the instrument maximum frequency.
  - Accept the band defaults of receiver source = ON, source state = ON, and delay state = OFF, or configure as required.

#### :SENSe{1-16}:OFFSet:CLEar

Description: Clears all currently defined multiple source control bands on the indicated channel, leaving a default band.

No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:OFFS:CLE

#### :SENSe{1-16}:OFFSet:DONe

Description: Done defining multiple source control bands on the indicated channel.

No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SENS1:OFFS:DON

**:SENSe{1-16}:OFFSet:HIGHest:FREQuency?**

Description: Query only.

Returns the highest multiple source control frequency on the indicated channel. The query range is limited by the band equation which changes depending on the CW on/off mode:

- If CW is off: Source = (Multiplier/Divisor) × (Frequency + Offset Frequency)
- If CW is on: Source = (Multiplier/Divisor) + Offset Frequency

Cmd Parameters: <NR3> The output parameter is in Hertz.

Range: MPND. Limited by the band equation.

Default Value: 1.0000000000E+010

Syntax Example: :SENS1:OFFS:HIGH:FREQ?

**:SENSe{1-16}:OFFSet:INTERNAL{1-4}:CW[:STATE] <char>****:SENSe{1-16}:OFFSet:INTERNAL{1-4}:CW[:STATE]?**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the indicated Internal Source CW mode on/off status for the last multiple source control band being defined on the indicated channel.

Returns the indicated Internal Source CW mode on/off status for the last multiple source control band being defined on the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :SENS1:OFFS:INT1:CW ON

:SENS1:OFFS:INT1:CW?

**:SENSe{1-16}:OFFSet:INTERNAL{1-4}[:FREQuency]:DIVisor <NRf>****:SENSe{1-16}:OFFSet:INTERNAL{1-4}[:FREQuency]:DIVisor?**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the internal source 1 frequency divisor for the last multiple source control band being defined on the indicated channel. The command/query range is limited by the band equation, which changes depending on the CW on/off mode:

- If CW is off: Source = (Multiplier/Divisor) × (Frequency + Offset Frequency)
- If CW is on: Source = (Multiplier/Divisor) + Offset Frequency

Returns the internal source 1 frequency divisor for the last multiple source control band being defined on the indicated channel.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR1> The output parameter is an integer.

Range: MPNI. Limited by the band equation.

Default Value: 1

Syntax Example: :SENS1:OFFS:INT1:DIV 4

:SENS1:OFFS:INT1:DIV?

```
:SENSe{1-16}:OFFSet:INTernal{1-4}[:FREQuency]:MULTiplier <NRf>
:SENSe{1-16}:OFFSet:INTernal{1-4}[:FREQuency]:MULTiplier?
```

**Applicability:** The use of Port 3 and/or Port 4 requires a 4-port VNA.

**Description:** Sets the internal source 1 frequency multiplier for the last multiple source control band being defined on the indicated channel. The command/query range is limited by the band equation which changes depending on the CW on/off mode:

- If CW is off: Source = (Multiplier/Divisor) × (Frequency + Offset Frequency)
- If CW is on: Source = (Multiplier/Divisor) + Offset Frequency

Returns the Internal source 1 or 2 frequency multiplier for the last multiple source control band being defined on the indicated channel.

**Cmd Parameters:** <NRf> The input parameter is a unitless number.

**Query Parameters:** <NR1> The output parameter is an integer.

**Range:** MPNI. Limited by the band equation.

**Default Value:** 1

**Syntax Example:**

```
:SENS1:OFFS:INT1:MULT 2
:SENS1:OFFS:INT1:MULT?
```

```
:SENSe{1-16}:OFFSet:INTernal{1-4}[:FREQuency]:OFFSet <NRf>
:SENSe{1-16}:OFFSet:INTernal{1-4}[:FREQuency]:OFFSet?
```

**Applicability:** The use of Port 3 and/or Port 4 requires a 4-port VNA.

**Description:** Sets the Internal Source 1 or 2 offset frequency for the LAST multiple source control band being defined on the indicated channel. The command/query range is limited by the band equation which changes depending on the CW on/off mode:

- If CW is off: Source = (Multiplier/Divisor) × (Frequency + Offset Frequency)
- If CW is on: Source = (Multiplier/Divisor) + Offset Frequency

Returns the Internal Source 1 or 2 offset frequency for the last multiple source control band being defined on the indicated channel.

**Cmd Parameters:** <NRf> The input parameter is in Hertz.

**Query Parameters:** <NR3> The output parameter is in Hertz.

**Range:** MPND. Limited by the band equation.

**Default Value:** 0.0000000000E+000

**Syntax Example:**

```
:SENS1:OFFS:INT1:OFFS 5.0E4
:SENS1:OFFS:INT1:OFFS?
```

**:SENSe{1-16}:OFFSet:INTernal{1-4}:STATE**  
**:SENSe{1-16}:OFFSet:INTernal{1-4}:STATE?**

Applicability: The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the state of the indicated internal source on the indicated channel.

Returns the state of the indicated internal source on the indicated channel.

Cmd Parameters: <char> AUTO | ACTive | INACtive

Query Parameters: <char> AUTO | ACT | INAC

Range: NA

Default Value: AUTO

Syntax Example: **:SENS1:OFFS:INT1:STAT INAC**

**:SENS1:OFFS:INT1:STAT?**

**:SENSe{1-16}:OFFSet:LOWest:FREQuency?**

Description: Query only.

Returns the lowest multiple source control frequency on the indicated channel. The query range is limited by the band equation which changes depending on the CW on/off mode:

- If CW is off: Source = (Multiplier/Divisor) × (Frequency + Offset Frequency)
- If CW is on: Source = (Multiplier/Divisor) + Offset Frequency

Query Parameters: <NR3> The output parameter is in Hertz.

Range: MPND. Limited by the band equation.

Default Value: 7.0000000000E+004

Syntax Example: **:SENS1:OFFS:LOW:FREQ?**

**:SENSe{1-16}:OFFSet:PINVersion[:STATE] <char>**  
**:SENSe{1-16}:OFFSet:PINVersion[:STATE]?**

Description: Turns on/off phase inversion for multiple source control on the indicated channel.

Returns the on/off status of phase inversion for multiple source control on the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: **:SENS1:OFFS:PINV ON**

**:SENS1:OFFS:PINV?**

**:SENSe{1-16}:OFFSet:RECEiver:CW[:STAtE] <char>**

**:SENSe{1-16}:OFFSet:RECEiver:CW[:STAtE]?**

Applicability: MS46121, MS46122, MS46131, MS46322, MS46522

Description: Sets the receiver CW mode on/off status for the last multiple source control band being defined on the indicated channel.

On the indicated channel, returns the receiver CW mode on/off status for the last multiple source control band being defined.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :SENS1:OFFS:RECE:CW ON

:SENS1:OFFS:RECE:CW?

**:SENSe{1-16}:OFFSet:RECEiver{1-2}:CW[:STAtE] <char>**

**:SENSe{1-16}:OFFSet:RECEiver{1-2}:CW[:STAtE]?**

Applicability: MS46524

Description: Sets the receiver CW mode on/off status for the last multiple source control band being defined on the indicated channel.

On the indicated channel, returns the receiver CW mode on/off status for the last multiple source control band being defined.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :SENS1:OFFS:RECE:CW ON

:SENS1:OFFS:RECE:CW?

```
:SENSe{1-16}:OFFSet:RECEiver[:FREQuency]:DIVisor <NRf>
:SENSe{1-16}:OFFSet:RECEiver[:FREQuency]:DIVisor?
```

Applicability: MS46121, MS46122, MS46131, MS46322, MS46522

Description: Sets the receiver frequency divisor for the last multiple source control band being defined on the indicated channel. The command/query range is limited by the band equation which changes depending on the CW on/off mode:

- If CW is off: Source = (Multiplier/Divisor) × (Frequency + Offset Frequency)
- If CW is on: Source = (Multiplier/Divisor) + Offset Frequency

Returns the receiver frequency divisor for the last multiple source control band being defined on the indicated channel.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR1> The output parameter is an integer.

Range: MPNI. Limited by the band equation.

Default Value: 1

Syntax Example: :SENS1:OFFS:RECE:DIV 4  
:SENS1:OFFS:RECE:DIV?

```
:SENSe{1-16}:OFFSet:RECEiver{1-2}[:FREQuency]:DIVisor <NRf>
:SENSe{1-16}:OFFSet:RECEiver{1-2}[:FREQuency]:DIVisor?
```

Applicability: MS46524

Description: Sets the receiver frequency divisor for the last multiple source control band being defined on the indicated channel. The command/query range is limited by the band equation which changes depending on the CW on/off mode:

- If CW is off: Source = (Multiplier/Divisor) × (Frequency + Offset Frequency)
- If CW is on: Source = (Multiplier/Divisor) + Offset Frequency

Returns the receiver frequency divisor for the last multiple source control band being defined on the indicated channel.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR1> The output parameter is an integer.

Range: MPNI. Limited by the band equation.

Default Value: 1

Syntax Example: :SENS1:OFFS:RECE:DIV 4  
:SENS1:OFFS:RECE:DIV?

```
:SENSe{1-16}:OFFSet:RECEiver[:FREQuency]:MULTiplier <NRf>
:SENSe{1-16}:OFFSet:RECEiver[:FREQuency]:MULTiplier?
```

Applicability: MS46121, MS46122, MS46131, MS46322, MS46522

Description: Sets the receiver frequency multiplier for the last multiple source control band being defined on the indicated channel. The command/query range is limited by the band equation which changes depending on the CW on/off mode:

- If CW is off: Source = (Multiplier/Divisor) × (Frequency + Offset Frequency)
- If CW is on: Source = (Multiplier/Divisor) + Offset Frequency

Returns the receiver frequency multiplier for the last multiple source control band being defined on the indicated channel.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR1> The output parameter is an integer.

Range: MPNI. Limited by the band equation.

Default Value: 1

Syntax Example: :SENS1:OFFS:RECE:MULT 2  
:SENS1:OFFS:RECE:MULT?

```
:SENSe{1-16}:OFFSet:RECEiver{1-2}[:FREQuency]:MULTiplier <NRf>
:SENSe{1-16}:OFFSet:RECEiver{1-2}[:FREQuency]:MULTiplier?
```

Applicability: MS46524

Description: Sets the receiver frequency multiplier for the last multiple source control band being defined on the indicated channel. The command/query range is limited by the band equation which changes depending on the CW on/off mode:

- If CW is off: Source = (Multiplier/Divisor) × (Frequency + Offset Frequency)
- If CW is on: Source = (Multiplier/Divisor) + Offset Frequency

Returns the receiver frequency multiplier for the last multiple source control band being defined on the indicated channel.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR1> The output parameter is an integer.

Range: MPNI. Limited by the band equation.

Default Value: 1

Syntax Example: :SENS1:OFFS:RECE:MULT 2  
:SENS1:OFFS:RECE:MULT?

```
:SENSe{1-16}:OFFSet:RECEiver[:FREQuency]:OFFSet <NRf>
:SENSe{1-16}:OFFSet:RECEiver[:FREQuency]:OFFSet?
```

Applicability: MS46121, MS46122, MS46131, MS46322, MS46522

Description: Sets the receiver offset frequency for the last multiple source control band being defined on the indicated channel. The command/query range is limited by the band equation which changes depending on the CW on/off mode:

- If CW is off: Source = (Multiplier/Divisor) × (Frequency + Offset Frequency)
- If CW is on: Source = (Multiplier/Divisor) + Offset Frequency

Returns the receiver offset frequency for the last multiple source control band being defined on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: MPND. Limited by the band equation.

Default Value: 0.0000000000E+000

Syntax Example: :SENS1:OFFS:RECE:OFFS 1.0E9

```
:SENS1:OFFS:RECE:OFFS?
```

```
:SENSe{1-16}:OFFSet:RECEiver{1-2}[:FREQuency]:OFFSet <NRf>
```

```
:SENSe{1-16}:OFFSet:RECEiver{1-2}[:FREQuency]:OFFSet?
```

Applicability: MS46524

Description: Sets the receiver offset frequency for the last multiple source control band being defined on the indicated channel. The command/query range is limited by the band equation which changes depending on the CW on/off mode:

- If CW is off: Source = (Multiplier/Divisor) × (Frequency + Offset Frequency)
- If CW is on: Source = (Multiplier/Divisor) + Offset Frequency

Returns the receiver offset frequency for the last multiple source control band being defined on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: MPND. Limited by the band equation.

Default Value: 0.0000000000E+000

Syntax Example: :SENS1:OFFS:RECE:OFFS 1.0E9

```
:SENS1:OFFS:RECE:OFFS?
```

**:SENSe{1-16}:OFFSet:STARt <NRf>**

**:SENSe{1-16}:OFFSet:STARt?**

Description: Sets the start frequency of the last multiple source control band being defined on the indicated channel.

Returns the start frequency of the last multiple source control band being defined on the indicated channel.

The Minimum Instrument Frequency ( $F_{min}$ ) depends on the instrument installed options. The Maximum Instrument Frequency ( $F_{max}$ ) depends on the instrument model. See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22 for frequency limits for combinations of instrument model and available options. The Minimum Frequency Step Size is equal to 1 Hz.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: Minimum Instrument Frequency to (Maximum Instrument Frequency minus Minimum Frequency Step Size)

Default Value: 7.00000000000E+004

Syntax Example: **:SENS1:OFFS:STAR 7.0E4**

**:SENS1:OFFS:STAR?**

**:SENSe{1-16}:OFFSet:STOP <NRf>**

**:SENSe{1-16}:OFFSet:STOP?**

Description: Sets the stop frequency of the last multiple source control band being defined on the indicated channel.

Returns the stop frequency of the last multiple source control band being defined on the indicated channel.

The Minimum Instrument Frequency ( $F_{min}$ ) depends on the instrument installed options. The Maximum Instrument Frequency ( $F_{max}$ ) depends on the instrument model. See “[Minimum/Maximum Instrument Frequency and Related Parameters](#)” on page 1-22 for frequency limits for combinations of instrument model and available options. The Minimum Frequency Step Size is equal to 1 Hz.

Cmd Parameters: <NRf> The input parameter is in Hertz.

Query Parameters: <NR3> The output parameter is in Hertz.

Range: (Minimum Instrument Frequency + Minimum Frequency Step Size) to Maximum Instrument Frequency

Default Value: 7.00000000000E+010

Syntax Example: **:SENS1:OFFS:STOP 2.0E9**

**:SENS1:OFFS:STOP 2000000000**

**:SENS1:OFFS:STOP?**

```
:SENSe{1-16}:OFFSet[:STATE] <char>
:SENSe{1-16}:OFFSet[:STATE]?
```

Description: Sets the state of the multiple source mode of the indicated channel to On, Off, or Define.

Returns the state of the multiple source mode of the indicated channel.

Refer to the “[General Procedure](#)” on page [5-553](#) when defining additional bands.

Cmd Parameters: <char> ON | OFF | DEF

Query Parameters: <char> ON | OFF | DEF

Range: NA

Default Value: OFF

Syntax Example: :SENSe1:OFFS ON

```
:SENSe1:OFFS?
```

## 5-95 :SENSe{1-16}:RECEiver Subsystem

The :SENSe{1-16} :RECEiver subsystem command is used to the configure the VNA receiver.

**:SENSe{1-16}:RECEiver:CALibration:EXIST? <char>**

Description: Query only.

Checks for the existence of a particular receiver calibration on the indicated channel.

Cmd Parameters: NA

Query Parameters: **2-Port VNAs:**

<char> A1 | A2 | B1 | B2

Where A and B are User-Defined numerator and denominator parameters.

**4-Port VNAs:**

<char> A1 | A2 | A3 | A4 | B1 | B2 | B3 | B4

Where A and B are User-Defined numerator and denominator parameters.

Query Output: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :SENS1:REC:CAL:EXIS? A1

**:SENSe{1-16}:RECEiver:CALibration:STATE <char1>,<char2>**

**:SENSe{1-16}:RECEiver:CALibration:STATE? <char>**

Description: Turns the receiver calibration on/off on the given channel.

Returns the receiver calibration on/off status on the given channel.

Cmd Parameters: **2-Port VNAs:**

<char1> A1 | A2 | B1 | B2 | ALL

Where A and B are User-Defined numerator and denominator parameters.

<char2> 1 | 0 | ON | OFF

**4-Port VNAs:**

<char1> A1 | A2 | A3 | A4 | B1 | B2 | B3 | B4 | ALL

Where A and B are User-Defined numerator and denominator parameters.

<char2> 1 | 0 | ON | OFF

Query Parameters: **2-Port VNAs:**

<char> A1 | A2 | B1 | B2

Where A and B are User-Defined numerator and denominator parameters.

**4-Port VNAs:**

<char> A1 | A2 | A3 | A4 | B1 | B2 | B3 | B4

Where A and B are User-Defined numerator and denominator parameters.

Query Output: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :SENS1:REC:CAL:STAT A1,ON

:SENS1:REC:CAL:STAT? A1

**:SENSe{1-16}:RECEiver:CALibration? <char1>,<char2>**

Description: Query only.

Returns the indicated receiver calibration status on the indicated channel and status where:

0 = Calibration Passed

1 = Calibration Failed

2 = Calibration Aborted

Cmd Parameters: NA

Query Parameters: **2-Port VNAs:**

<char1> A1 | A2 | B1 | B2

Where A and B are User-Defined numerator and denominator parameters.

<char2> PORT1 | PORT2

**4-Port VNAs:**

<char1> A1 | A2 | A3 | A4 | B1 | B2 | B3 | B4

Where A and B are User-Defined numerator and denominator parameters.

<char2> PORT1 | PORT2 | PORT3 | PORT4

Output: <NR1> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :SENS1:REC:CAL? A1,PORT1

**:SENSe{1-16}:RECEiver:CONFiguration <char>****:SENSe{1-16}:RECEiver:CONFiguration?**

Description: Sets the receiver configuration. Available command parameters depend on the instrument series and model number, where:

- STANDARD = The receiver frequency follows the source frequency.
- MSOURce = Multiple source receiver configuration. This can be used with or without actual multiple sources. If selected, allows the receiver frequency to be changed by an equation.

**MSOURce**

For MSOURce (Multiple Source), the equation used depends on whether CW is OFF or ON.

- If CW is OFF, Source = (Multiplier / Divisor) × (Frequency + Offset Frequency)
- If CW is ON, Source = (Multiplier / Divisor) × Offset Frequency

Returns the receiver configuration.

Cmd Parameters: <char> STANDARD | MSOURce

Query Parameters: <char> STAN | MSOUR

Range: NA

Default Value: NA

Syntax Example: :SENS1:RECE:CONF STAN

:SENS1:RECE:CONF?

## 5-96 :SENSe{1-16}:SEGMENT Subsystem

The :SENSe{1-16}:SEGMENT subsystem command is used to query the segmented sweep type as frequency-based or index-based on the active sweep.

### Limit Line and Segment Subsystems

Related limit line and segment configuration and control subsystems are:

- “:CALCulate{1-16}[:SElected]:LIMit Subsystem” on page 5-160
- “:CALCulate{1-16}[:SElected]:RLIMit Subsystem” on page 5-208
- “:DISPlay Subsystem” on page 5-281
- “:SENSe{1-16}:FSEGMENT Subsystem” on page 5-514.
- “:SENSe{1-16}:FSEGMENT{1-100} Subsystem” on page 5-526.
- “:SENSe{1-16}:ISEGMent Subsystem” on page 5-538.
- “:SENSe{1-16}:ISEGMEnt{1-100} Subsystem” on page 5-548.
- “:SENSe{1-16}:ISEGMEnt{1-100} Subsystem” on page 5-548
- “:SENSe{1-16}:SEGMENT Subsystem” on page 5-565

### :SENSe{1-16} : SEGMENT : TYPE?

Description: Query only.

Returns the segmented sweep type for the active segment as frequency-based or index-based where:

- FREQ = Frequency-based sweep type
- INDEX = Index-based sweep type

Query Parameters: <char> FREQ | INDEX

Range: NA

Default Value: NA

Syntax Example: :SENS1:SEGM:TYP?

## 5-97 :SENSe{1-16}:SPUR Subsystem

**Note** The :SENSe{1-16}:SPUR subsystem applies on to the MS46522B-082 Rev 02 or higher.  
The :SENSe{1-16}:SPUR subsystem commands do not apply to any revision of MS46522B-083.

The :SENSe{1-16}:SPUR subsystem command is used to toggle spur reduction on and off on the indicated channel.

### Channel and Sweep Subsystems

Related channel and sweep configuration and control subsystems are:

- “:SENSe{1-16}:AVERage Subsystem” on page 5-320
- “:SENSe{1-16}:FREQuency Subsystem” on page 5-510
- “:SENSe{1-16}:SPUR Subsystem” on page 5-566
- “:SENSe{1-16}:SWEep Subsystem” on page 5-567

**:SENSe{1-16}:SPUR:REDUction[:STATe] <char>**

**:SENSe{1-16}:SPUR:REDUction[:STATe]?**

Applicability: MS46522B-082 Rev 02 or higher; does not apply to any revision of MS46522B-083.

Available with a MS46522B with Option 82 only.

Description: Turns spur reduction on/off for the indicated channel.

Returns spur reduction on/off status for the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :SENS1:SPUR:RED ON

:SENS1:SPUR:RED?

## 5-98 :SENSe{1-16}:SWEep Subsystem

The :SENSe{1-16} :SWEep subsystem commands are used to configure and control the instrument sweeps.

### Sweep Subsystems

Related sweep configuration and control subsystems are:

- “:SENSe{1-16}:AVERage Subsystem” on page 5-320
- “:SENSe{1-16}:FREQuency Subsystem” on page 5-510
- “:SENSe{1-16}:SWEep Subsystem” on page 5-567

**:SENSe{1-16} :SWEep :CW :POINT <NRf>**

**:SENSe{1-16} :SWEep :CW :POINT?**

Description: Sets the CW sweep mode number of points.

Returns the CW sweep mode number of points.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR1> The output parameter is an integer.

Range: 1 to 20,001

Default Value: 1

Syntax Example: :SENS1:SWE:CW:POIN 1.01E2

:SENS1:SWE:CW:POIN?

**:SENSe{1-16} :SWEep :CW[:STATE] <char>**

**:SENSe{1-16} :SWEep :CW[:STATE]?**

Description: Turns on/off the CW sweep mode.

Returns the on/off status of the CW sweep mode.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default: 0

Syntax Example: :SENS1:SWE:CW 1

:SENS1:SWE:CW?

**:SENSe{1-16} :SWEep :DELay <NRf>**

**:SENSe{1-16} :SWEep :DELay?**

Applicability: MS46524

Description: Sets the sweep delay time.

Returns the sweep delay time.

Cmd Parameters: <NRf> The input parameter is in seconds.

Query Parameters: <NR3> The output parameter is in seconds.

Range: 0 to 100

Default Value: 0.000000000000E+000

Syntax Example: :SENS1:SWE:DEL 50.0E-3

:SENS1:SWE:DEL?

```
:SENSe{1-16}:SWEep:DELay:STATE <char>
:SENSe{1-16}:SWEep:DELay:STATE?
```

Applicability: MS46524

Description: Sets the sweep delay per point ON or OFF.

Returns the sweep delay per point state.

Cmd Parameters: <char> OFF | ON | 0 | 1

Query Parameters: <char> 0 | 1

Range: NA

Default Value: OFF

Syntax Example: :SENS1:SWE:DEL:STAT ON

```
:SENS1:SWE:DEL:STAT?
```

```
:SENSe{1-16}:SWEep:POINT <NRf>
```

```
:SENSe{1-16}:SWEep:POINT?
```

Description: Sets the number of measurement points.

Returns the number of measurement points.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR1> The output parameter is an integer.

Range: 2 to 20,001 points.

Default Value: 201

Syntax Example: :SENS1:SWE:POIN 1.01E2

```
:SENS1:SWE:POIN?
```

```
:SENSe{1-16}:SWEep:TIME <NRf>
```

```
:SENSe{1-16}:SWEep:TIME?
```

Applicability: MS46522, MS46524

Description: Sets the Sweep Time of the indicated channel.

Returns the Sweep Time of the indicated channel.

Cmd Parameters: <NRf> The input parameter is in Seconds.

Query Parameters: <NR3> The output parameter is in Seconds.

Range: MPND

Default: 0.00000000000E+000

Syntax Example: :SENS1:SWE:TIM 5.0E1

```
:SENS1:SWE:TIM?
```

**:SENSe{1-16}:SWEep:TIME:DISPLAY[:STATE] <char>**  
**:SENSe{1-16}:SWEep:TIME:DISPLAY[:STATE]?**

Applicability: MS46522, MS46524

Description: Sets the on/off state of the display of Sweep Time on the indicated channel.

Returns the on/off state the display of Sweep Time on the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default: 0

Syntax Example: **:SENS1:SWE:TIM:DISP 1**  
**:SENS1:SWE:TIM:DISP?**

**:SENSe{1-16}:SWEep:TIME:STATE <char>**  
**:SENSe{1-16}:SWEep:TIME:STATE?**

Applicability: MS46522, MS46524

Description: Sets the on/off state of Sweep Time of the indicated channel.

Returns the on/off state of Sweep Time of the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default: 0

Syntax Example: **:SENS1:SWE:TIM:STAT 1**  
**:SENS1:SWE:TIM:STAT?**

**:SENSe{1-16}:SWEep:TIME:TYPE <char>**  
**:SENSe{1-16}:SWEep:TIME:TYPE?**

Applicability: MS46522, MS46524

Description: Sets the Sweep Time Type of the indicated channel, where:

- AUTo = The VNA controls the sweep time automatically based on the sweep range and the number of sweep points.
- MANual = Allows the user to define the sweep time for the indicated channel.

Returns the Sweep Time Type of the indicated channel.

Cmd Parameters: <char> AUTo | MANual

Query Parameters: <char> AUT | MAN

Range: NA

Default: AUT

Syntax Example: **:SENS1:SWE:TIM:TYP AUT**  
**:SENS1:SWE:TIM:TYP?**

```
:SENSe{1-16}:SWEep:TYPE <char>
:SENSe{1-16}:SWEep:TYPE?
```

Description: Sets the sweep type, where the available sweep types are:

- LINear = Frequency-based linear sweep
- LOGarithmic = Frequency-based logarithmic sweep
- FSEGMENT = Segment-based sweep with frequency-based segments
- ISEGMENT = Index-based sweep with frequency-based segments
- POWer = Power-based sweep with either power-based sweep with a CW frequency, or power-based sweep with swept-frequency

Returns the sweep type.

Cmd Parameters: <char> LINear | LOGarithmic | FSEGMENT | ISEGMENT | POWer

Query Parameters: <char> LIN | LOG | FSEGM | ISEGM | POW

Range: NA

Default Value: LIN

Syntax Example: :SENS1:SWE:TYP LIN

```
:SENS1:SWE:TYP?
```

## 5-99 :SOURce{1-16}:EFFective Subsystem

The :SOURce{1-16}:EFFective subsystem command is used to output the power level on the indicated port.

### Power Configuration Subsystems

Related power configuration and control systems are:

- “:SOURce{1-16}:POWer Subsystem” on page 5-572
- “:STATus:OPERation Subsystem” on page 5-589

**:SOURce{1-16}:EFFective:POWer:PORT{1-4}[:LEVel][:IMMEDIATE]  
[:AMPLitude]?**

**Applicability:** The use of Port 3 and/or Port 4 requires a 4-port VNA.

**Description:** Query only.

Returns the effective power level of the given port on the given channel.

**Query Parameters:** <NR3> The output parameter is in dBm.

**Range:** -30.0 to +30.0 dBm

**Default Value:** +5

**Syntax Example:** :SOUR1:EFF:POW:PORT1?

## 5-100 :SOURce{1-16}:POWer Subsystem

The :SOURce{1-16}:EFFective subsystem command is used to output the power level on the indicated port. Power sweep is not supported when multiple source mode is active for MS465xx instruments.

### Power Configuration Subsystems

Related power configuration and control systems are:

- “:SOURce{1-16}:POWER Subsystem” on page 5-572
- “:STATus:OPERation Subsystem” on page 5-589

**:SOURce{1-16}:POWer <char>**

**:SOURce{1-16}:POWer?**

Applicability: MS46121, MS46122, MS46131, MS46322

For MS46522B and MS46524B power control commands, see  
“:SOURce{1-16}:POWER:PORT{1-4}[:LEVel][:IMMediate][:AMPlitude] <NRf>”  
on page 5-583

Description: Sets the power level for the given channel.

Returns the power level for the given channel.

HIGH = High power level

LOW = Low power level

Cmd Parameters: <char> HIGH | LOW

Query Parameters: <char>

Range: NA

Default Value: HIGH

Syntax Example: :SOUR1:POW HIGH

:SOUR1:POW?

**:SOURce{1-16}:ISEGMENT{1-100}:POWer <char>**

**:SOURce{1-16}:ISEGMENT{1-100}:POWer?**

Applicability: MS46121, MS46122, MS46131, MS46322

Description: Sets the power level for the specified index-based segment specified on the channel.

Returns the power level for the specified index-based segment on the channel

HIGH = High power level

LOW = Low power level

Cmd Parameters: HIGH | LOW

Query Output: <char>

Range: NA

Default: NA

Syntax Example: :SOUR1:ISEGMENT1:POW HIGH

:SOUR1:ISEGMENT1:POW?

**:SOURce{1-16}:FSEGMe nt{1-100}:POWe r <char>**  
**:SOURce{1-16}:FSEGMe nt{1-100}:POWe r?**

Applicability: MS46121, MS46122, MS46131, MS46322

Description: Sets the power level for the specified frequency based segment on the channel.

Returns the power level for the specified frequency based segment on the channel

HIGH = High power level

LOW = Low power level

Cmd Parameters: HIGH |LOW

Query Output : <char>

Range: NA

Default: NA

Syntax Example: :SOUR1:FSEGM1:POW HIGH

:SOUR1:FSEGM1:POW?

## 5-101 :SOURce{1-16}:POWer Subsystem

The :SOURce{1-16}:POWer subsystem commands are used to configure and control port power types, attenuation types and levels, power coupling, calibration, and correction data for the indicated channel and port.

### Power Configuration Subsystems

Related power configuration and control systems are:

- “[:SOURce{1-16}:EFFective Subsystem](#)” on page 5-571
- “[:STATus:OPEration Subsystem](#)” on page 5-589

**:SOURce{1-16}:POWer:HFIDelity[:STATE] <char>**  
**:SOURce{1-16}:POWer:HFIDelity[:STATE]?**

Applicability: MS46522 or MS46524 with Option 20, 40, or 43

Description: Turns high fidelity on/off on the given channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :SOUR1:POW:HFID 1

:SOUR1:POW:HFID?

**:SOURce{1-16}:POWer:PORT:COUPLE <char>**  
**:SOURce{1-16}:POWer:PORT:COUPLE?**

Applicability: MS46522, MS46524

Description: Turns port power coupling on/off on the given channel.

Returns the port power coupling on/off state on the given channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 1

Syntax Example: :SOUR1:POW:PORT:COUP ON

:SOUR1:POW:PORT:COUP?

**:SOURce{1-16}:POWer:PORT{1-4}:CORRection:COLLect**

Applicability: MS46522, MS46524

The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Performs a flat power correction calibration for the indicated channel and port, and returns the calibration result. The command returns status where:

- 0 = Calibration Passed
- 1 = Calibration Failed
- 2 = Calibration Aborted

No query.

For port number definitions, see [Table 5-1](#).

**Table 5-1.** Port Number Definitions

Port Number	Definition
1	Port1 (2- and 4-port system)
2	Port2 (2- and 4-port system)
3	Port3 (4-port system)
4	Port4 (4-port system)

Cmd Parameters: <NR1> 0 | 1 | 2

Range: NA

Default Value: NA

Syntax Example: **:SOUR1:POW:PORT1:CORR:COLL**

**:SOURce{1-16}:POWer:PORT{1-4}:CORRection:DATA <block>****:SOURce{1-16}:POWer:PORT{1-4}:CORRection:DATA?**

Applicability: MS46522, MS46524

The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Inputs the flat power correction data for the indicated channel and port.

Returns the flat power correction data of the indicated channel and port.

For port definitions, see [Table 5-1 on page 5-575](#).

Cmd Parameters: <block> data formatted as XML. See definition of “<block> or <arbitrary block>” [on page 2-10](#).

Query Parameters: <block> data formatted as XML. See definition of “<block> or <arbitrary block>” [on page 2-10](#).

Range: NA

Default Value: NA

Syntax Example: **:SOUR1:POW:PORT1:CORR:DATA <block>**  
**:SOUR1:POW:PORT1:CORR:DATA?**

```
:SOURce{1-16}:POWeR:PORT{1-4}:CORRection:TARGet <NRf>
:SOURce{1-16}:POWeR:PORT{1-4}:CORRection:TARGet?
```

Applicability: MS46522, MS46524

The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the power level target for the flat power correction calibration on the indicated channel and port.

Returns the power level target for the flat power correction calibration on the indicated channel and port.

For port definitions, see [Table 5-1 on page 5-575](#).

Cmd Parameters: <NRf> The input parameter is in dB.

Query Parameters: <NR3> The output parameter is in dB.

Range: MPNF

Default Value: 0.000000E+000

Syntax Example: :SOUR1:POW:PORT1:CORR:TARG 3.0  
:SOUR1:POW:PORT1:CORR:TARG?

```
:SOURce{1-16}:POWeR:PORT{1-4}:CORRection[:STATe] <char>
:SOURce{1-16}:POWeR:PORT{1-4}:CORRection[:STATe]?
```

Applicability: MS46522, MS46524

The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Turn on/off flat power correction for the indicated channel and port.

Returns the on/off status of flat power correction for the indicated channel and port.

For port definitions, see [Table 5-1 on page 5-575](#).

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :SOUR1:POW:PORT1:CORR ON  
:SOUR1:POW:PORT1:CORR?

**:SOURce{1-16}:POWer:PORT{1-4}:LINEar:CORRection:COLLect**

Applicability: MS46522, MS46524

The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Performs a power linearity correction calibration for the indicated channel and port, and returns the calibration result. Returns the calibration completion status where:

- 0 = Calibration Passed
- 1 = Calibration Failed
- 2 = Calibration Aborted
- No query.

For port definitions, see [Table 5-1 on page 5-575](#).

Cmd Parameters: <NR1> 0 | 1 | 2

Range: NA

Default Value: NA

Syntax Example: :SOUR1:POW:PORT1:LIN:CORR:COLL

**:SOURce{1-16}:POWer:PORT{1-4}:LINEar:CORRection:DATA <block>****:SOURce{1-16}:POWer:PORT{1-4}:LINEar:CORRection:DATA?**

Applicability: MS46522, MS46524

The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Inputs the power sweep linearity calibration data for the indicated channel.

No query. the power sweep linearity calibration data of the indicated channel and port.

For port definitions, see [Table 5-1 on page 5-575](#).

Cmd Parameters: <block> data formatted as XML. See definition of “[<block> or <arbitrary block>](#)” [on page 2-10](#).

Query Parameters: <block> data formatted as XML. See definition of “[<block> or <arbitrary block>](#)” [on page 2-10](#).

Range: NA

Default Value: NA

Syntax Example: :SOUR1:POW:PORT1:LIN:CORR:DATA <block>

:SOUR1:POW:PORT1:LIN:CORR:DATA?

**:SOURce{1-16}:POWeR:PORT{1-4}:LINear:CORRection:POWeR:STAR?**

Applicability: MS46522, MS46524

The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Query only.

Returns the power sweep start power target for the linear power calibration on the indicated channel and port.

For port definitions, see [Table 5-1 on page 5-575](#).

Cmd Parameters: NA

Query Parameters: <NR3> The output parameter is in dBm.

Range: MPNF

Default Value: -2.000000E+001 dBm

Syntax Example: :SOUR1:POW:PORT1:LIN:CORR:POW:STAR?

**:SOURce{1-16}:POWeR:PORT{1-4}:LINear:CORRection:POWeR:STOP?**

Applicability: MS46522, MS46524

The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Query only.

Returns the power sweep stop power target for the linear power calibration on the indicated channel and port.

For port definitions, see [Table 5-1 on page 5-575](#).

Cmd Parameters: <NR3> The output parameter is in dBm.

Range: NA

Default Value: +5 dBm

Syntax Example: :SOUR1:POW:PORT1:LIN:CORR:POW:STOP?

```
:SOURce{1-16}:POWer:PORT{1-4}:LINEar:CORRection[:STATe] <char>
:SOURce{1-16}:POWer:PORT{1-4}:LINEar:CORRection[:STATe]?
```

Applicability: MS46522, MS46524

The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Turns on/off the power sweep linear calibration for the indicated channel and port.

Returns the on/off status of the power sweep linear calibrations for the indicated channel and port.

For port definitions, see [Table 5-1 on page 5-575](#)

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :SOUR1:POW:PORT1:LIN:CORR 1  
:SOUR1:POW:PORT1:LIN:CORR?

```
:SOURce{1-16}:POWer:PORT{1-4}:LINEar:POWer:EFFECTive:STAR?
```

Applicability: MS46522, MS46524

The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Query only.

Returns the power sweep effective start power of the indicated port on the indicated channel.

For port definitions, see [Table 5-1 on page 5-575](#).

Query Parameters: <NR3> The output parameter is in dBm.

Range: MPNF

Default Value: +5 dBm

Syntax Example: :SOUR1:POW:PORT1:LIN:POW:EFF:STAR?

```
:SOURce{1-16}:POWer:PORT{1-4}:LINEar:POWer:EFFECTive:STOP?
```

Applicability: MS46522, MS46524

The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Query only.

Returns the power sweep effective stop power of the indicated port on the indicated channel.

For port definitions, see [Table 5-1 on page 5-575](#).

Query Parameters: <NR3> The output parameter is in dBm.

Range: MPNF

Default Value: +5 dBm

Syntax Example: :SOUR1:POW:PORT1:LIN:POW:EFF:STOP?

```
:SOURce{1-16}:POWeR:PORT{1-4}:LINear:POWeR:OFFSet <NRf>
:SOURce{1-16}:POWeR:PORT{1-4}:LINear:POWeR:OFFSet?
```

Applicability: MS46522, MS46524

The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the power sweep offset power on the indicated port on the indicated channel.

Returns the power sweep offset power of the indicated port on the indicated channel.

For port definitions, see [Table 5-1 on page 5-575](#).

Cmd Parameters: <NRf> The input parameter is in dB.

Query Parameters: <NR3> The output parameter is in dB.

Range: -1E2 to 1E2 dB

Default Value: 0.000000E+000

Syntax Example: :SOUR1:POW:PORT1:LIN:POW:OFFS 1.2E1

```
:SOUR1:POW:PORT1:LIN:POW:OFFS?
```

```
:SOURce{1-16}:POWeR:PORT{1-4}:LINear:POWeR:POINT <NRf>
```

```
:SOURce{1-16}:POWeR:PORT{1-4}:LINear:POWeR:POINT?
```

Applicability: MS46522, MS46524

The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the power sweep number of points on the indicated port on the indicated channel.

Returns the power sweep number of points of the indicated port on the indicated channel.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR1> The output parameter is an integer.

Range: 0 to 60

Default Value: 50

Syntax Example: :SOUR1:POW:PORT1:LIN:POW:POIN 10E0

```
:SOUR1:POW:PORT1:LIN:POW:POIN?
```

```
:SOURce{1-16}:POWeR:PORT{1-4}:LINear:POWeR:STAR <NRf>
```

```
:SOURce{1-16}:POWeR:PORT{1-4}:LINear:POWeR:STAR?
```

Applicability: MS46522, MS46524

The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the power sweep start power on the indicated port on the indicated channel.

Returns the power sweep start power of the indicated port on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in dBm.

Query Parameters: <NR3> The output parameter is in dBm.

Range: -3E1 to 2.99E1 dBm

Default Value: +5 dBm

Syntax Example: :SOUR1:POW:PORT1:LIN:POW:STAR 2.10E1

```
:SOUR1:POW:PORT1:LIN:POW:STAR?
```

**:SOURce{1-16}:POWer:PORT{1-4}:LINEar:POWer:STEP?**

Applicability: MS46522, MS46524

The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Query only.

Returns the power sweep step size of the indicated port on the indicated channel.

Query Parameters: <NR3> The output parameter is in dB.

Range: Power step is a calculated value based on the start and stop power levels divided by the number of points in the active channel.

Default Value: NA

Syntax Example: :SOUR1:POW:PORT1:LIN:POW:STEP?

**:SOURce{1-16}:POWer:PORT{1-4}:LINEar:POWer:STOP <NRf>****:SOURce{1-16}:POWer:PORT{1-4}:LINEar:POWer:STOP?**

Applicability: MS46522, MS46524

The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the power sweep stop power on the indicated port on the indicated channel.

Returns the power sweep stop power of the indicated port on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in dBm.

Query Parameters: <NR3> The output parameter is in dBm.

Range: -2.99E1 to 3E1 dBm

Default Value: +5 dBm

Syntax Example: :SOUR1:POW:PORT1:LIN:POW:STOP 2.5E1

:SOUR1:POW:PORT1:LIN:POW:STOP?

**:SOURce{1-16}:POWer:PORT{1-4}:LINEar:SINGle:POWer:EFFective:VALue?**

Applicability: MS46522, MS46524

The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Query only.

Returns the power sweep effective single power value of the indicated port on the indicated channel.

Query Parameters: <NR3> The output parameter is in dBm.

Range: -20 dBm to +5 dBm

Default Value: NA

Syntax Example: :SOUR1:POW:PORT1:LIN:SING:POW:EFF:VAL?

```
:SOURce{1-16}:POWeR:PORT{1-4}:LINear:SINGle:POWeR:VALue <NRf>
:SOURce{1-16}:POWeR:PORT{1-4}:LINear:SINGle:POWeR:VALue?
```

Applicability: MS46522, MS46524

The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Sets the power sweep single power value on the indicated port on the indicated channel.

Returns the power sweep single power value of the indicated port on the indicated channel.

Cmd Parameters: <NRf> The input parameter is in dBm.

Query Parameters: <NR3> The output parameter is in dBm.

Range: -3E1 to 3E1

Default Value: +5 dBm

Syntax Example: :SOUR1:POW:PORT1:LIN:SING:POW:VAL 1.0E1

```
:SOUR1:POW:PORT1:LIN:SING:POW:VAL?
```

```
:SOURce{1-16}:POWeR:PORT{1-4}:LINear:SINGle:POWeR[:STATe] <char>
:SOURce{1-16}:POWeR:PORT{1-4}:LINear:SINGle:POWeR[:STATe]?
```

Applicability: MS46522, MS46524

The use of Port 3 and/or Port 4 requires a 4-port VNA.

Description: Turns on/off the power sweep single power mode on the indicated port on the indicated channel.

Returns on/off state of the power sweep single power mode of the indicated port on the indicated channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :SOUR1:POW:PORT1:LIN:SING:POW 1

```
:SOUR1:POW:PORT1:LIN:SING:POW?
```

```
:SOURce{1-16}:POWer:PORT{1-4}[:LEVel][:IMMediate][:AMPLitude] <NRf>
:SOURce{1-16}:POWer:PORT{1-4}[:LEVel][:IMMediate][:AMPLitude]?
```

Applicability: MS46522, MS46524

The use of Port 3 and/or Port 4 requires a 4-port VNA.

For the MS46121, MS46122, MS46131, and MS46322 power control command, see  
“[:SOURce{1-16}:POWer <char>](#)” on page 5-572

Description: Sets the power level of the given port.

Returns the power level of the given port.

Cmd Parameters: <NRf> The input parameter is in dBm.

Query Parameters: <NR3> The output parameter is in dBm.

Range: -3E1 to 1.5E1

Default Value: 0 dBm

Syntax Example: :SOUR1:POW:PORT1 3.0E0  
:SOUR1:POW:PORT1?

## 5-102 :SOURce{1-16}:M131 Subsystem

The :SOURce{1-16}:M131 subsystem commands are used to configure and control MS46131A, ME7868A, and ME7869A modes.

```
:SOURce{1-16}:M131:DYNamic:IFGain[:STATE] <char>
:SOURce{1-16}:M131:DYNamic:IFGain[:STATE]?
```

Applicability: MS46131, ME7868A, ME7869A

Description: Turns dynamic IF gain mode on/off on the given channel.

Returns dynamic IF gain mode of the given channel.

Dynamic IF Gain Ranging Mode cannot be changed if an RF calibration is in progress or if a calibration is already applied in the specified channel. If the command is sent while an RF calibration is in progress, or after a calibration is completed, then the error message “Cannot set Dynamic IF gain mode while in a calibration or after a calibration.” will be returned.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :SOUR1:M131:DYN:IFG 1  
:SOUR1:M131:DYN:IFG?

```
:SOURce{1-16}:M131:HIGH:ISOLation:MODE <char>
:SOURce{1-16}:M131:HIGH:ISOLation:MODE?
```

Applicability: MS46131, ME7868A, ME7869A

Description: Sets the high isolation mode of the given channel. Command only applicable when two MS46131A units are connected and are 2-port operation enabled (i.e., Option 012, 025, 050, 100).

High Isolation Mode cannot be changed if an RF calibration is in progress or if a calibration is already applied in the specified channel. If the High Isolation Mode command is sent while an RF calibration is in progress, or after a calibration is completed, then the error message Cannot set High Isolation Mode while in a calibration or after a calibration will be returned.

Returns the high isolation mode of the given channel. Query only applicable when two MS46131A units are connected and are 2-port operation enabled (i.e., Option 012, 025, 050, 100).

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 1

Syntax Example: :SOUR1:M131:HIGH:ISOL:MODE 1  
:SOUR1:M131:HIGH:ISOL:MODE?

**:SYSTem:M131:IFRanging:GAIN[:STATE] <char>**

**:SYSTem:M131:IFRanging:GAIN[:STATE]?**

Applicability: ME7868A, ME7869A

Will only work appropriately if two or more of the MS46131A units have PhaseLync (Option 012, 025, 050, 100) enabled.

Description: Sets the IF Gain Ranging on/off.

Returns the IF Gain Ranging mode.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :SYST:M131:IFR:GAIN ON

:SYST:M131:IFR:GAIN?

**:SOURce{1-16}:M131:PARallel:SWEep[:STATE] <char>**

**:SOURce{1-16}:M131:PARallel:SWEep[:STATE]?**

Applicability: MS46131, ME7869A

Will only work appropriately if there are two or more MS46131A units connected and if the specified channel has no trace with response set as transmissive (i.e., S12, S21). If any of these conditions are violated then an error will be generated. The user can see the error message by sending the SCPI query syst:err?

Description: Sets parallel sweep state on the specified channel.

Returns the parallel sweep state of the specified channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :SOUR1:M131:PAR:SWE ON

:SOUR1:M131:PAR:SWE?

```
:SOURce{1-16}:M131:PHASe:COMPensation[:STATe] <char>
```

```
:SOURce{1-16}:M131:PHASe:COMPensation[:STATe]?
```

Applicability: ME7868A, ME7869A

Will only work appropriately if two or more of the MS46131A units all have PhaseLync (Option 012, 025, 050, 100) connected.

Description: Sets phase compensation state on the specified channel.

Returns the phase compensation state of the specified channel.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: 1

Syntax Example: :SOUR1:M131:PHAS:COMP ON

```
:SOUR1:M131:PHAS:COMP?
```

```
:SOURce{1-16}:M131:PHASe:COMPensation:CORRection:TRIGger <char>
```

Applicability: ME7868A, ME7869A

Will only work appropriately if two or more of the MS46131A units all have PhaseLync (Option 012, 025, 050, 100) connected.

Description: Triggers phase compensation cal on the specified channel.

No query.

Cmd Parameters: NA

Query Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SOUR1:M131:PHAS:COMP:CORR:TRIG

```
:SOURce{1-16}:M131:PHASe:COMPensation:INTegration:PERiod <char>
:SOURce{1-16}:M131:PHASe:COMPensation:INTegration:PERiod?
```

Applicability: ME7868A, ME7869A

Will only work appropriately if two or more of the MS46131A units have PhaseLync (Option 012, 025, 050, 100) enabled.

Description: Sets the mode of the integration period for the specified channel. A larger value results in smaller static phase fluctuations, but slows the response time to external disturbances (e.g., interconnect cable movement).

None: no averaging

Medium: 3 running averages

High: 10 running averages

Returns the mode of the integration period for the specified channel.

Cmd Parameters: <char> NONE | MED | HIGH

Query Parameters: NA

Query Output: <char> NONE | MED | HIGH

Range: NA

Default Value: MED

Syntax Example: :SOUR1:M131:PHAS:COMP:INT:PER NONE

```
:SOUR1:M131:PHAS:COMP:INT:PER?
```

```
:SOURce{1-16}:M131:PHASe:COMPensation:POInT:POSition <char>
```

```
:SOURce{1-16}:M131:PHASe:COMPensation:POInT:POSition?
```

Applicability: ME7868A, ME7869A

Will only work appropriately if two or more of the MS46131A units have PhaseLync (Option 012, 025, 050, 100) connected.

Description: Sets the point position to be used in phase compensation for the specified channel.

Returns the point position to be used in phase compensation for the specified channel.

Cmd Parameters: <char> FIRSt | LAST

Query Parameters: NA

Query Output: <char> FIRSt | LAST

Range: NA

Default Value: FIRSt

Syntax Example: :SOUR1:M131:PHAS:COMP:POIN:POS LAST

```
:SOUR1:M131:PHAS:COMP:POIN:POS?
```

```
:SOURce{1-16}:M131:PHASe:COMPensation:SAMPLE <NRf>
:SOURce{1-16}:M131:PHASe:COMPensation:SAMPLE?
```

Applicability: ME7868A, ME7869A with PhaseLync option (Options 012, 025, 050, or 100)

Description: Sets the number of compensation samples to be used in phase compensation for the specified channel.

Returns the number of compensation samples to be used in phase compensation for the specified channel.

Cmd Parameters: <NRf>

Query Parameters: NA

Query Output: <NR1>

Range: 0 – 501

Default Value: 22

Syntax Example: :SOUR1:M131:PHAS:COMP:SAMP 501

```
:SOUR1:M131:PHAS:COMP:SAMP?
```

```
:SOURce{1-16}:M131:POWeR:PORT{1-4} <char>
:SOURce{1-16}:M131:POWeR:PORT{1-4}?
```

Applicability: MS46131, ME7868A, ME7869A

Description: Sets the power level for the specified port on the given channel for MS46131A instruments.

Returns the power level for the specified port on the given channel for MS46131A instruments.

Cmd Parameters: <char> HIGH | LOW | OFF

Query Parameters: <char> HIGH | LOW | OFF

Range: NA

Default Value: HIGH

Syntax Example: :SOUR1:M131:POW:PORT1 OFF

```
:SOUR1:M131:POW:PORT1?
```

## 5-103 :STATus:OPERation Subsystem

The :STATus:OPERation subsystem commands are used to set and output values from the Operation Status Enable Register (refer to [Figure 2-3, “Status Register Structure” on page 2-28](#)).

### :STATUS:OPERATION:CONDition?

Description: Query only.

Returns the value of the operation status condition register.

Query Parameters: <NR1> The output parameter is an integer.

Range: 0 to 32767

Default Value: 0

Syntax Example: :STAT:OPER:COND?

### :STATUS:OPERATION:ENABLE <NRf>

### :STATUS:OPERATION:ENABLE?

Description: Sets the value of the operation status enable register.

Returns the value of the operation status enable register.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR1> The output parameter is an integer.

Range: 0 to 65535

Default Value: NA

Syntax Example: :STAT:OPER:ENAB 1

:STAT:OPER:ENAB?

### :STATUS:OPERATION:NTRansition <NRf>

### :STATUS:OPERATION:NTRansition?

Description: Sets the value of the negative transition filter of the operation status register.

Returns the value of the negative transition filter of the operation status register.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR1> The output parameter is an integer.

Range: 0 to 65535

Default Value: NA

Syntax Example: :STAT:OPER:NTR 1

:STAT:OPER:NTR?

**:STATus:OPERation:PTRansition <NRf>**

**:STATus:OPERation:PTRansition?**

Description: Sets the value of the positive transition filter of the operation status register.

Returns the value of the positive transition filter of the operation status register.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR1> The output parameter is an integer.

Range: 0 to 65535

Default Value: NA

Syntax Example: **:STAT:OPER:PTR 1**

**:STAT:OPER:PTR?**

**:STATus:OPERation[:EVENT]?**

Description: Query only.

Returns the value of the operation status event register.

Query Parameters: <NR1> The output parameter is an integer.

Range: 0 to 32767

Default Value: 0

Syntax Example: **:STAT:OPER?**

## 5-104 :STATus:QUESTIONable Subsystem

The :STATus:QUESTIONable subsystem commands are used to set and output values from the Questionable Status Enable Register.

### :STATUS:QUESTIONable:CONDITION?

Description: Query only.

Returns the value of the questionable status condition register.

Query Parameters: <NR1> The output parameter is an integer.

Range: 0 to 32767

Default Value: 0

Syntax Example: :STAT:QUES:COND?

### :STATUS:QUESTIONable:ENABLE <NRf>

### :STATUS:QUESTIONable:ENABLE?

Description: Sets the value of the questionable status enable register.

Returns the value of the questionable status enable register.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR1> The output parameter is an integer.

Range: 0 to 65535

Default Value: NA

Syntax Example: :STAT:QUES:ENAB 1

:STAT:QUES:ENAB?

### :STATUS:QUESTIONable:LIMit:CONDITION?

Description: Query only.

Returns the value of the questionable limit status condition register.

Query Parameters: <NR1> The output parameter is an integer.

Range: 0 to 32767

Default Value: 0

Syntax Example: :STAT:QUES:LIM:COND?

### :STATUS:QUESTIONable:LIMit:ENABLE <NRf>

### :STATUS:QUESTIONable:LIMit:ENABLE?

Description: Sets the value of the questionable limit status enable register.

Returns the value of the questionable limit status enable register.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR1> The output parameter is an integer.

Range: 0 to 65535

Default Value: NA

Syntax Example: :STAT:QUES:LIM:ENAB 1

:STAT:QUES:LIM:ENAB?

**:STATus:QUESTIONable:LIMit:NTRansition <NRf>**

**:STATus:QUESTIONable:LIMit:NTRansition?**

Description: Sets the value of the negative transition filter of the questionable limit status register.

Returns the value of the negative transition filter of the questionable limit status register.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR1> The output parameter is an integer.

Range: 0 to 65535

Default Value: NA

Syntax Example: **:STAT:QUES:LIM:NTR 1**

**:STAT:QUES:LIM:NTR?**

**:STATus:QUESTIONable:LIMit:PTRansition <NRf>**

**:STATus:QUESTIONable:LIMit:PTRansition?**

Description: Sets the value of the positive transition filter of the questionable limit status register.

Returns the value of the positive transition filter of the questionable limit status register.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR1> The output parameter is an integer.

Range: 0 to 65535

Default Value: 0

Syntax Example: **:STAT:QUES:LIM:PTR 1**

**:STAT:QUES:LIM:PTR?**

**:STATus:QUESTIONable:LIMit[:EVENT]?**

Description: Query only.

Returns the value of the questionable limit status event register.

Query Parameters: <NR1> The output parameter is an integer.

Range: 0 to 32767

Default Value: 0

Syntax Example: **:STAT:QUES:LIM?**

**:STATus:QUESTIONable:NTRansition <NRf>**

**:STATus:QUESTIONable:NTRansition?**

Description: Sets the value of the negative transition filter of the questionable status register.

Returns the value of the negative transition filter of the questionable status register.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR1> The output parameter is an integer.

Range: 0 to 65535

Default Value: NA

Syntax Example: **:STAT:QUES:NTR 1**

**:STAT:QUES:NTR?**

**:STATUS:QUESTIONable:PTRansition <NRf>**  
**:STATUS:QUESTIONable:PTRansition?**

Description: Sets the value of the positive transition filter of the questionable status register.

Returns the value of the positive transition filter of the questionable status register.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR1> The output parameter is an integer.

Range: 0 to 65535

Default Value: NA

Syntax Example: :STAT:QUES:PTR 1  
:STAT:QUES:PTR?

**:STATUS:QUESTIONable[:EVENT] ?**

Description: Query only.

Returns the value of the questionable status event register.

Query Parameters: <NR1> The output parameter is an integer.

Range: 0 to 32767

Default Value: 0

Syntax Example: :STAT:QUES?

## 5-105 :SYSTem Subsystem

The :SYSTEM subsystem commands configure and control various system-level instrument settings.

- :SYSTEM:COMMunicate commands are used to configure and control network communications.
- :SYSTEM:ERRor commands are used to query and clear the contents of the Error Queue.
- :SYSTEM:IFCalibration commands set the system IF calibration.
- :SYSTEM:M131 commands are used to configure MS46131A systems.
- :SYSTEM:POINT sets the maximum number of measurement points, and re-boots the instrument if required.
- :SYSTEM:PORT returns the number of ports on the instrument.
- :SYSTEM:PRESet commands configure the instrument preset/reset configuration, and if required, set the preset/reset configuration file.

### :SYSTem:COMMunicate:TCPIP:ADDRess?

Description: Query only.

Returns the IP address of the Ethernet interface. The setting cannot be changed by the user.

Query Parameters: <char> The output parameter can be any combination of numbers and letters.

Range: 0.0.0.0 to 255.255.255.255

Default Value: Varies with installation.

Syntax Example: :SYST:COMM:TCPIP:ADDR?

### :SYSTem:COMMunicate:TCPIP:GATE?

Description: Query only.

Returns the default Gateway of the Ethernet interface. The setting cannot be changed by the user.

Query Parameters: <char> The output parameter can be any combination of numbers and letters.

Range: 0.0.0.0 to 255.255.255.255

Default Value: Varies with installation.

Syntax Example: :SYST:COMM:TCPIP:GATE?

### :SYSTem:COMMunicate:TCPIP:HDW?

Description: Query only.

Returns the MAC hardware address of the Ethernet interface. The setting cannot be changed by the user.

Query Parameters: <char> The output parameter can be any combination of numbers and letters.

Range: NA

Default Value: Varies with individual instrument.

Syntax Example: :SYST:COMM:TCPIP:HDW?

**:SYSTem:COMMUnicatE:TCPIP:MASK?**

Description: Query only.

Returns the instrument TCP/IP port address. The setting cannot be changed by the user.

Query Parameters: <NR1> The output parameter is an integer.

Range: 0.0.0.0 to 255.255.255.255

Default Value: Varies with installation.

Syntax Example: :SYST:COMM:TCPIP:MASK?

**:SYSTem:COMMUnicatE:TCPIP:PORT <NRf>****:SYSTem:COMMUnicatE:TCPIP:PORT?**

Description: Enters the instrument TCP/IP port address. This value is user definable. The recommended TCP/IP address should be greater than or equal to 5001.

Returns the instrument TCP/IP port address.

Cmd Parameters: <NRf> The input parameter is a unitless number.

Query Parameters: <NR1> The output parameter is an integer.

Range: MPNI

Default Value: 5001

Syntax Example: :SYST:COMM:TCPIP:PORT 5001

:SYST:COMM:TCPIP:PORT?

**:SYSTem:ERRor:CLEar**

Description: Clears the contents of the error queue.

No query.

Cmd Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SYST:ERR:CLE

**:SYSTem:ERRor:COUNT?**

Description: Query only.

Returns the number of errors in the error queue.

Query Parameters: <NR1> The output parameter is an integer.

Range: 0 to 100

Default Value: 0

Syntax Example: :SYST:ERR:COUN?

**:SYSTem:ERRor:QUEue?**

Description: Query only.

Returns the contents of the error queue.

Query Parameters: <block> See definition of “<block> or <arbitrary block>” on page 2-10.

Range: NA

Default Value: NA

Syntax Example: :SYST:ERR:QUE?

**:SYSTem:ERRor[:NEXT]?**

Description: Query only.

Removes and returns the oldest error in the error queue.

Query Parameters: <ASCII> See definition of “<ASCII> or <Arbitrary ASCII>” on page 2-10.

Range: NA

Default Value: No Error

Syntax Example: :SYST:ERR?

**:SYSTem:FACTorycal:DELeTe**

Description: Deletes the factory calibration.

No query.

Range: NA

Default Value: NA

Syntax Example: :SYST:FACT:DEL

**:SYSTem:FACTorycal:RECover**

Description: Recovers the factory calibration.

No query.

Range: NA

Default Value: NA

Syntax Example: :SYST:FACT:REC

**:SYSTem:HOLD:RF[:STATE] <char>****:SYSTem:HOLD:RF[:STATE]?**

Description: Sets the RF on/off state in Hold.

Returns the RF on/off state in Hold

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: <char> 1 | 0

Range: NA

Default Value: NA

Syntax Example: :SYST:HOLD:RF ON

:SYST:HOLD:RF?

**:SYSTem:IFCalibration:TRIGger**

Description: Triggers an IF calibration.

No query.

Cmd Parameters: NA

Syntax Example: :SYST:IFC:TRIG

**:SYSTem:M131:CONNected:DEVices?**

Applicability: MS46131, ME7868A, ME7869A

Description: Query only.

Returns number of MS46131A series instruments connected.

Cmd Parameters: NA

Query Parameters: NA

Query Output: <NR1>

Range: NA

Default Value: Depends on the number of devices connected.

Syntax Example: :SYST:M131:CONN:DEV?

**:SYSTem:M131:CONFIG:INFO?**

Applicability: MS46131, ME7868A, ME7869A

Description: Query only.

Returns configuration information of all devices connected. Each instrument is represented by [External Serial Number], Port[Port Number], [BASE or SATELLITE].

Cmd Parameters: NA

Query Parameters: NA

Query Output: <char> [External Serial Num], Port PORT1...4, [BASE | SATELLITE]  
one line per attached MS46131A-series instrument

Range: NA

Default Value: NA

Syntax Example: :SYST:M131:CONF:INFO?

```
:SYST: M131: CONF: BASE  
:SYST: M131: CONF: BASE?
```

Applicability: MS46131, ME7868A, ME7869A

Description: Sets Base unit when multiple MS46131A instruments are connected. If one port is set to Base unit, all other ports are unset.

Returns Base unit when multiple MS46131A instruments are connected.

Cmd Parameters: <char> [External Serial Number of new Base unit]

Query Parameters: NA

Query Output: <char> [External Serial Number of current Base unit]

Range: NA

Default Value: Depends on the devices connected.

Syntax Example: :SYST: M131: CONF: BASE 234

```
:SYST: M131: CONF: BASE?
```

```
:SYST: M131: DEFine: PORT{1-4} <char>  
:SYST: M131: DEFine: PORT{1-4}?
```

Applicability: MS46131, ME7868A, ME7869A

Description: Sets temporary association between External Serial Number and Port Number, Actual assignment happens with call to :SYST: M131: DEF: PORT: VALIDate?.

Returns External Serial Number associated with given Port Number.

Cmd Parameters: <char> [External Serial Number]

Query Parameters: NA

Query Output: <char> [External Serial Number]

Range: NA

Default Value: Depends on the number of devices connected.

Syntax Example: :SYST: M131: DEF: PORT1 1234

```
:SYST: M131: DEF: PORT1?
```

**:SYSTem:M131:DEFInE:PORT:VALIDate?**

Applicability: MS46131, ME7868A, ME7869A

Description: Query only.

Validates current associations between External Serial Numbers and Port Numbers, and applies them if validation passes. Otherwise an error message is returned.

To pass validation, all External Serial numbers must be assigned to different ports.

Cmd Parameters: NA

Query Parameters: NA

Query Output: <char> Success message if validation passed, or error message if validation failed.

Range: NA

Default Value: NA

Syntax Example: :SYST:M131:DEF:PORT:VAL?

**:SYSTem:M131:SELFtest:PORT{1-4}?**

Applicability: MS46131, ME7868A, ME7869A

Description: Query only.

Runs self-test on the device representing the specified port and indicates the status with one of the following values:

- 0 indicates that self test passed.
- Any number greater than 0 indicates the number of the self test that failed.
- 144 indicates that the self test was aborted.

Cmd Parameters: NA

Query Parameters: NA

Query Output: <NR1>

Range: NA

Default Value: NA

Syntax Example: :SYST:M131:SELF:PORT1?

**:SYSTem:M131:SELFtest:PORT{1-4}:RESult?**

Applicability: MS46131, ME7868A, ME7869A

Description: Query only.

Returns the self-test results for the device representing the specified port.

Cmd Parameters: NA

Query Parameters: NA

Query Output: <arbitrary block>

Range: NA

Default Value: NA

Syntax Example: :SYST:M131:SELF:PORT1:RES?

**:SYSTem:M131:TEMPerature:PORT{1-4}?**

Applicability: MS46131, ME7868A, ME7869A

Description: Query only.

Returns the temperature of the system given the port number.

Cmd Parameters: NA

Query Parameters: NA

Query Output: <NRf> The output is in °C.

Range: NA

Default Value: NA

Syntax Example: :SYST:M131:TEMP:PORT1?

**:SYSTem:M131:TRIGger:DELay <NRf>****:SYSTem:M131:TRIGger:DELay?**

Applicability: MS46131, ME7868A, ME7869A

Description: Sets the trigger delay for MS46131A instruments.

Returns the trigger delay for MS46131A instruments.

Cmd Parameters: <NRf>

Query Parameters: NA

Query Output: <NR3>

Range: 0 to 5,000,000 µs

Default Value: 0

Syntax Example: :SYST:M131:TRIG:DEL 20

:SYST:M131:TRIG:DEL?

**:SYSTem:M131:TRIGger:EDGE <char>****:SYSTem:M131:TRIGger:EDGE?**

Applicability: MS46131, ME7868A, ME7869A

Description: Sets the trigger edge type for MS46131A instruments.

Returns the trigger edge type for MS46131A instruments.

Cmd Parameters: <char> RISing | FALLing

Query Parameters: <char> RIS | FALL

Range: NA

Default Value: RIS

Syntax Example: :SYST:M131:TRIG:EDG FALL

:SYST:M131:TRIG:EDG?

**:SYSTem:MATh:INTERtrace:EQUation:SNP:FILE{1-16} <string>**  
**:SYSTem:MATh:INTERtrace:EQUation:SNP:FILE{1-16}?**

Description: Sets the SNP filename 1 (or 2 or 3 or ... or 16) for Equation Editor, to be shared between all channels.

Returns the SNP filename 1 (or 2 or 3 or ... or 16) for Equation Editor, to be shared between all channels.

Cmd Parameters: <string> 'c:\myfile1.s1p' | 'c:\myfile2.s2p' | 'c:\myfile3.s3p' | 'c:\myfile4.s4p'

Query Parameters: NA

Query Output: <string> 'c:\myfile1.s1p' | 'c:\myfile2.s2p' | 'c:\myfile3.s3p' | 'c:\myfile4.s4p'

Range: NA

Default Value: NA

Syntax Example: **:SYST:MATh:INTE:EQU:SNP:FIL7 'c:\myfile.s2p'**  
**:SYST:MATh:INTE:EQU:SNP:FIL7?**

**:SYSTem:POINT:MAXimum?**

Description: Query only.

Returns the maximum number of points the instrument can measure in a sweep.

The Maximum Instrument Points (MIP) is:

- For models MS46122, MS46131, MS46322: 16,001
- For models MS46121, MS46522, MS46524: 20,001

Query Parameters: <char> 16001/20001

Range: NA

Default Value: 16001/20001

Syntax Example: **:SYST:POIN:MAX?**

**:SYSTem:PORT:COUNT?**

Description: Query only.

Returns the number of instrument test ports.

Cmd Parameters: NA

Query Parameters: 2-Port VNAs:

2

4-Port VNAs:

4

Range: NA

Default Value: NA

Syntax Example: **:SYST:PORT:COUN?**

**:SYSTem:POWerup:FILE <string>**  
**:SYSTem:POWerup:FILE?**

Description: Sets the file path for the .cha power up configuration file to use on power up.

Returns the file path of the .cha used for power up configuration.

Cmd Parameters: <string> Filename and path in the form: 'x:\directory\filename.cha' where x:\directory\filename.cha must exist. See definition of "[“<string>” on page 2-10](#)".

Query Parameters: <char> Filename and path in the form: x:\directory\filename.cha

Range: NA

Default Value: NA

Syntax Example: **:SYST:POW:FIL 'C:\filepath\filename.cha'**  
**:SYST:POW:FIL?**

**:SYSTem:POWerup:TYPE <char>**  
**:SYSTem:POWerup:TYPE?**

Description: Sets the power up instrument state to reset, last, or user-defined. If USER is selected, a previously saved user-defined power up configuration file must exist and be stored on the instrument hard disk drive.

Returns the power-up instrument state as reset, last, or user-defined.

Cmd Parameters: <char> RESET | LAST | USER

Query Parameters: <char> RESET | LAST | USER

Range: NA

Default Value: LAST

Syntax Example: **:SYST:POW:TYP RESET**  
**:SYST:POW:TYP?**

**:SYSTem:PRESet**

Description: No query.

Performs an instrument preset. The instrument returns to its factory as-shipped configuration, typically displaying four traces set to:

- Trace 1 (Tr1) set to Log Magnitude.
- Trace 2 (Tr2) set to Log Magnitude.
- Trace 3 (Tr3) set to Log Magnitude.
- Trace 4 (Tr4) set to Log Magnitude.
- Clears any user-defined segmented limit lines.

Cmd Parameters: NA

Query Parameters: NA

Range: NA

Default Value: NA

Syntax Example: **:SYST:PRES**

**:SYSTem:PRESet:FILE <string>**

**:SYSTem:PRESet:FILE?**

Description: Sets the file path for the .cha file to use on preset.

Returns the file path for the .cha file used for preset.

Cmd Parameters: <string> The directory and filename in the form: 'x:\directory\filename.cha' where x:\directory\filename.cha must exist. See definition of "["<string>"](#) on page 2-10.

Query Parameters: <char> Filename and path in the form: x:\directory\filename.cha

Range: NA

Default Value: NA

Syntax Example: **:SYST:PRES:FIL 'C:\directory\filename.cha'**

**:SYST:PRES:FIL?:SYSTem:PRESet:TYPE <char>**

**:SYSTem:PRESet:TYPE?**

Description: Sets the preset type to RESET, RESET0 (reset zero), or USER. The different preset types provide the following functions:

- USER – If the USER type is selected, a previously saved user-defined preset file must exist on the instrument disk drive. Once set, issuing a :SYSTem:PRESet command returns the instrument to the user-defined configuration. The user-defined preset file name is set using the :SYSTem:PRESet:FILE command.
- RESET – If the RESET type is selected, issuing a :SYSTem:PRESet command returns the instrument to the factory as-shipped configuration.
- RESET0 – If the RESET0 type is selected, issuing the :SYSTem:PRESet command clears the instrument memory of all settings, configurations and returns the instrument to a factory as-shipped state. Functionally, issuing a :SYSTem:PRESet:TYPE RESET0 command followed by a :SYSTem:PRESet command is the same as issuing a :SYSTem:PRESet:ZERO command. Note that the RESET0 parameter does not delete any files. See the :SYSTem:PRESet:ZERO command description for a complete listing of included and excluded preset elements.

The preset type can also be configured by from the front panel by:

- Navigating to MAIN | System | SYSTEM | Setup | SETUP | Preset Setup | PRESET SETUP
- On the PRESET SETUP menu, selecting either Default, Default 0, or Saved Setup.
- If Saved Setup is to be used, the user-defined configuration file must be saved to the instrument solid-state drive. Then select the Select Saved Setup File button and select the desired user-defined preset file. Then select Saved Setup.

A preset can also be executed from the front panel by doing one of the following actions:

- Pressing the front panel **Preset key**.
- Selecting the ICON TOOLBAR | Preset icon.
- Selecting the MENU BAR | Utilities | Preset command.

Returns the selected preset type.

Cmd Parameters: <char> RESET | RESET0 | USER

Query Parameters: <char> RESET | RESET0 | USER

Range: NA

Default Value: RESET

Syntax Example: **:SYST:PRES:TYP RESET**

**:SYST:PRES:TYP?**

**:SYSTem:PRESet:ZERO**

Description: No query.

Performs an instrument preset (same as :SYST:PRES). The instrument returns to its factory as-shipped configuration, typically displaying four traces set to:

- Trace 1 (Tr1) set to Log Magnitude.
- Trace 2 (Tr2) set to Log Magnitude.
- Trace 3 (Tr3) set to Log Magnitude.
- Trace 4 (Tr4) set to Log Magnitude.
- Clears any user-defined segmented limit lines.
- Clears any user-defined calibration kits.

Cmd Parameters: NA

Query Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :SYST:PRES:ZER

**:SYSTem:OP82:TYPE?**

Applicability: MS46522 with Option 82

Description: Query only.

On an Option -082 system, returns the Option -082 personality identifier where:

- 0 = Type E
- 1 = Type E+
- 9999 = Unidentified (Not an Option -082 system)

Cmd Parameters: NA

Query Output: <NR1> 0 | 1 | 9999

Range: NA

Default Value: NA

Syntax Example: :SYST:OP82:TYP?

## 5-106 :TRIGger[:SEQUence] Subsystem

The :TRIGger subsystem commands configure the trigger parameters and then control the trigger operation for internal, manual, and external trigger.

External trigger is not supported if there are multiple MS46131A units acting as Base units. This will happen if:

- The system is in parallel Return Loss sweep mode.
- The sync option (Option 012) is not enabled on one of the two MS46131A units in an ME7868A 2-port VNA.
- The sync option (Option 025, 050, 100) is not enabled on one of the MS46131A units in a ME7869A multi-port VNA.
- There is no sync cable connected between MS46131A units in a 2-port ME7868A or ME7869A configuration.

**:TRIGger[:SEQUence]:EXTernal:TYPE <char>**

**:TRIGger[:SEQUence]:EXTernal:TYPE?**

Applicability: MS46122, MS46131, ME7868A, ME7869A, MS46322, MS46522, MS46524

Description: Sets the type of trigger that will be associated with the external trigger.

Returns the type of trigger that will be associated with the external trigger.

Cmd Parameters: <char> ALL | POINT

Query Parameters: <char> ALL | POIN

Range: NA

Default Value: ALL

Syntax Example: :TRIG:EXT:TYP POIN

:TRIG:EXT:TYP?

**:TRIGger[:SEQUence]:SOURce <char>**

**:TRIGger[:SEQUence]:SOURce?**

Applicability: MS46122, MS46131, ME7868A, ME7869A, MS46322, MS46522, MS46524

Description: Sets the source of sweep/measurement triggering where the following options are available:

- INTERNAL = The triggering source is internal.
- EXTERNAL = The triggering source is from the rear panel external trigger port.

Returns the source of the sweep/measurement triggering.

Cmd Parameters: <char> INTERNAL | EXTERNAL

Query Parameters: <char> INT | EXT

Range: NA

Default Value: INT

Syntax Example: :TRIG:SOUR INT

:TRIG:SOUR?

**:TRIGger[:SEQUence][:IMMediate][:REmote]**

Description: Triggers a continuous sweep from the remote interface. During the sweep, command execution continues and does not pause. The operation of this command depends on the settings of the :SENSe{1-16}:HOLD:FUNCTION?, :TRIGger[:SEQUence][:REmote]:SINGle, and :TRIGger[:SEQUence][:IMMediate][:REmote] commands, described below.

No query.

See the following subsystems for additional information:

- “:SENSe{1-16}:ABORtal Subsystem” on page 5-319
- “:SENSe{1-16}:ISEGMent Subsystem” on page 5-538

**:SENSe{1-16}:HOLD:FUNC CONT and :TRIG**

```
:SENSe{1-16}:HOLD:FUNCTION CONTinuous
// Sweep State = The sweep is sweeping continuously
// Command Execution = The parser is ready for a command right away.

:TRIGger[:SEQUence][:IMMediate][:REmote]
// Sweep State = The sweep restarts and sweeps continuously. When the sweep gets to the end of the sweep, it continues to sweep. There is NO STATUS information that the end of the sweep has been reached.

// Command Execution = The parser is ready for a command right away
```

**:SENSe{1-16}:HOLD:FUNC CONT and :TRIG:SING**

```
:SENSe{1-16}:HOLD:FUNCTION CONTinuous
// Sweep State = The sweep is sweeping continuously.
// Command Execution = The parser is ready for a command right away

:TRIGger[:SEQUence][:REmote]:SINGLE
// Sweep State = The sweep restarts and sweeps continuously. When the sweep gets to the end of the sweep, it sets the end of sweep status bit and continues to sweep.

// Command Execution = Further execution is blocked until the end of the sweep.

// Command Execution resumes when the sweep has reached the end of the sweep.
```

**:SENSe{1-16}:HOLD:FUNC HOLD and :TRIG**

```
:SENSe{1-16}:HOLD:FUNCTION HOLD
// Sweep State = The sweep is stopped.
// Command Execution = The parser is ready for a command right away

:TRIGger[:SEQUence][:IMMediate][:REmote]
// Sweep State = The command has no effect. The sweep is stopped.
// Command Execution = The parser is ready for a command right away
```

**:SENSe{1-16}:HOLD:FUNC HOLD and :TRIG:SING**

```
:SENSe{1-16}:HOLD:FUNCTION HOLD
// Sweep State = The sweep is stopped
// Command Execution = The parser is ready for a command right
// away.

:TRIGger[:SEQUence][:REmote]:SINGle
// Sweep State = The sweep restarts and sweeps until the end of the
// sweep, at which point it sets the end of sweep status bit and
// stops.

// Command Execution = Further execution is blocked until the end
// of the sweep.

// Command Execution resumes when the sweep has reached the end of
// the sweep.
```

**:SENSe{1-16}:HOLD:FUNC SING and :TRIG**

```
:SENSe{1-16}:HOLD:FUNCTION SINGLE
// Sweep State = The sweep does one complete sweep, goes into hold
// and stops.

// Command Execution = The parser is ready for a command.

:TRIGger[:SEQUence][:IMMEDIATE][:REmote]
// Sweep State = The command has no effect. The sweep is stopped.
// Command Execution = The parser is ready for a command.
```

**:SENSe{1-16}:HOLD:FUNC SING and :TRIG:SING**

```
:SENSe{1-16}:HOLD:FUNCTION SINGLE
// Sweep State = The sweep does one complete sweep, goes into hold
// and stops.

// Command Execution = The parser is ready for a command right
// away.

:TRIGger[:SEQUence][:REmote]:SINGle
// Sweep State = The sweep restarts and sweeps until the end of the
// sweep, at which point it sets the end of sweep status bit and
// stops.

// Command Execution = Further execution is blocked until the end
// of the sweep.

// Command Execution resumes when the sweep has reached the end of
// the sweep.
```

Cmd Parameters: NA

Query Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :TRIG

```
:TRIGger[:SEQUence]:OUT[:STATE] <char>
:TRIGger[:SEQUence]:OUT[:STATE]?
```

Applicability: MS46131, ME7868A, ME7869A

Description: Turns on/off the trigger out.

Returns the state of the trigger out.

**Trigger Output** output signals are available through the rear panel of the instrument.

Cmd Parameters: <char> 1 | 0 | ON | OFF

Query Parameters: NA

Query Output: <char> 1 | 0

Range: NA

Default Value: 0

Syntax Example: :TRIG:OUT ON

```
:TRIG:OUT?
```

### :TRIGger[:SEQUence][:REMote]:SINGLE

Description: Triggers a single sweep with synchronization from the remote interface. During the sweep, command execution pauses until the sweep is complete. The operation of this command is modified by the instrument state set by the :SENSe{1-16}:HOLD:FUNCTION command. No query.

See the following subsystems for additional information:

- “:SENSe{1-16}:ABORtal Subsystem” on page 5-319
- “:SENSe{1-16}:ISEGMent Subsystem” on page 5-538

#### Variable Operation

The operation of this command depends on the settings of the

:SENSe{1-16}:HOLD:FUNCTION <char>,  
:TRIGger[:SEQUence][:REMote]:SINGLE, and  
:TRIGger[:SEQUence][:IMMediate][:REMote] commands. Each setting combination is described in the sections below.

