

# DG4000 Series Function/Arbitrary Waveform Generator

## SCPI Overview

### Syntax

### Symbol Description

### Parameter Type

### Command Abbreviation

### Command System

### COUNter

#### :COUNter:ATTenuation

#### :COUNter:AUTO

#### :COUNter:COUPing

#### :COUNter:GATETIME

#### :COUNter:HF

#### :COUNter:IMPedance

#### :COUNter:LEVE

#### :COUNter:MEASure

#### :COUNter:SENSitive

#### :COUNter[:STATe]

#### :COUNter:STATistics:CLEAr

#### :COUNter:STATistics:DISPlay

#### :COUNter:STATistics

### COUPling

#### :COUPling:AMPL:DEViation

#### :COUPling:AMPL[:STATe]

#### :COUPling:CHannel:BASE

#### :COUPling:FREQuency:DEViation

#### :COUPling:FREQuency[:STATe]

#### :COUPling:PHASe:DEViation

#### :COUPling:PHASe[:STATe]

#### :COUPling[:STATe]

### DISPlay

#### :DISPlay:BRIGHtness

#### :DISPlay:SAVer:IMMediate

#### :DISPlay:SAVer[:STATe]

### IEEE 488.2

#### \*IDN?

#### \*RCL

#### \*RST

#### \*SAV

#### \*TRG

### MEMory

#### :MEMory:STATe:DELeTe

#### :MEMory:STATe:LOCK

#### :MEMory:STATe:VALid?

MMEMory

:MMEMory:CATalog?

:MMEMory:CDIRectory

:MMEMory:COPI

:MMEMory:DELe

:MMEMory:LOAD

:MMEMory:MDIRectory

:MMEMory:RDIRectory?

:MMEMory:STORe

OUTPut

:OUTPut[:IMPedance

:OUTPut[:LOAD

:OUTPut[:NOISe:SCALe

:OUTPut[:NOISe[:STATe]

:OUTPut[:POLarity

:OUTPut[:[:STATe]

:OUTPut[:SYNC:POLarity

:OUTPut[:SYNC[:STATe]

SOURce

SOURce APPLy

[:SOURce]:APPLy:CUSTom

[:SOURce]:APPLy:HARMonic

[:SOURce]:APPLy:NOISe

[:SOURce]:APPLy:PULSe

[:SOURce]:APPLy:RAMP

[:SOURce]:APPLy:SINusoid

[:SOURce]:APPLy:SQUare

[:SOURce]:APPLy:USER

[:SOURce]:APPLy?

SOURce BURSt

[:SOURce]:BURSt:GATE:POLarity

[:SOURce]:BURSt:INTernal:PERiod

[:SOURce]:BURSt:MODE

[:SOURce]:BURSt:NCYCles

[:SOURce]:BURSt:PHASe

[:SOURce]:BURSt[:STATe]

[:SOURce]:BURSt:TDELay

[:SOURce]:BURSt:TRIGger[:IMMediate]

[:SOURce]:BURSt:TRIGger:SLOPe

[:SOURce]:BURSt:TRIGger:SOURce

[:SOURce]:BURSt:TRIGger:TRIGOut

SOURce FREQuency

[:SOURce]:FREQuency:CENTer

[:SOURce]:FREQuency[:FIXed]

[:SOURce]:FREQuency:SPAN

[\[.:SOURce\]:FREQuency:STARt](#)  
[\[.:SOURce\]:FREQuency:STOP](#)  
[SOURce FUNCtion](#)  
[\[.:SOURce\]:FUNCtion:ARB:STEP](#)  
[\[.:SOURce\]:FUNCtion:RAMP:SYMMetry](#)  
[\[.:SOURce\]:FUNCtion\[:SHAPE\]](#)  
[\[.:SOURce\]:FUNCtion:SQUare:DCYCLE](#)  
[SOURce HARMonic](#)  
[\[.:SOURce\]:HARMonic:AMPL](#)  
[\[.:SOURce\]:HARMonic:ORDER](#)  
[\[.:SOURce\]:HARMonic:PHASe](#)  
[\[.:SOURce\]:HARMonic:TYPE](#)  
[SOURce MARKer](#)  
[\[.:SOURce\]:MARKer:FREQuency](#)  
[\[.:SOURce\]:MARKer\[:STATe\]](#)  
[SOURce MOD](#)  
[\[.:SOURce\]:MOD\[:STATe\]](#)  
[\[.:SOURce\]:MOD:TYPE](#)  
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[\[.:SOURce\]:MOD:AM:INTernal:FREQuency](#)  
[\[.:SOURce\]:MOD:AM:INTernal:FUNCtion](#)  
[\[.:SOURce\]:MOD:AM:SOURce](#)  
[\[.:SOURce\]:MOD:FM\[:DEViation\]](#)  
[\[.:SOURce\]:MOD:FM:INTernal:FREQuency](#)  
[\[.:SOURce\]:MOD:FM:INTernal:FUNCtion](#)  
[\[.:SOURce\]:MOD:FM:SOURce](#)  
[\[.:SOURce\]:MOD:PM\[:DEViation\]](#)  
[\[.:SOURce\]:MOD:PM:INTernal:FREQuency](#)  
[\[.:SOURce\]:MOD:PM:INTernal:FUNCtion](#)  
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[\[.:SOURce\]:MOD:ASKey:AMPLitude](#)  
[\[.:SOURce\]:MOD:ASKey:INTernal\[:RATE\]](#)  
[\[.:SOURce\]:MOD:ASKey:POLarity](#)  
[\[.:SOURce\]:MOD:ASKey:SOURce](#)  
[\[.:SOURce\]:MOD:FSKey\[:FREQuency\]](#)  
[\[.:SOURce\]:MOD:FSKey:INTernal:RATE](#)  
[\[.:SOURce\]:MOD:FSKey:POLarity](#)  
[\[.:SOURce\]:MOD:FSKey:SOURce](#)  
[\[.:SOURce\]:MOD:PSKey:INTernal:RATE](#)  
[\[.:SOURce\]:MOD:PSKey:PHASe](#)  
[\[.:SOURce\]:MOD:PSKey:POLarity](#)  
[\[.:SOURce\]:MOD:PSKey:SOURce](#)  
[\[.:SOURce\]:MOD:BPSKey:DATA](#)  
[\[.:SOURce\]:MOD:BPSKey:INTernal:RATE](#)  
[\[.:SOURce\]:MOD:BPSKey:PHASe](#)

[\[.SOURce\]:MOD:QPSKey:DATA](#)  
[\[.SOURce\]:MOD:QPSKey:INTernal:RATE](#)  
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[\[.SOURce\]:MOD:QPSKey:PHASe2](#)  
[\[.SOURce\]:MOD:QPSKey:PHASe3](#)  
[\[.SOURce\]:MOD:3FSKey\[:FREQuency\]](#)  
[\[.SOURce\]:MOD:3FSKey:INTernal:RATE](#)  
[\[.SOURce\]:MOD:4FSKey\[:FREQuency\]](#)  
[\[.SOURce\]:MOD:4FSKey:INTernal:RATE](#)  
[\[.SOURce\]:MOD:OSKey:INTernal:RATE](#)  
[\[.SOURce\]:MOD:OSKey:SOURce](#)  
[\[.SOURce\]:MOD:OSKey:TIME](#)  
[\[.SOURce\]:MOD:PWM\[:DEViation\]:DCYCLe](#)  
[\[.SOURce\]:MOD:PWM\[:DEViation\]\[:WIDTh\]](#)  
[\[.SOURce\]:MOD:PWM:INTernal:FREQuency](#)  
[\[.SOURce\]:MOD:PWM:INTernal:FUNCTion](#)  
[\[.SOURce\]:MOD:PWM:SOURce](#)  
[SOURce PERiod](#)  
[\[.SOURce\]:PERiod\[:FIXed\]](#)  
[SOURce PHASe](#)  
[\[.SOURce\]:PHASe\[:ADJust\]](#)  
[\[.SOURce\]:PHASe:INITiate](#)  
[SOURce PULSe](#)  
[\[.SOURce\]:PULSe:DCYCLe](#)  
[\[.SOURce\]:PULSe:DELay](#)  
[\[.SOURce\]:PULSe:HOLD](#)  
[\[.SOURce\]:PULSe:TRANsition\[:LEADing\]](#)  
[\[.SOURce\]:PULSe:TRANsition:TRAILing](#)  
[\[.SOURce\]:PULSe:WIDTh](#)  
[SOURce SWEep](#)  
[\[.SOURce\]:SWEep:HTIME:START](#)  
[\[.SOURce\]:SWEep:HTIME:STOP](#)  
[\[.SOURce\]:SWEep:RTIME](#)  
[\[.SOURce\]:SWEep:SPACing](#)  
[\[.SOURce\]:SWEep:STATe](#)  
[\[.SOURce\]:SWEep:STEP](#)  
[\[.SOURce\]:SWEep:TIME](#)  
[\[.SOURce\]:SWEep:TRIGger\[:IMMediate\]](#)  
[\[.SOURce\]:SWEep:TRIGger:SLOPe](#)  
[\[.SOURce\]:SWEep:TRIGger:SOURce](#)  
[\[.SOURce\]:SWEep:TRIGger:TRIGOut](#)  
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[\[.SOURce\]:VOLTage\[:LEVel\]\[:IMMediate\]\[:AMPLitude\]](#)  
[\[.SOURce\]:VOLTage\[:LEVel\]\[:IMMediate\]:HIGH](#)  
[\[.SOURce\]:VOLTage\[:LEVel\]\[:IMMediate\]:LOW](#)

[\[\[:SOURce\]:VOLTage\[:LEVel\]\]\[:IMMediate\]:OFFSet](#)

[\[\[:SOURce\]:VOLTage:UNIT](#)

[SYSTem](#)

[:SYSTem:BEEPer\[:IMMediate\]](#)

[:SYSTem:BEEPer:STATe](#)

[:SYSTem:COMMunicate:LAN:AUTOip\[:STATe\]](#)

[:SYSTem:COMMunicate:LAN:DHCP\[:STATe\]](#)

[:SYSTem:COMMunicate:LAN:DNS](#)

[:SYSTem:COMMunicate:LAN:GATEway](#)

[:SYSTem:COMMunicate:LAN:IPADdress](#)

[:SYSTem:COMMunicate:LAN:MAC?](#)

[:SYSTem:COMMunicate:LAN:SMASk](#)

[:SYSTem:COMMunicate:LAN:STATic\[:STATe\]](#)

[:SYSTem:COMMunicate:USB:INFormation?](#)

[:SYSTem:COMMunicate:USB\[:SELF\]:CLASs](#)

[:SYSTem:CSCopy](#)

[:SYSTem:CWCopy](#)

[:SYSTem:ERRor?](#)

[:SYSTem:KLOCK](#)

[:SYSTem:LANGuage](#)

[:SYSTem:POWeron](#)

[:SYSTem:POWSet](#)

[:SYSTem:PRESet](#)

[:SYSTem:RESTART](#)

[:SYSTem:ROSCillator:SOURce](#)

[:SYSTem:SHUTDOWN](#)

[:SYSTem:VERSion?](#)

[TRACe](#)

[\[\[:TRACe\]:DATA:DAC16](#)

[\[\[:TRACe\]:DATA:DAC](#)

[\[\[:TRACe\]:DATA\[:DATA\]](#)

[\[\[:TRACe\]:DATA:POINts:INTerpolate](#)

[\[\[:TRACe\]:DATA:POINts](#)

[\[\[:TRACe\]:DATA:VALue?](#)

[\[\[:TRACe\]:DATA:VALue](#)

[\[\[:TRACe\]:DATA:LOAD?](#)

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# Programming Guide

## DG4000 Series Function/Arbitrary Waveform Generator

This manual introduces how to program and control **RIGOL** DG4000 series function/arbitrary waveform generator using SCPI commands through remote interfaces (USB or LAN).

### Main topics in this manual:

[SCPI Overview](#)

[Command System](#)

[Programming Demos](#)

[Command Quick Reference](#)

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# Command Quick Reference A-Z

- [\\*IDN?](#)
- [\\*RCL USER1|USER2|USER3|USER4|USER5|USER|6USER7|USER8|USER9|USER10](#)
- [\\*RST](#)
- [\\*SAV USER1|USER2|USER3|USER4|USER5|USER6|USER7|USER8|USER9|USER10](#)
- [\\*TRG](#)