#### :SENSe{1-16}:HOLD:FUNC CONT and :TRIG

```
:SENSe{1-16}:HOLD:FUNCTION CONTinuous
// Sweep State = The sweep is sweeping continuously
// Command Execution = The parser is ready for a command right away.
:TRIGger[:SEQUence][:IMMediate][:REMote]
// Sweep State = The sweep restarts and sweeps continuously. When the sweep gets to the end of the sweep, it continues to sweep. There is NO STATUS information that the end of the sweep has been reached.
// Command Execution = The parser is ready for a command right away
```

**:SENSe{1-16}:HOLD:FUNC CONT and :TRIG:SING**

```
:SENSe{1-16}:HOLD:FUNCTION CONTinuous
// Sweep State = The sweep is sweeping continuously.
// Command Execution = The parser is ready for a command right away
:TRIGger[:SEQUence][:REmote]:SINGle
// Sweep State = The sweep restarts and sweeps continuously. When
the sweep gets to the end of the sweep, it sets the end of sweep
status bit and continues to sweep.
// Command Execution = Further execution is blocked until the end
of the sweep.
// Command Execution resumes when the sweep has reached the end of
the sweep.
```

**:SENSe{1-16}:HOLD:FUNC HOLD and :TRIG**

```
:SENSe{1-16}:HOLD:FUNCTION HOLD
// Sweep State = The sweep is stopped.
// Command Execution = The parser is ready for a command right away
:TRIGger[:SEQUence][:IMMEDIATE][:REmote]
// Sweep State = The command has no effect. The sweep is stopped.
// Command Execution = The parser is ready for a command right away
```

**:SENSe{1-16}:HOLD:FUNC HOLD and :TRIG:SING**

```
:SENSe{1-16}:HOLD:FUNCTION HOLD
// Sweep State = The sweep is stopped
// Command Execution = The parser is ready for a command right
away.
:TRIGger[:SEQUence][:REmote]:SINGle
// Sweep State = The sweep restarts and sweeps until the end of the
sweep, at which point it sets the end of sweep status bit and
stops.
// Command Execution = Further execution is blocked until the end
of the sweep.
// Command Execution resumes when the sweep has reached the end of
the sweep.
```

**:SENSe{1-16}:HOLD:FUNC SING and :TRIG**

```
:SENSe{1-16}:HOLD:FUNCTION SINGLE
// Sweep State = The sweep does one complete sweep, goes into hold
and stops.
// Command Execution = The parser is ready for a command.
:TRIGger[:SEQUence][:IMMEDIATE][:REmote]
// Sweep State = The command has no effect. The sweep is stopped.
// Command Execution = The parser is ready for a command.
```

**:SENSe{1-16}:HOLD:FUNC SING and :TRIG:SING**

```
:SENSe{1-16}:HOLD:FUNCTION SINGLE
// Sweep State = The sweep does one complete sweep, goes into hold
and stops.

// Command Execution = The parser is ready for a command right
away.

:TRIGger[:SEQUence] [:REMrte]:SINGLE
// Sweep State = The sweep restarts and sweeps until the end of the
sweep, at which point it sets the end of sweep status bit and
stops.

// Command Execution = Further execution is blocked until the end
of the sweep.

// Command Execution resumes when the sweep has reached the end of
the sweep.
```

Cmd Parameters: NA

Query Parameters: NA

Range: NA

Default Value: NA

Syntax Example: :TRIG:SING

# **Appendix A — Third Party Programming and Driver Support**

For more information on program and driver support not listed elsewhere in this manual, contact Anritsu at [www.anritsu.com/contact-us](http://www.anritsu.com/contact-us)



# Appendix B — Agilent ENA Programming Emulation

## B-1 Introduction

This chapter provides a list of Agilent ENA programming commands supported through software emulation. Agilent ENA commands are only available in Agilent mode, which is activated through the use of the command :CONFigure:BASE:MODE AGILent. Any commands that fall in both the ENA and ShockLine command bases will be interpreted according to the current SCPI mode. To return to Anritsu mode, use the command :CONFigure:BASE:MODE ANRitsu.

For more detailed information about using these commands, refer to the appropriate ENA Programming Manual. Refer to [Chapter 2, “Programming the ShockLine Series VNA”](#) for definitions of parameters and other notations, and for a summary of command notational conventions used throughout this manual. For help with transitioning existing test software from Agilent ENA to Anritsu ShockLine VNAs, contact Anritsu at [www.anritsu.com/contact-us](http://www.anritsu.com/contact-us).

## B-2 ENA Command Listing

```
:CALCulate{1-160}[:PARAmeter{1-16}]:DEFIne<string>{S11|S21|S31|S41|S12|S22|S32|S42|S13  
|S23|S33|S43|S14|S24|S34|S44|A|B|C|D|R1|R2|R3|R4|Aux1|AUX2}  
:CALCulate{1-160}[:PARAmeter{1-16}]:DEFIne?  
:CALCulate{1-160}[:PARAmeter{1-16}]:SELect  
:CALCulate{1-160}[:PARAmeter]:COUNT <numeric>  
:CALCulate{1-160}[:PARAmeter]:COUNT?  
:CALCulate{1-160}[:SElected]:DATA:FDATA <numeric1>,... ,<numericNOP*2>  
:CALCulate{1-160}[:SElected]:DATA:FDATA?  
:CALCulate{1-160}[:TRACe{1-16}]:DATA:FDATA<numeric1>,... ,<numeric NOP*2>  
:CALCulate{1-160}[:TRACe{1-16}]:DATA:FDATA?  
:CALCulate{1-160}[:SESelected]:DATA:FMEMory <numeric1>,... ,<numeric NOP*2>  
:CALCulate{1-160}[:SESelected]:DATA:FMEMory?  
:CALCulate{1-160}[:TRACe{1-16}]:DATA:FMEMory<numeric1>,... ,<numeric NOP*2>  
:CALCulate{1-160}[:TRACe{1-16}]:DATA:FMEMory?  
:CALCulate{1-160}[:SESelected]:DATA:SDATA <numeric 1>,... ,<numericNOP*2>  
:CALCulate{1-160}[:SESelected]:DATA:SDATA?  
:CALCulate{1-160}[:TRACe{1-16}]:DATA:SDATA<numeric1>,... ,<numeric NOP*2>  
:CALCulate{1-160}[:TRACe{1-16}]:DATA:SDATA?  
:CALCulate{1-160}[:SESelected]:DATA:SMEMemory <numeric1>,... ,<numeric NOP*2>  
:CALCulate{1-160}[:SESelected]:DATA:SMEMemory?  
:CALCulate{1-160}[:TRACe{1-16}]:DATA:SMEMemory<numeric1>,... ,<numeric NOP*2>  
:CALCulate{1-160}[:TRACe{1-16}]:DATA:SMEMemory?  
:CALCulate{1-160}[:SESelected]:FILTer[:GATE]:TIME:CENTER <numeric>  
:CALCulate{1-160}[:SESelected]:FILTter[:GATE]:TIME:CENTER?  
:CALCulate{1-160}[:TRACe{1-16}]:FILTter[:GATE]:TIME:CENTER<numeric>  
:CALCulate{1-160}[:TRACe{1-16}]:FILTter[:GATE]:TIME:CENTER?  
:CALCulate{1-160}[:SESelected]:FILTter[:GATE]:TIME:SPAN <numeric>  
:CALCulate{1-160}[:SESelected]:FILTter[:GATE]:TIME:SPAN?  
:CALCulate{1-160}[:TRACe{1-16}]:FILTter[:GATE]:TIME:SPAN<numeric>  
:CALCulate{1-160}[:TRACe{1-16}]:FILTter[:GATE]:TIME:SPAN?  
:CALCulate{1-160}[:SESelected]:FILTter[:GATE]:TIME:STARt <numeric>  
:CALCulate{1-160}[:SESelected]:FILTter[:GATE]:TIME:STARt?  
:CALCulate{1-160}[:TRACe{1-16}]:FILTter[:GATE]:TIME:STARt<numeric>  
:CALCulate{1-160}[:TRACe{1-16}]:FILTter[:GATE]:TIME:STARt?
```

```

:CALCulate{1-160}[:SElected]:FILTer[:GATE]:TIME:STATE{ON|OFF|1|0}
:CALCulate{1-160}[:SElected]:FILTer[:GATE]:TIME:STATE?
:CALCulate{1-160}:TRACe{1-16}:FILTer[:GATE]:TIME:STATE{ON|OFF|1|0}
:CALCulate{1-160}:TRACe{1-16}:FILTer[:GATE]:TIME:STATE?
:CALCulate{1-160}[:SElected]:FILTer[:GATE]:TIME:STOP <numeric>
:CALCulate{1-160}[:SElected]:FILTer[:GATE]:TIME:STOP?
:CALCulate{1-160}:TRACe{1-16}:FILTer[:GATE]:TIME:STOP<numeric>
:CALCulate{1-160}:TRACe{1-16}:FILTer[:GATE]:TIME:STOP?
:CALCulate{1-160}[:SElected]:FILTer[:GATE]:TIME[:TYPE]{BPASS|NOTCh}
:CALCulate{1-160}[:SElected]:FILTer[:GATE]:TIME[:TYPE]?
:CALCulate{1-160}:TRACe{1-16}:FILTer[:GATE]:TIME[:TYPE]{BPASS|NOTCh}
:CALCulate{1-160}:TRACe{1-16}:FILTer[:GATE]:TIME[:TYPE]?
:CALCulate{1-160}[:SElected]:LIMit:DISPlay[:STATE] {ON|OFF|1|0}
:CALCulate{1-160}[:SElected]:LIMit:DISPlay[:STATE]?
:CALCulate{1-160}:TRACe{1-16}:LIMit:DISPlay[:STATE]{ON|OFF|1|0}
:CALCulate{1-160}:TRACe{1-16}:LIMit:DISPlay[:STATE]?
:CALCulate{1-160}[:SElected]:LIMit:FAIL?
:CALCulate{1-160}:TRACe{1-16}:LIMit:FAIL?
:CALCulate{1-160}[:SElected]:LIMit:REPort[:DATA]?
:CALCulate{1-160}:TRACe{1-16}:LIMit:REPort[:DATA]?
:CALCulate{1-160}[:SElected]:LIMit:REPort:POInts?
:CALCulate{1-160}:TRACe{1-16}:LIMit:REPort:POInts?
:CALCulate{1-160}[:SElected]:LIMit[:STATE] {ON|OFF|1|0}
:CALCulate{1-160}[:SElected]:LIMit[:STATE]?
:CALCulate{1-160}:TRACe{1-16}:LIMit[:STATE] {ON|OFF|1|0}
:CALCulate{1-160}:TRACe{1-16}:LIMit[:STATE]?
:CALCulate{1-160}[:SElected]:MARKer{1-10}:ACTivate
:CALCulate{1-160}:TRACe{1-16}:MARKer{1-10}:ACTivate
:CALCulate{1-160}[:SElected]:MARKer:COUPLE {ON|OFF|1|0}
:CALCulate{1-160}[:SElected]:MARKer:COUPLE?
:CALCulate{1-160}:TRACe{1-16}:MARKer:COUPLE {ON|OFF|1|0}
:CALCulate{1-160}:TRACe{1-16}:MARKer:COUPLE?
:CALCulate{1-160}[:SElected]:MARKer{1-10}:DISCrete{ON|OFF|1|0}
:CALCulate{1-160}[:SElected]:MARKer{1-10}:DISCrete?
:CALCulate{1-160}:TRACe{1-16}:MARKer{1-10}:DISCrete{ON|OFF|1|0}
:CALCulate{1-160}:TRACe{1-16}:MARKer{1-10}:DISCrete?
:CALCulate{1-160}[:SElected]:MARKer:FUNCTION:DOMain:COUPLE{ON|OFF|1|0}
:CALCulate{1-160}[:SElected]:MARKer:FUNCTION:DOMain:COUPLE?
:CALCulate{1-160}:TRACe{1-16}:MARKer:FUNCTION:DOMain:COUPLE{ON|OFF|1|0}
:CALCulate{1-160}:TRACe{1-16}:MARKer:FUNCTION:DOMain:COUPLE?
:CALCulate{1-160}[:SElected]:MARKer:FUNCTION:DOMain:STARt<numeric>
:CALCulate{1-160}[:SElected]:MARKer:FUNCTION:DOMain:STARt?
:CALCulate{1-160}:TRACe{1-16}:MARKer:FUNCTION:DOMain:STARt<numeric>
:CALCulate{1-160}:TRACe{1-16}:MARKer:FUNCTION:DOMain:STARt?
:CALCulate{1-160}[:SElected]:MARKer:FUNCTION:DOMain[:STATE]{ON|OFF|1|0}
:CALCulate{1-160}[:SElected]:MARKer:FUNCTION:DOMain[:STATE]?
:CALCulate{1-160}:TRACe{1-16}:MARKer:FUNCTION:DOMain[:STATE]{ON|OFF|1|0}
:CALCulate{1-160}:TRACe{1-16}:MARKer:FUNCTION:DOMain[:STATE]?
:CALCulate{1-160}[:SElected]:MARKer:FUNCTION:DOMain:STOP <numeric>
:CALCulate{1-160}[:SElected]:MARKer:FUNCTION:DOMain:STOP?
:CALCulate{1-160}:TRACe{1-16}:MARKer:FUNCTION:DOMain:STOP <numeric>
:CALCulate{1-160}:TRACe{1-16}:MARKer:FUNCTION:DOMain:STOP?
:CALCulate{1-160}[:SElected]:MARKer{1-10}:FUNCTION:PEXCursion <numeric>
:CALCulate{1-160}[:SElected]:MARKer{1-10}:FUNCTION:PEXCursion?
:CALCulate{1-160}:TRACe{1-16}:MARKer{1-10}:FUNCTION:PEXCursion <numeric>
:CALCulate{1-160}:TRACe{1-16}:MARKer{1-10}:FUNCTION:PEXCursion?

```

```

:CALCulate{1-160}[:SElected]:MARKer{1-10}:FUNCTION:PPOLarity{POSitive|NEGative|BOTH}
:CALCulate{1-160}[:SESelected]:MARKer{1-10}:FUNCTION:PPOLarity?
:CALCulate{1-160}:TRACe{1-16}:MARKer{1-10}:FUNCTION:PPOLarity
{POSitive|NEGative|BOTH}
:CALCulate{1-160}:TRACe{1-16}:MARKer{1-10}:FUNCTION:PPOLarity?
:CALCulate{1-160}[:SESelected]:MARKer{1-10}:FUNCTION:TARGet<numeric>
:CALCulate{1-160}[:SESelected]:MARKer{1-10}:FUNCTION:TARGet?
:CALCulate{1-160}:TRACe{1-16}:MARKer{1-10}:FUNCTION:TARGet<numeric>
:CALCulate{1-160}:TRACe{1-16}:MARKer{1-10}:FUNCTION:TARGet?
:CALCulate{1-160}[:SESelected]:MARKer{1-10}:FUNCTION:TRACKing{ON|OFF|1|0}
:CALCulate{1-160}[:SESelected]:MARKer{1-10}:FUNCTION:TRACKing?
:CALCulate{1-160}:TRACe{1-16}:MARKer{1-10}:FUNCTION:TRACKing {ON|OFF|1|0}
:CALCulate{1-160}:TRACe{1-16}:MARKer{1-10}:FUNCTION:TRACKing?
:CALCulate{1-160}[:SESelected]:MARKer{1-10}:FUNCTION:TTRansition
{POSitive|NEGative|BOTH}
:CALCulate{1-160}[:SESelected]:MARKer{1-10}:FUNCTION:TTRansition?
:CALCulate{1-160}:TRACe{1-16}:MARKer{1-10}:FUNCTION:TTRansition
{POSitive|NEGative|BOTH}
:CALCulate{1-160}:TRACe{1-16}:MARKer{1-10}:FUNCTION:TTRansition?
:CALCulate{1-160}[:SESelected]:MARKer{1-10}[:STATE] {ON|OFF|1|0}
:CALCulate{1-160}[:SESelected]:MARKer{1-10}[:STATE]?
:CALCulate{1-160}:TRACe{1-16}:MARKer{1-10}[:STATE]{ON|OFF|1|0}
:CALCulate{1-160}:TRACe{1-16}:MARKer{1-10}[:STATE]?
:CALCulate{1-160}[:SESelected]:MARKer{1-10}:X <numeric>
:CALCulate{1-160}[:SESelected]:MARKer{1-10}:X?
:CALCulate{1-160}:TRACe{1-16}:MARKer{1-10}:X <numeric>
:CALCulate{1-160}:TRACe{1-16}:MARKer{1-10}:X?
:CALCulate{1-160}[:SESelected]:MARKer{1-10}:Y?
:CALCulate{1-160}:TRACe{1-16}:MARKer{1-10}:Y?
:CALCulate{1-160}[:SESelected]:MARKer:REFERENCE[:STATE]{ON|OFF|1|0}
:CALCulate{1-160}[:SESelected]:MARKer:REFERENCE[:STATE]?
:CALCulate{1-160}:TRACe(Tr):MARKer:REFERENCE[:STATE]{ON|OFF|1|0}
:CALCulate{1-160}:TRACe(Tr):MARKer:REFERENCE[:STATE]?
:CALCulate{1-160}[:SESelected]:MATH:FUNCTION {NORMal|SUBTract|DIVide|ADD|MULTiply}
:CALCulate{1-160}[:SESelected]:MATH:FUNCTION?
:CALCulate{1-160}:TRACe{1-16}:MATH:FUNCTION {NORMal|SUBTract|DIVide|ADD|MULTiply}
:CALCulate{1-160}:TRACe{1-16}:MATH:FUNCTION?
:CALCulate{1-160}[:SESelected]:MATH:MEMorize
:CALCulate{1-160}:TRACe{1-16}:MATH:MEMorize
:CALCulate{1-160}[:SESelected]:MSTATistics:DATA?
:CALCulate{1-160}:TRACe{1-16}:MSTATistics:DATA?
:CALCulate{1-160}[:SESelected]:MSTATistics[:STATE] {ON|OFF|1|0}
:CALCulate{1-160}[:SESelected]:MSTATistics[:STATE]?
:CALCulate{1-160}:TRACe{1-16}:MSTATistics[:STATE] {ON|OFF|1|0}
:CALCulate{1-160}:TRACe{1-16}:MSTATistics[:STATE]?
:CALCulate{1-160}:TRACe{1-16}:SMOothing:APERture <numeric>
:CALCulate{1-160}:TRACe{1-16}:SMOothing:APERture?
:CALCulate{1-160}[:SESelected]:SMOothing[:STATE] {ON|OFF|1|0}
:CALCulate{1-160}[:SESelected]:SMOothing[:STATE]?
:CALCulate{1-160}:TRACe{1-16}:SMOothing[:STATE] {ON|OFF|1|0}
:CALCulate{1-160}:TRACe{1-16}:SMOothing[:STATE]?
:CALCulate{1-160}[:SESelected]:TRANSform:TIME:CENTer <numeric>
:CALCulate{1-160}[:SESelected]:TRANSform:TIME:CENTer?
:CALCulate{1-160}:TRACe{1-16}:TRANSform:TIME:CENTer<numeric>
:CALCulate{1-160}:TRACe{1-16}:TRANSform:TIME:CENTer?
:CALCulate{1-160}[:SESelected]:TRANSform:TIME:IMPulse:WIDTh?

```

```
:CALCulate{1-160}:TRACe{1-16}:TRANSform:TIME:IMPulse:WIDTh?
:CALCulate{1-160}[:SElected]:TRANSform:TIME:KBESsel <numeric>
:CALCulate{1-160}[:SElected]:TRANSform:TIME:KBESsel?
:CALCulate{1-160}:TRACe{1-16}:TRANSform:TIME:KBESsel<numeric>
:CALCulate{1-160}:TRACe{1-16}:TRANSform:TIME:KBESsel?
:CALCulate{1-160}[:SElected]:TRANSform:TIME:SPAN <numeric>
:CALCulate{1-160}[:SElected]:TRANSform:TIME:SPAN?
:CALCulate{1-160}:TRACe{1-16}:TRANSform:TIME:SPAN <numeric>
:CALCulate{1-160}:TRACe{1-16}:TRANSform:TIME:SPAN?
:CALCulate{1-160}[:SElected]:TRANSform:TIME:STARt <numeric>
:CALCulate{1-160}[:SElected]:TRANSform:TIME:STARt?
:CALCulate{1-160}:TRACe{1-16}:TRANSform:TIME:STARt <numeric>
:CALCulate{1-160}:TRACe{1-16}:TRANSform:TIME:STARt?
:CALCulate{1-160}[:SElected]:TRANSform:TIME:STATE {ON|OFF|1|0}
:CALCulate{1-160}[:SElected]:TRANSform:TIME:STATE?
:CALCulate{1-160}:TRACe{1-16}:TRANSform:TIME:STATE{ON|OFF|1|0}
:CALCulate{1-160}:TRACe{1-16}:TRANSform:TIME:STATE?
:CALCulate{1-160}[:SElected]:TRANSform:TIME:STIMulus{IMPulse|STEP}
:CALCulate{1-160}[:SElected]:TRANSform:TIME:STIMulus?
:CALCulate{1-160}:TRACe{1-16}:TRANSform:TIME:STIMulus{IMPulse|STEP}
:CALCulate{1-160}:TRACe{1-16}:TRANSform:TIME:STIMulus?
:CALCulate{1-160}[:SElected]:TRANSform:TIME:STOP <numeric>
:CALCulate{1-160}[:SElected]:TRANSform:TIME:STOP?
:CALCulate{1-160}:TRACe{1-16}:TRANSform:TIME:STOP <numeric>
:CALCulate{1-160}:TRACe{1-16}:TRANSform:TIME:STOP?
:CALCulate{1-160}[:SElected]:TRANSform:TIME[:TYPE] {BPASSs|LPASSs}
:CALCulate{1-160}[:SElected]:TRANSform:TIME[:TYPE]?
:CALCulate{1-160}:TRACe{1-16}:TRANSform:TIME[:TYPE]{BPASSs|LPASSs}
:CALCulate{1-160}:TRACe{1-16}:TRANSform:TIME[:TYPE]?
:DISPlay:ANNotation:FREQuency[:STATe] {ON|OFF|1|0}
:DISPlay:ANNotation:FREQuency[:STATe]?
:DISPlay:COLor{1|2}:BACK <numeric 1>,<numeric 2>,<numeric 3>
:DISPlay:COLor{1|2}:BACK?
:DISPlay:COLor{1|2}:GRATicule{1|2} <numeric 1>,<numeric2>,<numeric 3>
:DISPlay:COLor{1|2}:GRATicule{1|2}?
:DISPlay:COLor{1|2}:LIMIT{1|2} <numeric 1>,<numeric 2>,<numeric3>
:DISPlay:COLor{1|2}:LIMIT{1|2}?
:DISPlay:COLor{1|2}:RESET
:DISPlay:FSIGn {ON|OFF|1|0}
:DISPlay:FSIGn?
:DISPlay:IMAGe {NORMAL|INVert}
:DISPlay:IMAGe?
:DISPlay:SKEY[:STATe] {ON|OFF|1|0}
:DISPlay:SKEY[:STATe]?
:DISPlay:WINDOW{1-160}:MAXimize {ON|OFF|1|0}
:DISPlay:WINDOW{1-160}:MAXimize?
:DISPlay:WINDOW{1-160}:TITLE:DATA <string>
:DISPlay:WINDOW{1-160}:TITLE:DATA?
:DISPlay:WINDOW{1-160}:TITLE:STATe {ON|OFF|1|0}
:DISPlay:WINDOW{1-160}:TITLE:STATe?
:DISPlay:WINDOW{1-160}:TRACe{1-16}:MEMORY[:STATe]{ON|OFF|1|0}
:DISPlay:WINDOW{1-160}:TRACe{1-16}:MEMORY[:STATe]?
:DISPlay:WINDOW{1-160}:TRACe{1-16}:STATE {ON|OFF|1|0}
:DISPlay:WINDOW{1-160}:TRACe{1-16}:STATE?
:DISPlay:WINDOW{1-160}:TRACe{1-16}:Y[:SCALE]:PDIVision<numeric>
:DISPlay:WINDOW{1-160}:TRACe{1-16}:Y[:SCALE]:PDIVision?
```

```
:DISPLAY:WINDOW{1-160}:TRACe{1-16}:Y[:SCALE]:RLEVel<numeric>
:DISPLAY:WINDOW{1-160}:TRACe{1-16}:Y[:SCALE]:RLEVel?
:DISPLAY:WINDOW{1-160}:TRACe{1-36}:Y[:SCALE]:RPOSITION<numeric>
:DISPLAY:WINDOW{1-160}:TRACe{1-36}:Y[:SCALE]:RPOSITION?
:FORMAT:BORDer {NORMal|SWAPPed}
:FORMAT:BORDer?
:FORMAT:DATA {ASCII|REAL|REAL32}
:FORMAT:DATA?
:HCOPY:IMAGE {NORMAL|INVert}
*CLS
*ESE <numeric>
*ESE?
*ESR?
*IDN?
*OPC
*OPT?
*RST
*SRE <numeric>
*SRE?
*STB?
*TRG
*WAI
:INITiate{1-160}:CONTinuous {ON|OFF|1|0}
:INITiate{1-160}:CONTinuous?
:MMEMory:CATalog? <string 1>
:MMEMory:COPY <string 1>,<string 2>
:MMEMory:DELete <string>
:MMEMory:LOAD:CKIT{1-30} <string>
:MMEMory:LOAD:LIMit <string>
:MMEMory:MDIRectory <string>
:MMEMory:STORe:IMAGe <string>
:MMEMory:STORe:LIMit <string>
:SENSe{1-160}:AVERage:CLEAR
:SENSe{1-160}:AVERage:COUNT <numeric>
:SENSe{1-160}:AVERage:COUNT?
:SENSe{1-160}:AVERage[:STATE] {ON|OFF|1|0}
:SENSe{1-160}:AVERage[:STATE]?
:SENSe{1-160}:BANDwidth[:RESolution] <numeric>
:SENSe{1-160}:BANDwidth[:RESolution]?
:SENSe{1-160}:BWIDth[:RESolution] <numeric>
:SENSe{1-160}:BWIDth[:RESolution]?
:SENSe{1-160}:CORRection:STATE {ON|OFF|1|0}
:SENSe{1-160}:CORRection:STATE?
:SENSe{1-160}:FREQUency:CENTer <numeric>
:SENSe{1-160}:FREQUency:CENTer?
:SENSe{1-160}:FREQUency[:CW] <numeric>
:SENSe{1-160}:FREQUency[:CW]?
:SENSe{1-160}:FREQUency:FIXed <numeric>
:SENSe{1-160}:FREQUency:FIXed?
:SENSe{1-160}:FREQUency:DATA?
:SENSe{1-160}:FREQUency:SPAN <numeric>
:SENSe{1-160}:FREQUency:SPAN?
:SENSe{1-160}:FREQUency:START <numeric>
:SENSe{1-160}:FREQUency:START?
:SENSe{1-160}:FREQUency:STOP <numeric>
:SENSe{1-160}:FREQUency:STOP?
```

```
:SENSe{1-160}:SWEep:POINTs <numeric>
:SENSe{1-160}:SWEep:POINTs?
:SOURce{1-160}:POWeR:PORT{1|2|3|4}[:LEVel] [:IMMEDIATE] [:AMPLitude]<numeric>
:SOURce{1-160}:POWeR:PORT{1|2|3|4}[:LEVel] [:IMMEDIATE] [:AMPLitude]?
:SOURce{1-160}:POWeR:PORT:COUPLE {ON|OFF|1|0}
:SOURce{1-160}:POWeR:PORT:COUPLE?
:SYSTem:ERRor?
:SYSTem:PRESet
:TRIGger[:SEQUence]:SOURce {INTERNAL|EXTERNAL|MANual|BUS}
:TRIGger[:SEQUence]:SOURce?
```

# Appendix C — IVI Functions

## C-1 Introduction

**Note**

IVI software has been deprecated as of version V2022.3.2. IVI package V2022.3.2 is still included in current and future ShockLine software releases, but development has ceased and support is minimal.

Please contact Anritsu at [www.anritsu.com/contact-us](http://www.anritsu.com/contact-us) for any questions or additional support.

This document is preliminary and subject to change. For further support contact Anritsu at [www.anritsu.com/contact-us](http://www.anritsu.com/contact-us)

Anritsu ShockLine VNAs can be remotely controlled over their Ethernet connection by means of an IVI-C driver built on a binary communications protocol rather than SCPI protocols.

This chapter documents the IVI-C functions provided by the IVI-C driver. It lists functions with a description of the function and its C syntax, a description of each parameter, and error codes where applicable. For C#, Python, MATLAB usage the usage is similar.

**Note**

A C++ compiler supported by the user's version of MATLAB is required. Refer to MathWorks compatibility page at: <https://www.mathworks.com/support/compilers.html>.

The general process for control is:

- Connect to the instrument
- Configure the instrument
- Perform measurements and fetch data
- Close the connection with the instrument when done

To do this, the following conditions must be met:

- The instrument is reachable via Ethernet
- The IP address supplied to the initialize function must match the IP address of the instrument
- ShockLine IVI Service must be running on instrument
- ANVNA IVI-C driver must be installed on client/remote PC.

## Error and Status Information

Each function in the instrument driver returns a status code that indicates either success or an error condition. Your application should examine the status code from each call to an instrument driver function to determine whether an error occurred.

The general meaning of the status code is as follows:

Value	Meaning
0	Success
Non-zero	Error

Where applicable, each instrument driver function's description lists possible error codes and their meanings.

## Command Descriptions and Syntax

Each IVI command is followed by a complete descriptive listing of the command description, parameters, and output. If applicable, an example for each command, the default value, and the range information is written out at the end of the individual description.

- See [Chapter 2, “Programming the ShockLine Series VNA”, “Notational Conventions” on page 2-5](#) for definitions of parameters and notations.
- The following symbologies and parameter types are used throughout Anritsu VNA instrument programming. A subset of these are used in IVI programming on the device. Detailed descriptions of parameter types is available in [“Data Transmission Methods” on page 2-9](#) and through the links below.
  - <NR1>
  - <NR2>
  - <NR3>
  - <NRf>
  - <string>
  - <ASCII> or <Arbitrary ASCII>
  - <block> or <arbitrary block>
  - <char>
  - <char1>,<char2>
  - <char1>,<char2>,<char3>
  - <char1>,<char2>,<char3>,<char4>
  - MPND
  - MPNF
  - MPNI

## IVI-C Driver Information

The ANVNA IVI driver provides an IVI-C implementation. Any other programming languages must use wrapping methods to call the IVI-C driver.

### Driver Identification

This section provides IVI-required identity information for the ANVNA driver.

Identification Category	Description
Driver Revision	1.0
Driver Vendor	Anritsu
Driver Description	IVI driver for Anritsu ShockLine VNAs
Prefix/Component Identifier	ANVNA
Supported Models	MS46121A, MS46122A, MS46322A, MS46522B, and MS46524B are supported. IVI requires V1.1.03 or later ShockLine software.

## Functions and Attributes General Information

### Attribute Accessors

See also: “[Attributes](#)” on page C-393.

Attribute	Attribute Accessor
Get Attribute Vi Boolean	<a href="#">ANVNA_GetAttributeViBoolean</a>
Get Attribute Vi UInt32	<a href="#">ANVNA_GetAttributeViUInt32</a>
Get Attribute Vi Int32	<a href="#">ANVNA_GetAttributeViInt32</a>
Get Attribute Vi Int64	<a href="#">ANVNA_GetAttributeViInt64</a>
Get Attribute Vi Real64	<a href="#">ANVNA_GetAttributeViReal64</a>
Get Attribute Vi String	<a href="#">ANVNA_GetAttributeViString</a>
Set Attribute Vi Boolean	<a href="#">ANVNA_SetAttributeViBoolean</a>
Set Attribute Vi UInt32	<a href="#">ANVNA_SetAttributeViUInt32</a>
Set Attribute Vi Int32	<a href="#">ANVNA_SetAttributeViInt32</a>
Set Attribute Vi Int64	<a href="#">ANVNA_SetAttributeViInt64</a>
Set Attribute Vi Real64	<a href="#">ANVNA_SetAttributeViReal64</a>
Set Attribute Vi String	<a href="#">ANVNA_SetAttributeViString</a>

### Functions and Their Corresponding IVI Class

[Table C-1](#) lists Anritsu IVI functions by their IVI class and Anritsu subclass within the class.

**Table C-1.** Anritsu IVI functions by IVI class and Anritsu subclass (1 of 6)

Class	Subclass	Function Description	Function Name
Channel	Measurement	Create a Measurement Using a Channel	<a href="#">ANVNA_ChannelMeasurementCreate</a>
Channel	Measurement	Fetch Data as Complex Numbers	<a href="#">ANVNA_ChannelMeasurementFetchComplex</a>
Channel	Measurement	Fetch Data in Formatted Manner	<a href="#">ANVNA_ChannelMeasurementFetchFormatted</a>
Channel	Measurement	Fetch List of Sweep Frequencies	<a href="#">ANVNA_ChannelMeasurementFetchX</a>
Channel	Measurement	Get Channel Measurement Name	<a href="#">ANVNA_GetChannelMeasurementName</a>
Channel	Measurement	Get Response Type	<a href="#">ANVNA_ChannelMeasurementGetResponseType</a>
Channel	Measurement	Get S Parameter Port Numbers	<a href="#">ANVNA_ChannelMeasurementGetSParameter</a>
Channel	Measurement	Set S Parameter Port Numbers	<a href="#">ANVNA_ChannelMeasurementSetSParameter</a>
Channel	Measurement	Get High Fidelity Status	<a href="#">ANVNA_GetHighFidelity</a>
Channel	Measurement	Set High Fidelity Status	<a href="#">ANVNA_SetHighFidelity</a>
Channel	Misc	Trigger Sweep Asynchronously	<a href="#">ANVNA_ChannelAsynchronousTriggerSweep</a>
Channel	Misc	Get Channel Name	<a href="#">ANVNA_GetChannelName</a>
Channel	Segment	Add Segment using Center and Span Values	<a href="#">ANVNA_ChannelSegmentAddCenterSpan</a>
Channel	Segment	Add Segment using Start and Stop Values	<a href="#">ANVNA_ChannelSegmentAddStartStop</a>
Channel	Segment	Delete All Segments	<a href="#">ANVNA_ChannelSegmentDeleteAll</a>
Channel	Stimulus Range	Configure Channel using Center and Span Frequencies	<a href="#">ANVNA_ChannelStimulusRangeConfigureCenterSpan</a>
Channel	Stimulus Range	Configure Channel using Start and Stop Frequencies	<a href="#">ANVNA_ChannelStimulusRangeConfigureStartStop</a>
Channel	Sweep	Trigger Sweep	<a href="#">ANVNA_ChannelTriggerSweep</a>
System	Open/Close	Close Connection to VNA	<a href="#">ANVNA_close</a>
System	Open/Close	Initialize Connection with VNA	<a href="#">ANVNA_init</a>
System	Open/Close	Initialize Connection using Options	<a href="#">ANVNA_InitWithOptions</a>
System	State Control	Wait For Operation to Complete	<a href="#">ANVNA_SystemWaitForOperationComplete</a>

**Table C-1.** Anritsu IVI functions by IVI class and Anritsu subclass (2 of 6)

<b>Class</b>	<b>Subclass</b>	<b>Function Description</b>	<b>Function Name</b>
System	State Control	Reset VNA to predefined state	<a href="#">ANVNA_reset</a>
System	State Control	Reset VNA to predefined state with options	<a href="#">ANVNA_ResetWithDefaults</a>
System	State Control	Revision Query	<a href="#">ANVNA_revision_query</a>
System	State Control	Perform Self Test	<a href="#">ANVNA_self_test</a>
System	Status	Retrieve Error Message	<a href="#">ANVNA_error_message</a>
System	Calibration	Setup calibration type, method, and ports usage	<a href="#">ANVNA_SetupCalibration</a>
System	Calibration	Setup a manual calibration kit	<a href="#">ANVNA_SetManualCalKit</a>
System	Calibration	Setup a manual calibration	<a href="#">ANVNA_SetupManualCalibration</a>
System	Calibration	Get calibration type	<a href="#">ANVNA_GetCalibrationType</a>
System	Calibration	Get calibration method	<a href="#">ANVNA_GetCalibrationMethod</a>
System	Calibration	Get calibration line	<a href="#">ANVNA_GetCalibrationLine</a>
System	Calibration	Start Calibration	<a href="#">ANVNA_StartCalibration</a>
System	Calibration	Store measured data during calibration	<a href="#">ANVNA_CalStoreData</a>
System	Calibration	Abort calibration procedure	<a href="#">ANVNA_AbortCalibration</a>
System	Calibration	End calibration procedure	<a href="#">ANVNA_EndCalibration</a>
System	Calibration	Get calibration status (on or off)	<a href="#">ANVNA_GetCalStatus</a>
System	Calibration	Set calibration status on/off	<a href="#">ANVNA_SetCalStatus</a>
System	Calibration Kit	Is calibration active	<a href="#">ANVNA_GetCalActive</a>
System	Calibration Kit	Load calibration kit file for the specified port	<a href="#">ANVNA_LoadCalKit</a>
System	Calibration Kit	Set thru properties for the specified ports	<a href="#">ANVNA_SetThru</a>
System	Calibration Kit	Get thru properties for the specified ports	<a href="#">ANVNA_GetThru</a>
System	Calibration Kit	Set thru reciprocal on for the specified ports	<a href="#">ANVNA_SetReciprocalThru</a>
System	Calibration Kit	Is reciprocal thru on for specified ports	<a href="#">ANVNA_GetReciprocalThru</a>
	Smart Cal	Add Selected Port	<a href="#">ANVNA_AddSelectedPort</a>
	Smart Cal	Set AutoCal Device	<a href="#">ANVNA_SetAutoCalDevice</a>
	Smart Cal	Get AutoCal Device	<a href="#">ANVNA_GetAutoCalDevice</a>
	Smart Cal	Set SmartCal Device	<a href="#">ANVNA_SetSmartCalDevice</a>
	Smart Cal	Get SmartCal Cal Device	<a href="#">ANVNA_GetSmartCalDevice</a>
	Smart Cal	Set Additional True	<a href="#">ANVNA_SetAdditionalThru</a>
	Smart Cal	Add One Port Connection	<a href="#">ANVNA_AddOnePortConnection</a>
	Smart Cal	Add Two Port Connection	<a href="#">ANVNA_AddTwoPortConnection</a>
	Smart Cal	Add Three Port Connection	<a href="#">ANVNA_AddThreePortConnection</a>
	AutoCal	Add Four Port Connection	<a href="#">ANVNA_AddFourPortConnection</a>
	AutoCal	Begin Auto Cal Calibration	<a href="#">ANVNA_BeginAutoCalCalibration</a>
	AutoCal	Resume Auto Cal Calibration	<a href="#">ANVNA_ResumeAutoCalCalibration</a>
	AutoCal	End Auto Cal Calibration	<a href="#">ANVNA_EndAutoCalCalibration</a>
Marker		Get number of instrument's markers	<a href="#">ANVNA_GetMarkersCount</a>
Marker		Set marker's frequency	<a href="#">ANVNA_SetMarkerFrequency</a>
Marker		Get marker's frequency	<a href="#">ANVNA_GetMarkerFrequency</a>
Marker		Set type of search for specified marker	<a href="#">ANVNA_SetMarkerSearch</a>
Marker		Get type of search for specified marker	<a href="#">ANVNA_GetMarkerSearch</a>
Marker		Get marker's value	<a href="#">ANVNA_GetMarkerValue</a>
Marker		Turn marker on or off	<a href="#">ANVNA_SetMarkerState</a>
Marker		Get marker's state	<a href="#">ANVNA_GetMarkerState</a>
Marker		Get Marker Search Bandwidth Statistics	<a href="#">ANVNA_GetMarkerSearchBandwidthStatistics</a>
Marker		Set Marker Search Bandwidth ON OFF value	<a href="#">ANVNA_SetMarkerSearchBandwidthOnOff</a>
Marker		Get Marker Search Bandwidth ON OFF value	<a href="#">ANVNA_GetMarkerSearchBandwidthOnOff</a>
Marker		Set Marker Search Bandwidth value	<a href="#">ANVNA_SetMarkerSearchBandwidthDefinedValue</a>
Marker		Get Marker Search Bandwidth value	<a href="#">ANVNA_GetMarkerSearchBandwidthDefinedValue</a>

**Table C-1.** Anritsu IVI functions by IVI class and Anritsu subclass (3 of 6)

<b>Class</b>	<b>Subclass</b>	<b>Function Description</b>	<b>Function Name</b>
Marker		Set Marker Search Bandwidth Reference Marker type	<a href="#">ANVNA_SetMarkerSearchBandwidthReferenceType</a>
Marker		Get Marker Search Bandwidth Reference Marker type	<a href="#">ANVNA_GetMarkerSearchBandwidthReferenceType</a>
Marker		Set Marker Search Bandwidth Reference value	<a href="#">ANVNA_SetMarkerSearchBandwidthReferenceValue</a>
Marker		Get Marker Search Bandwidth Reference value	<a href="#">ANVNA_GetMarkerSearchBandwidthReferenceValue</a>
Marker		Set Marker Search Bandwidth start position	<a href="#">ANVNA_SetMarkerSearchBandwidthStartPosition</a>
Marker		Get Marker Search Bandwidth start position	<a href="#">ANVNA_GetMarkerSearchBandwidthStartPosition</a>
Marker		Set Marker Search Bandwidth Shape Factor ON OFF value	<a href="#">ANVNA_SetMarkerSearchBandwidthShapeFactorOnOff</a>
Marker		Get Marker Search Bandwidth Shape Factor ON OFF value	<a href="#">ANVNA_GetMarkerSearchBandwidthShapeFactorOnOff</a>
Marker		Set Shape Factor High value of Marker Search Bandwidth	<a href="#">ANVNA_SetMarkerSearchBandwidthShapeFactorHigh</a>
Marker		Get Shape Factor High value of Marker Search Bandwidth	<a href="#">ANVNA_GetMarkerSearchBandwidthShapeFactorHigh</a>
Marker		Set Shape Factor Low value of Marker Search Bandwidth	<a href="#">ANVNA_SetMarkerSearchBandwidthShapeFactorLow</a>
Marker		Get Shape Factor Low value of Marker Search Bandwidth	<a href="#">ANVNA_GetMarkerSearchBandwidthShapeFactorLow</a>
Marker		Get Marker Search Notch statistics	<a href="#">ANVNA_GetMarkerSearchNotchStatistics</a>
Marker		Set Marker Search Notch ON OFF value	<a href="#">ANVNA_SetMarkerSearchNotchOnOff</a>
Marker		Get Marker Search Notch ON OFF value	<a href="#">ANVNA_GetMarkerSearchNotchOnOff</a>
Marker		Set Marker Search Notch value	<a href="#">ANVNA_SetMarkerSearchNotchDefinedValue</a>
Marker		Get Marker Search Notch value	<a href="#">ANVNA_GetMarkerSearchNotchDefinedValue</a>
Marker		Set Marker Search Notch Reference Marker type	<a href="#">ANVNA_SetMarkerSearchNotchReferenceType</a>
Marker		Get Marker Search Notch Reference Marker type	<a href="#">ANVNA_GetMarkerSearchNotchReferenceType</a>
Marker		Set Marker Search Notch Reference Marker value	<a href="#">ANVNA_SetMarkerSearchNotchReferenceValue</a>
Marker		Get Marker Search Notch Reference Marker value	<a href="#">ANVNA_GetMarkerSearchNotchReferenceValue</a>
Marker		Set Marker Search Notch start position	<a href="#">ANVNA_SetMarkerSearchNotchStartPosition</a>
Marker		Get Marker Search Notch start position	<a href="#">ANVNA_GetMarkerSearchNotchStartPosition</a>
Marker		Set Marker Search Notch ON OFF value	<a href="#">ANVNA_SetMarkerSearchNotchShapeFactorOnOff</a>
Marker		Get Marker Search Notch ON OFF value	<a href="#">ANVNA_GetMarkerSearchNotchShapeFactorOnOff</a>
Marker		Set Shape Factor High value of Marker Search Notch	<a href="#">ANVNA_SetMarkerSearchNotchShapeFactorHigh</a>
Marker		Get Shape Factor High value of Marker Search Notch	<a href="#">ANVNA_GetMarkerSearchNotchShapeFactorHigh</a>
Marker		Set Shape Factor Low value of Marker Search Notch	<a href="#">ANVNA_SetMarkerSearchNotchShapeFactorLow</a>
Marker		Get Shape Factor Low value of Marker Search Notch	<a href="#">ANVNA_GetMarkerSearchNotchShapeFactorLow</a>
Time		Enables time domain with password	<a href="#">ANVNA_EnableTimeDomainOption</a>
Time		Checks for time domain option	<a href="#">ANVNA_IsTimeDomainInstalled</a>
Time		Set time domain type	<a href="#">ANVNA_SetTimeDomainType</a>
Time		Get time domain type	<a href="#">ANVNA_GetTimeDomainType</a>
Time		Set time domain response	<a href="#">ANVNA_SetTimeDomainResponse</a>
Time		Get time domain response	<a href="#">ANVNA_GetTimeDomainResponse</a>
Time		Set time domain trip	<a href="#">ANVNA_SetTimeDomainTrip</a>
Time		Get time domain trip	<a href="#">ANVNA_GetTimeDomainTrip</a>
Time		Set time domain unit	<a href="#">ANVNA_SetTimeDomainUnit</a>
Time		Get time domain unit	<a href="#">ANVNA_GetTimeDomainUnit</a>
Time		Set time domain range using start and stop values	<a href="#">ANVNA_SetTimeDomainRangeStartStop</a>
Time		Get time domain range using start and stop values	<a href="#">ANVNA_GetTimeDomainRangeStartStop</a>
Time		Set time domain range center and span values	<a href="#">ANVNA_SetTimeDomainRangeCenterSpan</a>
Time		Get time domain range center and span values	<a href="#">ANVNA_GetTimeDomainRangeCenterSpan</a>
Time		Set time domain DC Term values	<a href="#">ANVNA_SetTimeDomainRangeDCTerm</a>
Time		Get time domain DC Term values	<a href="#">ANVNA_GetTimeDomainRangeDCTerm</a>

**Table C-1.** Anritsu IVI functions by IVI class and Anritsu subclass (4 of 6)

<b>Class</b>	<b>Subclass</b>	<b>Function Description</b>	<b>Function Name</b>
Time		Set time domain range properties	<a href="#">ANVNA_SetTimeDomainRangeProperties</a>
Time		Get time domain range properties	<a href="#">ANVNA_GetTimeDomainRangeProperties</a>
Time		Set time domain gate start and stop interval	<a href="#">ANVNA_SetTimeDomainGateStartStop</a>
Time		Get time domain gate start and stop interval	<a href="#">ANVNA_GetTimeDomainGateStartStop</a>
Time		Set time domain gate center and span interval	<a href="#">ANVNA_SetTimeDomainGateCenterSpan</a>
Time		Get time domain gate center and span interval	<a href="#">ANVNA_GetTimeDomainGateCenterSpan</a>
Time		Set time domain gate properties	<a href="#">ANVNA_SetTimeDomainGateProperties</a>
Time		Get time domain gate properties	<a href="#">ANVNA_GetTimeDomainGateProperties</a>
Limits		Set Limit Testing On Off	<a href="#">ANVNA_SetLimitTestingOnOff</a>
Limits		Get Limit Testing On Off	<a href="#">ANVNA_GetLimitTestingOnOff</a>
Limits		Set Limit Test Result Sign	<a href="#">ANVNA_SetLimitTestResultSign</a>
Limits		Get Limit Test Result Sign	<a href="#">ANVNA_GetLimitTestResultSign</a>
Limits		Clear All Limits	<a href="#">ANVNA_ClearAllLimits</a>
Limits		Get Limits Count	<a href="#">ANVNA_GetLimitsCount</a>
Limits		Add Limit	<a href="#">ANVNA_AddLimit</a>
Limits		Set Limit	<a href="#">ANVNA_SetLimit</a>
Limits		Get Limit	<a href="#">ANVNA_GetLimit</a>
Limits		Set Limit Type	<a href="#">ANVNA_SetLimitType</a>
Limits		Get Limit Type	<a href="#">ANVNA_GetLimitType</a>
Limits		Get Actual Limit Values	<a href="#">ANVNA_GetLimitActual</a>
Limits		Delete Limit Segment At	<a href="#">ANVNA_DeleteLimitSegmentAt</a>
Limits		Is Limit Test Pass	<a href="#">ANVNA_IsLimitTestPass</a>
Limits		Get Lower Limit Buffer	<a href="#">ANVNA_GetLowerLimitBuffer</a>
Limits		Get Upper Limit Buffer	<a href="#">ANVNA_GetUpperLimitBuffer</a>
Limits		Get Lower Limit Fail Points Buffer	<a href="#">ANVNA_GetLowerLimitFailPointsBuffer</a>
Limits		Get Upper Limit Fail Points Buffer	<a href="#">ANVNA_GetUpperLimitFailPointsBuffer</a>
Ripple Limits		Set Ripple Limit Testing On Off	<a href="#">ANVNA_SetRippleLimitTestingOnOff</a>
Ripple Limits		Set Ripple Limit Testing On Off	<a href="#">ANVNA_GetRippleLimitTestingOnOff</a>
Ripple Limits		Set Ripple Limit Test Result Sign	<a href="#">ANVNA_SetRippleLimitTestResultSign</a>
Ripple Limits		Get Ripple Limit Test Result Sign	<a href="#">ANVNA_GetRippleLimitTestResultSign</a>
Ripple Limits		Add Default Ripple Limit Segment	<a href="#">ANVNA_AddDefaultRippleLimitSegment</a>
Ripple Limits		Get Ripple Limits Count	<a href="#">ANVNA_GetRippleLimitsCount</a>
Ripple Limits		Delete Ripple Limit Segment	<a href="#">ANVNA_DeleteRippleLimitSegment</a>
Ripple Limits		Clear All Ripple Limits	<a href="#">ANVNA_ClearAllRippleLimits</a>
Ripple Limits		Add Ripple Limit Segment	<a href="#">ANVNA_AddRippleLimitSegment</a>
Ripple Limits		Get Ripple Limit Values	<a href="#">ANVNA_GetRippleLimitValues</a>
Ripple Limits		Delete Ripple Limit Segment At	<a href="#">ANVNA_DeleteRippleLimitSegmentAt</a>
Ripple Limits		Is Ripple Limit Test Pass	<a href="#">ANVNA_IsRippleLimitTestPass</a>
Ripple Limits		Set Ripple Limit X1 Val	<a href="#">ANVNA_SetRippleLimitX1Val</a>
Ripple Limits		Get Ripple Limit X1 Val	<a href="#">ANVNA_GetRippleLimitX1Val</a>

**Table C-1.** Anritsu IVI functions by IVI class and Anritsu subclass (5 of 6)

<b>Class</b>	<b>Subclass</b>	<b>Function Description</b>	<b>Function Name</b>
Ripple Limits		Set Ripple Limit X2 Val	ANVNA_SetRippleLimitX2Val
Ripple Limits		Get Ripple Limit X2 Val	ANVNA_GetRippleLimitX2Val
Ripple Limits		Set Ripple Limit Ripple Val	ANVNA_SetRippleLimitRippleVal
Ripple Limits		Get Ripple Limit Ripple Val	ANVNA_GetRippleLimitRippleVal
Ripple Limits		Get Ripple Limit Upper Lower Values	ANVNA_GetRippleLimitUpperLowerValues
Ripple Limits		Get Ripple Limit Fail Points Buffer	ANVNA_GetRippleLimitFailPointsBuffer
Ripple Limits		Set Ripple Limit Line Active	ANVNA_SetRippleLimitLineActive
Ripple Limits		Get Ripple Limit Line Active	ANVNA_GetRippleLimitLineActive
Ripple Limits		Set Ripple Limit Lines On Off	ANVNA_SetRippleLimitLinesOnOff
Ripple Limits		Get Ripple Limit Lines On Off	ANVNA_GetRippleLimitLinesOnOff
Ripple Limits		Set Ripple Limit Ripple Value Format	ANVNA_SetRippleLimitRippleValueFormat
Ripple Limits		Get Ripple Limit Ripple Value Format	ANVNA_GetRippleLimitRippleValueFormat
Ripple Limits		Get Ripple Limit Ripple Measurement Value	ANVNA_GetRippleLimitRippleMeasurementValue
Hybrid Cal		Set Hybrid Cal File	ANVNA_SetHybridCalFile
Hybrid Cal		Get Hybrid Cal File	ANVNA_GetHybridCalFile
Hybrid Cal		Clear Hybrid Cal File	ANVNA_ClearHybridCalFile
Hybrid Cal		Set Hybrid ThruLine Use Reciprocal	ANVNA_SetHybridThruLineUseReciprocal
Hybrid Cal		Get Hybrid ThruLine Use Reciprocal	ANVNA_GetHybridThruLineUseReciprocal
Hybrid Cal		Clear Hybrid ThruLine Use Reciprocal	ANVNA_ClearHybridThruLineUseReciprocal
Hybrid Cal		Set Hybrid ThruLine Active	ANVNA_SetHybridThruLineActive
Hybrid Cal		Get Hybrid ThruLine Active	ANVNA_GetHybridThruLineActive
Hybrid Cal		Clear Hybrid ThruLine Active	ANVNA_ClearHybridThruLineActive
Hybrid Cal		Begin Hybrid Cal Full2	ANVNA_BeginHybridCalFull2
Hybrid Cal		Begin Hybrid Cal Full3	ANVNA_BeginHybridCalFull3
Hybrid Cal		Begin Hybrid Cal Full4 From Full1	ANVNA_BeginHybridCalFull4FromFull1
Hybrid Cal		Begin Hybrid Cal Full4 From Full2	ANVNA_BeginHybridCalFull4FromFull2
Hybrid Cal		Collect Hybrid Cal Thru Standard Data	ANVNA_CollectHybridCalThruStandardData
Imped. Trans.		Enable or disable Impedance Transformation on the given Channel	ANVNA_SetImpedanceTransformationEnabled
Imped. Trans.		Get Enabled/Disabled status of Impedance Transformation on the given Channel	ANVNA_GetImpedanceTransformationEnabled
Imped. Trans.		Set Impedance Transformation Type (Port or PortPair) on the given Channel	ANVNA_SetImpedanceTransformationType

**Table C-1.** Anritsu IVI functions by IVI class and Anritsu subclass (6 of 6)

<b>Class</b>	<b>Subclass</b>	<b>Function Description</b>	<b>Function Name</b>
Imped. Trans.		Get Impedance Transformation Type (Port or PortPair) on the given Channel	<a href="#">ANVNA_GetImpedanceTransformationType</a>
Imped. Trans.		Set Resistive term for single-ended Impedance Transformation on a given Port and Channel	<a href="#">ANVNA_SetImpedanceTransformationResistiveTerm</a>
Imped. Trans.		Get Resistive term for single-ended Impedance Transformation on a given Port and Channel	<a href="#">ANVNA_GetImpedanceTransformationResistiveTerm</a>
Imped. Trans.		Set Reactive term for single-ended Impedance Transformation on a given Port and Channel	<a href="#">ANVNA_SetImpedanceTransformationReactiveTerm</a>
Imped. Trans.		Get Reactive term for single-ended Impedance Transformation on a given Port and Channel	<a href="#">ANVNA_GetImpedanceTransformationReactiveTerm</a>
Imped. Trans.		Set Resistive term in Differential Mode for Impedance Transformation on a given PortPair and Channel	<a href="#">ANVNA_SetImpedanceTransformationEnabled</a>
Imped. Trans.		Get Resistive term in Differential Mode for Impedance Transformation on a given PortPair and Channel	<a href="#">ANVNA_GetImpedanceTransformationPortPairDifferentialModeResistiveTerm</a>
Imped. Trans.		Set Resistive term in Common Mode for Impedance Transformation on a given PortPair and Channel	<a href="#">ANVNA_SetImpedanceTransformationPortPairCommonModeResistiveTerm</a>
Imped. Trans.		Get Resistive term in Common Mode for Impedance Transformation on a given PortPair and Channel	<a href="#">ANVNA_GetImpedanceTransformationPortPairCommonModeResistiveTerm</a>
Imped. Trans.		Set Reactive term in Differential Mode for Impedance Transformation on a given PortPair and Channel	<a href="#">ANVNA_SetImpedanceTransformationPortPairDifferentialModeReactiveTerm</a>
Imped. Trans.		Get Reactive term in Differential Mode for Impedance Transformation on a given PortPair and Channel	<a href="#">ANVNA_GetImpedanceTransformationPortPairDifferentialModeReactiveTerm</a>
Imped. Trans.		Set Reactive term in Common Mode for Impedance Transformation on a given PortPair and Channel	<a href="#">ANVNA_SetImpedanceTransformationPortPairCommonModeReactiveTerm</a>
Imped. Trans.		Get Reactive term in Common Mode for Impedance Transformation on a given PortPair and Channel	<a href="#">ANVNA_GetImpedanceTransformationPortPairCommonModeReactiveTerm</a>

## C-2 ANVNA\_ChannelAsynchronousTriggerSweep

```
ViStatus ANVNA_ChannelAsynchronousTriggerSweep (
    ViSession vi,
    ViConstString repCapIdentifier);
```

Description: The function initiates all the sweeps on the channel and then returns without waiting for sweep finish. User is advised to call function [ANVNA\\_SystemWaitForOperationComplete](#) to check if/when the sweep operation is completed.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. Pass VI_NULL or empty string if operation does not apply to a repeated capability. (not parsed, can be "" or ":")

### C++ Example:

```
/*
 * Initialization code ...
 */

ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
if((status = ANVNA_ChannelAsynchronousTriggerSweep(sessionId, ":")) != VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while triggering sweep asynchronously: %s\n", status,
    ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}

//wait for operation to complete:
while((status = ANVNA_SystemWaitForOperationComplete(sessionId, 10)) > VI_SUCCESS)
{
    //do nothing, function call is blocking during timeout
}
if(status != VI_SUCCESS)
```

```

{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while waiting for operation to complete: %s\n", status,
    ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
//Data is now ready to be fetched

```

**C# Example:**

```

/*
 * Initialization code and sweep trigger
 */
int status = 0;
if ((status = ANVNA.ChannelAsynchronousTriggerSweep(sessionId, ":")) != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
    ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " while triggering sweep
    asynchronously: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}
//wait for operation to complete:
while ((status = ANVNA.SystemWaitForOperationComplete(sessionId, 10)) >
0)
{
    //do nothing, function call is blocking during timeout
}
if (status != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
    ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " while waiting for
    operation to complete: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}
//Data is now ready to be fetched

```

**Python Example:**

```
#Initialization code ...

status = ANVNA_ChannelAsynchronousTriggerSweep(sessionId, ":")
if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status,
MAX_STRING_LENGTH);
    print('Error {0} while triggering sweep asynchronously:
{1}\n'.format(status, ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)

status = 1 #VI_FALSE
while (status == 1):
    status = ANVNA_SystemWaitForOperationComplete(sessionId, 1000)

if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status,
MAX_STRING_LENGTH);
    print(" Error {0} waiting for operation to
complete:{1}\n".format(status, ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)

#Data is now ready to be fetched
```

**MATLAB Example:**

```
%     * Initialization code ...
status = anvna.ChannelAsynchronousTriggerSweep(':');
if( status ~= 0)

    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while triggering sweep asynchronously: %s\n', stat,
ErrorMessage);
    status = anvna.close();
return;
end

%wait for operation to complete:
status = anvna.SystemWaitForOperationComplete(10);
while (status > 0)

    %do nothing, function call is blocking during timeout
end
if(status ~= 0)

    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while waiting for operation to complete: %s\n', stat,
ErrorMessage);
    status = anvna.close();
return;
end
%Datal is now ready to be fetched
```

## C-3 ANVNA\_ChannelMeasurementCreate

```
ViStatus ANVNA_ChannelMeasurementCreate (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViInt32 receiverPortVal,
    ViInt32 sourcePortVal);
```

Description: Creates a new measurement with specified Source and Receiver port values.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1".
receiverPortVal	ViInt32	Receiver port value.
sourcePortVal	ViInt32	Source port value.

### C++ Example:

```
/*
 * Initialization code ...
 */

ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
//Create S21 measurement on channel 1 and trace 1:
if ((status = ANVNA_ChannelMeasurementCreate(sessionId, "CH1:Trace1", 2, 1))
!= VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while setting S21 measurement on channel 1, trace 1:
%s\n", status, ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
```

**C# Example:**

```

/*
 * Initialization code and sweep trigger
 */

int status = 0;
//Create S21 measurement on channel 1 and trace 1:
if ((status = ANVNA.ChannelMeasurementCreate(sessionId, "CH1:Trace1", 2,
1)) != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " while setting S21
measurement on channel 1, trace 1: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}

```

**Python Example:**

```

#Create S21 measurement on channel 1 and trace 1:
status = ANVNA_ChannelMeasurementCreate (sessionId, "CH1:Trace1",2 , 1)
if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print('Error {0} while setting S21 measurement on channel 1, trace 1:
{1}\n'.format(status, ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)

```

**MATLAB Example:**

```

%     * Initialization code ...
status = anvna.ChannelMeasurementCreate('CH1:Trace1', 2, 1);
if( status ~= 0)
    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while setting S21 measurement on channel 1, trace 1:
%s\n', stat, ErrorMessage);
    status = anvna.close();
    return;
end

```

## C-4 ANVNA\_ChannelMeasurementFetchComplex

```
ViStatus ANVNA_ChannelMeasurementFetchComplex (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViInt32 pRealResponseValBufferSize,
    ViReal64 pRealResponseVal[],
    ViInt32 *pRealResponseValActualSize,
    ViInt32 pImagResponseValBufferSize,
    ViReal64 pImagResponseVal[],
    ViInt32 *pImagResponseValActualSize);
```

Description: Returns real and imaginary values of measurement data

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1".
pRealResponseValBufferSize	ViInt32	Number of elements in pRealResponseVal.
pRealResponseVal	ViReal64[]	Output buffer containing the real values.
pRealResponseValActualSize	ViInt32* (passed by pointer)	Actual number of elements in pRealResponseVal.
pImagResponseValBufferSize	ViInt32	Number of elements in pImagResponseVal.
pImagResponseVal	ViReal64[]	Output buffer containing the imaginary values.
pImagResponseValActualSize	ViInt32* (passed by pointer)	Actual number of elements in pImagResponseVal.

### C++ Example:

```
/*
 * Initialization code ...
 * Trigger sweep ...
 * Read attribute's value ANVNA_ATTR_CHANNEL_POINTS into " noPoints " ...
 */
ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
```

```

ViPReal64 dataReal = new ViReal64[noPoints];
ViInt32 realActualSize = 0;
ViPReal64 dataImag = new ViReal64[noPoints];
ViInt32 imagActualSize = 0;

if(( status = ANVNA_ChannelMeasurementFetchComplex(sessionId, "CH1:Trace1",
noPoints, dataReal, &realActualSize, noPoints, dataImag, &imagActualSize)) !=
VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while fetching complex data: %s\n", status, ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}

// Use fetched data here ...

delete[] dataReal;
delete[] dataImag;

```

**C# Example:**

```

/*
 * Initialization code ...
 * Trigger sweep ...
 * Read attribute's value ANVNA_ATTR_CHANNEL_POINTS into "points" ...
*/
int status = 0;
double[] dataReal = new double[points];
int realActualSize = 0;
double[] dataImag = new double[points];
int imagActualSize = 0;

if ((status = ANVNA.ChannelMeasurementFetchComplex(sessionId, "CH1:Trace1",
(int)points, dataReal, out realActualSize, (int)points, dataImag, out
imagActualSize)) != 0)

{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " while fetching complex
data: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}

```

```
// Use fetched data here ...
```

**Python Example:**

```
# Initialization code ...

# Trigger sweep ...

# Read attribute's value ANVNA_ATTR_CHANNEL_POINTS into "points" ...

status, RESULT_REAL, RESULT_SIZE_REAL, RESULT_IMAG, RESULT_SIZE_IMAG =
ANVNA_ChannelMeasurementFetchComplex(sessionId, "CH1:Measurement1", points, points)

if status != 0:

    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)

    print('Error {0} while fetching complex data: {1}\n'.format(status,
ErrorMessage))

    ANVNA_close(sessionId)

    exit(1)
```

**MATLAB Example:**

```
% Initialization code ...

% Trigger sweep ...

% Read attribute's value ANVNA_ATTR_CHANNEL_POINTS into "noPoints"

[status, dataReal, realActualSize,dataImag,imagActualSize] =
anvna.ChannelMeasurementFetchComplex('CH1:Trace1', noPoints, noPoints);

if( status ~= 0)

    [ stat, ErrorMessage ] = anvna.error_message(status);

    fprintf('Error %d while fetching complex data: %s\n', stat,
ErrorMessage);

    status = anvna.close();

    return;

end

% Use fetched data here ...
```

## C-5 ANVNA\_ChannelMeasurementFetchFormatted

```
ViStatus ANVNA_ChannelMeasurementFetchFormatted (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViInt32 retValBufferSize,
    ViReal32 retVal[],
    ViInt32* retValActualSize);
```

Description: Returns measurement data in the current format as set by the [ANVNA\\_ATTR\\_CHANNEL\\_MEASUREMENT\\_FORMAT](#) property. Smith and Polar formats are not supported.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1".
retValBufferSize	ViInt32	Number of elements in RetVal.
retVal	ViReal32[]	Output buffer containing measurement values.
retValActualSize	ViInt32* (passed by pointer)	Actual number of elements in RetVal.

### C++ Example:

```
/*
 * Initialization code and sweep trigger ...
 * Read attribute's value ANVNA_ATTR_CHANNEL_POINTS into "points" ...
 */

ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
ViPReal32 measData = new ViReal32[points];
ViInt32 actualSize = 0;
// fetch measurement data from trace 1:
if ((status = ANVNA_ChannelMeasurementFetchFormatted(sessionId, "CH1:Trace1",
points, measData, &actualSize)) != VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while fetching data on channel 1, trace 1: %s\n", status,
ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
```

```

    }

    // Use fetched data here ...

    delete[] measData;

```

**C# Example:**

```

/*
 * Initialization code ...
 * Trigger sweep ...
 * Read attribute's value ANVNA_ATTR_CHANNEL_POINTS into "points" ...
 */

int status = 0;
float[] measData = new float[points];
int actualSize = 0;
// fetch measurement data from trace 1:
if ((status = ANVNA.ChannelMeasurementFetchFormatted(sessionId, "CH1:Trace1",
(int) points, measData, out actualSize)) != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " while fetching data on channel
1, trace 1: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}
// Use fetched data here ...

```

**Python Example:**

```

# Initialization code
# Sweep trigger ...
# Read attribute's value ANVNA_ATTR_CHANNEL_POINTS into "points"

status, RESULT, RESULT_SIZE = ANVNA_ChannelMeasurementFetchFormatted(sessionId,
"CH1:Measurement1", POINTS)

if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print('Error {0} while fetching data on channel 1, trace 1:
{1}\n'.format(status, ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)

```

**MATLAB Example:**

```
% Initialization code ...
% Sweep trigger ...
% Read attribute's value ANVNA_ATTR_CHANNEL_POINTS into "points"

[status, measData, actualSize] =
anvna.ChannelMeasurementFetchFormatted('CH1:Trace1', points);

if( status ~= 0)

    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while fetching data on channel 1, trace 1: %s\n', stat,
ErrorMessage);
    status = anvna.close();
    return;

end

% Use fetched data here ...
```

## C-6 ANVNA\_ChannelMeasurementFetchX

```
ViStatus ANVNA_ChannelMeasurementFetchX (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViInt32 retValBufferSize,
    ViReal64 retVal[],
    ViInt32 *retValActualSize);
```

Description: Returns the stimulus values for the specified channel (list of swept frequencies).

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. Pass VI_NULL or empty string if operation does not apply to a repeated capability. (Only channel index is parsed, for example "CH1:").
retValBufferSize	ViInt32	Number of elements in RetVal.
retVal	ViReal64[]	Output buffer containing frequency values.
retValActualSize	ViInt32* (passed by pointer)	Actual number of elements in RetVal.

### C++ Example:

```
/*
 * Initialization code ...
 * Trigger sweep ...
 * Read attribute's value ANVNA_ATTR_CHANNEL_POINTS into variable "points" ...
 */

ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
ViPReal64 freq = new ViReal64[points];
ViInt32 actualSize = 0;
// fetch the frequencies list:
if ((status = ANVNA_ChannelMeasurementFetchX(sessionId, "CH1:", points, freq,
&actualSize)) != VI_SUCCESS)
```

```
{  
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);  
    printf("Error %d while fetching frequencies list on channel 1: %s\n", status,  
        ErrorMessage);  
    ANVNA_close(sessionId);  
    exit(1);  
}  
  
// Use frequencies list here ...  
  
delete[] freq;
```

**C# Example:**

```
/*  
 * Initialization code ...  
 * Trigger sweep ...  
 * Read attribute's value ANVNA_ATTR_CHANNEL_POINTS into variable "points" ...  
 */  
  
int status = 0;  
double[] freq = new double[points];  
int actualSize = 0;  
  
// fetch the frequencies list:  
if ((status = ANVNA.ChannelMeasurementFetchX(sessionId, "CH1:", (int) points,  
freq, out actualSize)) != 0)  
{  
    string ErrorMessage = "";  
    ANVNA.error_message(sessionId, status, out ErrorMessage,  
        ANVNA.MAX_STRING_LENGTH);  
    System.Console.WriteLine("Error " + status + " while fetching frequencies  
list on channel 1: " + ErrorMessage);  
    ANVNA.close(sessionId);  
    System.Environment.Exit(1);  
}  
// Use frequencies list here ...
```

**Python Example:**

```
#Initialization code ...

#Trigger sweep ...

#Read attribute's value ANVNA_ATTR_CHANNEL_POINTS into variable "POINTS" ...

status, RESULT, RESULT_SIZE = ANVNA_ChannelMeasurementFetchX(sessionId,
"CH1:Measurement1", POINTS)

if status != 0:
    status, ErrorMessage = ANVNA_error_message(sessionId, MAX_STRING_LENGTH)
    print("Error {0} while fetching frequencies list on channel 1:
{1}\n".format(status, ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)

#Use frequencies list here...
```

**MATLAB Example:**

```
% Initialization code ...

% Trigger sweep ...

% Read attribute's value ANVNA_ATTR_CHANNEL_POINTS into "points" ...

    fetch the frequencies list:
    [status, freq, actualSize] = anvna.ChannelMeasurementFetchX('CH1:', points);
    if( status ~= 0)

        [ stat, ErrorMessage ] = anvna.error_message(status);
        fprintf('Error %d while fetching frequencies list on channel 1: %s\n',
stat, ErrorMessage);
        status = anvna.close();
        return;

    end

% Use frequencies list here ...
```

## C-7 ANVNA\_ChannelMeasurementGetResponseType

```
ViStatus ANVNA_ChannelMeasurementGetResponseType (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViPUInt32 responseType);
```

Description: Returns the value for the response type.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1".
responseType	ViPUInt32	Response type value.

### C++ Example:

```
ViStatus status = VI_SUCCESS;
ViUInt32 responseType = 0;
status = ANVNA_ChannelMeasurementGetResponseType(sessionId, "CH1:TR1",
&responseType);
```

### C# Example:

```
int status = 0;
uint responseType = 0;
status = ANVNA.ChannelMeasurementGetResponseType(sessionId, "CH1:TR1", out
responseType);
```

### Python Example:

```
status, responseType = ANVNA_ChannelMeasurementGetResponseType(sessionId,
"CH1:TR1")
```

### MATLAB Example:

```
status, responseType = anvna.ChannelMeasurementGetResponseType('CH1:TR1');
```

## C-8 ANVNA\_ChannelMeasurementGetSParameter

```
ViStatus ANVNA_ChannelMeasurementGetSParameter (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViInt32 *pReceiverPortVal,
    ViInt32 *pSourcePortVal);
```

Description: Returns the values for Source port and Receiver port number specified in measurement.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1".
pReceiverPortVal	ViInt32* (passed by pointer)	Receiver port.
pSourcePortVal	ViInt32* (passed by pointer)	Source port.

### C++ Example:

```
/*
 * Initialization code ...
 * Measurement setup ...
 */
ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
ViInt32 sourcePort = 0;
ViInt32 receivPort = 0;

if ((status = ANVNA_ChannelMeasurementGetSParameter(sessionId, "CH1:Measurement1",
&receivPort, &sourcePort)) != VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while reading source and destination port numbers: %s\n", status,
ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
// Source and destination port numbers are now available in sourcePort and
receivPort ...
```

**C# Example:**

```

/*
 * Initialization code ...
 * Measurement setup ...
 */

int status = 0;
int sourcePort = 0;
int receivPort = 0;
if ((status = ANVNA.ChannelMeasurementGetSParameter(sessionId, "CH1:Measurement1",
out receivPort, out sourcePort)) != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " while reading source and
destination port numbers: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}

// Source and destination port numbers are now available in sourcePort and
receivPort ...
System.Console.WriteLine("Source port is " + sourcePort + " && Destination port
is " + receivPort);

```

**Python Example:**

```

#Initialization code ...
#Measurement setup ...

status, source, receiver = ANVNA_ChannelMeasurementGetSParameter(sessionId,
"CH1:Measurement1")
if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print("Error {0} while reading source and destination port numbers:
{0}\n".format(status, ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)

#Source and destination port numbers are now available in source and receiver...

```

**MATLAB Example:**

```
% Initialization code ...

% Measurement setup ...

[status, receivPort, sourcePort] =
anvna.ChannelMeasurementGetSParameter('CH1:Measurement1');

if( status ~= 0)

    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while reading source and destination port numbers:
%s\n', stat, ErrorMessage);
    status = anvna.close();
    return;

end

% Source and destination port numbers are now available in sourcePort and
receivPort ...
```

## C-9 ANVNA\_ChannelRecallState

```
ViStatus ANVNA_ChannelRecallState (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViConstString Identifier);
```

Description: Recalls the instrument state from the specified instrument file for the specified channel.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:".
Identifier	ViConstString	File name to be loaded for the specified channel.

### C++ Example:

```
/*
 * Initialization code ...
 */

ViStatus status = VI_SUCCESS;
if ((status = ANVNA_ChannelRecallState(sessionId, "CH1:",
"C:\\\\AnritsuVNA\\\\Cal\\\\Calibration.chx")) != VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while recalling channel state: %s\\n", status, ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
// Channel is now in the recalled state ...
```

**C# Example:**

```
/*
 * Initialization code ...
 */
int status = 0;

if ((status = ANVNA.ChannelRecallState(sessionId, "CH1:",
"C:\\\\AnritsuVNA\\\\Cal\\\\Calibration.chx")) != 0)

{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);

    System.Console.WriteLine("Error " + status + " while recalling channel
state: " + ErrorMessage);

    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}

// Channel is now in the recalled state ...
```

**Python Example:**

```
#Initialization code ...

status = ANVNA_ChannelRecallState (sessionId, "CH1:",
"C:\\\\AnritsuVNA\\\\Cal\\\\Calibration.chx")

if status != 0:

    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print("Error {0} while recalling channel state: {1}\n".format(status,
ErrorMessage))

    ANVNA_close(sessionId)
    exit(1)

#Channel is now in the recalled state...
```

**MATLAB Example:**

```
% Initialization code ...

status = anvna.ChannelRecallState ('CH1:',
'C:\\\\AnritsuVNA\\\\Cal\\\\Calibration.chx');

if( status ~= 0)

    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while recalling channel state: %s\\n', stat,
ErrorMessage);
    status = anvna.close();

return;
end

% Channel is now in the recalled state ...
```

## C-10 ANVNA\_SetRippleLimitTestingOnOff

```
ViStatus ANVNA_SetRippleLimitTestingOnOff (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViBoolean onOff);
```

Description: Activates the ripple limit testing if the boolean parameter is set on true or deactivates it otherwise. Checks if the limit test is failing or not for a channel trace.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:TR1".)
onOff	ViBoolean	Ripple limit testing state.

### C++ Example:

```
status = ANVNA_SetRippleLimitTestingOnOff ( sessionId, "CH1:TR1", VI_TRUE );
```

### C# Example:

```
ANVNA.SetRippleLimitTestingOnOff(sessionId, "CH1:TR1", 1);
```

### Python Example:

```
status = ANVNA_SetRippleLimitTestingOnOff(sessionId, 'CH1:TR1', 1)
```

### MATLAB Example:

```
status = anvna.SetRippleLimitTestingOnOff('CH1:Trace1', 1);
```

## C-11 ANVNA\_GetRippleLimitTestingOnOff

```
ViStatus ANVNA_GetRippleLimitTestingOnOff (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViBoolean onOff);
```

Description: Returns the state of ripple limit testing query, declared per trace. Default value is 1.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_Init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:TR1".)
onOff	ViBoolean	Ripple limit testing state.

### C++ Example:

```
ViBoolean rippleLimitTestingStatus = VI_FALSE;
status = ANVNA_GetRippleLimitTestingOnOff ( sessionId, "CH1:TR1",
&rippleLimitTestingStatus );
```

### C# Example:

```
ushort onOff;
ANVNA.GetRippleLimitTestingOnOff(sessionId, "CH1:TR1", out onOff);
```

### Python Example:

```
status, limitSet = ANVNA_GetRippleLimitTestingOnOff(sessionId, 'CH1:TR1')
print('Limit testing get value is {0}'.format(limitSet))
```

### MATLAB Example:

```
[status, limitTesting] = anvna.GetRippleLimitTestingOnOff('CH1:Trace1');
```

## C-12 ANVNA\_SetRippleLimitTestResultSign

```
ViStatus ANVNA_SetRippleLimitTestResultSign (
    ViSession vi,
    ViBoolean onOff)
```

Description: Activates the ripple limit testing result sign if the boolean parameter is set on true or deactivates it otherwise.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
onOff	ViBoolean	Ripple limit testing sign state.

### C++ Example:

```
status = ANVNA_SetRippleLimitTestResultSign ( sessionId, VI_TRUE );
```

### C# Example:

```
ANVNA.SetRippleLimitTestResultSign(sessionId, 1);
```

### Python Example:

```
status = ANVNA_SetRippleLimitTestResultSign(sessionId, 1)
```

### MATLAB Example:

```
status = anvna.SetRippleLimitTestResultSign(1);
```

## C-13 ANVNA\_GetRippleLimitTestResultSign

```
ViStatus ANVNA_GetRippleLimitTestResultSign (
    ViSession vi,
    ViBoolean onOff)
```

Description: Returns the state of ripple limit testing result sign declared per trace. Default value is 0.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session
onOff	ViBoolean	Ripple limit testing result sign state.

### C++ Example:

```
ViBoolean rippleLimitTestingSignStatus = VI_FALSE;
status = ANVNA_GetRippleLimitTestResultSign ( sessionId,
&rippleLimitTestingSignStatus );
```

### C# Example:

```
ushort limitSign;
ANVNA.GetRippleLimitTestResultSign(sessionId, out limitSign);
```

### Python Example:

```
status, limitVisible = ANVNA_GetRippleLimitTestResultSign(sessionId)
print('Limit testing sign get value is {0}'.format(limitVisible))
```

### MATLAB Example:

```
[status, limitSignTesting] = anvna.GetRippleLimitTestResultSign();
```

## C-14 ANVNA\_AddDefaultRippleLimitSegment

```
ViStatus ANVNA_AddDefaultRippleLimitSegment (
    ViSession vi,
    ViConstString repCapIdentifier )
```

Description: Add default ripple limit segment for a channel trace.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)

### C++ Example:

```
status = ANVNA_AddDefaultRippleLimitSegment ( sessionId, "CH1:TR1" );
```

### C# Example:

```
ANVNA.AddDefaultRippleLimitSegment (sessionId, "CH1:TR1");
```

### Python Example:

```
status = ANVNA_AddDefaultRippleLimitSegment (sessionId, 'CH1:TR1')
```

### MATLAB Example:

```
status = anvna.AddDefaultRippleLimitSegment ('CH1:Trace1');
```

## C-15 ANVNA\_GetRippleLimitsCount

```
ViStatus ANVNA_GetRippleLimitsCount (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViPUI32 readCount);
```

Description: Returns the number of ripple limits declared per trace. Default value is 0. The function will return 0 if no segments are declared or after [ANVNA\\_ClearAllRippleLimits](#) is called.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:TR1".)
readCount	ViPUI32	Number of ripple limits returned by the function

### C++ Example:

```
ViUInt32 limits = 0;
status = ANVNA_GetRippleLimitsCount ( sessionId, "CH1:TR1", &limits );
printf("Number of limits is %d\n", limits );
```

### C# Example:

```
UInt32 limitsCount;
ANVNA.GetRippleLimitsCount(sessionId, "CH1:TR1", out limitsCount);
```

### Python Example:

```
status, limitsCount = ANVNA_GetRippleLimitsCount(sessionId, 'CH1:TR1')
print('Limit number is {}'.format(limitsCount))
```

### MATLAB Example:

```
[status, noOfRippleLimits] = anvna.GetRippleLimitsCount('CH1:Trace1');
```

## C-16 ANVNA\_DeleteRippleLimitSegment

```
ViStatus ANVNA_DeleteRippleLimitSegment (  
    ViSession vi,  
    ViConstString repCapIdentifier);
```

Description: Deletes ripple limit segment for a channel trace.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)

### C++ Example:

```
status = ANVNA_DeleteRippleLimitSegment( sessionId, "CH1:TR1" );
```

### C# Example:

```
ANVNA.DeleteRippleLimitSegment(sessionId, "CH1:TR1");
```

### Python Example:

```
status = ANVNA_DeleteRippleLimitSegment(sessionId, 'CH1:TR1')
```

### MATLAB Example:

```
status = anvna.DeleteRippleLimitSegment('CH1:Trace1');
```

## C-17 ANVNA\_ClearAllRippleLimits

```
ViStatus ANVNA_ClearAllRippleLimits (
    ViSession vi,
    ViConstString repCapIdentifier);
```

Description: Deletes all the ripple limits for a channel trace.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)

### C++ Example:

```
status = ANVNA_ClearAllRippleLimits ( sessionId, "CH1:TR1" );
```

### C# Example:

```
ANVNA.ClearAllRippleLimits(sessionId, "CH1:TR1");
```

### Python Example:

```
status = ANVNA_ClearAllRippleLimits(sessionId, 'CH1:TR1')
```

### MATLAB Example:

```
status = anvna.ClearAllRippleLimits('CH1:Trace1');
```

## C-18 ANVNA\_AddRippleLimitSegment

```
ViStatus ANVNA_AddRippleLimitSegment (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViReal64 x1,
    ViReal64 x2,
    ViReal32 ripple);
```

Description: Adds a new ripple limit segment.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier.
x1	ViReal64	Start frequency in Hz.
x2	ViReal64	Stop frequency in Hz.
ripple	ViReal32	Ripple value.