## C

- [:COUNter:ATTenuation 1X|10X](#)
- [:COUNter:ATTenuation?](#)
- [:COUNter:AUTO](#)
- [:COUNter:COUPing AC|DC](#)
- [:COUNter:COUPing?](#)
- [:COUNter:GATETIME AUTO|USER1|USER2|USER3|USER4|USER5|USER6](#)
- [:COUNter:GATETIME?](#)
- [:COUNter:HF ON|OFF](#)
- [:COUNter:HF?](#)
- [:COUNter:IMPedance 50|1M](#)
- [:COUNter:IMPedance?](#)
- [:COUNter:LEVE <value>|MINimum|MAXimum](#)
- [:COUNter:LEVE? \[MINimum|MAXimum\]](#)
- [:COUNter:MEASure?](#)
- [:COUNter:SENSitive <value>|MINimum|MAXimum](#)
- [:COUNter:SENSitive? \[MINimum|MAXimum\]](#)
- [:COUNter\[:STATe\] ON|OFF](#)
- [:COUNter\[:STATe\]?](#)
- [:COUNter:STATistics:CLEAr](#)
- [:COUNter:STATistics:DISPlay DIGITAL|CURVE](#)
- [:COUNter:STATistics:DISPlay?](#)
- [:COUNter:STATistics\[:STATe\] ON|OFF](#)
- [:COUNter:STATistics\[:STATe\]?](#)
- [:COUPling:AMPL:DEViation <deviation>](#)
- [:COUPling:AMPL:DEViation?](#)
- [:COUPling:AMPL\[:STATe\] ON|OFF](#)
- [:COUPling:AMPL\[:STATe\]?](#)

[:COUPling:CHannel:BASE CH1|CH2](#)

[:COUPling:CHannel:BASE?](#)

[:COUPling:FREQuency:DEViation <deviation>](#)

[:COUPling:FREQuency:DEViation?](#)

[:COUPling:FREQuency\[:STATe\] ON|OFF](#)

[:COUPling:FREQuency\[:STATe\]?](#)

[:COUPling:PHASe:DEViation <deviation>](#)

[:COUPling:PHASe:DEViation?](#)

[:COUPling:PHASe\[:STATe\] ON|OFF](#)

[:COUPling:PHASe\[:STATe\]?](#)

[:COUPling\[:STATe\] ON|OFF](#)

[:COUPling\[:STATe\]?](#)

D

[:DISPlay:BRIGhtness <brightness>|MINimum|MAXimum](#)

[:DISPlay:BRIGhtness? \[MINimum|MAXimum\]](#)

[:DISPlay:SAVer:IMMediate](#)

[:DISPlay:SAVer\[:STATe\] ON|OFF](#)

[:DISPlay:SAVer\[:STATe\]?](#)

M

[:MEMory:STATe:DElete USER1|USER2|USER3|USER4|USER5|USER|6USER7|USER8|USER9|USER10](#)

[:MEMory:STATe:LOCK USER1|USER2|USER3|USER4|USER5|USER|6USER7|USER8|USER9|USER10,ON|OFF](#)

[:MEMory:STATe:LOCK? USER1|USER2|USER3|USER4|USER5|USER|6USER7|USER8|USER9|USER10](#)

[:MEMory:STATe:VALId? USER1|USER2|USER3|USER4|USER5|USER|6USER7|USER8|USER9|USER10](#)

[:MMEMory:CATabg?](#)

[:MMEMory:CDIRectory <directory name>](#)

[:MMEMory:CDIRectory?](#)

[:MMEMory:COPY <directory name>,<file name>](#)

[:MMEMory:DElete <file name>](#)

[:MMEMory:LOAD <file name>](#)

[:MMEMory:MDIRectory <dir name>](#)

[:MMEMory:RDIRectory?](#)

[:MMEMory:STORe <file name>](#)



O

[:OUTPut\[<n>\]:IMPedance <ohms>|INFinity|MINimum|MAXimum](#)

[:OUTPut\[<n>\]:IMPedance? \[MINimum|MAXimum\]](#)

[:OUTPut\[<n>\]:LOAD <ohms>|INFinity|MINimum|MAXimum](#)

[:OUTPut\[<n>\]:LOAD? \[MINimum|MAXimum\]](#)

[:OUTPut\[<n>\]:NOISe:SCALe <percent>|MINimum|MAXimum](#)

[:OUTPut\[<n>\]:NOISe:SCALe? \[MINimum|MAXimum\]](#)

[:OUTPut\[<n>\]:NOISe\[:STATe\] ON|OFF](#)

[:OUTPut\[<n>\]:NOISe\[:STATe\]?](#)

[:OUTPut\[<n>\]:POLarity NORMal|INVerted](#)

[:OUTPut\[<n>\]:POLarity?](#)

[:OUTPut\[<n>\]\[::STATe\] ON|OFF](#)

[:OUTPut\[<n>\]\[::STATe\]?](#)

[:OUTPut\[<n>\]:SYNC:POLarity POSitive|NEGative](#)

[:OUTPut\[<n>\]:SYNC:POLarity?](#)

[:OUTPut\[<n>\]:SYNC\[:STATe\] ON|OFF](#)

[:OUTPut\[<n>\]:SYNC\[:STATe\]?](#)

S

[\[:SOURce<n>\]:APPLY:CUSTom\[<freq>\[,<amp>\[,<offset>\[,<phase>\]\]\]\]](#)

[\[:SOURce<n>\]:APPLY:HARMonic \[<freq>\[,<amp>\[,<offset>\[,<phase>\]\]\]\]](#)

[\[:SOURce<n>\]:APPLY:NOISe \[<amp>\[,<offset>\]\]](#)

[\[:SOURce<n>\]:APPLY:PULSe \[<freq>\[,<amp>\[,<offset>\[,<delay>\]\]\]\]](#)

[\[:SOURce<n>\]:APPLY:RAMP \[<freq>\[,<amp>\[,<offset>\[,<phase>\]\]\]\]](#)

[\[:SOURce<n>\]:APPLY:SINusoid \[<freq>\[,<amp>\[,<offset>\[,<phase>\]\]\]\]](#)

[\[:SOURce<n>\]:APPLY:SQUare \[<freq>\[,<amp>\[,<offset>\[,<phase>\]\]\]\]](#)

[\[:SOURce<n>\]:APPLY:USER \[<freq>\[,<amp>\[,<offset>\[,<phase>\]\]\]\]](#)

[\[:SOURce<n>\]:APPLY?](#)

[\[:SOURce<n>\]:BURSt:GATE:POLarity NORMal|INVerted](#)

[\[:SOURce<n>\]:BURSt:GATE:POLarity?](#)

[\[:SOURce<n>\]:BURSt:INTernal:PERiod <period>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:BURSt:INTernal:PERiod? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:BURSt:MODE TRIGGered|GATed|INFinity](#)

[\[:SOURce<n>\]:BURSt:MODE?](#)

[\[:SOURce<n>\]:BURSt:NCYCles <cycles>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:BURSt:NCYCles? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:BURSt:PHASe <phase>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:BURSt:PHASe? \[MINimum|MAXimum\]](#)

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[\[:SOURce<n>\]:BURSt\[:STATe\]?](#)

[\[:SOURce<n>\]:BURSt:TDElay <delay>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:BURSt:TDElay? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:BURSt:TRIGger\[:IMMediate\]](#)

[\[:SOURce<n>\]:BURSt:TRIGger:SLOPe POSitive|NEGative](#)

[\[:SOURce<n>\]:BURSt:TRIGger:SLOPe?](#)

[\[:SOURce<n>\]:BURSt:TRIGger:SOURce INTernal|EXTernal|MANual](#)

[\[:SOURce<n>\]:BURSt:TRIGger:SOURce?](#)

[\[:SOURce<n>\]:BURSt:TRIGger:TRIGOut OFF|POSitive|NEGative](#)

[\[:SOURce<n>\]:BURSt:TRIGger:TRIGOut?](#)

[\[:SOURce<n>\]:FREQuency:CENTer <frequency>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:FREQuency:CENTer? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:FREQuency\[:FIXed\] <frequency>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:FREQuency\[:FIXed\]? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:FREQuency:SPAN <frequency>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:FREQuency:SPAN? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:FREQuency:STARt <frequency>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:FREQuency:STARt? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:FREQuency:STOP <frequency>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:FREQuency:STOP? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:FUNCTion:ARB:STEP](#)

[\[:SOURce<n>\]:FUNCTion:RAMP:SYMMetry <symmetry>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:FUNCTion:RAMP:SYMMetry? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:FUNCTion\[:SHAPE\] <wave>](#)

[\[:SOURce<n>\]:FUNCTion\[:SHAPE\]?](#)

[\[:SOURce<n>\]:FUNCTion:SQUare:DCYCle <percent>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:FUNCTion:SQUare:DCYCle? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:HARMonic:AMPL <sn>,<value>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:HARMonic:AMPL? <sn>\[,MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:HARMonic:ORDEr <value>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:HARMonic:ORDER? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:HARMonic:PHASe <sn>,<value>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:HARMonic:PHASe? <sn>\[,MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:HARMonic:TYPe EVEN|ODD|ALL|USER](#)

[\[:SOURce<n>\]:HARMonic:TYPe?](#)

[\[:SOURce<n>\]:MARKer:FREQuency <frequency>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MARKer:FREQuency? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MARKer\[:STATE\] ON|OFF](#)

[\[:SOURce<n>\]:MARKer\[:STATE\]?](#)

[\[:SOURce<n>\]:MOD\[:STATE\] ON|OFF](#)

[\[:SOURce<n>\]:MOD\[:STATE\]?](#)

[\[:SOURce<n>\]:MOD:TYPe AM|FM|PM|ASK|FSK|PSK|PWM|BPSK|QPSK|3FSK|4FSK|OSK](#)

[\[:SOURce<n>\]:MOD:TYPe?](#)

[\[:SOURce<n>\]:MOD:AM\[:DEPT h\] <depth>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:AM\[:DEPT h\]? \[MINimum|MAXimum\]](#)

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[\[:SOURce<n>\]:MOD:AM:INTernal:FREQuency? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:AM:INTernal:FUNCTion SINusoid|SQUare|TRIangle|RAMP|NRAMp|NOISe|USER](#)

[\[:SOURce<n>\]:MOD:AM:INTernal:FUNCTion?](#)

[\[:SOURce<n>\]:MOD:AM:SOURce INTernal|EXTernal](#)

[\[:SOURce<n>\]:MOD:AM:SOURce?](#)

[\[:SOURce<n>\]:MOD:FM\[:DEVIation\] <deviation>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:FM\[:DEVIation\]? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:FM:INTernal:FREQuency <frequency>|MINimum|MAXimum](#)

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[\[:SOURce<n>\]:MOD:FM:INTernal:FUNCTion SINusoid|SQUare|TRIangle|RAMP|NRAMp|NOISe|USER](#)

[\[:SOURce<n>\]:MOD:FM:INTernal:FUNCTion?](#)

[\[:SOURce<n>\]:MOD:FM:SOURce INTernal|EXTernal](#)

[\[:SOURce<n>\]:MOD:FM:SOURce?](#)

[\[:SOURce<n>\]:MOD:PM\[:DEVIation\] <deviation>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:PM\[:DEVIation\]? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:PM:INTernal:FREQuency <frequency>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:PM:INTernal:FREQuency? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:PM:INTernal:FUNCTion SINusoid|SQUare|TRIangle|RAMP|NRAMp|NOISe|USER](#)

[\[:SOURce<n>\]:MOD:PM:INTernal:FUNCTion?](#)

[\[:SOURce<n>\]:MOD:PM:SOURce INTernal|EXTernal](#)

[\[:SOURce<n>\]:MOD:PM:SOURce?](#)

[\[:SOURce<n>\]:MOD:ASKey:AMPLitude <amplitude>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:ASKey:AMPLitude? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:ASKey:INTernal\[:RATE\] <frequency>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:ASKey:INTernal\[:RATE\]? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:ASKey:SOURce INTernal|EXTernal](#)

[\[:SOURce<n>\]:MOD:ASKey:SOURce?](#)

[\[:SOURce<n>\]:MOD:ASKey:POLarity POSitive|NEGative](#)

[\[:SOURce<n>\]:MOD:ASKey:POLarity?](#)

[\[:SOURce<n>\]:MOD:FSKey\[:FREQuency\] <frequency>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:FSKey\[:FREQuency\]? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:FSKey:INTernal:RATE <rate>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:FSKey:INTernal:RATE? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:FSKey:SOURce INTernal|EXTernal](#)

[\[:SOURce<n>\]:MOD:FSKey:SOURce?](#)

[\[:SOURce<n>\]:MOD:FSKey:POLarity POSitive|NEGative](#)

[\[:SOURce<n>\]:MOD:FSKey:POLarity?](#)

[\[:SOURce<n>\]:MOD:PSKey:INTernal:RATE <rate>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:PSKey:INTernal:RATE? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:PSKey:PHASe <phase>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:PSKey:PHASe? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:PSKey:POLarity POSitive|NEGative](#)

[\[:SOURce<n>\]:MOD:PSKey:POLarity?](#)

[\[:SOURce<n>\]:MOD:PSKey:SOURce INTernal|EXTernal](#)

[\[:SOURce<n>\]:MOD:PSKey:SOURce?](#)