### C++ Example:

```
ViReal64 startFrequency = 3000000000;
ViReal64 stopFrequency = 8000000000;
ViReal32 ripple = 9.8;
```

```
status = ANVNA_AddRippleLimitSegment ( sessionId, "CH1:TR1", startFrequency,
stopFrequency, ripple );
```

### C# Example:

```
ANVNA.AddRippleLimitSegment(sessionId, "CH1:TR1", startFrequency, stopFrequency,
(float) -9.8);
```

### Python Example:

```
x1 = float(10000000); x2 = float(8000000000); ripple = -99.8
status = ANVNA_AddRippleLimitSegment(sessionId, 'CH1:TR1', x1, x2, ripple)
```

### MATLAB Example:

```
status = anvna.AddRippleLimitSegment('CH1:Trace1', startFrequency, stopFrequency,
-9.4);
```

## C-19 ANVNA\_GetRippleLimitValues

```
ViStatus ANVNA_GetRippleLimitValues (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 limitSegmentNumber,
    ViPReal64 x1,
    ViPReal64 x2,
    ViPReal32 ripple);
```

Description: Get configuration for an existing ripple limit, Start and Stop frequency, ripple values.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
limitSegmentNumber	ViUInt32	Limit index number.
x1	ViPReal64	Start frequency in Hz.
x2	ViPReal64	Stop frequency in Hz.
ripple	ViPReal32	Ripple value.

### C++ Example:

```
ViReal64 startFrequency = 0;
ViReal64 stopFrequency = 0;
ViReal32 ripple = 0;
status = ANVNA_GetRippleLimitValues ( sessionId, "CH1:TR1", 1,
&startFrequency, &stopFrequency, &ripple );
```

### C# Example:

```
double outX1, outX2;
float ripple;

ANVNA.GetRippleLimitValues(sessionId, "CH1:TR1", 1, out outX1, out outX2, out
ripple);
```

### Python Example:

```
status, outX1, outX2, ripple = ANVNA_GetRippleLimitValues(sessionId, 'CH1:TR1', 1)
```

### MATLAB Example:

```
[status, outStartFreq, outStopFreq, outRipple] =
anvna.GetRippleLimitValues('CH1:Trace1', 1);
```

## C-20 ANVNA\_DeleteRippleLimitSegmentAt

```
ViStatus ANVNA_DeleteRippleLimitSegmentAt (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt32 limitSegmentNumber);
```

Description: Deletes ripple limit segment at index specified by limitSegmentNumber, for a trace.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
limitSegmentNumber	ViUInt32	Ripple limit index number.

### C++ Example:

```
status = ANVNA_DeleteRippleLimitSegmentAt ( sessionId, "CH1:TR1", 1 );
```

### C# Example:

```
ANVNA.DeleteRippleLimitSegmentAt(sessionId, "CH1:TR1", 1);
```

### Python Example:

```
status = ANVNA_DeleteRippleLimitSegmentAt(sessionId, 'CH1:TR1', 1)
```

### MATLAB Example:

```
status = anvna.DeleteRippleLimitSegmentAt('CH1:Trace1', 1);
```

## C-21 ANVNA\_IsRippleLimitTestPass

```
ViStatus ANVNA_IsRippleLimitTestPass

ViSession vi,
ViConstString repCapIdentifier,
ViPBoolean passNoPass);
```

Description: Checks if the ripple limit test is failing or not for a channel trace.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
passNoPass	ViPBoolean	Ripple limit testing result.

### C++ Example:

```
ViBoolean limitTestingResultStatus = VI_FALSE;
status = ANVNA_IsRippleLimitTestPass ( sessionId,
"CH1:TR1", &limitTestingResultStatus );
```

### C# Example:

```
ushort outLimitTestPass;

ANVNA.IsRippleLimitTestPass(sessionId, "CH1:TR1", out outLimitTestPass);
```

### Python Example:

```
status, isLimitTestPass = ANVNA_IsRippleLimitTestPass(sessionId, 'CH1:TR1')
```

### MATLAB Example:

```
[status, limitPass] = anvna.IsRippleLimitTestPass('CH1:Trace1');
```

## C-22 ANVNA\_SetRippleLimitX1Val

```
ViStatus ANVNA_SetRippleLimitX1Val (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 limitSegmentNumber,
    ViReal64 x1);
```

Description: Set configuration for an existing ripple limit using Start and Stop frequency, ripple values.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
limitSegmentNumber	ViUInt32	Limit index number.
x1	ViReal64	x1 value in Hz.

### C++ Example:

```
ViUInt32 segmentNumber = 1;
ViReal64 x1 = 10000000;
status = ANVNA_SetRippleLimitX1Val ( sessionId, "CH1:TR1", segmentNumber, x1 );
```

### C# Example:

```
ANVNA.SetRippleLimitX1Val(sessionId, "CH1:TR1", (uint)1, x1);
```

### Python Example:

```
x1 = float(10000000);
status = ANVNA_SetRippleLimitX1Val(sessionId, 'CH1:TR1', 1, x1)
```

### MATLAB Example:

```
status = anvna.SetRippleLimitX1Val('CH1:Trace1', 1, x1);
```

## C-23 ANVNA\_GetRippleLimitX1Val

```
ViStatus ANVNA_GetRippleLimitX1Val (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 limitSegmentNumber,
    ViReal64 x2);
```

Description: Get configuration for an existing ripple limit using Start and Stop frequency, ripple values.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
limitSegmentNumber	ViUInt32	Ripple limit index number.
x1	ViReal64	x1 value in Hz.

### C++ Example:

```
ViUInt32 segmentNumber = 1;
ViReal64 x1 = 0;
status = ANVNA_GetRippleLimitX1Val ( sessionId, "CH1:TR1", segmentNumber, &x1 );
```

### C# Example:

```
double outX1;
ANVNA.GetRippleLimitX1Val(sessionId, "CH1:TR1", 1, out outX1);
```

### Python Example:

```
status, outX1= ANVNA_GetRippleLimitX1Val(sessionId, 'CH1:TR1', 1)
```

### MATLAB Example:

```
[status, outX1] = anvna.GetRippleLimitX1Val('CH1:Trace1', 1);
```

## C-24 ANVNA\_SetRippleLimitX2Val

```
ViStatus ANVNA_SetRippleLimitX2Val (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 limitSegmentNumber,
    ViPReal64 x2);
```

Description: Set configuration for an existing ripple limit using Start and Stop frequency, ripple values.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
limitSegmentNumber	ViUInt32	Limit index number.
x2	ViPReal64	x2 value in Hz.

### C++ Example:

```
ViUInt32 segmentNumber = 1;
ViReal64 x2 = 10000000;
status = ANVNA_SetRippleLimitX2Val ( sessionId, "CH1:TR1", segmentNumber, x2 );
```

### C# Example:

```
double outX1;
ANVNA.GetRippleLimitX1Val(sessionId, "CH1:TR1", 1, out outX1);
```

### Python Example:

```
x2 = float(10000000;
status = ANVNA_SetRippleLimitX2Val(sessionId, 'CH1:TR1', 1, x2)
```

### MATLAB Example:

```
status = anvna.SetRippleLimitX2Val('CH1:Trace1', 1, x2);
```

## C-25 ANVNA\_GetRippleLimitX2Val

```
ViStatus ANVNA_GetRippleLimitX2Val (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 limitSegmentNumber,
    ViPReal64 x2);
```

Description: Get configuration for an existing ripple limit, Start and Stop frequency, ripple values.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
limitSegmentNumber	ViUInt32	Ripple limit index number.
x2	ViReal64	x2 value in Hz.

### C++ Example:

```
ViUInt32 segmentNumber = 1;
ViReal64 x2 = 0;
status = ANVNA_GetRippleLimitX2Val ( sessionId, "CH1:TR1", segmentNumber, &x2 );
```

### C# Example:

```
double outX2;
ANVNA.GetRippleLimitX1Val(sessionId, "CH1:TR1", 1, out outX2);
```

### Python Example:

```
status, outX2= ANVNA_GetRippleLimitX2Val(sessionId, 'CH1:TR1', 1)
```

### MATLAB Example:

```
[status, outX2] = anvna.GetRippleLimitX2Val('CH1:Trace1', 1);
```

## C-26 ANVNA\_SetRippleLimitRippleVal

```
ViStatus ANVNA_SetRippleLimitRippleVal (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 limitSegmentNumber,
    ViPReal32 ripple);
```

Description: Set configuration for an existing ripple limit using Start and Stop frequency, ripple values.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
limitSegmentNumber	ViUInt32	Limit index number.
ripple	ViPReal32	Ripple value.

### C++ Example:

```
ViUInt32 segmentNumber = 1;
ViReal32 ripple = 10;
status = ANVNA_SetRippleLimitRippleVal ( sessionId, "CH1:TR1", segmentNumber,
                                         ripple );
```

### C# Example:

```
ANVNA.SetRippleLimitRippleVal(sessionId, "CH1:TR1", (uint)1, ripple);
```

### Python Example:

```
ripple = float(10);
status = ANVNA_SetRippleLimitRippleVal(sessionId, 'CH1:TR1', 1, ripple)
```

### MATLAB Example:

```
status = anvna.SetRippleLimitRippleVal('CH1:Trace1', 1, ripple);
```

## C-27 ANVNA\_GetRippleLimitRippleVal

```
ViStatus ANVNA_GetRippleLimitRippleVal (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 limitSegmentNumber,
    ViPReal32 ripple);
```

Description: Get configuration for an existing ripple values.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
limitSegmentNumber	ViUInt32	Ripple limit index number.
ripple	ViReal32	Ripple value.

### C++ Example:

```
ViUInt32 segmentNumber = 1;
ViReal32 ripple = 10;
status = ANVNA_GetRippleLimitRippleVal ( sessionId, "CH1:TR1", segmentNumber,
&ripple );
```

### C# Example:

```
double outRipple;
ANVNA.GetRippleLimitRippleVal(sessionId, "CH1:TR1", 1, out outRipple);
```

### Python Example:

```
status, outRipple= ANVNA_GetRippleLimitRippleVal(sessionId, 'CH1:TR1', 1)
```

### MATLAB Example:

```
[status, outRipple] = anvna.GetRippleLimitRippleVal('CH1:Trace1', 1);
```

## C-28 ANVNA\_GetRippleLimitUpperLowerValues

```
ViStatus ANVNA_GetRippleLimitUpperLowerValues (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 limitSegmentNumber,
    ViPReal32 upper,
    ViPReal32 lower);
```

Description: Get ripple limit using upper, lower parameter.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
limitSegmentNumber	ViPReal32	Limit index number.
upper	ViPReal32	Output parameter for upper.
lower	ViPReal32	Output parameter for lower.

### C++ Example:

```
ViPReal lower = 0;
status = ANVNA_GetRippleLimitUpperLowerValues ( sessionId, "CH1:TR1", 1, &upper,
&lower );
```

### C# Example:

```
float outUpper; float outLower;
ANVNA.GetRippleLimitUpperLowerValues (sessionId, "CH1:TR1", 1, out outUpper, out
&outLower);
```

### Python Example:

```
status, outUpper outLower = ANVNA_GetRippleLimitUpperLowerValues (sessionId,
'CH1:TR1', 1, 2)
```

### MATLAB Example:

```
status, outUpper, outLower = anvna.GetRippleLimitUpperLowerValues
('CH1:Trace1', 1, 2);
```

## C-29 ANVNA\_GetRippleLimitFailPointsBuffer

```
ViStatus ANVNA_GetRippleLimitFailPointsBuffer (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViPReal64 dataUpper,
    ViUInt32 dataSizeUpper,
    ViPUInt32 readCountUpper,
    ViPReal64 dataLower,
    ViUInt32 dataSizeLower,
    ViPUInt32 readCountLower );
```

Description: Returns lower and upper values for fail points.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example “CH1:TR1”.)
dataUpper	ViPReal64[]	Number of upper fail points.
dataSizeUpper	ViUInt32	Output parameter for upper.
readCountUpper	ViPUInt32	Actual number of fail points.
dataLower	ViPReal64[]	Output buffer of lower fail points.
dataSizeLower	ViUInt32	Number of lower fail points.
readCountLower	ViPUInt32	Actual number of lower fail points.

### C++ Example:

```
ViUInt32 dataSizeUpper = 10;
ViUInt32 dataSizeLower = 15;
ViUInt32 readCountUpper;
ViUInt32 readCountLower;
ViReal64 *dataUpper = new ViReal64 [dataSizeUpper];
ViReal64 *dataLower = new ViReal64 [dataSizeLower];
status = ANVNA_GetRippleLimitFailPointsBuffer ( sessionId, "CH1:TR1", dataUpper,
dataSizeUpper, &readCountUpper, dataLower, dataSizeLower, &readCountLower );
delete [] dataUpper;
delete [] dataLower;
```

**C# Example:**

```
int dataSizeUpper =10;  
int dataSizeLower =15;  
double[] dataUpper = new double[dataSizeUpper];  
double[] dataLower = new double[dataSizeLower];  
int readCountUpper, readCountLower;  
  
ANVNA.GetRippleLimitFailPointsBuffer(sessionId, "CH1:TR1", dataUpper,  
dataSizeupper, out readDataUpper, dataLower, dataSizeLower, out readDataLower);
```

**Python Example:**

```
status, dataUpper, readCountUpper, dataLower, readCountLower =  
ANVNA_GetRippleLimitFailPointsBuffer (sessionId, 'CH1:TR1', 10, 15)
```

**MATLAB Example:**

```
[status, dataUpper, readCountUpper, dataLower, readCountLower] =  
anvna.GetRippleLimitFailPointsBuffer ('CH1:Trace1', 10, 15);
```

## C-30 ANVNA\_GetRippleLimitLineActive

```
ViStatus ANVNA_GetRippleLimitLineActive (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt32 segmentNum,
    ViPBoolean onOff);
```

Description: This function reads the activation state for the ripple limit line number.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
segmentNum	ViUInt32	Segment number index starting from 1.
onOff	ViPBoolean	Ripple limit's state.

### C++ Example:

```
ViBoolean rippleLimitStatus = VI_FALSE;
status = ANVNA_GetRippleLimitLineActive ( sessionId, "CH1:TR1", 1,
&rippleLimitStatus );
```

### C# Example:

```
ushort onOff;
ANVNA.GetRippleLimitLineActive (sessionId, "CH1:TR1", 1, out onOff);
```

### Python Example:

```
status, limitSet = ANVNA_GetRippleLimitLineActive(sessionId, 1, 'CH1:TR1')
print('Limit testing get value is {}'.format(limitSet))
```

### MATLAB Example:

```
[status, limitStatus] = anvna.GetRippleLimitLineActive ('CH1:Trace1', 1);
```

## C-31 ANVNA\_SetRippleLimitLineActive

```
ViStatus ANVNA_SetRippleLimitLineActive (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt32 segmentNum,
    ViBoolean onOff);
```

Description: This function activates or deactivates a ripple limit line.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
segmentNum	ViUInt32	Segment number
onOff	ViBoolean	Ripple limit state.

### C++ Example:

```
status = ANVNA_SetRippleLimitLineActive ( sessionId, "CH1:TR1", 1, VI_TRUE );
```

### C# Example:

```
ANVNA.SetRippleLimitLineActive(sessionId, "CH1:TR1", 2, 1);
```

### Python Example:

```
status = ANVNA_SetRippleLimitLineActive(sessionId, 'CH1:TR1', 2, 1)
```

### MATLAB Example:

```
status = anvna.SetRippleLimitLineActive('CH1:Trace1', 2, 1);
```

## C-32 ANVNA\_SetRippleLimitLinesOnOff

```
ViStatus ANVNA_SetRippleLimitLinesOnOff (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViBoolean onOff);
```

Description: This function activates or deactivates ripple limit lines.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:TR1".)
onOff	ViBoolean	Ripple limit lines state.

### C++ Example:

```
status = ANVNA_SetRippleLimitLinesOnOff ( sessionId, "CH1:TR1", VI_TRUE );
```

### C# Example:

```
ANVNA.SetRippleLimitLinesOnOff(sessionId, "CH1:TR1", 1);
```

### Python Example:

```
status = ANVNA_SetRippleLimitLinesOnOff(sessionId, 'CH1:TR1', 1)
```

### MATLAB Example:

```
status = anvna.SetRippleLimitLinesOnOff('CH1:Trace1', 1);
```

## C-33 ANVNA\_GetRippleLimitLinesOnOff

```
ViStatus ANVNA_GetRippleLimitLinesOnOff (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViPBoolean onOff);
```

Description: This function reads the activation state for the ripple limit lines.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability. (Only channel index is identifier. Ex: "CH1:TR1".)
onOff	ViPBoolean	Ripple limit's state.

### C++ Example:

```
ViBoolean rippleLimitStatus = VI_FALSE;
status = ANVNA_GetRippleLimitLinesOnOff ( sessionId, "CH1:TR1", &rippleLimitStatus );
```

### C# Example:

```
ushort onOff;
ANVNA.GetRippleLimitLinesOnOff (sessionId, "CH1:TR1", out onOff);
```

### Python Example:

```
status, limitSet = ANVNA_GetRippleLimitLinesOnOff(sessionId, 'CH1:TR1')
print('Limit testing get value is {}'.format(limitSet))
```

### MATLAB Example:

```
[status, limitStatus] = anvna.GetRippleLimitLinesOnOff ('CH1:Trace1');
```

## C-34 ANVNA\_SetRippleLimitRippleValueFormat

```
ViStatus ANVNA_SetRippleLimitRippleValueFormat (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViPUInt32 type);
```

Description: This function ripple limit value format.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:TR1".)
type	ViPUInt32	Ripple value format type.

### C++ Example:

```
status = ANVNA_SetRippleLimitRippleValueFormat ( sessionId, "CH1:TR1", 1);
```

### C# Example:

```
ANVNA.SetRippleLimitRippleValueFormat(sessionId, "CH1:TR1", 1);
```

### Python Example:

```
status = ANVNA_SetRippleLimitRippleValueFormat(sessionId, 'CH1:TR1', 1)
```

### MATLAB Example:

```
status = anvna.SetRippleLimitRippleValueFormat('CH1:Trace1', 1);
```

## C-35 ANVNA\_GetRippleLimitRippleValueFormat

```
ViStatus ANVNA_GetRippleLimitRippleValueFormat (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViPUInt32 type);
```

Description: This function reads the ripple limit value format.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability. Ex: "CH1:TR1".
type	ViPUInt32	Ripple limit value format.

### C++ Example:

```
ViUInt32 rippleLimitType = 0;
status = ANVNA_GetRippleLimitRippleValueFormat ( sessionId, "CH1:TR1",
&rippleLimitType );
```

### C# Example:

```
uint type;
ANVNA.GetRippleLimitRippleValueFormat (sessionId, "CH1:TR1", out type);
```

### Python Example:

```
status, type = ANVNA_GetRippleLimitRippleValueFormat(sessionId, 'CH1:TR1')
print('Limit testing get value is {}'.format(type))
```

### MATLAB Example:

```
[status, type] = anvna.GetRippleLimitRippleValueFormat ('CH1:Trace1');
```

## C-36 ANVNA\_GetRippleLimitRippleMeasurementValue

```
ViStatus ANVNA_GetRippleLimitRippleMeasurementValue (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt32 segmentNum,
    ViPReal64 data);
```

Description: This function get ripple limit measurement value.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
segmentNum	ViUInt32	Segment number index starting from 1.
data	ViPReal64	Ripple limit measurement value.

### C++ Example:

```
ViReal64 rippleLimitValue = 100000000;
status = ANVNA_GetRippleLimitRippleMeasurementValue ( sessionId, "CH1:TR1", 1,
&rippleLimitValue );
```

### C# Example:

```
double data
ANVNA.GetRippleLimitRippleMeasurementValue (sessionId, "CH1:TR1", 1, out data);
```

### Python Example:

```
status, limitValue = ANVNA_GetRippleLimitRippleMeasurementValue (sessionId, 1,
'CH1:TR1')
print('Limit testing get value is {0}'.format(limitValue))
```

### MATLAB Example:

```
[status, limitValue] = anvna.GetRippleLimitRippleMeasurementValue ('CH1:Trace1',
1);
```

## C-37 ANVNA\_SetHybridCalFile

```
ViStatus ANVNA_SetHybridCalFile (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt32 fileNum,
    ViString fileName);
```

Description: Set hybrid cal file for current channel, including file number from 0-3.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability
fileNum	ViUInt32	File number for current channel (range: 1-4).
fileName	ViString	Filename to be stored, including full path.

### C++ Example:

```
ANVNA_SetHybridCalFile (sessionId, "CH1:TR1", 1, "C:\AnritsuVNA\filename.chx");
```

### C# Example:

```
ANVNA.SetHybridCalFile (sessionId, "CH1:TR1", 1, "C:\AnritsuVNA\filename.chx");
```

### Python Example:

```
Status = ANVNA_SetHybridCalFile (sessionId, 'CH1:TR1', 1,
'C:\AnritsuVNA\filename.chx');
```

### MATLAB Example:

```
anvna.SetHybridCalFile (sessionId, 'CH1:TR1', 1, 'C:\AnritsuVNA\filename.chx');
```

## C-38 ANVNA\_GetHybridCalFile

```
ViStatus ANVNA_GetHybridCalFile (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt32 fileNum,
    ViUInt32 bufferSize,
    ViPChar fileName);
```

Description: Gets hybrid cal file for current channel, and file number.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:".
fileNum	ViUInt32	File number for current channel (range: 1-4).
bufferSize	ViUInt32	Size (in bytes) of buffer area allocated for storing traceFileName.
fileName	ViPChar	Filename including full path. Pointer to buffer.

### C++ Example:

```
char buffer[512]
ANVNA_GetHybridCalFile (sessionId, "CH1:TR1", 0, 512, &buffer);
```

### C# Example:

```
String buffer = string.Empty;
ANVNA.GetHybridCalFile (sessionId, "CH1:TR1", 0, 512, buffer);
```

### Python Example:

```
Status, fileName = ANVNA_SetHybridCalFile (sessionId, 'CH1:TR1', 0)
```

### MATLAB Example:

```
[Status, filename] = anvna.SetHybridCalFile (sessionId, 'CH1:TR1', 0);
```

## C-39 ANVNA\_ClearHybridCalFile

```
ViStatus ANVNA_ClearHybridCalFile (
    ViSession vi,
    ViConstString repCapIdentifier
);
```

Description: Clears all hybrid cal files for all channels and file numbers.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:".

### C++ Example:

```
ANVNA_ClearHybridCalFile (sessionId, "CH1:TR1");
```

### C# Example:

```
ANVNA.ClearHybridCalFile (sessionId, "CH1:TR1");
```

### Python Example:

```
Status = ANVNA_SetHybridCalFile (sessionId, 'CH1:TR1')
```

### MATLAB Example:

```
[Status] = anvna.SetHybridCalFile (sessionId, 'CH1:TR1');
```

## C-40 ANVNA\_SetHybridThruLineUseReciprocal

```
ViStatus ANVNA_SetHybridThruLineUseReciprocal (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt32 firstPortSelected,
    ViUInt32 secondPortSelected,
    ViBoolean isThruReciprocal);
```

Description: Sets the Line Use Reciprocal value (true/false) for a given port pair.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:".
firstPortSelected	ViUInt32	First port identifying the selected port pair (1-4).
secondPortSelected	ViUInt32	Second port identifying the selected port pair (1-4).
isThruReciprocal	ViBoolean	Contains the value to set Thru Reciprocal to.

### C++ Example:

```
ANVNA_SetHybridThruLineUseReciprocal (sessionId, "CH1:TR1", 1, 2, true);
```

### C# Example:

```
ANVNA.SetHybridThruLineUseReciprocal (sessionId, "CH1:TR1", 1, 2, true);
```

### Python Example:

```
status, responseType = ANVNA_SetHybridThruLineUseReciprocal(sessionId, "CH1:TR1")
```

### MATLAB Example:

```
[Status] = anvna.SetHybridThruLineUseReciprocal (sessionId, 'CH1:TR1', 1, 2, true);
```

## C-41 ANVNA\_GetHybridThruLineUseReciprocal

```
ViStatus ANVNA_GetHybridThruLineUseReciprocal (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt32 firstPortSelected,
    ViUInt32 secondPortSelected,
    ViPBoolean isThruReciprocal);
```

Description: Gets the value of Line Use Reciprocal value (true/false) for a given port pair.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:".
firstPortSelected	ViUInt32	First port identifying the selected port pair (1-4).
secondPortSelected	ViUInt32	Second port identifying the selected port pair (1-4).
isThruReciprocal	ViPBoolean	Contains the retrieved value of Thru Reciprocal.

### C++ Example:

```
Bool value = false;
ANVNA_GetHybridThruLineUseReciprocal (sessionId, "CH1:TR1", 1, 2, &value);
```

### C# Example:

```
Bool value = false;
ANVNA.GetHybridThruLineUseReciprocal (sessionId, "CH1:TR1", 1, 2, ref value);
```

### Python Example:

```
Status, value = ANVNA_GetHybridThruLineUseReciprocal (sessionId, 'CH1:TR1', 1, 2)
```

### MATLAB Example:

```
[Status, value] = anvna.GetHybridThruLineUseReciprocal (sessionId, 'CH1:TR1', 1, 2);
```

## C-42 ANVNA\_ClearHybridThruLineUseReciprocal

```
ViStatus ANVNA_ClearHybridThruLineUseReciprocal (
    ViSession vi,
    ViConstString repCapIdentifier
);
```

Description: Sets the value of all Line Use Reciprocal value (true/false) for all port pair combos to false (default value).

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:".

### C++ Example:

```
ANVNA_ClearHybridThruLineUseReciprocal (sessionId, "CH1:TR1);
```

### C# Example:

```
ANVNA.ClearHybridThruLineUseReciprocal (sessionId, "CH1:TR1);
```

### Python Example:

```
Status = ANVNA_ClearHybridThruLineUseReciprocal (sessionId, 'CH1:TR1')
```

### MATLAB Example:

```
[Status] = anvna.ClearHybridThruLineUseReciprocal (sessionId, 'CH1:TR1');
```

## C-43 ANVNA\_SetHybridThruLineActive

```
ViStatus ANVNA_SetHybridThruLineActive (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt32 firstPortSelected,
    ViUInt32 secondPortSelected,
    ViBoolean isActive);
```

Description: Sets the Included value (true/false) for a given port pair.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:".
firstPortSelected	ViUInt32	First port identifying the selected port pair (1-4).
secondPortSelected	ViUInt32	Second port identifying the selected port pair (1-4).
isActive	ViBoolean	Contains the value to set IsIncluded to.

### C++ Example:

```
ANVNA_SetHybridThruLineActive (sessionId, "CH1:TR1", 1, 2, true);
```

### C# Example:

```
ANVNA.SetHybridThruLineActive (sessionId, "CH1:TR1", 1, 2, true);
```

### Python Example:

```
Status = ANVNA_SetHybridThruLineActive (sessionId, 'CH1:TR1', 1, 2, true)
```

### MATLAB Example:

```
[Status] = anvna.SetHybridThruLineActive (sessionId, 'CH1:TR1', 1, 2, true);
```

## C-44 ANVNA\_GetHybridThruLineActive

```
ViStatus ANVNA_GetHybridThruLineActive (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt32 firstPortSelected,
    ViUInt32 secondPortSelected,
    ViPBoolean isActive);
```

Description: Gets the value of Included value (true/false) for a given port pair.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:".
firstPortSelected	ViUInt32	First port identifying the selected port pair (1-4).
secondPortSelected	ViUInt32	Second port identifying the selected port pair (1-4).
isActive	ViPBoolean	Contains the value to set IsIncluded to.

### C++ Example:

```
ANVNA_GetHybridThruLineActive (sessionId, "CH1:TR1", 1, 2, true);
```

### C# Example:

```
ANVNA.GetHybridThruLineActive (sessionId, "CH1:TR1", 1, 2, true);
```

### Python Example:

```
Status = ANVNA_GetHybridThruLineActive (sessionId, 'CH1:TR1', 1, 2, true)
```

### MATLAB Example:

```
[Status] = anvna.GetHybridThruLineActive (sessionId, 'CH1:TR1', 1, 2, true);
```

## C-45 ANVNA\_ClearHybridThruLineActive

```
ViStatus ANVNA_ClearHybridThruLineActive (
    ViSession vi,
    ViConstString repCapIdentifier
);
```

**Description:** Sets the value of all Is Included value (true/false) for all port pair combos to false (default value).

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:".

### C++ Example:

```
ANVNA_ClearHybridThruLineActive (sessionId, "CH1:TR1);
```

### C# Example:

```
ANVNA.ClearHybridThruLineActive (sessionId, "CH1:TR1);
```

### Python Example:

```
Status = ANVNA_ClearHybridThruLineActive (sessionId, 'CH1:TR1')
```

### MATLAB Example:

```
[Status] = anvna.ClearHybridThruLineActive (sessionId, 'CH1:TR1');
```

## C-46 ANVNA\_BeginHybridCalFull2

```
ViStatus ANVNA_BeginHybridCalFull2 (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt32 firstPortSelected,
    ViUInt32 secondPortSelected
);
```

Description: Combines two single port cals into a 2-port hybrid cal.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:".
firstPortSelected	ViUInt32	First port identifying the selected port pair (1-4).
secondPortSelected	ViUInt32	Second port identifying the selected port pair (1-4).

### C++ Example:

```
ANVNA_BeginHybridCalFull2 (sessionId, "CH1:TR1", 1, 2);
```

### C# Example:

```
ANVNA.BeginHybridCalFull2 (sessionId, "CH1:TR1", 1, 2);
```

### Python Example:

```
Status = ANVNA_BeginHybridCalFull2 (sessionId, 'CH1:TR1', 1, 2)
```

### MATLAB Example:

```
[Status] = anvna.BeginHybridCalFull2 (sessionId, 'CH1:TR1', 1, 2);
```

## C-47 ANVNA\_BeginHybridCalFull3

```
ViStatus ANVNA_BeginHybridCalFull3 (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt32 firstPortSelected,
    ViUInt32 secondPortSelected,
    ViUInt32 thirdPortSelected
);
```

Description: Combines three single port cal's into a 3-port hybrid cal.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:".
firstPortSelected	ViUInt32	First port identifying the selected port in trio (1-4).
secondPortSelected	ViUInt32	Second port identifying the selected port in trio (1-4).
thirdPortSelected	ViUInt32	Third port identifying the selected port in trio (1-4).

### C++ Example:

```
ANVNA_BeginHybridCalFull3 (sessionId, "CH1:TR1", 1, 2, 3);
```

### C# Example:

```
ANVNA.BeginHybridCalFull3 (sessionId, "CH1:TR1", 1, 2, 3);
```

### Python Example:

```
Status = ANVNA_BeginHybridCalFull3 (sessionId, 'CH1:TR1', 1, 2, 3)
```

### MATLAB Example:

```
[Status] = anvna.BeginHybridCalFull3 (sessionId, 'CH1:TR1', 1, 2, 3);
```

## C-48 ANVNA\_BeginHybridCalFull4FromFull1

```
ViStatus ANVNA_BeginHybridCalFull4FromFull1 (
    ViSession vi,
    ViConstString repCapIdentifier
);
```

Description: Combines four single port calcs into a 4-port hybrid cal. Port numbers do not need to be specified because all 4 ports are used.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:".

### C++ Example:

```
ANVNA_BeginHybridCalFull4FromFull1 (sessionId, "CH1:TR1");
```

### C# Example:

```
ANVNA.BeginHybridCalFull4FromFull1 (sessionId, "CH1:TR1");
```

### Python Example:

```
Status = ANVNA_BeginHybridCalFull4FromFull1 (sessionId, 'CH1:TR1')
```

### MATLAB Example:

```
[Status] = anvna.BeginHybridCalFull4FromFull1 (sessionId, 'CH1:TR1');
```

```

ViStatus ANVNA_BeginHybridCalFull4FromFull2 (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt32 firstPortSelected,
    ViUInt32 secondPortSelected
);

```

**Description:** Combines two dual port calcs into a 4-port hybrid cal. The first and second port parameters specify the ports of the first dual-cal used. The remaining two ports are automatically selected from the remaining two ports. (For example, if ports 1 and 2 are specified as firstPortSelected and secondPortSelected, then ports 3 and 4 become the other two port pair)

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:".
firstPortSelected	ViUInt32	First port identifying the first selected port pair (1-4).
secondPortSelected	ViUInt32	Second port identifying the first selected port pair (1-4).

#### C++ Example:

```
ANVNA_BeginHybridCalFull4FromFull2 (sessionId, "CH1:TR1", 1, 2);
```

#### C# Example:

```
ANVNA.BeginHybridCalFull4FromFull2 (sessionId, "CH1:TR1", 1, 2);
```

#### Python Example:

```
Status = ANVNA_BeginHybridCalFull4FromFull2 (sessionId, 'CH1:TR1', 1, 2)
```

#### MATLAB Example:

```
[Status] = anvna.BeginHybridCalFull4FromFull2 (sessionId, 'CH1:TR1', 1, 2);
```

## C-50 ANVNA\_CollectHybridCalThruStandardData

```
ViStatus ANVNA_CollectHybridCalThruStandardData (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt32 firstPortSelected,
    ViUInt32 secondPortSelected
);
```

Description: Initiates Standard Thru/Reciprocal Data collection on selected port pair.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:".
firstPortSelected	ViUInt32	First port identifying the selected port pair (1-4).
secondPortSelected	ViUInt32	Second port identifying the selected port pair (1-4).

### C++ Example:

```
ANVNA_CollectHybridCalThruStandardData (sessionId, "CH1:TR1", 1, 2);
```

### C# Example:

```
ANVNA.CollectHybridCalThruStandardData (sessionId, "CH1:TR1", 1, 2);
```

### Python Example:

```
Status = ANVNA_CollectHybridCalThruStandardData (sessionId, 'CH1:TR1', 1, 2)
```

### MATLAB Example:

```
[Status] = anvna.CollectHybridCalThruStandardData (sessionId, 'CH1:TR1', 1, 2);
```

## C-51 ANVNA\_ChannelSaveState

```
ViStatus ANVNA_ChannelSaveState (
```

```
    ViSession Vi,
```

```
    ViConstString RepCapIdentifier,
```

```
    ViConstString Identifier);
```

Description: Saves the instrument state to the specified instrument file for the specified channel.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:".
Identifier	ViConstString	File name to be saved for the specified channel.

## C-52 ANVNA\_ChannelMeasurementSetUserDefinedParameter

```
ViStatus ANVNA_ChannelMeasurementSetUserDefinedParameter (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt32 numerator,
    ViUInt32 denominator,
    ViUInt32 DriverPort);
```

Description: Set user-defined measurement.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1".
numerator	ViUInt32	Numerator definition.
denominator	ViUInt32	Denominator definition.
DriverPort	ViUInt32	Driver port value.

---

### Numerator and Denominator Definitions

---

ANVNA\_VAL\_ANRITSU\_VNA\_MEASUREMENT\_A1  
ANVNA\_VAL\_ANRITSU\_VNA\_MEASUREMENT\_A2  
ANVNA\_VAL\_ANRITSU\_VNA\_MEASUREMENT\_B1  
ANVNA\_VAL\_ANRITSU\_VNA\_MEASUREMENT\_B2  
ANVNA\_VAL\_ANRITSU\_VNA\_MEASUREMENT\_ONE

---

#### C++ Example:

```
ViStatus status = VI_SUCCESS;
status = ANVNA_ChannelMeasurementSetUserDefinedParameter(sessionId, "CH1:TR1",
    ANVNA_VAL_ANRITSU_VNA_MEASUREMENT_A1, ANVNA_VAL_ANRITSU_VNA_MEASUREMENT_B1, 1);
```

#### C# Example:

```
int status = 0;
status = ANVNA.ChannelMeasurementSetUserDefinedParameter(sessionId, "CH1:TR1",
    ANVNA.VAL_ANRITSU_VNA_MEASUREMENT_A1, ANVNA.VAL_ANRITSU_VNA_MEASUREMENT_B1, 1);
```

#### Python Example:

```
status = ANVNA_ChannelMeasurementSetUserDefinedParameter(sessionId, "CH1:TR1",
    ANVNA_VAL_ANRITSU_VNA_MEASUREMENT_A1, ANVNA_VAL_ANRITSU_VNA_MEASUREMENT_B1, 1)
```

**MATLAB Example:**

```
status = anvna.ChannelMeasurementSetUserDefinedParameter('CH1:TR1',  
anvna.VAL_ANRITSU_VNA_MEUREMENT_A1, anvna.VAL_ANRITSU_VNA_MEUREMENT_B1, 1);
```

## C-53 ANVNA\_ChannelMeasurement GetUserDefinedParameter

```
ViStatus ANVNA_ChannelMeasurementSetUserDefinedParameter (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViPUIInt32 numerator,
    ViPUIInt32 denominator,
    ViPUIInt32 DriverPort);
```

Description: Get user-defined measurement.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1".
numerator	ViPUIInt32	Numerator definition.
denominator	ViPUIInt32	Denominator definition.
DriverPort	ViPUIInt32	Driver port value.

---

### Numerator and Denominator Definitions

---

ANVNA\_VAL\_ANRITSU\_VNA\_MEASUREMENT\_A1  
 ANVNA\_VAL\_ANRITSU\_VNA\_MEASUREMENT\_A2  
 ANVNA\_VAL\_ANRITSU\_VNA\_MEASUREMENT\_B1  
 ANVNA\_VAL\_ANRITSU\_VNA\_MEASUREMENT\_B2  
 ANVNA\_VAL\_ANRITSU\_VNA\_MEASUREMENT\_ONE

---

#### C++ Example:

```
ViStatus status = VI_SUCCESS;
ViUInt32 numerator = 0;
ViUInt32 denominator = 0;
ViUInt32 DriverPort = 0;

status = ANVNA_ChannelMeasurementGetUserDefinedParameter(sessionId, "CH1:TR11",
    &numerator, &denominator, &DriverPort);
```

**C# Example:**

```
int status = 0;  
uint numerator = 0;  
uint denominator = 0;  
uint DriverPort = 0;  
  
status = ANVNA.ChannelMeasurement GetUserDefinedParameter(sessionId, "CH1:TR1", out  
numerator, out denominator, out DriverPort);
```

**Python Example:**

```
status, numerator, denominator, DriverPort =  
ANVNA_ChannelMeasurement GetUserDefinedParameter(sessionId, "CH1:TR1")
```

**MATLAB Example:**

```
status, numerator, denominator, DriverPort =  
anvna.ChannelMeasurement GetUserDefinedParameter('CH1:TR1');
```

## C-54 ANVNA\_ChannelMeasurementGetMixedModeResponseType

```
ViStatus ANVNA_ChannelMeasurementGetMixedModeResponseType (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViPUInt32 responseType);
```

Description: Get the response type.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1".
ResponseType	ViPUInt32	Response type value.

### C++ Example:

```
ViStatus status = VI_SUCCESS;
ViUInt32 responseType = 0;
status = ANVNA_ChannelMeasurementGetMixedModeResponseType(sessionId, "CH1:TR1",
&responseType);
```

### C# Example:

```
int status = 0;
uint responseType = 0;
status = ANVNA.ChannelMeasurementGetMixedModeResponseType(sessionId, "CH1:TR1", out
responseType);
```

### Python Example:

```
status, responseType = ANVNA_ChannelMeasurementGetMixedModeResponseType(sessionId,
"CH1:TR1")
```

### MATLAB Example:

```
status, responseType = anvna.ChannelMeasurementGetMixedModeResponseType('CH1:TR1');
```

## C-55 ANVNA\_ChannelMeasurementSetMixedModeTwoDiffPairsResponse

```
ViStatus ANVNA_ChannelMeasurementSetMixedModeTwoDiffPairsResponse (
    ViSession vi,
    ViConstString RepCapIdentifier,
    ViUint32 Pair1Port1,
    ViUint32 Pair1Port2,
    ViUint32 Pair2Port1,
    ViUint32 Pair2Port2,
    ViUInt32 Response);
```

Description: Sets the measurement parameter to specified value.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1".
Pair1Port1	ViUInt32	Pair1 port1 value.
Pair1Port2	ViUInt32	Pair1 port2 value.
Pair2Port1	ViUInt32	Pair2 port1 value.
Pair2Port2	ViUInt32	Pair2 port2 value.
Response	ViUInt32	Response value.

### C++ Example:

```
/*
 * Initialization code ...
 * Measurement setup ...
 */

ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];

if ((status = ANVNA_ChannelMeasurementSetMixedModeTwoDiffPairsResponse (sessionId,
"CH1:Measurement1", 2, 1, 2, 1, 1)) != VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while setting mixed mode two diff pairs response: %s\n", status,
ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
```

```
}
```

**C# Example:**

```
/*
 * Initialization code ...
 * Measurement setup ...
 */

int status = 0;
if ((status =
ANVNA.ChannelMeasurementSetMixedModeTwoDiffPairsResponse(sessionId,
"CH1:Measurement1", 2, 1, 2, 1, 1)) != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + "while setting mixed
mode two diff pairs responses: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}
```

**Python Example:**

```
# Initialization code ...
# Measurement setup ...

status = ANVNA_ChannelMeasurementSetMixedModeTwoDiffPairsResponse(sessionId,
"CH1:Measurement1", 2, 1, 2, 1, 1)
if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print("Error {0} while setting mixed mode two diff pairs response:
{1}\n".format(status, ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)
print(sessionId, 'ANVNA_ChannelMeasurementSetMixedModeTwoDiffPairsResponse
on CH1:Measurement1', status)
```

**MATLAB Example:**

```
% Initialization code ...

% Measurement setup ...

status =
anvna.ChannelMeasurementSetMixedModeTwoDiffPairsResponse('CH1:Measurement1', 2, 1,
2, 1, 1);

if( status ~= 0)
    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while setting mixed mode two diff pairs response:
%s\n', stat, ErrorMessage);
    status = anvna.close();

return;

end
```

## C-56 ANVNA\_ChannelMeasurementGetMixedModeTwoDiffPairsResponse

```
ViStatus ANVNA_ChannelMeasurementGetMixedModeTwoDiffPairsResponse (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt32 *pPair1Port1,
    ViUInt32 *pPair1Port2,
    ViUInt32 *pPair2Port1,
    ViUInt32 *pPair2Port2,
    ViUInt32 *pResponse);
```

Description: Returns the values for mixed mode two diff pair response.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1".
pPair1Port1	ViUInt32*(passed by pointer)	Pair1 port1.
pPair1Port2	ViUInt32*	Pair1 port2.
pPair2Port1	ViUInt32*	Pair2 port1.
pPair2Port2	ViUInt32*	Pair2 port2.
pResponse	ViUInt32* (passed by pointer)	Response.

### C++ Example:

```
/*
 * Initialization code ...
 * Measurement setup ...
 */

ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
ViUInt32 Pair1Port1 = 0;
ViUInt32 Pair1Port2 = 0;
ViUInt32 Pair2Port1 = 0;
ViUInt32 Pair2Port2 = 0;
ViUInt32 Response = 0;
```

```
if ((status = ANVNA_ChannelMeasurementGetMixedModeTwoDiffPairsResponse (sessionId,
    "CH1:Measurement1", &Pair1Port1, &Pair1Port2, &Pair2Port1, &Pair2Port2, &Response)) != VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while reading mixed mode two diff pairs response: %s\n", status,
        ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
```

**C# Example:**

```
/*
 * Initialization code ...
 * Measurement setup ...
 */

int status = 0;
int Pair1Port1 = 0;
int Pair1Port2 = 0;
int Pair2Port1 = 0;
int Pair2Port2 = 0;

    int Response = 0;

    if ((status = ANVNA.ChannelMeasurementGetMixedModeTwoDiffPairsResponse
(sessionId, "CH1:Measurement1", out Pair1Port1, out Pair1Port2, out Pair2Port1, out
Pair2Port2, out Response)) != 0)

    {

        string ErrorMessage = "";
        ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);

        System.Console.WriteLine("Error " + status + " while reading mixed
mode two diff pairs response: " + ErrorMessage);

        ANVNA.close(sessionId);
        System.Environment.Exit(1);
    }
}
```

**Python Example:**

```
#Initialization code ...

#Measurement setup ...

status, pair1Port1, pair1Port2, pair2Port1, pair2Port2, response =
ANVNA_ChannelMeasurementGetMixedModeTwoDiffPairsResponse (sessionId,
"CH1:Measurement1")

if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print("Error {0} while reading mixed mode two diff pairs response:
{0}\n".format(status, ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)
```

**MATLAB Example:**

```
% Initialization code ...

% Measurement setup ...

[status, pair1Port1, pair1Port2, pair2Port1, pair2Port2, response] =
anvna.ChannelMeasurementGetMixedModeTwoDiffPairsResponse ('CH1:Measurement1');

if( status ~= 0)

    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while reading mixed mode two diff pairs response:
%s\n', stat, ErrorMessage);
    status = anvna.close();

return;

end
```

## C-57 ANVNA\_ChannelMeasurementSetMixedModeOneDiffPairOneSingResponse

```
ViStatus ANVNA_ChannelMeasurementSetMixedModeOneDiffPairOneSingResponse (
    ViSession vi,
    ViConstString RepCapIdentifier,
    ViUint32 Pair1Port1,
    ViUint32 Pair1Port2,
    ViUint32 Singleton1,
    ViUInt32 Response);
```

Description: Sets the measurement parameter to specified value.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1".
Pair1Port1	ViUInt32	Pair1 port1 value.
Pair1Port2	ViUInt32	Pair1 port2 value.
Singleton1	ViUInt32	Singleton1.
Response	ViUInt32	Response Value

### C++ Example:

```
/*
 * Initialization code ...
 * Measurement setup ...
 */

ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];

if ((status = ANVNA_ChannelMeasurementSetMixedModeOneDiffPairOneSingResponse
(sessionId, "CH1:Measurement1", 2, 1, 1, 1)) != VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while setting mixed mode one diff pair one singleton response:
%s\n", status, ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
```

```
}
```

**C# Example:**

```
/*
 * Initialization code ...
 * Measurement setup ...
 */

int status = 0;
if ((status =
ANVNA.ChannelMeasurementSetMixedModeOneDiffPairOneSingResponse (sessionId,
"CH1:Measurement1", 2, 1, 1, 1)) != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + "while setting mixed
mode one diff pair one singleton responses: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}
```

**Python Example:**

```
# Initialization code ...
# Measurement setup ...

status = ANVNA_ChannelMeasurementSetMixedModeOneDiffPairOneSingResponse
(sessionId, "CH1:Measurement1", 2, 1, 1, 1)
if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print("Error {0} while setting mixed mode one diff pair one singleton
response: {1}\n".format(status, ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)
    print(sessionId,
'ANVNA_ChannelMeasurementSetMixedModeOneDiffPairOneSingResponse on
CH1:Measurement1', status)
```

**MATLAB Example:**

```
% Initialization code ...

% Measurement setup ...

status = anvna.ChannelMeasurementSetMixedModeOneDiffPairOneSingResponse
('CH1:Measurement1', 2, 1, 1, 1);

if( status ~= 0)
    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while setting mixed mode one diff pair one singleton
response: %s\n', stat, ErrorMessage);
    status = anvna.close();

return;

end
```

## C-58 ANVNA\_ChannelMeasurementGetMixedModeOneDiffPairOneSingResponse

```
ViStatus ANVNA_ChannelMeasurementGetMixedModeOneDiffPairOneSingResponse (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt32 *pPair1Port1,
    ViUInt32 *pPair1Port2,
    ViUInt32 *pSingleton1,
    ViUInt32 *pResponse);
```

Description: Returns the values for mixed mode one diff pair one singleton response.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1".
pPair1Port1	ViUInt32* (passed by pointer)	Pair1 port1.
pPair1Port2	ViUInt32*	Pair1 port2.
pSingleton1	ViUInt32*	Pair2 port1.
pResponse	ViUInt32* (passed by pointer)	Response.

### C++ Example:

```
/*
 * Initialization code ...
 * Measurement setup ...
 */
ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
ViUInt32 Pair1Port1 = 0;
ViUInt32 Pair1Port2 = 0;
ViUInt32 Singleton1 = 0;
ViUInt32 Response = 0;
```

```

if ((status = ANVNA_ChannelMeasurementGetMixedModeOneDiffPairOneSingResponse
(sessionId, "CH1:Measurement1", &Pair1Port1, &Pair1Port2, &Singleton1, &Response))
!= VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while reading mixed mode one diff pair one singleton response:
%s\n", status, ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}

```

**C# Example:**

```

/*
 * Initialization code ...
 * Measurement setup ...
 */

int status = 0;
int Pair1Port1 = 0;
int Pair1Port2 = 0;
int Singleton1 = 0;
int Response = 0;

    if ((status =
ANVNA.ChannelMeasurementGetMixedModeOneDiffPairOneSingResponse (sessionId,
"CH1:Measurement1", out Pair1Port1, out Pair1Port2, out Singleton1, out Response))
!= 0)

    {

        string ErrorMessage = "";
        ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);

        System.Console.WriteLine("Error " + status + " while reading mixed
mode one diff pair one singleton response: " + ErrorMessage);

        ANVNA.close(sessionId);

        System.Environment.Exit(1);
    }
}

```

**Python Example:**

```
#Initialization code ...  
  
#Measurement setup ...  
  
    status, pair1Port1, pair1Port2, singleton1, response =  
    ANVNA_ChannelMeasurementGetMixedModeOneDiffPairOneSingResponse (sessionId,  
    "CH1:Measurement1")  
  
    if status != 0:  
        ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)  
        print("Error {0} while reading mixed mode one diff pair one singleton  
response: {0}\n".format(status, ErrorMessage))  
        ANVNA_close(sessionId)  
        exit(1)
```

**MATLAB Example:**

```
% Initialization code ...  
  
% Measurement setup ...  
  
[status, pair1Port1, pair1Port2, singleton1, response] =  
anvna.ChannelMeasurementGetMixedModeOneDiffPairOneSingResponse  
('CH1:Measurement1');  
  
if( status ~= 0)  
  
    [ stat, ErrorMessage ] = anvna.error_message(status);  
    fprintf('Error %d while reading mixed mode one diff pair one singleton  
response: %s\n', stat, ErrorMessage);  
    status = anvna.close();  
return;  
  
end
```

## C-59 ANVNA\_ChannelMeasurementSetMixedModeOneDiffPairTwoSingResponse

```
ViStatus ANVNA_ChannelMeasurementSetMixedModeOneDiffPairTwoSingResponse (
    ViSession vi,
    ViConstString RepCapIdentifier,
    ViUInt32 Pair1Port1,
    ViUInt32 Pair1Port2,
    ViUInt32 Singleton1,
    ViUInt32 Singleton2,
    ViUInt32 Response);
```

Description: Sets the measurement parameter to specified value.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1".
Pair1Port1	ViUInt32	Pair1 port1 value.
Pair1Port2	ViUInt32	Pair1 port2 value.
Singleton1	ViUInt32	Singleton1.
Singleton2	ViUInt32	Singleton2.
Response	ViUInt32	Response value.

### C++ Example:

```
/*
 * Initialization code ...
 * Measurement setup ...
 */
ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];

if ((status = ANVNA_ChannelMeasurementSetMixedModeOneDiffPairTwoSingResponse
(sessionId, "CH1:Measurement1", 2, 1, 1, 2, 2)) != VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while setting mixed mode one diff pair two singleton response:
%s\n", status, ErrorMessage);
```

```

ANVNA_close(sessionId);
exit(1);
}

```

**C# Example:**

```

/*
 * Initialization code ...
 * Measurement setup ...
 */

int status = 0;
if ((status =
ANVNA.ChannelMeasurementSetMixedModeOneDiffPairTwoSingResponse (sessionId,
"CH1:Measurement1", 2, 1, 1, 2, 2)) != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + "while setting mixed
mode one diff pair two singleton responses: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}

```

**Python Example:**

```

# Initialization code ...

# Measurement setup ...

status = ANVNA_ChannelMeasurementSetMixedModeOneDiffPairTwoSingResponse
(sessionId, "CH1:Measurement1", 2, 1, 1, 2, 2)

if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print("Error {0} while setting mixed mode one diff pair two singleton
response: {1}\n".format(status, ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)
    print(sessionId,
'ANVNA_ChannelMeasurementSetMixedModeOneDiffPairTwoSingResponse on
CH1:Measurement1', status)

```

**MATLAB Example:**

```
% Initialization code ...

% Measurement setup ...

status = anvna.ChannelMeasurementSetMixedModeOneDiffPairTwoSingResponse
('CH1:Measurement1', 2, 1, 1, 2, 2);

if( status ~= 0)
    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while setting mixed mode one diff pair two singleton
response: %s\n', stat, ErrorMessage);
    status = anvna.close();

return;

end
```

## C-60 ANVNA\_ChannelMeasurementGetMixedModeOneDiffPairTwoSingResponse

```
ViStatus ANVNA_ChannelMeasurementGetMixedModeOneDiffPairTwoSingResponse (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt32 *pPair1Port1,
    ViUInt32 *pPair1Port2,
    ViUInt32 *pSingleton1,
    ViUInt32 *pSingleton2,
    ViUInt32 *pResponse);
```

Description: Returns the values for mixed-mode one differential pair two singleton response.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1".
pPair1Port1	ViUInt32* (passed by pointer)	Pair1 port1.
pPair1Port2	ViUInt32*	Pair1 port2.
pSingleton1	ViUInt32*	Singleton1.
pSingleton2	ViUInt32*	Singleton2.
pResponse	ViUInt32* (passed by pointer)	Response.

### C++ Example:

```
/*
 * Initialization code ...
 * Measurement setup ...
 */

ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
ViUInt32 Pair1Port1 = 0;
ViUInt32 Pair1Port2 = 0;
ViUInt32 Singleton1 = 0;
ViUInt32 Singleton2 = 0;
ViUInt32 Response = 0;
```

```
if ((status = ANVNA_ChannelMeasurementGetMixedModeOneDiffPairTwoSingResponse
(sessionId, "CH1:Measurement1", &Pair1Port1, &Pair1Port2, &Singleton1, &Singleton2,
&Response)) != VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while reading mixed mode one diff pair two singleton response:
%s\n", status, ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
```

**C# Example:**

```
/*
 * Initialization code ...
 * Measurement setup ...
 */

int status = 0;
int Pair1Port1 = 0;
int Pair1Port2 = 0;
int Singleton1 = 0;
int Singleton2 = 0;
int Response = 0;

    if ((status =
ANVNA.ChannelMeasurementGetMixedModeOneDiffPairTwoSingResponse (sessionId,
"CH1:Measurement1", out Pair1Port1, out Pair1Port2, out Singleton1, out Singleton2,
out Response)) != 0)

    {

        string ErrorMessage = "";
        ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);

        System.Console.WriteLine("Error " + status + " while reading mixed
mode one diff pair two singleton response: " + ErrorMessage);

        ANVNA.close(sessionId);

        System.Environment.Exit(1);
    }
```

**Python Example:**

```
#Initialization code ...  
  
#Measurement setup ...  
  
    status, pair1Port1, pair1Port2, singleton1, singleton2, response =  
    ANVNA_ChannelMeasurementGetMixedModeOneDiffPairTwoSingResponse (sessionId,  
    "CH1:Measurement1")  
  
    if status != 0:  
        ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)  
        print("Error {0} while reading mixed mode one diff pair two singleton  
        response: {0}\n".format(status, ErrorMessage))  
        ANVNA_close(sessionId)  
        exit(1)
```

**MATLAB Example:**

```
% Initialization code ...  
  
% Measurement setup ...  
  
[status, pair1Port1, pair1Port2, singleton1, singleton2, response] =  
anvna.ChannelMeasurementGetMixedModeOneDiffPairTwoSingResponse  
('CH1:Measurement1');  
  
if( status ~= 0)  
  
    [ stat, ErrorMessage ] = anvna.error_message(status);  
    fprintf('Error %d while reading mixed mode one diff pair two singleton  
    response: %s\n', stat, ErrorMessage);  
    status = anvna.close();  
return;  
  
end
```

## C-61 ANVNA\_ChannelMeasurementSetMixedModeOneDiffPairResponse

```
ViStatus ANVNA_ChannelMeasurementSetMixedModeOneDiffPairResponse (
    ViSession vi,
    ViConstString RepCapIdentifier,
    ViUint32 Pair1Port1,
    ViUint32 Pair1Port2,
    ViUInt32 Response);
```

Description: Sets the measurement parameter to specified value.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1".
Pair1Port1	ViUInt32	Pair1 port1 value.
Pair1Port2	ViUInt32	Pair1 port2 value.
Response	ViUInt32	Response value.

### C++ Example:

```
/*
 * Initialization code ...
 * Measurement setup ...
 */

ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];

if ((status = ANVNA_ChannelMeasurementSetMixedModeOneDiffPairResponse (sessionId,
"CH1:Measurement1", 2, 1, 1)) != VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while setting mixed mode one diff pair response: %s\n", status,
ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
```

**C# Example:**

```

/*
 * Initialization code ...
 * Measurement setup ...
 */

int status = 0;

if ((status = ANVNA.ChannelMeasurementSetMixedModeOneDiffPairResponse
(sessionId, "CH1:Measurement1", 2, 1, 1)) != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + "while setting mixed
mode one diff pair response: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}

```

**Python Example:**

```

# Initialization code ...

# Measurement setup ...

status = ANVNA_ChannelMeasurementSetMixedModeOneDiffPairResponse (sessionId,
"CH1:Measurement1", 2, 1, 1)

if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print("Error {0} while setting mixed mode one diff pair response:
{1}\n".format(status, ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)

print(sessionId, 'ANVNA_ChannelMeasurementSetMixedModeOneDiffPairResponse
on CH1:Measurement1', status)

```

**MATLAB Example:**

```
% Initialization code ...

% Measurement setup ...

status = anvna.ChannelMeasurementSetMixedModeOneDiffPairResponse
('CH1:Measurement1', 2, 1, 1);

if( status ~= 0)
    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while setting mixed mode one diff pair response:
%s\n', stat, ErrorMessage);

status = anvna.close();

return;

end
```

## C-62 ANVNA\_ChannelMeasurementGetMixedModeOneDiffPairResponse

```
ViStatus ANVNA_ChannelMeasurementGetMixedModeOneDiffPairResponse (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt32 *pPair1Port1,
    ViUInt32 *pPair1Port2,
    ViUInt32 *pResponse);
```

Description: Returns the values for mixed mode one diff pair response.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1".
pPair1Port1	ViUInt32* (passed by pointer)	Pair1 port1.
pPair1Port2	ViUInt32*	Pair1 port2.
pResponse	ViUInt32* (passed by pointer)	Response.

### C++ Example:

```
/*
 * Initialization code ...
 * Measurement setup ...
 */

ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
ViUInt32 Pair1Port1 = 0;
ViUInt32 Pair1Port2 = 0;
ViUInt32 Response = 0;

if ((status = ANVNA_ChannelMeasurementGetMixedModeOneDiffPairResponse (sessionId,
"CH1:Measurement1", &Pair1Port1, &Pair1Port2, &Response)) != VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while reading mixed mode one diff pair response: %s\n", status,
ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
```

```
}
```

**C# Example:**

```
/*
 * Initialization code ...
 * Measurement setup ...
 */

int status = 0;
int Pair1Port1 = 0;
int Pair1Port2 = 0;
int Response = 0;

if ((status = ANVNA.ChannelMeasurementGetMixedModeOneDiffPairResponse
(sessionId, "CH1:Measurement1", out Pair1Port1, out Pair1Port2, out Response)) != 0)

{

    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " while reading mixed
mode one diff pair response: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}
```

**Python Example:**

```
#Initialization code ...
#Measurement setup ...

status, pair1Port1, pair1Port2, response =
ANVNA_ChannelMeasurementGetMixedModeOneDiffPairResponse (sessionId,
"CH1:Measurement1")

if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print("Error {0} while reading mixed mode one diff pair response:
{0}\n".format(status, ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)
```

**MATLAB Example:**

```
% Initialization code ...

% Measurement setup ...

[status, pair1Port1, pair1Port2, response] =
anvna.ChannelMeasurementGetMixedModeOneDiffPairResponse ('CH1:Measurement1');

if( status ~= 0)
    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while reading mixed mode one diff pair response:
%s\n', stat, ErrorMessage);
    status = anvna.close();

return;
end
```

## C-63 ANVNA\_ChannelMeasurementSetMaxEfficiencyResponse

```
ViStatus ANVNA_ChannelMeasurementSetMaxEfficiencyResponse (
    ViSession vi,
    ViConstString RepCapIdentifier,
    ViUint32 Port1,
    ViUint32 Port2);
```

Description: Sets the measurement parameter to specified value.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1".
Port1	ViUint32	Pair1 value.
Port2	ViUint32	Pair2 value.

### C++ Example:

```
/*
 * Initialization code ...
 * Measurement setup ...
 */

ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];

if ((status = ANVNA_ChannelMeasurementSetMaxEfficiencyResponse (sessionId,
"CH1:Measurement1", 1, 2)) != VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while setting max efficiency response: %s\n", status,
ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
```

**C# Example:**

```
/*
 * Initialization code ...
 * Measurement setup ...
 */

int status = 0;

if ((status = ANVNA.ChannelMeasurementSetMaxEfficiencyResponse
(sessionId, "CH1:Measurement1", 1, 2)) != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + "while setting max
efficiency response: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}
```

**Python Example:**

```
# Initialization code ...

# Measurement setup ...

status = ANVNA_ChannelMeasurementSetMaxEfficiencyResponse (sessionId,
"CH1:Measurement1", 1, 2)

if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print("Error {0} while setting max efficiency response:
{1}\n".format(status, ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)

print(sessionId, 'ANVNA_ChannelMeasurementSetMaxEfficiencyResponse on
CH1:Measurement1', status)
```

**MATLAB Example:**

```
% Initialization code ...

% Measurement setup ...

status = anvna.ChannelMeasurementSetMaxEfficiencyResponse
('CH1:Measurement1', 1, 2);

if( status ~= 0)
    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while setting max efficiency response: %s\n', stat,
ErrorMessage);

status = anvna.close();

return;

end
```

## C-64 ANVNA\_ChannelMeasurementGetMaxEfficiencyResponse

```
ViStatus ANVNA_ChannelMeasurementGetMaxEfficiencyResponse (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt32 *pPort1,
    ViUInt32 *pPort2);
```

Description: Returns the values for max efficiency response.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1".
pPair1Port1	ViUInt32* (passed by pointer)	Pair1.
pPair1Port2	ViUInt32*	Pair2.

### C++ Example:

```
/*
 * Initialization code ...
 * Measurement setup ...
 */
ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
ViUInt32 Port1 = 0;
ViUInt32 Port2 = 0;

if ((status = ANVNA_ChannelMeasurementGetMaxEfficiencyResponse (sessionId,
"CH1:Measurement1", &Port1, &Port2)) != VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while reading max efficiency response: %s\n", status,
ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
```

**C# Example:**

```
/*
 * Initialization code ...
 * Measurement setup ...
 */

int status = 0;
int Port1 = 0;
int Port2 = 0;

if ((status = ANVNA.ChannelMeasurementGetMaxEfficiencyResponse (sessionId,
"CH1:Measurement1", out Port1, out Port2)) != 0)

{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);

    System.Console.WriteLine("Error " + status + " while reading max
efficiency response: " + ErrorMessage);

    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}
```

**Python Example:**

```
#Initialization code ...

#Measurement setup ...

status, port1, port2 = ANVNA_ChannelMeasurementGetMaxEfficiencyResponse (sessionId,
"CH1:Measurement1")

if status != 0:

    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print("Error {0} while reading max efficiency response:
{0}\n".format(status, ErrorMessage))

    ANVNA_close(sessionId)
    exit(1)
```

**MATLAB Example:**

```
% Initialization code ...

% Measurement setup ...

[status, port1, port2] = anvna.ChannelMeasurementGetMaxEfficiencyResponse
('CH1:Measurement1');

if( status ~= 0)
    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while reading max efficiency response: %s\n', stat,
ErrorMessage);

status = anvna.close();

return;

end
```

## C-65 ANVNA\_ChannelMeasurementSetSParameter

```
ViStatus ANVNA_ChannelMeasurementSetSParameter (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViInt32 newReceiverPortVal,
    ViInt32 newSourcePortVal);
```

Description: Sets the measurement parameter to specified value.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1".
newReceiverPortVal	ViInt32	Receiver port value.
newSourcePortVal	ViInt32	Source port value.

### C++ Example:

```
/*
 * Initialization code ...
 * Measurement setup ...
 */

ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];

// Set S21 on CH1:Measurement1
if ((status = ANVNA_ChannelMeasurementSetSParameter(sessionId, "CH1:Measurement1",
2, 1)) != VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while setting source and destination port numbers: %s\n",
status, ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
// Now CH1:Measurement1 is set as S21 ...
```

**C# Example:**

```

/*
 * Initialization code ...
 * Measurement setup ...
 */

int status = 0;
// Set S21 on CH1:Measurement1
if ((status = ANVNA.ChannelMeasurementSetSParameter(sessionId,
"CH1:Measurement1", 2, 1)) != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + "while setting source and
destination port numbers: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}

// Now CH1:Measurement1 is set as S21 ...

```

**Python Example:**

```

# Initialization code ...
# Measurement setup ...

status = ANVNA_ChannelMeasurementSetSParameter(sessionId, "CH1:Measurement1",
2, 1)
if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print("Error {0} while setting source and destination port numbers:
{1}\n".format(status, ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)
    print(sessionId, 'ANVNA_ChannelMeasurementSetSParameter on
CH1:Measurement1', status)

# Now CH1:Measurement1 is set as S21...

```

**MATLAB Example:**

```
% Initialization code ...

% Measurement setup ...
status = anvna.ChannelMeasurementSetSParameter('CH1:Measurement1', 2, 1);
if( status ~= 0)

    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while setting source and destination port numbers:
%s\n', stat, ErrorMessage);
    status = anvna.close();
    return;

end

% Now CH1:Measurement1 is set as S21 ...
```

## C-66 ANVNA\_ChannelSegmentGetCount

```
ViStatus ANVNA_ChannelSegmentGetCount (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViPUInt32 numSegments);
```

Description: Returns the number of segments declared per channel. Default value is 1. The function will return 1 if no segments are declared or after [ANVNA\\_ChannelSegmentDeleteAll](#) is called.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:").
numSegments	ViPUInt32	Number of segments returned by the function.

### C++ Example:

```
// get number of points:
ViUInt32 segments = 0;

if ((status = ANVNA_ChannelSegmentGetCount(sessionId, "CH1:", &segments)) != VI_SUCCESS)
{
    char ErrorMessage[MAX_STRING_LENGTH];
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while retrieving number of segments: %s\n", status, ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
printf("number of segments is %d\n", segments);
```

**C# Example:**

```

// Get the number of points

    uint segments;

    if ((status = ANVNA.ChannelSegmentGetCount(sessionId, "CH1:", out
segments)) != 0)

    {

        string ErrorMessage = "";

        ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);

        System.Console.WriteLine("Error " + status + " while retrieving
number of segments: " + ErrorMessage);

        ANVNA.close(sessionId);

        System.Environment.Exit(1);

    }

    System.Console.WriteLine("number of segments " + segments);

```

**Python Example:**

```

# Get the number of points:

status, segments = ANVNA_ChannelSegmentGetCount(sessionId, "CH1:Measurement1")

if status != 0:

    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH);

    print('Error {0} while retrieving number of segments: {1}\n'.format(status,
ErrorMessage))

    ANVNA_close(sessionId)

    exit(1)

print ("number of segments is {0}\n".format(segments))

```

**MATLAB Example:**

```

% get number of points:

[status, segments] = anvna.ChannelSegmentGetCount('CH1:');

if( status ~= 0)

    [ stat, ErrorMessage ] = anvna.error_message(status);

    fprintf('Error %d while retrieving number of segments: %s\n', stat,
ErrorMessage);

    status = anvna.close();

return;

end

fprintf('number of segments is %d\n', segments);

```

## C-67 ANVNA\_ChannelSegmentGetProperties

```
ViStatus ANVNA_ChannelSegmentGetProperties (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViInt32 SegmentId,
    ViPReal64 StartVal,
    ViPReal64 StopVal,
    ViPInt32 NumberOfPointsVal,
    ViPReal64 IFBandwidthVal);
```

Description : Returns all properties (start and stop frequencies, number of points, IF Bandwidth, Power and time values) of a given segment. Segment is selected using segmented value.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:").
SegmentId	ViPUInt32	Segment selector. Range is 0 : ANVNA_ChannelSegmentGetCount Result -1
StartVal	ViPReal64	Start frequency [Hz].
StopVal	ViPReal64	Stop frequency [Hz].
NumberOfPointsVal	ViPInt32	Number of points.
IFBandwidthVal	ViPReal64	IF Bandwidth [Hz].

### C++ Example:

```
/*
 * Initialization code ...
 * Measurement setup ...
 */

ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];

ViReal64 StartVal;
ViReal64 StopVal;
ViInt32 NumberOfPointsVal;
ViReal64 IFBandwidthVal;

if(( status = ANVNA_ChannelSegmentGetProperties(sessionId, "CH1:", 1,
&StartVal, &StopVal, &NumberOfPointsVal, &IFBandwidthVal)) != VI_SUCCESS)
{
```

```
ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
printf("Error %d while getting segment properties: %s\n", status, ErrorMessage);
ANVNA_close(sessionId);
exit(1);
}
// Now there is a new segment on channel CH1
```

**C# Example:**

```
/*
 * Initialization code ...
 * Measurement setup ...
 */

int status = 0;
double StartVal;
double StopVal;
int NumberOfPointsVal;
double IFBandwidthVal;

if ((status = ANVNA.ChannelSegmentGetProperties(sessionId, "CH1:", 1, out StartVal,
out StopVal, out NumberOfPointsVal, out IFBandwidthVal)) != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " while getting segment
properties: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}

// Now there is a new segment on channel CH1
```

**Python Example:**

```
#Initialization code...
#Measurement setup...

Status, StartVal, StopVal, NumberOfPointsVal, IFBandwidthVal =
ANVNA_ChannelSegmentGetProperties(sessionId, "CH1:", 1)

if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print("Error {0} while getting segment properties: {1}\n".format(status,
ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)

#Now there is a new segment on channel CH1
```

**MATLAB Example:**

```
% Initialization code ...
% Measurement setup ...

[status, StartVal, StopVal, NumberOfPointsVal, IFBandwidthVal] =
anvna.ChannelSegmentGetProperties('CH1:', 1);

if( status ~= 0)

    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while getting segment properties: %s\n', stat,
ErrorMessage);
    status = anvna.close();

return;
end
```

## C-68 ANVNA\_ChannelSegmentAddCenterSpan

```
ViStatus ANVNA_ChannelSegmentAddCenterSpan (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViReal64 centerVal,
    ViReal64 spanVal,
    ViInt32 numberOfPointVal,
    ViReal64 IFBandwidthVal);
```

Description: Adds a new segment using center and span frequency values.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:".)
centerVal	ViReal64	Center frequency in Hz.
spanVal	ViReal64	Span value, in Hz.
numberOfPointVal	ViInt32	Number of points. Maximum number depends on VNA model; see specifications.
IFBandwidthVal	ViReal64	IF Bandwidth, in Hz. Allowed values depend on VNA model; see specifications.

### C++ Example:

```
/*
 * Initialization code ...
 * Measurement setup ...
 */
ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];

if(( status = ANVNA_ChannelSegmentAddCenterSpan(sessionId, "CH1:", 4000000000.0,
6000000000.0, 401, 10000.0)) != VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while adding a new segment: %s\n", status, ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
// Now there is a new segment on channel CH1
```

**C# Example:**

```
/*
 * Initialization code ...
 * Measurement setup ...
 */

int status = 0;

if ((status = ANVNA.ChannelSegmentAddCenterSpan(sessionId, "CH1:", 1000000000.0,
7000000000.0, 401, 10000.0)) != 0)

{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " while adding a new segment: "
+ ErrorMessage);

    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}

// Now there is a new segment on channel CH1
```

**Python Example:**

```
#Initialization code ...

#Measurement setup ...

status = ANVNA_ChannelSegmentAddCenterSpan(sessionId, "CH1:",
float(4000000000), float(6000000000), 401, 10000)

if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print("Error {0} while adding a new segment: {1}\n".format(status,
ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)

#Now there is a new segment on channel CH1
```

**MATLAB Example:**

```
% Initialization code ...

% Measurement setup ...

status = anvna.ChannelSegmentAddCenterSpan('CH1:', 4000000000.0,
6000000000.0, 401, 10000.0);

if( status ~= 0)

    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while adding a new segment: %s\n', stat,
ErrorMessage);
    status = anvna.close();
    return;

end

% Now there is a new segment on channel CH1
```

## C-69 ANVNA\_ChannelSegmentAddStartStop

```
ViStatus ANVNA_ChannelSegmentAddStartStop (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViReal64 startVal,
    ViReal64 stopVal,
    ViInt32 numberOfPointsVal,
    ViReal64 IFBandwidthVal);
```

Description: Adds a new segment using start and stop frequency values.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1":.)
startVal	ViReal64	Start frequency in Hz.
stopVal	ViReal64	Stop frequency in Hz.
numberOfPointVal	ViInt32	Number of points. Maximum number depends on VNA model; see specifications.
IFBandwidthVal	ViReal64	IF Bandwidth in Hz. Maximum value depends on VNA model; see specifications.

### C++ Example:

```
/*
 * Initialization code ...
 * Measurement setup ...
 */

ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];

if(( status = ANVNA_ChannelSegmentAddStartStop(sessionId, "CH1:", 1000000000.0,
7000000000.0, 401, 10000.0)) != VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while adding a new segment: %s\n", status, ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}

// Now there is a new segment on channel CH1
```

**C# Example:**

```
/*
 * Initialization code ...
 * Measurement setup ...
 */

int status = 0;

if ((status = ANVNA.ChannelSegmentAddStartStop(sessionId, "CH1:", 1000000000.0,
7000000000.0, 401, 10000.0)) != 0)

{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " while adding a new segment:
" + ErrorMessage);

    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}

// Now there is a new segment on channel CH1
```

**Python Example:**

```
#Initialization code...
#Measurement setup...

status = ANVNA_ChannelSegmentAddStartStop(sessionId, "CH1: ",
float(1000000000), float(7000000000), 401, 10000)

if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print(sessionId, 'ANVNA_ChannelSegmentAddStartStop on CH1:Measurement1',
status)

    print("Error {0} while adding a new segment: {1}\n".format(status,
ErrorMessage))

    ANVNA_close(sessionId)
    exit(1)

#Now there is a new segment on channel CH1
```

**MATLAB Example:**

```
% Initialization code ...

% Measurement setup ...

status = anvna.ChannelSegmentAddStartStop('CH1:', 1000000000.0,
7000000000.0, 401, 10000.0);

if( status ~= 0)

    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while adding a new segment: %s\n', stat,
ErrorMessage);
    status = anvna.close();
    return;

end

% Now there is a new segment on channel CH1
```

## C-70 ANVNA\_ChannelSegmentDeleteAll

```
ViStatus ANVNA_ChannelSegmentDeleteAll (
    ViSession vi,
    ViConstString repCapIdentifier);
```

Description: Deletes all the segments for a channel.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:").

### C++ Example:

```
/*
 * Initialization code ...
 * Measurement setup ...
 */
ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];

if(( status = ANVNA_ChannelSegmentDeleteAll(sessionId, "CH1:")) != VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while deleting all segments: %s\n", status, ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}

// Now CH1 is not segmented
```

**C# Example:**

```
/*
 * Initialization code ...
 * Measurement setup ...
 */

int status = 0;

if ((status = ANVNA.ChannelSegmentDeleteAll(sessionId, "CH1:")) != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " while deleting all segments:
" + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}

// Now CH1 is not segmented
```

**Python Example:**

```
#Initialization code ...

#Measurement setup ...

status = ANVNA_ChannelSegmentDeleteAll(sessionId, "CH1:")
if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print("Error {0} while deleting all segments: {1}\n".format(status,
ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)

#Now CH1 is not segmented
```

**MATLAB Example:**

```
% Initialization code ...

% Measurement setup ...

status = anvna.ChannelSegmentDeleteAll('CH1:');
if( status ~= 0)

    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while deleting all segments: %s\n', stat,
ErrorMessage);

    status = anvna.close();
    return;

end

% Now CH1 is not segmented
```

## C-71 ANVNA\_SetupManualCalibration

```
ViStatus ANVNA_SetupManualCalibration (
    ViSession vi,
    ViConstString RepCapIdentifier,
    ViUInt32 calibrationMethod,
    ViUInt32 calibrationLine);
```

Description: Setup a manual calibration process. This is the initial step in performing a calibration.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:").
calibrationMethod	ViUInt32	The calibration method, see possible values below.
calibrationLine	ViUInt32	The calibration line, see possible values below.

calibrationMethod	Values
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_SOLT	1
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_SOLR	3
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_SSLT	4
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_SSST	5
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_LRX	6
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_LRL	6
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_LRM	7
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_TOPSHELF_AUTOCAL	8
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_TRADITIONAL_AUTOCAL	9
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_SUPER_LRM	10
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_AUTOBOT_AUTOCAL	11

calibrationLine	Values
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_LINETYPE_COAXIAL	0
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_LINETYPE_WAVEGUIDE	1
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_LINETYPE_MICROSTRIP	2
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_LINETYPE_NONDISPERSIVE	3

**C/C++ Example:**

```
/* Start a full two port calibration for ports one and two */
status = ANVNA_SetupManualCalibration(sessionId, "CH1:",
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_SOLT,
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_LINETYPE_COAXIAL);
```

**C# Example:**

```
/* Start a full two port calibration for ports one and two */
status = ANVNA.SetupManualCalibration(sessionId, "CH1:",
ANVNA.VAL_ANRITSU_VNA_CALIBRATION_METHOD_SOLT,
ANVNA.VAL_ANRITSU_VNA_CALIBRATION_LINETYPE_COAXIAL);
```

**Python Example:**

```
# Start a full two port calibration for ports one and two
status = ANVNA_SetupManualCalibration(sessionId, "CH1:",
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_SOLT,
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_LINETYPE_COAXIAL)
```

**MATLAB Example:**

```
% Start a full two port calibration for ports one and two
status = anvna.SetupManualCalibration('CH1:',
anvna.VAL_ANRITSU_VNA_CALIBRATION_METHOD_SOLT,
anvna.VAL_ANRITSU_VNA_CALIBRATION_LINETYPE_COAXIAL);
```

## C-72 ANVNA\_SetupCalibration

```
ViStatus ANVNA_SetupCalibration (
    ViSession vi,
    ViConstString RepCapIdentifier,
    Bool usePort1,
    Bool usePort2,
    Bool usePort3,
    Bool usePort4,
    ViUInt32 calibrationType,
    ViUInt32 calibrationMethod,
    ViUInt32 calibrationLine);
```

Description: Setup a calibration process. This is the initial step in performing a calibration.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1":.)
usePort1	Bool	Sets port 1 either active or inactive for the current calibration setup (True = Active).
usePort2	Bool	Sets port 2 either active or inactive for the current calibration setup (True = Active).
usePort3	Bool	Sets port 3 either active or inactive for the current calibration setup (True = Active).
usePort4	Bool	Sets port 4 either active or inactive for the current calibration setup (True = Active).
calibrationType	ViUInt32	The calibration type, see possible values below.
calibrationMethod	ViUInt32	The calibration method, see possible values below.
calibrationLine	ViUInt32	The calibration line, see possible values below.

<b>calibrationType</b>	<b>Values</b>
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLONEPORT	0
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_ONEPATHTWOPORTFORWARD	1
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_RESPONSEONEPORT	2
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_TFRFORWARDPATH	3
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLTWOPORT	4
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_ONEPATHTWOPORTREVERSE	5
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_REFLECTIONBOTHPORT	6
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_RESPONSETWOPORT	7
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_TFRREVERSEPATH	8
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_TRFBOTHPATHS	9
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLTHREEPORT	10
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLFOURPORT	11

<b>calibrationMethod</b>	<b>Values</b>
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_SOLT	1
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_SOLR	3
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_SSLT	4
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_SSST	5
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_LRX	6
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_LRL	6
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_LRM	7
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_TOPSHELF_AUTOCAL	8
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_TRADITIONAL_AUTOCAL	9
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_SUPER_LRM	10
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_AUTOBOT_AUTOCAL	11

<b>calibrationLine</b>	<b>Values</b>
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_LINETYPE_COAXIAL	0
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_LINETYPE_WAVEGUIDE	1
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_LINETYPE_MICROSTRIP	2
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_LINETYPE_NONDISPERSIVE	3

Example: See [ANVNA\\_StartCalibration](#).