[\[:SOURce<n>\]:MOD:BPSKey:INTernal:RATE <rate>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:BPSKey:INTernal:RATE? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:BPSKey:PHASe <phase>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:BPSKey:PHASe? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:BPSKey:DATA 01|10|PN15|PN21](#)

[\[:SOURce<n>\]:MOD:BPSKey:DATA?](#)

[\[:SOURce<n>\]:MOD:QPSKey:INTernal:RATE <rate>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:QPSKey:INTernal:RATE? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:QPSKey:PHASe1 <phase>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:QPSKey:PHASe1? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:QPSKey:PHASe2 <phase>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:QPSKey:PHASe2? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:QPSKey:PHASe3 <phase>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:QPSKey:PHASe3? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:QPSKey:DATA PN15|PN21](#)

[\[:SOURce<n>\]:MOD:QPSKey:DATA?](#)

[\[:SOURce<n>\]:MOD:3FSKey:INTernal:RATE <rate>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:3FSKey:INTernal:RATE? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:3FSKey\[:FREQuency\] <n>,<frequency>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:3FSKey\[:FREQuency\]? <n>\[,MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:4FSKey:INTernal:RATE <rate>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:4FSKey:INTernal:RATE? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:4FSKey\[:FREQuency\] <n>,<frequency>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:4FSKey\[:FREQuency\]? <n>\[,MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:OSKey:SOURce INTernal|EXTernal](#)

[\[:SOURce<n>\]:MOD:OSKey:SOURce?](#)

[\[:SOURce<n>\]:MOD:OSKey:INTernal:RATE <rate>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:OSKey:INTernal:RATE? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:OSKey:TIME <time>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:OSKey:TIME? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:PWM:INTernal:FREQuency <frequency>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:PWM:INTernal:FREQuency? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:PWM:INTernal:FUNCTion SINusoid|SQUare|TRIangle|RAMP|NRAMP|NOISe|USER](#)

[\[:SOURce<n>\]:MOD:PWM:INTernal:FUNCTion?](#)

[\[:SOURce<n>\]:MOD:PWM:SOURce INTernal|EXTernal](#)

[\[:SOURce<n>\]:MOD:PWM:SOURce?](#)

[\[:SOURce<n>\]:MOD:PWM\[:DEViation\]:DCYClе <percent>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:PWM\[:DEViation\]:DCYClе? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:PWM\[:DEViation\]\[:WIDTh\] <deviation>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:PWM\[:DEViation\]\[:WIDTh\]? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:PERiod\[:FIXed\] <period>](#)

[\[:SOURce<n>\]:PERiod\[:FIXed\]?](#)

[\[:SOURce<n>\]:PHASe\[:ADJust\] <phase>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:PHASe\[:ADJust\]? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:PHASE:INITiate](#)

[\[:SOURce<n>\]:PULSe:DCYCle <percent>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:PULSe:DCYCle? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:PULSe:DELay <delay>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:PULSe:DELay? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:PULSe:HOLD WIDTH|DUTY](#)

[\[:SOURce<n>\]:PULSe:HOLD?](#)

[\[:SOURce<n>\]:PULSe:TRANSition\[:LEADing\] <seconds>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:PULSe:TRANSition\[:LEADing\]? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:PULSe:TRANSition:TRAIling <seconds>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:PULSe:TRANSition:TRAIling? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:PULSe:WIDTh <seconds>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:PULSe:WIDTh? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:SWEep:HTIME:STARt <seconds>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:SWEep:HTIME:STARt? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:SWEep:HTIME:STOP <seconds>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:SWEep:HTIME:STOP? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:SWEep:RTIME <seconds>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:SWEep:RTIME? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:SWEep:SPACing LINear|LOGarithmic|STEp](#)

[\[:SOURce<n>\]:SWEep:SPACing?](#)

[\[:SOURce<n>\]:SWEep:STATe OFF|ON](#)

[\[:SOURce<n>\]:SWEep:STATe?](#)

[\[:SOURce<n>\]:SWEep:STEP <steps>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:SWEep:STEP? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:SWEep:TIME <seconds>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:SWEep:TIME? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:SWEep:TRIGger\[:IMMediate\]](#)

[\[:SOURce<n>\]:SWEep:TRIGger:SLOPe POSitive|NEGative](#)

[\[:SOURce<n>\]:SWEep:TRIGger:SLOPe?](#)

[\[:SOURce<n>\]:SWEep:TRIGger:SOURce INTernal|EXTernal|MANual](#)

[\[:SOURce<n>\]:SWEep:TRIGger:SOURce?](#)

[\[:SOURce<n>\]:SWEep:TRIGger:TRIGOut OFF|POSitive|NEGative](#)

[\[:SOURce<n>\]:SWEep:TRIGger:TRIGOut?](#)

[\[:SOURce<n>\]:VOLTage\[:LEVel\]\[:IMMediate\]\[:AMPLitude\] <amplitude>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:VOLTage\[:LEVel\]\[:IMMediate\]\[:AMPLitude\]? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:VOLTage\[:LEVel\]\[:IMMediate\]:HIGH <voltage>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:VOLTage\[:LEVel\]\[:IMMediate\]:HIGH? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:VOLTage\[:LEVel\]\[:IMMediate\]:LOW <voltage>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:VOLTage\[:LEVel\]\[:IMMediate\]:LOW? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:VOLTage\[:LEVel\]\[:IMMediate\]:OFFSet <voltage>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:VOLTage\[:LEVel\]\[:IMMediate\]:OFFSet? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:VOLTage:UNIT VPP|VRMS|DBM](#)

[\[:SOURce<n>\]:VOLTage:UNIT?](#)

[:SYSTEM:BEEPer\[:IMMediate\]](#)

[:SYSTEM:BEEPer:STATe ON|OFF](#)

[:SYSTEM:BEEPer:STATe?](#)

[:SYSTEM:COMMUnicate:LAN:AUTOip\[:STATe\] ON|OFF](#)

[:SYSTEM:COMMUnicate:LAN:AUTOip\[:STATe\]?](#)

[:SYSTEM:COMMUnicate:LAN:DHCP\[:STATe\] ON|OFF](#)

[:SYSTEM:COMMUnicate:LAN:DHCP\[:STATe\]?](#)

[:SYSTEM:COMMUnicate:LAN:DNS <address>](#)

[:SYSTEM:COMMUnicate:LAN:DNS?](#)

[:SYSTEM:COMMUnicate:LAN:GATeWay <address>](#)

[:SYSTEM:COMMUnicate:LAN:GATeWay?](#)

[:SYSTEM:COMMUnicate:LAN:IPADdress <ip\\_addr>](#)

[:SYSTEM:COMMUnicate:LAN:IPADdress?](#)

[:SYSTEM:COMMUnicate:LAN:MAC?](#)

[:SYSTEM:COMMUnicate:LAN:SMASk <mask>](#)

[:SYSTEM:COMMUnicate:LAN:SMASk?](#)

[:SYSTEM:COMMUnicate:LAN:STATic\[:STATe\] ON|OFF](#)

[:SYSTEM:COMMUnicate:LAN:STATic\[:STATe\]?](#)

[:SYSTEM:COMMUnicate:USB:INFormation?](#)

[:SYSTEM:COMMUnicate:USB\[:SELF\]:CLASs COMPuter|PRINter](#)

[:SYSTEM:COMMUnicate:USB\[:SELF\]:CLASs?](#)

[:SYSTEM:CSCopy CH1|CH2,CH2|CH1](#)

[:SYSTEM:CWCopY CH1|CH2,CH2|CH1](#)

[:SYSTEM:ERRor?](#)

[:SYSTem:KLOCK\[:STATe\] ON|OFF](#)

[:SYSTem:KLOCK\[:STATe\]?](#)

[:SYSTem:LANGUage ENGLISH|SCHinese](#)

[:SYSTem:LANGUage?](#)

[:SYSTem:POWeron DEFAULT|LAST](#)

[:SYSTem:POWeron?](#)

[:SYSTem:POWSet AUTO|USER](#)

[:SYSTem:POWSet?](#)

[:SYSTem:PRESet DEFAULT|USER1|USER2|USER3|USER4|USER5|USER6|USER7|USER8|USER9|USER10](#)

[:SYSTem:RESTART](#)

[:SYSTem:ROSCillator:SOURce INTERNAL|EXTERNAL](#)

[:SYSTem:ROSCillator:SOURce?](#)

[:SYSTem:SHUTDOWN](#)

[:SYSTem:VERSion?](#)

T

[\[\[:TRACe\]:DATA:DAC16 VOLATILE,<flag>,<binary block data>](#)

[\[\[:TRACe\]:DATA:DAC VOLATILE,\[<binary block data>|<value>,<value>,<value>...\]](#)

[\[\[:TRACe\]:DATA\[:DATA\] VOLATILE,<value>{,<value>}](#)

[\[\[:TRACe\]:DATA:POINts:INTERpolate LINear|OFF](#)

[\[\[:TRACe\]:DATA:POINts:INTERpolate?](#)

[\[\[:TRACe\]:DATA:POINts VOLATILE,<value>|MINimum|MAXimum](#)

[\[\[:TRACe\]:DATA:POINts? VOLATILE\[,MINimum|MAXimum\]](#)

[\[\[:TRACe\]:DATA:VALue? VOLATILE,<point>](#)

[\[\[:TRACe\]:DATA:VALue VOLATILE,<point>,<data>](#)

[\[\[:TRACe\]:DATA:LOAD? VOLATILE](#)

[\[\[:TRACe\]:DATA:LOAD? <num>](#)



# SCPI Overview

SCPI (Standard Commands for Programmable Instrument) is a standard command set for programmable instrument based on IEEE 488.2.

Topics of this chapter:

[Syntax](#)

[Symbol Description](#)

[Parameter Type](#)

[Command Abbreviation](#)

# Command System

In this chapter, the DG4000 series command subsystems are introduced in alphabetical order (from A to Z).

- [COUNter Command Subsystem](#)
- [COUPLing Command Subsystem](#)
- [DISPlay Command Subsystem](#)
- [IEEE 488.2 Common Commands](#)
- [MEMory Command Subsystem](#)
- [MMEMory Command Subsystem](#)
- [OUTPut Command Subsystem](#)
- [SOURce Command Subsystem](#)
- [SYSTem Command Subsystem](#)
- [TRACe Command Subsystem](#)

**Explanation:** in this command set, commands relating to some parameter (such as frequency and amplitude) settings can be sent with units. The units supported by these parameters and the default units are as listed in the table below.

Parameter	Units Supported	Default Unit
Frequency	MHZ/KHZ/HZ/UHZ	HZ
Amplitude	VPP/MVPP/VRMS /MVRMS/DBM	VPP/VRMS/DBM (depend on the parameter currently to be set)
Offset/High Level/Low Level	V/MV	V
Time	MS/KS/S/US/NS	S
Phase	°	°
Duty Cycle/Modulation Depth etc.	%	%

- MHZ is equivalent to mHz.
- MVPP is equivalent to mVpp, MVRMS is equivalent to mVrms, MV is equivalent to mV.
- MS is equivalent to ms.

Note: this manual takes DG4162 as an example to illustrate the ranges of parameters in the commands.

# Programming Demos

This chapter lists some programming demos to illustrate how to use commands to realize the common functions of the generator in the development environments of Visual C++ 6.0, Visual Basic 6.0 and LabVIEW 8.6. All demos are based on NI (National Instrument)-VISA (Virtual Instrument Software Architecture).

NI-VISA is an API (application programming interface) written by NI on the basis of VISA standards. You can use NI-VISA to realize the communication between the generator and the PC via instrument buses such as USB. As VISA has defined a set of software commands, users can control the instrument without understanding the working state of the interface bus. For more details, please refer to NI-VISA help.

Topics of this chapter:

[Programming Preparations](#)

[Visual C++ 6.0 Programming Demo](#)

[Visual Basic 6.0 Programming Demo](#)

[LabVIEW 8.6 Programming Demo](#)

# **\*IDN?**

## **Syntax**

\*IDN?

## **Description**

Query the ID character string of the instrument.

## **Return Format**

The query returns the manufacturer, model, serial number and version number in character string and all the items are separated by commas.

## **Example**

The command below queries the ID of the instrument and returns Rigol Technologies,DG4162,DG41620000,00.01.02.

\*IDN?

# \*RCL

## Syntax

\*RCL USER1|USER2|USER3|USER4|USER5|USER6|USER7|USER8|USER9|USER10

## Description

Recall the state file stored in the specified storage location in the non-volatile memory.

## Parameter

Name	Type	Range	Default
--	Keyword	USER1 USER2 USER3 USER4 USER5 USER6 USER7 USER8 USER9 USER10	USER1

## Explanation

This command is only available when the specified storage location contains data currently. This command only loads the file stored in the specified storage location to the instrument.

## Example

The command below loads the state file stored in USER2.