## C-73 ANVNA\_SetManualCalKit

```
ViStatus ANVNA_SetManualCalKit (
    ViSession vi,
    ViConstString RepCapIdentifier,
    ViUInt16 PortNumber,
    ViUInt32 KitId,
    ViUInt32 BBLoad);
```

Description: Setup a manual calibration kit from the predefined list.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:").
PortNumber	ViUInt16	The port number.
KitId	Vi UInt32	The kit ID definition.
BBLoad	Vi UInt32	BB load parameter.

:

---

### KitId Values

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_GPCTHREEPOINTFIVE\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_KCONN\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_NCONN\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_SMA\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_TNC\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_VCONN\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_W1CONN\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_SEVENTYSIXTEEN\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_GPC7\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_NCONN75\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_TOSLK50\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_TOSLN50\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_GCS35M\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR10\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR12\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR15\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR28\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR42\_MALE

---

**KitId Values**

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR62\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR75\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR90\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR112\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR137\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR159\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR187\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR229\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED1\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED2\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED3\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED4\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED5\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED6\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED7\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED8\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_TWOPORTFOUR\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_GPC7THREEPOINTFIVE\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_KCONN\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_NCONN\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_SMA\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_TNC\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_VCONN\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_W1CONN\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_SEVENTYSIXTEEN\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_GPC7\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_NCONN75\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_TOSLK50\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_TOSLN50\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_GCS35M\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR10\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR12\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR15\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR28\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR42\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR62\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR75\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR90\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR112\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR137\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR159\_FEMALE

---

**KitId Values**

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR187\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR229\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED1\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED2\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED3\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED4\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED5\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED6\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED7\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED8\_FEMALE

---

**C/C++ Example:**

```
/* Start a full two port calibration for ports one and two */
status = ANVNA_SetManualCalKit(sessionId, "CH1:TR1", 1,
ANVNA_VAL_ANRITSU_VNA_CALKIT_KCONN_MALE, 0);
```

**C# Example:**

```
/* Start a full two port calibration for ports one and two */
status = ANVNA.SetManualCalKit(sessionId, "CH1:TR1", 1,
ANVNAVAL_ANRITSU_VNA_CALKIT_KCONN_MALE, 0);
```

**Python Example:**

```
# Start a full two port calibration for ports one and two
status = ANVNA_SetManualCalKit(sessionId, "CH1:TR1", 1,
ANVNA_VAL_ANRITSU_VNA_CALKIT_KCONN_MALE, 0)
```

**MATLAB Example:**

```
% Start a full two port calibration for ports one and two
status = anvna.SetManualCalKit('CH1:TR1', 1,
anvna.VAL_ANRITSU_VNA_CALKIT_KCONN_MALE, 0);
```

## C-74 ANVNA\_GetManualCalKit

```
ViStatus ANVNA_GetManualCalKit (
    ViSession vi,
    ViConstString RepCapIdentifier,
    ViUInt16 PortNumber,
    ViPUInt32 KitId,
    ViPUInt32 BBLoad);
```

Description: Get manual calibration kit.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:").
PortNumber	ViUInt16	The port number.
KitId	ViPUInt32	The kit ID.
BBLoad	ViPUInt32	BB load parameter.

### KitId Values

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_GPCTHREEPOINTFIVE\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_KCONN\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_NCONN\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_SMA\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_TNC\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_VCONN\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_W1CONN\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_SEVENTYSIXTEEN\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_GPC7\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_NCONN75\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_TOSLK50\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_TOSLN50\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_GCS35M\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR10\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR12\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR15\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR28\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR42\_MALE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR62\_MALE

---

**KitId Values**

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR75\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR90\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR112\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR137\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR159\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR187\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR229\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED1\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED2\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED3\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED4\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED5\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED6\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED7\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED8\_MALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_TWOPORTFOUR\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_GPCTHREEPOINTFIVE\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_KCONN\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_NCONN\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_SMA\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_TNC\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_VCONN\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_W1CONN\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_SEVENSIXTEEN\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_GPC7\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_NCONN75\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_TOSLK50\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_TOSLN50\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_GCS35M\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR10\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR12\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR15\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR28\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR42\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR62\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR75\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR90\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR112\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR137\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR159\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR187\_FEMALE

**KitId Values**

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_WR229\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED1\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED2\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED3\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED4\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED5\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED6\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED7\_FEMALE  
ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_USERDEFINED8\_FEMALE

---

**C/C++ Example:**

```
ViUInt32 KitId;  
ViUInt32 BBLoad;  
  
status = ANVNA_SetManualCalKit(sessionId, "CH1:TR1", 1, KitId, BBLoad);
```

**C# Example:**

```
uint KitId;  
uint BBLoad;  
  
status = ANVNA.SetManualCalKit(sessionId, "CH1:TR1", 1, out KitId, out BBLoad);
```

**Python Example:**

```
status, KitId, BBLoad = ANVNA_SetManualCalKit(sessionId, "CH1:TR1", 1)
```

**MATLAB Example:**

```
status, KitId, BBLoad = anvna.SetManualCalKit('CH1:TR1', 1);
```

## C-75 ANVNA\_LoadCalibrationKit

```
ViStatus ANVNA_LoadCalibrationKit (
    ViSession vi,
    ViConstString RepCapIdentifier,
    ViConstString calKitFile,
    ViConstString label,
    ViUInt32 type,
    ViUInt32 calibrationLine,
    ViUInt32 calibrationMethod);
```

Description: Loads a calibration kit from file.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:".)
calKitFile	ViConstString	The CCF file name to be loaded.
label	ViConstString	The GUI label associated with this.
type	ViUInt32	Calibration kit type.
calibrationLine	ViUInt32	Calibration line.
calibrationMethod	ViUInt32	Calibration method.

---

### type Values

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALKIT\_TYPE\_S1P

---



---

### calibrationLine Values

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALIBRATION\_LINETYPE\_WAVEGUIDE

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALIBRATION\_LINETYPE\_MICROSTRIP

---

ANVNA\_VAL\_ANRITSU\_VNA\_CALIBRATION\_LINETYPE\_NONDISPERSIVE

---

## calibrationMethod Values

ANVNA\_VAL\_ANRITSU\_VNA\_CALIBRATION\_METHOD\_SOLT  
ANVNA\_VAL\_ANRITSU\_VNA\_CALIBRATION\_METHOD\_SOLR  
ANVNA\_VAL\_ANRITSU\_VNA\_CALIBRATION\_METHOD\_SSLT  
ANVNA\_VAL\_ANRITSU\_VNA\_CALIBRATION\_METHOD\_SSST  
ANVNA\_VAL\_ANRITSU\_VNA\_CALIBRATION\_METHOD\_LRX  
ANVNA\_VAL\_ANRITSU\_VNA\_CALIBRATION\_METHOD\_LRL  
ANVNA\_VAL\_ANRITSU\_VNA\_CALIBRATION\_METHOD\_LRM  
ANVNA\_VAL\_ANRITSU\_VNA\_CALIBRATION\_METHOD\_TOPSHELF\_AUTOCAL  
ANVNA\_VAL\_ANRITSU\_VNA\_CALIBRATION\_METHOD\_TRADITIONAL\_AUTOCAL  
ANVNA\_VAL\_ANRITSU\_VNA\_CALIBRATION\_METHOD\_SUPER\_LRM  
ANVNA\_VAL\_ANRITSU\_VNA\_CALIBRATION\_METHOD\_AUTOBOT\_AUTOCAL

## C++ Example:

```
ANVNA_LoadCalibrationKit(sessionId, "CH1:", "C:\AnritsuVNA\custom.ccf", "Custom  
Kit", ANVNA_VAL_ANRITSU_VNA_CALKIT_TYPE_CCF,  
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_LINETYPE_COAXIAL,  
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_SOLT);
```

## C# Example:

```
ANVNA.LoadCalibrationKit(sessionId, "CH1:", "C:\AnritsuVNA\custom.ccf", "Custom  
Kit", ANVNA.VAL_ANRITSU_VNA_CALKIT_TYPE_CCF,  
ANVNA.VAL_ANRITSU_VNA_CALIBRATION_LINETYPE_COAXIAL,  
ANVNA.VAL_ANRITSU_VNA_CALIBRATION_METHOD_SOLT);
```

## Python Example:

```
ANVNA_LoadCalibrationKit(sessionId, "CH1:", "C:\AnritsuVNA\custom.ccf", "Custom  
Kit", ANVNA_VAL_ANRITSU_VNA_CALKIT_TYPE_CCF,  
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_LINETYPE_COAXIAL,  
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_SOLT)
```

## MATLAB Example:

```
anvna.LoadCalibrationKit(sessionId, "CH1:", "C:\AnritsuVNA\custom.ccf", "Custom  
Kit", anvna.VAL_ANRITSU_VNA_CALKIT_TYPE_CCF,  
anvna.VAL_ANRITSU_VNA_CALIBRATION_LINETYPE_COAXIAL,  
anvna.VAL_ANRITSU_VNA_CALIBRATION_METHOD_SOLT);
```

## C-76 ANVNA\_StartCalibration

```
ViStatus ANVNA_StartCalibration (
    ViSession vi,
    ViConstString RepCapIdentifier
```

Description: Starts a calibration measuring process.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:").

### C/C++ Example:

```
/* Start a full two port calibration for port one and two */
if(( status = ANVNA_SetupCalibration(sessionId, "CH1:", true, true false, false,
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLTWOPOINT,
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_SOLT,
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_LINETYPE_COAXIAL)) != VI_SUCCESS)
{
    ANVNA_AbortCalibration(sessionId, "CH1:");
    exit(1);
}

if(( status = ANVNA_SetThru(sessionId, "CH1:", 1, 2, 0.0, 0.0, 0.0, 0.0)) != VI_SUCCESS)
{
    ANVNA_AbortCalibration(sessionId, "CH1:");
    exit(1);
}

if(( status = ANVNA_SetReciprocalThru(sessionId, "CH1:", 1, 2, false)) != VI_SUCCESS)
{
    ANVNA_AbortCalibration(sessionId, "CH1:");
    exit(1);
}
```

```
if(( status = ANVNA_LoadCalKit(sessionId, "CH1:", "C:\AnritsuVNA\CalKit1.ccf", 1)) != VI_SUCCESS)
{
    ANVNA_AbortCalibration(sessionId, "CH1:");
    exit(1);
}

if(( status = ANVNA_StartCalibration(sessionId, "CH1:")) != VI_SUCCESS)
{
    ANVNA_AbortCalibration(sessionId, "CH1:");
    exit(1);
}

if(( status = ANVNA_CalStoreData(sessionId, "CH1:", 1, 1,
ANVNA_VAL_ANRITSU_VNA_CALDATA_SHORT)) != VI_SUCCESS)
{
    ANVNA_AbortCalibration(sessionId, "CH1:");
    exit(1);
}

if(( status = ANVNA_CalStoreData(sessionId, "CH1:", 1, 1,
ANVNA_VAL_ANRITSU_VNA_CALDATA_OPEN)) != VI_SUCCESS)
{
    ANVNA_AbortCalibration(sessionId, "CH1:");
    exit(1);
}

if(( status = ANVNA_CalStoreData(sessionId, "CH1:", 1, 1,
ANVNA_VAL_ANRITSU_VNA_CALDATA_LOAD)) != VI_SUCCESS)
{
    ANVNA_AbortCalibration(sessionId, "CH1:");
    exit(1);
}

if(( status = ANVNA_CalStoreData(sessionId, "CH1:", 2, 2,
ANVNA_VAL_ANRITSU_VNA_CALDATA_SHORT)) != VI_SUCCESS)
{
    ANVNA_AbortCalibration(sessionId, "CH1:");
    exit(1);
}
```

```
if(( status = ANVNA_CalStoreData(sessionId, "CH1:", 2, 2,
ANVNA_VAL_ANRITSU_VNA_CALDATA_OPEN)) != VI_SUCCESS)
{
    ANVNA_AbortCalibration(sessionId, "CH1:");
    exit(1);
}

if(( status = ANVNA_CalStoreData(sessionId, "CH1:", 2, 2,
ANVNA_VAL_ANRITSU_VNA_CALDATA_LOAD)) != VI_SUCCESS)
{
    ANVNA_AbortCalibration(sessionId, "CH1:");
    exit(1);
}

if(( status = ANVNA_CalStoreData(sessionId, "CH1:", 1, 2,
ANVNA_VAL_ANRITSU_VNA_CALDATA_THRU)) != VI_SUCCESS)
{
    ANVNA_AbortCalibration(sessionId, "CH1:");
    exit(1);
}

/* End calibration process */
if(( status = ANVNA_EndCalibration(sessionId, "CH1:")) != VI_SUCCESS)
{
    ANVNA_AbortCalibration(sessionId, "CH1:");
    exit(1);
}

/* Get calibration type */
ViUInt32 calType;
ANVNA_GetCalibrationType(sessionId, "CH1:", &calType);

/* Get calibration method */
ViUInt32 calMethod;
ANVNA_GetCalibrationMethod(sessionId, "CH1:", &calMethod);

/* Get calibration line */
ViUInt32 calLine;
ANVNA_GetCalibrationLine(sessionId, "CH1:", &calLine);

/* Get calibration active */
```

```
ViBoolean calActive;
ANVNA_GetCalActive(sessionId, "CH1:", &calActive);

/* Set calibration status */
ANVNA_SetCalStatus(sessionId, "CH1:", false);

/* Get calibration status */
ViBoolean calStatus;
ANVNA_GetCalStatus(sessionId, "CH1:", &calStatus);

/* Get thru values */
ViReal64 trueThruLength;
ViReal64 trueThruImpedance;
ViReal64 trueThruLineLoss;
ViReal64 trueThruRefFrequency;
ANVNA_GetThru(sessionId, "CH1:", 1, 2, &trueThruLength, &trueThruImpedance,
&trueThruLineLoss, &trueThruRefFrequency);

/* Get reciprocal thru value */
ViBoolean isThruReciprocal;
ANVNA_GetReciprocalThru(sessionId, "CH1:", 1, 2, &isThruReciprocal);
```

**C# Example:**

```
/* Start a full two port calibration for port one and two */

if ((status = ANVNA.SetupCalibration(sessionId, "CH1:", true, true, false, false,
ANVNA.VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLTWOPOINT,
ANVNA.VAL_ANRITSU_VNA_CALIBRATION_METHOD_SOLT,
ANVNA.VAL_ANRITSU_VNA_CALIBRATION_LINETYPE_COAXIAL)) != 0)

{

    ANVNA.AbortCalibration(sessionId, "CH1:");

    System.Environment.Exit(1);

}

if ((status = ANVNA.SetThru(sessionId, "CH1:", 1, 2, 0.0, 0.0, 0.0, 0.0)) != 0)

{

    ANVNA.AbortCalibration(sessionId, "CH1:");

    System.Environment.Exit(1);

}

if ((status = ANVNA.SetReciprocalThru(sessionId, "CH1:", 1, 2, 0)) != 0)

{

    ANVNA.AbortCalibration(sessionId, "CH1:");

    System.Environment.Exit(1);

}

if ((status = ANVNA.LoadCalKit(sessionId, "CH1:", "C:\AnritsuVNA\CalKit1.ccf", 1)) != 0)

{

    ANVNA_AbortCalibration(sessionId, "CH1:");

    exit(1);

}

if ((status = ANVNA.StartCalibration(sessionId, "CH1:")) != 0)

{

    ANVNA.AbortCalibration(sessionId, "CH1:");

    System.Environment.Exit(1);

}

if ((status = ANVNA.CalStoreData(sessionId, "CH1:", 1, 1,
(uint)ANVNA.VAL_ANRITSU_VNA_CALDATA_SHORT)) != 0)

{

    ANVNA.AbortCalibration(sessionId, "CH1:");

    System.Environment.Exit(1);

}
```

```
}

if ((status = ANVNA.CalStoreData(sessionId, "CH1:", 1, 1,
(uint)ANVNA.VAL_ANRITSU_VNA_CALDATA_OPEN)) != 0)
{
    ANVNA.AbortCalibration(sessionId, "CH1:");
    System.Environment.Exit(1);
}

if ((status = ANVNA.CalStoreData(sessionId, "CH1:", 1, 1,
(uint)ANVNA.VAL_ANRITSU_VNA_CALDATA_LOAD)) != 0)
{
    ANVNA.AbortCalibration(sessionId, "CH1:");
    System.Environment.Exit(1);
}

if ((status = ANVNA.CalStoreData(sessionId, "CH1:", 2, 2,
(uint)ANVNA.VAL_ANRITSU_VNA_CALDATA_SHORT)) != 0)
{
    ANVNA.AbortCalibration(sessionId, "CH1:");
    System.Environment.Exit(1);
}

if ((status = ANVNA.CalStoreData(sessionId, "CH1:", 2, 2,
(uint)ANVNA.VAL_ANRITSU_VNA_CALDATA_OPEN)) != 0)
{
    ANVNA.AbortCalibration(sessionId, "CH1:");
    System.Environment.Exit(1);
}

if ((status = ANVNA.CalStoreData(sessionId, "CH1:", 2, 2,
(uint)ANVNA.VAL_ANRITSU_VNA_CALDATA_LOAD)) != 0)
{
    ANVNA.AbortCalibration(sessionId, "CH1:");
    System.Environment.Exit(1);
}

if ((status = ANVNA.CalStoreData(sessionId, "CH1:", 1, 2,
(uint)ANVNA.VAL_ANRITSU_VNA_CALDATA_THRU)) != 0)
{
    ANVNA.AbortCalibration(sessionId, "CH1:");
    System.Environment.Exit(1);
}
```

```
}

/* End calibration process */
if ((status = ANVNA.EndCalibration(sessionId, "CH1:")) != 0)
{
    ANVNA.AbortCalibration(sessionId, "CH1:");
    System.Environment.Exit(1);
}

/* Get calibration type */
uint calType;
ANVNA.GetCalibrationType(sessionId, "CH1:", out calType);

/* Get calibration method */
uint calMethod;
ANVNA.GetCalibrationMethod(sessionId, "CH1:", out calMethod);

/* Get calibration method */
uint calLine;
ANVNA.GetCalibrationLine(sessionId, "CH1:", out calLine);

/* Get calibration active */
ushort calActive;
ANVNA.GetCalActive(sessionId, "CH1:", out calActive);

/* Set calibration status */
ANVNA.SetCalStatus(sessionId, "CH1:", 1);

/* Get calibration status */
ushort calStatus;
ANVNA.GetCalStatus(sessionId, "CH1:", out calStatus);

/* Get thru values */
double trueThruLength;
double trueThruImpedance;
double trueThruLineLoss;
double trueThruRefFrequency;
ANVNA_GetThru(sessionId, "CH1:", 1, 2, out trueThruLength, out trueThruImpedance,
out trueThruLineLoss, out trueThruRefFrequency);
```

```
/* Get reciprocal thru value */
ushort isThruReciprocal;
ANVNA_GetReciprocalThru(sessionId, "CH1:", 1, 2, out isThruReciprocal);
```

**Python Example:**

```
# Start a full two port calibration for port one and two
status = ANVNA_SetupCalibration(sessionId, "CH1:", True, True, False, False,
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLTWOPOINT,
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_SOLT,
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_LINETYPE_COAXIAL)
if status != 0:
    ANVNA_AbortCalibration(sessionId, "CH1:")
    exit(1)

status = ANVNA_SetThru(sessionId, "CH1:", 1, 2, 0.0, 0.0, 0.0, 0.0)
if status != 0:
    ANVNA_AbortCalibration(sessionId, "CH1:")
    exit(1)

status = ANVNA_SetReciprocalThru(sessionId, "CH1:", 1, 2, False)
if status != 0:
    ANVNA_AbortCalibration(sessionId, "CH1:")
    exit(1)

status = ANVNA_LoadCalKit(sessionId, "CH1:", "C:\AnritsuVNA\CalKit1.ccf", 1)
if status != 0:
    ANVNA_AbortCalibration(sessionId, "CH1:")
    exit(1)

status = ANVNA_StartCalibration(sessionId, "CH1:")
if status != 0:
    ANVNA_AbortCalibration(sessionId, "CH1:")
    exit(1)

status = ANVNA_CalStoreData(sessionId, "CH1:", 1, 1,
ANVNA_VAL_ANRITSU_VNA_CALDATA_SHORT)
if status != 0:
    ANVNA_AbortCalibration(sessionId, "CH1:")
    exit(1)

status = ANVNA_CalStoreData(sessionId, "CH1:", 1, 1,
ANVNA_VAL_ANRITSU_VNA_CALDATA_OPEN)
if status != 0:
    ANVNA_AbortCalibration(sessionId, "CH1:")
    exit(1)
```

```
status = ANVNA_CalStoreData(sessionId, "CH1:", 1, 1,
ANVNA_VAL_ANRITSU_VNA_CALDATA_LOAD)

if status != 0:
    ANVNA_AbortCalibration(sessionId, "CH1:")
    exit(1)

status = ANVNA_CalStoreData(sessionId, "CH1:", 2, 2,
ANVNA_VAL_ANRITSU_VNA_CALDATA_SHORT)

if status != 0:
    ANVNA_AbortCalibration(sessionId, "CH1:")
    exit(1)

status = ANVNA_CalStoreData(sessionId, "CH1:", 2, 2,
ANVNA_VAL_ANRITSU_VNA_CALDATA_OPEN)

if status != 0:
    ANVNA_AbortCalibration(sessionId, "CH1:")
    exit(1)

status = ANVNA_CalStoreData(sessionId, "CH1:", 2, 2,
ANVNA_VAL_ANRITSU_VNA_CALDATA_LOAD)

if status != 0:
    ANVNA_AbortCalibration(sessionId, "CH1:")
    exit(1)

status = ANVNA_CalStoreData(sessionId, "CH1:", 1, 2,
ANVNA_VAL_ANRITSU_VNA_CALDATA_THRU)

if status != 0:
    ANVNA_AbortCalibration(sessionId, "CH1:")
    exit(1)

# End calibration process

status = ANVNA_EndCalibration(sessionId, "CH1:")

if status != 0:
    ANVNA_AbortCalibration(sessionId, "CH1:")
    exit(1)

# Get calibration type

status, calType = ANVNA_GetCalibrationType(sessionId, "CH1:")

# Get calibration method

status, calMethod = ANVNA_GetCalibrationMethod(sessionId, "CH1:")
```

```
# Get calibration line
status, calLine = ANVNA_GetCalibrationLine(sessionId, "CH1:")

# Get calibration active
status, calActive = ANVNA_GetCalActive(sessionId, "CH1:")

# Set calibration status
status = ANVNA_SetCalStatus(sessionId, "CH1:", False)

# Get calibration status
status, calStatus = ANVNA_GetCalStatus(sessionId, "CH1:")

# Get thru values
status, trueThruLength, trueThruImpedance, trueThruLineLoss, trueThruRefFrequency =
ANVNA_GetThru(sessionId, "CH1:", 1, 2)

# Get reciprocal thru value
status, isThruReciprocal = ANVNA_GetReciprocalThru(sessionId, "CH1:", 1, 2)
```

**MATLAB Example:**

```
% Start a full two port calibration for port one and two
status = anvna.SetupCalibration('CH1:', 1, 1, 0, 0,
anvna.VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLTWOPOINT,
anvna.VAL_ANRITSU_VNA_CALIBRATION_METHOD_SOLT,
anvna.VAL_ANRITSU_VNA_CALIBRATION_LINETYPE_COAXIAL);
if status ~= 0
    anvna.AbortCalibration('CH1:')
    exit(1)
end

status = anvna.SetThru('CH1:', 1, 2, 0.0, 0.0, 0.0, 0.0);
if status ~= 0
    anvna.AbortCalibration('CH1:')
    exit(1)
end

status = anvna.SetReciprocalThru('CH1:', 1, 2, 0);
if status ~= 0
    anvna.AbortCalibration('CH1:')
    exit(1)
end

status = anvna.LoadCalKit('CH1:', "C:\AnritsuVNA\CalKit1.ccf", 1)
if status != 0:
    ANVNA_AbortCalibration(sessionId, "CH1:")
    exit(1)

status = anvna.StartCalibration('CH1:');
if status ~= 0
    anvna.AbortCalibration('CH1:')
    exit(1)
end

status = anvna.CalStoreData('CH1:', 1, 1, anvna.VAL_ANRITSU_VNA_CALDATA_SHORT);
if status ~= 0
    anvna.AbortCalibration('CH1:')
    exit(1)
end

status = anvna.CalStoreData('CH1:', 1, 1, anvna.VAL_ANRITSU_VNA_CALDATA_OPEN);
```

```
if status ~= 0
    anvna.AbortCalibration('CH1:')
    exit(1)
end

status = anvna.CalStoreData('CH1:', 1, 1, anvna.VAL_ANRITSU_VNA_CALDATA_LOAD);
if status ~= 0
    anvna.AbortCalibration('CH1:')
    exit(1)
end

status = anvna.CalStoreData('CH1:', 2, 2, anvna.VAL_ANRITSU_VNA_CALDATA_SHORT);
if status ~= 0
    anvna.AbortCalibration('CH1:')
    exit(1)
end

status = anvna.CalStoreData('CH1:', 2, 2, anvna.VAL_ANRITSU_VNA_CALDATA_OPEN);
if status ~= 0
    anvna.AbortCalibration('CH1:')
    exit(1)
end

status = anvna.CalStoreData('CH1:', 2, 2, anvna.VAL_ANRITSU_VNA_CALDATA_LOAD);
if status ~= 0
    anvna.AbortCalibration('CH1:')
    exit(1)
end

status = anvna.CalStoreData('CH1:', 1, 2, anvna.VAL_ANRITSU_VNA_CALDATA_THRU);
if status ~= 0
    anvna.AbortCalibration('CH1:')
    exit(1)
end

% End calibration process
status = anvna.EndCalibration('CH1:');
if status ~= 0
    anvna.AbortCalibration('CH1:')
    exit(1)
```

```
end

% Get calibration type
status, calType = anvna.GetCalibrationType('CH1:');

% Get calibration method
status, calMethod = anvna.GetCalibrationMethod('CH1:');

% Get calibration line
status, callLine = anvna.GetCalibrationLine('CH1:');

% Get calibration active
status, calActive = anvna.GetCalActive('CH1:');

% Set calibration status
status = anvna.SetCalStatus('CH1:', 0);

% Get calibration status
status, calStatus = anvna.GetCalStatus('CH1:');

% Get thru values
status, trueThruLength, trueThruImpedance, trueThruLineLoss, trueThruRefFrequency =
anvna.GetThru("CH1:", 1, 2)

% Get reciprocal thru value
status, isThruReciprocal = anvna.GetReciprocalThru("CH1:", 1, 2)
```

## C-77 ANVNA\_CalStoreData

```
ViStatus ANVNA_CalStoreData (
    ViSession vi,
    ViConstString RepCapIdentifier,
    ViInt32 sourcePort,
    ViInt32 destPort,
    ViUInt32 dataType);
```

Description: To be called during calibration each time a calibration kit element is connected.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:").
sourcePort	ViInt32	Power active port.
destPort	ViInt32	Receiver port.
dataType	ViUInt32	Type of cal kit DUT, see possible values below.

dataType	Values
ANVNA_VAL_ANRITSU_VNA_CALDATA_SHORT	0
ANVNA_VAL_ANRITSU_VNA_CALDATA_OPEN	1
ANVNA_VAL_ANRITSU_VNA_CALDATA_LOAD	2
ANVNA_VAL_ANRITSU_VNA_CALDATA_THRU	3

Example: See example for [ANVNA\\_StartCalibration](#).

## C-78 ANVNA\_EndCalibration

```
ViStatus ANVNA_EndCalibration (
    ViSession vi,
    ViConstString RepCapIdentifier);
```

Description: Ends the calibration process. Will return error if not enough measurements are taken using ANVNA\_CalStoreData or if a calibration process hasn't been started (call to ANVNA\_SetupCalibration is missing).

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:".)

Example: See example for [ANVNA\\_StartCalibration](#).

## C-79 ANVNA\_GetCalibrationType

```
ViStatus ANVNA_GetCalibrationType (
    ViSession vi,
    ViConstString RepCapIdentifier,
    ViPUInt32 calType);
```

Description: Gets the type of current calibration. Has a defaults value and is gets updated once ANVNA\_StartCalibration is called.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:").
calType	ViPUInt32	The type of calibration value, returned by the function.

calType	Values
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLONEPORT	0
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_ONEPATHTWOPORTFORWARD	1
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_RESPONSEONEPORT	2
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_TFRFORWARDPATH	3
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_ONEPATHTWOPORTREVERSE	5
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLSCREENTWOPORT	4
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_REFLECTIONBOTHPORT	6
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_RESPONSETWOPORT	7
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_TFRREVERSEPATH	8
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_TRFBITHPATHS	9
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLSCREENTHREEPORT	10
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLSCREENFOURPORT	11

Example: See example for [ANVNA\\_StartCalibration](#).

## C-80 ANVNA\_GetCalibrationMethod

```
ViStatus ANVNA_GetCalibrationMethod (
    ViSession vi,
    ViConstString RepCapIdentifier,
    ViPUInt32 calMethod);
```

Description: Gets the method of current calibration. Has a defaults value and is gets updated once ANVNA\_SetupCalibration is called.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:").
calType	ViPUInt32	Calibration method value, returned by the function. See possible values below.

calMethod	Values
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_SOLT	1
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_SOLR	3
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_SSLT	4
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_SSST	5
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_LRX	6
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_LRL	6
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_LRM	7
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_TOPSHELF_AUTOCAL	8
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_TRADITIONAL_AUTOCAL	9
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_SUPER_LRM	10
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_METHOD_AUTOBOT_AUTOCAL	11

Example: See example for [ANVNA\\_StartCalibration](#).

## C-81 ANVNA\_GetCalibrationLine

```
ViStatus ANVNA_GetCalibrationLine (
    ViSession vi,
    ViConstString RepCapIdentifier,
    ViPUInt32 callLine);
```

Description: Get the calibration line for current calibration. This parameter is set when ANVNA\_SetupCalibration function is called.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:").
callLine	ViPUInt32	Calibration method line type, returned by the function. See possible values below.

callLine	Values
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_LINETYPE_COAXIAL	0
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_LINETYPE_WAVEGUIDE	1
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_LINETYPE_MICROSTRIP	2
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_LINETYPE_NONDISPERSIVE	3

Example: See example for [ANVNA\\_StartCalibration](#).

## C-82 ANVNA\_GetCalActive

```
ViStatus ANVNA_GetCalActive (
```

```
    ViSession vi,
```

```
    ViConstString RepCapIdentifier,
```

```
    ViPBoolean calActive);
```

Description: Function returns whether a calibration exists or not in the current session.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:").
calActive	ViPBoolean	Result returned, either TRUE (CAL EXISTS) or FALSE (CAL DOES NOT EXIST)

Example: See example for [ANVNA\\_StartCalibration](#).

## C-83 ANVNA\_LoadCalKit

```
ViStatus ANVNA_LoadCalKit (
```

```
    ViSession vi,
```

```
    ViConstString RepCapIdentifier,
```

```
    ViConstString calKitFile,
```

```
    ViUInt32 port);
```

Description: Loads a calibration kit from file and associates it with a port number.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:").
calKitFile	ViConstString	File name to be loaded.
port	ViUInt32	Port to be associated with.

Example: See example for [ANVNA\\_StartCalibration](#).

## C-84 ANVNA\_LoadS1PKit

```
ViStatus ANVNA_LoadS1PKit (
    ViSession vi,
    ViConstString RepCapIdentifier,
    ViConstString calKitFile,
    ViUInt32 port,
    ViUInt32 dataType);
```

Description: Loads a S1P calibration kit from file and associates it with a port number.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:").
calKitFile	ViConstString	The S1P file name to be loaded.
port	ViUInt32	Port to be associated with.
dataType	ViUInt3	Data type to be loaded.

dataType	Values
ANVNA_VAL_ANRITSU_VNA_CALDATA_SHORT	0
ANVNA_VAL_ANRITSU_VNA_CALDATA_OPEN	1
ANVNA_VAL_ANRITSU_VNA_CALDATA_LOAD	2
ANVNA_VAL_ANRITSU_VNA_CALDATA_THRU	3

Example: See example for [ANVNA\\_StartCalibration](#).

## C-85 ANVNA\_SetThru

```
ViStatus ANVNA_SetThru (
    ViSession vi,
    ViConstString RepCapIdentifier,
    ViUInt32 srcPort,
    ViUInt32 destPort,
    ViReal64 trueThruLength,
    ViReal64 trueThruImpedance,
    ViReal64 trueThruLineLoss,
    ViReal64 trueThruRefFrequency);
```

Description: Set thru properties.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:").
srcPort	ViUInt32	Thru source port.
destPort	ViUInt32	Thru destination port.
trueThruLength	ViReal64	Thru length.
trueThruImpedance	ViReal64	Thru impedance.
trueThruLineLoss	ViReal64	Thru line loss.
trueThruRefFrequency	ViReal64	Thru ref frequency.

Example: See example for [ANVNA\\_StartCalibration](#).

## C-86 ANVNA\_GetThru

```
ViStatus ANVNA_GetThru (
    ViSession vi,
    ViConstString RepCapIdentifier,
    ViUInt32 srcPort,
    ViUInt32 destPort,
    ViPReal64 trueThruLength,
    ViPReal64 trueThruImpedance,
    ViPReal64 trueThruLineLoss,
    ViPReal64 trueThruRefFrequency);
```

Description: Get thru properties.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:").
srcPort	ViUInt32	Thru source port.
destPort	ViUInt32	Thru destination port.
trueThruLength	ViPReal64	Out thru length.
trueThruImpedance	ViPReal64	Out thru impedance.
trueThruLineLoss	ViPReal64	Out thru line loss.
trueThruRefFrequency	ViPReal64	Out thru ref frequency.

Example: See example for [ANVNA\\_StartCalibration](#).

## C-87 ANVNA\_SetReciprocalThru

```
ViStatus ANVNA_SetReciprocalThru (
```

```
    ViSession vi,
```

```
    ViConstString RepCapIdentifier,
```

```
    ViUInt32 srcPort,
```

```
    ViUInt32 destPort,
```

```
    ViBoolean isThruReciprocal);
```

Description: Set reciprocal thru state.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:".)
srcPort	ViUInt32	Thru source port.
destPort	ViUInt32	Thru destination port.
isThruReciprocal	ViBoolean	Reciprocal thru state.

Example: See example for [ANVNA\\_StartCalibration](#).

```
ViStatus ANVNA_GetReciprocalThru (  
    ViSession vi,  
    ViConstString RepCapIdentifier,  
    ViUInt32 srcPort,  
    ViUInt32 destPort,  
    ViPBoolean isThruReciprocal);
```

Description: Get reciprocal thru state.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:").
srcPort	ViUInt32	Thru source port.
destPort	ViUInt32	Thru destination port.
isThruReciprocal	ViPBoolean	Reciprocal thru state.

Example: See example for [ANVNA\\_StartCalibration](#).

## C-89 ANVNA\_GetCalStatus

```
ViStatus ANVNA_GetCalStatus (
```

```
    ViSession vi,
```

```
    ViConstString RepCapIdentifier,
```

```
    ViPBoolean calStatus);
```

Description: Function returns whether a calibration is active or not in the current session. If no calibration exists then an error code is returned.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:").
calStatus	ViPBoolean	Result returned, either TRUE (CAL ACTIVE) or FALSE (CAL INACTIVE)

Example: See example for [ANVNA\\_StartCalibration](#).

## C-90 ANVNA\_SetCalStatus

```
ViStatus ANVNA_SetCalStatus (  
    ViSession vi,  
    ViConstString RepCapIdentifier,  
    ViBoolean calStatus);
```

Description: Function sets a calibration either active or inactive in the current session.

<b>Note</b>	Activate only if a calibration has been previously performed. Otherwise ANVNA_SetCalStatus will return error if trying to set to "TRUE".
-------------	--

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:").
calStatus	ViBoolean	Calibration status setter either TRUE (CAL ACTIVE) or FALSE (CAL INACTIVE)

Example: See example for [ANVNA\\_StartCalibration](#).

## C-91 ANVNA\_AddSelectedPort

```
ViStatus ANVNA_AddSelectedPort (
    ViSession vi,
    ViUInt16 PortNumber,
    ViUInt16 CurrentEncodedPorts,
    ViPUInt16 NewEncodedPorts);
```

Description: Helper function to accumulate ports.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
PortNumber	ViUInt16	Port number to be added.
CurrentEncodedPorts	ViBoolean	Current value. At first call, or when you want to reset the conceded value you need to pass zero.
NewEncodedPorts	ViPUInt16	Result value obtained by combining the PortNumber and CurrentEncodedPorts variables.

### C++ Example:

```
ViUInt16 port = 0;
status = ANVNA_AddSelectedPort(sessionId, 1, port, &port);
```

### C# Example:

```
ushort port;
ANVNA.AddSelectedPort (sessionId, (ushort)1, port, out port);
```

### Python Example:

```
port = 0
status, port = ANVNA_AddSelectedPort (sessionId, 1, port)
```

### MATLAB Example:

```
port = 0;
status, port = anvna.AddSelectedPort (1, port);
```

## C-92 ANVNA\_SetAutoCalDevice

```
ViStatus ANVNA_SetAutoCalDevice (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViConstString comPort,
    ViConstString characterizationFile,
    ViUInt16 portLeft,
    ViUInt16 portRight,
    ViBoolean orientation,
    ViBoolean autoSenseOn);
```

Description: Helper function to accumulate ports.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier.
comPort	ViConstString	COM port identifier.
characterizationFile	ViConstString	AutoCal device characterization file.
portLeft	ViUInt16	AutoCal left ports.
portRight	ViUInt16	AutoCal right ports.
orientation	ViBoolean	VI_TRUE for left, VI_FALSE for right.
autoSenseOn	ViBoolean	Enable AutoSense capabilities.

### C++ Example:

```
ViUInt16 portLeft = 0;
ViUInt16 portRight = 0;
status = ANVNA_AddSelectedPort(sessionId, 1, 0, &portLeft);
status = ANVNA_AddSelectedPort(sessionId, 2, 0, &portRight);
status = ANVNA_SetAutoCalDevice (sessionId, "CH1:", "COM1",
"CharacterizationFile.chf", portLeft, portRight, VI_TRUE, VI_FALSE);
```

### C# Example:

```
ushort portLeft;
ushort portRight;
ANVNA.AddSelectedPort (sessionId, (ushort)1, portLeft, out portLeft);
ANVNA.AddSelectedPort (sessionId, (ushort)2, portRight, out portRight);
ANVNA.SetAutoCalDevice(sessionId, "CH1:", "COM1", "CharacterizationFile.chf",
portLeft, portRight, True, False);
```

**Python Example:**

```
portLeft = 0
portRight = 0
status, portLeft = ANVNA_AddSelectedPort (sessionId, 1, portLeft)
status, portRight = ANVNA_AddSelectedPort (sessionId, 2, portRight)
status, port = ANVNA_SetAutoCalDevice(sessionId, 'CH1:', 'COM1',
'CharacterizationFile.chf', portLeft, portRight, True, False)
```

**MATLAB Example:**

```
portLeft = 0;
portRight = 0;
status, portLeft = anvna.AddSelectedPort (1, portLeft);
status, portRight = anvna.AddSelectedPort (2, portRight);
status = anvna.SetAutoCalDevice(sessionId, 'CH1:', 'COM1',
'CharacterizationFile.chf', portLeft, portRight, True, False);
```

## C-93 ANVNA\_GetAutoCalDevice

```
ViStatus ANVNA_GetAutoCalDevice (
    ViSession vi,
    ViPConstString repCapIdentifier,
    ViPConstString comPort,
    ViPConstString characterizationFile,
    ViPUInt16 portLeft,
    ViPUInt16 portRight,
    ViPBoolean orientation,
    ViPBoolean autoSenseOn);
```

Description: Get Auto Calibration device current parameters.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViPConstString	The physical or virtual repeated capability identifier.
comPort	ViPConstString	COM port identifier.
characterizationFile	ViPConstString	AutoCal device characterization file.
portLeft	ViPUInt16	AutoCal left ports.
portRight	ViPUInt16	AutoCal right ports.
orientation	ViPBoolean	VI_TRUE for left, VI_FALSE for right.
autoSenseOn	ViPBoolean	Enable AutoSense capabilities.

### C++ Example:

```
ViChar comPort[256];
ViChar characterizationFile[256];
ViUInt16 portLeft = 0;
ViUInt16 portRight = 0;
ViPBoolean orientation = VI_FALSE;
ViPBoolean autoSenseOn = VI_FALSE;
status = ANVNA_GetAutoCalDevice (sessionId, &comPort, &characterizationFile,
&portLeft, &portRight, &orientation, &autoSenseOn);
```

**C# Example:**

```
string comPort;
string characterizationFile;
ushort portLeft;
ushort portRight;
ushort orientation;
ushort autoSenseOn;

ANVNA.GetAutoCalDevice(sessionId, out comPort, out characterizationFile, out
portLeft, out portRight, out orientation, out autoSenseOn);
```

**Python Example:**

```
status, comport, characterizationFile, portLeft, portRight, orientation =
ANVNA_GetAutoCalDevice(sessionId, 'CH1:')
```

**MATLAB Example:**

```
status, comport, characterizationFile, portLeft, portRight, orientation =
anvna.GetAutoCalDevice(sessionId, 'CH1:');
```

## C-94 ANVNA\_SetSmartCalDevice

```
ViStatus ANVNA_SetSmartCalDevice (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt16 NumPorts,
    ViUInt16 PortA,
    ViUInt16 PortB,
    ViUInt16 PortC,
    ViUInt16 PortD,
    ViBoolean autoSenseOn);
```

Description: Set SmartCal device parameters.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_Init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier.
NumPorts	ViUInt16	Number of ports.
PortA	ViUInt16	SmartCal port A ports.
PortB	ViUInt16	SmartCal port B ports.
PortC	ViUInt16	SmartCal port C ports.
PortD	ViUInt16	SmartCal port D ports.
autoSenseOn	ViBoolean	Enable AutoSense capabilities.

### C++ Example:

```
ViUInt16 portA = 0;
ViUInt16 portB = 0;

status = ANVNA_AddSelectedPort(sessionId, 1, 0, &portA);
status = ANVNA_AddSelectedPort(sessionId, 2, 0, &portB);
status = ANVNA_SetSmartCalDevice (sessionId, 2, portA, portB, 0, 0, VI_TRUE);
```

### C# Example:

```
ushort portA;
ushort portB;

ANVNA.AddSelectedPort (sessionId, (ushort)1, portA, out portA);
ANVNA.AddSelectedPort (sessionId, (ushort)2, portB, out portB);
ANVNA.SetSmartCalDevice(sessionId, 2, portA, portB, 0, 0, True);
```

**Python Example:**

```
portA = 0
portB = 0
status, portA = ANVNA_AddSelectedPort (sessionId, 1, portA)
status, portB = ANVNA_AddSelectedPort (sessionId, 2, portB)
status, port = ANVNA_SetSmartCalDevice(sessionId, 2, portA, portB, 0, 0, True)
```

**MATLAB Example:**

```
portA = 0;
portB = 0;
status, portA = anvna.AddSelectedPort (1, portA);
status, portB = anvna.AddSelectedPort (2, portB);
status = anvna.SetSmartCalDevice(sessionId, 2, portA, portB, 0, 0, True);
```

## C-95 ANVNA\_GetSmartCalDevice

```
ViStatus ANVNA_GetSmartCalDevice (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViPUInt16 NumPorts,
    ViPUInt16 PortA,
    ViPUInt16 PortB,
    ViPUInt16 PortC,
    ViPUInt16 PortD,
    ViPBoolean autoSenseOn);
```

Description: Get SmartCal device parameters.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier.
NumPorts	ViPUInt16	Number of ports.
PortA	ViPUInt16	SmartCal port A ports.
PortB	ViPUInt16	SmartCal port B ports.
PortC	ViPUInt16	SmartCal port C ports.
PortD	ViPUInt16	SmartCal port D ports.
autoSenseOn	ViPBoolean	Enable AutoSense capabilities.

### C++ Example:

```
ViUInt16 NumPorts = 0;
ViUInt16 portA = 0;
ViUInt16 portB = 0;
ViUInt16 portC = 0;
ViUInt16 portD = 0;
ViPBoolean autoSenseOn = VI_FALSE;
status = ANVNA_GetSmartCalDevice (sessionId, &NumPorts, &portA, &portB, &portC,
&portD, &autoSenseOn);
```

**C# Example:**

```
ushort NumPorts;  
ushort portA;  
ushort portB;  
ushort portC;  
ushort portD;  
ushort autoSenseOn;  
  
ANVNA.GetSmartCalDevice(sessionId, out NumPorts, out portA, out portB, out portC,  
out portD, out autoSenseOn);
```

**Python Example:**

```
status, NumPorts, portA, portB, portC, portD, autoSenseOn =  
ANVNA_GetSmartCalDevice(sessionId, 'CH1:')
```

**MATLAB Example:**

```
status, NumPorts, portA, portB, portC, portD, autoSenseOn =  
anvna.GetSmartCalDevice(sessionId, 'CH1:');
```

## C-96 ANVNA\_SetAdditionalThru

```
ViStatus ANVNA_SetAdditionalThru (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt16 portA,
    ViUInt16 portB);
```

Description: Set additional thru between VNA portA and VNA portB.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier.
portA	ViUInt16	VNA port 1.
portB	ViUInt16	VNA port 2.

### C++ Example:

```
status = ANVNA_SetAdditionalThru (sessionId, "CH1:", 1, 2);
```

### C# Example:

```
ANVNA.SetAdditionalThru(sessionId, "CH1:", 1, ,2);
```

### Python Example:

```
status = ANVNA_SetAdditionalThru(sessionId, 'CH1:', 1, 2)
```

### MATLAB Example:

```
status = anvna.SetAdditionalThru(sessionId, 'CH1:', 1, 2);
```

## C-97 ANVNA\_AddOnePortConnection

```
ViStatus ANVNA_AddOnePortConnection (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt16 CalibrationType,
    ViUInt32 portA,
    ViBoolean resetAccumulation);
```

Description: Setup device for one port connection.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier.
CalibrationType	ViUInt16	Calibration type, see calibration types.
portA	ViUInt16	VNA port A.
resetAccumulation	ViBoolean	Reset VNA port accumulation.

CalibrationType	Values
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLONEPORT	0
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_ONEPATHTWOPORTFORWARD	1
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_RESPONSEONEPORT	2
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_TFRFORWARDPATH	3
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLTWOPORT	4
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_ONEPATHTWOPORTREVERSE	5
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_REFLECTIONBOTHPORT	6
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_RESPONSETWOPORT	7
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_TFRREVERSEPATH	8
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_TRFBOTHPATHS	9
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLTHREEPORT	10
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLFOURPORT	11

**C++ Example:**

```
ViUInt16 portA = 0;  
  
status = ANVNA_AddSelectedPort(sessionId, 1, 0, &portA);  
  
status = ANVNA_AddOnePortConnection(sessionId, "CH1:",  
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLONEPORT, portA, VI_TRUE);
```

**C# Example:**

```
ushort portA;  
  
ANVNA.AddSelectedPort (sessionId, (ushort)1, portA, out portA);  
  
ANVNA.AddOnePortConnection(sessionId,  
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLONEPORT, portA, True);
```

**Python Example:**

```
portA = 0  
  
status, portA = ANVNA_AddSelectedPort (sessionId, 1, portA)  
  
status = ANVNA_AddOnePortConnection(sessionId, 'CH1:',  
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLONEPORT, portA, True)
```

**MATLAB Example:**

```
portA = 0;  
  
status, portA = anvna.AddSelectedPort (1, portA);  
  
status = anvna.AddOnePortConnection(sessionId, 'CH1:',  
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLONEPORT, portA, True);
```

## C-98 ANVNA\_AddTwoPortConnection

```
ViStatus ANVNA_AddTwoPortConnection (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt16 CalibrationType,
    ViUInt32 portA,
    ViUInt32 portB,
    ViBoolean resetAccumulation);
```

Description: Setup device for two port connection.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier.
CalibrationType	ViUInt16	Calibration type, see calibration types.
portA	ViUInt16	VNA port A.
portB	ViUInt16	VNA port B.
resetAccumulation	ViBoolean	Reset VNA port accumulation.

CalibrationType	Values
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLONEPORT	0
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_ONEPATHTWOPORTFORWARD	1
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_RESPONSEONEPORT	2
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_TFRFORWARDPATH	3
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLTWOPORT	4
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_ONEPATHTWOPORTREVERSE	5
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_REFLECTIONBOTHPORT	6
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_RESPONSETWOPORT	7
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_TFRREVERSEPATH	8
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_TRFBOTHPATHS	9
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLTHREEPORT	10
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLSCREENFOURPORT	11

**C++ Example:**

```
ViUInt16 portA = 0;  
ViUInt16 portB = 0;  
  
status = ANVNA_AddSelectedPort(sessionId, 1, 0, &portA);  
status = ANVNA_AddSelectedPort(sessionId, 2, 0, &portB);  
status = ANVNA_AddTwoPortConnection(sessionId, "CH1:",  
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLONEPORT, portA, portB, VI_TRUE);
```

**C# Example:**

```
ushort portA;  
ushort portB;  
  
ANVNA.AddSelectedPort (sessionId, (ushort)1, portA, out portA);  
ANVNA.AddSelectedPort (sessionId, (ushort)2, portB, out portB);  
ANVNA.AddTwoPortConnection(sessionId,  
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLONEPORT, portA, portB, True);
```

**Python Example:**

```
portA = 0  
portB = 0  
  
status, portA = ANVNA_AddSelectedPort (sessionId, 1, portA)  
status, portB = ANVNA_AddSelectedPort (sessionId, 2, portB)  
status = ANVNA_AddTwoPortConnection(sessionId, 'CH1:',  
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLONEPORT, portA, portB, True)
```

**MATLAB Example:**

```
portA = 0;  
portB = 0;  
  
status, portA = anvna.AddSelectedPort (1, portA);  
status, portB = anvna.AddSelectedPort (2, portB);  
status = anvna.AddTwoPortConnection(sessionId, 'CH1:',  
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLONEPORT, portA, portB, True);
```

## C-99 ANVNA\_AddThreePortConnection

```
ViStatus ANVNA_AddThreePortConnection (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt16 CalibrationType,
    ViUInt32 portA,
    ViUInt32 portB,
    ViUInt32 portC,
    ViBoolean resetAccumulation);
```

Description: Setup device for three port connection.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier.
CalibrationType	ViUInt16	Calibration type, see calibration types.
portA	ViUInt16	VNA port A.
portB	ViUInt16	VNA port B.
portC	ViUInt16	VNA port C.
resetAccumulation	ViBoolean	Reset VNA port accumulation.

CalibrationType	Values
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLONEPORT	0
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_ONEPATHTWOPORTFORWARD	1
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_RESPONSEONEPORT	2
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_TFRFORWARDPATH	3
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLTWOPORT	4
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_ONEPATHTWOPORTREVERSE	5
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_REFLECTIONBOTHPORT	6
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_RESPONSETWOPORT	7
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_TFRREVERSESEPATH	8
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_TRFBOTHPATHS	9
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLTHREEPORT	10
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLSCREENFOURPORT	11

**C++ Example:**

```

ViUInt16 portA = 0;
ViUInt16 portB = 0;
ViUInt16 portC = 0;

status = ANVNA_AddSelectedPort(sessionId, 1, 0, &portA);
status = ANVNA_AddSelectedPort(sessionId, 2, 0, &portB);
status = ANVNA_AddSelectedPort(sessionId, 3, 0, &portC);
status = ANVNA_AddThreePortConnection(sessionId, "CH1:",
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLONEPORT, portA, portB, portC, VI_TRUE);

```

**C# Example:**

```

ushort portA;
ushort portB;
ushort portC;

ANVNA.AddSelectedPort (sessionId, (ushort)1, portA, out portA);
ANVNA.AddSelectedPort (sessionId, (ushort)2, portB, out portB);
ANVNA.AddSelectedPort (sessionId, (ushort)3, portC, out portC);
ANVNA.AddThreePortConnection(sessionId,
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLONEPORT, portA, portB, portC, True);

```

**Python Example:**

```

portA = 0
portB = 0
portC = 0

status, portA = ANVNA_AddSelectedPort (sessionId, 1, portA)
status, portB = ANVNA_AddSelectedPort (sessionId, 2, portB)
status, portC = ANVNA_AddSelectedPort (sessionId, 3, portC)
status = ANVNA_AddThreePortConnection(sessionId, 'CH1:',
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLONEPORT, portA, portB, portC, True)

```

**MATLAB Example:**

```

portA = 0;
portB = 0;
portC = 0;

status, portA = anvna.AddSelectedPort (1, portA);
status, portB = anvna.AddSelectedPort (2, portB);
status, portC = anvna.AddSelectedPort (3, portC);
status = anvna.AddThreePortConnection(sessionId, 'CH1:',
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLONEPORT, portA, portB, portC,

```

## C-100 ANVNA\_AddFourPortConnection

```
ViStatus ANVNA_AddFourPortConnection (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt16 CalibrationType,
    ViUInt32 portA,
    ViUInt32 portB,
    ViUInt32 portC,
    ViUInt32 portD,
    ViBoolean resetAccumulation);
```

Description: Setup device for four port connection.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_Init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier.
CalibrationType	ViUInt16	Calibration type, see calibration types.
portA	ViUInt16	VNA port A.
portB	ViUInt16	VNA port B.
portC	ViUInt16	VNA port C.
portD	ViUInt16	VNA port D.
resetAccumulation	ViBoolean	Reset VNA port accumulation.

CalibrationType	Values
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLONEPORT	0
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_ONEPATHTWOPORTFORWARD	1
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_RESPONSEONEPORT	2
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_TFRFORWARDPATH	3
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLTWOPORT	4
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_ONEPATHTWOPORTREVERSE	5
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_REFLECTIONBOTHPORT	6
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_RESPONSETWOPORT	7
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_TFRREVERSEPATH	8
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_TRFBOTHPATHS	9
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLTHREEPORT	10
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLSCREENFOURPORT	11

**C++ Example:**

```
ViUInt16 portA = 0;
ViUInt16 portB = 0;
ViUInt16 portC = 0;
ViUInt16 portD = 0;

status = ANVNA_AddSelectedPort(sessionId, 1, 0, &portA);
status = ANVNA_AddSelectedPort(sessionId, 2, 0, &portB);
status = ANVNA_AddSelectedPort(sessionId, 3, 0, &portC);
status = ANVNA_AddSelectedPort(sessionId, 4, 0, &portD);
status = ANVNA_AddFourPortConnection(sessionId, "CH1:",
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLONEPORT, portA, portB, portC, portD,
VI_TRUE);
```

**C# Example:**

```
ushort portA;
ushort portB;
ushort portC;

ANVNA.AddSelectedPort (sessionId, (ushort)1, portA, out portA);
ANVNA.AddSelectedPort (sessionId, (ushort)2, portB, out portB);
ANVNA.AddSelectedPort (sessionId, (ushort)3, portC, out portC);
ANVNA.AddSelectedPort (sessionId, (ushort)4, portD, out portD);

ANVNA.AddFourPortConnection(sessionId,
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLONEPORT, portA, portB, portC, portD,
True);
```

**Python Example:**

```
portA = 0
portB = 0
portC = 0

status, portA = ANVNA_AddSelectedPort (sessionId, 1, portA)
status, portB = ANVNA_AddSelectedPort (sessionId, 2, portB)
status, portC = ANVNA_AddSelectedPort (sessionId, 3, portC)
status, portD = ANVNA_AddSelectedPort (sessionId, 4, portD)

status = ANVNA_AddFourPortConnection(sessionId, 'CH1:',
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLONEPORT, portA, portB, portC, portD,
True)
```

**MATLAB Example:**

```
portA = 0;  
portB = 0;  
portC = 0;  
  
status, portA = anvna.AddSelectedPort (1, portA);  
status, portB = anvna.AddSelectedPort (2, portB);  
status, portC = anvna.AddSelectedPort (3, portC);  
status, portD = anvna.AddSelectedPort (4, portD);  
  
status = anvna.AddFourPortConnection(sessionId, 'CH1:',  
ANVNA_VAL_ANRITSU_VNA_CALIBRATION_TYPE_FULLONEPORT, portA, portB, portC, portD,  
True);
```

## C-101 ANVNA\_BeginAutoCalCalibration

```
ViStatus ANVNA_BeginAutoCalCalibration (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViPBoolean endStatus,
    ViPUInt16 portA,
    ViPUInt16 portB);
```

Description: Start auto calibration process.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier.
endStatus	ViPBoolean	Is set to VI_TRUE if calibration has ended.
portA	ViPUInt16	VNA port A to be connected.
portB	ViPUInt16	VNA port B to be connected.

### C++ Example:

```
ViBoolean endStatus = VI_FALSE;
ViUInt16 portA = 0;
ViUInt16 portB = 0;
status = ANVNA_BeginAutoCalCalibration(sessionId, "CH1:", &endStatus, &portA,
&portB);
```

### C# Example:

```
ushort endStatus;
ushort portA;
ushort portB;
ANVNA.BeginAutoCalCalibration(sessionId, out endStatus, out portA, out portB);
```

### Python Example:

```
status, endStatus, portA, portB = ANVNA_BeginAutoCalCalibration(sessionId, 'CH1:')
```

### MATLAB Example:

```
status, endStatus, portA, portB = anvna.BeginAutoCalCalibration(sessionId, 'CH1:');
```

## C-102 ANVNA\_ResumeAutoCalCalibration

```
ViStatus ANVNA_ResumeAutoCalCalibration (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViPBoolean endStatus,
    ViPUInt16 portA,
    ViPUInt16 portB);
```

Description: Resume calibration process.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier.
endStatus	ViPBoolean	Is set to VI_TRUE if calibration has ended.
portA	ViPUInt16	VNA port A to be connected.
portB	ViPUInt16	VNA port B to be connected.

### C++ Example:

```
ViBoolean endStatus = VI_FALSE;
ViUInt16 portA = 0;
ViUInt16 portB = 0;

status = ANVNA_ResumeAutoCalCalibration(sessionId, "CH1:", &endStatus, &portA,
&portB);
```

### C# Example:

```
ushort endStatus;
ushort portA;
ushort portB;

ANVNA.ResumeAutoCalCalibration(sessionId, out endStatus, out portA, out portB);
```

### Python Example:

```
status, endStatus, portA, portB = ANVNA_ResumeAutoCalCalibration(sessionId, 'CH1:')
```

### MATLAB Example:

```
status, endStatus, portA, portB = anvna.ResumeAutoCalCalibration(sessionId,
'CH1:');
```

## C-103 ANVNA\_EndAutoCalCalibration

```
ViStatus ANVNA_EndAutoCalCalibration (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViPBoolean endStatus);
```

Description: Returns the calibration process end status.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier.
endStatus	ViPBoolean	Is set to VI_TRUE if calibration has ended.

### C++ Example:

```
ViBoolean endStatus = VI_FALSE;
ViUInt16 portA = 0;
ViUInt16 portB = 0;
status = ANVNA_EndAutoCalCalibration(sessionId, "CH1:", &endStatus, &portA,
&portB);
```

### C# Example:

```
ushort endStatus;
ushort portA;
ushort portB;
ANVNA.EndAutoCalCalibration(sessionId, out endStatus, out portA, out portB);
```

### Python Example:

```
status, endStatus, portA, portB = ANVNA_EndAutoCalCalibration(sessionId, 'CH1:')
```

### MATLAB Example:

```
status, endStatus, portA, portB = anvna.EndAutoCalCalibration(sessionId, 'CH1:');
```

## C-104 ANVNA\_AbortCalibration

```
ViStatus ANVNA_AbortCalibration (  
    ViSession vi,  
    ViConstString RepCapIdentifier);
```

Description: Aborts the calibration process.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:".)

Example: See example for [ANVNA\\_StartCalibration](#).

## C-105 ANVNA\_ChannelStimulusRangeConfigureCenterSpan

```
ViStatus ANVNA_ChannelStimulusRangeConfigureCenterSpan (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViReal64 centerVal,
    ViReal64 spanVal);
```

Description: Sets the sweep range for the channel using center and span value of the frequencies.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:").
centerVal	ViReal64	Center frequency value, in Hz.
spanVal	ViReal64	Span value, in Hz.

### C++ Example:

```
/*
 * Initialization code ...
 * Measurement setup ...
 */

ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];

if(( status = ANVNA_ChannelStimulusRangeConfigureCenterSpan(sessionId, "CH1:",
4000000000.0, 6000000000.0) != VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while configuring center and span bandwidth: %s\n",
status, ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}

// Now CH1 is configured as needed
```

**C# Example:**

```
/*
 * Initialization code ...
 * Measurement setup ...
 */

int status = 0;

if ((status = ANVNA.ChannelStimulusRangeConfigureCenterSpan(sessionId, "CH1:",
40000000000.0, 6000000000.0)) != 0)

{
    string ErrorMessage = "";

    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);

    System.Console.WriteLine("Error " + status + " while configuring center and
span bandwidth: " + ErrorMessage);

    ANVNA.close(sessionId);

    System.Environment.Exit(1);
}

// Now CH1 is configured as needed
```

**Python Example:**

```
#Initialization code ...

#Measurement setup ...

status = ANVNA_ChannelStimulusRangeConfigureCenterSpan(sessionId,
"CH1:",2000000000,1000000000)

if status == 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print("Error {0} while configuring center and span bandwidth:
{1}\n".format(status, ErrorMessage))

    ANVNA_close(sessionId)
    exit(1)

#Now CH1 is configured as needed
```

**MATLAB Example:**

```
% Initialization code ...

% Measurement setup ...

status = anvna.ChannelStimulusRangeConfigureCenterSpan('CH1:',
4000000000.0, 6000000000.0);

if( status ~= 0)

    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while configuring center and span bandwidth: %s\n',
stat, ErrorMessage);

    status = anvna.close();

    return;

end

% Now CH1 is configured as needed
```

## C-106 ANVNA\_ChannelStimulusRangeConfigureStartStop

```
ViStatus ANVNA_ChannelStimulusRangeConfigureStartStop (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViReal64 startVal,
    ViReal64 stopVal);
```

Description: Sets the sweep range for the channel using start and stop values of the frequencies.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:").
startVal	ViReal64	Start frequency value, in Hz.
stopVal	ViReal64	Stop frequency value, in Hz.

### C++ Example:

```
/*
 * Initialization code ...
 * Measurement setup ...
 */
ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];

if(( status = ANVNA_ChannelStimulusRangeConfigureStartStop(sessionId, "CH1:",
2000000000.0, 6000000000.0)) != VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while configuring start and stop bandwidth: %s\n", status,
ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}

// Now CH1 is configured as needed
```

**C# Example:**

```
/*
 * Initialization code ...
 * Measurement setup ...
 */

int status = 0;

if(( status = ANVNA.ChannelStimulusRangeConfigureStartStop(sessionId, "CH1:",
2000000000.0, 6000000000.0) != 0)

{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);

    System.Console.WriteLine("Error " + status + " while configuring start and
stop bandwidth: " + ErrorMessage);

    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}

// Now CH1 is configured as needed
```

**Python Example:**

```
#Initialization code...
#Measurement setup...

status = ANVNA_ChannelStimulusRangeConfigureStartStop(sessionId,
"CH1:",float(2000000000),float(3000000000))

if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print("Error {0} while configuring start and stop bandwidth:
{1}\n".format(status, ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)

#Now CH1 is configured as needed
```

**MATLAB Example:**

```
% Initialization code ...

% Measurement setup ...

status = anvna.ChannelStimulusRangeConfigureStartStop('CH1:', 2000000000.0,
60000000000.0);

if( status ~= 0)

    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while configuring start and stop bandwidth: %s\n',
stat, ErrorMessage);
    status = anvna.close();
    return;
end

% Now CH1 is configured as needed
```

## C-107 ANVNA\_ChannelTriggerSweep

```
ViStatus ANVNA_ChannelTriggerSweep (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViInt32 timeoutVal);
```

**Description:** This will trigger the sweep on all channels. Method does not return until sweep completes or timeout value is exceeded.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (not parsed, can be "" or ":")
timeoutVal	ViInt32	Time out value, in milliseconds.

### C++ Example:

```
/*
 * Initialization code ...
 * Trigger sweep ...
 */

ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
// trigger sweep on channel 1 with 2 seconds timeout:
if ((status = ANVNA_ChannelTriggerSweep(sessionId, "CH1:", 2000)) != VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while triggering sweep on channel 1: %s\n", status,
ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
// Sweep done, data can be fetched now ...
```

**C# Example:**

```
/*
 * Initialization code ...
 * Trigger sweep ...
 */

int status = 0;
status = ANVNA.ChannelTriggerSweep(sessionId, "CH1:", 2000);
if (status != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " while triggering sweep on
channel 1: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}
// Sweep done, data can be fetched now ...
```

**Python Example:**

```
#Initialization code...
#Trigger sweep...

#trigger sweep on channel 1 with 2 seconds timeout:
status = ANVNA_ChannelTriggerSweep(sessionId, "CH1:", 2000)
if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print("Error {0} while triggering sweep on channel 1: {1}\n".format(status,
ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)

#Sweep done, data can be fetched now...
```

**MATLAB Example:**

```
% Initialization code ...

% Trigger sweep ...

status = anvna.ChannelTriggerSweep('CH1:',2000);
if( status ~= 0)

    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while triggering sweep on channel 1: %s\n', stat,
ErrorMessage);
    status = anvna.close();
    return;

end

% Sweep done, data can be fetched now ...
```

## C-108 ANVNA\_close

```
ViStatus ANVNA_close (
    ViSession vi);
```

Description: Closes the connection to the instrument. All subsequent function calls will return error.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.

### C++ Example:

```
# include "ANVNA.h" // Specific driver header file
void main()
{
    ViStatus status;
    ViSession sessionId;
    // Initialize the driver
    // This will also check the instrument ID to make sure it is supported and will
    // pre-set the instrument to its default state:
    status = ANVNA_Init("TCPIP::127.0.0.1::SOCKET", VI_TRUE, VI_TRUE, & sessionId);

    if(status != VI_SUCCESS)
    {
        printf("Error %d while initializing\n", status);
        exit(1);
    }

    // ... call driver functions using " sessionId " variable

    status = ANVNA_close(sessionId);
}
```

**C# Example:**

```
int status = 0;
uint sessionId = 0;
string ResourceName = "TCPIP:: 127.0.0.1::SOCKET";
string OptionsString = "Simulate=false";
// Initialize the driver in non-simulated mode
// This will also check the instrument ID to make sure it is supported and will
pre-set the instrument to its default state:

status = ANVNA.init(ResourceName, TRUE, TRUE, out sessionId);
if (status != 0)
{
    System.Console.WriteLine("Error " + status + " while initializing");
    System.Environment.Exit(1);
}

// ... call driver functions using "sessionId" variable
status = ANVNA.close(sessionId);
```

**Python Example:**

```
#Initialize the driver
#This will also check the instrument ID to make sure it is supported and will
pre-set the instrument to its default state:

status, sessionId = ANVNA_InitWithOptions('TCPIP::127.0.0.1::SOCKET', False,
False, "simulate=false")
if status != 0:
    print ("Error {0} while initializing".format(status))
    exit(1)

#call driver functions using " sessionId " variable
status = ANVNA_close(sessionId)
```

**MATLAB Example:**

```
% Initialize the driver
% This will also check the instrument ID to make sure it is supported and will
% pre-set the instrument to its default state:
status = anvna.init('TCPIP::127.0.0.1::SOCKET', 1, 1);
if( status ~= 0)

    fprintf('Error %d while initializing\n', status);
    return;

end

% ... call driver functions
status = anvna.close();
```

## C-109 ANVNA\_error\_message

```
ViStatus ANVNA_error_message (
    ViSession vi,
    ViStatus errorCode,
    ViChar errorMessage[]);
```

**Description:** Translates the error return value from an IVI driver function to a user-readable string. The user should pass a buffer with at least 256 bytes for the ErrorMessage parameter.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
errorCode	ViStatus	Instrument driver status code.
errorMessage	ViChar[]	Output buffer containing the instrument driver error message.

### C++ Example:

```
/*
 * Initialization code ...
 */

ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
// trigger sweep on channel 1 with 2 seconds timeout:
if ((status = ANVNA_ChannelTriggerSweep(sessionId, "CH1:", 2000)) != VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while triggering sweep on channel 1: %s\n", status,
ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
```

**C# Example:**

```
/*
 * Initialization code ...
 * Trigger sweep ...
 * Read attribute's value ANVNA_ATTR_CHANNEL_POINTS into "points"
 */

int status = 0;
status = ANVNA.ChannelTriggerSweep(sessionId, "CH1:", 2000);
if (status != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " while triggering sweep on
channel 1: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}
// Sweep done, data can be fetched now ...
```

**Python Example:**

```
#Initialization code...
#Trigger sweep...

#trigger sweep on channel 1 with 2 seconds timeout:
status = ANVNA_ChannelTriggerSweep(sessionId, "CH1:", 2000)
if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print("Error {0} while triggering sweep on channel 1: {1}\n".format(status,
ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)

#Sweep done, data can be fetched now...
```

**MATLAB Example:**

```
% Initialization code ..  
  
% trigger sweep on channel 1 with 2 seconds timeout:  
status = anvna.ChannelTriggerSweep('CH1:',2000);  
if( status ~= 0)  
  
    [ stat, ErrorMessage ] = anvna.error_message(status); % function is used here  
    fprintf('Error %d while triggering sweep on channel 1: %s\n', stat,  
ErrorMessage);  
    status = anvna.close();  
    return;  
  
end
```

## C-110 ANVNA\_GetAttributeViBoolean

```
ViStatus ANVNA_GetAttributeViBoolean (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViAttr attributeID,
    ViBoolean *attributeValue);
```

Description: This function is used to access low-level settings of the instrument. See the attributeID parameter for a link to all attributes of the instrument.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Otherwise, the user passes VI_NULL or an empty string.
attributeID	ViAttr	The ID of the attribute. The valid values for this parameter can be found in the driver header file.
attributeValue	ViBoolean* (passed by pointer)	Returns the current value of the attribute. The user must specify the address of a variable that has the same data type as the attribute.

Example: See [Generic Attribute Getter Examples](#).

## C-111 ANVNA\_GetAttributeViInt32

```
ViStatus ANVNA_GetAttributeViInt32 (
```

```
    ViSession vi,
```

```
    ViConstString repCapIdentifier,
```

```
    ViAttr attributeID,
```

```
    ViInt32 *attributeValue);
```

Description: This function is used to access low-level settings of the instrument. See the attributeID parameter for a link to all attributes of the instrument.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Otherwise, the user passes VI_NULL or an empty string.
attributeID	ViAttr	The ID of the attribute. The valid values for this parameter can be found in the driver header file.
attributeValue	ViInt32* (passed by pointer)	Returns the current value of the attribute. The user must specify the address of a variable that has the same data type as the attribute.

Example: See [Generic Attribute Getter Examples](#).

## C-112 ANVNA\_GetAttributeViInt64

```
ViStatus ANVNA_GetAttributeViInt64 (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViAttr attributeID,
    ViInt64 *attributeValue);
```

Description: This function is used to access low-level settings of the instrument. See the attributeID parameter for a link to all attributes of the instrument.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Otherwise, the user passes VI_NULL or an empty string.
attributeID	ViAttr	The ID of the attribute. The valid values for this parameter can be found in the driver header file.
attributeValue	ViInt64* (passed by pointer)	Returns the current value of the attribute. The user must specify the address of a variable that has the same data type as the attribute.

Example: See [Generic Attribute Getter Examples](#).

## C-113 ANVNA\_GetAttributeViReal64

```
ViStatus ANVNA_GetAttributeViReal64 (
```

```
    ViSession vi,
```

```
    ViConstString repCapIdentifier,
```

```
    ViAttr attributeID,
```

```
    ViReal64 *attributeValue);
```

Description: This function is used to access low-level settings of the instrument. See the attributeID parameter for a link to all attributes of the instrument.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Otherwise, the user passes VI_NULL or an empty string.
attributeID	ViAttr	The ID of the attribute. The valid values for this parameter can be found in the driver header file.
attributeValue	ViReal64 (passed by pointer)	Returns the current value of the attribute. The user must specify the address of a variable that has the same data type as the attribute.

Example: See [Generic Attribute Getter Examples](#).

## C-114 ANVNA\_GetAttributeViReal32

```
ViStatus ANVNA_GetAttributeViReal32 (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViAttr attributeID,
    ViReal32 *attributeValue);
```

Description: This function is used to access low-level settings of the instrument. See the attributeID parameter for a link to all attributes of the instrument.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Otherwise, the user passes VI_NULL or an empty string.
attributeID	ViAttr	The ID of the attribute. The valid values for this parameter can be found in the driver header file.
attributeValue	ViReal32 (passed by pointer)	Returns the current value of the attribute. The user must specify the address of a variable that has the same data type as the attribute.

Example: See [Generic Attribute Getter Examples](#).

## C-115 ANVNA\_GetAttributeViString

```
ViStatus ANVNA_GetAttributeViString (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViAttr attributeID,
    ViInt32 attributeValueBufferSize,
    ViChar attributeValue[]);
```

Description: This function is used to access low-level settings of the instrument. See the attributeID parameter for a link to all attributes of the instrument.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Otherwise, the user passes VI_NULL or an empty string.
attributeID	ViAttr	The ID of the attribute. The valid values for this parameter can be found in the driver header file.
attributeValueBufferSize	ViInt32	The number of bytes in the ViChar array that the user specifies for the AttributeValue parameter.
attributeValue	ViChar[]	The buffer in which the function returns the current value of the attribute.

Example: See [Generic Attribute Getter Examples](#).

## C-116 ANVNA\_GetAttributeViUInt32

```
ViStatus ANVNA_GetAttributeViUInt32 (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViAttr attributeID,
    ViUInt32 *attributeValue);
```

Description: This function is used to access low-level settings of the instrument. See the attributeID parameter for a link to all attributes of the instrument.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Otherwise, the user passes VI_NULL or an empty string.
attributeID	ViAttr	The ID of the attribute. The valid values for this parameter can be found in the driver header file.
attributeValue	ViUInt32* (passed by pointer)	Returns the current value of the attribute. The user must specify the address of a variable that has the same data type as the attribute.

Example: See [Generic Attribute Getter Examples](#).

## C-117 ANVNA\_GetChannelMeasurementName

```
ViStatus ANVNA_GetChannelMeasurementName (
    ViSession vi,
    ViConstString channel,
    ViInt32 index,
    ViInt32 nameBufferSize,
    ViChar name[]);
```

**Description:** This function returns the physical identifier that corresponds to the one-based index measurement that the user specifies. If the value that the user passes for the Index parameter is less than one or greater than the value of the corresponding Measurement Count attribute, the function returns an empty string in the Name parameter and returns an error.

Parameter List:

Name	Variable Type	Description
vi	ViSession	Identifies the instrument session.
channel	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:".
index	ViInt32	A one-based index that defines the trace whose name is to be returned.
nameBufferSize	ViInt32	The number of bytes in the ViChar array that the user specifies for the name parameter.
name	ViChar[]	The buffer into which the function returns the measurement name that corresponds to the index the user specifies.

### C++ Example:

```
/*
 * Initialization code ...
 */

ViChar name[MAX_STRING_LENGTH];

if(( status = ANVNA_GetChannelMeasurementName(sessionId, "CH1:", 1,
MAX_STRING_LENGTH, name)) != VI_SUCCESS)
{
    ViChar ErrorMessage[MAX_STRING_LENGTH];
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while getting measurement name: %s\n", status, ErrorMessage);
    ANVNA_close(sessionId);
    getchar();
    exit(1);
}

printf("Measurement name is %s\n", name);
```

**C# Example:**

```
string name = "";
if ((status = ANVNA.GetChannelMeasurementName(sessionId, "CH1:", 1,
ANVNA.MAX_STRING_LENGTH, out name)) != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " while getting measurement name:
" + ErrorMessage);
    ANVNA.close(sessionId);
    System.Console.Read();
    Environment.Exit(0);
}

System.Console.WriteLine("Measurement name is " + name);
```

**Python Example:**

```
#Initialization code
status, name = ANVNA_GetChannelMeasurementName(sessionId, "CH1:", 1,
MAX_STRING_LENGTH)
if status == 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print("Error {0} while getting measurement name: {1}\n".format(status,
ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)

print ('Measurement name is ' + str(name))
```

**MATLAB Example:**

```
%     * Initialization code ...

[status, name] = anvna.GetChannelMeasurementName('CH1:', 1, 1024);
if( status ~= 0)

    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while getting measurement name: %s\n', stat,
ErrorMessage);
    status = anvna.close();
    return;

end

fprintf('Measurement name is %s\n', name);
```

## C-118 ANVNA\_GetChannelName

```
ViStatus ANVNA_GetChannelName (
    ViSession vi,
    ViInt32 index,
    ViInt32 nameBufferSize,
    ViChar name[]);
```

**Description:** This function returns the physical identifier that corresponds to the one-based index that the user specifies. If the value that the user passes for the Index parameter is less than one or greater than the value of the corresponding Channel Count attribute, the function returns an empty string in the Name parameter and returns an error.

Parameter List:

Name	Variable Type	Description
vi	ViSession	Identifies the instrument session.
index	ViInt32	A one-based index that defines which channel name to return.
nameBufferSize	ViInt32	The number of bytes in the ViChar array that the user specifies for the name parameter.
name	ViChar[]	The buffer into which the function returns the channel name that corresponds to the index the user specifies.

### C++ Example:

```
/*
 * Initialization code ...
 */

ViChar channelName[MAX_STRING_LENGTH];
if(( status = ANVNA_GetChannelName(sessionId, 1, MAX_STRING_LENGTH,
channelName)) != VI_SUCCESS)
{
    ViChar ErrorMessage[MAX_STRING_LENGTH];
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while getting channel name: %s\n", status, ErrorMessage);
    ANVNA_close(sessionId);
    getchar();
    exit(1);
}
printf("Channel name is %s\n", channelName);
```

**C# Example:**

```
string name = "";
if ((status = ANVNA.GetChannelName(sessionId, 1, ANVNA.MAX_STRING_LENGTH, out
name)) != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " while getting channel name: "
+ ErrorMessage);
    ANVNA.close(sessionId);
    System.Console.Read();
    Environment.Exit(0);
}

System.Console.WriteLine("Channel name is " + name);
```

**Python Example:**

```
#Initialization code ...
status, channelName = ANVNA_GetChannelName(sessionId,1 , MAX_STRING_LENGTH)
if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print('Error {0} getting channel name\n'.format(status))
    ANVNA_close(sessionId)
    exit(1)

print ('Channel name is  ' + str(channelName))
```

**MATLAB Example:**

```
% Initialization code ...
[status, channelName] = anvna.GetChannelName(1, 1024);
if(status ~= 0)
    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while getting measurement name: %s\n', stat,
ErrorMessage);
    status = anvna.close();
    return;

end
fprintf('Channel name is %s\n', channelName);
```

## C-119 ANVNA\_SetChannelSourcePowerLevel

```
ViStatus ANVNA_SetChannelSourcePowerLevel (
```

```
    ViSession vi,
```

```
    ViConstString RepCapIdentifier,
```

```
    ViInt32 PortVal,
```

```
    ViReal64 Val);
```

Description: This function sets the power value for the input port.

Parameter List:

Name	Variable Type	Description
vi	ViSession	Identifies the instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Otherwise, the user passes VI_NULL or an empty string.
PortVal	ViInt32	The port number to be changed.
Val	ViReal64	The power value to be set.

```
ViStatus ANVNA_GetChannelSourcePowerLevel (
    ViSession vi,
    ViConstString RepCapIdentifier,
    ViInt32 PortVal,
    ViReal64 Val);
```

Description: This function gets the power value for the input port.

Parameter List:

Name	Variable Type	Description
vi	ViSession	Identifies the instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Otherwise, the user passes VI_NULL or an empty string.
PortVal	ViInt32	The port number to be changed.
Val	ViReal64	The output variable for the power value.

## C-121 ANVNA\_init

```
ViStatus ANVNA_init (
    ViRsrc resourceName,
    ViBoolean idQuery,
    ViBoolean reset,
    ViSession *vi);
```

**Description:** Opens the communication with the instrument. Driver functions that access the instrument are only accessible after ANVNA\_init is called. Initialize optionally performs a Reset and queries the instrument to validate the instrument model.

Parameter List:

Name	Variable Type	Description
resourceName	ViRsrc	An IVI logical name or an instrument specific string that identifies the address of the instrument. Example "TCPIP::192.168.1.2::SOCKET".
idQuery	ViBoolean	Specifies whether to verify the ID of the instrument (VI_TRUE triggers instrument verification).
reset	ViBoolean	Specifies whether to reset the instrument (VI_TRUE triggers reset).
vi	ViSession* (passed by pointer)	Unique identifier for an IVI session.

### C++ Example:

```
#include "ANVNA.h" // Specific driver header file
void main()
{
    ViStatus status;
    ViSession sessionId;
    // Initialize the driver
    // This will also check the instrument ID to make sure it is supported and will
    // pre-set the instrument to its default state:
    status = ANVNA_Init("TCPIP::127.0.0.1::SOCKET", VI_TRUE, VI_TRUE, &sessionId);

    if(status != VI_SUCCESS)
    {
        printf("Error %d while initializing\n", status);
        exit(1);
    }
    // ... call driver functions using "sessionId" variable
    status = ANVNA_close(sessionId);
}
```

**C# Example:**

```
int status = 0;
uint sessionId = 0;
string ResourceName = "TCPIP::127.0.0.1::SOCKET";
string OptionsString = "Simulate=false";
// Initialize the driver in non-simulated mode
// This will also check the instrument ID to make sure it is supported and will
pre-set the instrument to its default state:
status = ANVNA.init(ResourceName, TRUE, TRUE, out sessionId);
if (status != 0)
{
    System.Console.WriteLine("Error " + status + " while initializing");
    System.Environment.Exit(1);
}

// ... call driver functions using "sessionId" variable
status = ANVNA.close(sessionId);
```

**Python Example:**

```
#Initialize the driver
#This will also check the instrument ID to make sure it is supported and will
pre-set the instrument to its default state:

status, sessionId = ANVNA_init('TCPIP::127.0.0.1::SOCKET', True, True)
if status != 0:
    print("Error {0} while initializing\n".format(status))
    exit(1)

#call driver functions using "session" variable
```

**MATLAB Example:**

```
anvna = ANVNADriver(); %Specific driver header file

% Initialize the driver
% This will also check the instrument ID to make sure it is supported and will
% pre-set the instrument to its default state:
status = anvna.init('TCPIP::127.0.0.1::SOCKET', 1, 1);
if( status ~= 0)

    fprintf('Error %d while initializing\n', status);
    return;
end

% call driver functions

status = anvna.close();
```

## C-122 ANVNA\_InitWithOptions

```
ViStatus ANVNA_InitWithOptions (
    ViRsrc resourceName
    ViBoolean idQuery,
    ViBoolean reset,
    ViConstString optionsString,
    ViSession *vi);
```

Description: Opens the communication with the instrument. Driver methods and properties that access the instrument are only accessible after Initialize is called. Initialize optionally performs a Reset and queries the instrument to validate the instrument model.

Parameter List:

Name	Variable Type	Description
resourceName	ViRsrc	An IVI logical name or an instrument specific string that identifies the address of the instrument. Example "TCPIP::192.168.1.2::SOCKET".
idQuery	ViBoolean	Specifies whether to verify the ID of the instrument.
reset	ViBoolean	Specifies whether to reset the instrument.
optionsString	ViConstString	The user can use the OptionsString parameter to specify the initial values of certain IVI inherent attributes for the session. The format of an assignment in the OptionsString parameter is "Name=Value", where Name is one of:, Simulate,. Value is either true or false
vi	ViSession* (passed by pointer)	Unique identifier for an IVI session.

### C++ Example:

```
#include "ANVNA.h" // Specific driver header file
void main()
{
    ViStatus status;
    ViSession sessionId;
    // Initialize the driver in non-simulated mode
    // This will also check the instrument ID to make sure it is supported
    status = ANVNA_InitWithOptions("TCPIP::127.0.0.1::SOCKET", VI_TRUE, VI_TRUE,
"Simulate=false", & sessionId);

    if(status != VI_SUCCESS)
    {
        printf("Error %d while initializing\n", status);
        exit(1);
    }
}
```

```
// ... call driver functions

status = ANVNA_close(sessionId);
}
```

**C# Example:**

```
int status = 0;
uint sessionId = 0;
string ResourceName = "TCPIP::127.0.0.1::SOCKET";
string OptionsString = "Simulate=false";

status = ANVNA.InitWithOptions(ResourceName, FALSE, FALSE, OptionsString, out
sessionId);

if (status != 0)
{
    System.Console.WriteLine("Error " + status + " while initializing");
    System.Environment.Exit(1);
}

// ... call driver functions

status = ANVNA.close(sessionId);
```

**Python Example:**

```
#Initialize the driver

#This will also check the instrument ID to make sure it is supported and will
#pre-set the instrument to its default state:

status, sessionId = ANVNA_InitWithOptions('TCPIP::127.0.0.1::SOCKET', False,
False, "simulate=false")

if status != 0:
    print("Error {0} while initializing\n".format(status))
    exit(1)

#call driver functions using "sessionId" variable

ANVNA_close(sessionId)
```

**MATLAB Example:**

```
anvna = ANVNADriver(); %Specific driver header file

% Initialize the driver in non-simulated mode
% This will also check the instrument ID to make sure it is supported
status = anvna.InitWithOptions('TCPIP::127.0.0.1::SOCKET', 1, 1,
'Simulate=false');

if( status ~= 0)

    fprintf('Error %d while initializing\n', status);
    return;
end

% ... call driver functions

status = anvna.close();
```

## C-123 ANVNA\_reset

```
ViStatus ANVNA_reset (
    ViSession vi);
```

Description: Places the instrument in a known state.

For parameter Simulate=True passed by optionsString in [ANVNA\\_InitWithOptions](#) function, ANVNA\_reset will NOT change it back to the default value(False).

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.

### C++ Example:

```
#include "ANVNA.h" // Specific driver header file
void main()
{
    ViStatus status;
    ViSession sessionId;
    char ErrorMessage[MAX_STRING_LENGTH];

    // Initialize the driver in non-simulated mode
    // This will also check the instrument ID to make sure it is supported
    status = ANVNA_InitWithOptions("TCPIP::127.0.0.1::SOCKET", VI_FALSE, VI_FALSE,
        "Simulate=false", & sessionId);

    if(status != VI_SUCCESS)
    {
        printf("Error %d while initializing\n", status);
        exit(1);
    }

    // Reset the instrument
    Status = ANVNA_reset(sessionId);
    if(status != VI_SUCCESS)
    {
        ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
        printf("Error %d while resetting device: %s\n", status, ErrorMessage);
        ANVNA_close(sessionId);
        exit(1);
    }
}
```

```
}

// ... call driver functions

status = ANVNA_close(sessionId);

}
```

**C# Example:**

```
int status = 0;

uint sessionId = 0;

status = ANVNA.InitWithOptions("TCPIP::127.0.0.1::SOCKET", FALSE, FALSE,
"Simulate=false", out sessionId);

if (status != 0)
{
    System.Console.WriteLine("Error " + status + " while initializing");
    System.Environment.Exit(1);
}

// Reset the instrument

status = ANVNA.reset(sessionId);

if (status != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " while resetting device: " +
ErrorMessage);

    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}

status = ANVNA.close(sessionId);
```

**Python Example:**

```
#Initialize the driver  
  
#This will also check the instrument ID to make sure it is supported and will  
#pre-set the instrument to its default state:  
  
    status, sessionId = ANVNA_InitWithOptions('TCPIP::127.0.0.1::SOCKET', False,  
    False, "simulate=False")  
  
    if status != 0:  
        print("Error {0} while initializing\n".format(status))  
        exit(1)  
  
  
#Reset the instrument  
  
status = ANVNA_reset(sessionId)  
if status != 0:  
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)  
    print("Error {0} while resetting device: {1}\n".format(status,  
    ErrorMessage))  
    ANVNA_close(sessionId)  
    exit(1)  
  
  
#call driver functions ...  
  
status = ANVNA_close(sessionId)
```

**MATLAB Example:**

```
anvna = ANVNADriver(); %Specific driver header file

% Initialize the driver in non-simulated mode
% This will also check the instrument ID to make sure it is supported
status = anvna.InitWithOptions('TCPIP::127.0.0.1::SOCKET', 0, 0,
'Simulate=false');

if( status ~= 0)
    fprintf('Error %d while initializing\n', status);
    return;
end

% Reset the instrument:
status = anvna.reset();
if( status ~= 0)

    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while resetting device: %s\n', stat, ErrorMessage);
    status = anvna.close();

    return;
end

% ... call driver functions

status = anvna.close();
```

## C-124 ANVNA\_ResetWithDefaults

```
ViStatus ANVNA_ResetWithDefaults (
    ViSession vi);
```

**Description:** Does the equivalent of Reset and then configures the driver to option string settings used when ANVNA\_InitWithOptions was last executed.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.

### C++ Example:

```
#include "ANVNA.h" // Specific driver header file
void main()
{
    ViStatus status;
    ViSession sessionId;
    char ErrorMessage[MAX_STRING_LENGTH];
    // Initialize the driver in non-simulated mode
    // This will also check the instrument ID to make sure it is supported
    status = ANVNA_InitWithOptions("TCPIP::127.0.0.1::SOCKET", VI_FALSE, VI_FALSE,
"Simulate=false", & sessionId);

    if(status != VI_SUCCESS)
    {
        printf("Error %d while initializing\n", status);
        exit(1);
    }

    // Reset the instrument
    Status = ANVNA_ResetWithDefaults(sessionId);
    if(status != VI_SUCCESS)
    {
        ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
        printf("Error %d while resetting device: %s\n", status, ErrorMessage);
        ANVNA_close(sessionId);
        exit(1);
    }
}
```

```
// ... call driver functions

status = ANVNA_close(sessionId);
}
```

**C# Example:**

```
int status = 0;

uint sessionId = 0;

status = ANVNA.InitWithOptions("TCPIP::127.0.0.1::SOCKET", FALSE, FALSE,
"Simulate=false", out sessionId);

if (status != 0)
{
    System.Console.WriteLine("Error " + status + " while initializing");
    System.Environment.Exit(1);
}

// Reset the instrument

status = ANVNA.ResetWithDefaults(sessionId);

if (status != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " while resetting device: " +
+ ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}

// Call driver functions ...

status = ANVNA.close(sessionId);
```

**Python Example:**

```
#Initialize the driver
#This will also check the instrument ID to make sure it is supported and will
#pre-set the instrument to its default state:

status, sessionId = ANVNA_InitWithOptions('TCPIP::127.0.0.1::SOCKET', False,
False, "simulate=False")
if status != 0:
    print("Error {0} while initializing\n".format(status))
    exit(1)

#Reset the instrument
status = ANVNA_ResetWithDefaults(sessionId)
if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print("Error {0} while resetting device: {1}\n".format(status,
ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)

# call driver functions

status = ANVNA_close(sessionId)
```

**MATLAB Example:**

```
anvna = ANVNADriver(); %Specific driver header file

% Initialize the driver in non-simulated mode
% This will also check the instrument ID to make sure it is supported
status = anvna.InitWithOptions('TCPIP::127.0.0.1::SOCKET', 0, 0,
'Simulate=false');

if( status ~= 0)
    fprintf('Error %d while initializing\n', status);
    return;
end

% Reset the instrument:
status = anvna.ResetWithDefaults();
if( status ~= 0)

    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while resetting device: %s\n', stat, ErrorMessage);
    status = anvna.close();
    return;
end

% ... call driver functions

status = anvna.close();
```

## C-125 ANVNA\_revision\_query

```
ViStatus ANVNA_revision_query (
    ViSession vi,
    ViChar driverRev[],
    ViChar instrRev[]);
```

Description: Retrieves revision information from the instrument.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
driverRev	ViChar[]	Returns the revision of the IVI specific driver, which is the value held in the Specific Driver Revision attribute. Refer to the Specific Driver Revision attribute for more information.
instrRev	ViChar[]	Returns the firmware revision of the instrument, which is the value held in the Instrument Firmware Revision attribute. Refer to the Instrument Firmware Revision attribute for more information.

### C++ Example:

```
/*
 * Initialization code ...
 */

ViChar driverRev[MAX_STRING_LENGTH];
ViChar instrRev[MAX_STRING_LENGTH];

if ((status = ANVNA_revision_query(sessionId, driverRev, instrRev)) != VI_SUCCESS)
{
    char ErrorMessage[MAX_STRING_LENGTH];
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while retrieving revision information: %s\n", status, ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}

printf("Driver revision is %s and instrument revision is %s\n", driverRev, instrRev);
```

**C# Example:**

```
string driverRev;
string instrRev;
if ((status = ANVNA.revision_query(sessionId, out driverRev, out instrRev)) != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " while retrieving revision
information: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}

System.Console.WriteLine("Driver revision is " + driverRev + " and instrument
revision is " + instrRev);
```

**Python Example:**

```
#Initialization code ...
status, driverRev, instrRev = ANVNA_revision_query (sessionId)
if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print("Error {0} while retrieving revision information:
{1}\n".format(status, ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)

print("Driver revision is {0} and instrument revision is
{1}\n".format(driverRev, instrRev))
```

**MATLAB Example:**

```
%     * Initialization code ...

[status, driverRev, instrRev] = anvna.revision_query();
if( status ~= 0)

    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while retrieving revision information: %s\n', stat,
ErrorMessage);
    status = anvna.close();
    return;

end

fprintf('Driver revision is %s and instrument revision is %s\n', driverRev,
instrRev);
```

## C-126 ANVNA\_self\_test

```
ViStatus ANVNA_self_test (
    ViSession vi,
    ViInt16 *testResult,
    ViChar testMessage[]);
```

**Description:** Performs an instrument self test, waits for the instrument to complete the test, and queries the instrument for the results. If the instrument passes the test, TestResult is zero and TestMessage is 'Self test passed'.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
testResult	ViInt16* (passed by pointer)	The numeric result from the self test operation. 0 = no error (test passed)
testMessage	ViChar[]	The self test status message

### C++ Example:

```
/*
 * Initialization code ...
 */
ViInt16 testResult = 0;
ViChar testMessage[MAX_STRING_LENGTH];
if(( status = ANVNA_self_test(sessionId, &testResult, testMessage) ) != VI_SUCCESS)
{
    char ErrorMessage[MAX_STRING_LENGTH];
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while performing instrument self test: %s\n", status, ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
printf("Self test result is %d:%s\n", testResult, testMessage);
```

**C# Example:**

```
string TestMessage = "";

    if ((status = ANVNA.self_test(sessionId, out TestResult, out
TestMessage)) != 0)
    {
        string ErrorMessage = "";
        ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);
        System.Console.WriteLine("Error " + status + " while performing
instrument self test: " + ErrorMessage);
        ANVNA.close(sessionId);
        System.Console.Read();
        Environment.Exit(0);
    }

    System.Console.WriteLine("Self test result is " + TestResult.ToString()
+ ":" + TestMessage);
```

**Python Example:**

```
status, result, message = ANVNA_self_test (sessionId)

if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print("Error {0} while performing instrument self test:
{1}\n".format(status, ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)

print("Self test result is {0}:{1}\n".format(result, message))
```

**MATLAB Example:**

```
%     * Initialization code ...

[status, testResult, testMessage] = anvna.self_test();
if( status ~= 0)

    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while performing instrument self test: %s\n', stat,
ErrorMessage);
    status = anvna.close();
    return;

end

fprintf('Self test result is %d:%s\n', testResult, testMessage);
```

## C-127 ANVNA\_SetAttributeViBoolean

```
ViStatus ANVNA_SetAttributeViBoolean (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViAttr attributeID,
    ViBoolean attributeValue);
```

Description: This function is used to access low-level settings of the instrument. See the attributeID parameter for a link to all attributes of the instrument.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Otherwise, the user passes VI_NULL or an empty string.
attributeID	ViAttr	The ID of the attribute. The valid values for this parameter can be found in the driver header file.
attributeValue	ViBoolean	The value to which to set the attribute.

Example: See [Generic Attribute Setter Examples](#).

```
ViStatus ANVNA_SetAttributeViInt32 (
```

```
    ViSession vi,
```

```
    ViConstString repCapIdentifier,
```

```
    ViAttr attributeID,
```

```
    ViInt32 attributeValue);
```

Description: This function is used to access low-level settings of the instrument. See the attributeID parameter for a link to all attributes of the instrument.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier.
attributeID	ViAttr	The ID of the attribute. The valid values for this parameter can be found in the driver header file.
attributeValue	ViInt32	The value to which to set the attribute.

Example: See [Generic Attribute Setter Examples](#).

## C-129 ANVNA\_SetAttributeViInt64

```
ViStatus ANVNA_SetAttributeViInt64 (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViAttr attributeID,
    ViInt64 attributeValue);
```

Description: This function is used to access low-level settings of the instrument. See the attributeID parameter for a link to all attributes of the instrument.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Otherwise, the user passes VI_NULL or an empty string.
attributeID	ViAttr	The ID of the attribute. The valid values for this parameter can be found in the driver header file.
attributeValue	ViInt64	The value to which to set the attribute.

Example: See [Generic Attribute Setter Examples](#).

## C-130 ANVNA\_SetAttributeViReal64

```
ViStatus ANVNA_SetAttributeViReal64 (
```

```
    ViSession vi,
```

```
    ViConstString repCapIdentifier,
```

```
    ViAttr attributeID,
```

```
    ViReal64 attributeValue);
```

Description: This function is used to access low-level settings of the instrument. See the attributeID parameter for a link to all attributes of the instrument.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Otherwise, the user passes VI_NULL or an empty string.
attributeID	ViAttr	The ID of the attribute. The valid values for this parameter can be found in the driver header file.
attributeValue	ViReal64	The value to which to set the attribute.

Example: See [Generic Attribute Setter Examples](#).

## C-131 ANVNA\_SetAttributeViReal32

```
ViStatus ANVNA_SetAttributeViReal32 (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViAttr attributeID,
    ViReal32 attributeValue);
```

Description: This function is used to access low-level settings of the instrument. See the attributeID parameter for a link to all attributes of the instrument.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Otherwise, the user passes VI_NULL or an empty string.
attributeID	ViAttr	The ID of the attribute. The valid values for this parameter can be found in the driver header file.
attributeValue	ViReal32	The value to which to set the attribute.

Example: See [Generic Attribute Setter Examples](#).

## C-132 ANVNA\_SetAttributeViString

```
ViStatus ANVNA_SetAttributeViString (
```

```
    ViSession vi,
```

```
    ViConstString repCapIdentifier,
```

```
    ViAttr attributeID,
```

```
    ViConstString attributeValue);
```

Description: This function is used to access low-level settings of the instrument. See the attributeID parameter for a link to all attributes of the instrument.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier.
attributeID	ViAttr	The ID of the attribute. The valid values for this parameter can be found in the driver header file.
attributeValue	ViConstString	The value to which to set the attribute.

Example: See [Generic Attribute Setter Examples](#).

## C-133 ANVNA\_SetAttributeViUInt32

```
ViStatus ANVNA_SetAttributeViUInt32 (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViAttr attributeID,
    ViUInt32 attributeValue);
```

Description: This function is used to access low-level settings of the instrument. See the attributeID parameter for a link to all attributes of the instrument.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Otherwise, the user passes VI_NULL or an empty string.
attributeID	ViAttr	The ID of the attribute. The valid values for this parameter can be found in the driver header file.
attributeValue	ViUInt32	The value to which to set the attribute.

Example: See [Generic Attribute Setter Examples](#).

## C-134 ANVNA\_SystemWaitForOperationComplete

```
ViStatus ANVNA_SystemWaitForOperationComplete (  
    ViSession vi,  
    ViInt32 maxTimeMilliseconds);
```

Description: Function returns when all pending operations are complete or MaxTimeMilliseconds exceeded.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
maxTimeMilliseconds	ViInt32	Maximum time out, in milliseconds.

Example: See example for [ANVNA\\_ChannelAsynchronousTriggerSweep](#).

## C-135 ANVNA\_GetMarkersCount

```
ViStatus ANVNA_GetMarkersCount (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViPUIInt32 markersCount);
```

Description: Function returns the number of all available markers for a trace. The count is done for all active and inactive markers.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
markersCount	ViPUIInt32	Number of available markers.

Example: See example for [ANVNA\\_SetMarkerFrequency](#) function.

## C-136 ANVNA\_SetMarkerFrequency

```
ViStatus ANVNA_SetMarkerFrequency (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt32 markerNum,
    ViReal64 frequency);
```

Description: Set marker reference frequency. By setting its frequency, the marker state is automatically set to on.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
markerNum	ViUInt32	Marker index starting from 1.
frequency	ViReal64	Input frequency to be set.

### C++ Example:

```
ANVNA_SetMarkerFrequency(sessionId, "CH1:TR1", 1, 1000000000);

// trigger sweep ...

ViReal64 marker_frequency = 0.0;
ViReal64 marker_value = 0.0;

ANVNA_GetMarkerFrequency(sessionId, "CH1:TR1", 1, &marker_frequency);
ANVNA_GetMarkerValue(sessionId, "CH1:TR1", 1, &marker_value);

printf("marker 1 frequency : %f\n", marker_frequency);
printf("marker 1 value : %f\n", marker_value);
```

**C# Example:**

```
ANVNA.SetMarkerFrequency(sessionId, "CH1:TR1", 1, 1000000000);

// trigger sweep ...

double marker_value = 0.0;

ANVNA.GetMarkerFrequency(sessionId, "CH1:TR1", 1, out marker_frequency);
ANVNA.GetMarkerValue(sessionId, "CH1:TR1", 1, out marker_value);

System.Console.WriteLine("marker 1 frequency : " + marker_frequency);
System.Console.WriteLine("marker 1 value : %" + marker_value);
```

**Python Example:**

```
status = ANVNA_SetMarkerFrequency(sessionId, "CH1:TR1", 1, float(1000000000))

// trigger sweep ...

status, marker_frequency = ANVNA_GetMarkerFrequency(sessionId, "CH1:TR1", 1,
&marker_frequency)
status, marker_value = ANVNA_GetMarkerValue(sessionId, "CH1:TR1", 1, &marker_value)

print('marker 1 frequency : {0}\n'.format(marker_frequency))
print('marker 1 value : {0}\n'.format(marker_value))
```

**MATLAB Example:**

```
status = anvna.SetMarkerFrequency('CH1:TR1', 1, 1000000000);

% trigger sweep ...

[status, marker_frequency] = anvna.GetMarkerFrequency('CH1:TR1', 1);
[status, marker_value] = anvna.GetMarkerValue('CH1:TR1', 1);
```

## C-137 ANVNA\_GetMarkerFrequency

```
ViStatus ANVNA_GetMarkerFrequency (
```

```
    ViSession vi,
```

```
    ViConstString repCapIdentifier,
```

```
    ViUInt32 markerNum,
```

```
    ViReal64 frequency);
```

Description: Get marker reference frequency. This function works with inactive markers also.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
markerNum	ViUInt32	Marker index starting from 1.
frequency	ViReal64	Output frequency.

Example: See example for [ANVNA\\_SetMarkerFrequency](#) function.

## C-138 ANVNA\_SetMarkerSearch

```
ViStatus ANVNA_SetMarkerSearch (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt32 markerNum,
    ViReal64 start,
    ViReal64 stop,
    ViUInt32 search_type);
```

Description: Setup a search marker on the frequency interval between start and stop looking for MIN or MAX in that range. By configuring the search marker its state is set to on.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
start	ViReal64	Start frequency.
stop	ViReal64	Stop frequency.
search_type	ViUInt32	Search type is set to minimum or maximum.

search_type	Values
ANVNA_VAL_ANRITSU_VNA_MARKER_SEARCH_TYPE_MAX	0
ANVNA_VAL_ANRITSU_VNA_MARKER_SEARCH_TYPE_MIN	1

### C++ Example:

```
ANVNA_SetMarkerSearch(sessionId, "CH1:TR1", 1, 1000000000, 2000000000,
ANVNA_VAL_ANRITSU_VNA_MARKER_SEARCH_TYPE_MAX);

ANVNA_SetMarkerState(sessionId, "CH1:TR1", 1, VI_TRUE);

// trigger sweep ...

ViReal64 start;
ViReal64 stop;
ViUInt32 type;

ANVNA_GetMarkerSearch(sessionId, "CH1:TR1", 1, &start, &stop, &type);
```

```
ViBoolean state;
ANVNA_GetMarkerState(sessionId, "CH1:TR1", 1, &state);

ViReal64 marker_frequency = 0.0;
ViReal64 marker_value = 0.0;

ANVNA_GetMarkerFrequency(sessionId, "CH1:TR1", 1, &marker_frequency);
ANVNA_GetMarkerValue(sessionId, "CH1:TR1", 1, &marker_value);

printf("marker 1 frequency : %f\n", marker_frequency);
printf("marker 1 value : %f\n", marker_value);
```

**C# Example:**

```
ANVNA.SetMarkerSearch(sessionId, "CH1:TR1", 1, 1000000000, 2000000000,
(uint)ANVNA.VAL_ANRITSU_VNA_MARKER_SEARCH_TYPE_MAX);

ANVNA.SetMarkerState(sessionId, "CH1:TR1", 1, (ushort)1);

// trigger sweep ...

double start;
double stop;
uint type;
ANVNA.GetMarkerSearch (sessionId, "CH1:TR1", 1, out start, out stop, out type);

ushort state;
ANVNA.GetMarkerState(sessionId, "CH1:TR1", 1, out state);

double marker_frequency = 0.0;
double marker_value = 0.0;

ANVNA.GetMarkerFrequency(sessionId, "CH1:TR1", 1, out marker_frequency);
ANVNA.GetMarkerValue(sessionId, "CH1:TR1", 1, out marker_value);

System.Console.WriteLine("marker 1 frequency : " + marker_frequency);
System.Console.WriteLine("marker 1 value : %" + marker_value);
```

**Python Example:**

```
status = ANVNA_SetMarkerSearch(sessionId, "CH1:TR1", 1, float(1000000000),  
float(2000000000), ANVNA_VAL_ANRITSU_VNA_MARKER_SEARCH_TYPE_MAX)  
status = ANVNA_SetMarkerState(sessionId, "CH1:TR1", 1, True)  
  
// trigger sweep ...  
  
status, start, stop, type = ANVNA_GetMarkerSearch(sessionId, "CH1:TR1", 1)  
status, state = ANVNA_GetMarkerState(sessionId, "CH1:TR1", 1)  
  
status, marker_frequency = ANVNA_GetMarkerFrequency(sessionId, "CH1:TR1", 1,  
&marker_frequency)  
status, marker_value = ANVNA_GetMarkerValue(sessionId, "CH1:TR1", 1, &marker_value)  
  
print('marker 1 frequency : {0}\n'.format(marker_frequency))  
print('marker 1 value : {0}\n'.format(marker_value))
```

**MATLAB Example:**

```
status = anvna.SetMarkerSearch('CH1:TR1', 1, 1000000000, 2000000000,  
anvna.VAL_ANRITSU_VNA_MARKER_SEARCH_TYPE_MAX);  
status = anvna.SetMarkerState('CH1:TR1', 1, 1);  
  
% trigger sweep ...  
  
[status, start, stop, type] = anvna.GetMarkerSearch('CH1:TR1', 1);  
[status, state] = anvna.GetMarkerState('CH1:TR1', 1);  
  
[status, marker_frequency] = anvna.GetMarkerFrequency('CH1:TR1', 1);  
[status, marker_value] = anvna.GetMarkerValue('CH1:TR1', 1);
```

## C-139 ANVNA\_GetMarkerSearch

```
ViStatus ANVNA_GetMarkerSearch (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt32 markerNum,
    ViPReal64 start,
    ViPReal64 stop,
    ViPUInt32 search_type);
```

Description: This function retrieves previously set search marker properties and it works with inactive markers also.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
markerNum	ViUInt32	Marker index starting from 1.
start	ViPReal64	Start frequency.
stop	ViPReal64	Stop frequency.
search_type	ViPUInt32	Search type is set to minimum or maximum.

search_type	Values
ANVNA_VAL_ANRITSU_VNA_MARKER_SEARCH_TYPE_MAX	0
ANVNA_VAL_ANRITSU_VNA_MARKER_SEARCH_TYPE_MIN	1

Example: See [ANVNA\\_SetMarkerSearch](#) function example.

## C-140 ANVNA\_GetMarkerValue

```
ViStatus ANVNA_GetMarkerValue (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt32 markerNum,
    ViPReal64 value);
```

Description: This function retrieves the data value pointed by the marker. The marker state must be active when calling this function, otherwise an error is returned.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
markerNum	ViUInt32	Marker index starting from 1.
value	ViPReal64	Returned marker data value.

Example: See [ANVNA\\_SetMarkerSearch](#) function example.

## C-141 ANVNA\_GetMarkerUpLowValue

```
ViStatus ANVNA_GetMarkerUpLowValue (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt32 markerNum,
    ViPReal64 up,
    ViPReal64 low);
```

**Description:** This function retrieves the data value pointed by the marker in case of double value trace. The marker state must be active when calling this function, otherwise an error is returned.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
markerNum	ViUInt32	Marker index starting from 1.
up	ViPReal64	This variable holds the upper marker value.
low	ViPReal64	This variable holds the lower marker value.

### C++ Example:

```
ViReal64 up = 0.0;
ViReal64 low = 0.0;

ANVNA_GetMarkerUpLowValue(sessionId, "CH1:TR1", 1, &up, &low);
```

### C# Example:

```
double up = 0.0;
double low = 0.0;

ANVNA.GetMarkerUpLowValue(sessionId, "CH1:TR1", 1, out up, out low);
```

### Python Example:

```
status, up, low = ANVNA_GetMarkerUpLowValue(sessionId, "CH1:TR1", 1)
```

**MATLAB Example:**

```
[status, up, low] = anvna.GetMarkerUpLowValue('CH1:TR1', 1);
```

```
ViStatus ANVNA_GetMarkerState (
```

## C-142 ANVNA\_SetMarkerState

```
ViStatus ANVNA_SetMarkerState (  
    ViSession vi,  
    ViConstString repCapIdentifier,  
    ViUInt32 markerNum,  
    ViBoolean on_off );
```

Description: This function activates or deactivates a marker. If the marker is deactivated the marker value is not updated. Trying to fetch the value of an inactive marker will return an error.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
markerNum	ViUInt32	Marker index starting from 1.
on_off	ViBoolean	Marker State.

Example: See [ANVNA\\_SetMarkerSearch](#) function example.

## C-143 ANVNA\_GetMarkerState

```
ViStatus ANVNA_GetMarkerState (
```

```
    ViSession vi,
```

```
    ViConstString repCapIdentifier,
```

```
    ViUInt32 markerNum,
```

```
    ViPBoolean on_off );
```

Description: This function reads the activation state for the input marker number.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
markerNum	ViUInt32	Marker index starting from 1.
on_off	ViPBoolean	Marker State.

Example: See [ANVNA\\_SetMarkerSearch](#) function example.

## C-144 ANVNA\_GetMarkerSearchBandwidthStatistics

```
ViStatus ANVNA_GetMarkerSearchBandwidthStatistics (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum,
    ViBoolean displayHeadings,
    ViPChar statusReport );
```

Description: Generates a status report containing a number of statistics related to Marker Search for the selected marker. Returns 4-5 elements, comma separated. Includes Bandwidth, Center Position, QFactor, Loss Readout, and Shape Factor when applicable. Will return "N/A" as value if calculation does not work with current settings.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
ViUInt32	markerNum	Marker number to check.
ViBoolean	displayHeadings	If true, also display headers with the 4-5 return values.
ViPChar	statusReport	String containing the status report to return.

### C++ Example:

```
char buffer [512];
ViPChar response = &buffer;
status = ANVNA_GetMarkerSearchBandwidthStatistics (sessionId, "CH1:TR1", 1, true,
response);
```

### C# Example:

```
string response;
ANVNA.GetMarkerSearchBandwidthStatistics (sessionId, "CH1:TR1", 1, true, out
response);
```

### Python Example:

```
status, response = ANVNA_GetMarkerSearchBandwidthStatistics (sessionId, 'CH1:TR1',
1, true)
```

**MATLAB Example:**

```
[status, response] = anvna.GetMarkerSearchBandwidthStatistics ('CH1:Trace1', 1,  
true);
```

## C-145 ANVNA\_SetMarkerSearchBandwidthOnOff

```
ViStatus ANVNA_SetMarkerSearchBandwidthOnOff (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViBoolean onOff );
```

Description: Sets value of Marker Search Bandwidth. Setting is per trace, no need to specify Marker.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
onOff	ViBoolean	Sets value of this parameter.

### C++ Example:

```
bool value = true;
status = ANVNA_SetMarkerSearchBandwidthOnOff ( sessionId, "CH1:TR1", value);
```

### C# Example:

```
bool value = true;
ANVNA.SetMarkerSearchBandwidthOnOff (sessionId, "CH1:TR1", value);
```

### Python Example:

```
Status = ANVNA_SetMarkerSearchBandwidthOnOff (sessionId, 'CH1:TR1', true)
```

### MATLAB Example:

```
[status] = anvna.SetMarkerSearchBandwidthOnOff ('CH1:Trace1', true);
```

## C-146 ANVNA\_GetMarkerSearchBandwidthOnOff

```
ViStatus ANVNA_GetMarkerSearchBandwidthOnOff (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViPBoolean onOff );
```

Description: Gets value of Marker Search Bandwidth. Setting is per trace, no need to specify Marker.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
onOff	ViPBoolean	Current value of this parameter.

### C++ Example:

```
bool value;
status = ANVNA_GetMarkerSearchBandwidthOnOff ( sessionId, "CH1:TR1", &value);
```

### C# Example:

```
bool value;
ANVNA.GetMarkerSearchBandwidthOnOff (sessionId, "CH1:TR1", out value);
```

### Python Example:

```
Status, value = ANVNA_GetMarkerSearchBandwidthOnOff (sessionId, 'CH1:TR1')
```

### MATLAB Example:

```
[status, value] = anvna.GetMarkerSearchBandwidthOnOff ('CH1:Trace1');
```

## C-147 ANVNA\_SetMarkerSearchBandwidthDefinedValue

```
ViStatus ANVNA_SetMarkerSearchBandwidthDefinedValue (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum
    ViReal64 value );
```

Description: Sets Defined Value of Marker Search Bandwidth on the specified marker.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
markerNum	ViUInt32	Marker to use.
value	ViReal64	Value to set this parameter to.

### C++ Example:

```
bool value = true;
status = ANVNA_SetMarkerSearchBandwidthDefinedValue ( sessionId, "CH1:TR1", 1,
value);
```

### C# Example:

```
bool value = true;
ANVNA.SetMarkerSearchBandwidthDefinedValue (sessionId, "CH1:TR1", 1, value);
```

### Python Example:

```
Status = ANVNA_SetMarkerSearchBandwidthDefinedValue (sessionId, 'CH1:TR1', 1, true)
```

### MATLAB Example:

```
[status] = anvna.SetMarkerSearchBandwidthDefinedValue ('CH1:Trace1', 1, value);
```

## C-148 ANVNA\_GetMarkerSearchBandwidthDefinedValue

```
ViStatus ANVNA_GetMarkerSearchBandwidthDefinedValue (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum
    ViPReal64 value );
```

Description: Gets current Defined Value of Marker Search Bandwidth on the specified marker.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
markerNum	ViUInt32	Marker to use.
value	ViPReal64	Current value of this parameter.

### C++ Example:

```
ViReal64 value;
status = ANVNA_GetMarkerSearchBandwidthDefinedValue ( sessionId, "CH1:TR1", 1,
&value);
```

### C# Example:

```
double value;
ANVNA.GetMarkerSearchBandwidthDefinedValue (sessionId, "CH1:TR1", 1, out value);
```

### Python Example:

```
Status, value = ANVNA_GetMarkerSearchBandwidthDefinedValue (sessionId, 'CH1:TR1',
1)
```

### MATLAB Example:

```
[status, value] = anvna.GetMarkerSearchBandwidthDefinedValue ('CH1:Trace1', 1);
```

## C-149 ANVNA\_SetMarkerSearchBandwidthReferenceType

```
ViStatus ANVNA_SetMarkerSearchBandwidthReferenceType (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum
    ViUInt32 referenceType );
```

Description: Sets Reference Type of Marker Search Bandwidth on the specified marker.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
markerNum	ViUInt32	Marker to use.
referenceType	ViUInt32	Value to set this parameter to. Valid values are 1 and 0.

referenceType	Values
ANVNA_VAL_ANRITSU_VNA_BANDWIDTH_NOTCH_REFERENCE_TYPE_MARKER	0
ANVNA_VAL_ANRITSU_VNA_BANDWIDTH_NOTCH_REFERENCE_TYPE_REFERENCE_VAL	1

### C++ Example:

```
Unsigned int value = 1;
status = ANVNA_SetMarkerSearchBandwidthReferenceType ( sessionId, "CH1:TR1", 1,
value);
```

### C# Example:

```
uint value = 1;
ANVNA.SetMarkerSearchBandwidthReferenceType (sessionId, "CH1:TR1", 1, value);
```

### Python Example:

```
Status = ANVNA_SetMarkerSearchBandwidthReferenceType (sessionId, 'CH1:TR1', 1, 1)
```

### MATLAB Example:

```
[status] = anvna.SetMarkerSearchBandwidthReferenceType ('CH1:Trace1', 1, 1);
```

## C-150 ANVNA\_GetMarkerSearchBandwidthReferenceType

```
ViStatus ANVNA_GetMarkerSearchBandwidthReferenceType (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum
    ViPUI32 referenceType );
```

Description: Gets current value of Reference Type of Marker Search Bandwidth on the specified marker.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
markerNum	ViUInt32	Marker to use.
referenceType	ViPUI32	Will contain current value of this setting. Valid values are 1 and 0.

referenceType	Values
ANVNA_VAL_ANRITSU_VNA_BANDWIDTH_NOTCH_REFERENCE_TYPE_MARKER	0
ANVNA_VAL_ANRITSU_VNA_BANDWIDTH_NOTCH_REFERENCE_TYPE_REFERENCE_VAL	1

### C++ Example:

```
Unsigned int value;
status = ANVNA_GetMarkerSearchBandwidthReferenceType ( sessionId, "CH1:TR1", 1,
&value);
```

### C# Example:

```
uint value;
ANVNA.GetMarkerSearchBandwidthReferenceType (sessionId, "CH1:TR1", 1, out value);
```

### Python Example:

```
Status, value = ANVNA_GetMarkerSearchBandwidthReferenceType (sessionId, 'CH1:TR1',
1)
```

### MATLAB Example:

```
[status, value] = anvna.GetMarkerSearchBandwidthReferenceType ('CH1:Trace1', 1);
```

## C-151 ANVNA\_SetMarkerSearchBandwidthReferenceValue

```
ViStatus ANVNA_SetMarkerSearchBandwidthReferenceValue (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum
    ViReal64 value );
```

Description: Sets Reference Value of Marker Search Bandwidth on the specified marker. Only useful if Reference Type is set to 'Reference Value'.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
markerNum	ViUInt32	Marker to use.
value	ViReal64	Value to set this parameter to.

### C++ Example:

```
double value = 3.0;
status = ANVNA_SetMarkerSearchBandwidthReferenceValue ( sessionId, "CH1:TR1", 1,
value );
```

### C# Example:

```
double value = 3.0;
ANVNA.SetMarkerSearchBandwidthReferenceValue (sessionId, "CH1:TR1", 1, value);
```

### Python Example:

```
Status = ANVNA_SetMarkerSearchBandwidthReferenceValue (sessionId, 'CH1:TR1', 1,
3.0)
```

### MATLAB Example:

```
[status] = anvna.SetMarkerSearchBandwidthReferenceValue ('CH1:Tracel', 1, 3.0);
```

## C-152 ANVNA\_GetMarkerSearchBandwidthReferenceValue

```
ViStatus ANVNA_GetMarkerSearchBandwidthReferenceValue (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum
    ViPReal64 value );
```

Description: Gets current Reference Value of Marker Search Bandwidth on the specified marker. Only useful if Reference Type is set to 'Reference Value'.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
markerNum	ViUInt32	Marker to use.
value	ViPReal64	Current value of this parameter.

### C++ Example:

```
double value;
status = ANVNA_GetMarkerSearchBandwidthReferenceValue ( sessionId, "CH1:TR1", 1,
&value);
```

### C# Example:

```
double value;
ANVNA.GetMarkerSearchBandwidthReferenceValue (sessionId, "CH1:TR1", 1, out value);
```

### Python Example:

```
Status, value = ANVNA_GetMarkerSearchBandwidthReferenceValue (sessionId, 'CH1:TR1',
1)
```

### MATLAB Example:

```
[status, value] = anvna.GetMarkerSearchBandwidthReferenceValue ('CH1:Trace1', 1);
```

## C-153 ANVNA\_SetMarkerSearchBandwidthStartPosition

```
ViStatus ANVNA_SetMarkerSearchBandwidthStartPosition (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum
    ViUInt32 startPosition );
```

Description: Sets Start Position of Marker Search Bandwidth on the specified marker.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
markerNum	ViUInt32	Marker to use.
startPosition	ViUInt32	Value to set this parameter to. Valid values are 1 and 0.

startPosition	values
ANVNA_VAL_ANRITSU_VNA_BANDWIDTH_NOTCH_START_POSITION_MIN_OR_MAX	0
ANVNA_VAL_ANRITSU_VNA_BANDWIDTH_NOTCH_START_POSITION_BEGINNING	1

### C++ Example:

```
Unsigned int value = 1;
status = ANVNA_SetMarkerSearchBandwidthStartPosition ( sessionId, "CH1:TR1", 1,
value);
```

### C# Example:

```
uint value = 1;
ANVNA.SetMarkerSearchBandwidthStartPosition (sessionId, "CH1:TR1", 1, value);
```

### Python Example:

```
Status = ANVNA_SetMarkerSearchBandwidthStartPosition (sessionId, 'CH1:TR1', 1, 1)
```

### MATLAB Example:

```
[status] = anvna.SetMarkerSearchBandwidthStartPosition ('CH1:Trace1', 1, 1);
```

## C-154 ANVNA\_GetMarkerSearchBandwidthStartPosition

```
ViStatus ANVNA_GetMarkerSearchBandwidthStartPosition (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum
    ViPUI32 startPosition );
```

Description: Gets current Start Position of Marker Search Bandwidth on the specified marker.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
markerNum	ViUInt32	Marker to use.
startPosition	ViPUI32	Current value of this parameter. Valid values are 1 and 0.

startPosition	Values
ANVNA_VAL_ANRITSU_VNA_BANDWIDTH_NOTCH_START_POSITION_MIN_OR_MAX	0
ANVNA_VAL_ANRITSU_VNA_BANDWIDTH_NOTCH_START_POSITION_BEGINNING	1

### C++ Example:

```
Unsigned int value;
status = ANVNA_GetMarkerSearchBandwidthStartPosition ( sessionId, "CH1:TR1", 1,
&value);
```

### C# Example:

```
uint value;
ANVNA.GetMarkerSearchBandwidthStartPosition (sessionId, "CH1:TR1", 1, out value);
```

### Python Example:

```
Status, value = ANVNA_GetMarkerSearchBandwidthStartPosition (sessionId, 'CH1:TR1',
1)
```

### MATLAB Example:

```
[status, value] = anvna.GetMarkerSearchBandwidthStartPosition ('CH1:Trace1', 1);
```

## C-155 ANVNA\_SetMarkerSearchBandwidthShapeFactorOnOff

```
ViStatus ANVNA_SetMarkerSearchBandwidthShapeFactorOnOff (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum,
    ViBoolean onOff );
```

Description: Turns ShapeFactor for Marker Search Bandwidth on or off.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
markerNum	ViUInt32	Specify marker to use.
onOff	ViBoolean	If true, turn ShapeFactor on.

### C++ Example:

```
bool value = true;
ViPChar response = &buffer;
status = ANVNA_SetMarkerSearchBandwidthShapeFactorOnOff ( sessionId, "CH1:TR1", 1,
value);
```

### C# Example:

```
bool value = true;
ANVNA.SetMarkerSearchBandwidthShapeFactorOnOff (sessionId, "CH1:TR1", 1, value);
```

### Python Example:

```
Status = ANVNA_SetMarkerSearchBandwidthShapeFactorOnOff (sessionId, 'CH1:TR1', 1,
true)
```

### MATLAB Example:

```
[status] = anvna.SetMarkerSearchBandwidthShapeFactorOnOff ('CH1:Trace1', 1, true);
```

## C-156 ANVNA\_GetMarkerSearchBandwidthShapeFactorOnOff

```
ViStatus ANVNA_GetMarkerSearchBandwidthShapeFactorOnOff (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum,
    ViPBoolean onOff );
```

Description: Gets current value of ShapeFactor setting for Marker Search Bandwidth.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
markerNum	ViUInt32	Specify marker to use
onOff	ViPBoolean	Current value of this parameter.

### C++ Example:

```
bool value;
status = ANVNA_GetMarkerSearchBandwidthShapeFactorOnOff ( sessionId, "CH1:TR1", 1,
&value);
```

### C# Example:

```
bool value;
ANVNA.GetMarkerSearchBandwidthShapeFactorOnOff (sessionId, "CH1:TR1", 1, out
value);
```

### Python Example:

```
Status, value = ANVNA_GetMarkerSearchBandwidthShapeFactorOnOff (sessionId,
'CH1:TR1', 1)
```

### MATLAB Example:

```
[status, value] = anvna.GetMarkerSearchBandwidthShapeFactorOnOff ('CH1:Trace1', 1);
```

## C-157 ANVNA\_SetMarkerSearchBandwidthShapeFactorHigh

```
ViStatus ANVNA_SetMarkerSearchBandwidthShapeFactorHigh (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum
    ViReal64 value );
```

Description: Sets Shape Factor High Value of Marker Search Bandwidth on the specified marker.  
Only useful if Shape Factor is On.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
markerNum	ViUInt32	Marker to use.
value	ViReal64	Value to set this parameter to.

### C++ Example:

```
double value = 3.0;
status = ANVNA_SetMarkerSearchBandwidthShapeFactorHigh ( sessionId, "CH1:TR1", 1,
value );
```

### C# Example:

```
double value = 3.0;
ANVNA.SetMarkerSearchBandwidthShapeFactorHigh (sessionId, "CH1:TR1", 1, value);
```

### Python Example:

```
Status = ANVNA_SetMarkerSearchBandwidthShapeFactorHigh (sessionId, 'CH1:TR1', 1,
3.0)
```

### MATLAB Example:

```
[status] = anvna.SetMarkerSearchBandwidthShapeFactorHigh ('CH1:Trace1', 1, 3.0);
```

## C-158 ANVNA\_GetMarkerSearchBandwidthShapeFactorHigh

```
ViStatus ANVNA_GetMarkerSearchBandwidthShapeFactorHigh (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum
    ViPReal64 value );
```

Description: Gets current value of Shape Factor High of Marker Search Bandwidth on the specified marker. Only useful if Shape Factor is On.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
markerNum	ViUInt32	Marker to use.
value	ViPReal64	Current value of this parameter.

### C++ Example:

```
double value;
status = ANVNA_GetMarkerSearchBandwidthShapeFactorHigh ( sessionId, "CH1:TR1", 1,
&value);
```

### C# Example:

```
double value
ANVNA.GetMarkerSearchBandwidthShapeFactorHigh (sessionId, "CH1:TR1", 1, out value);
```

### Python Example:

```
Status, value = ANVNA_GetMarkerSearchBandwidthShapeFactorHigh (sessionId,
'CH1:TR1', 1)
```

### MATLAB Example:

```
[status, value] = anvna.GetMarkerSearchBandwidthShapeFactorHigh ('CH1:Trace1', 1);
```

## C-159 ANVNA\_SetMarkerSearchBandwidthShapeFactorLow

```
ViStatus ANVNA_SetMarkerSearchBandwidthShapeFactorLow (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum
    ViReal64 value );
```

Description: Sets Shape Factor Low Value of Marker Search Bandwidth on the specified marker. Only useful if Shape Factor is On.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
markerNum	ViUInt32	Marker to use.
value	ViReal64	Value to set this parameter to.

### C++ Example:

```
double value = 3.0;
status = ANVNA_SetMarkerSearchBandwidthShapeFactorLow ( sessionId, "CH1:TR1", 1,
value );
```

### C# Example:

```
double value = 3.0;
ANVNA.SetMarkerSearchBandwidthShapeFactorLow (sessionId, "CH1:TR1", 1, value);
```

### Python Example:

```
Status = ANVNA_SetMarkerSearchBandwidthShapeFactorLow (sessionId, 'CH1:TR1', 1,
3.0)
```

### MATLAB Example:

```
[status] = anvna.SetMarkerSearchBandwidthShapeFactorLow ('CH1:Tracel', 1, 3.0);
```

## C-160 ANVNA\_GetMarkerSearchBandwidthShapeFactorLow

```
ViStatus ANVNA_GetMarkerSearchBandwidthShapeFactorLow (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum
    ViPReal64 value );
```

Description: Gets current value of Shape Factor Low of Marker Search Bandwidth on the specified marker. Only useful if Shape Factor is On.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
markerNum	ViUInt32	Marker to use.
value	ViPReal64	Current value of this parameter.

### C++ Example:

```
double value;
status = ANVNA_GetMarkerSearchBandwidthShapeFactorLow ( sessionId, "CH1:TR1", 1,
&value);
```

### C# Example:

```
double value
ANVNA.GetMarkerSearchBandwidthShapeFactorLow (sessionId, "CH1:TR1", 1, out value);
```

### Python Example:

```
Status, value = ANVNA_GetMarkerSearchBandwidthShapeFactorLow (sessionId, 'CH1:TR1',
1)
```

### MATLAB Example:

```
[status, value] = anvna.GetMarkerSearchBandwidthShapeFactorLow ('CH1:Trace1', 1);
```

## C-161 ANVNA\_GetMarkerSearchNotchStatistics

```
ViStatus ANVNA_GetMarkerSearchNotchStatistics (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum,
    ViBoolean displayHeadings,
    ViPChar statusReport );
```

Description: Generates a status report containing a number of statistics related to Marker Search for the selected marker. Returns 4-5 elements, comma separated. Includes Notch, Center Position, QFactor, Loss Reaout and ShapeFactor when applicable. Will return “N/A” as value if calculation does not work with current settings.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example “CH1:TR1”.)
markerNum	ViUInt32	Marker number to check.
displayHeadings	ViBoolean	If true, also display headers with the 4-5 return values.
statusReport	ViPChar	String containing the status report to return.

### C++ Example:

```
char buffer [512];
ViPChar response = &buffer;
status = ANVNA_GetMarkerSearchNotchStatistics ( sessionId, "CH1:TR1", 1, true,
response);
```

### C# Example:

```
string response;
ANVNA.GetMarkerSearchNotchStatistics (sessionId, "CH1:TR1", 1, true, out response);
```

### Python Example:

```
status, response = ANVNA_GetMarkerSearchNotchStatistics (sessionId, 'CH1:TR1', 1,
true)
```

### MATLAB Example:

```
[status, response] = anvna.GetMarkerSearchNotchStatistics ('CH1:Trace1', 1, true);
```

## C-162 ANVNA\_SetMarkerSearchNotchOnOff

```
ViStatus ANVNA_SetMarkerSearchNotchOnOff (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViBoolean onOff );
```

Description: Sets value of Marker Search Notch. Setting is per trace, no need to specify Marker.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
onOff	ViBoolean	Sets value of this parameter.

### C++ Example:

```
bool value = true;
status = ANVNA_SetMarkerSearchNotchOnOff ( sessionId, "CH1:TR1", value);
```

### C# Example:

```
bool value = true;
ANVNA.SetMarkerSearchNotchOnOff (sessionId, "CH1:TR1", value);
```

### Python Example:

```
Status = ANVNA_SetMarkerSearchNotchOnOff (sessionId, 'CH1:TR1', true)
```

### MATLAB Example:

```
[status] = anvna.SetMarkerSearchNotchOnOff ('CH1:Trace1', true);
```

## C-163 ANVNA\_GetMarkerSearchNotchOnOff

```
ViStatus ANVNA_GetMarkerSearchNotchOnOff (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViPBoolean onOff );
```

Description: Gets value of Marker Search Notch. Setting is per trace, no need to specify Marker.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
onOff	ViPBoolean	Current value of this parameter.

### C++ Example:

```
bool value;
status = ANVNA_GetMarkerSearchNotchOnOff ( sessionId, "CH1:TR1", &value);
```

### C# Example:

```
bool value;
ANVNA.GetMarkerSearchNotchOnOff (sessionId, "CH1:TR1", out value);
```

### Python Example:

```
Status, value = ANVNA_GetMarkerSearchNotchOnOff (sessionId, 'CH1:TR1')
```

### MATLAB Example:

```
[status, value] = anvna.GetMarkerSearchNotchOnOff ('CH1:Trace1');
```

## C-164 ANVNA\_SetMarkerSearchNotchDefinedValue

```
ViStatus ANVNA_SetMarkerSearchNotchDefinedValue (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum
    ViReal64 value );
```

Description: Sets Defined Value of Marker Search Notch on the specified marker.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
markerNum	ViUInt32	Marker to use.
value	ViReal64	Value to set this parameter to.

### C++ Example:

```
bool value = true;
status = ANVNA_SetMarkerSearchNotchDefinedValue ( sessionId, "CH1:TR1", 1, value);
```

### C# Example:

```
bool value = true;
ANVNA.SetMarkerSearchNotchDefinedValue (sessionId, "CH1:TR1", 1, value);
```

### Python Example:

```
Status = ANVNA_SetMarkerSearchNotchDefinedValue (sessionId, 'CH1:TR1', 1, true)
```

### MATLAB Example:

```
[status] = anvna.SetMarkerSearchNotchDefinedValue ('CH1:Trace1', 1, value);
```

## C-165 ANVNA\_GetMarkerSearchNotchDefinedValue

```
ViStatus ANVNA_GetMarkerSearchNotchDefinedValue (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum
    ViPReal64 value );
```

Description: Gets current Defined Value of Marker Search Notch on the specified marker.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
markerNum	ViUInt32	Marker to use.
value	ViPReal64	Current value of this parameter.

### C++ Example:

```
ViReal64 value;
status = ANVNA_GetMarkerSearchNotchDefinedValue ( sessionId, "CH1:TR1", 1, &value);
```

### C# Example:

```
double value;
ANVNA.GetMarkerSearchNotchDefinedValue (sessionId, "CH1:TR1", 1, out value);
```

### Python Example:

```
Status, value = ANVNA_GetMarkerSearchNotchDefinedValue (sessionId, 'CH1:TR1', 1)
```

### MATLAB Example:

```
[status, value] = anvna.GetMarkerSearchNotchDefinedValue ('CH1:Trace1', 1);
```

## C-166 ANVNA\_SetMarkerSearchNotchReferenceType

```
ViStatus ANVNA_SetMarkerSearchNotchReferenceType (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum
    ViUInt32 referenceType );
```

Description: Sets Reference Type of Marker Search Notch on the specified marker.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
markerNum	ViUInt32	Marker to use.
referenceType	ViUInt32	Value to set this parameter to. Valid values are 1 and 0.

referenceType	Values
ANVNA_VAL_ANRITSU_VNA_BANDWIDTH_NOTCH_REFERENCE_TYPE_MARKER	0
ANVNA_VAL_ANRITSU_VNA_BANDWIDTH_NOTCH_REFERENCE_TYPE_REFERENCE_VAL	1

### C++ Example:

```
Unsigned int value = 1;
status = ANVNA_SetMarkerSearchNotchReferenceType ( sessionId, "CH1:TR1", 1, value);
```

### C# Example:

```
uint value = 1;
ANVNA.SetMarkerSearchNotchReferenceType (sessionId, "CH1:TR1", 1, value);
```

### Python Example:

```
Status = ANVNA_SetMarkerSearchNotchReferenceType (sessionId, 'CH1:TR1', 1, 1)
```

### MATLAB Example:

```
[status] = anvna.SetMarkerSearchNotchReferenceType ('CH1:Trace1', 1, 1);
```

## C-167 ANVNA\_GetMarkerSearchNotchReferenceType

```
ViStatus ANVNA_GetMarkerSearchNotchReferenceType (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum
    ViPUInt32 referenceType );
```

Description: Gets current value of Reference Type of Marker Search Notch on the specified marker.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
markerNum	ViUInt32	Marker to use.
referenceType	ViPUInt32	Will contain current value of this setting. Valid values are 1 and 0.

referenceType	Values
ANVNA_VAL_ANRITSU_VNA_BANDWIDTH_NOTCH_REFERENCE_TYPE_MARKER	0
ANVNA_VAL_ANRITSU_VNA_BANDWIDTH_NOTCH_REFERENCE_TYPE_REFERENCE_VAL	1

### C++ Example:

```
Unsigned int value;
status = ANVNA_GetMarkerSearchNotchReferenceType ( sessionId, "CH1:TR1", 1,
&value);
```

### C# Example:

```
uint value;
ANVNA.GetMarkerSearchNotchReferenceType (sessionId, "CH1:TR1", 1, out value);
```

### Python Example:

```
Status, value = ANVNA_GetMarkerSearchNotchReferenceType (sessionId, 'CH1:TR1', 1)
```

### MATLAB Example:

```
[status, value] = anvna.GetMarkerSearchNotchReferenceType ('CH1:Trace1', 1);
```

## C-168 ANVNA\_SetMarkerSearchNotchReferenceValue

```
ViStatus ANVNA_SetMarkerSearchNotchReferenceValue (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum
    ViReal64 value );
```

Description: Sets Reference Value of Marker Search Notch on the specified marker. Only useful if Reference Type is set to 'Reference Value'.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
markerNum	ViUInt32	Marker to use.
value	ViReal64	Value to set this parameter to.

### C++ Example:

```
double value = 3.0;
status = ANVNA_SetMarkerSearchNotchReferenceValue ( sessionId, "CH1:TR1", 1,
value);
```

### C# Example:

```
double value = 3.0;
ANVNA.SetMarkerSearchNotchReferenceValue (sessionId, "CH1:TR1", 1, value);
```

### Python Example:

```
Status = ANVNA_SetMarkerSearchNotchReferenceValue (sessionId, 'CH1:TR1', 1, 3.0)
```

### MATLAB Example:

```
[status] = anvna.SetMarkerSearchNotchReferenceValue ('CH1:Trace1', 1, 3.0);
```

## C-169 ANVNA\_GetMarkerSearchNotchReferenceValue

```
ViStatus ANVNA_GetMarkerSearchNotchReferenceValue (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum
    ViPReal64 value );
```

Description: Gets current Reference Value of Marker Search Notch on the specified marker. Only useful if Reference Type is set to 'Reference Value'.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1")
markerNum	ViUInt32	Marker to use.
value	ViPReal64	Current value of this parameter.

### C++ Example:

```
double value;
status = ANVNA_GetMarkerSearchNotchReferenceValue ( sessionId, "CH1:TR1", 1,
&value);
```

### C# Example:

```
double value;
ANVNA.GetMarkerSearchNotchReferenceValue (sessionId, "CH1:TR1", 1, out value);
```

### Python Example:

```
Status, value = ANVNA_GetMarkerSearchNotchReferenceValue (sessionId, 'CH1:TR1', 1)
```

### MATLAB Example:

```
[status, value] = anvna.GetMarkerSearchNotchReferenceValue ('CH1:Trace1', 1);
```

## C-170 ANVNA\_SetMarkerSearchNotchStartPosition

```
ViStatus ANVNA_SetMarkerSearchNotchStartPosition (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum
    ViUInt32 startPosition );
```

Description: Sets Start Position of Marker Search Notch on the specified marker.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1")
markerNum	ViUInt32	Marker to use.
startPosition	ViUInt32	Value to set this parameter to. Valid values are 1 and 0.

startPosition	Values
ANVNA_VAL_ANRITSU_VNA_BANDWIDTH_NOTCH_START_POSITION_MIN_OR_MAX	0
ANVNA_VAL_ANRITSU_VNA_BANDWIDTH_NOTCH_START_POSITION_BEGINNING	1

### C++ Example:

```
Unsigned int value = 1;
status = ANVNA_SetMarkerSearchNotchStartPosition ( sessionId, "CH1:TR1", 1, value);
```

### C# Example:

```
uint value = 1;
ANVNA.SetMarkerSearchNotchStartPosition (sessionId, "CH1:TR1", 1, value);
```

### Python Example:

```
Status = ANVNA_SetMarkerSearchNotchStartPosition (sessionId, 'CH1:TR1', 1, 1)
```

### MATLAB Example:

```
[status] = anvna.SetMarkerSearchNotchStartPosition ('CH1:Trace1', 1, 1);
```

## C-171 ANVNA\_GetMarkerSearchNotchStartPosition

```
ViStatus ANVNA_GetMarkerSearchNotchStartPosition (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum
    ViPUInt32 startPosition );
```

Description: Gets current Start Position of Marker Search Notch on the specified marker.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
markerNum	ViUInt32	Marker to use.
startPosition	ViPUInt32	Current value of this parameter. Valid values are 1 and 0.

startPosition	Values
ANVNA_VAL_ANRITSU_VNA_BANDWIDTH_NOTCH_START_POSITION_MIN_OR_MAX	0
ANVNA_VAL_ANRITSU_VNA_BANDWIDTH_NOTCH_START_POSITION_BEGINNING	1

### C++ Example:

```
Unsigned int value;
status = ANVNA_GetMarkerSearchNotchStartPosition ( sessionId, "CH1:TR1", 1,
&value );
```

### C# Example:

```
uint value;
ANVNA.GetMarkerSearchNotchStartPosition (sessionId, "CH1:TR1", 1, out value);
```

### Python Example:

```
Status, value = ANVNA_GetMarkerSearchNotchStartPosition (sessionId, 'CH1:TR1', 1)
```

### MATLAB Example:

```
[status, value] = anvna.GetMarkerSearchNotchStartPosition ('CH1:Trace1', 1);
```

## C-172 ANVNA\_SetMarkerSearchNotchShapeFactorOnOff

```
ViStatus ANVNA_SetMarkerSearchNotchShapeFactorOnOff (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum,
    ViBoolean onOff );
```

Description: Turns ShapeFactor for Marker Search Notch on or off.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
markerNum	ViUInt32	Specify marker to use
onOff	ViBoolean	If true, turn ShapeFactor on.

### C++ Example:

```
bool value = true;
ViPChar response = &buffer;
status = ANVNA_SetMarkerSearchNotchShapeFactorOnOff ( sessionId, "CH1:TR1", 1,
value);
```

### C# Example:

```
bool value = true;
ANVNA.SetMarkerSearchNotchShapeFactorOnOff (sessionId, "CH1:TR1", 1, value);
```

### Python Example:

```
Status = ANVNA_SetMarkerSearchNotchShapeFactorOnOff (sessionId, 'CH1:TR1', 1, true)
```

### MATLAB Example:

```
[status] = anvna.SetMarkerSearchNotchShapeFactorOnOff ('CH1:Trace1', 1, true);
```

## C-173 ANVNA\_GetMarkerSearchNotchShapeFactorOnOff

```
ViStatus ANVNA_GetMarkerSearchNotchShapeFactorOnOff (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum,
    ViPBoolean onOff );
```

Description: Gets current value of ShapeFactor setting for Marker Search Notch.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
markerNum	ViUInt32	Specify marker to use
onOff	ViPBoolean	Current value of this parameter.

### C++ Example:

```
bool value;
status = ANVNA_GetMarkerSearchNotchShapeFactorOnOff ( sessionId, "CH1:TR1", 1,
&value);
```

### C# Example:

```
bool value;
ANVNA.GetMarkerSearchNotchShapeFactorOnOff (sessionId, "CH1:TR1", 1, out value);
```

### Python Example:

```
Status, value = ANVNA_GetMarkerSearchNotchShapeFactorOnOff (sessionId, 'CH1:TR1',
1)
```

### MATLAB Example:

```
[status, value] = anvna.GetMarkerSearchNotchShapeFactorOnOff ('CH1:Trace1', 1);
```

## C-174 ANVNA\_SetMarkerSearchNotchShapeFactorHigh

```
ViStatus ANVNA_SetMarkerSearchNotchShapeFactorHigh (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum
    ViReal64 value );
```

Description: Sets Shape Factor High Value of Marker Search Notch on the specified marker. Only useful if Shape Factor is On.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
markerNum	ViUInt32	Marker to use.
value	ViReal64	Value to set this parameter to.

### C++ Example:

```
double value = 3.0;
status = ANVNA_SetMarkerSearchNotchShapeFactorHigh ( sessionId, "CH1:TR1", 1,
value);
```

### C# Example:

```
double value = 3.0;
ANVNA.SetMarkerSearchNotchShapeFactorHigh (sessionId, "CH1:TR1", 1, value);
```

### Python Example:

```
Status = ANVNA_SetMarkerSearchNotchShapeFactorHigh (sessionId, 'CH1:TR1', 1, 3.0)
```

### MATLAB Example:

```
[status] = anvna.SetMarkerSearchNotchShapeFactorHigh ('CH1:Trace1', 1, 3.0);
```

## C-175 ANVNA\_GetMarkerSearchNotchShapeFactorHigh

```
ViStatus ANVNA_GetMarkerSearchNotchShapeFactorHigh (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum
    ViPReal64 value );
```

Description: Gets current value of Shape Factor High of Marker Search Notch on the specified marker. Only useful if Shape Factor is On.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
markerNum	ViUInt32	Marker to use.
value	ViPReal64	Current value of this parameter.

### C++ Example:

```
double value;
status = ANVNA_GetMarkerSearchNotchShapeFactorHigh ( sessionId, "CH1:TR1", 1,
&value);
```

### C# Example:

```
double value
ANVNA.GetMarkerSearchNotchShapeFactorHigh (sessionId, "CH1:TR1", 1, out value);
```

### Python Example:

```
Status, value = ANVNA_GetMarkerSearchNotchShapeFactorHigh (sessionId, 'CH1:TR1', 1)
```

### MATLAB Example:

```
[status, value] = anvna.GetMarkerSearchNotchShapeFactorHigh ('CH1:Trace1', 1);
```

## C-176 ANVNA\_SetMarkerSearchNotchShapeFactorLow

```
ViStatus ANVNA_SetMarkerSearchNotchShapeFactorHigh (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum
    ViReal64 value );
```

Description: Sets Shape Factor Low Value of Marker Search Notch on the specified marker. Only useful if Shape Factor is On.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
markerNum	ViUInt32	Marker to use.
value	ViReal64	Value to set this parameter to.

### C++ Example:

```
double value = 3.0;
status = ANVNA_SetMarkerSearchNotchShapeFactorLow ( sessionId, "CH1:TR1", 1,
value);
```

### C# Example:

```
double value = 3.0;
ANVNA.SetMarkerSearchNotchShapeFactorLow (sessionId, "CH1:TR1", 1, value);
```

### Python Example:

```
Status = ANVNA_SetMarkerSearchNotchShapeFactorLow (sessionId, 'CH1:TR1', 1, 3.0)
```

### MATLAB Example:

```
[status] = anvna.SetMarkerSearchNotchShapeFactorLow ('CH1:Trace1', 1, 3.0);
```

## C-177 ANVNA\_GetMarkerSearchNotchShapeFactorLow

```
ViStatus ANVNA_GetMarkerSearchNotchShapeFactorLow (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 markerNum
    ViPReal64 value );
```

Description: Gets current value of Shape Factor Low of Marker Search Notch on the specified marker.  
Only useful if Shape Factor is On.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
markerNum	ViUInt32	Marker to use.
value	ViPReal64	Current value of this parameter.

### C++ Example:

```
double value;
status = ANVNA_GetMarkerSearchNotchShapeFactorLow ( sessionId, "CH1:TR1", 1,
&value);
```

### C# Example:

```
double value
ANVNA.GetMarkerSearchNotchShapeFactorLow (sessionId, "CH1:TR1", 1, out value);
```

### Python Example:

```
Status, value = ANVNA_GetMarkerSearchNotchShapeFactorLow (sessionId, 'CH1:TR1', 1)
```

### MATLAB Example:

```
[status, value] = anvna.GetMarkerSearchNotchShapeFactorLow ('CH1:Trace1', 1);
```

## C-178 ANVNA\_EnableTimeDomainOption

```
ViStatus ANVNA_EnableTimeDomainOption (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViConstString password );
```

Description: This function activates time domain option using the given password.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
password	ViConstString	The password to be used for activation.

### C++ Example:

```
status = ANVNA_EnableTimeDomainOption(sessionId, ":", "password");
```

### C# Example:

```
ANVNA.EnableTimeDomainOption(sessionId, ":", "password");
```

### Python Example:

```
status = ANVNA_EnableTimeDomainOption (sessionId, ":", "password")
```

### MATLAB Example:

```
status = anvna.EnableTimeDomainOption(':', 'password');
```

## C-179 ANVNA\_IsTimeDomainInstalled

```
ViStatus ANVNA_IsTimeDomainInstalled (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViPBoolean on_off );
```

Description: This function checks time domain option.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
on_off	ViPBoolean	Install state: true or false.

### C++ Example:

```
ViBoolean hasTimeDomain;
ANVNA_IsTimeDomainInstalled(sessionId, ":", &hasTimeDomain);
```

### C# Example:

```
ushort hasTimeDomain;
ANVNA.IsTimeDomainInstalled(sessionId, ":", out hasTimeDomain);
```

### Python Example:

```
status, hasTimeDomain =
ANVNA_IsTimeDomainInstalled(sessionId, ":")
```

### MATLAB Example:

```
[status, hasTimeDomain] = anvna.IsTimeDomainInstalled('');
```

## C-180 ANVNA\_SetTimeDomainType

```
ViStatus ANVNA_SetTimeDomainType (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 domainType );
```

Description: Set time domain type.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
domainType	ViUInt32	For accepted values see list below.

domainType	Values
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_TYPE_FREQUENCYNOTIMEGATE	0
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_TYPE_FREQUENCYTIMEGATE	1
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_TYPE_TIMEBANDPASS	2
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_TYPE_TIMELOWPASS	3

### C++ Example:

```
status = ANVNA_SetTimeDomainType(sessionId, "CH1:",
    ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_TYPE_TIMELOWPASS);
```

### C# Example:

```
ANVNA.SetTimeDomainType(sessionId, "CH1:",
    ANVNA.VAL_ANRITSU_VNA_TIMEDOMAIN_TYPE_TIMELOWPASS);
```

### Python Example:

```
status = ANVNA_SetTimeDomainType(sessionId, "CH1:",
    ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_TYPE_TIMELOWPASS)
```

### MATLAB Example:

```
status = anvna.SetTimeDomainType('CH1:',
    anvna.VAL_ANRITSU_VNA_TIMEDOMAIN_TYPE_TIMELOWPASS);
```

## C-181 ANVNA\_GetTimeDomainType

```
ViStatus ANVNA_GetTimeDomainType (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViPUInt32 domainType );
```

Description: Get time domain type.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
domainType	ViPUInt32	For possible return values see list below.

domainType	Values
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_TYPE_FREQUENCYNOTIMEGATE	0
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_TYPE_FREQUENCYTIMEGATE	1
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_TYPE_TIMEBANDPASS	2
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_TYPE_TIMELOWPASS	3

### C++ Example:

```
ViUInt32 domainType;
status = ANVNA_GetTimeDomainType(sessionId, "CH1:", &domainType);
```

### C# Example:

```
uint domainType;
ANVNA.GetTimeDomainType(sessionId, "CH1:", out domainType);
```

### Python Example:

```
Status, domainType = ANVNA_GetTimeDomainType(sessionId, "CH1:")
```

### MATLAB Example:

```
[status, domainType] = anvna.GetTimeDomainType('CH1:');
```

## C-182 ANVNA\_SetTimeDomainResponse

```
ViStatus ANVNA_SetTimeDomainResponse (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 response );
```

Description: Set time domain response.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
response	ViUInt32	For possible input values see list below.

response	Values
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_RESPONSE_IMPULSE	0
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_RESPONSE_STEP	1

### C++ Example:

```
status = ANVNA_SetTimeDomainResponse(sessionId, "CH1:",
    ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_RESPONSE_IMPULSE);
```

### C# Example:

```
ANVNA.SetTimeDomainResponse(sessionId, "CH1:",
    ANVNA.VAL_ANRITSU_VNA_TIMEDOMAIN_RESPONSE_IMPULSE);
```

### Python Example:

```
status = ANVNA_SetTimeDomainResponse (sessionId, "CH1:",
    ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_RESPONSE_IMPULSE)
```

### MATLAB Example:

```
status = anvna.SetTimeDomainResponse('CH1:',
    anvna.VAL_ANRITSU_VNA_TIMEDOMAIN_RESPONSE_IMPULSE);
```

## C-183 ANVNA\_GetTimeDomainResponse

```
ViStatus ANVNA_GetTimeDomainResponse (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViPUInt32 response );
```

Description: Get time domain type.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
response	ViPUInt32	For possible input values see list below.

response	Values
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_RESPONSE_IMPULSE	0
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_RESPONSE_STEP	1

### C++ Example:

```
ViUInt32 domainResponse;
status = ANVNA_GetTimeDomainResponse(sessionId, "CH1:", &domainResponse);
```

### C# Example:

```
uint domainResponse;
ANVNA.GetTimeDomainResponse(sessionId, "CH1:", out domainResponse);
```

### Python Example:

```
status, domainResponse = ANVNA_GetTimeDomainResponse(sessionId, "CH1:")
```

### MATLAB Example:

```
[status, domainResponse] = anvna.GetTimeDomainResponse('CH1:');
```

## C-184 ANVNA\_SetTimeDomainTrip

```
ViStatus ANVNA_SetTimeDomainTrip (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 tripMode );
```

Description: Set time domain trip.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
tripMode	ViUInt32	For possible return values see list below.

tripMode	Values
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_TRIP_AUTO	0
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_TRIP_ONEWAY	1
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_TRIP_ROUNDTRIP	2

### C++ Example:

```
status = ANVNA_SetTimeDomainResponse(sessionId, "CH1:",
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_RESPONSE_IMPULSE);
```

### C# Example:

```
ANVNA.SetTimeDomainResponse(sessionId, "CH1:",
ANVNA.VAL_ANRITSU_VNA_TIMEDOMAIN_RESPONSE_IMPULSE);
```

### Python Example:

```
status = ANVNA_SetTimeDomainResponse (sessionId, "CH1:",
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_RESPONSE_IMPULSE)
```

### MATLAB Example:

```
status = anvna.SetTimeDomainResponse('CH1:',
anvna.VAL_ANRITSU_VNA_TIMEDOMAIN_RESPONSE_IMPULSE);
```

## C-185 ANVNA\_GetTimeDomainTrip

```
ViStatus ANVNA_GetTimeDomainTrip (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViPUInt32 tripMode );
```

Description: Get time domain trip.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
tripMode	ViPUInt32	For return values see list below.

tripMode	Values
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_TRIP_AUTO	0
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_TRIP_ONEWAY	1
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_TRIP_ROUNDTRIP	2

### C++ Example:

```
ViUInt32 domainTrip;
status = ANVNA_GetTimeDomainTrip(sessionId, "CH1:", &domainTrip);
```

### C# Example:

```
uint domainTrip;
ANVNA.GetTimeDDomainTrip(sessionId, "CH1:", out domainTrip);
```

### Python Example:

```
status, domainTrip = ANVNA_GetTimeDomainTrip(sessionId, "CH1:")
```

### MATLAB Example:

```
[status, domainTrip] = anvna.GetTimeDomainTrip('CH1:');
```

## C-186 ANVNA\_SetTimeDomainUnit

```
ViStatus ANVNA_SetTimeDomainUnit (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 unit );
```

Description: Set time domain unit.

Parameters List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
unit	ViUInt32	For possible return values see list below.

unit	Values
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_UNIT_TIME	0
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_UNIT_DISTANCE	1

### C++ Example:

```
status = ANVNA_SetTimeDomainUnit(sessionId, "CH1:",
    ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_UNIT_TIME);
```

### C# Example:

```
ANVNA.SetTimeDomainUnit(sessionId, "CH1:",
    ANVNA.VAL_ANRITSU_VNA_TIMEDOMAIN_UNIT_TIME);
```

### Python Example:

```
status = ANVNA_SetTimeDomainUnit(sessionId, "CH1:",
    ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_UNIT_TIME)
```

### MATLAB Example:

```
status = anvna.SetTimeDomainUnit('CH1:',
    anvna.VAL_ANRITSU_VNA_TIMEDOMAIN_UNIT_TIME);
```

## C-187 ANVNA\_GetTimeDomainUnit

```
ViStatus ANVNA_GetTimeDomainUnit (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViPUInt32 unit );
```

Description: Get time domain trip.

Parameters List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
unit	ViPUInt32	For possible return values see list below.

Unit	Values
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_UNIT_TIME	0
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_UNIT_DISTANCE	1

### C++ Example:

```
ViUInt32 domainUnit;
status = ANVNA_GetTimeDomainUnit(sessionId, "CH1:", &domainUnit);
```

### C# Example:

```
uint domainUnit;
ANVNA.GetTimeDomainUnit(sessionId, "CH1:", out domainUnit);
```

### Python Example:

```
status, domainUnit = ANVNA_GetTimeDomainUnit(sessionId, "CH1:")
```

### MATLAB Example:

```
[status, domainUnit] = anvna.GetTimeDomainUnit('CH1:');
```

## C-188 ANVNA\_SetTimeDomainRangeStartStop

```
ViStatus ANVNA_SetTimeDomainRangeStartStop (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViReal64 start,
    ViReal64 stop );
```

Description: Set time domain range using start and stop values.

Parameters List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
start	ViReal64	Range start value.
stop	ViReal64	Range stop value.

### C++ Example:

```
status = ANVNA_SetTimeDomainRangeStartStop(sessionId, "CH1:TR1", 50000000,
60000000);
```

### C# Example:

```
ANVNA.SetTimeDomainRangeStartStop(sessionId, "CH1:TR1", 50000000, 60000000);
```

### Python Example:

```
status = ANVNA_SetTimeDomainRangeStartStop(sessionId, "CH1:TR1", 50000000,
60000000)
```

### MATLAB Example:

```
status = anvna.SetTimeDomainRangeStartStop('CH1:TR1', 50000000, 60000000);
```

```

ViStatus ANVNA_GetTimeDomainRangeStartStop (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViPReal64 start,
    ViPReal64 stop );

```

Description: Get time domain range using start and stop values.

Parameters List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
start	ViPReal64	Range start value.
stop	ViPReal64	Range stop value.

#### C++ Example:

```

ViReal64 start, stop;
status = ANVNA_GetTimeDomainRangeStartStop(sessionId, "CH1:TR1", &start, &stop);

```

#### C# Example:

```

double start, stop;
ANVNA.GetTimeDomainRangeStartStop(sessionId, "CH1:TR1", out start, out stop);

```

#### Python Example:

```

status, start, stop = ANVNA_GetTimeDomainRangeStartStop(sessionId, "CH1:TR1")

```

#### MATLAB Example:

```

[status, start, stop] = anvna.GetTimeDomainRangeStartStop('CH1:TR1');

```

## C-190 ANVNA\_SetTimeDomainRangeCenterSpan

```
ViStatus ANVNA_SetTimeDomainRangeCenterSpan (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViReal64 center,
    ViReal64 span );
```

Description: Set time domain range center and span values.

Parameters List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
Center	ViReal64	Range center value.
span	ViReal64	Range span value.

### C++ Example:

```
ViReal64 center, span;
status = ANVNA_SetTimeDomainRangeCenterSpan(sessionId, "CH1:TR1", &center, &span);
```

### C# Example:

```
double center, span;ANVNA.GetTimeDomainRangeCenterSpan(sessionId, "CH1:TR1", out
center, out span);
```

### Python Example:

```
status, center, span = ANVNA_SetTimeDomainRangeCenterSpan(sessionId, "CH1:TR1")
```

### MATLAB Example:

```
[status, center, span] = anvna.GetTimeDomainRangeStartStop('CH1:TR1');
```

## C-191 ANVNA\_GetTimeDomainRangeCenterSpan

```
ViStatus ANVNA_GetTimeDomainRangeCenterSpan (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViPReal64 center,
    ViPReal64 span );
```

Description: Get time domain range center and span values.

Parameters List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
Center	ViPReal64	Range center value.
span	ViPReal64	Range span value.

### C++ Example:

```
ViReal64 center, span;
status = ANVNA_GetTimeDomainRangeCenterSpan(sessionId, "CH1:TR1", &center, &span);
```

### C# Example:

```
double center, span;
ANVNA.GetTimeDomainRangeCenterSpan(sessionId, "CH1:TR1", out center, out span);
```

### Python Example:

```
status, center, span = ANVNA_GetTimeDomainRangeCenterSpan(sessionId, "CH1:TR1")
```

### MATLAB Example:

```
[status, center, span] = anvna.GetTimeDomainRangeStartStop('CH1:TR1');
```

## C-192 ANVNA\_SetTimeDomainRangeDCTerm

```
ViStatus ANVNA_SetTimeDomainRangeDCTerm (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 extrapolationType,
    ViReal64 extrapolation,
    ViUInt32 extrapolationMethod );
```

Description: Set time domain DC Term values.