\*RCL USER2

## Related Command

[\\*SAV USER1|USER2|USER3|USER4|USER5|USER6|USER7|USER8|USER9|USER10](#)

# **\*RST**

## **Syntax**

\*RST

## **Description**

Restore the instrument to its default states.

# **\*SAV**

## **Syntax**

\*SAV USER1|USER2|USER3|USER4|USER5|USER6|USER7|USER8|USER9|USER10

## **Description**

Store the current instrument state to the specified storage location of the non-volatile memory.

## **Parameter**

Name	Type	Range	Default
--	Keyword	USER1 USER2 USER3 USER4 USER5 USER6 USER7 USER8 USER9 USER10	USER1

## **Explanation**

If data currently exists in the specified storage location, the current instrument state will overwrite the previous data directly and no prompt message will be displayed.

## **Example**

The command below stores the current instrument state to USER2.

\*SAV USER2

## **Related Command**

[\\*RCL USER1|USER2|USER3|USER4|USER5|USER6|USER7|USER8|USER9|USER10](#)

# \*TRG

## Syntax

\*TRG

## Description

Trigger the instrument to generate an output.

## Explanation

This command is only available when Sweep or Burst is enabled (refer to the [\[:SOURce<n>\]:SWEep:STATe OFF|ON](#) or [\[:SOURce<n>\]:BURSt\[:STATe\] ON|OFF](#) command) and the trigger source is set to manual (refer to the [\[:SOURce<n>\]:SWEep:TRIGger:SOURce INTernal|EXTernal|MANual](#) or [\[:SOURce<n>\]:BURSt:TRIGger:SOURce INTernal|EXTernal|MANual](#) command).

## Related Commands

[\[:SOURce<n>\]:SWEep:STATe OFF|ON](#)  
[\[:SOURce<n>\]:SWEep:TRIGger:SOURce INTernal|EXTernal|MANual](#)  
[\[:SOURce<n>\]:BURSt\[:STATe\] ON|OFF](#)  
[\[:SOURce<n>\]:BURSt:TRIGger:SOURce INTernal|EXTernal|MANual](#)



# :COUNter:ATTenuation

## Syntax

:COUNter:ATTenuation 1X|10X  
:COUNter:ATTenuation?

## Description

Set the attenuation coefficient of the counter to X1 or X10.  
Query the attenuation coefficient of the counter.

## Parameter

Name	Type	Range	Default
--	Keyword	1X 10X	1X

## Return Format

The query returns 1X or 10X.

## Example

The command below sets the attenuation coefficient to X10.  
:COUNter:ATTenuation 10X

The query below returns 10X.  
:COUNter:ATTenuation?

## Related Commands

[:COUNter\[:STATe\] ON|OFF](#)  
[:COUNter\[:STATe\]?](#)

# :COUNter:AUTO

## Syntax

:COUNter:AUTO

## Description

Send this command and the instrument will set the gate time of the counter automatically.

## Explanation

This command is only available when the counter function is enabled.

The function of this command is the same with that of the [:COUNter:GATETIME AUTO](#) command.

## Example

The command below sets the gate time of the counter automatically.

```
:COUNter:AUTO
```

## Related Commands

[:COUNter:GATETIME AUTO|USER1|USER2|USER3|USER4|USER5|USER6](#)

[:COUNter:GATETIME?](#)

[:COUNter\[:STATE\] ON|OFF](#)

[:COUNter\[:STATE\]?](#)

# :COUNter:COUPing

## Syntax

:COUNter:COUPing AC|DC  
:COUNter:COUPing?

## Description

Set the coupling mode of the counter to AC or DC.  
Query the coupling mode of the counter.

## Parameter

Name	Type	Range	Default
--	Keyword	AC DC	AC

## Return Format

The query returns AC or DC.

## Example

The command below sets the coupling mode to DC.  
:COUNter:COUPing DC

The query below returns DC.  
:COUNter:COUPing?

## Related Commands

[:COUNter\[:STATe\] ON|OFF](#)  
[:COUNter\[:STATe\]?](#)

# :COUNter:GATETIME

## Syntax

:COUNter:GATETIME AUTO|USER1|USER2|USER3|USER4|USER5|USER6  
:COUNter:GATETIME?

## Description

Set the gate time of the counter.  
Query the gate time of the counter.

## Parameter

Name	Type	Range	Default
--	Keyword	AUTO USER1 USER2 USER3 USER4 USER5 USER6	USER1

## Explanation

The gate time corresponding to each parameter is as shown in the table below.

AUTO	AUTO
USER1	1ms
USER2	10ms
USER3	100ms
USER4	1s
USER5	10s
USER6	>10s

## Return Format

The query returns AUTO, USER1, USER2, USER3, USER4, USER5 or USER6.

## Example

The command below sets the gate time of the counter to 10ms.

```
:COUNter:GATETIME USER2
```

The query below returns USER2.

```
:COUNter:GATETIME?
```

### Related Commands

[:COUNter\[:STATe\] ON|OFF](#)

[:COUNter\[:STATe\]?](#)

[:COUNter:AUTO](#)

# :COUNter:HF

## Syntax

:COUNter:HF ON|OFF  
:COUNter:HF?

## Description

Enable or disable the high-frequency reject of the counter.  
Query whether the high-frequency reject of the counter is enabled.

## Parameter

Name	Type	Range	Default
--	Bool	ON OFF	OFF

## Return Format

The query returns ON or OFF.

## Example

The command below enables the high-frequency reject of the counter.  
:COUNter:HF ON

The query below returns ON.  
:COUNter:HF?

## Related Commands

[:COUNter\[:STATe\] ON|OFF](#)  
[:COUNter\[:STATe\]?](#)

# :COUNter:IMPedance

## Syntax

:COUNter:IMPedance 50|1M  
:COUNter:IMPedance?

## Description

Set the input impedance of the counter to 50  $\Omega$  or 1 M $\Omega$ .  
Query the input impedance of the counter.

## Parameter

Name	Type	Range	Default
--	Discrete	50 $\Omega$  1 M $\Omega$	1 M $\Omega$

## Return Format

The query returns 50 or 1M.

## Example

The command below sets the input impedance to 50  $\Omega$ .  
:COUNter:IMPedance 50

The query below returns 50.  
:COUNter:IMPedance?

## Related Commands

[:COUNter\[:STATe\] ON|OFF](#)  
[:COUNter\[:STATe\]?](#)

# :COUNter:LEVE

## Syntax

:COUNter:LEVE <value>|MINimum|MAXimum  
:COUNter:LEVE? [MINimum|MAXimum]

## Description

Set the trigger level of the counter.  
Query the trigger level of the counter.