Parameters List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
extrapolationType	ViUInt32	For extrapolation types see list below.
extrapolation	ViReal64	Extrapolation value.
extrapolationMethod	ViUInt32	For extrapolation methods see list below.

extrapolationType	Values
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_DCTERM_AUTOEXTRAPOLATE	0
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_DCTERM_LINEIMPEDANCE	1
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_DCTERM_OPEN	2
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_DCTERM_SHORT	3
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_DCTERM_OTHER	4

extrapolationMethod	Values
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_DCTERM_METHOD_PHASEONLY	0
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_DCTERM_METHOD_MAGPHASE	1
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_DCTERM_METHOD_USERDEFINED	2

### C++ Example:

```
status = ANVNA_SetTimeDomainRangeDCTerm(sessionId, "CH1:TR1",
    ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_DCTERM_AUTOEXTRAPOLATE, 0.0,
    ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_DCTERM_METHOD_PHASEONLY);
```

**C# Example:**

```
ANVNA.SetTimeDomainRangeCenterSpan(sessionId, "CH1:TR1", ANVNA.  
VAL_ANRITSU_VNA_TIMEDOMAIN_DCTERM_AUTOEXTRAPOLATE, 0.0, ANVNA.  
VAL_ANRITSU_VNA_TIMEDOMAIN_DCTERM_METHOD_PHASEONLY);
```

**Python Example:**

```
status = ANVNA_SetTimeDomainRangeCenterSpan(sessionId, "CH1:TR1",  
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_DCTERM_AUTOEXTRAPOLATE, 0.0,  
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_DCTERM_METHOD_PHASEONLY)
```

**MATLAB Example:**

```
status = anvna.SetTimeDomainRangeCenterSpan('CH1:TR1',  
anvna.VAL_ANRITSU_VNA_TIMEDOMAIN_DCTERM_AUTOEXTRAPOLATE, 0.0,  
anvna.VAL_ANRITSU_VNA_TIMEDOMAIN_DCTERM_METHOD_PHASEONLY);
```

## C-193 ANVNA\_GetTimeDomainRangeDCTerm

```
ViStatus ANVNA_SetTimeDomainRangeDCTerm (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViPUInt32 extrapolationType,
    ViPReal64 extrapolation,
    ViPUInt32 extrapolationMethod,
    ViPReal64 reflectionCoefficient );
```

Description: Get time domain DC Term values.

Parameters List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
extrapolationType	ViPUInt32	For extrapolation types see list below.
extrapolation	ViPReal64	Extrapolation value.
extrapolationMethod	ViPUInt32	For extrapolation methods see list below.
reflectionCoefficient	ViPReal64	Gets the reflection coefficient value.

extrapolationType	Values
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_DCTERM_AUTOEXTRAPOLATE	0
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_DCTERM_LINEIMPEDANCE	1
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_DCTERM_OPEN	2
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_DCTERM_SHORT	3
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_DCTERM_OTHER	4

extrapolationMethod	Values
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_DCTERM_METHOD_PHASEONLY	0
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_DCTERM_METHOD_MAGPHASE	1
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_DCTERM_METHOD_USERDEFINED	2

**C++ Example:**

```
ViUInt32 extrapolationType, extrapolationMethod;  
ViReal64 extrapolation, reflectionCoefficient;  
status = ANVNA_GetTimeDomainRangeDCTerm(sessionId, "CH1:TR1", &extrapolationType,  
&extrapolation, &extrapolationMethod, &reflectionCoefficient);
```

**C# Example:**

```
uint extrapolationType, extrapolationMethod;  
double extrapolation, reflectionCoefficient;  
ANVNA.GetTimeDomainRangeDCTerm(sessionId, "CH1:TR1", out extrapolationType, out  
extrapolation, out extrapolationMethod, out reflectionCoefficient);
```

**Python Example:**

```
status, extrapolationType, extrapolation, extrapolationMethod,  
reflectionCoefficient = ANVNA_GetTimeDomainRangeDCTerm (sessionId, "CH1:TR1")
```

**MATLAB Example:**

```
[status, extrapolationType, extrapolation, extrapolationMethod,  
reflectionCoefficient] = anvna.GetTimeDomainRangeDCTerm('CH1:TR1');
```

## C-194 ANVNA\_SetTimeDomainRangeProperties

```
ViStatus ANVNA_SetTimeDomainRangeProperties (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 windowShape,
    ViReal64 shapeValue,
    ViReal64 aliasFreeRange );
```

Description: Set time domain range properties: windows shape, shape value and alias free range.

Parameters List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
windowShape	ViUInt32	For extrapolation types see list below.
shapeValue	ViReal64	Custom shape value.
aliasFreeRange	ViReal64	Alias free range value.

windowShape	Values
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_WINDOWSHAPE_NOMINAL	0
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_WINDOWSHAPE_RECTANGULAR	1
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_WINDOWSHAPE_LOWSIDELOBE	2
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_WINDOWSHAPE_MINSIDELOBE	3
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_WINDOWSHAPE_KAIERBESSEL	4
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_WINDOWSHAPE_DOLPHCHEBYSHEV	5

### C++ Example:

```
status = ANVNA_SetTimeDomainRangeProperties(sessionId, "CH1:TR1",
    ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_WINDOWSHAPE_NOMINAL, 0.0, 0.0);
```

### C# Example:

```
ANVNA.SetTimeDomainRangeProperties(sessionId, "CH1:TR1",
    ANVNA.VAL_ANRITSU_VNA_TIMEDOMAIN_WINDOWSHAPE_NOMINAL, 0.0, 0.0);
```

### Python Example:

```
status = ANVNA_SetTimeDomainRangeProperties(sessionId, "CH1:TR1",
    ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_WINDOWSHAPE_NOMINAL, 0.0, 0.0)
```

**MATLAB Example:**

```
status = anvna.SetTimeDomainRangeProperties('CH1:TR1',  
    anvna.VAL_ANRITSU_VNA_TIMEDOMAIN_WINDOWSHAPE_NOMINAL, 0.0, 0.0);
```

## C-195 ANVNA\_GetTimeDomainRangeProperties

```
ViStatus ANVNA_GetTimeDomainRangeProperties (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViPUInt32 windowShape,
    ViPReal64 shapeValue );
```

Description: Get time domain range properties: windows shape, shape value.

Parameters List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1"
windowShape	ViPUInt32	For extrapolation types see list below.
shapeValue	ViPReal64	Custom shape value.

windowShape	Values
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_WINDOWSHAPE_NOMINAL	0
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_WINDOWSHAPE_RECTANGULAR	1
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_WINDOWSHAPE_LOWSIDELOBE	2
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_WINDOWSHAPE_MINSIDELOBE	3
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_WINDOWSHAPE_KAIERBESSEL	4
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_WINDOWSHAPE_DOLPHCHEBYSHEV	5

### C++ Example:

```
ViUInt32 windowShape;
ViReal64 shapeValue;
status = ANVNA_GetTimeDomainRangeProperties(sessionId, "CH1:TR1",
&extrapolationType, &shapeValue);
```

### C# Example:

```
uint windowShape;
double shapeValue;
ANVNA.GetTimeDomainRangeProperties(sessionId, "CH1:TR1", out windowShape, out
shapeValue);
```

**Python Example:**

```
status, windowShape, shapeValue = ANVNA_GetTimeDomainRangeProperties(sessionId,  
"CH1:TR1")
```

**MATLAB Example:**

```
[status, windowShape, shapeValue] = anvna.GetTimeDomainRangeProperties('CH1:TR1');
```

## C-196 ANVNA\_SetTimeDomainGateStartStop

```
ViStatus ANVNA_SetTimeDomainGateStartStop (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViReal64 start,
    ViReal64 stop );
```

Description: Set time domain gate start and stop interval.

Parameters List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
start	ViReal64	For extrapolation types see list below.
stop	ViReal64	Custom shape value.

### C++ Example:

```
status = ANVNA_SetTimeDomainGateStartStop(sessionId, "CH1:TR1", 50000000,
60000000);
```

### C# Example:

```
ANVNA.SetTimeDomainGateStartStop(sessionId, "CH1:TR1", 50000000, 60000000);
```

### Python Example:

```
status = ANVNA_SetTimeDomainGateStartStop(sessionId, "CH1:TR1", 50000000, 60000000)
```

### MATLAB Example:

```
status = anvna.SetTimeDomainGateStartStop('CH1:TR1', 50000000, 60000000);
```

```

ViStatus ANVNA_GetTimeDomainGateStartStop (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViPReal64 start,
    ViPReal64 stop );

```

Description: Get time domain gate start and stop interval.

Parameters List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
start	ViPReal64	Interval start value.
stop	ViPReal64	Interval stop value.

#### C++ Example:

```

ViReal64 start, stop;
status = ANVNA_GetTimeDomainGateStartStop(sessionId, "CH1:TR1", &start, &stop);

```

#### C# Example:

```

double start, stop;
ANVNA.GetTimeDomainGateStartStop(sessionId, "CH1:TR1", out start, out stop);

```

#### Python Example:

```

status, start, stop = ANVNA_GetTimeDomainGateStartStop(sessionId, "CH1:TR1")

```

#### MATLAB Example:

```

[status, start, stop] = anvna.GetTimeDomainGateStartStop('CH1:TR1');

```

## C-198 ANVNA\_SetTimeDomainGateCenterSpan

```
ViStatus ANVNA_SetTimeDomainGateCenterSpan (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViReal64 center,
    ViReal64 span );
```

Description: Set time domain gate center and span interval.

Parameters List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
center	ViReal64	Center interval.
span	ViReal64	Interval span.

### C++ Example:

```
status = ANVNA_SetTimeDomainGateCenterSpan(sessionId, "CH1:TR1", 50000000,
10000000);
```

### C# Example:

```
ANVNA.SetTimeDomainGateCenterSpan(sessionId, "CH1:TR1", 50000000, 10000000);
```

### Python Example:

```
status = ANVNA_SetTimeDomainGateCenterSpan(sessionId, "CH1:TR1", 50000000,
10000000)
```

### MATLAB Example:

```
status = anvna.SetTimeDomainGateCenterSpan('CH1:TR1', 50000000, 10000000);
```

## C-199 ANVNA\_GetTimeDomainGateCenterSpan

```
ViStatus ANVNA_GetTimeDomainGateCenterSpan (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViPReal64 center,
    ViPReal64 span );
```

Description: Get time domain gate center and span interval.

Parameters List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
center	ViPReal64	Center interval.
span	ViPReal64	Interval span.

### C++ Example:

```
ViReal64 center, span;
status = ANVNA_GetTimeDomainGateCenterSpan(sessionId, "CH1:TR1", &center, &span);
```

### C# Example:

```
double center, span;
ANVNA.GetTimeDomainGateCenterSpan(sessionId, "CH1:TR1", out center, out span);
```

### Python Example:

```
status, center, span = ANVNA_GetTimeDomainGateCenterSpan(sessionId, "CH1:TR1")
```

### MATLAB Example:

```
[status, center, span] = anvna.GetTimeDomainGateStartStop('CH1:TR1');
```

## C-200 ANVNA\_SetTimeDomainGateProperties

```
ViStatus ANVNA_SetTimeDomainGateProperties (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 setup,
    ViBoolean notch,
    ViUInt32 shape,
    ViReal64 shapeValue );
```

Description: Set time domain gate properties: setup, notch, shape and shape value.

Parameters List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
setup	ViUInt32	See possible values in the list below.
notch	ViBoolean	If notch is activated or not.
shape	ViUInt32	Gate shape type.
shapevalue	ViReal64	If shape is KAISERBESSEL or DOLPHCHEBYSHEV this value considered as shape value.

setup	Values
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_GATE_DISPLAY	0
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_GATE_OFF	1
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_GATE_ON	2

shape	values
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_GATESHAPE_NOMINAL	0
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_GATESHAPE_MINIMUM	1
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_GATESHAPE_MAXIMUM	2
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_GATESHAPE_WIDE	3
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_GATESHAPE_KAISERBESSEL	4
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_GATESHAPE_DOLPHCHEBYSHEV	5

**C++ Example:**

```
status = ANVNA_SetTimeDomainGateProperties(sessionId, "CH1:TR1",
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_GATE_ON, VI_FALSE,
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_GATESHAPE_NOMINAL, 0.0);
```

**C# Example:**

```
ANVNA.SetTimeDomainGateProperties(sessionId, "CH1:TR1",
ANVNA.VAL_ANRITSU_VNA_TIMEDOMAIN_GATE_ON, 0,
ANVNA.VAL_ANRITSU_VNA_TIMEDOMAIN_GATESHAPE_NOMINAL, 0.0);
```

**Python Example:**

```
status = ANVNA_SetTimeDomainGateProperties(sessionId, "CH1:TR1",
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_GATE_ON, False,
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_GATESHAPE_NOMINAL, 0.0)
```

**MATLAB Example:**

```
status = anvna.SetTimeDomainGateProperties('CH1:TR1',
anvna.VAL_ANRITSU_VNA_TIMEDOMAIN_GATE_ON, 0,
anvna.VAL_ANRITSU_VNA_TIMEDOMAIN_GATESHAPE_NOMINAL, 0.0);
```

## C-201 ANVNA\_GetTimeDomainGateProperties

```
ViStatus ANVNA_GetTimeDomainGateProperties (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViPUInt32 setup,
    ViPBoolean notch,
    ViPUInt32 shape,
    ViPReal64 shapeValue );
```

Description: Get time domain gate properties: setup, notch, shape and shape value.

Parameters List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
setup	ViPUInt32	See possible values in the list below.
notch	ViPBoolean	If notch is activated or not.
shape	ViPUInt32	Gate shape type.
shapevalue	ViPReal64	If shape is KAISERBESSEL or DOLPHCHEBYSHEV this value considered as shape value.

setup	Values
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_GATE_DISPLAY	0
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_GATE_OFF	1
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_GATE_ON	2

shape	Values
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_GATESHAPE_NOMINAL	0
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_GATESHAPE_MINIMUM	1
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_GATESHAPE_MAXIMUM	2
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_GATESHAPE_WIDE	3
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_GATESHAPE_KAISERBESSEL	4
ANVNA_VAL_ANRITSU_VNA_TIMEDOMAIN_GATESHAPE_DOLPHCHEBYSHEV	5

**C++ Example:**

```
ViUInt32 setup, shape;
ViBoolean notch;
ViReal64 shapeValue;
status = ANVNA_GetTimeDomainGateProperties(sessionId, "CH1:TR1", &setup, &notch,
&shape, &shapeValue);
```

**C# Example:**

```
uint setup, shape;
double shapeValue;
ANVNA.GetTimeDomainGateProperties(sessionId, "CH1:TR1", out setup, out notch, out
shape, out shapeValue);
```

**Python Example:**

```
status, setup, notch, shape, shapeValue =
ANVNA_GetTimeDomainGateProperties(sessionId, "CH1:TR1")
```

**MATLAB Example:**

```
[status, windowShape, shapeValue] = anvna.GetTimeDomainGateProperties('CH1:TR1');
```

## C-202 ANVNA\_GetTimeDomainDistanceValues

```
ViStatus ANVNA_GetTimeDomainDistanceValues (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViInt32 RetValBufferSize,
    ViPReal64 RetVal,
    ViPInt32 RetValActualSize );
```

Description: Get time domain distance values.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier.
RetValBufferSize	ViInt32	User allocated buffer size.
RetVal	ViPReal64	Destination buffer address.
RetValActualSize	ViPInt32	Returned number of elements from buffer.

### C++ Example:

```
ViReal64 RetVal[1024];
ViInt32 RetValActualSize;

status = ANVNA_GetTimeDomainDistanceValues(sessionId, "CH1:TR1", 1024, &RetVal,
&RetValActualSize);
```

### C# Example:

```
double RetVal[1024];
int RetValActualSize;

ANVNA.GetTimeDomainDistanceValues(sessionId, "CH1:TR1", 1024, out RetVal, out
RetValActualSize);
```

### Python Example:

```
status, RetVal, RetValActualSize = ANVNA_GetTimeDomainDistanceValues(sessionId,
"CH1:TR1", 1024)
```

### MATLAB Example:

```
[status, RetVal, RetValActualSize] = anvna.GetTimeDomainDistanceValues('CH1:TR1',
1024);
```

## C-203 ANVNA\_GetTimeDomainGateValues

```
ViStatus ANVNA_GetTimeDomainGateValues (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViInt32 RetValBufferSize,
    ViPReal32 RetVal,
    ViPInt32 RetValActualSize );
```

Description: Get time domain gate values. For each OX value there is a gate value.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability identifier. Ex: "CH1:TR1".
RetValBufferSize	ViInt32	User allocated buffer size.
RetVal	ViPReal32	Destination buffer address.
RetValActualSize	ViPInt32	Returned number of elements from buffer.

### C++ Example:

```
ViReal32 RetVal[1024];
ViInt32 RetValActualSize;
status = ANVNA_GetTimeDomainGateValues(sessionId, "CH1:TR1", 1024, &RetVal,
&RetValActualSize);
```

### C# Example:

```
float RetVal[1024];
int RetValActualSize;
ANVNA.GetTimeDomainGateValues(sessionId, "CH1:TR1", 1024, out RetVal, out
RetValActualSize);
```

### Python Example:

```
status, RetVal, RetValActualSize = ANVNA_GetTimeDomainGateValues(sessionId,
"CH1:TR1", 1024)
```

### MATLAB Example:

```
[status, RetVal, RetValActualSize] = anvna.GetTimeDomainGateValues('CH1:TR1',
1024);
```

## C-204 ANVNA\_SetLimitTestingOnOff

```
ViStatus ANVNA_SetLimitTestingOnOff (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViBoolean onOff );
```

Description: Activates the limit testing if the boolean parameter is set on true or deactivates it otherwise.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:TR1".)
onOff	ViBoolean	Limit testing state.

### C++ Example:

```
status = ANVNA_SetLimitTestingOnOff ( sessionId, "CH1:TR1", VI_TRUE );
```

### C# Example:

```
ANVNA.SetLimitTestingOnOff(sessionId, "CH1:TR1", 1);
```

### Python Example:

```
status = ANVNA_SetLimitTestingOnOff(sessionId, 'CH1:TR1', 1)
```

### MATLAB Example:

```
status = anvna.SetLimitTestingOnOff('CH1:Trace1', 1);
```

## C-205 ANVNA\_GetLimitTestingOnOff

```
ViStatus ANVNA_GetLimitTestingOnOff (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViPBoolean onOff );
```

Description: Returns the state of limit testing query, declared per trace. Default value is 1.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:TR1".)
onOff	ViPBoolean	Limit testing state.

### C++ Example:

```
ViBoolean limitTestingStatus = VI_FALSE;
status = ANVNA_GetLimitTestingOnOff ( sessionId, "CH1:TR1", &limitTestingStatus );
```

### C# Example:

```
ushort onOff;
ANVNA.GetLimitTestingOnOff(sessionId, "CH1:TR1", out onOff);
```

### Python Example:

```
status, limitSet = ANVNA_GetLimitTestingOnOff(sessionId, 'CH1:TR1')
print('Limit testing get value is {}'.format(limitSet))
```

### MATLAB Example:

```
[status, limitTesting] = anvna.GetLimitTestingOnOff('CH1:Trace1');
```

## C-206 ANVNA\_SetLimitTestResultSign

```
ViStatus ANVNA_SetLimitTestResultSign (
    ViSession vi,
    ViBoolean onOff );
```

Description: Activates the limit testing result sign if the boolean parameter is set on true or deactivates it otherwise.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
onOff	ViBoolean	Limit testing sign state.

### C++ Example:

```
status = ANVNA_SetLimitTestResultSign ( sessionId, VI_TRUE );
```

### C# Example:

```
ANVNA.SetLimitTestResultSign(sessionId, 1);
```

### Python Example:

```
status = ANVNA_SetLimitTestResultSign(sessionId, 1)
```

### MATLAB Example:

```
status = anvna.SetLimitTestResultSign(1);
```

## C-207 ANVNA\_GetLimitTestResultSign

```
ViStatus ANVNA_GetLimitTestResultSign (
    ViSession vi,
    ViPBoolean onOff );
```

Description: Returns the state of limit testing result sign declared per trace. Default value is 0.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
onOff	ViPBoolean	Limit testing result sign state.

### C++ Example:

```
ViBoolean limitTestingSignStatus = VI_FALSE;
status = ANVNA_GetLimitTestResultSign ( sessionId, &limitTestingSignStatus );
```

### C# Example:

```
ushort limitSign;
ANVNA.GetLimitTestResultSign(sessionId, out limitSign);
```

### Python Example:

```
status, limitVisible = ANVNA_GetLimitTestResultSign(sessionId)
print('Limit testing sign get value is {}'.format(limitVisible))
```

### MATLAB Example:

```
[status, limitSignTesting] = anvna.GetLimitTestResultSign();
```

## C-208 ANVNA\_ClearAllLimits

```
ViStatus ANVNA_ClearAllLimits (  
    ViSession vi,  
    ViConstString repCapIdentifier );
```

Description: Deletes all the limits for a channel trace.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)

### C++ Example:

```
status = ANVNA_ClearAllLimits ( sessionId, "CH1:TR1" );
```

### C# Example:

```
ANVNA.ClearAllLimits(sessionId, "CH1:TR1");
```

### Python Example:

```
status = ANVNA_ClearAllLimits(sessionId, 'CH1:TR1')
```

### MATLAB Example:

```
status = anvna.ClearAllLimits('CH1:Trace1');
```

## C-209 ANVNA\_GetLimitsCount

```
ViStatus ANVNA_GetLimitsCount (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViPUInt32 countLimits );
```

**Description:** Returns the number of limits declared per trace. Default value is 0. The function will return 0 if no segments are declared or after ANVNA\_ClearAllLimits is called.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (Only channel index is parsed, for example "CH1:TR1")
countLimits	ViPUInt32	Number of limits returned by the function .

### C++ Example:

```
ViUInt32 limits = 0;
status = ANVNA_GetLimitsCount ( sessionId, "CH1:TR1", &limits );
printf("Number of limits is %d\n", limits );
```

### C# Example:

```
UInt32 limitsCount;
ANVNA.GetLimitsCount(sessionId, "CH1:TR1", out limitsCount);
```

### Python Example:

```
status, limitsCount = ANVNA_GetLimitsCount(sessionId, 'CH1:TR1')
print('Limit number is {0}'.format(limitsCount))
```

### MATLAB Example:

```
[status, noOfLimits] = anvna.GetLimitsCount('CH1:Trace1');
```

## C-210 ANVNA\_AddLimit

```
ViStatus ANVNA_AddLimit (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViReal64 x1,
    ViReal64 x2,
    ViReal32 y1,
    ViReal32 y2,
    ViReal32 radius,
    ViUInt32 limitType );
```

Description: Adds a new limit using Start and Stop frequency, Y1 and Y2, radius – for circular limits and limitType values.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1")
x1	ViReal64	Start frequency in Hz.
x2	ViReal64	Stop frequency in Hz.
y1	ViReal32	y1 value.
y2	ViReal32	y2 value.
radius	ViReal32	Radius value for circular limits.
limitType	ViUInt32	Limit type.

limitType	Values
ANVNA_VAL_ANRITSU_VNA_LIMIT_TYPE_UPPER	0
ANVNA_VAL_ANRITSU_VNA_LIMIT_TYPE_LOWER	1

### C++ Example:

```
ViReal64 startFrequency = 3000000000;
ViReal64 stopFrequency = 8000000000;
ViReal32 y1 = 9.8;
ViReal32 y2 = 9.8;
ViReal32 radius = 4.5;
status = ANVNA_AddLimit ( sessionId, "CH1:TR1", startFrequency, stopFrequency, y1,
y2, radius, ANVNA_VAL_ANRITSU_VNA_LIMIT_TYPE_LOWER );
```

**C# Example:**

```
ANVNA.AddLimit(sessionId, "CH1:TR1", startFrequency, stopFrequency, (float) -9.8,  
(float) 9.8, (float) 4.5, (uint)ANVNA.VAL_ANRITSU_VNA_LIMIT_TYPE_LOWER);
```

**Python Example:**

```
x1 = float(10000000); x2 = float(8000000000); y1 = -99.8; y2 = -99.8; radius =  
float(4.5)  
  
status = ANVNA_AddLimit(sessionId, 'CH1:TR1', x1, x2, y1, y2, radius,  
ANVNA_VAL_ANRITSU_VNA_LIMIT_TYPE_LOWER)
```

**MATLAB Example:**

```
status = anvna.AddLimit('CH1:Trace1', startFrequency, stopFrequency, -9.4, 13.4,  
5.5, anvna.VAL_ANRITSU_VNA_LIMIT_TYPE_UPPER);
```

## C-211 ANVNA\_SetLimit

```
ViStatus ANVNA_SetLimit (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 limitSegmentNumber,
    ViReal64 x1,
    ViReal64 x2,
    ViReal32 y1,
    ViReal32 y2,
    ViReal32 radius,
    ViUInt32 limitType );
```

Description: Set configuration for an existing limit using Start and Stop frequency, Y1 and Y2, radius – for circular limits and limitType values.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
limitSegmentNumber	ViUInt32	Limit index number.
x1	ViReal64	Start frequency in Hz.
x2	ViReal64	Stop frequency in Hz.
y1	ViReal32	y1 value.
y2	ViReal32	y2 value.
radius	ViReal32	Radius value for circular limits.
limitType	ViUInt32	Limit type.

limitType	Values
ANVNA_VAL_ANRITSU_VNA_LIMIT_TYPE_UPPER	0
ANVNA_VAL_ANRITSU_VNA_LIMIT_TYPE_LOWER	1

### C++ Example:

```
ViReal64 startFrequency = 3000000000;
ViReal64 stopFrequency = 8000000000;
ViReal32 y1 = 9.8;
ViReal32 y2 = 9.8;
ViReal32 radius = 4.5;
```

```
status = ANVNA_SetLimit ( sessionId, "CH1:TR1", 1, startFrequency, stopFrequency,  
y1, y2, radius, ANVNA_VAL_ANRITSU_VNA_LIMIT_TYPE_UPPER );
```

**C# Example:**

```
ANVNA.SetLimit(sessionId, "CH1:TR1", (uint)1, startFrequency, stopFrequency,  
(float)-9.8, (float)9.8, (float)4.5, (uint)ANVNA.VAL_ANRITSU_VNA_LIMIT_TYPE_UPPER);
```

**Python Example:**

```
x1 = float(10000000); x2 = float(8000000000); y1 = -99.8; y2 = -99.8; radius =  
float(4.5)  
  
status = ANVNA_SetLimit(sessionId, 'CH1:TR1', 1, x1, x2, y1, y2, radius,  
ANVNA_VAL_ANRITSU_VNA_LIMIT_TYPE_LOWER)
```

**MATLAB Example:**

```
status = anvna.SetLimit('CH1:Trace1', 1, startFrequency, stopFrequency, -9.4, 13.4,  
5.5, anvna.VAL_ANRITSU_VNA_LIMIT_TYPE_LOWER);
```

## C-212 ANVNA\_GetLimit

```
ViStatus ANVNA_GetLimit (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 limitSegmentNumber,
    ViPReal64 x1,
    ViPReal64 x2,
    ViPReal32 y1,
    ViPReal32 y2,
    ViPReal32 radius,
    ViPUInt32 limitType );
```

Description: Get configuration for an existing limit, Start and Stop frequency, Y1 and Y2, radius – for circular limits and limitType values.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
limitSegmentNumber	ViUInt32	Limit index number.
x1	ViPReal64	Start frequency in Hz.
x2	ViPReal64	Stop frequency in Hz.
y1	ViPReal32	y1 value.
y2	ViPReal32	y2 value.
radius	ViPReal32	Radius value for circular limits.
limitType	ViPUInt32	Output parameter for limit type.

### C++ Example:

```
ViReal64 startFrequency = 0;
ViReal64 stopFrequency = 0;
ViReal32 y1 = 0;
ViReal32 y2 = 0;
ViReal32 radius = 0;
ViUInt32 limitType = 0;

status = ANVNA_GetLimit ( sessionId, "CH1:TR1", 1, &startFrequency, &stopFrequency,
&y1, &y2, &radius, &limitType );
```

**C# Example:**

```
double outX1, outX2;  
float outY1, outY2, outRadius;  
uint outLimitType;  
ANVNA.GetLimit(sessionId, "CH1:TR1", 1, out outX1, out outX2, out outY1, out  
outY2, out outRadius, out outLimitType);
```

**Python Example:**

```
status, outX1, outX2, outY1, outY2, outRadius, outLimitType =  
ANVNA_GetLimit(sessionId, 'CH1:TR1', 1)
```

**MATLAB Example:**

```
[status, outStartFreq, outStopFreq, outY1, outY2, outRadius, outLimitType] =  
anvna.GetLimit('CH1:Trace1', 1);
```

## C-213 ANVNA\_SetLimitType

```
ViStatus ANVNA_SetLimitType (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 limitSegmentNumber,
    ViUInt32 limitType );
```

Description: Set limit type for an existing limit using limitType value.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
limitSegmentNumber	ViUInt32	Limit index number.
limitType	ViUInt32	Limit type.

limitType	Values
ANVNA_VAL_ANRITSU_VNA_LIMIT_TYPE_UPPER	0
ANVNA_VAL_ANRITSU_VNA_LIMIT_TYPE_LOWER	1

### C++ Example:

```
status = ANVNA_SetLimitType ( sessionId, "CH1:TR1", 1,
    ANVNA_VAL_ANRITSU_VNA_LIMIT_TYPE_UPPER );
```

### C# Example:

```
ANVNA.SetLimitType(sessionId, "CH1:TR1", (uint)1,
    (uint)ANVNA.VAL_ANRITSU_VNA_LIMIT_TYPE_UPPER);
```

### Python Example:

```
status = ANVNA_SetLimitType(sessionId, 'CH1:TR1', 1,
    ANVNA_VAL_ANRITSU_VNA_LIMIT_TYPE_LOWER)
```

### MATLAB Example:

```
status = anvna.SetLimitType('CH1:TR1', 1, anvna.VAL_ANRITSU_VNA_LIMIT_TYPE_LOWER);
```

## C-214 ANVNA\_GetLimitType

```
ViStatus ANVNA_GetLimitType (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 limitSegmentNumber,
    ViPUInt32 limitType );
```

Description: Get type for an existing limit using limitType parameter.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
limitSegmentNumber	ViUInt32	Limit index number.
limitType	ViPUInt32	Output parameter for limit type.

### C++ Example:

```
ViUInt32 limitType = 0;
status = ANVNA_GetLimitType ( sessionId, "CH1:TR1", 1, &limitType );
```

### C# Example:

```
uint outLimitType1;
ANVNA.GetLimitType(sessionId, "CH1:TR1", 1, out outLimitType1);
```

### Python Example:

```
status, outLimitType = ANVNA_GetLimitType(sessionId, 'CH1:TR1', 1)
```

### MATLAB Example:

```
status, outLimitType = anvna.GetLimitType('CH1:Trace1', 1);
```

## C-215 ANVNA\_GetLimitActual

```
ViStatus ANVNA_GetLimitActual (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViUInt32 limitSegmentNumber,
    ViPReal64 x1Actual,
    ViPReal64 x2Actual
);
```

**Purpose:** Get supplemental configuration for an existing limit, X1 Actual and X2 Actual (representing the actual X-values used when ShockLine takes user entered values and rounds down to nearest data point).

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_Init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier (ex. "CH1:TR1")	ViConstString	The physical or virtual repeated capability identifier.
limitSegmentNumber	ViUInt32	Limit index number. (1-relative)
x1Actual	ViPReal64	Start frequency in Hz.
x2Actual	ViPReal64	Stop frequency in Hz.

### C++ example:

```
ViReal64 startFrequency = 0;
ViReal64 stopFrequency = 0;
status = ANVNA_GetLimitActual ( sessionId, "CH1:TR1", 1, &startFrequency,
&stopFrequency );
```

### C# example:

```
double outX1, outX2;
ANVNA.GetLimitActual(sessionId, "CH1:TR1", 1, out outX1, out outX2);
```

### Python example:

```
status, outX1, outX2 = ANVNA_GetLimitActual(sessionId, 'CH1:TR1', 1);
```

### MATLAB example:

```
[status, outStartFreq, outStopFreq] = anvna.GetLimit('CH1:Trace1', 1);
```

## C-216 ANVNA\_DeleteLimitSegmentAt

```
ViStatus ANVNA_DeleteLimitSegmentAt (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViUInt32 limitSegmentNumber );
```

Description: Deletes limit segment at index specified by limitSegmentNumber, for a trace.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
limitSegmentNumber	ViUInt32	Limit index number.

### C++ Example:

```
status = ANVNA_DeleteLimitSegmentAt ( sessionId, "CH1:TR1", 1 );
```

### C# Example:

```
ANVNA.DeleteLimitSegmentAt(sessionId, "CH1:TR1", 1);
```

### Python Example:

```
status = ANVNA_DeleteLimitSegmentAt(sessionId, 'CH1:TR1', 1)
```

### MATLAB Example:

```
status = anvna.DeleteLimitSegmentAt('CH1:Trace1', 1);
```

## C-217 ANVNA\_IsLimitTestPass

```
ViStatus ANVNA_IsLimitTestPass (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViPBoolean passNoPass );
```

Description: Checks if the limit test is failing or not for a channel trace.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. (For example "CH1:TR1".)
passNoPass	ViPBoolean	Limit testing result.

### C++ Example:

```
ViBoolean limitTestingResultStatus = VI_FALSE;
status = ANVNA_IsLimitTestPass ( sessionId, "CH1:TR1", &limitTestingResultStatus );
```

### C# Example:

```
ushort outLimitTestPass;
ANVNA.IsLimitTestPass(sessionId, "CH1:TR1", out outLimitTestPass);
```

### Python Example:

```
status, isLimitTestPass = ANVNA_IsLimitTestPass(sessionId, 'CH1:TR1')
```

### MATLAB Example:

```
[status, limitPass] = anvna.IsLimitTestPass('CH1:Trace1');
```

## C-218 ANVNA\_GetLowerLimitBuffer

```
ViStatus ANVNA_GetLowerLimitBuffer (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViInt32 dataIndexXSize,
    ViPInt32 dataIndexX,
    ViPInt32 dataIndexXActualSize,
    ViInt32 dataValueYSize,
    ViInt32 dataValueY,
    ViPInt32 dataValueYActualSize );
```

Description: Returns frequency index values and y values for lower limit. If multiple lower limits are defined they are mixed together in order to obtain only one lower limit.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1".
dataIndexXSize	ViInt32	Number of elements in dataIndexX.
dataIndexX	ViInt32	Output buffer containing the frequency index values.
dataIndexXActualSize	ViPInt32	Actual number of elements in dataIndexX.
dataValueYSize	ViInt32	Number of elements in dataValueY.
dataValueY	ViInt32	Output buffer containing the lower limit y values.
dataValueYActualSize	ViPInt32	Actual number of elements in dataValueY.

### C++ Example:

```
ViInt32 noOfPts = 10;
ViInt32 outXActualSize;
ViInt32 outValueYActualSize;
ViInt32 *dataIndexX = new ViInt32 [10];
ViReal32 *dataValueY = new ViReal32 [10];
status = ANVNA_GetLowerLimitBuffer ( sessionId, "CH1:TR1", noOfPts, dataIndexX,
&outXActualSize, noOfPts, dataValueY, &outValueYActualSize );
delete [] dataIndexX;
delete [] dataValueY;
```

**C# Example:**

```
int noPoints = 10;  
int[] indexX = new int[noPoints];  
float[] valueY = new float[noPoints];  
int indexXactualSize, valueYactualSize;  
  
ANVNA.GetLowerLimitBuffer(sessionId, "CH1:TR1", (int)noPoints, indexX, out  
indexXactualSize, (int)noPoints, valueY, out valueYactualSize);
```

**Python Example:**

```
status, dataIndexX, dataIndexXactualSize, dataValueY, dataValueYactualSize =  
ANVNA_GetLowerLimitBuffer(sessionId, 'CH1:TR1', 3, 3)
```

**MATLAB Example:**

```
[status, dataIndexX, dataIndexXActualSize, dataValueY, dataValueYActualSize] =  
anvna.GetLowerLimitBuffer('CH1:Trace1', noPoints, noPoints);
```

## C-219 ANVNA\_GetUpperLimitBuffer

```
ViStatus ANVNA_GetUpperLimitBuffer (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViInt32 dataIndexXSize,
    ViPInt32 dataIndexX,
    ViPInt32 dataIndexXActualSize,
    ViInt32 dataValueYSize,
    ViPReal32 dataValueY,
    ViPInt32 dataValueYActualSize );
```

Description: Returns frequency index values and y values for upper limit. If multiple upper limits are defined they are mixed together in order to obtain only one upper limit.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1".
dataIndexXSize	ViInt32	Number of elements in dataIndexX.
dataIndexX	ViPInt32	Output buffer containing the frequency index values.
dataIndexXActualSize	ViPInt32	Actual number of elements in dataIndexX.
dataValueYSize	ViInt32	Number of elements in dataValueY.
dataValueY	ViPReal32	Output buffer containing the upper limit y values.
dataValueYActualSize	ViPInt32	Actual number of elements in dataValueY.

### C++ Example:

```
ViInt32 noOfPts = 10;
ViInt32 outXActualSize;
ViInt32 outValueYActualSize;
ViInt32 *dataIndexX = new ViInt32 [10];
ViReal32 *dataValueY = new ViReal32 [10];
status = ANVNA_GetUpperLimitBuffer ( sessionId, "CH1:TR1", noOfPts, dataIndexX,
&outXActualSize, noOfPts, dataValueY, &outValueYActualSize );
delete [] dataIndexX;
delete [] dataValueY;
```

**C# Example:**

```
noPoints = 10;  
  
int[] indexX = new int[noPoints];  
float[] valueY = new float[noPoints];  
int indexXactualSize, valueYactualSize;  
  
ANVNA.GetUpperLimitBuffer(sessionId, "CH1:TR1", (int)noPoints, indexX, out  
indexXactualSize, (int)noPoints, valueY, out valueYactualSize);
```

**Python Example:**

```
status, dataIndexX, dataIndexXactualSize, dataValueY, dataValueYactualSize = ANVNA_  
GetUpperLimitBuffer (sessionId, 'CH1:TR1', 3, 3)
```

**MATLAB Example:**

```
[status, dataIndexX, dataIndexXActualSize, dataValueY, dataValueYActualSize] =  
anvna.GetUpperLimitBuffer('CH1:Trace1', noPoints, noPoints);
```

## C-220 ANVNA\_GetLowerLimitFailPointsBuffer

```
ViStatus ANVNA_GetLowerLimitFailPointsBuffer (
    ViUInt32 vi,
    ViConstString repCapIdentifier,
    ViInt32 dataValueXSize,
    ViPReal64 dataValueX,
    ViPInt32 dataValueXActualSize,
)
```

Description: Returns frequency values, x values, x failed values for lower limit.

Parameter List:

Name	Variable Type	Description
vi	ViUInt32	The ViUInt32 handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1".
dataValueXSize	ViInt32	Number of elements in dataValueX.
dataValueX	ViPReal64[]	Output buffer containing the frequency values.
dataValueXActualSize	ViPInt32	Actual number of elements in dataValueX.

### C++ Example:

```
ViInt32 outXActualSize;
ViReal64 *dataValueX = new ViReal64[10];

status = ANVNA_GetLowerLimitFailPointsBuffer(sessionId, "CH1:TR1", dataValueX,
&outXActualSize);

delete [] dataValueX;
```

### C# Example:

```
int noPts =10;
double [] valueX = new double[noPts];
int valueXActualSize;

ANVNA.GetLowerLimitFailPointsBuffer(sessionId, "CH1:TR1", valueX, out
valueXActualSize);
```

### Python Example:

```
status, dataValueX, dataValueXActualSize =
ANVNA_GetLowerLimitFailPointsBuffer(sessionId, 'CH1:TR1', 4)
```

**MATLAB Example:**

```
[status, dataValueX, dataValueXActualSize] = anvna.GetLowerLimitFailPointsBuffer(  
    'CH1:Trace1', 4);
```

## C-221 ANVNA\_GetUpperLimitFailPointsBuffer

```
ViStatus ANVNA_GetUpperLimitFailPointsBuffer (
    ViSession vi,
    ViConstString repCapIdentifier,
    ViInt32 dataValueXSize,
    ViPReal64 dataValueX,
    ViPInt32 dataValueXActualSize );
```

Description: Returns frequency values, x values, x failed values for upper limit.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1".
dataValueXSize	ViInt32	Number of elements in dataValueX.
dataValueX	ViPReal64[]	Output buffer containing the frequency values.
dataValueXActualSize	ViPInt32	Actual number of elements in dataValueX.

### C++ Example:

```
ViInt32 outXActualSize;
ViReal64 *dataValueX = new ViReal64[10];

status = ANVNA_GetUpperLimitFailPointsBuffer(sessionId, "CH1:TR1", dataValueX,
&outXActualSize);

delete [] dataValueX;
```

### C# Example:

```
int noPts =10;
double [] valueX = new double[noPts];
int valueXActualSize;

ANVNA.GetUpperLimitFailPointsBuffer(sessionId, "CH1:TR1", valueX, out
valueXActualSize);
```

### Python Example:

```
status, dataValueX, dataValueXActualSize =
ANVNA_GetUpperLimitFailPointsBuffer(sessionId, 'CH1:TR1', 4)
```

**MATLAB Example:**

```
[status, dataValueX, dataValueXActualSize] = anvna.GetUpperLimitFailPointsBuffer(  
    'CH1:Trace1', 4);
```

## C-222 ANVNA\_GetLowerTraceLowerLimitBuffer

```
ViStatus ANVNA_GetLowerTraceLowerLimitBuffer (
    ViUInt32 Vi,
    ViConstString RepCapIdentifier,
    ViInt32 dataIndexXSize,
    ViPInt32 dataIndexX,
    ViPInt32 dataIndexXActualSize,
    ViInt32 dataValueYSize,
    ViPReal32 dataValueY,
    ViPInt32 dataValueYActualSize );
```

Description: Returns lower limit buffer for lower trace.

### Parameter List

Name	Variable Type	Description
vi	ViUInt32	The ViUInt32 handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	If the attribute applies to a repeated capability, the user passes a physical or virtual repeated capability
dataIndexXSize	ViInt32	Number of elements in indexX
dataIndexX	ViPInt32	Index X values
dataIndexXActualSize	ViPInt32	Actual number of elements in IndexX
dataValueYSize	ViInt32	Number of elements in dataValueY.
dataValueY	ViPReal64[]	Output buffer containing values Y.
dataValueYActualSize	ViPInt32	Actual number of elements in dataValueY.

### C++ Example:

```
ViInt32 noOfIndexX = 10;
ViInt32 noOfValueY = 10;
ViInt32 outXActualSize;
ViInt32 *dataIndexX = new ViInt32 [10];
ViInt32 outYActualSize;
ViReal64 *dataValueY = new ViReal64 [10];

status = ANVNA_GetLowerTraceLowerLimitBuffer ( sessionId, "CH1:TR1", noOfIndexX,
dataIndexX, &outXActualSize, noOfValueY, dataValueY, &outYActualSize);
```

**C# Example:**

```
int noPts = 10;  
int[] indexX = new int[noPts];  
int indexXactualSize;  
double[] valueY = new double[noPts];  
int valueYactualSize;  
  
ANVNA.GetLowerTraceLowerLimitBuffer (sessionId, "CH1:TR1", noPts, indexX, out  
indexXactualSize, noPts, valueY, out valueYactualSize);
```

**Python Example:**

```
status, dataIndexX, dataIndexXactualSize, dataValueY, dataValueYActualSize =  
ANVNA_GetLowerTraceLowerLimitBuffer (sessionId, 'CH1:TR1', noPts, noPts)
```

**MATLAB Example:**

```
[status, dataIndexX, dataIndexXActualSize, dataValueY, dataValueYActualSize] =  
anvna.GetLowerTraceLowerLimitBuffer ('CH1:Trace1', noPoints, noPoints);
```

## C-223 ANVNA\_GetLowerTraceUpperLimitBuffer

```
ViStatus ANVNA_GetLowerTraceUpperLimitBuffer (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViInt32 dataIndexXSize,
    ViPInt32 dataIndexX,
    ViPInt32 dataIndexXActualSize,
    ViInt32 dataIndexYSize,
    ViPReal32 minValueY,
    ViPInt32 minValueYActualSize );
```

Description: Returns upper limit buffer for lower trace.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1".
dataIndexXSize	ViInt32	Number of elements in indexX
dataIndexX	ViPInt32	Index X values
dataIndexXActualSize	ViPInt32	Actual number of elements in IndexX
dataValueYSize	ViInt32	Number of elements in dataValueY.
dataValueY	ViPReal64[]	Output buffer containing values Y.
dataValueYActualSize	ViPInt32	Actual number of elements in dataValueY

### C++ Example:

```
ViInt32 noOfPts = 10;
ViInt32 outXActualSize;
ViInt32 *dataIndexX = new ViInt32 [10];
ViInt32 outYActualSize;
ViReal64 *dataValueY = new ViReal64 [10];

status = ANVNA_GetLowerTraceUpperLimitBuffer ( sessionId, "CH1:TR1", noOfPts,
dataIndexX, &outXActualSize, noOfPts, dataValueY, &outYActualSize);
```

**C# Example:**

```
int noPts = 10;  
int[] indexX = new int[noPts];  
int indexXactualSize;  
double[] valueY = new double[noPts];  
int valueYactualSize;  
  
ANVNA.GetLowerTraceUpperLimitBuffer (sessionId, "CH1:TR1", noPts, indexX, out  
indexXactualSize, noPts, valueY, out valueYactualSize);
```

**Python Example:**

```
status, dataIndexX, dataIndexXactualSize, dataValueY, dataValueYActualSize =  
ANVNA_GetLowerTraceUpperLimitBuffer (sessionId, 'CH1:TR1', 10, 10)
```

**MATLAB Example:**

```
[status, dataIndexX, dataIndexXActualSize, dataValueY, dataValueYActualSize] =  
anvna.GetLowerTraceUpperLimitBuffer ('CH1:Trace1', noPoints, noPoints);
```

## C-224 ANVNA\_GetLowerTraceLowerLimitFailPointsBuffer

```
ViStatus ANVNA_GetLowerTraceLowerLimitFailPointsBuffer (
    ViUInt32 Vi,
    ViConstString RepCapIdentifier,
    ViInt32 dataValueXSize,
    ViPReal64 dataValueX,
    ViPInt32 dataValueXActualSize );
```

Description: Returns lower limit fail points buffer for lower trace.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1".
dataValueXSize	ViInt32	Number of values X
dataValuesX	ViPReal64	X values
dataValuesXActualSize	ViPInt32	Actual number of X values

### C++ Example:

```
ViInt32 noOfPts = 10;
ViInt32 outXActualSize;
ViReal64 *dataValueX = new ViReal64 [10];

status = ANVNA_GetLowerTraceLowerLimitFailPointersBuffer ( sessionId, "CH1:TR1",
noOfPts, dataValueX, &outXActualSize);
```

### C# Example:

```
int noPts = 10;
double[] valueX = new double[noPts];
int valueXactualSize;

ANVNA.GetLowerTraceLowerLimitFailPointersBuffer (sessionId, "CH1:TR1", noPts,
valueX, out valueXactualSize);
```

### Python Example:

```
status, dataValueX, dataValueXActualSize =
ANVNA_GetLowerTraceLowerLimitFailPointersBuffer (sessionId, 'CH1:TR1', 10)
```

### MATLAB Example:

```
[status, dataValueX, dataValueXActualSize] =
anvna.GetLowerTraceLowerLimitFailPointersBuffer ('CH1:Trace1', noPoints);
```

## C-225 ANVNA\_GetLowerTraceUpperLimitFailPointsBuffer

```
ViStatus ANVNA_GetLowerTraceUpperLimitFailPointsBuffer (
    ViUInt32 Vi,
    ViConstString RepCapIdentifier,
    ViInt32 dataValueXSize,
    ViPReal64 dataValueX,
    ViPInt32 dataValueXActualSize );
```

Description: Returns upper limit fail points buffer for lower trace.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1".
dataValueXSize	ViInt32	Number of values X.
dataValuesX	ViPReal64	X values.
dataValuesXActualSize	ViPInt32	Actual number of X values.

### C++ Example:

```
ViInt32 noOfPts = 10;
ViInt32 outXActualSize;
ViReal64 *dataValueX = new ViReal64 [10];

status = ANVNA_GetLowerTraceUpperLimitFailPointsBuffer ( sessionId, "CH1:TR1",
noOfPts, dataValueX, &outXActualSize);
```

### C# Example:

```
int noPts = 10;
double[] valueX = new double[noPts];
int valueXactualSize;

ANVNA.GetLowerTraceUpperLimitFailPointsBuffer (sessionId, "CH1:TR1", noPts,
valueX, out valueXactualSize);
```

### Python Example:

```
status, dataValueX, dataValueXActualSize =
ANVNA_GetLowerTraceUpperLimitFailPointsBuffer (sessionId, 'CH1:TR1', 10)
```

### MATLAB Example:

```
[status, dataValueX, dataValueXActualSize] =
anvna.GetLowerTraceUpperLimitFailPointsBuffer ('CH1:Tracel', noPoints);
```

## C-226 ANVNA\_SetImpedanceTransformationEnabled

```
ViStatus ANVNA_SetImpedanceTransformationEnabled (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViBoolean enable );
```

Description: Returns upper limit fail points buffer for lower trace.

Parameter List:

Name	Variable Type	Description
vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
repCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1". (Only channel is required for this command.)
enable	ViBoolean	If true, Impedance Transformation will be enabled. If false, Impedance Transformation will be disabled.

### C++ Example:

```
ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
if((status = ANVNA_SetImpedanceTransformationEnabled(sessionId, "CH1:", true))
!=VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d encountered while running this command: %s\n", status,
ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
```

**C# Example:**

```
int status = 0;  
if ((status = ANVNA.SetImpedanceTransformationEnabled(sessionId, "CH1:",  
(ushort)true)) != 0)  
{  
    string ErrorMessage = "";  
    ANVNA.error_message(sessionId, status, out ErrorMessage,  
    ANVNA.MAX_STRING_LENGTH);  
    System.Console.WriteLine("Error " + status + " encountered while running this  
    command: " + ErrorMessage);  
    ANVNA.close(sessionId);  
    System.Environment.Exit(1);  
}
```

**Python Example:**

```
status = ANVNA_SetImpedanceTransformationEnabled(sessionId, "CH1: ", true)  
if status != 0:  
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH);  
    print('Error {0} encountered while running this command: {1}\n'.format(status,  
    ErrorMessage))  
    ANVNA_close(sessionId)  
    exit(1)
```

**MATLAB Example:**

```
status = anvna. SetImpedanceTransformationEnabled('CH1: ', true);  
if( status ~= 0)  
    [ stat, ErrorMessage ] = anvna.error_message(status);  
    fprintf('Error %d encountered while running this command:%s\n', stat,  
    ErrorMessage);  
    status = anvna.close();  
    return;  
end
```

## C-227 ANVNA\_GetImpedanceTransformationEnabled

```
ViStatus ANVNA_GetImpedanceTransformationEnabled (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViPBoolean enable );
```

Description: Gets Enabled/Disabled status of Impedance Transformation on the given channel.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
RepCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1". (Only channel is required for this command)
enable	ViPBoolean	If true, Impedance Transformation is currently enabled. If false, Impedance Transformation is currently disabled.

### C++ Example:

```
ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
unsigned short enabled = false;
if((status = ANVNA_GetImpedanceTransformationEnabled(sessionId, "CH1:", &enabled)) !=VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d encountered while running this command: %s\n", status, ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
```

**C# Example:**

```
int status = 0;
ushort enabled = 0;
if ((status = ANVNA.GetImpedanceTransformationEnabled(sessionId, "CH1:", out
enabled)) != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
    ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " encountered while running this
command: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}
```

**Python Example:**

```
status, enabled = ANVNA_GetImpedanceTransformationEnabled(sessionId, "CH1: ")
if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH);
    print('Error {0} encountered while running this command: {1}\n'.format(status,
ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)
```

**MATLAB Example:**

```
Status, enabled = anvna.GetImpedanceTransformationEnabled('CH1: ');
if( status ~= 0)
    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d encountered while running this command:%s\n', stat,
ErrorMessage);
    status = anvna.close();
    return;
end
```

## C-228 ANVNA\_SetImpedanceTransformationType

```
ViStatus ANVNA_SetImpedanceTransformationEnabled (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViInt16 type );
```

Description: Sets Impedance Transformation Type (Port or PortPair) on the given channel.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
RepCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1". (Only channel is required for this command.)
type	ViUInt16	The Impedance Transformation Type to set.

type	Values
ANVNA_VAL_ANRITSU_VNA_IMPEDANCE_PORT	0
ANVNA_VAL_ANRITSU_VNA_IMPEDANCE_PORTPAIR	1

### C++ Example:

```
ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
if((status = ANVNA_SetImpedanceTransformationType(sessionId, "CH1:",
ANVNA_VAL_ANRITSU_VNA_IMPEDANCE_PORT)) !=VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d encountered while running this command: %s\n", status,
ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
```

**C# Example:**

```

int status = 0;

if ((status = ANVNA.SetImpedanceTransformationType(sessionId, "CH1:",
(ushort)ANVNA.VAL_ANRITSU_VNA_IMPEDANCE_PORT)) != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
    ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " encountered while running this
command: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}

```

**Python Example:**

```

status = ANVNA_SetImpedanceTransformationType(sessionId, "CH1: ",
ANVNA_VAL_ANRITSU_VNA_IMPEDANCE_PORT)

if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print('Error {0} encountered while running this command: {1}\n'.format(status,
ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)

```

**MATLAB Example:**

```

status = anvna.SetImpedanceTransformationType('CH1: ',
anvna.ANVNA_VAL_ANRITSU_VNA_IMPEDANCE_PORT);

if( status ~= 0)
    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d encountered while running this command:%s\n', stat,
ErrorMessage);
    status = anvna.close();
    return;
end

```

## C-229 ANVNA\_GetImpedanceTransformationType

```
ViStatus ANVNA_GetImpedanceTransformationEnabled (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViPUInt16 type );
```

Description: Gets Impedance Transformation Type (Port or PortPair) on the given channel.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
RepCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1". (Only channel is required for this command.)
type	ViPUInt16	The currently active Impedance Transformation Type.

type	Values
ANVNA_VAL_ANRITSU_VNA_IMPEDANCE_PORT	0
ANVNA_VAL_ANRITSU_VNA_IMPEDANCE_PORTPAIR	1

### C++ Example:

```
ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
unsigned short active = 0;
if((status = ANVNA_GetImpedanceTransformationType(sessionId, "CH1:", &active))
!=VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d encountered while running this command: %s\n", status,
    ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
```

**C# Example:**

```
int status = 0;
ushort active = 0;
if ((status = ANVNA.GetImpedanceTransformationType(sessionId, "CH1:", out active)) != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
    ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " encountered while running this
command: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}
```

**Python Example:**

```
Status, active = ANVNA_GetImpedanceTransformationType(sessionId, "CH1: ")
if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH);
    print('Error {0} encountered while running this command: {1}\n'.format(status,
ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)
```

**MATLAB Example:**

```
active = 0
Status, active = anvna.SetImpedanceTransformationType('CH1: ');
if( status ~= 0)
    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d encountered while running this command:%s\n', stat,
ErrorMessage);
    status = anvna.close();
    return;
end
```

## C-230 ANVNA\_SetImpedanceTransformationResistiveTerm

```
ViStatus ANVNA_SetImpedanceTransformationResistiveTerm (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViInt16 portNumber,
    ViReal64 resistance );
```

Description: Sets Resistive term for single-ended Impedance Transformation on a given Port and Channel.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
RepCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1". (Only channel is required for this command.)
portNumber	ViInt16	The port number to apply Impedance Transformation on (1-4).
resistance	ViReal64	Resistive term value to set (must be greater than 0).

### C++ Example:

```
ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
if((status = ANVNA_SetImpedanceTransformationResistiveTerm(sessionId, "CH1:", 1, 20)) !=VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d encountered while running this command: %s\n", status, ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
```

**C# Example:**

```
int status = 0;  
if ((status = ANVNA.SetImpedanceTransformationResistiveTerm(sessionId, "CH1:", 1,  
20)) != 0)  
{  
    string ErrorMessage = "";  
    ANVNA.error_message(sessionId, status, out ErrorMessage,  
    ANVNA.MAX_STRING_LENGTH);  
    System.Console.WriteLine("Error " + status + " encountered while running this  
    command: " + ErrorMessage);  
    ANVNA.close(sessionId);  
    System.Environment.Exit(1);  
}
```

**Python Example:**

```
status = ANVNA_SetImpedanceTransformationResistiveTerm(sessionId, "CH1: ", 1, 20)  
if status != 0:  
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)  
    print('Error {0} encountered while running this command: {1}\n'.format(status,  
    ErrorMessage))  
    ANVNA_close(sessionId)  
    exit(1)
```

**MATLAB Example:**

```
status = anvna.SetImpedanceTransformationResistiveTerm('CH1: ', 1, 20);  
if( status ~= 0)  
    [ stat, ErrorMessage ] = anvna.error_message(status);  
    fprintf('Error %d encountered while running this command:%s\n', stat,  
    ErrorMessage);  
    status = anvna.close();  
    return;  
end
```

## C-231 ANVNA\_GetImpedanceTransformationResistiveTerm

```
ViStatus ANVNA_GetImpedanceTransformationResistiveTerm (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViInt16 portNumber,
    ViPReal64 resistance );
```

Description: Sets Resistive term for single-ended Impedance Transformation on a given Port and Channel.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
RepCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1". (Only channel is required for this command.)
portNumber	ViInt16	The port number to apply Impedance Transformation on (1-4).
resistance	ViPReal64	Current Resistive term value for specified Port and Channel.

### C++ Example:

```
ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
double resistive = 0;

if((status = ANVNA_GetImpedanceTransformationResistiveTerm(sessionId, "CH1:", 1,
&resistive)) !=VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d encountered while running this command: %s\n", status,
ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
```

**C# Example:**

```
int status = 0;
double resistive;
if ((status = ANVNA.SetImpedanceTransformationResistiveTerm(sessionId, "CH1:", 1, out
resistive)) != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " encountered while running this
command: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}
```

**Python Example:**

```
Status, resistive = ANVNA_SetImpedanceTransformationResistiveTerm(sessionId, "CH1: ",
1)
if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print('Error {0} encountered while running this command: {1}\n'.format(status,
ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)
```

**MATLAB Example:**

```
resistive = 0
status, resistive = anvna.SetImpedanceTransformationResistiveTerm('CH1: ', 1);
if( status ~= 0)
    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d encountered while running this command:%s\n', stat,
ErrorMessage);
    status = anvna.close();
    return;
end
```

## C-232 ANVNA\_SetImpedanceTransformationReactiveTerm

```
ViStatus ANVNA_SetImpedanceTransformationReactiveTerm (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViInt16 portNumber,
    ViReal64 resistance );
```

Description: Sets Reactive term for single-ended Impedance Transformation on a given Port and Channel.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
RepCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1". (Only channel is required for this command.)
portNumber	ViInt16	The port number to apply Impedance Transformation on (1-4).
resistance	ViReal64	Reactive term value to set.

### C++ Example:

```
ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
if((status = ANVNA_SetImpedanceTransformationReactiveTerm(sessionId, "CH1:", 1, 20)) !=VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d encountered while running this command: %s\n", status, ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
```

**C# Example:**

```
int status = 0;  
if ((status = ANVNA.SetImpedanceTransformationReactiveTerm(sessionId, "CH1:", 1, 20))  
!= 0)  
{  
    string ErrorMessage = "";  
    ANVNA.error_message(sessionId, status, out ErrorMessage,  
    ANVNA.MAX_STRING_LENGTH);  
    System.Console.WriteLine("Error " + status + " encountered while running this  
command: " + ErrorMessage);  
    ANVNA.close(sessionId);  
    System.Environment.Exit(1);  
}
```

**Python Example:**

```
status = ANVNA_SetImpedanceTransformationReactiveTerm(sessionId, "CH1: ", 1, 20)  
if status != 0:  
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH);  
    print('Error {0} encountered while running this command: {1}\n'.format(status,  
    ErrorMessage))  
    ANVNA_close(sessionId)  
    exit(1)
```

**MATLAB Example:**

```
status = anvna.SetImpedanceTransformationReactiveTerm('CH1: ', 1, 20);  
if( status ~= 0)  
    [ stat, ErrorMessage ] = anvna.error_message(status);  
    fprintf('Error %d encountered while running this command:%s\n', stat,  
    ErrorMessage);  
    status = anvna.close();  
    return;  
end
```

## C-233 ANVNA\_GetImpedanceTransformationReactiveTerm

```
ViStatus ANVNA_GetImpedanceTransformationReactiveTerm (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViInt16 portNumber,
    ViPReal64 resistance );
```

Description: Sets Reactive term for single-ended Impedance Transformation on a given Port and Channel.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
RepCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1". (Only channel is required for this command.)
portNumber	ViInt16	The port number to apply Impedance Transformation on (1-4).
resistance	ViPReal64	Current Reactive term value for specified Port and Channel.

### C++ Example:

```
ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
double reactive = 0;

if((status = ANVNA_GetImpedanceTransformationReactiveTerm(sessionId, "CH1:", 1,
&resistive)) !=VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d encountered while running this command: %s\n", status,
ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
```

**C# Example:**

```
int status = 0;
double reactive;
if ((status = ANVNA.SetImpedanceTransformationReactiveTerm(sessionId, "CH1:", 1, out
resistive)) != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
    ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " encountered while running this
command: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}
```

**Python Example:**

```
Status, reactive = ANVNA_SetImpedanceTransformationReactiveTerm(sessionId, "CH1: ",
1)
if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print('Error {0} encountered while running this command: {1}\n'.format(status,
ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)
```

**MATLAB Example:**

```
resistive = 0
status, reactive = anvna.SetImpedanceTransformationReactiveTerm('CH1: ', 1);
if( status ~= 0)
    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d encountered while running this command:%s\n', stat,
ErrorMessage);
    status = anvna.close();
    return;
end
```

## C-234 ANVNA\_SetImpedanceTransformationPortPairDifferentialModeResistiveTerm

```

ViStatus
ANVNA_SetImpedanceTransformationPortPairDifferentialModeResistiveTerm (

    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViInt16 portNumber,
    ViReal64 resistance );

```

Description: Sets Resistive term in Differential Mode for Impedance Transformation on a given PortPair and Channel. Valid Port Pairs include 12, 13, 14, 23, 24, 34. On two port instruments, only Port pair allowed is 12.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
RepCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1". (Only channel is required for this command)
portA	ViInt16	The port number of the first port to apply Impedance Transformation on (1-4).
portB	ViInt16	The port number of the second port to apply Impedance Transformation on (1-4).
resistance	ViReal64	Resistive term value to set (must be greater than 0).

### C++ Example:

```

ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
if((status =
ANVNA_SetImpedanceTransformationPortPairDifferentialModeResistiveTerm(sessionId,
"CH1:", 1, 2, 20)) !=VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d encountered while running this command: %s\n", status,
ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}

```

**C# Example:**

```

int status = 0;
if ((status =
ANVNA.SetImpedanceTransformationPortPairDifferentialModeResistiveTerm(sessionId,
"CH1:", 1, 2, 20)) != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
    ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " encountered while running this
command: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}

```

**Python Example:**

```

status =
ANVNA_SetImpedanceTransformationPortPairDifferentialModeResistiveTerm(sessionId,
"CH1:", 1, 2, 20)
if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print('Error {} encountered while running this command: {}'.format(status,
ErrorMessage))
    ANVNA_close(sessionId)
exit(1)

```

**MATLAB Example:**

```

status = anvna.SetImpedanceTransformationPortPairDifferentialModeResistiveTerm('CH1:
', 1, 2, 20);
if( status ~= 0)
    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d encountered while running this command:%s\n', stat,
ErrorMessage);
    status = anvna.close();
    return;
end

```

## C-235 ANVNA\_GetImpedanceTransformationPortPairDifferentialModeResistiveTerm

```

ViStatus
ANVNA_GetImpedanceTransformationPortPairDifferentialModeResistiveTerm (

    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViInt16 portNumber,
    ViPReal64 resistance );

```

Description: Gets Resistive term in Differential Mode for Impedance Transformation on a given PortPair and Channel. Valid Port Pairs include 12, 13, 14, 23, 24, 34. On two port instruments, only Port pair allowed is 12.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
RepCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1". (Only channel is required for this command.)
portA	ViInt16	The port number of the first port to apply Impedance Transformation on (1-4).
portB	ViInt16	The port number of the second port to apply Impedance Transformation on (1-4).
resistance	ViPReal64	Current Resistive term value for selected configuration.

### C++ Example:

```

ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
double resistance = 0;

if((status =
ANVNA_GetImpedanceTransformationPortPairDifferentialModeResistiveTerm(sessionId,
"CH1:", 1, 2, &resistance)) !=VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d encountered while running this command: %s\n", status,
ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}

```

**C# Example:**

```

int status = 0;
double resistance = 0;

if ((status =
ANVNA.GetImpedanceTransformationPortPairDifferentialModeResistiveTerm(sessionId,
"CH1:", 1, 2, out resistance)) != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
    ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " encountered while running this
command: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}

```

**Python Example:**

```

Status, resistance =
ANVNA_GetImpedanceTransformationPortPairDifferentialModeResistiveTerm(sessionId,
"CH1: ", 1, 2)
if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print('Error {0} encountered while running this command: {1}\n'.format(status,
ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)

```

**MATLAB Example:**

```

resistance = 0
status, resistance =
anvna.GetImpedanceTransformationPortPairDifferentialModeResistiveTerm('CH1: ', 1, 2);
if( status ~= 0)
    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d encountered while running this command:%s\n', stat,
ErrorMessage);
    status = anvna.close();
    return;
end

```

## C-236 ANVNA\_SetImpedanceTransformationPortPairCommonModeResistiveTerm

```
ViStatus ANVNA_SetImpedanceTransformationPortPairCommonModeResistiveTerm (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViInt16 portNumber,
    ViReal64 resistance );
```

Description: Sets Resistive term in Common Mode for Impedance Transformation on a given PortPair and Channel. Valid Port Pairs include 12, 13, 14, 23, 24, 34. On two port instruments, only Port pair allowed is 12.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
RepCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1". (Only channel is required for this command.)
portA	ViInt16	The port number of the first port to apply Impedance Transformation on (1-4).
portB	ViInt16	The port number of the second port to apply Impedance Transformation on (1-4).
resistance	ViReal64	Resistive term value to set (must be greater than 0).

### C++ Example:

```
ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
if((status =
ANVNA_SetImpedanceTransformationPortPairCommonModeResistiveTerm(sessionId, "CH1:", 1,
2, 20)) !=VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d encountered while running this command: %s\n", status,
ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
```

**C# Example:**

```
int status = 0;  
if ((status =  
ANVNA.SetImpedanceTransformationPortPairCommonModeResistiveTerm(sessionId, "CH1:", 1,  
2, 20)) != 0)  
{  
    string ErrorMessage = "";  
    ANVNA.error_message(sessionId, status, out ErrorMessage,  
    ANVNA.MAX_STRING_LENGTH);  
    System.Console.WriteLine("Error " + status + " encountered while running this  
    command: " + ErrorMessage);  
    ANVNA.close(sessionId);  
    System.Environment.Exit(1);  
}
```

**Python Example:**

```
status = ANVNA_SetImpedanceTransformationPortPairCommonModeResistiveTerm(sessionId,  
"CH1: ", 1, 2, 20)  
if status != 0:  
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)  
    print('Error {} encountered while running this command: {}'.format(status,  
    ErrorMessage))  
    ANVNA_close(sessionId)  
    exit(1)
```

**MATLAB Example:**

```
status = anvna.SetImpedanceTransformationPortPairCommonModeResistiveTerm('CH1: ', 1,  
2, 20);  
if( status ~= 0)  
    [ stat, ErrorMessage ] = anvna.error_message(status);  
    fprintf('Error %d encountered while running this command:%s\n', stat,  
    ErrorMessage);  
    status = anvna.close();  
    return;  
end
```

## C-237 ANVNA\_GetImpedanceTransformationPortPairCommonModeResistiveTerm

```
ViStatus ANVNA_GetImpedanceTransformationPortPairCommonModeResistiveTerm (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViInt16 portNumber,
    ViPReal64 resistance );
```

**Description:** Gets Resistive term in Common Mode for Impedance Transformation on a given PortPair and Channel. Valid Port Pairs include 12, 13, 14, 23, 24, 34. On two port instruments, only Port pair allowed is 12.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
RepCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1". (Only channel is required for this command.)
portA	ViInt16	The port number of the first port to apply Impedance Transformation on (1-4).
portB	ViInt16	The port number of the second port to apply Impedance Transformation on (1-4).
resistance	ViPReal64	Current Resistive term value for selected configuration.

### C++ Example:

```
ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
double resistance = 0;

if((status =
ANVNA_GetImpedanceTransformationPortPairCommonModeResistiveTerm(sessionId, "CH1:", 1,
2, &resistance)) !=VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d encountered while running this command: %s\n", status,
ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
```

**C# Example:**

```

int status = 0;
double resistance = 0;

if ((status =
ANVNA.GetImpedanceTransformationPortPairCommonModeResistiveTerm(sessionId, "CH1:", 1,
2, out resistance)) != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
    ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " encountered while running this
command: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}

```

**Python Example:**

```

Status, resistance =
ANVNA_GetImpedanceTransformationPortPairCommonModeResistiveTerm(sessionId, "CH1: ",
1, 2)
if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH);
    print('Error {0} encountered while running this command: {1}\n'.format(status,
ErrorMessage))
    ANVNA_close(sessionId)
    exit(1);

```

**MATLAB Example:**

```

resistance = 0
status, resistance =
anvna.GetImpedanceTransformationPortPairCommonModeResistiveTerm('CH1: ', 1, 2);
if( status ~= 0)
    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d encountered while running this command:%s\n', stat,
ErrorMessage);
    status = anvna.close();
    return;
end

```

## C-238 ANVNA\_SetImpedanceTransformationPortPairDifferentialModeReactiveTerm

```
ViStatus
ANVNA_SetImpedanceTransformationPortPairDifferentialModeReactiveTerm (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViInt16 portNumber,
    ViReal64 reactiveTerm );
```

Description: Sets Reactive term in Differential Mode for Impedance Transformation on a given PortPair and Channel. Valid Port Pairs include 12, 13, 14, 23, 24, 34. On two port instruments, only Port pair allowed is 12.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
RepCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1". (Only channel is required for this command.)
portA	ViInt16	The port number of the first port to apply Impedance Transformation on (1-4).
portB	ViInt16	The port number of the second port to apply Impedance Transformation on (1-4).
reactiveTerm	ViReal64	Reactive term value to set (must be greater than 0).

### C++ Example:

```
ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
if((status =
ANVNA_SetImpedanceTransformationPortPairDifferentialModeReactiveTerm(sessionId,
"CH1:", 1, 2, 20)) !=VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d encountered while running this command: %s\n", status,
ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
```

**C# Example:**

```
int status = 0;  
if ((status =  
ANVNA.SetImpedanceTransformationPortPairDifferentialModeReactiveTerm(sessionId,  
"CH1:", 1, 2, 20)) != 0)  
{  
    string ErrorMessage = "";  
    ANVNA.error_message(sessionId, status, out ErrorMessage,  
    ANVNA.MAX_STRING_LENGTH);  
    System.Console.WriteLine("Error " + status + " encountered while running this  
command: " + ErrorMessage);  
    ANVNA.close(sessionId);  
    System.Environment.Exit(1);  
}
```

**Python Example:**

```
status =  
ANVNA_SetImpedanceTransformationPortPairDifferentialModeReactiveTerm(sessionId, "CH1:  
", 1, 2, 20)  
if status != 0:  
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH);  
    print('Error {} encountered while running this command: {}'.format(status,  
    ErrorMessage))  
    ANVNA_close(sessionId)  
    exit(1)
```

**MATLAB Example:**

```
status = anvna.SetImpedanceTransformationPortPairDifferentialModeReactiveTerm('CH1: ',  
1, 2, 20);  
if( status ~= 0)  
    [ stat, ErrorMessage ] = anvna.error_message(status);  
    fprintf('Error %d encountered while running this command:%s\n', stat,  
    ErrorMessage);  
    status = anvna.close();  
    return;  
end
```

## C-239 ANVNA\_GetImpedanceTransformationPortPairDifferentialModeReactiveTerm

```

ViStatus
ANVNA_GetImpedanceTransformationPortPairDifferentialModeReactiveTerm (

    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViInt16 portNumber,
    ViPReal64 reactiveTerm );

```

Description: Gets Reactive term in Differential Mode for Impedance Transformation on a given PortPair and Channel. Valid Port Pairs include 12, 13, 14, 23, 24, 34. On two port instruments, only Port Pair allowed is 12.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
RepCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1". (Only channel is required for this command.)
portA	ViInt16	The port number of the first port to apply Impedance Transformation on (1-4).
portB	ViInt16	The port number of the second port to apply Impedance Transformation on (1-4).
reactiveTerm	ViPReal64	Current Reactive term value for selected configuration.

### C++ Example:

```

ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
double reactiveTerm = 0;

if((status =
ANVNA_GetImpedanceTransformationPortPairDifferentialModeReactiveTerm(sessionId,
"CH1:", 1, 2, &reactiveTerm)) !=VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d encountered while running this command: %s\n", status,
ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}

```

**C# Example:**

```

int status = 0;
double reactiveTerm = 0;

if ((status =
ANVNA.GetImpedanceTransformationPortPairDifferentialModeReactiveTerm(sessionId,
"CH1:", 1, 2, out reactiveTerm)) != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
    ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " encountered while running this
command: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}

```

**Python Example:**

```

Status, reactiveTerm =
ANVNA_GetImpedanceTransformationPortPairDifferentialModeReactiveTerm(sessionId, "CH1:",
", 1, 2)
if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print('Error {0} encountered while running this command: {1}\n'.format(status,
ErrorMessage))
    ANVNA_close(sessionId)
    exit(1);

```

**MATLAB Example:**

```

reactiveTerm = 0
status, reactiveTerm =
anvna.GetImpedanceTransformationPortPairDifferentialModeReactiveTerm('CH1: ', 1, 2);
if( status ~= 0)
    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d encountered while running this command:%s\n', stat,
ErrorMessage);
    status = anvna.close();
    return;
end

```

## C-240 ANVNA\_SetImpedanceTransformationPortPairCommonModeReactiveTerm

```
ViStatus ANVNA_SetImpedanceTransformationPortPairCommonModeReactiveTerm (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViInt16 portNumber,
    ViReal64 reactiveTerm );
```

Description: Sets Reactive term in Common Mode for Impedance Transformation on a given PortPair and Channel. Valid Port Pairs include 12, 13, 14, 23, 24, 34. On two port instruments, only Port Pair allowed is 12.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
RepCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1". (Only channel is required for this command.)
portA	ViInt16	The port number of the first port to apply Impedance Transformation on (1-4).
portB	ViInt16	The port number of the second port to apply Impedance Transformation on (1-4).
reactiveTerm	ViReal64	Reactive term value to set (must be greater than 0).

### C++ Example:

```
ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
if((status =
ANVNA_SetImpedanceTransformationPortPairCommonModeReactiveTerm(sessionId, "CH1:", 1,
2, 20)) !=VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d encountered while running this command: %s\n", status,
ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
```

**C# Example:**

```

int status = 0;
if ((status =
ANVNA.SetImpedanceTransformationPortPairCommonModeReactiveTerm(sessionId, "CH1:", 1,
2, 20)) != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
    ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " encountered while running this
command: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}

```

**Python Example:**

```

status = ANVNA_SetImpedanceTransformationPortPairCommonModeReactiveTerm(sessionId,
"CH1: ", 1, 2, 20)
if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print('Error {} encountered while running this command: {}'.format(status,
ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)

```

**MATLAB Example:**

```

status = anvna.SetImpedanceTransformationPortPairCommonModeReactiveTerm('CH1: ', 1, 2,
20);
if( status ~= 0)
    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d encountered while running this command:%s\n', stat,
ErrorMessage);
    status = anvna.close();
    return;
end

```

## C-241 ANVNA\_GetImpedanceTransformationPortPairCommonModeReactiveTerm

```
ViStatus ANVNA_GetImpedanceTransformationPortPairCommonModeReactiveTerm (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViInt16 portNumber,
    ViPReal64 reactiveTerm );
```

Description: Gets Reactive term in Common Mode for Impedance Transformation on a given PortPair and Channel. Valid Port Pairs include 12, 13, 14, 23, 24, 34. On two port instruments, only Port pair allowed is 12.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
RepCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1". (Only channel is required for this command.)
portA	ViInt16	The port number of the first port to apply Impedance Transformation on (1-4).
portB	ViInt16	The port number of the second port to apply Impedance Transformation on (1-4).
reactiveTerm	ViPReal64	Current Reactive term value for selected configuration.

### C++ Example:

```
ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
double reactiveTerm = 0;

if((status =
ANVNA_GetImpedanceTransformationPortPairCommonModeReactiveTerm(sessionId, "CH1:", 1,
2, &reactiveTerm) !=VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d encountered while running this command: %s\n", status,
ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
```

**C# Example:**

```

int status = 0;
double reactiveTerm = 0;

if ((status =
ANVNA.GetImpedanceTransformationPortPairCommonModeReactiveTerm(sessionId, "CH1:", 1,
2, out reactiveTerm)) != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
    ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " encountered while running this
command: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}

```

**Python Example:**

```

Status, reactiveTerm =
ANVNA_GetImpedanceTransformationPortPairCommonModeReactiveTerm(sessionId, "CH1: ", 1,
2)
if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print('Error {0} encountered while running this command: {1}\n'.format(status,
ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)

```

**MATLAB Example:**

```

reactiveTerm = 0
status, reactiveTerm =
anvna.GetImpedanceTransformationPortPairCommonModeReactiveTerm('CH1: ', 1, 2);
if( status ~= 0)
    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d encountered while running this command:%s\n', stat,
ErrorMessage);
    status = anvna.close();
    return;
end

```

## C-242 ANVNA\_SetHighFidelity

**Note** This command is only valid for MS465xB VNAs.  
If multiple source is ON, the user can turn on High Fidelity, but it will not have any effect.

```
ViStatus ANVNA_SetHighFidelity (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViBoolean enable);
```

Description: Enables or disables High Fidelity on the given channel.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
RepCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1". (Only channel is required for this command.)
enable	ViBoolean	If true, High Fidelity will be enabled. If false, High Fidelity will be disabled.

### C++ Example:

```
ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
if((status = ANVNA_SetHighFidelity(sessionId, "CH1:", true)) !=VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d encountered while running this command: %s\n", status,
    ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
```

**C# Example:**

```
int status = 0;  
if ((status = ANVNA.SetHighFidelity(sessionId, "CH1:", (ushort)true)) != 0)  
{  
    string ErrorMessage = "";  
    ANVNA.error_message(sessionId, status, out ErrorMessage,  
    ANVNA.MAX_STRING_LENGTH);  
    System.Console.WriteLine("Error " + status + " encountered while running this  
    command: " + ErrorMessage);  
    ANVNA.close(sessionId);  
    System.Environment.Exit(1);  
}
```

**Python Example:**

```
status = ANVNA_SetHighFidelity(sessionId, "CH1: ", true)  
if status != 0:  
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH);  
    print('Error {0} encountered while running this command: {1}\n'.format(status,  
    ErrorMessage))  
    ANVNA_close(sessionId)  
    exit(1)
```

**MATLAB Example:**

```
status = anvna.SetHighFidelity('CH1: ', true);  
if( status ~= 0)  
    [ stat, ErrorMessage ] = anvna.error_message(status);  
    fprintf('Error %d encountered while running this command:%s\n', stat,  
    ErrorMessage);  
    status = anvna.close();  
    return;  
end
```

## C-243 ANVNA\_GetHighFidelity

```
ViStatus ANVNA_GetHighFidelity (
    ViSession Vi,
    ViConstString RepCapIdentifier,
    ViBoolean enable);
```

Description: Gets Enabled or Disabled status of High Fidelity on the given channel.

Parameter List:

Name	Variable Type	Description
Vi	ViSession	The ViSession handle that you obtain from the ANVNA_init or ANVNA_InitWithOptions function. The handle identifies a particular instrument session.
RepCapIdentifier	ViConstString	The physical or virtual repeated capability identifier. For example "CH1:Measurement1". (Only channel is required for this command.)
enable	ViBoolean	If true, High Fidelity is currently enabled. If false, High Fidelity is currently disabled.

### C++ Example:

```
ViStatus status = VI_SUCCESS;
char ErrorMessage[MAX_STRING_LENGTH];
unsigned short enabled = false;
if((status = ANVNA_GetHighFidelity(sessionId, "CH1:", &enabled)) !=VI_SUCCESS)
{
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d encountered while running this command: %s\n", status,
    ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}
```

**C# Example:**

```
int status = 0;
ushort enabled = 0;
if ((status = ANVNA.GetHighFidelity (sessionId, "CH1:", out enabled)) != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
    ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " encountered while running this
command: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}
```

**Python Example:**

```
status, enabled = ANVNA_GetHighFidelity (sessionId, "CH1: ")
if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH);
    print('Error {0} encountered while running this command: {1}\n'.format(status,
ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)
```

**MATLAB Example:**

```
Status, enabled = anvna.GetHighFidelity('CH1: ');
if( status ~= 0)
    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d encountered while running this command:%s\n', stat,
ErrorMessage);
    status = anvna.close();
    return;
end
```

## C-244 Attributes

### Attribute Information for the Following Functions

ANVNA\_GetAttributeViInt32  
ANVNA\_SetAttributeViInt32  
ANVNA\_GetAttributeViInt64  
ANVNA\_SetAttributeViInt64  
ANVNA\_GetAttributeViReal164  
ANVNA\_SetAttributeViReal164  
ANVNA\_GetAttributeViBoolean  
ANVNA\_SetAttributeViBoolean  
ANVNA\_GetAttributeViString  
ANVNA\_SetAttributeViString

### Inherent IVI Attributes

Driver Capabilities  
Class Group Capabilities

## ANVNA\_ATTR\_GROUP\_CAPABILITIES

<b>Supported Instrument Models</b>	<a href="#">ANVNA_ATTR_SUPPORTED_INSTRUMENT_MODELS</a>
<b>Driver Identification</b>	
<b>Specific Driver Class Spec Major Version</b>	<a href="#">ANVNA_ATTR_SPECIFIC_DRIVER_CLASS_SPEC_MAJOR_VERSION</a>
<b>Specific Driver Class Spec Minor Version</b>	<a href="#">ANVNA_ATTR_SPECIFIC_DRIVER_CLASS_SPEC_MINOR_VERSION</a>
<b>Specific Driver Description</b>	<a href="#">ANVNA_ATTR_SPECIFIC_DRIVER_DESCRIPTION</a>
<b>Specific Driver Prefix</b>	<a href="#">ANVNA_ATTR_SPECIFIC_DRIVER_PREFIX</a>
Specific Driver Revision	<a href="#">ANVNA_ATTR_SPECIFIC_DRIVER_REVISION</a>
Specific Driver Vendor	<a href="#">ANVNA_ATTR_SPECIFIC_DRIVER_VENDOR</a>
Instrument Identification	
Instrument Firmware Revision	<a href="#">ANVNA_ATTR_INSTRUMENT_FIRMWARE_REVISION</a>
Instrument Manufacturer	<a href="#">ANVNA_ATTR_INSTRUMENT_MANUFACTURER</a>
Instrument Model	<a href="#">ANVNA_ATTR_INSTRUMENT_MODEL</a>
Instrument Serial Number	<a href="#">ANVNA_ATTR_INSTRUMENT_SERIAL_NUMBER</a>
User Options	
Simulate	<a href="#">ANVNA_ATTR_SIMULATE</a>
Channel	
Averaging	<a href="#">ANVNA_ATTR_CHANNEL_AVERAGING</a>
Averaging Factor	<a href="#">ANVNA_ATTR_CHANNEL_AVERAGING_FACTOR</a>

Channel Count	<a href="#">ANVNA_ATTR_CHANNEL_COUNT</a>
Correction	<a href="#">ANVNA_ATTR_CHANNEL_CORRECTION</a>
CW Frequency	<a href="#">ANVNA_ATTR_CHANNEL_CW_FREQUENCY</a>
IF Bandwidth	<a href="#">ANVNA_ATTR_CHANNEL_IF_BANDWIDTH</a>
Points	<a href="#">ANVNA_ATTR_CHANNEL_POINTS</a>
Sweep Type	<a href="#">ANVNA_ATTR_CHANNEL_SWEEP_TYPE</a>
Trigger Mode	<a href="#">ANVNA_ATTR_CHANNEL_TRIGGER_MODE</a>
Measurement	
Channel Measurement Count	<a href="#">ANVNA_ATTR_CHANNEL_MEASUREMENT_COUNT</a>
Format	<a href="#">ANVNA_ATTR_CHANNEL_MEASUREMENT_FORMAT</a>
Smoothing	<a href="#">ANVNA_ATTR_CHANNEL_MEASUREMENT_SMOOTHING</a>
Smoothing Aperture	<a href="#">ANVNA_ATTR_CHANNEL_MEASUREMENT_SMOOTHING_APERTURE</a>
StimulusRange	
Center	<a href="#">ANVNA_ATTR_CHANNEL_STIMULUSRANGE_CENTER</a>
Span	<a href="#">ANVNA_ATTR_CHANNEL_STIMULUSRANGE_SPAN</a>
Start	<a href="#">ANVNA_ATTR_CHANNEL_STIMULUSRANGE_START</a>
Stop	<a href="#">ANVNA_ATTR_CHANNEL_STIMULUSRANGE_STOP</a>
Instrument	
Serial Number	<a href="#">ANVNA_ATTR_INSTRUMENT_SERIAL_NUMBER</a>
Trigger	
Source	<a href="#">ANVNA_ATTR_TRIGGER_SOURCE</a>
System	
Serial Number	<a href="#">ANVNA_ATTR_SYSTEM_SERIAL_NUMBER</a>

### **ANVNA\_ATTR\_CHANNEL\_AVERAGING**

Data Type: ViBoolean

Description: Turns trace averaging ON or OFF.

True/1 = ON

False/0 = OFF

Read/write attribute, accessible via [ANVNA\\_GetAttributeViBoolean](#) and [ANVNA\\_SetAttributeViBoolean](#)

repCapIdentifier info for Set/Get Attribute functions: Channel name expected to be passed in string, e.g. "CH1:"

### **ANVNA\_ATTR\_CHANNEL\_AVERAGING\_FACTOR**

Data Type: ViUInt32

Description: Sets the number of measurement sweeps to combine for an average.

Read/write attribute accessible via [ANVNA\\_GetAttributeViUInt32](#) and [ANVNA\\_SetAttributeViUInt32](#) functions.

Range: 1-1024

repCapIdentifier info for Set/Get Attribute functions: Channel name expected to be passed in string, e.g. "CH1:"

**ANVNA\_ATTR\_CHANNEL\_CORRECTION**

Data Type: ViBoolean

Description: Sets the correction state (calibration state) for all measurements on the channel.

Read/write attribute accessible via [ANVNA\\_GetAttributeViBoolean](#) and [ANVNA\\_SetAttributeViBoolean](#) functions.

True/1=ON

False/0=OFF

repCapIdentifier info for Set/Get Attribute functions: Channel name expected to be passed in string, e.g. "CH1:"

**ANVNA\_ATTR\_CHANNEL\_COUNT**

Data Type: ViUInt32

Accepted Values: 1, 2, 3, 4, 6, 8, 9, 10, 12, 16

repCapIdentifier info for Set/Get Attribute functions: No info expected to be passed in string, e.g. ":" or ""

Description: Attribute that contains the number of Channels available on the instrument. This is the maximum index that may be used with the GetChannelName() function.

Maximum value is 16.

Read/write attribute accessible via [ANVNA\\_GetAttributeViUInt32](#) and [ANVNA\\_SetAttributeViUInt32](#) functions.

**ANVNA\_ATTR\_CHANNEL\_CW\_FREQUENCY**

Data Type: ViReal64

Description: Sets the Continuous Wave frequency.

Read/write attribute accessible via [ANVNA\\_GetAttributeViReal64](#) and [ANVNA\\_SetAttributeViReal64](#) functions.

repCapIdentifier info for Set/Get Attribute functions: Channel and Trace/Measurement names expected to be passed in string, e.g. "CH1:Measurement1"

Range: Dependent on installed frequency options.

Measurement Unit: Hz

**ANVNA\_ATTR\_CHANNEL\_IF\_BANDWIDTH**

Data Type: ViReal64

Description: Sets the bandwidth of the digital IF filter to be used in the measurement.

Range: Model dependent. Supported values (in Hz) include (2, 10, 20, 30, 50, 70, 100, 300, 500, 700, 1000, 2000, 3000, 5000, 7000, 10000, 20000, 30000, 50000, 70000, 100000, 200000, 300000, 500000, 700000, 1000000)

121 Series Instruments support up to 100 kHz IFBW

122 Series Instruments support up to 300 kHz IFBW

300 Series Instruments support up to 300 kHz IFBW

500 Series Instruments support up to 500 kHz IFBW

repCapIdentifier info for Set/Get Attribute functions: Channel and Trace/Measurement names expected to be passed in string, e.g. "CH1:Measurement1"

Read/write attribute accessible via [ANVNA\\_GetAttributeViReal64](#) and [ANVNA\\_SetAttributeViReal64](#) functions

**ANVNA\_ATTR\_CHANNEL\_MEASUREMENT\_COUNT**

Data Type: ViUInt32

Description: Attribute that contains the number of Measurements available on the instrument for one channel. This is the maximum index that may be used with the GetChannelMeasurementName() function.

Maximum value is 16.

Range: 1-16

repCapIdentifier info for Set/Get Attribute functions: Channel name expected to be passed in string, eg. "CH1:"

Read/write attribute accessible via [ANVNA\\_GetAttributeViUInt32](#) and [ANVNA\\_SetAttributeViUInt32](#) functions.

**ANVNA\_ATTR\_CHANNEL\_MEASUREMENT\_FORMAT**

Data Type: ViUInt32

Description: Sets the data format for the specified measurement

**VALUES DEFINITION**

Definition	Values
ANVNA_VAL_ANRITSU_VNA_MEASUREMENT_LOG_MAG	0
ANVNA_VAL_ANRITSU_VNA_MEASUREMENT_LIN_MAG	1
ANVNA_VAL_ANRITSU_VNA_MEASUREMENT_PHASE	2
ANVNA_VAL_ANRITSU_VNA_MEASUREMENT_GROUP_DELAY	3
ANVNA_VAL_ANRITSU_VNA_MEASUREMENT_SWR	4
ANVNA_VAL_ANRITSU_VNA_MEASUREMENT_REAL	5
ANVNA_VAL_ANRITSU_VNA_MEASUREMENT_IMAG	6
ANVNA_VAL_ANRITSU_VNA_MEASUREMENT_POLAR	7
ANVNA_VAL_ANRITSU_VNA_MEASUREMENT_SMITH	8
ANVNA_VAL_ANRITSU_VNA_MEASUREMENT_S_LINEAR	9
ANVNA_VAL_ANRITSU_VNA_MEASUREMENT_S_LOGARITHMIC	10
ANVNA_VAL_ANRITSU_VNA_MEASUREMENT_S_COMPLEX	11
ANVNA_VAL_ANRITSU_VNA_MEASUREMENT_S_ADMITTANCE	12
ANVNA_VAL_ANRITSU_VNA_MEASUREMENT_P_LINEAR	13
ANVNA_VAL_ANRITSU_VNA_MEASUREMENT_P_LOGARITHMIC	14
ANVNA_VAL_ANRITSU_VNA_MEASUREMENT_U_PHASE	15
ANVNA_VAL_ANRITSU_VNA_MEASUREMENT_P_PHASE	16

ACCEPTED VALUES ARE 0, 1, 2, 3, 4, 5, 6, 8

repCapIdentifier info for Set/Get Attribute functions: Channel and Trace/Measurement names expected to be passed in string, e.g. "CH1:Measurement1"

Read/write attribute accessible via [ANVNA\\_GetAttributeViUInt32](#) and [ANVNA\\_SetAttributeViUInt32](#) functions.

**ANVNA\_ATTR\_CHANNEL\_MEASUREMENT\_SMOOTHING**

Data Type: ViBoolean

Description: Sets smoothing on or off for a measurement (trace)

Read/write attribute accessible via [ANVNA\\_GetAttributeViBoolean](#) and [ANVNA\\_SetAttributeViBoolean](#) functions.

True/1=ON

False/0=OFF

repCapIdentifier info for Set/Get Attribute functions: Channel and Trace/Measurement names expected to be passed in string, e.g. "CH1:Measurement1"

**ANVNA\_ATTR\_CHANNEL\_MEASUREMENT\_SMOOTHING\_APERTURE**

Data Type: ViReal64

Description: Sets the value of smoothing percentage for the measurement

Read/write attribute accessible via [ANVNA\\_GetAttributeViReal64](#) and [ANVNA\\_SetAttributeViReal64](#) functions.

Range: 0-100% – NO MEASUREMENT UNIT

repCapIdentifier info for Set/Get Attribute functions: Channel and Trace/Measurement names expected to be passed in string, e.g. "CH1:Measurement1"

**ANVNA\_ATTR\_CHANNEL\_POINTS**

Data Type: ViUInt32

Description: Sets the number of data points for the measurement, for the specified channel.

Maximum value depends on the model.

Read/write attribute accessible via [ANVNA\\_GetAttributeViUInt32](#) and [ANVNA\\_SetAttributeViUInt32](#) functions.

Range: MODEL DEPENDENT

MS46122/322: 0-16001

MS4652x: 0-20001

repCapIdentifier info for Set/Get Attribute functions: Channel name expected to be passed in string, e.g. "CH1:"

**ANVNA\_ATTR\_CHANNEL\_STIMULUSRANGE\_CENTER**

Range: Dependent on installed frequency option.

Data Type: ViReal64

Description: Sets the center frequency value of the sweep for the channel

Read/write attribute accessible via [ANVNA\\_GetAttributeViReal64](#) and [ANVNA\\_SetAttributeViReal64](#) functions.

repCapIdentifier info for Set/Get Attribute functions: Channel and Trace/Measurement names expected to be passed in string, e.g. "CH1:Measurement1"

If ANVNA\_ATTR\_CHANNEL\_STIMULUSRANGE\_CENTER is modified

ANVNA\_ATTR\_CHANNEL\_STIMULUSRANGE\_SPAN remains as it is and

ANVNA\_ATTR\_CHANNEL\_STIMULUSRANGE\_STOP &&

ANVNA\_ATTR\_CHANNEL\_STIMULUSRANGE\_START params are recomputed.

Measurement Unit: HZ

**ANVNA\_ATTR\_CHANNEL\_STIMULUSRANGE\_SPAN**

Range: Dependent on installed frequency option.

Data Type: ViReal64

Description: Sets the span value of the sweep for the channel

Read/write attribute accessible via [ANVNA\\_GetAttributeViReal64](#) and [ANVNA\\_SetAttributeViReal64](#) functions.

repCapIdentifier info for Set/Get Attribute functions: Channel and Trace/Measurement names expected to be passed in string, e.g. "CH1:Measurement1"

If ANVNA\_ATTR\_CHANNEL\_STIMULUSRANGE\_SPAN is modified

ANVNA\_ATTR\_CHANNEL\_STIMULUSRANGE\_CENTER remains as it is and

ANVNA\_ATTR\_CHANNEL\_STIMULUSRANGE\_STOP &&

ANVNA\_ATTR\_CHANNEL\_STIMULUSRANGE\_START params are recomputed.

Measurement Unit: HZ

**ANVNA\_ATTR\_CHANNEL\_STIMULUSRANGE\_START**

Range: Dependent on installed frequency option

repCapIdentifier info for Set/Get Attribute functions: Channel and Trace/Measurement names expected to be passed in string, e.g. "CH1:Measurement1"

If ANVNA\_ATTR\_CHANNEL\_STIMULUSRANGE\_START is modified

ANVNA\_ATTR\_CHANNEL\_STIMULUSRANGE\_STOP remains as it is and

ANVNA\_ATTR\_CHANNEL\_STIMULUSRANGE\_SPAN &&

ANVNA\_ATTR\_CHANNEL\_STIMULUSRANGE\_CENTER params are recomputed.

Data Type: ViReal64

Description: Sets the start value of the sweep range of channel

Read/write attribute accessible via [ANVNA\\_GetAttributeViReal64](#) and [ANVNA\\_SetAttributeViReal64](#) functions.

Measurement Unit: HZ

**ANVNA\_ATTR\_CHANNEL\_STIMULUSRANGE\_STOP**

Range: Dependent on installed frequency option.

Data Type: ViReal64

Description: Sets the stop value of the sweep range of channel

Read/write attribute accessible via [ANVNA\\_GetAttributeViReal64](#) and [ANVNA\\_SetAttributeViReal64](#) functions.

repCapIdentifier info for Set/Get Attribute functions: Channel and Trace/Measurement names expected to be passed in string, e.g. "CH1:Measurement1"

If ANVNA\_ATTR\_CHANNEL\_STIMULUSRANGE\_STOP is modified  
 ANVNA\_ATTR\_CHANNEL\_STIMULUSRANGE\_START remains as it is and  
 ANVNA\_ATTR\_CHANNEL\_STIMULUSRANGE\_SPAN &&  
 ANVNA\_ATTR\_CHANNEL\_STIMULUSRANGE\_CENTER params are recomputed.

Measurement Unit: HZ

For ANVNA\_ATTR\_CHANNEL\_STIMULUSRANGE\_START/STOP/SPAN/CENTER, valid ranges will be documented in future – STOP VALUES ARE MODEL DEPENDENT

ANVNA\_ATTR\_CHANNEL\_STIMULUSRANGE\_START VALUE IS DOCUMENTED AS 300 KHz but it is actually possible to set it as low as 50KHz

ANVNA\_ATTR\_CHANNEL\_STIMULUSRANGE\_STOP values:

MS4642xA series 2 and 4 PORTS: 8.5GHz

MS46322A series values depend on model – up to 8/20/40 GHz

**ANVNA\_ATTR\_CHANNEL\_SWEEP\_TYPE**

Data Type: ViUInt32

Description: Sets the sweep type of channel.

repCapIdentifier info for Set/Get Attribute functions: Channel name expected to be passed in string, e.g. "CH1:"

Read/write attribute accessible via [ANVNA\\_GetAttributeViUInt32](#) and [ANVNA\\_SetAttributeViUInt32](#) functions.

VALUE DEFINITIONS	Values
ANVNA_VAL_ANRITSU_VNA_SWEEP_TYPE_LIN_FREQUENCY	0
ANVNA_VAL_ANRITSU_VNA_SWEEP_TYPE_LOG_FREQUENCY	1
ANVNA_VAL_ANRITSU_VNA_SWEEP_TYPE_POWER	2
ANVNA_VAL_ANRITSU_VNA_SWEEP_TYPE_SEGMENT	3
ANVNA_VAL_ANRITSU_VNA_SWEEP_TYPE_INDEX_SEGMENT	4
ANVNA_VAL_ANRITSU_VNA_SWEEP_TYPE_CW_TIME	5

Support for additional Sweep Types may be added in the future.

**ANVNA\_ATTR\_CHANNEL\_TRIGGER\_MODE**

Data Type: ViUInt32

repCapIdentifier info for Set/Get Attribute functions: Channel name expected to be passed in string, e.g. "CH1:"

Description: Sets the trigger mode for the specified channel..

Value Definitions	Values
ANVNA_VAL_TRIGGER_MODE_HOLD	0
ANVNA_VAL_TRIGGER_MODE_CONTINUOUS	1

Read/write attribute accessible via [ANVNA\\_GetAttributeViUInt32](#) and [ANVNA\\_SetAttributeViUInt32](#) functions.

**ANVNA\_ATTR\_GROUP\_CAPABILITIES**

Data Type: ViString

repCapIdentifier info for Get Attribute functions: No info expected to be passed in string, e.g. ":" or ""

Description: A comma-separated list of the class capability groups implemented by the driver. Capability group names are documented in the IVI class specifications. If the driver is not class compliant, the driver returns an empty string.

Read-only attribute, [ANVNA\\_GetAttributeViString](#) returns empty string.

**ANVNA\_ATTR\_INSTRUMENT\_FIRMWARE\_REVISION**

Data Type: ViString

repCapIdentifier info for Get Attribute functions: No info expected to be passed in string, e.g. ":" or ""

Description: The firmware revision reported by the physical instrument (FPGA version).

Read-only attribute accessible via [ANVNA\\_GetAttributeViString](#), not dependent on the repcap parameter.

MODEL-DEPENDENT STRING

**ANVNA\_ATTR\_INSTRUMENT\_MANUFACTURER**

Data Type: ViString

repCapIdentifier info for Get Attribute functions: No info expected to be passed in string, e.g. ":" or ""

Description: The name of the manufacturer reported by the physical instrument (typically "Anritsu").

Manufacturer is limited to 256 bytes

Read-only attribute accessible via [ANVNA\\_GetAttributeViString](#), not dependent on the repcap parameter.

Expected Value: "Anritsu"

**ANVNA\_ATTR\_INSTRUMENT\_MODEL**

Data Type: ViString

repCapIdentifier info for Get Attribute functions: No info expected to be passed in string, e.g. ":" or ""

Description: The model number or name reported by the physical instrument.

Model is limited to 256 bytes

Read-only attribute accessible via [ANVNA\\_GetAttributeViString](#), not dependent on the repcap parameter.

Expected Values: "MS46322A", "MS46522B", "MS46524B"

**ANVNA\_ATTR\_INSTRUMENT\_SERIAL\_NUMBER**

Data Type: ViUInt32

repCapIdentifier info for Get Attribute functions: Channel name expected to be passed in string, e.g. "CH1:". This will return the serial number of the 121-Series Instrument that is associated with the selected channel. Use this attribute instead of **ANVNA\_ATTR\_SYSTEM\_SERIAL\_NUMBER** when using 121-Series Instruments.

Description: Instrument serial number (for individual 121-Series Instrument)

Read-only attribute accessible via [ANVNA\\_GetAttributeViUInt32](#) function

UNIT DEPENDENT VALUE

**ANVNA\_ATTR\_SIMULATE**

Data Type: ViBoolean

repCapIdentifier info for Get Attribute functions: No info expected to be passed in string, e.g. ":" or ""

Description: If True, the driver does not perform I/O to the instrument, and returns simulated values for output parameters.

Read-only attribute accessible via [ANVNA\\_GetAttributeViBoolean](#), not dependent on the repcap parameter.

True/1=ON

False/0=OFF

**ANVNA\_ATTR\_SPECIFIC\_DRIVER\_CLASS\_SPEC\_MAJOR\_VERSION**

Data Type: ViInt32

repCapIdentifier info for Get Attribute functions: No info expected to be passed in string, e.g. ":" or ""

Description: Returns the major version number of the class specification in accordance with which the IVI specific driver was developed. Zero is returned if the driver is not compliant with a class specification.

Read-only attribute accessible via [ANVNA\\_GetAttributeViInt32](#), not dependent on the repeated capability parameter.

Expected Value: Should match installed version of IVI-C Driver as an integer. For example, in "V2018.2.1", this should return "20180201"

**ANVNA\_ATTR\_SPECIFIC\_DRIVER\_CLASS\_SPEC\_MINOR\_VERSION**

Data Type: ViInt32

repCapIdentifier info for Get Attribute functions: No info expected to be passed in string, e.g. ":" or ""

Description: Returns the minor version number of the class specification in accordance with which the IVI specific driver was developed. Zero is returned if the driver is not compliant with a class specification.

Read-only attribute accessible via [ANVNA\\_GetAttributeViInt32](#), not dependent on the repeated capability parameter.

Expected Value: '0'

**ANVNA\_ATTR\_SPECIFIC\_DRIVER\_DESCRIPTION**

Data Type: ViString

repCapIdentifier info for Get Attribute functions: No info expected to be passed in string, e.g. ":" or ""

Description: Returns a brief description of the IVI specific driver. The string that this attribute returns contains a maximum of 256 bytes including the NULL byte.

Read-only attribute accessible via [ANVNA\\_GetAttributeViString](#), not dependent on the repeated capability parameter (can be NULL).

Expected Value: 'Anritsu VNA Shockline Driver'

**ANVNA\_ATTR\_SPECIFIC\_DRIVER\_PREFIX**

Data Type: ViString

repCapIdentifier info for Get Attribute functions: No info expected to be passed in string, e.g. ":" or ""

Description: Returns the case-sensitive prefix of the user-callable functions that the IVI-C specific driver exports. The string that this attribute returns contains a maximum of 32 bytes including the NULL byte.

Typically "ANVNA"

Read-only attribute accessible via [ANVNA\\_GetAttributeViString](#), not dependent on the repeated capability parameter (can be NULL).

Expected Value: 'ANVNA'

**ANVNA\_ATTR\_SPECIFIC\_DRIVER\_REVISION**

Data Type: ViString

repCapIdentifier info for Get Attribute functions: No info expected to be passed in string, e.g. ":" or ""

Description: Returns version information about the IVI specific driver. The string that this attribute returns contains a maximum of 256 bytes including the NULL byte.

Read-only attribute accessible via [ANVNA\\_GetAttributeViString](#), not dependent on the repeated capability parameter (can be NULL).

Expected Value: '01'

**ANVNA\_ATTR\_SPECIFIC\_DRIVER\_VENDOR**

Data Type: ViString

repCapIdentifier info for Get Attribute functions: No info expected to be passed in string, e.g. ":" or ""

Description: Returns the name of the vendor that supplies the IVI specific driver. The string that this attribute returns contains a maximum of 256 bytes including the NUL byte.

Typically "Anritsu"

Read-only attribute accessible via [ANVNA\\_GetAttributeViString](#), not dependent on the repeated capability parameter (can be NULL).

Expected Value: 'Anritsu'

**ANVNA\_ATTR\_SUPPORTED\_INSTRUMENT\_MODELS**

Data Type: ViString

repCapIdentifier info for Get Attribute functions: No info expected to be passed in string, e.g. ":" or ""

Description: A comma-separated list of instrument models that the IVI specific driver can control. The string does not include an abbreviation for the manufacturer if it is the same for all models.

Read-only attribute accessible via [ANVNA\\_GetAttributeViString](#), not dependent on the repeated capability parameter (can be NULL).

Expected Values: 'MS46322A','MS46522B','MS46524B' DEPENDING ON MODEL

**ANVNA\_ATTR\_SYSTEM\_SERIAL\_NUMBER**

Data Type: ViString

repCapIdentifier info for Get Attribute functions: No info expected to be passed in string, e.g. ":" or ""

Description: Returns instrument serial number as marked on the system circuit board.

Read-only attribute accessible via [ANVNA\\_GetAttributeViString](#) function not dependent on the repeated capability parameter (can be NULL).

UNIT DEPENDENT VALUE

**ANVNA\_ATTR\_TRIGGER\_SOURCE**

Data Type: ViUInt32

Description: Selects the trigger source

repCapIdentifier info for Set/Get Attribute functions: Channel name expected to be passed in string, e.g. "CH1:"

Read/write attribute

**Value Definitions:**

Definitions	Values
ANVNA_VAL_ANRITSU_VNA_TRIGGER_SOURCE_INTERNAL	0
ANVNA_VAL_ANRITSU_VNA_TRIGGER_SOURCE_EXTERNAL	1
ANVNA_VAL_ANRITSU_VNA_TRIGGER_SOURCE_BUS	2
ANVNA_VAL_ANRITSU_VNA_TRIGGER_SOURCE_MANUAL	3

## C-245 Generic Attribute Getter Examples

Getter function calls should be performed using the following pattern:

```
ANVNA_GetAttribute<type>(sessionId, "CH<channel index>:Measurement<trace index>",
<attribute identifier>, <value pointer>);
```

### Example for fetching number of points:

#### C++ Example:

```
/*
 * Initialization code ...
 */

// get number of points:
ViUInt32 points = 0;

if ((status = ANVNA_GetAttributeViUInt32(sessionId, "CH1:",
ANVNA_ATTR_CHANNEL_POINTS, &points)) != VI_SUCCESS)

{
    char ErrorMessage[MAX_STRING_LENGTH];
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while retrieving number of points: %s\n", status,
ErrorMessage);

    ANVNA_close(sessionId);
    exit(1);
}

printf("number of points is %d\n", points);
```

#### C# Example:

```
/*
 * Initialization code ...
 */

// Get the number of points
uint points;

if ((status = ANVNA.GetAttributeViUInt32(sessionId, "CH1:",
(uint)ANVNA.ATTR_CHANNEL_POINTS, out points)) != 0)

{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " while retrieving number of
points: " + ErrorMessage);

    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}

System.Console.WriteLine("number of points " + points);
```

**Python Example:**

```
# Initialization code

# Get the number of points:
status, points = ANVNA_GetAttributeViUInt32 (sessionId, "CH1:Measurement1",
ANVNA_ATTR_CHANNEL_POINTS)

if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print('Error {0} while retrieving number of points: {1}\n'.format(status,
ErrorMessage))
    ANVNA_close(sessionId)
    exit(1)

print ("number of points is {0}\n".format(points))
```

**MATLAB Example:**

```
% * Initialization code ...

% get number of points:
[status, points] = anvna.GetAttributeViUInt32 ('CH1:',
anvna.ATTR_CHANNEL_POINTS);
if( status ~= 0)

    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while retrieving number of points: %s\n', stat,
ErrorMessage);
    status = anvna.close();
    return;

end

fprintf('number of points is %d\n', points);
```

## C-246 Generic Attribute Setter Examples

Setter function calls should be performed using the following pattern:

```
ANVNA_SetAttribute<type>(sessionId, "CH<channel index>:Measurement<trace index>,<attribute identifier>, <value>);
```

### Example for setting number of points:

#### C++ Example:

```
/*
 * Initialization code ...
 */

// set number of points:
ViUInt32 points = 501;

if ((status = ANVNA_SetAttributeViUInt32(sessionId, "CH1:",
ANVNA_ATTR_CHANNEL_POINTS, points)) != VI_SUCCESS)
{
    char ErrorMessage[MAX_STRING_LENGTH];
    ANVNA_error_message(sessionId, status, ErrorMessage, MAX_STRING_LENGTH);
    printf("Error %d while setting number of points: %s\n", status, ErrorMessage);
    ANVNA_close(sessionId);
    exit(1);
}

// Number of points on channel 1 is now 501 ...
```

**C# Example:**

```
/*
 * Initialization code ...
 */

// set number of points:
uint points = 501;

if ((status = ANVNA.SetAttributeViUInt32(sessionId, "CH1:",
(uint)ANVNA.ATTR_CHANNEL_POINTS, points)) != 0)
{
    string ErrorMessage = "";
    ANVNA.error_message(sessionId, status, out ErrorMessage,
ANVNA.MAX_STRING_LENGTH);
    System.Console.WriteLine("Error " + status + " while setting number of
points: " + ErrorMessage);
    ANVNA.close(sessionId);
    System.Environment.Exit(1);
}

// Number of points on channel 1 is now 501 ...
```

**Python Example:**

```
# Initialization code ...

# Set the number of points:
points = 501

status = ANVNA_SetAttributeViUInt32 (sessionId, "CH1:Measurement1",
ANVNA_ATTR_CHANNEL_POINTS, points)

if status != 0:
    ErrorMessage = ANVNA_error_message(sessionId, status, MAX_STRING_LENGTH)
    print('Error {0} while setting number of points: {1}\n'.format(status,
ErrorMessage))

    ANVNA_close(sessionId)
    exit(1)

# Number of points on channel 1 is now 501 ...
```

**MATLAB Example:**

```
%     * Initialization code ...

%     set number of points:
points=501;

status = anvna.SetAttributeViUInt32 ('CH1:', anvna.ATTR_CHANNEL_POINTS,
points);

if( status ~= 0)

    [ stat, ErrorMessage ] = anvna.error_message(status);
    fprintf('Error %d while setting number of points: %s\n', stat,
ErrorMessage);
    status = anvna.close();
    return;

end

%     Number of points on channel 1 is now 501 ...
```

## C-247 IVI Driver Installation

The Anritsu IVI-C driver for ShockLine VNA series can be downloaded from the Anritsu website.

There are two versions of the installation files:

- *ANVNA32-bitsWindows.exe* for 32 bit architecture, all Windows flavors;
- *ANVNA64-bitsWindows.exe* for 64 bit architecture, all Windows flavors.

As a prerequisite, the IVI foundation shared components must be installed.

See [http://www.ivifoundation.org/shared\\_components/Default.aspx](http://www.ivifoundation.org/shared_components/Default.aspx).

The ANVNA driver will use the same installation path.

### C and C++

ANVNA.h and ANVNA.dll files are delivered in the standard paths as specified by IVI Foundation:  
<IVI Root Dir>\Include and <IVI Root Dir>\Bin respectively.

The ANVNA.lib file to be used for C/C++ application development is delivered as specified by IVI Foundation in <IVI Root Dir>\Lib\msc. There is a VS2005 C++ project example delivered in  
<IVI Root Dir>\Drivers\ANVNA\CPP\Examples.

### C#

C Sharp binaries ANVNA\_IVI\_CSHARP.dll and ANVNA\_IVI\_CSHARP\_LIB.dll are also delivered in  
<IVI Root Dir>\Bin because this path is added to PATH environment variable so the dll files are available at run-time. A C Sharp VS2005 project example is delivered under  
<IVI Root Dir>\Drivers\ANVNA\CSHARP\Examples.

### Python

For Python scripting, python version 3.4 or greater must be used. Python binaries are delivered in  
<IVI Root Dir>\Drivers\ANVNA\Python and a Python example can be found in  
<IVI Root Dir>\Drivers\ANVNA\Python\Examples.

### MATLAB

MATLAB support is also provided, the “.m” driver file is delivered under  
<IVI Root Dir>\Drivers\ANVNA\MATLAB and an example of usage under  
<IVI Root Dir>\Drivers\ANVNA\MATLAB\Examples. The example has been tested with MATLAB version R2014A.

### LabVIEW

A LabVIEW project for importing functions from the ANVNA.dll file is delivered under  
<IVI Root Dir>\rivers\ANVNA\LabView\ANVNA\_LabView\ANVNA.lvlib file. Two examples (for calibrated and uncalibrated scenarios) are provided in  
<IVI Root Dir>\Drivers\ANVNA\LabView\ANVNA\_LabView\EXAMPLES, tested with LabVIEW version 13.0f2.

Note: To be able to use ShockLine devices remotely, the ShockLine application must be closed and “IVI ShockLine Service” service must be running on device.



# Appendix D — Programming with LabVIEW

This appendix includes the following sections:

## D-1 Introduction

This document provides an overview of programming techniques for controlling the ShockLine VNA using the ShockLine VNA LabVIEW driver over TCP/IP (using VXI-11 or raw socket) via an Ethernet or USB physical connections. (USB connections are only available on the MS461xx series VNAs.) This document assumes some previous knowledge of LabVIEW.

The LabVIEW driver is based on the SCPI commands in the Programming Manual (this manual) to communicate with ShockLine VNAs. This appendix contains the following sections:

- [Section D-1 “Introduction”](#)
- [Section D-2 “Overview”](#)
- [Section D-3 “Installing and Configuring the ShockLine VNA LabVIEW Driver”](#)
- [Section D-4 “Connecting LabVIEW to the MS46524B”](#)
- [Section D-6 “Example 1 – Open a Session – Get Some Instrument Information”](#)
- [Section D-7 “Example 2 – Send the \\*IDN? Command – Display Results”](#)
- [Section D-8 “Example 3 – Error Checking”](#)
- [Section D-9 “Example 4 – Acquiring Trace Data”](#)
- [Section D-10 “Example 5 – Output S2P File to PC Controller”](#)
- [Section D-11 “Example 6 – Graphic Output as a Bit-mapped BMP File”](#)
- [Section D-12 “Example 7 – Configure and Query Marker”](#)

<b>Note</b>	Example output values and traces may be different from those shown on customer's equipment.
-------------	---

## References

- [LabVIEW Fundamentals Manual](#)
- [ShockLine Programming Manual – 10410-00746](#)

## D-2 Overview

### Programming Basics

There are many cases where a user may want programmatic control of the VNA. Examples include automating a test sequence, manufacturing testing, orchestrating a complex measurement involving various pieces of test equipment, gathering a time series of data, or as a convenient way of getting data, files or images transferred from the VNA to a PC for further analysis.

### Programming Environments

Programming environments that are commonly used with [test equipment](#) include LabVIEW, Visual Studio, Python, and so forth.

Anritsu ShockLine drivers can be run under LabVIEW 2011, 2018, 2019, and 2020.

The examples that follow use LabVIEW Version 2019 with the ShockLine VNA LabVIEW driver.

## What is VISA?

VISA (Virtual Instrument System Architecture) is an I/O software standard for communicating with test instruments like ShockLine over any of the bus architectures which ShockLine supports. A VISA driver is available from both National Instruments and Agilent. National Instruments VISA drivers are available for the following operating systems: Windows, Mac OS X, Linux and others. It's always a good idea to get the latest driver, but make sure to get the Full Version (not just the runtime) for the best support of the latest .NET Framework and TCP/IP. The driver is available from <http://www.ni.com/visa/> or from the NI Device Driver CD that comes with NI hardware and is installed along with LabVIEW. The ShockLine VNA LabVIEW drivers uses VISA or raw socket to communicate.

VISA uses connection strings to set up communication with the VNA over various protocols. Here are some connection string examples:

```
//VXI-11 Connection String  
"TCPIPO::192.168.1.7::INSTR";  
  
//Raw Socket Connection String  
"TCPIPO::192.168.1.7::5001";
```

The beauty of using VISA is that the only thing that needs to be changed for any of these possible communication protocols is the connection string. The rest of the code should be exactly the same (except for SOCKETS which are not covered in this document). For TCP/IP we recommend using VXI-11 since it better implements the IEEE 488.2 standard and all status checking. The “[Connecting LabVIEW to the MS46524B](#)” section shows how to set up for communication over VXI-11 (TCP/IP).

## D-3 Installing and Configuring the ShockLine VNA LabVIEW Driver

The ShockLine VNA LabVIEW driver was developed and is supported by National Instruments. The driver is available at the National Instrument’s Instrument Driver Network (<http://www.ni.com/devzone/idnet/>), or you can download it directly from within LabVIEW as shown in the following figures.

The ShockLine LabVIEW driver can be downloaded from NI website:

[https://sine.ni.com/apps/utf8/niid\\_web\\_display.download\\_page?p\\_id\\_guid=ADD35DA7B7C2197EE05400144FF8363B](https://sine.ni.com/apps/utf8/niid_web_display.download_page?p_id_guid=ADD35DA7B7C2197EE05400144FF8363B)

**Note**

LabVIEW must be installed on the PC before proceeding.

You must have an Internet connection before proceeding.

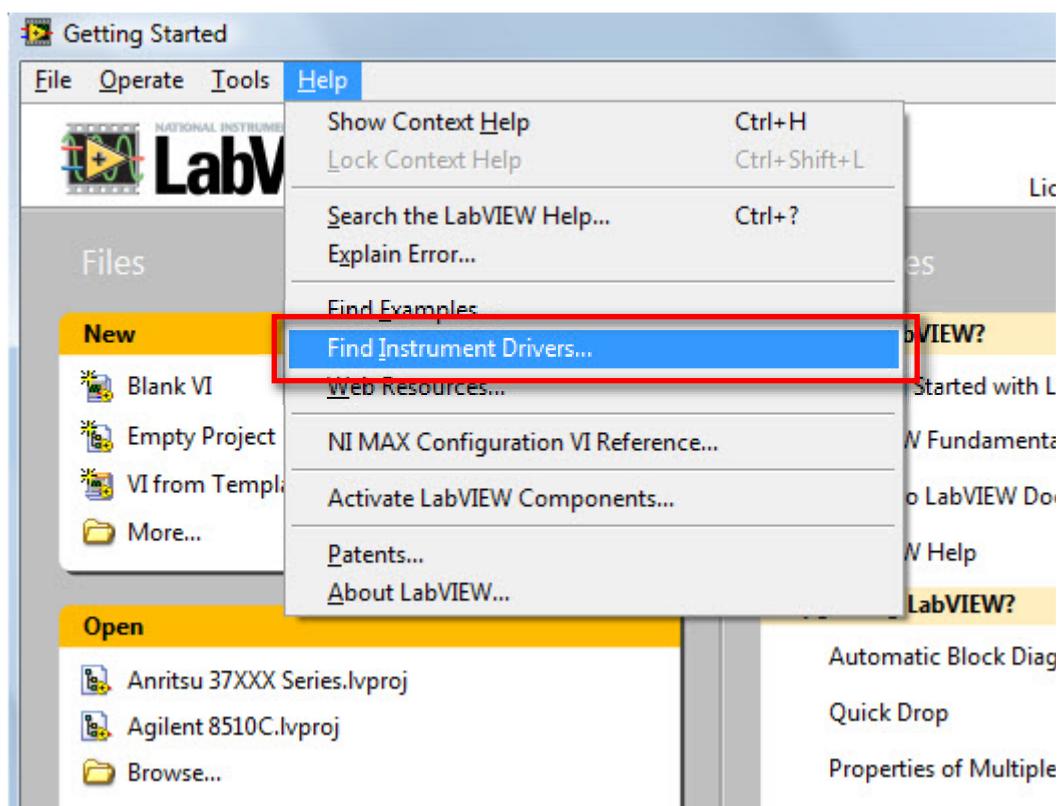
- From the NI web page, click the NI Instrument Driver Network field to go to LabVIEW.

The screenshot shows the NI Instrument Driver Network page for the Anritsu MS46XXX Analyzer. The page has a green header bar with the title "Instrument Driver Network". Below it, the main content area is outlined in red. The left side contains "Driver Specifications" for the MS4612B model, including manufacturer (Anritsu), interface (Ethernet), instrument type (Analyzer), driver version (1.1), original release date (11-NOV-2020), update release date (29-APR-2021), and other supported models (See Below). It also lists NI Certified? (Yes) and NI Supported? (Yes). The "Driver Ratings" section shows 0 Ratings | out of 5. On the right, there are "Next Steps" links: Browse All Drivers, Submit New Driver, Request New Driver, Request Support, and Follow this driver. A "Rate this Driver" section with a dropdown menu and a "Submit" button is also present. Below these are "Learn More" links: Learn How to Use Your Driver, Learn More About Instrument Drivers, IDNet License Agreement, Instrument Control Discussion Forum, and Instrument Driver Troubleshooting. A "Plug and Play Driver Installation Instructions" link with a "Learn how to install your Plug and Play Instrument driver" sub-link is highlighted in a green box. The "Download Driver and Related Software" section includes a table showing the required software for different LabVIEW versions: LabVIEW 2013, 2018, 2019, and 2020, all requiring NI-VISA 5.0. The "Models Supported by this Driver" section lists various models with their support status (Yes or No). At the bottom, there's a footer with links to My Profile, RSS, Privacy, Legal, Contact NI, and E-Mail this Page.

Application Development Environment	Minimum Software Required
LabVIEW 2013 <a href="#">Upgrade</a>	NI-VISA 5.0 <a href="#">Login to Download</a>
LabVIEW 2018 <a href="#">Upgrade</a>	NI-VISA 5.0 <a href="#">Login to Download</a>
LabVIEW 2019 <a href="#">Upgrade</a>	NI-VISA 5.0 <a href="#">Login to Download</a>
LabVIEW 2020 <a href="#">Upgrade</a>	NI-VISA 5.0 <a href="#">Login to Download</a>

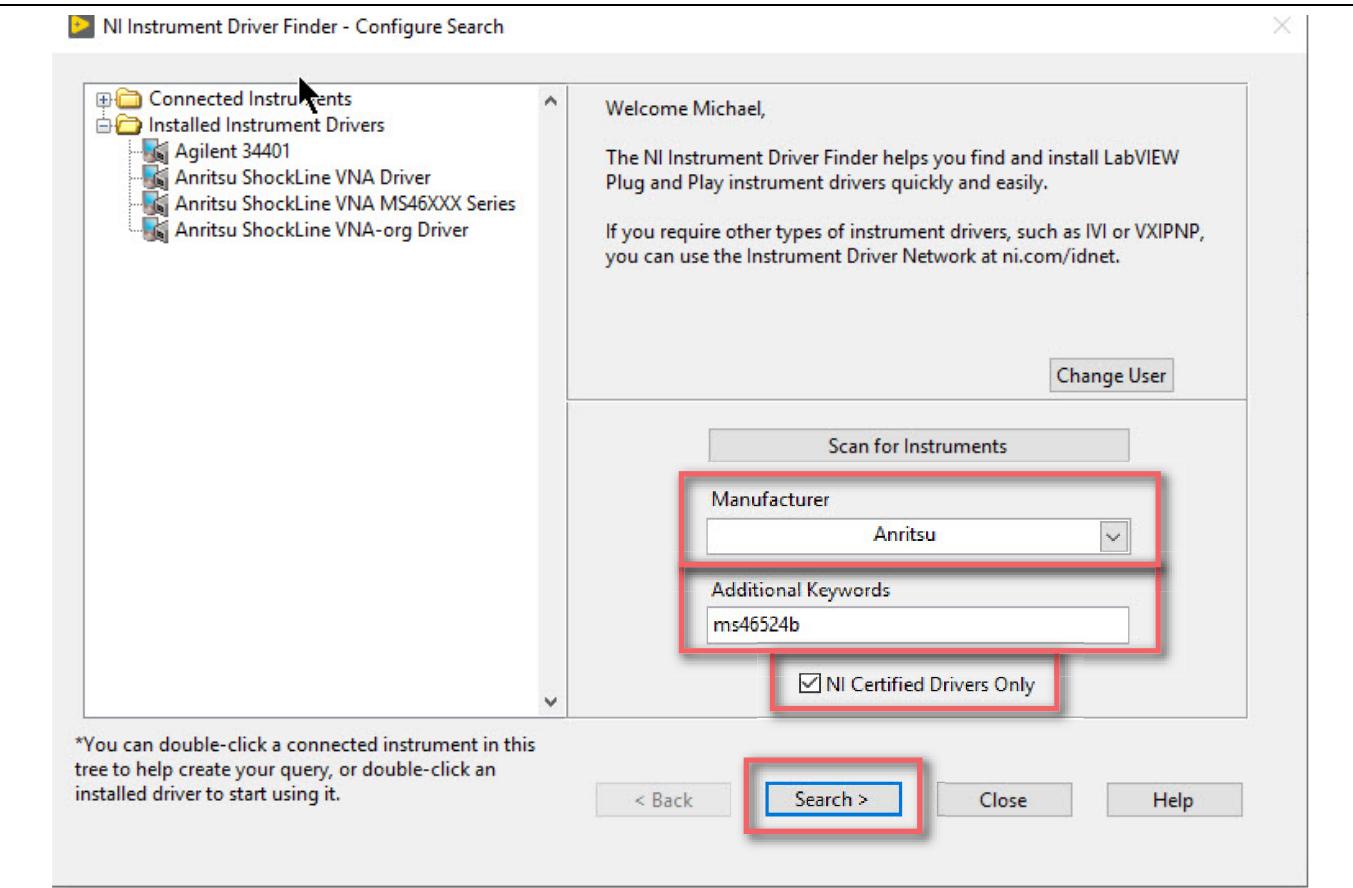
**Figure D-1.** NI Instrument Driver Network Web Page

2. Select Find Instrument Drivers from the LabVIEW Help menu.



**Figure D-2.** Installing LabVIEW Drivers

3. 3) Select Anritsu for Manufacturer and enter any ShockLine model keyword, such as *MS46524B*.
4. 4) Check NI-certified Drivers Only and click Search.



**Figure D-3.** Search for Manufacturer = Anritsu + MS46524B

5. Click on Install.

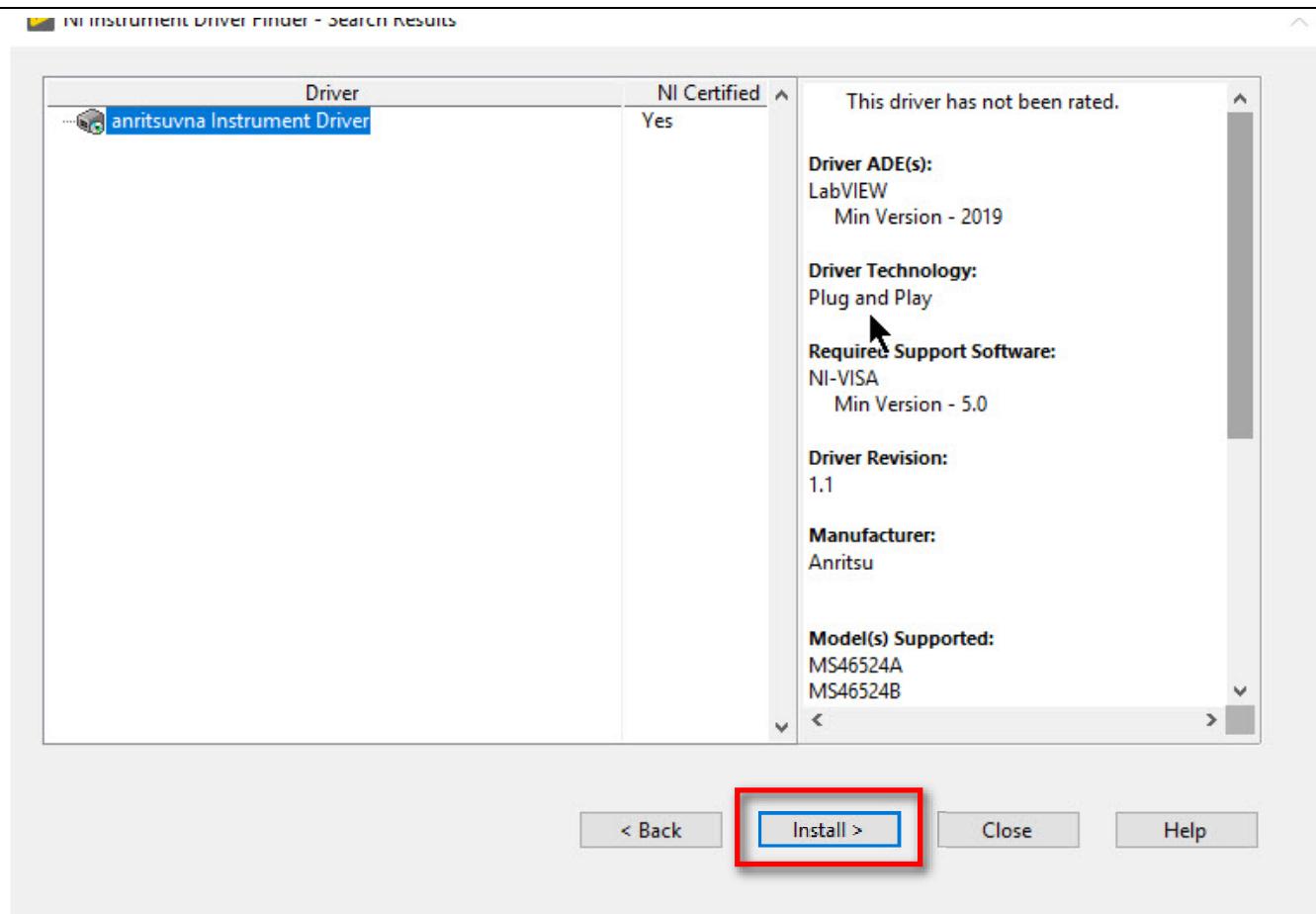
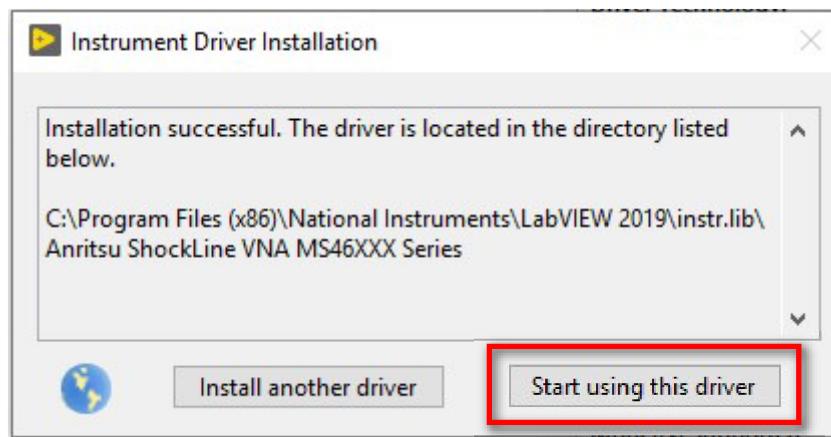


Figure D-4. NI Instrument Driver Finder – Install Driver

6. Click Start using this driver. A pop-up window will display the NI Instrument Finder dialog box with four ShockLine LabVIEW driver examples.

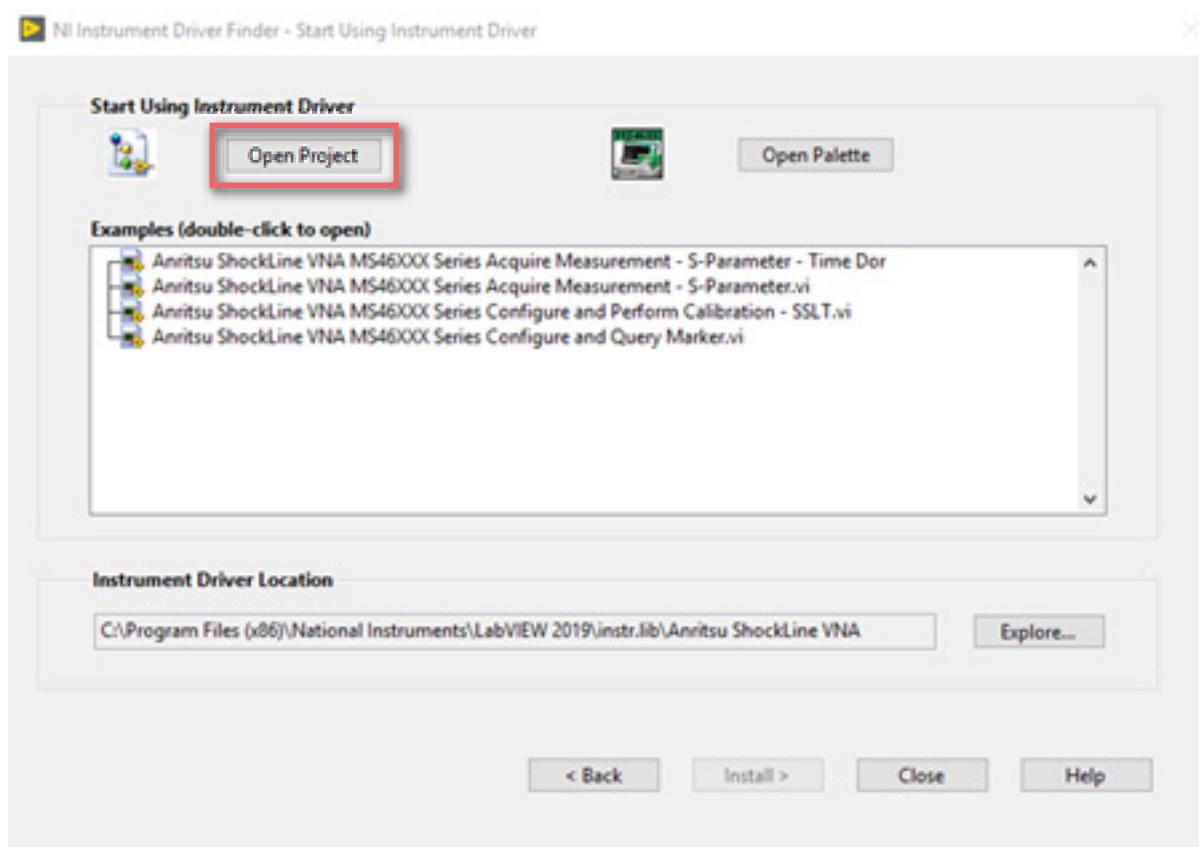


The driver is stored in:

C:\Program Files (x86)\National Instruments\LabVIEW 2019\instr.lib\Anritsu ShockLine VNA MS46XXX Series

Figure D-5. Instrument Driver Installation Location

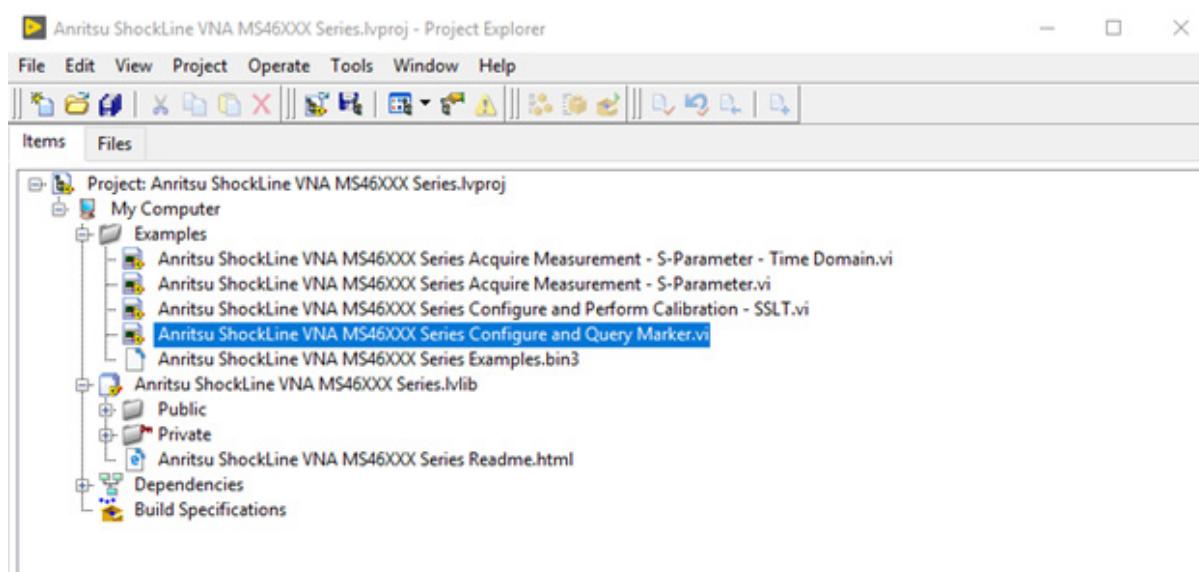
7. In the NI Instrument Finder dialog box, click Open Project.



There are four examples of ShockLine LabVIEW drivers.

**Figure D-6.** NI Instrument Driver Finder – Start Using Instrument Driver

8. A Project Explorer window is displayed.



**Figure D-7.** Project Explorer Window: Anritsu ShockLine VNA MS46XXX Series.lvproj

- The LabVIEW driver is installed.

## D-4 Connecting LabVIEW to the MS46524B

- On the ShockLine instrument, select Utilities > System > Network Interface and record the IP Address.

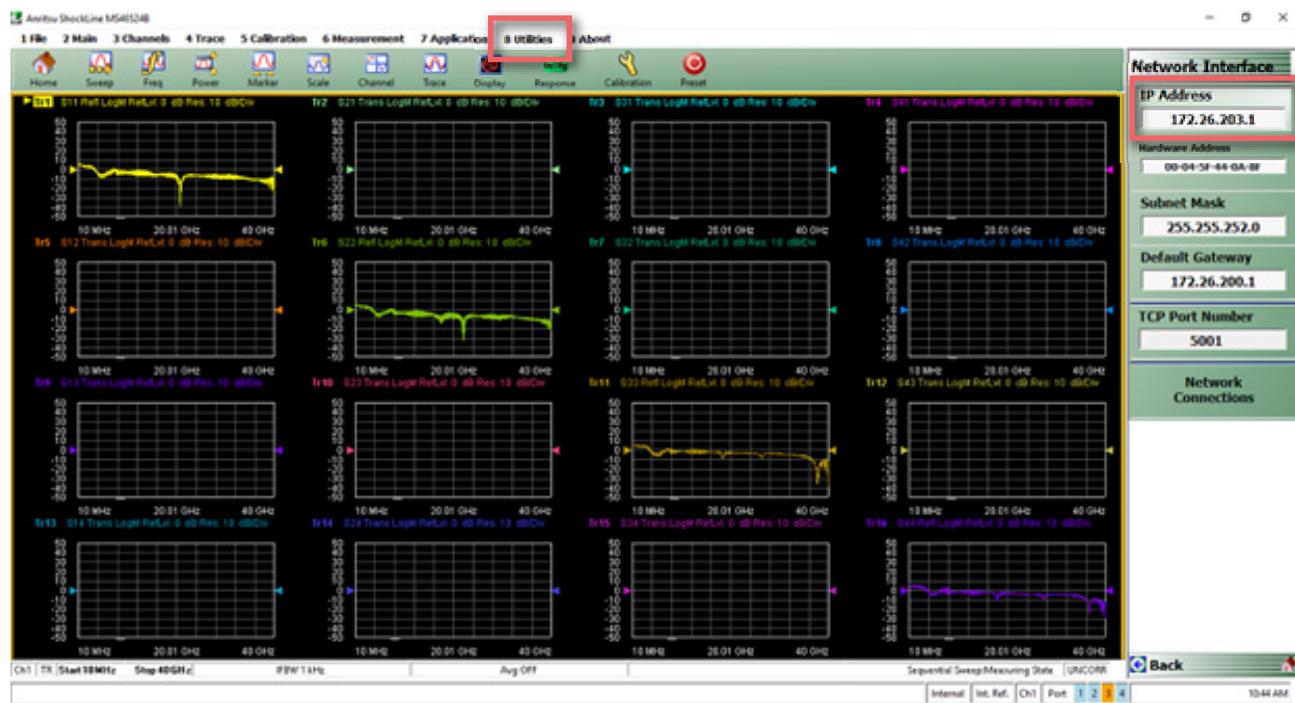
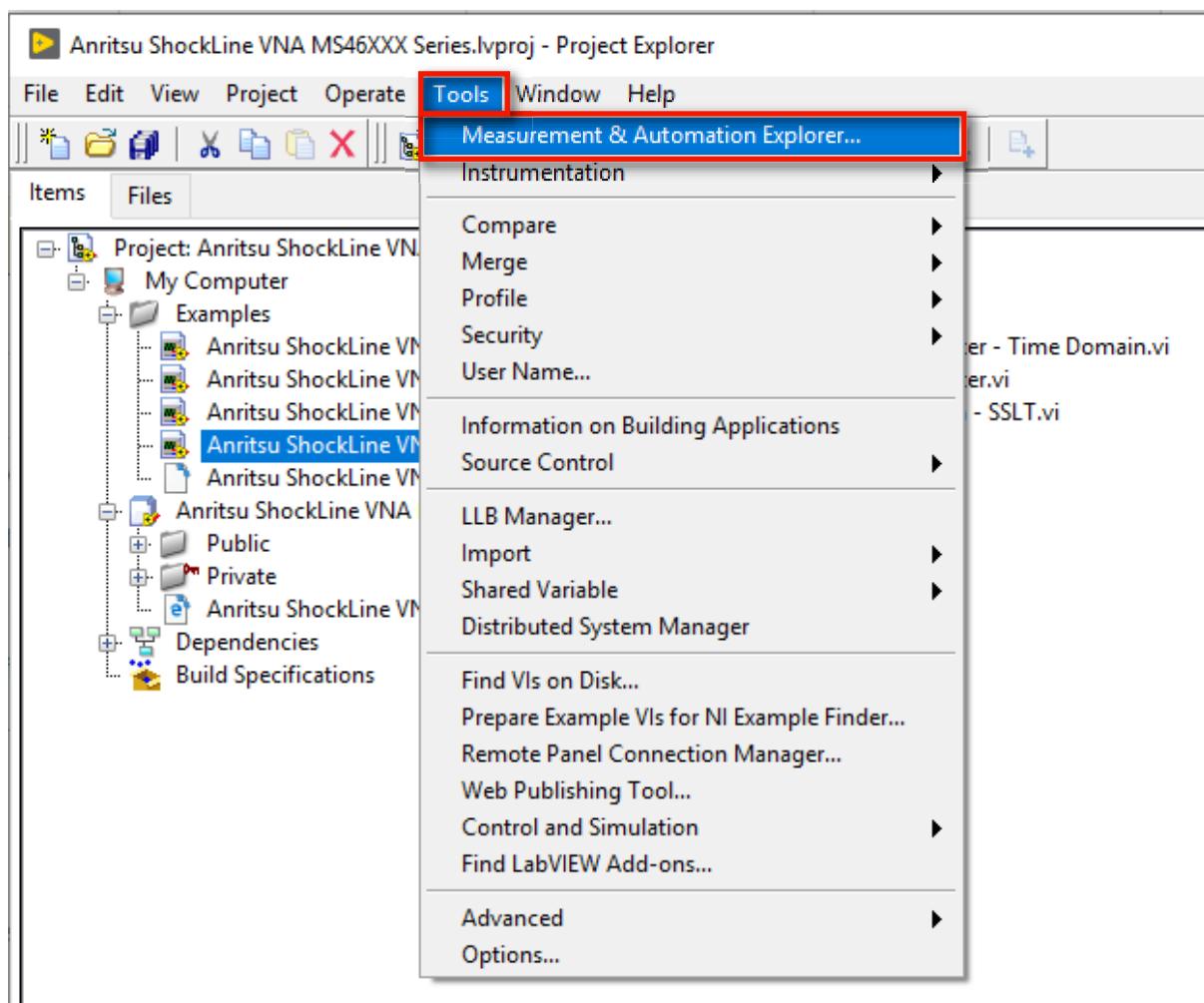


Figure D-8. ShockLine User Interface: Network Interface Menu

2. Go to the LabVIEW Project Explorer window, select Tools and then Measurement & Automation Explorer...



**Figure D-9.** Selecting Application Example

3. In the Measurement & Automation Explorer window, right-click on Devices and Interfaces.

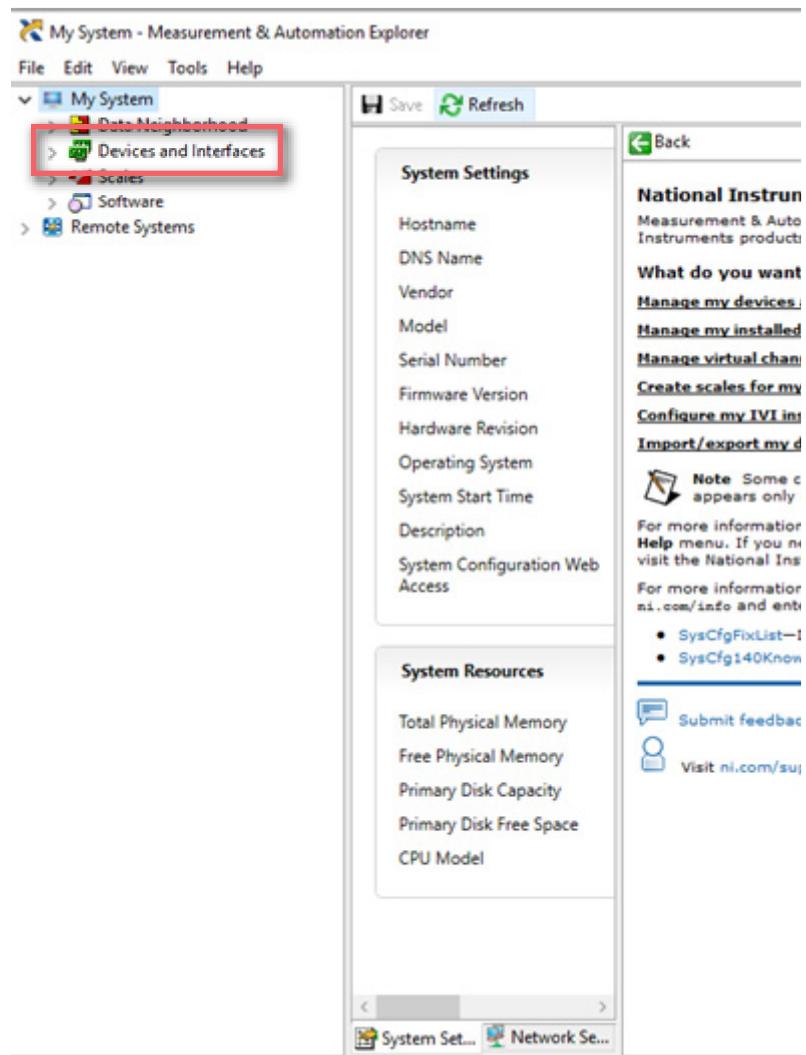


Figure D-10. Measurement & Automation Explorer Window – Devices and Interfaces

4. Click Create New...

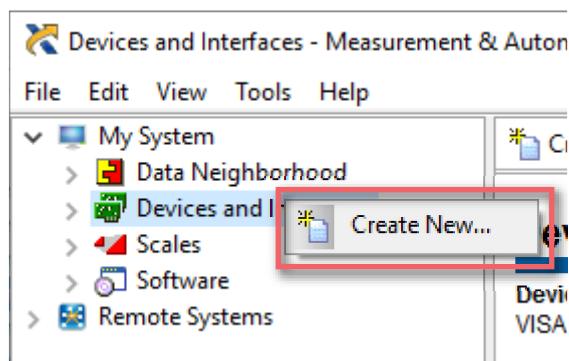


Figure D-11. Measurement & Automation Explorer Window – Create New...

5. In the Create New... dialog, select VISA TCP/IP Resource and click Next.

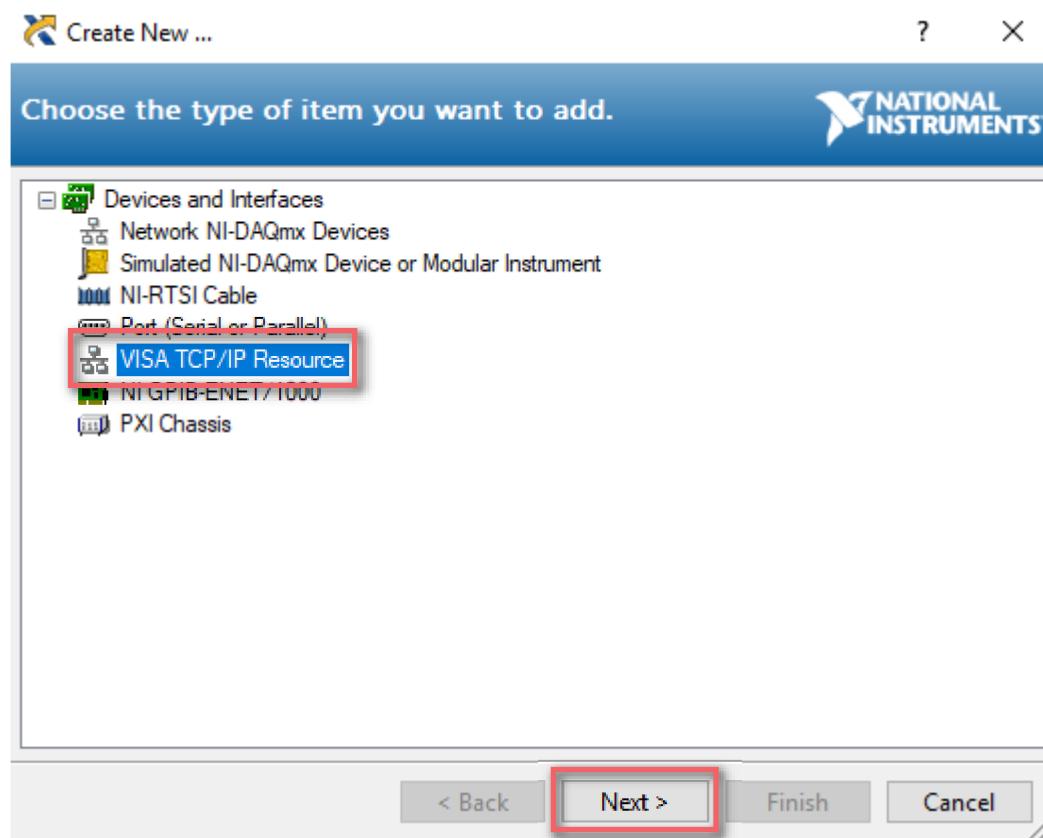


Figure D-12. Select VISA TCP/IP Resource

6. Select Manual Entry of LAN Instrument, then click Next.

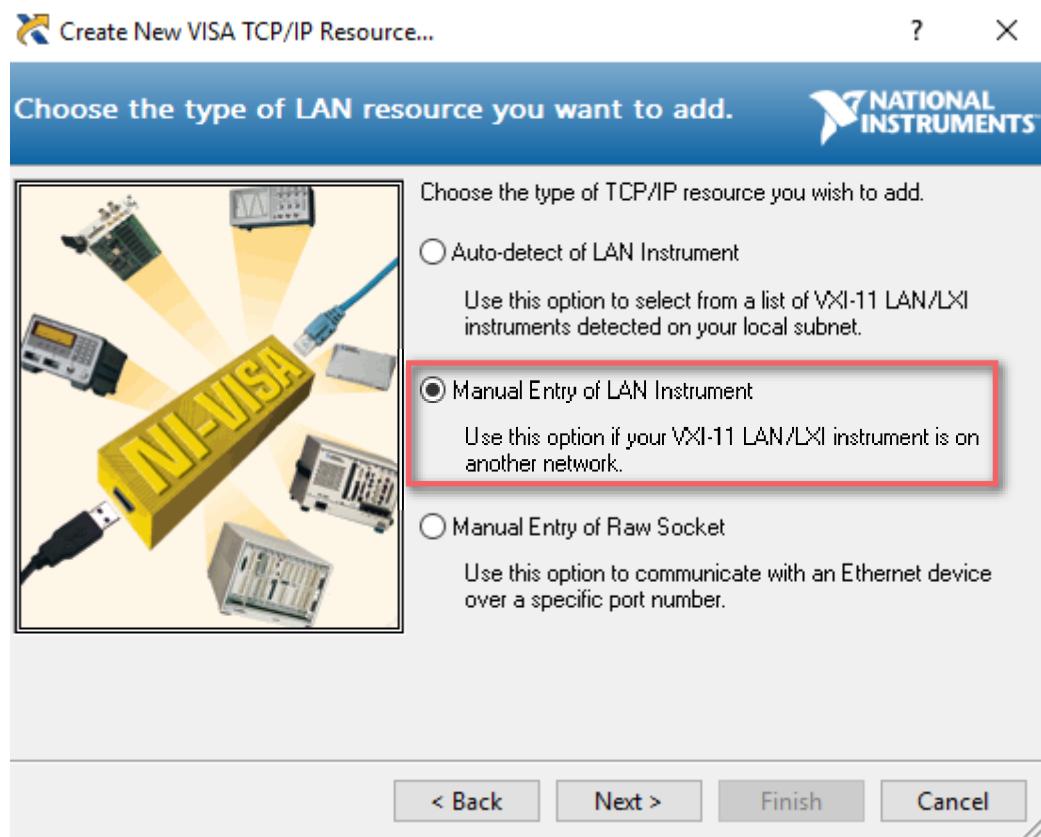
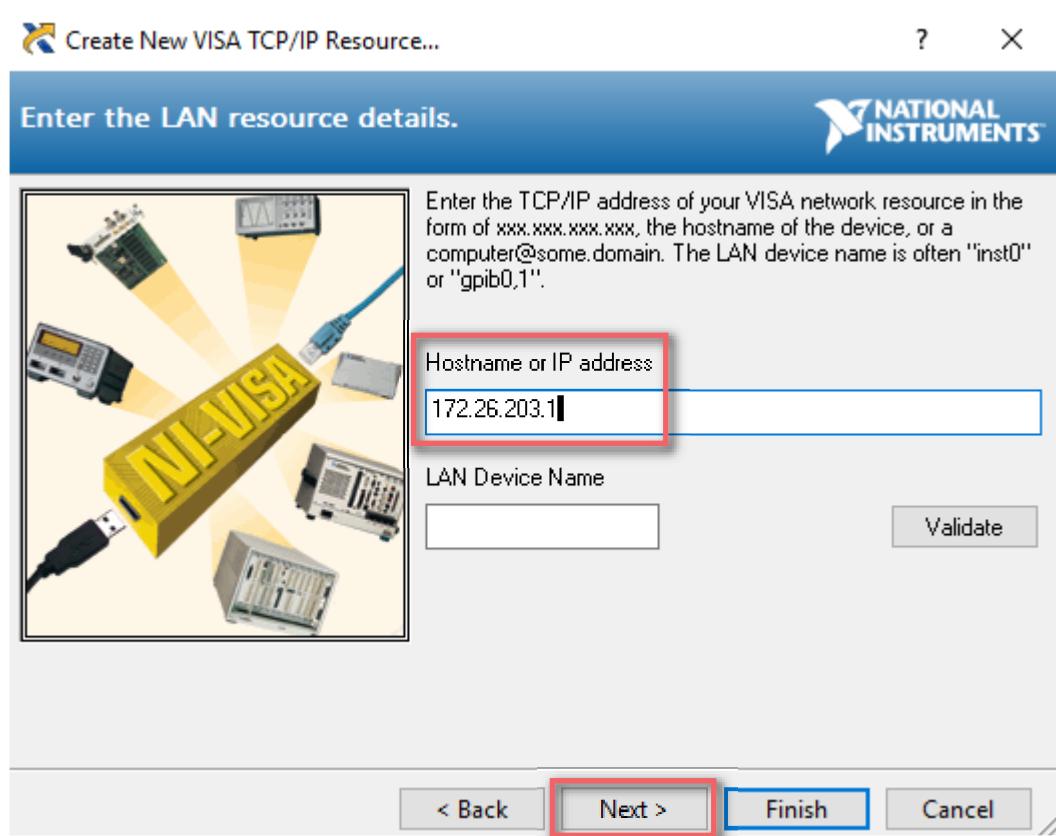


Figure D-13. Manually Create New VISA TCP/IP Resource

7. Enter the IP address that was captured from the ShockLine Application GUI in [Step 1](#), then click Next.



**Figure D-14.** Enter TCP/IP Address

8. Click Validate.

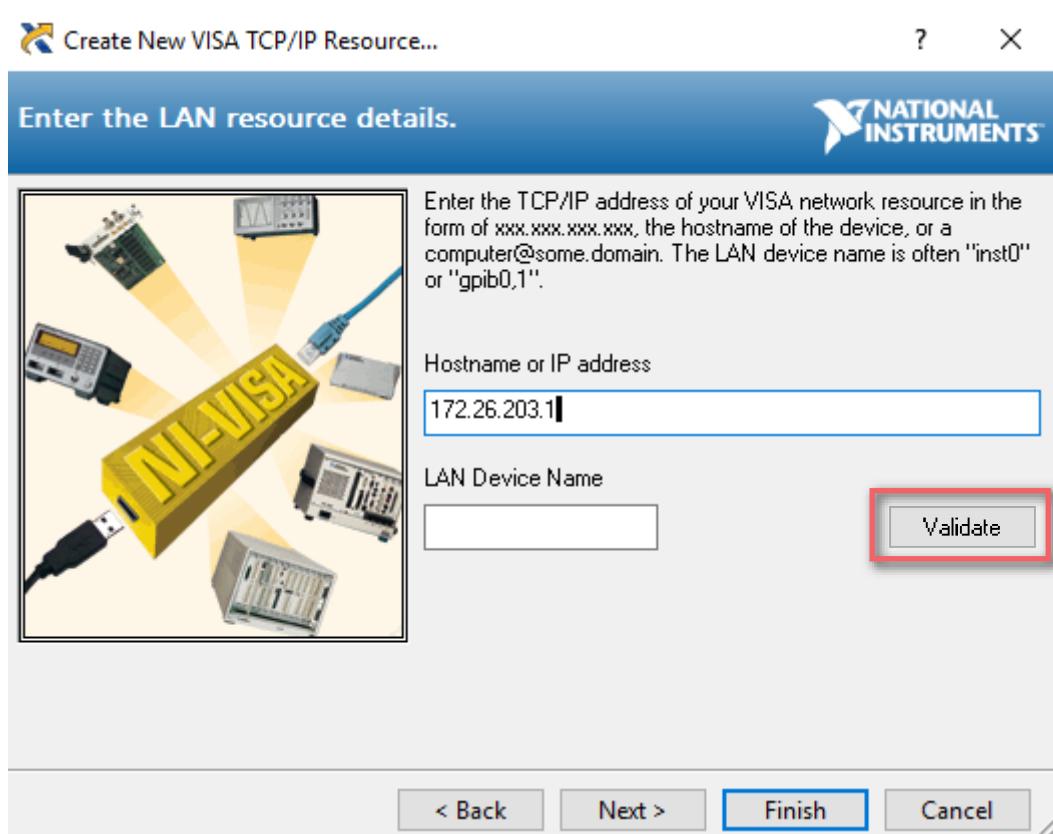
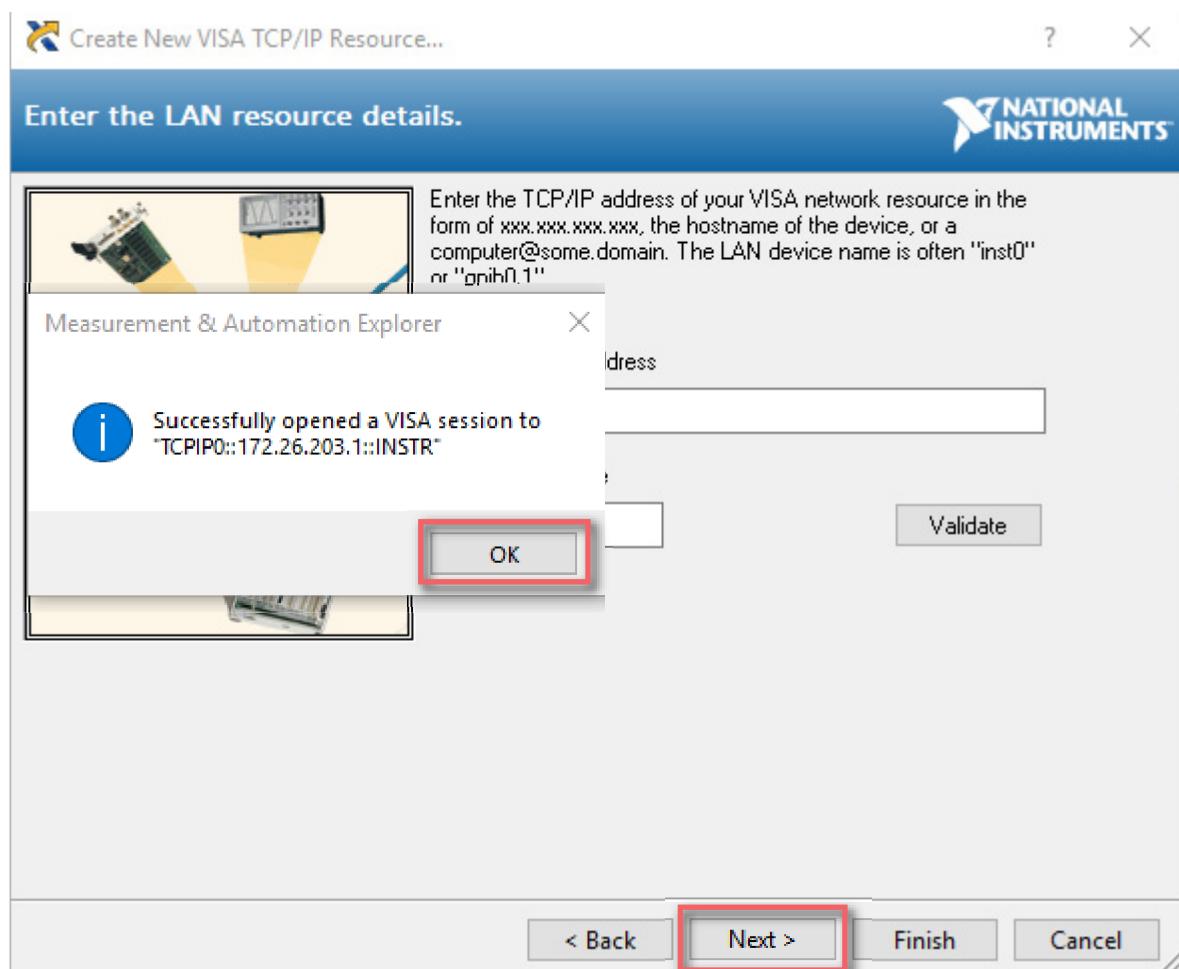


Figure D-15. Validate TCP/IP Address

9. Click OK, and then click Next.



**Figure D-16.** Successfully Opened a VISA VXI-11 Session

10. Copy the Resource Name and click Finish.

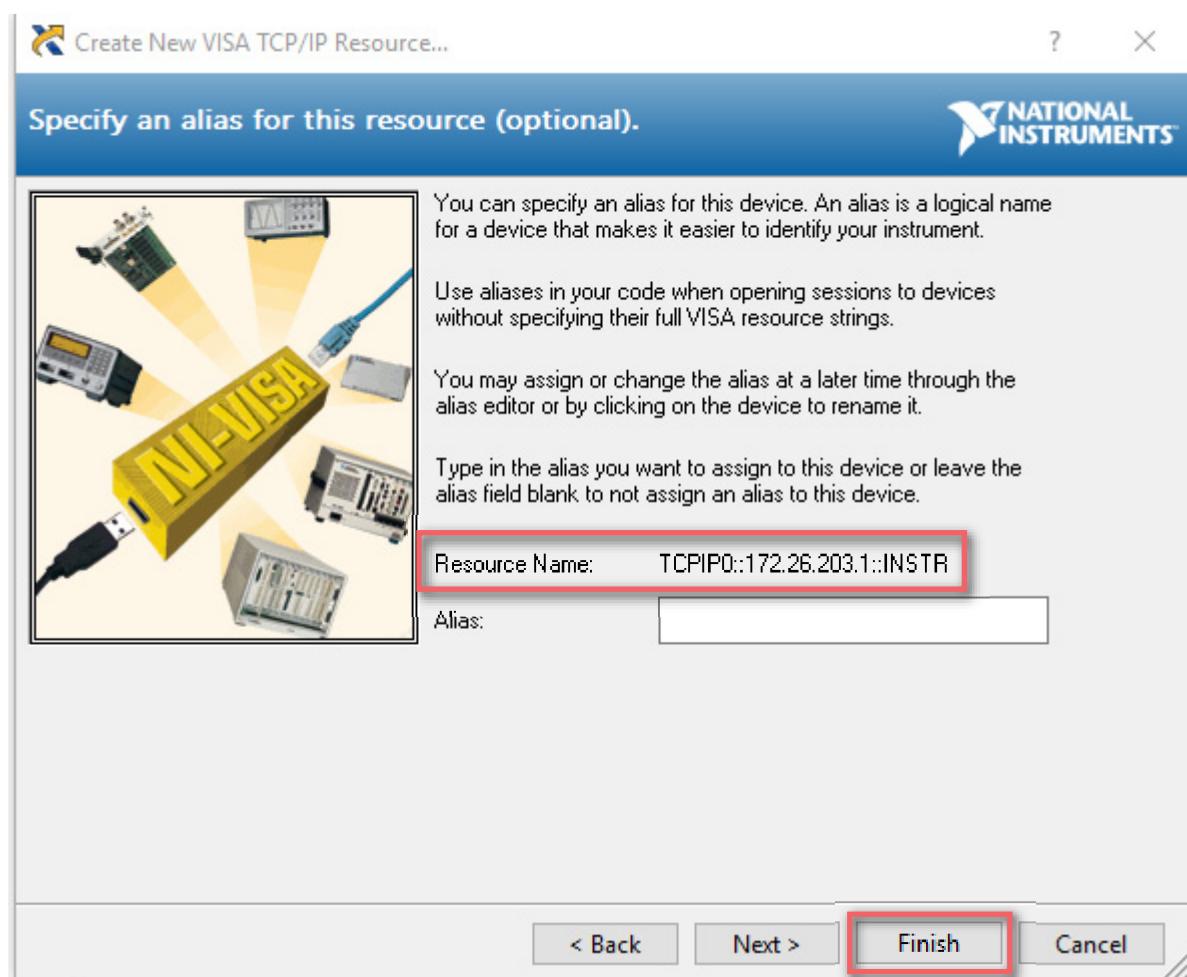


Figure D-17. Display the VISA VXI-11 Resource Name

11. An MS46524B VNA is connected to the LabVIEW project.

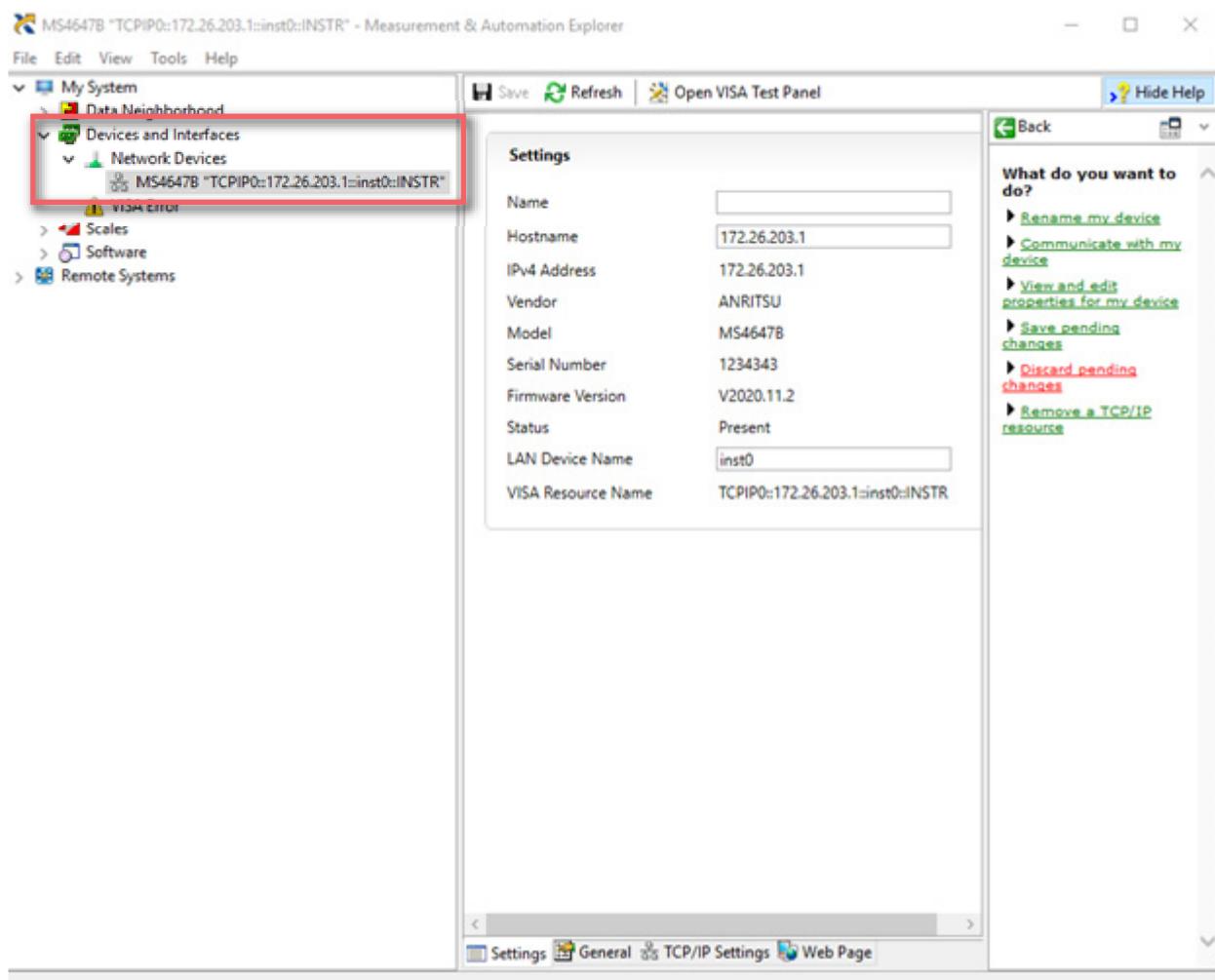


Figure D-18. Measurement & Automation Explorer Window – MS 46524B Connected to LabVIEW

## D-5 Introduction: LabVIEW Examples

The examples in the following sections are intended to introduce various methods of interacting with the MS46XXX VNA. The individual VIs used in the examples, and Example 7's VI script, are can be accessed through the Anritsu ShockLine VNA MS46XXX Series project in LabVIEW Project Explorer, as shown in [Figure D-19](#). The examples are the following:

- [Section D-6 “Example 1 – Open a Session – Get Some Instrument Information”](#)
- [Section D-7 “Example 2 – Send the \\*IDN? Command – Display Results”](#)
- [Section D-8 “Example 3 – Error Checking”](#)
- [Section D-9 “Example 4 – Acquiring Trace Data”](#)
- [Section D-10 “Example 5 – Output S2P File to PC Controller”](#)
- [Section D-11 “Example 6 – Graphic Output as a Bit-mapped BMP File”](#)
- [Section D-12 “Example 7 – Configure and Query Marker”](#)

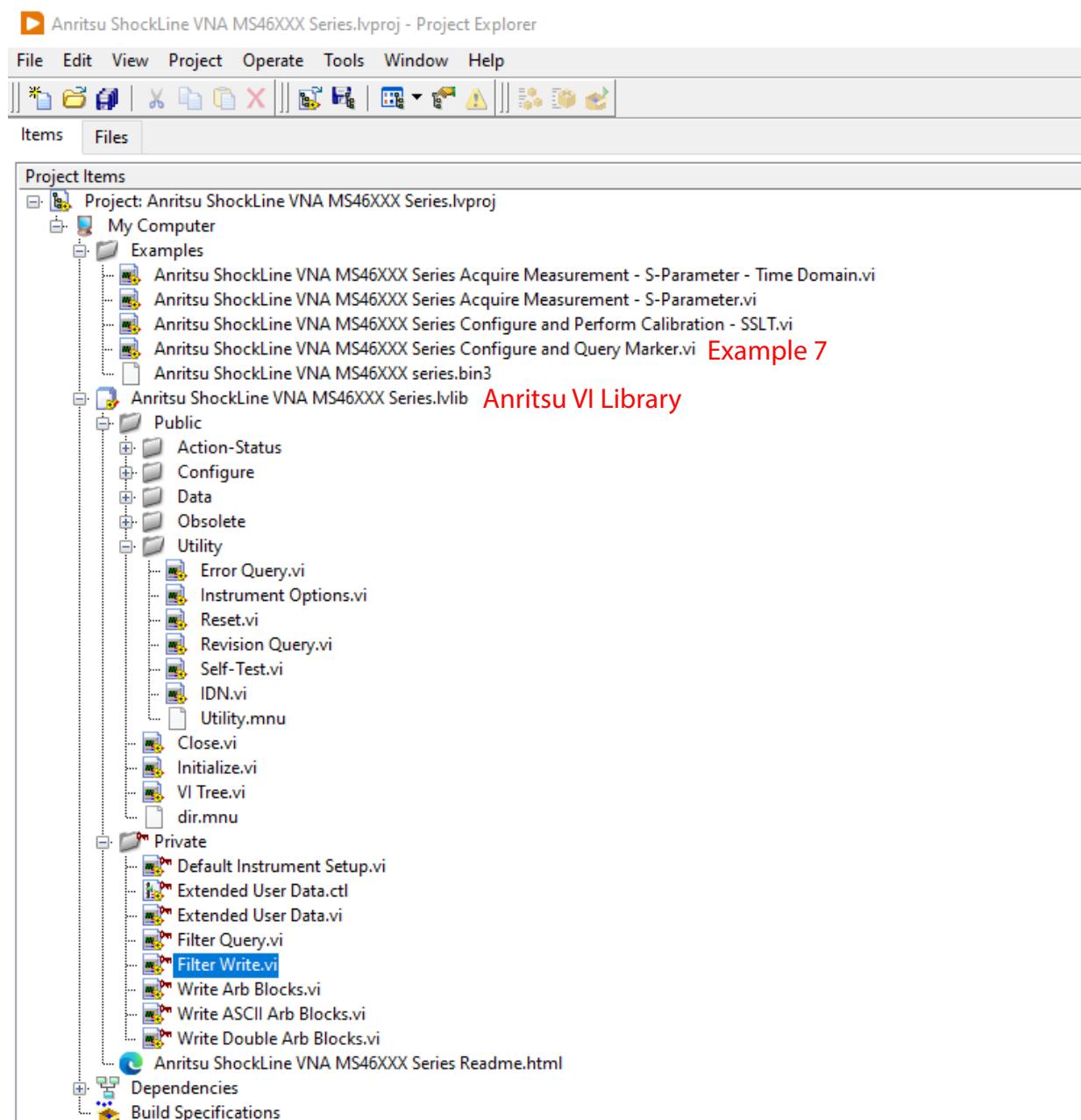
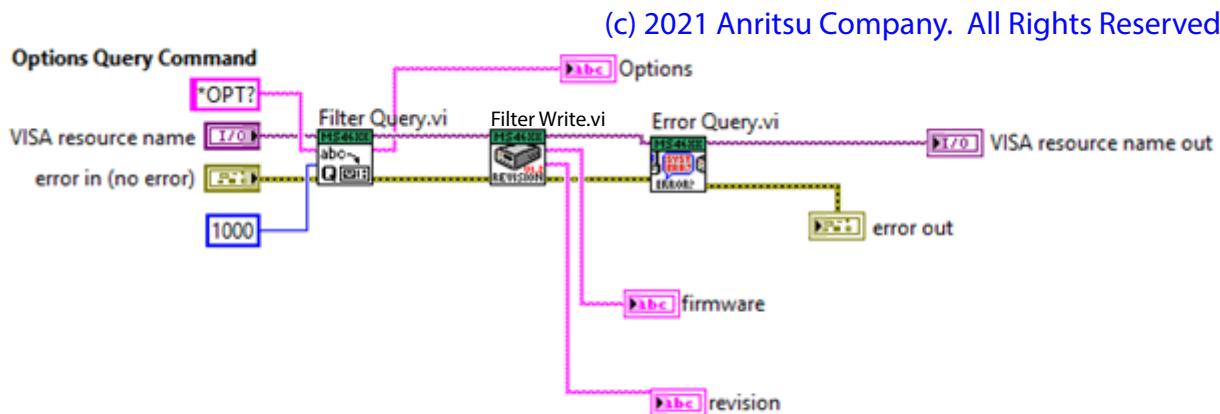


Figure D-19. Anritsu Examples and VI Directory

## D-6 Example 1 – Open a Session – Get Some Instrument Information

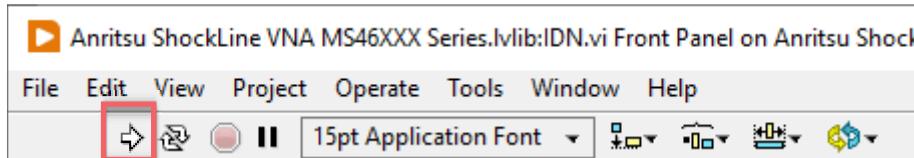
In this first example we will open a communication session to the VNA and then use driver VIs to get information about the VNA.

1. Use the Tools menu in LabVIEW to create the block diagram shown in [Figure D-20](#). This example uses two VIs from the Anritsu ShockLine VNA Series driver: (1) Filter Query.vi, (2) Error Query.vi.



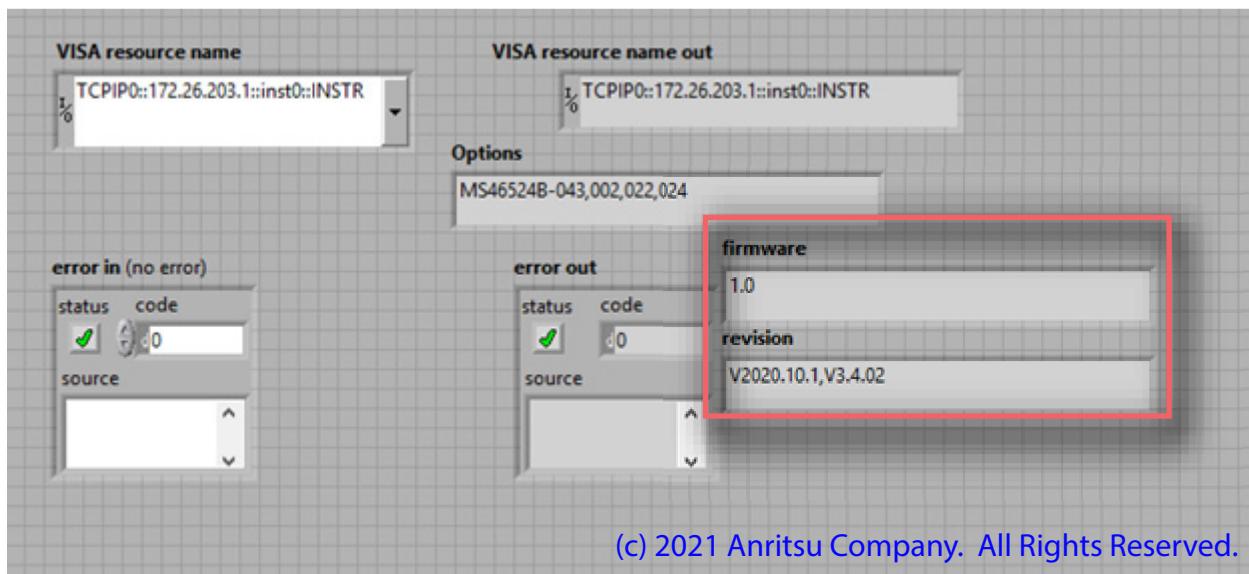
**Figure D-20.** Example 1 – Block Diagram – Open Session – Obtain Information

2. Click the Run icon.



**Figure D-21.** LabVIEW Run Command Icon

3. The VNA Firmware Version and Revision Number are displayed on the LabVIEW Front Panel.



**Figure D-22.** Example 1 – LabView Front Panel – VNA Firmware and Revision Information Displayed

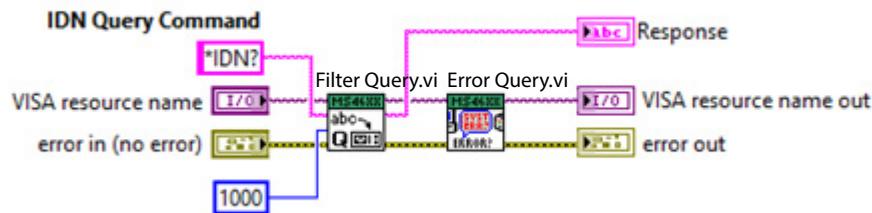
## D-7 Example 2 – Send the \*IDN? Command – Display Results

The previous example used only driver VIs to get some information from the VNA. The command “\*IDN?” returns the Manufacturer, Model #, Serial Number and Firmware Version from the VNA.

In this example we directly issue the “\*IDN?” command and then parse the different parts of the response string.

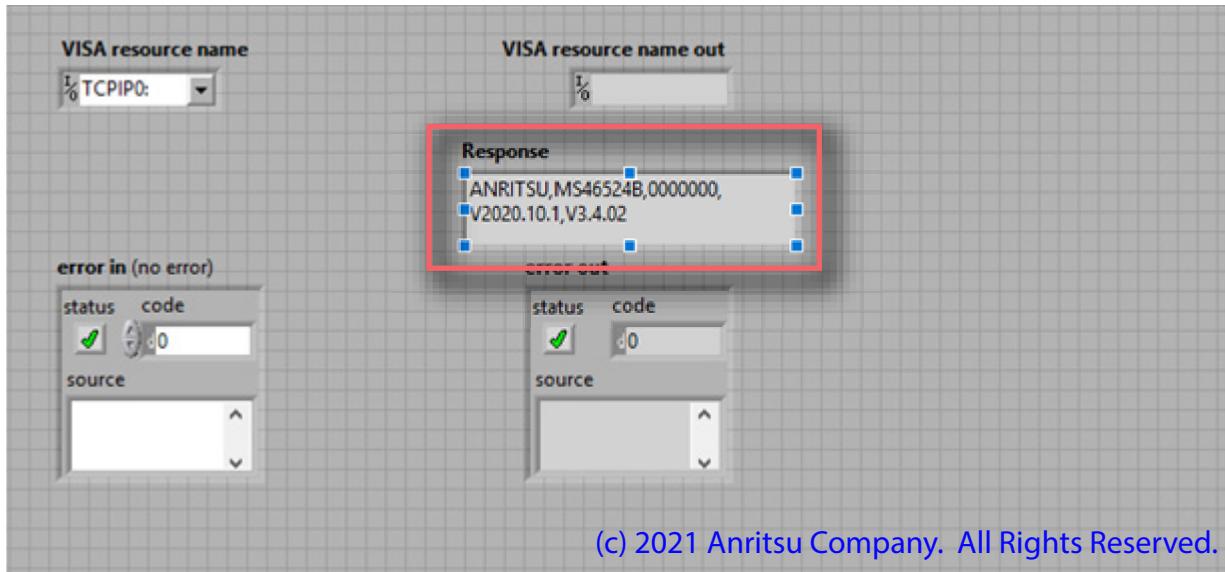
1. Use the LabVIEW Tools menu to create the block diagram shown in [Figure D-23](#). The example begins with sending the “\*IDN?” command string to the VNA using the VISA Write function. The example then reads back the response from the VNA using the VISA Read function.

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**Figure D-23.** Example 2 – Block Diagram – Send \*IDN? Command

2. Click Run.
3. Next, the example uses the Scan From String function to grab the different comma-separated values in the response string.



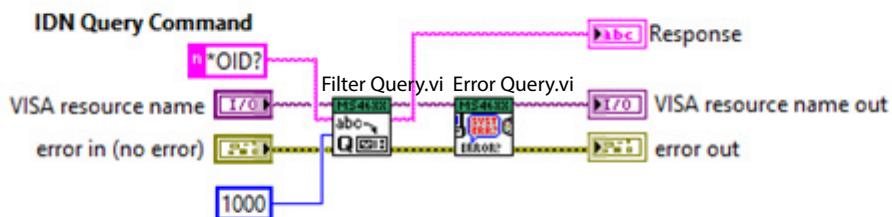
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**Figure D-24.** Example 2 – LabView Front Panel – Results Displayed

## D-8 Example 3 – Error Checking

Most of the ShockLine VNA driver VIs use Error Query.vi to capture any command errors. This example shows that if an invalid command string is sent to the VNA, then the Error Query VI will catch the error and display the error message from the VNA. Here we send \*OID?, which is not a valid command, and the instrument reports the error to the LabVIEW Front Panel.

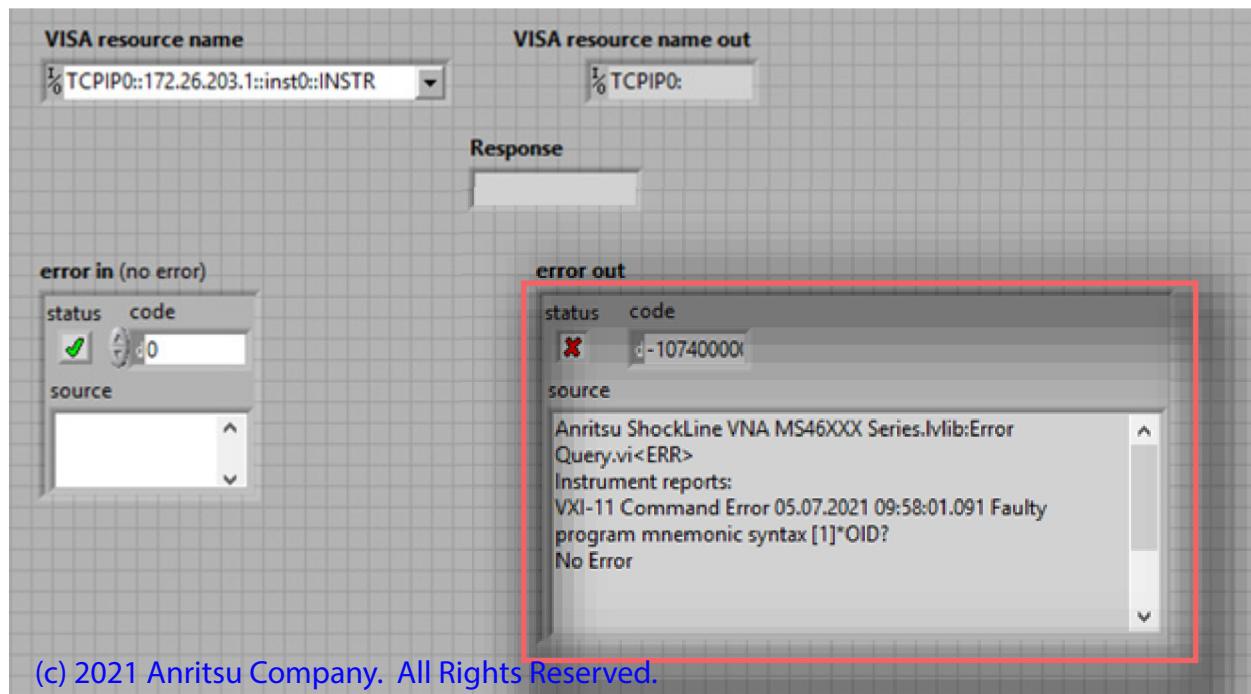
1. Use the Tools menu to create the block diagram shown in [Figure D-25](#). This example mixes VISA Writes and Reads with the ShockLine VNA driver's Error Query.vi.



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**Figure D-25.** Example 3 – Block Diagram – Error Checking

2. Click Run to send the \*OID? command, which is invalid and is captured by Error Query.vi.



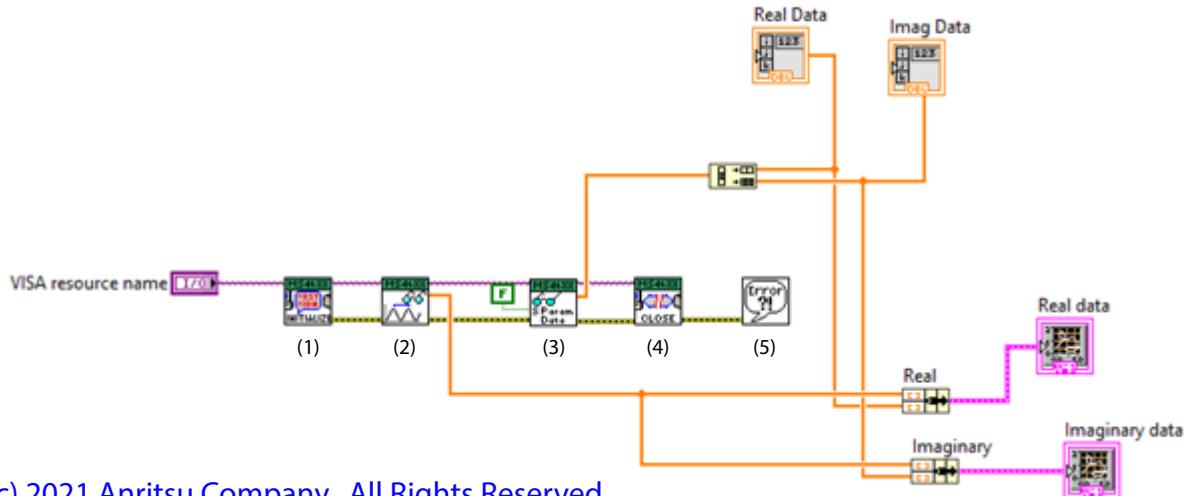
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**Figure D-26.** Example 3 – LabView Front Panel – Error Message Displayed

## D-9 Example 4 – Acquiring Trace Data

In this example we Initialize the VNA and get Real and Imaginary Data from the Active Channel. When there are two sets of data, we need to “Decimate” the one-dimensional array into two arrays since data 0, 2, 4, ... are Real data and 1, 3, 5, ... are Imaginary data.

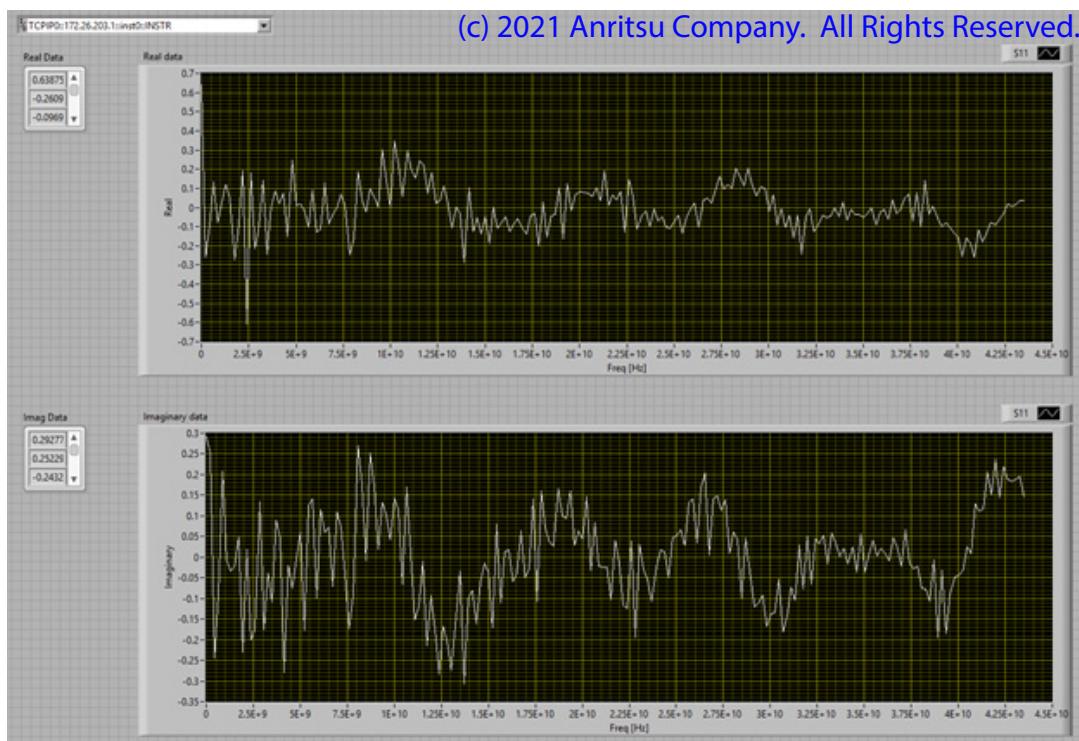
1. Use the Tools menu to create the block diagram shown in [Figure D-27](#). This example first gets Frequency Values, and then gets the S-Parameter data, which is Real and Imaginary.



- (1) Initialization.vi
- (2) Read Frequency List – Frequency.vi
- (3) Read S-Parameter Data – S-Parameter.vi
- (4) Close.vi
- (5) Simple Error Handler.nivi

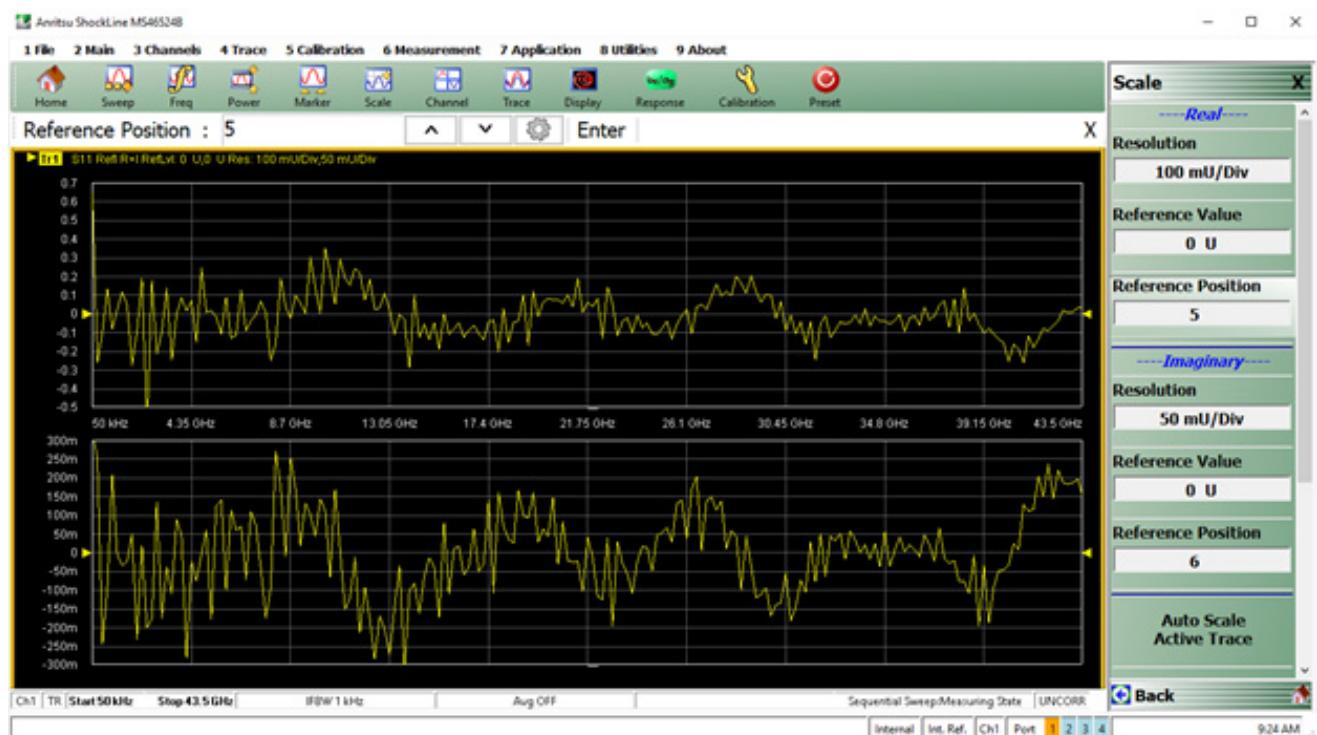
**Figure D-27.** Example 4 – Block Diagram – Acquire Trace Data

2. Separate traces are sent to each XY Graph on the LabVIEW Front Panel.



**Figure D-28.** Example 4 – LabView Front Panel – Resultant XY Graphs

3. The LabVIEW front panel display matches the ShockLine display.

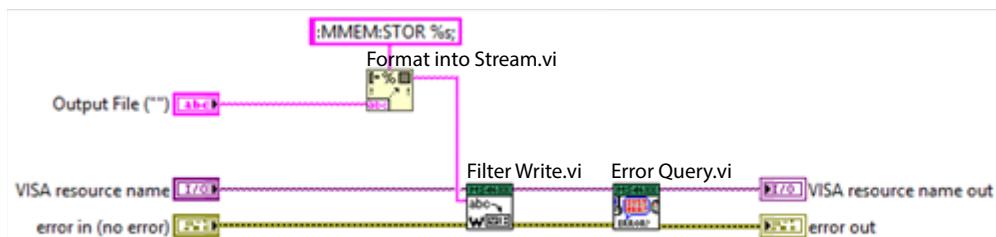


**Figure D-29.** Example 4 – ShockLine Real and Imaginary Display

## D-10 Example 5 – Output S2P File to PC Controller

This example uses VISA Writes and ShockLine VNA driver VIs to accomplish some useful things. Specifically, we are going to send some ShockLine commands to output an S2P file from the VNA to the PC.

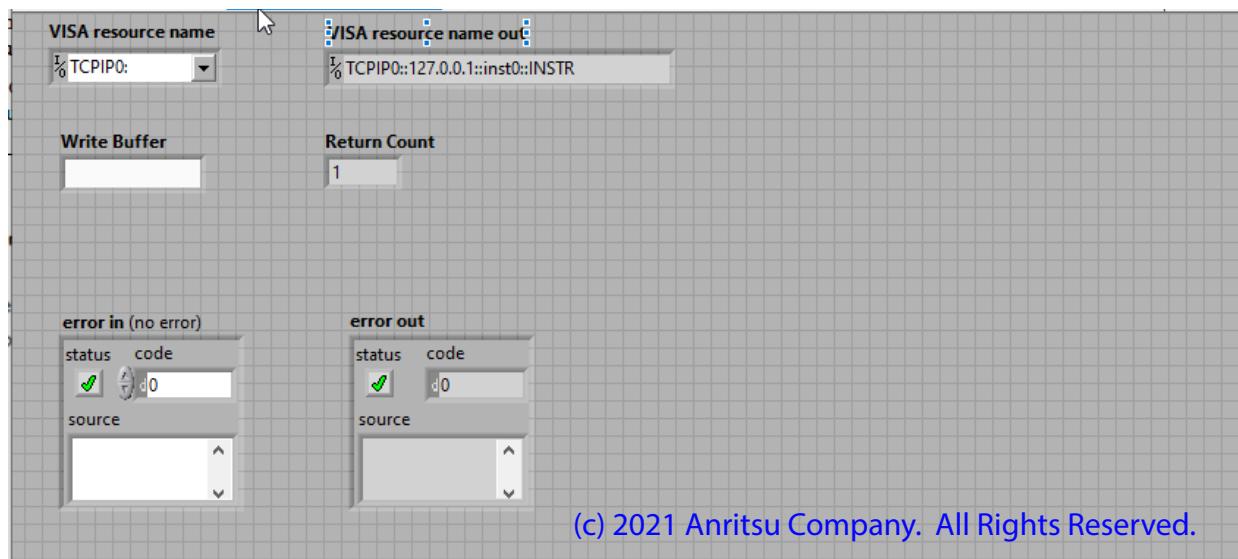
1. Use the Tools menu to create the block diagram shown in [Figure D-30](#). This example uses a combination of VISA and driver commands.



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**Figure D-30.** Example 5 – Block Diagram – Output S2P File

2. Set up the LabVIEW Front panel.



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**Figure D-31.**

3. Use ShockLine command strings or the ShockLine front panel to setup the S2P output to:
  - 25 data points (FREQUENCY menu)
  - Start and Stop frequency in Hz (FREQUENCY menu)
  - Data Format to Real/Imaginary (DISPLAY | TRACE FORMAT menu)
4. Send the :MMEMORY:STOR <string> command to set the file name.
5. The Read ASCII ARB function is used to strip off the header.

6. When the VI runs, it puts up a dialog to allow the user to select a file name to transfer to the PC. Make sure to save the file with an .S2P extension.

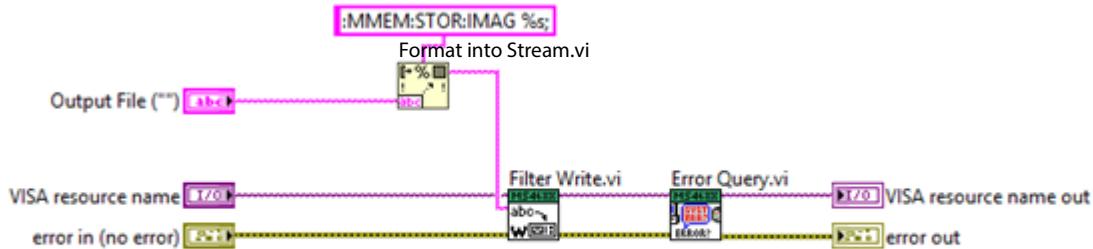
```
test.s2p - Notepad
File Edit Format View Help
MS46524B
! 0000000/M1: 92520074/M2: 92920118
! 5/6/2021 5:49:29 PM
! C:\ANRITSUVNA\TEST.S2P
! CHANNEL.1
! TR.MEASUREMENT
! CORRECTED.DATA
# GHZ S RI R 50.0
! FREQ.GHZ      S11RE      S11IM      S21RE      S21IM      S12RE      S12IM      S22RE      S22IM
!; PortSelection: Port_12
  5.0000000000 -76.2683100 65.0589000 0.0007018 0.0004107 0.0000811 0.0001146 13.2796200 -5.9466270
  5.0175000000 88.6948900 116.9279000 0.0000566 -0.0035118 -0.0001453 0.0008609 12.7939200 -53.3248000
  5.0350000000 23.3578300 26.7882100 0.0000085 -0.0000667 0.0001987 -0.0000166 19.9318500 -20.0861400
  5.0525000000 24.1398100 -15.9272200 -0.0001238 0.0000560 -0.0003138 -0.0001150 48.5404100 13.5766700
  5.0700000000 51.9573300 -286.6815000 0.0004359 0.0012528 0.0001295 -0.0000120 21.1511400 -4.7865940
  5.0875000000 -105.0049000 54.1307200 0.0000988 0.0000224 0.0006885 -0.0007365 9.4707790 11.2389900
  5.1050000000 13.3680700 38.6723400 0.0000309 0.0000996 -0.0001478 -0.0002226 31.0513700 2.2861240
  5.1225000000 22.9488800 26.7031700 -0.0001037 -0.0000433 -0.0000668 0.0000271 20.0667000 -31.5887200
  5.1400000000 1.5192180 -34.5490300 -0.0000822 0.0001591 -0.0000951 0.0000373 24.9595000 1.2842320
  5.1575000000 50.5547800 -14.3820000 0.0004299 -0.0001713 0.0001387 0.0001460 15.6111200 -5.3284130
  5.1750000000 183.4200000 35.1156700 0.0005732 -0.0000425 -0.0008391 -0.0018772 23.3200900 23.1694400
  5.1925000000 22.0048100 69.5420200 -0.0013338 -0.0002103 0.0005730 0.0002329 61.9275200 -78.4264700
  5.2100000000 -68.3810900 -12.1531400 0.0001213 -0.0002649 0.0001839 -0.0009674 7.2819260 31.5621400
  5.2275000000 -132.1555000 -47.1694800 -0.0018640 0.0029586 -0.0024584 -0.0002305 98.7157900 6.8003060
  5.2450000000 24.9272700 33.6685600 -0.0000865 0.0001824 0.0001649 -0.0002044 21.4789200 -6.6859150
  5.2625000000 36.1727900 72.1176200 0.0001396 0.0001582 0.0001053 0.0001734 16.8842400 -7.4543270
  5.2800000000 75.4125400 158.9189000 0.0006824 -0.0013036 -0.0002372 0.0002777 18.0223400 -12.7792500
  5.2975000000 42.7616100 2.9466040 -0.0002179 -0.0000716 0.0000064 0.0000628 20.4122300 -0.2390275
  5.3150000000 32.6858100 22.0197000 -0.0000739 -0.0000668 -0.0002655 -0.0003368 21.5998500 -3.9257500
  5.3325000000 16.7306300 16.0062400 0.0000690 -0.0000101 0.0000332 0.0000273 24.8804300 -5.2755680
  5.3500000000 67.9734600 -39.7734700 0.0001431 0.00003036 -0.0000324 0.0000686 20.7478400 -7.1848840
  5.3675000000 27.0582200 -2.4023260 -0.0004814 -0.00008443 0.0001862 0.0001603 -104.9774000 -34.7205100
  5.3850000000 138.4816000 35.6421700 -0.0012659 -0.0004525 0.0027880 -0.0056132 -11.1263000 61.9537200
  5.4025000000 37.4773200 11.0609400 -0.0000772 -0.0004173 0.0001700 0.0004031 43.4003900 -5.8682420
  5.4200000000 14.6389600 -18.9258600 -0.0005132 -0.0001671 0.0009184 -0.0019851 -22.8714300 195.6541000
  5.4375000000 40.5287600 -32.1993500 -0.0000792 0.0000910 -0.0000286 -0.0001467 38.0946800 -4.7464280
  5.4550000000 -19.9588000 44.1471800 -0.0000881 -0.0000483 -0.0010275 0.0001712 28.5849200 12.2220700
  5.4725000000 29.8838900 34.9973800 -0.0000428 -0.0001953 0.0001914 -0.00006410 48.8493000 -9.2200270
  5.4900000000 29.2962200 21.8839100 -0.0000551 0.0001031 -0.0000247 0.00001653 26.0388400 15.9190600
  5.5075000000 35.7039100 -5.1070740 0.00002898 0.0001035 0.0000189 -0.0000114 19.2701900 3.4596700
  5.5250000000 -2.6406820 68.1710400 -0.0004816 -0.0006993 0.0000653 0.0005136 26.6396200 34.7702700
  5.5425000000 -67.6181700 -47.0835600 -0.0005416 -0.0003061 -0.0003323 -0.0002995 18.7824300 4.1764500
  5.5600000000 56.1978700 -3.1761490 -0.0003911 0.0001737 -0.0000102 -0.0000466 68.0208700 -11.9939900
```

**Figure D-32.** Example 5 – Output File – S2P File Transferred to the PC Controller

## D-11 Example 6 – Graphic Output as a Bit-mapped BMP File

We can use a similar technique as Example 5 to get the bitmap data to a file.

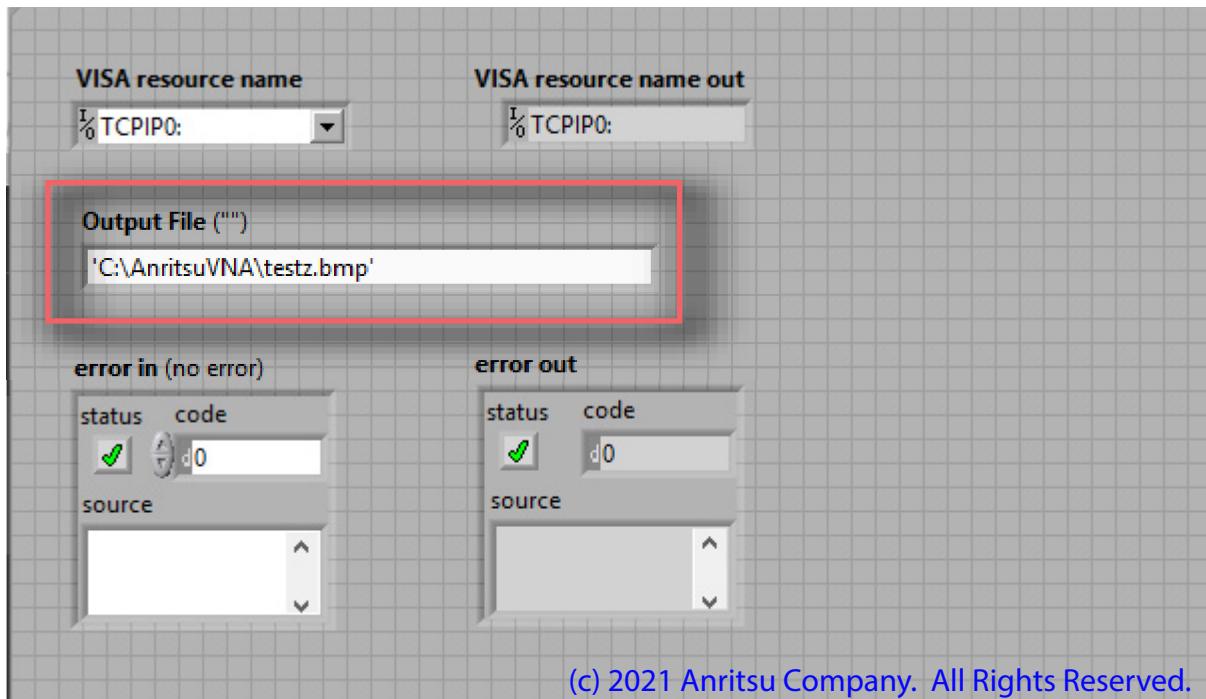
1. Use the Tools menu to create the block diagram shown in [Figure D-33](#).



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**Figure D-33.** Example 6 – Block Diagram – Graphic Output as a BMP File

2. First, the example uses the :MMEM:STOR:IMAG SCPI command to output a bitmap file. This selects Color on White as the color scheme by default, as this makes for better printouts. Note that the file is written to a binary file.
3. When the VI runs, it puts up a dialog to allow the user to select a file name. Make sure to save the file with a ".BMP" extension.



**Figure D-34.** Example 6 – LabView Front Panel – Graphic Output as a BMP File

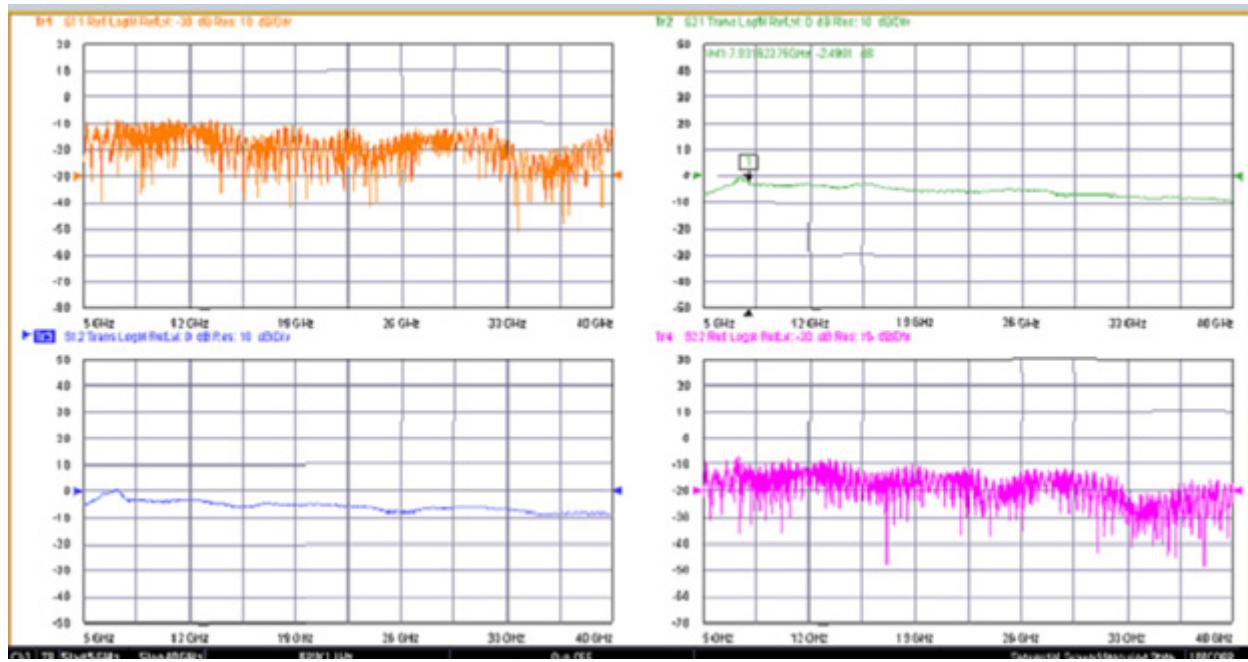
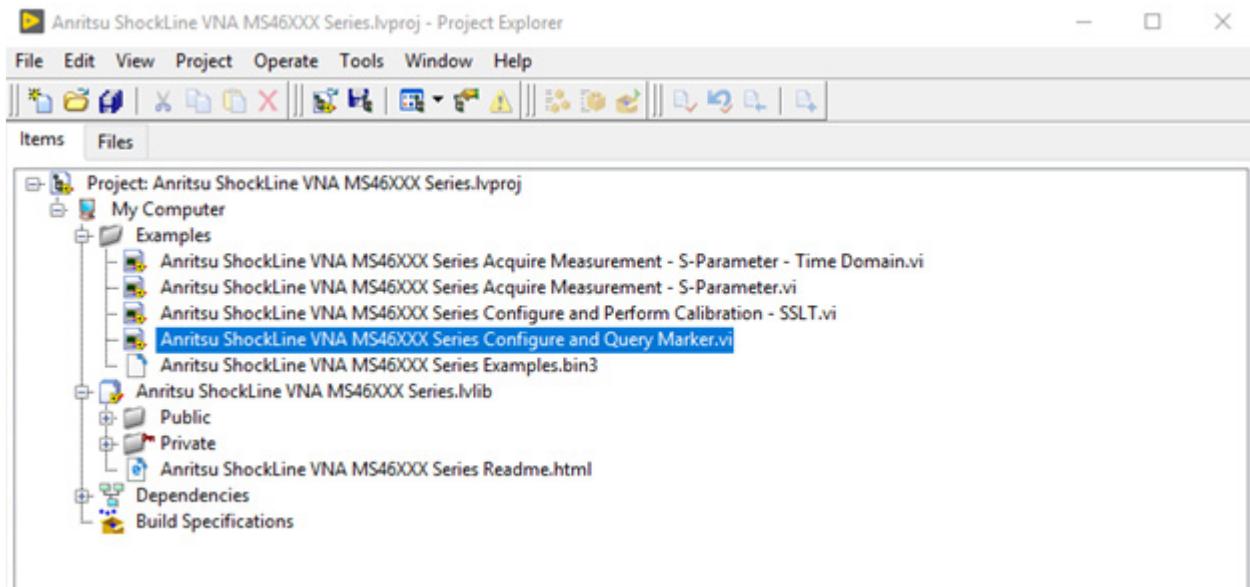


Figure D-35. Example 6 – Output – Graphic Output as a BMP File

## D-12 Example 7 – Configure and Query Marker

1. Go to C:\Program Files (x86)\National Instruments\LabVIEW 2019\instr.lib\Anritsu ShockLine VNA MS46XXX Series\Examples.
2. Double-click on **Anritsu ShockLine VNA MS46XXX Series Configure and Query Marker.vi**



**Figure D-36.** Example 7 – Project Explorer Window – Configure and Query Marker.vi Example Selected

3. Click in LabVIEW Front Panel VISA resource name area and select the VISA resource name that is connected to the MS46524B. Click Run.

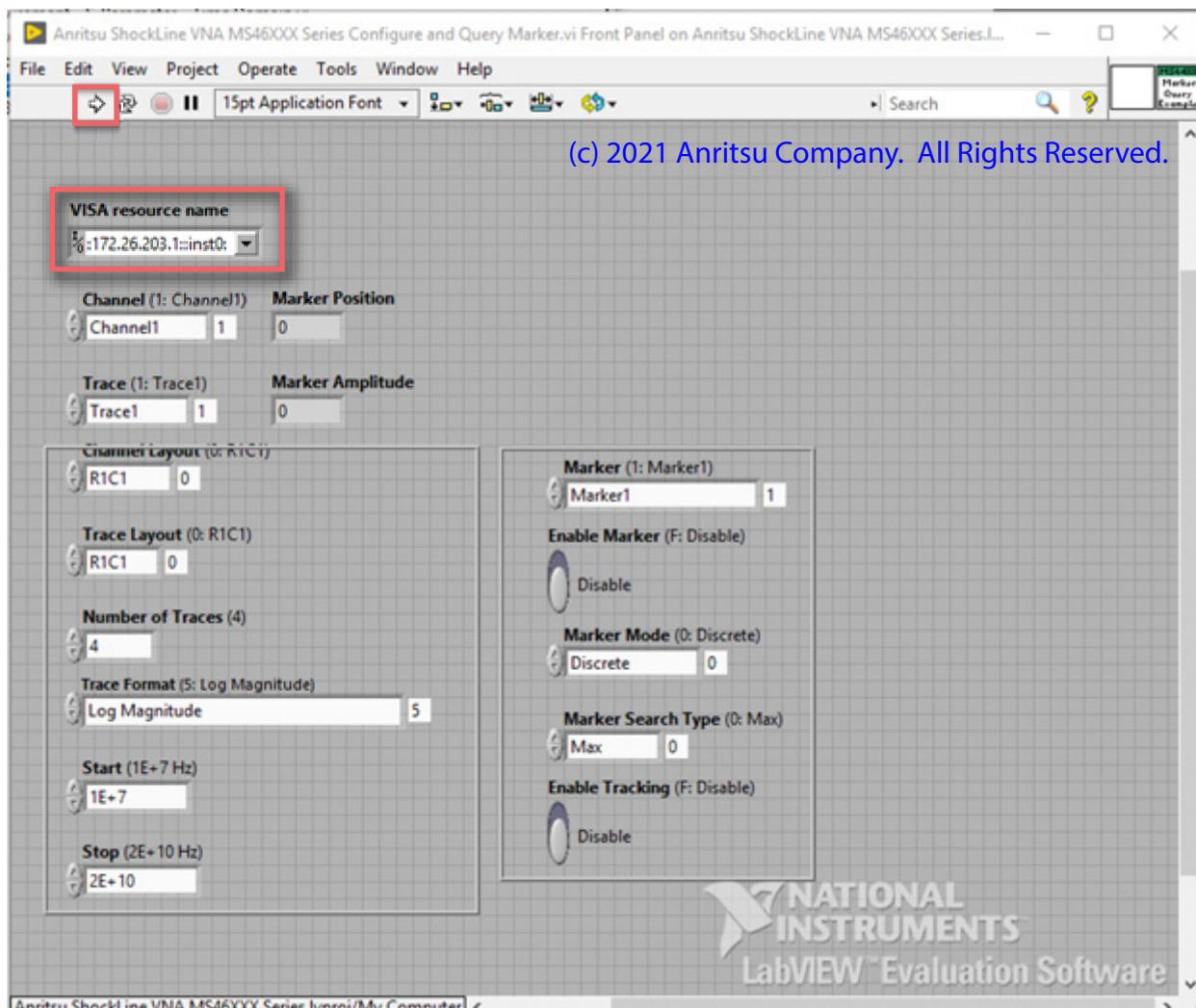


Figure D-37. Example 7 – LabView Front Panel – Connect to VISA Resource

4. To open the block diagram, use the Tools menu.

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- (1) Initialization.vi
- (2) Configure Channel Layout.vi
- (3) Configure Trace Number.vi
- (4) Configure Trace Layout.vi
- (5) Configure Trace Format.vi.
- (6) Configure Sweep Range (Start Sweep).vi
- (7) Configure Marker.vi
- (8) Configure Marker Search.vi
- (9) Query Marker.vi
- (10) Close.vi
- (11) Simple Error Handler.nivi

**Figure D-38.** Example 7 – Block Diagram – Anritsu ShockLine VNA MS46XXX – Configure and Query Marker.vi

5. Verify that the marker amplitude shown on the LabVIEW Front Panel matches the marker value displayed on the VNA Trace Display (Figure D-40).

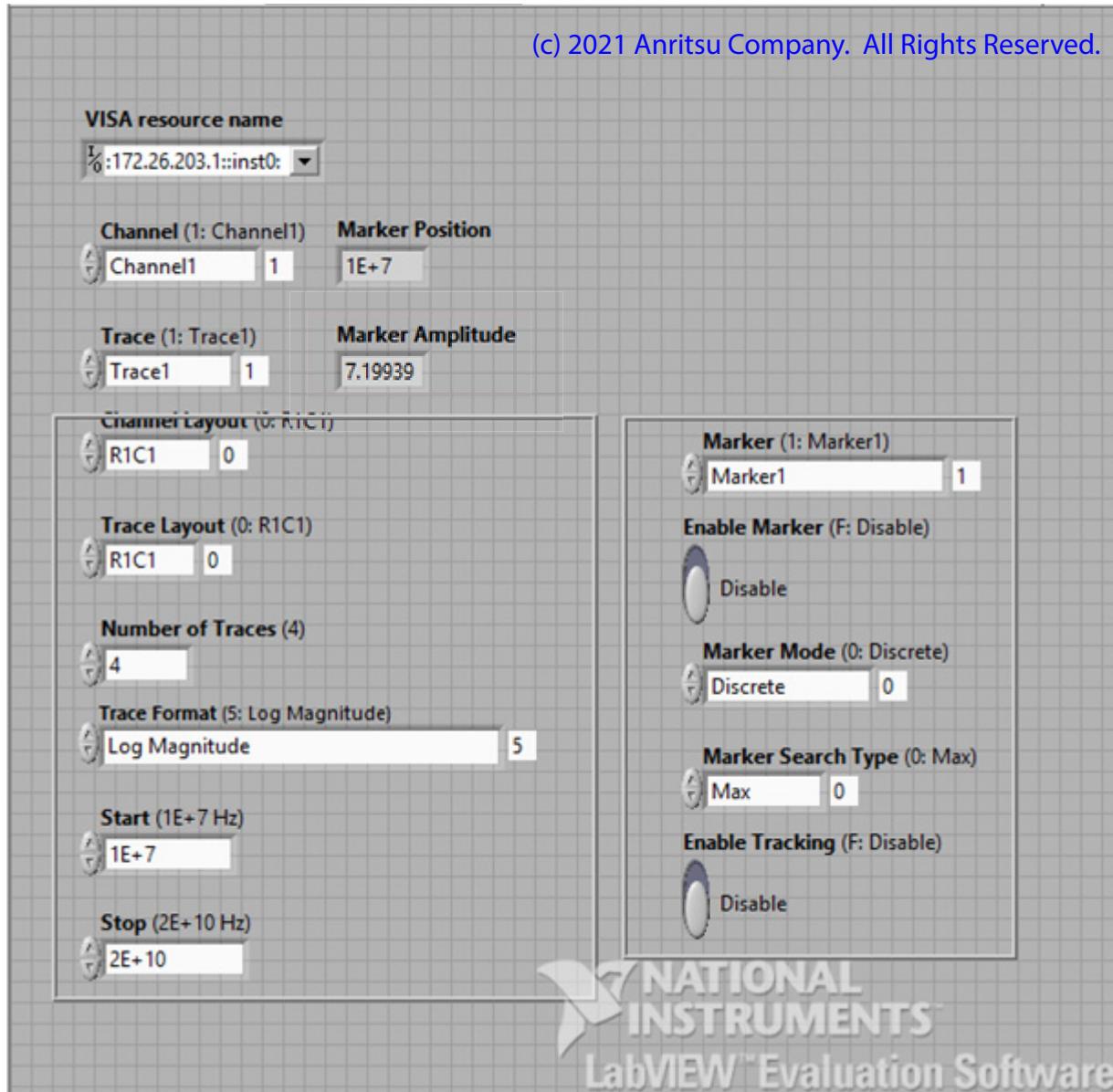


Figure D-39. Example 7 – LabView Front Panel – Result After Run

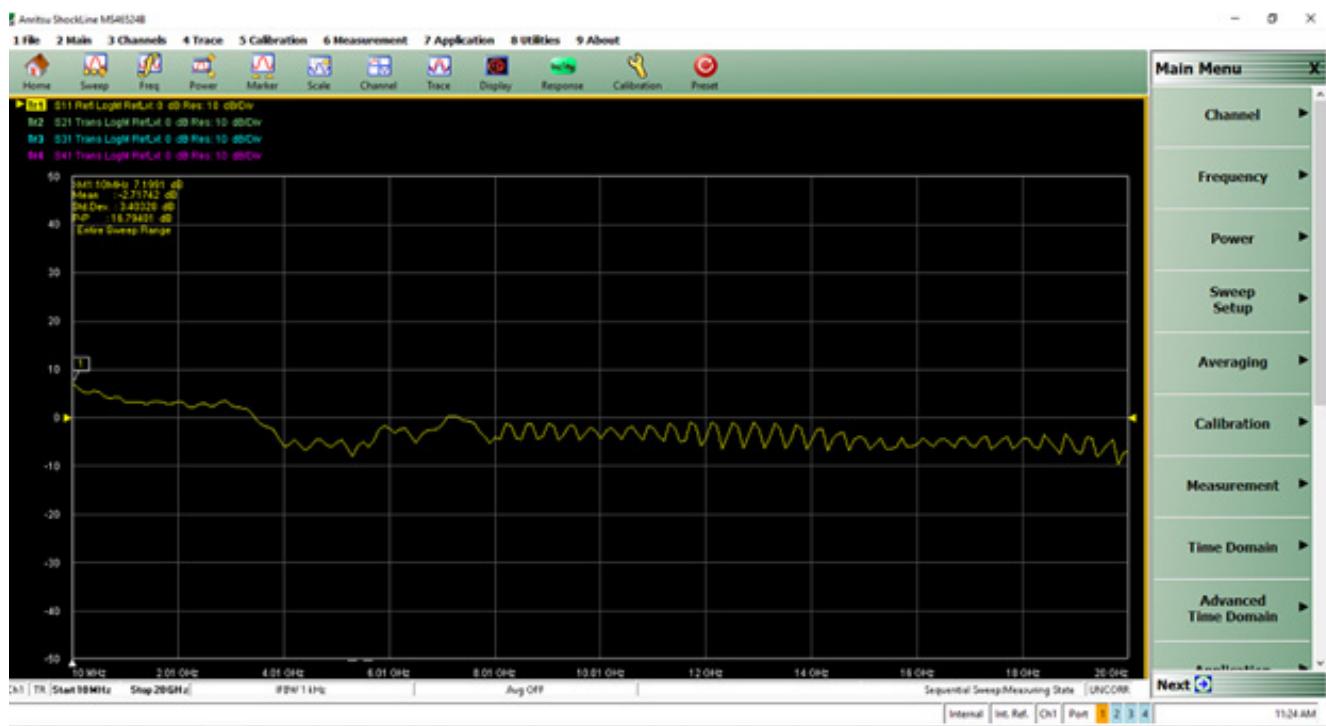


Figure D-40. Example 7 – ShockLine Display – Result After Run

6. Zoom in on the marker to confirm that the marker value is the same between LabView Front Panel and the VNA Display.

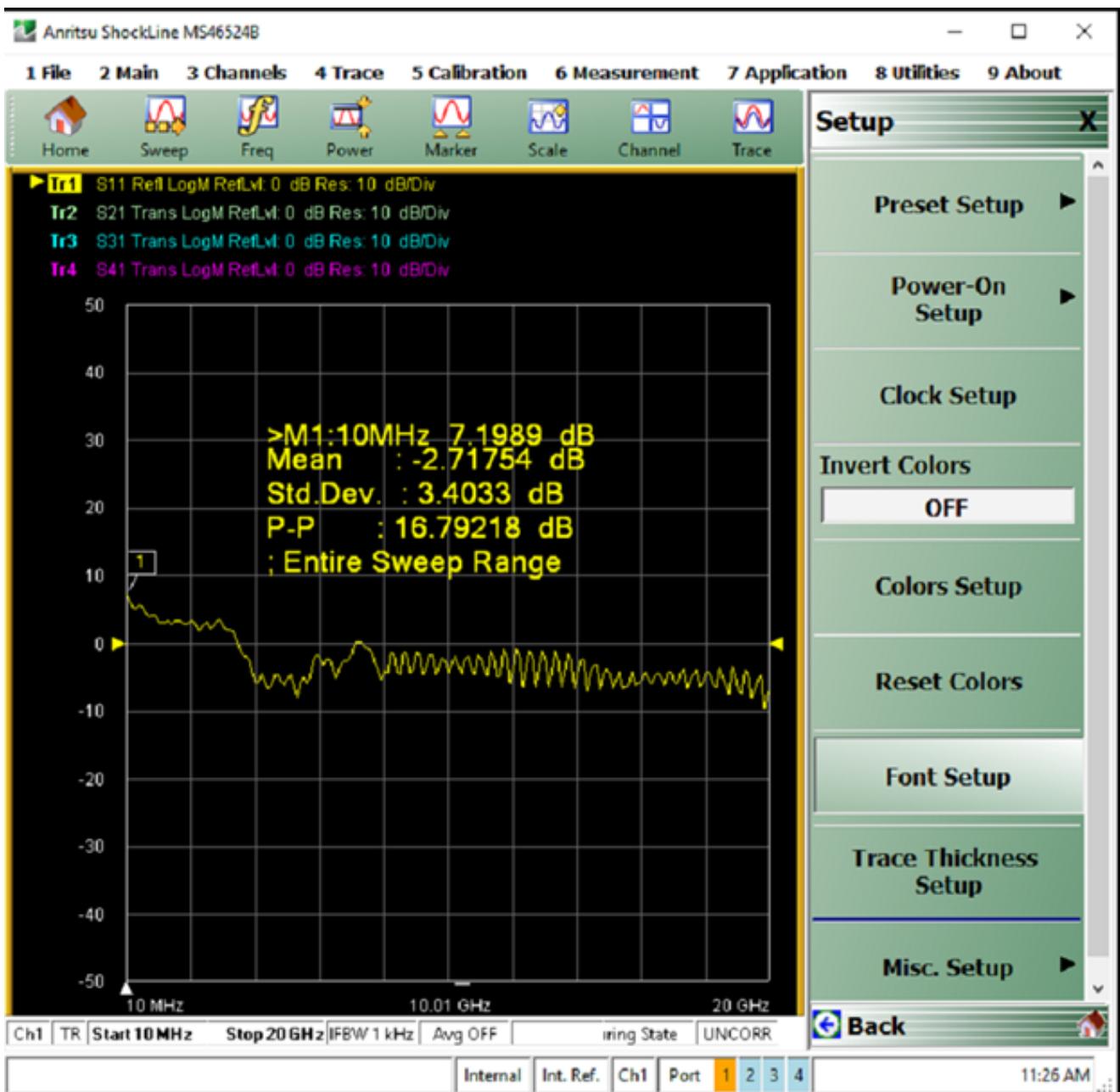


Figure D-41. Example 7 – ShockLine Trace – Marker Magnified

# Appendix E — Alphabetical Command Index

## E-1 Introduction

This appendix provides an alphabetical listing of all IEEE and SCPI commands for the ShockLine VNAs.

### Sorting

Due to ASCII sorting:

- Commands beginning with a colon (“ : ” or SCPI commands) are sorted first.
- Commands with an optional keyword indicated by brackets (“[ ]”) sort after the non-optional keywords. For example :STATe sorts before [:STATe].
- Commands that start with an asterisk (“ \* ” or IEEE-488.2 commands) are sorted next.
- Commands that start with a number or letter are sorted last.

## E-2 Alphabetical Command Listing

.....	5-519
:CALCulate:IFRanging:DISable?	5-67
:CALCulate:IFRanging:DISable[:STATe]<char>	5-67
:CALCulate:MARKer:TABLE[:STATe] <char>	5-72
:CALCulate:MARKer:TABLE[:STATe]?	5-72
:CALCulate{1-16}:ALL:ALTerNate:TRACe:NAMe <char>	5-5
:CALCulate{1-16}:ALTerNate:TRACe:NAMe:STATe <char>	5-5
:CALCulate{1-16}:ALTerNate:TRACe:NAMe:STATe?	5-5
:CALCulate{1-16}:CORRection:ADAPter:REMoval	5-6
:CALCulate{1-16}:CORRection:ADAPter:REMoval:CALibration:X <string>	5-6
:CALCulate{1-16}:CORRection:ADAPter:REMoval:CALibration:X?	5-6
:CALCulate{1-16}:CORRection:ADAPter:REMoval:CALibration:Y <string>	5-7
:CALCulate{1-16}:CORRection:ADAPter:REMoval:CALibration:Y?	5-7
:CALCulate{1-16}:CORRection:ADAPter:REMoval:LENGth <NRF>	5-7
:CALCulate{1-16}:CORRection:ADAPter:REMoval:LENGth?	5-7
:CALCulate{1-16}:DISPlay:FREQuency:RESolution <NRF>	5-24
:CALCulate{1-16}:DISPlay:FREQuency:RESolution?	5-24
:CALCulate{1-16}:DISPlay:MARKer:ALL[:STATe] <char>	5-24
:CALCulate{1-16}:DISPlay:MARKer:ALL[:STATe]?	5-24
:CALCulate{1-16}:DISPlay:MARKer:INOVerlay[:STATe] <char>	5-25
:CALCulate{1-16}:DISPlay:MARKer:INOVerlay[:STATe]?	5-25
:CALCulate{1-16}:EOOE:EO4Measurment:CALCulate?	5-27
:CALCulate{1-16}:EOOE:EO4Measurment:CALFile <string>	5-28
:CALCulate{1-16}:EOOE:EO4Measurment:CALFile?	5-28
:CALCulate{1-16}:EOOE:EO4Measurment:CHARfile <char>	5-28
:CALCulate{1-16}:EOOE:EO4Measurment:CHARfile:SWAP[:STATe] <char>	5-29
:CALCulate{1-16}:EOOE:EO4Measurment:CHARfile:SWAP[:STATe]?	5-29
:CALCulate{1-16}:EOOE:EO4Measurment:CHARfile?	5-28
:CALCulate{1-16}:EOOE:EO4Measurment:CONFIGuration <char>	5-29
:CALCulate{1-16}:EOOE:EO4Measurment:CONFIGuration?	5-29
:CALCulate{1-16}:EOOE:EO4Measurment:EOPort <char>	5-30
:CALCulate{1-16}:EOOE:EO4Measurment:EOPort?	5-30
:CALCulate{1-16}:EOOE:EO4Measurment:OEPoRt <char>	5-30
:CALCulate{1-16}:EOOE:EO4Measurment:OEPoRt?	5-30
:CALCulate{1-16}:EOOE:EOMeasurment:CALCulate?	5-26
:CALCulate{1-16}:EOOE:EOMeasurment:CALFile <string>	5-27

:CALCulate{1-16}:EOOE:EOMeasurment:CALFile?	5-27
:CALCulate{1-16}:EOOE:EOMeasurment:CHARfile <string>	5-28
:CALCulate{1-16}:EOOE:EOMeasurment:CHARfile:SWAP[:STATe] <char>	5-29
:CALCulate{1-16}:EOOE:EOMeasurment:CHARfile:SWAP[:STATe]?	5-29
:CALCulate{1-16}:EOOE:EOMeasurment:CHARfile?	5-28
:CALCulate{1-16}:EOOE:EOMeasurment:EOPort <char>	5-30
:CALCulate{1-16}:EOOE:EOMeasurment:EOPort?	5-30
:CALCulate{1-16}:EOOE:GO4Measurment:CALCulate?	5-32
:CALCulate{1-16}:EOOE:GO4Measurment:CALFile <string>	5-33
:CALCulate{1-16}:EOOE:GO4Measurment:CALFile?	5-33
:CALCulate{1-16}:EOOE:GO4Measurment:CHARfile <char>	5-33
:CALCulate{1-16}:EOOE:GO4Measurment:CHARfile?	5-33
:CALCulate{1-16}:EOOE:GO4Measurment:CONFiguration <char>	5-34
:CALCulate{1-16}:EOOE:GO4Measurment:CONFiguration?	5-34
:CALCulate{1-16}:EOOE:GO4Measurment:EOPort <char>	5-34
:CALCulate{1-16}:EOOE:GO4Measurment:EOPort?	5-34
:CALCulate{1-16}:EOOE:GO4Measurment:OEPort <char>	5-35
:CALCulate{1-16}:EOOE:GO4Measurment:OEPort?	5-35
:CALCulate{1-16}:EOOE:GOMeasurment:CALCulate?	5-31
:CALCulate{1-16}:EOOE:GOMeasurment:CALFile <string>	5-32
:CALCulate{1-16}:EOOE:GOMeasurment:CALFile?	5-32
:CALCulate{1-16}:EOOE:GOMeasurment:CHARfile <char>	5-33
:CALCulate{1-16}:EOOE:GOMeasurment:CHARfile?	5-33
:CALCulate{1-16}:EOOE:GOMeasurment:EOPort <char>	5-34
:CALCulate{1-16}:EOOE:GOMeasurment:EOPort?	5-34
:CALCulate{1-16}:EOOE:GOMeasurment:TARGetfile <string>	5-35
:CALCulate{1-16}:EOOE:GOMeasurment:TARGetfile?	5-35
:CALCulate{1-16}:EOOE:MSGs:LIST?	5-36
:CALCulate{1-16}:EOOE:OE4Measurment:CALFile <string>	5-38
:CALCulate{1-16}:EOOE:OE4Measurment:CALFile?	5-38
:CALCulate{1-16}:EOOE:OE4Measurment:CHARfile <string>	5-38
:CALCulate{1-16}:EOOE:OE4Measurment:CHARfile:SWAP[:STATe] <char>	5-39
:CALCulate{1-16}:EOOE:OE4Measurment:CHARfile:SWAP[:STATe]?	5-39
:CALCulate{1-16}:EOOE:OE4Measurment:CHARfile?	5-38
:CALCulate{1-16}:EOOE:OE4Measurment:CONFiguration <char>	5-39
:CALCulate{1-16}:EOOE:OE4Measurment:CONFiguration?	5-39
:CALCulate{1-16}:EOOE:OE4Measurment:EOPort <char>	5-40
:CALCulate{1-16}:EOOE:OE4Measurment:EOPort?	5-40
:CALCulate{1-16}:EOOE:OE4Measurment:OEPort <char>	5-40
:CALCulate{1-16}:EOOE:OE4Measurment:OEPort?	5-40
:CALCulate{1-16}:EOOE:OEMeasurment:CALCulate?	5-37
:CALCulate{1-16}:EOOE:OEMeasurment:CALFile <string>	5-37
:CALCulate{1-16}:EOOE:OEMeasurment:CALFile?	5-37
:CALCulate{1-16}:EOOE:OEMeasurment:CHARfile <string>	5-38
:CALCulate{1-16}:EOOE:OEMeasurment:CHARfile:SWAP[:STATe] <char>	5-39
:CALCulate{1-16}:EOOE:OEMeasurment:CHARfile:SWAP[:STATe]?	5-39
:CALCulate{1-16}:EOOE:OEMeasurment:CHARfile?	5-38
:CALCulate{1-16}:EOOE:OEMeasurment:EOPort <char>	5-40
:CALCulate{1-16}:EOOE:OEMeasurment:EOPort?	5-40
:CALCulate{1-16}:EOOE:TYPE?	5-41
:CALCulate{1-16}:EXTRaction	5-8
:CALCulate{1-16}:EXTRaction:CALibration:CALB:FILE <string>	5-10
:CALCulate{1-16}:EXTRaction:CALibration:CALB:FILE?	5-10
:CALCulate{1-16}:EXTRaction:CALibration:CALB:PORT <char>	5-10
:CALCulate{1-16}:EXTRaction:CALibration:CALB:PORT?	5-10
:CALCulate{1-16}:EXTRaction:CALibration:INNER <string>	5-11

:CALCulate{1-16}:EXTRaction:CALibration:INNer?	5-11
:CALCulate{1-16}:EXTRaction:CALibration:OUTer <string>	5-11
:CALCulate{1-16}:EXTRaction:CALibration:OUTer?	5-11
:CALCulate{1-16}:EXTRaction:CALibration[:CALa]:FILE <string>	5-9
:CALCulate{1-16}:EXTRaction:CALibration[:CALa]:FILE?	5-9
:CALCulate{1-16}:EXTRaction:CALibration[:CALa]:PORT <char>	5-9
:CALCulate{1-16}:EXTRaction:CALibration[:CALa]:PORT?	5-9
:CALCulate{1-16}:EXTRaction:DELay{1-4} <NRf>	5-14
:CALCulate{1-16}:EXTRaction:DELay{1-4}?	5-14
:CALCulate{1-16}:EXTRaction:ELL1:LENGth <NRf>	5-12
:CALCulate{1-16}:EXTRaction:ELL1:LENGth?	5-12
:CALCulate{1-16}:EXTRaction:ELL2:LENGth <NRf>	5-13
:CALCulate{1-16}:EXTRaction:ELL2:LENGth?	5-13
:CALCulate{1-16}:EXTRaction:ELL3:LENGth <NRf>	5-13
:CALCulate{1-16}:EXTRaction:ELL3:LENGth?	5-13
:CALCulate{1-16}:EXTRaction:ELL4:LENGth <NRf>	5-14
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