## Parameter

Name	Type	Range	Default
<value>	Consecutive Real Number	-2.5 V to 2.5 V	0 V

## Return Format

The query returns the trigger level in scientific notation.

## Example

The command below sets the trigger level to 2 V.  
:COUNter:LEVE 2

The query below returns 2.000000E+00.  
:COUNter:LEVE?

## Related Commands

[:COUNter\[:STATe\] ON|OFF](#)  
[:COUNter\[:STATe\]?](#)



# :COUNter:MEASure

## Syntax

:COUNter:MEASure?

## Description

Query the current measurement results of the counter.

## Return Format

The query returns the measurement result of each parameter in "Frequency, Period, Duty Cycle, Positive Pulse Width, Negative Pulse Width" format and each parameter is expressed in scientific notation.

## Example

The query below returns 1.000099993E+03,9.999000134E-04,1.422600068E+01,1.422537019E-04,8.576463115E-04.

:COUNter:MEASure?

## Related Commands

[:COUNter\[:STATe\] ON|OFF](#)

[:COUNter\[:STATe\]?](#)

# :COUNter:SENSitive

## Syntax

:COUNter:SENSitive <value>|MINimum|MAXimum  
:COUNter:SENSitive? [MINimum|MAXimum]

## Description

Set the trigger sensitivity of the counter.  
Query the trigger sensitivity of the counter.

## Parameter

Name	Type	Range	Default
<value>	Consecutive Real Number	0% to 100%	50%

## Return Format

The query returns the trigger sensitivity in scientific notation.

## Example

The command below sets the trigger sensitivity to 60%.  
:COUNter:SENSitive 60

The query below returns 6.000000E+01.  
:COUNter:SENSitive?

## Related Commands

[:COUNter\[:STATe\] ON|OFF](#)  
[:COUNter\[:STATe\]?](#)

# :COUNter[:STATe]

## Syntax

:COUNter[:STATe] ON|OFF  
:COUNter[:STATe]?

## Description

Enable or disable the counter function.  
Query the state of the counter function.

## Parameter

Name	Type	Range	Default
--	Bool	ON OFF	OFF

## Return Format

The query returns ON (when the counter is enabled) or OFF (when the counter is disabled).

## Example

The command below enables the counter.  
:COUNter:STATe ON

The query below returns ON.  
:COUNter:STATe?

# :COUNter:STATIstics:CLEAr

## Syntax

:COUNter:STATIstics:CLEAr

## Description

Clear the current statistic results.

## Explanation

This command is only available when the statistic function is enabled (use the [:COUNter:STATIstics\[:STATe\] ON|OFF](#) command to enable the statistic function).

## Related Commands

[:COUNter\[:STATe\] ON|OFF](#)

[:COUNter\[:STATe\]?](#)

[:COUNter:STATIstics\[:STATe\] ON|OFF](#)

[:COUNter:STATIstics\[:STATe\]?](#)

# :COUNter:STATIstics:DISPlay

## Syntax

:COUNter:STATIstics:DISPlay DIGITAL|CURVE  
:COUNter:STATIstics:DISPlay?

## Description

Set the display mode of the statistic results of the counter to DIGITAL or CURVE.  
Query the display mode of the statistic results of the counter.

## Parameter

Name	Type	Range	Default
--	Keyword	DIGITAL CURVE	DIGITAL

## Return Format

The query returns DIGITAL or CURVE.

## Example

The command below sets the display mode of the statistic results to CURVE.  
:COUNter:STATIstics:DISPlay CURVE

The query below returns CURVE.  
:COUNter:STATIstics:DISPlay?

## Related Commands

- [:COUNter\[:STATe\] ON|OFF](#)
- [:COUNter\[:STATe\]?](#)
- [:COUNter:STATIstics\[:STATe\] ON|OFF](#)
- [:COUNter:STATIstics\[:STATe\]?](#)

# :COUNter:STATIstics

## Syntax

```
:COUNter:STATIstics[:STATe] ON|OFF
:COUNter:STATIstics[:STATe]?
```

## Description

Enable or disable the measurement results statistic function of the counter.  
Query the status of the measurement results statistic function of the counter.

## Parameter

Name	Type	Range	Default
--	Bool	ON OFF	OFF

## Return Format

The query returns ON or OFF.

## Example

The command below enables the measurement results statistic function of the counter.  
:COUNter:STATIstics ON

The query below returns ON.  
:COUNter:STATIstics?

## Related Commands

```
:COUNter\[:STATe\] ON|OFF
:COUNter\[:STATe\]?
```

# :COUPling:AMPL:DEViation

## Syntax

:COUPling:AMPL:DEViation <deviation>  
:COUPling:AMPL:DEViation?

## Description

Set the amplitude deviation of amplitude coupling.  
Query the amplitude deviation.

## Parameter

Name	Type	Range	Default
<deviation>	Consecutive Real Number	0 Vpp to 20 Vpp	0 Vpp

## Return Format

The query returns the current amplitude deviation in scientific notation.

## Example

The command below sets the amplitude deviation to 500 mVpp.  
:COUPling:AMPL:DEViation 0.5

The query below returns 5.000000E-01.  
:COUPling:AMPL:DEViation?

## Related Commands

[:COUPling\[:STATe\] ON|OFF](#)  
[:COUPling\[:STATe\]?](#)  
[:COUPling:AMPL\[:STATe\] ON|OFF](#)  
[:COUPling:AMPL\[:STATe\]?](#)

# :COUPling:AMPL[:STATe]

## Syntax

:COUPling:AMPL[:STATe] ON|OFF  
:COUPling:AMPL[:STATe]?

## Description

Enable or disable amplitude coupling.  
Query the status of amplitude coupling.

## Parameter

Name	Type	Range	Default
--	Bool	ON OFF	OFF

## Explanation

You can also use the [:COUPling\[:STATe\] ON|OFF](#) command to enable or disable frequency coupling, phase coupling and amplitude coupling at the same time.

## Return Format

The query returns ON or OFF.

## Example

The command below enables amplitude coupling.  
:COUPling:AMPL:STATe ON

The query below returns ON.  
:COUPling:AMPL:STATe?

## Related Commands

- [:COUPling\[:STATe\] ON|OFF](#)
- [:COUPling\[:STATe\]?](#)
- [:COUPling:AMPL:DEViation <deviation>](#)
- [:COUPling:AMPL:DEViation?](#)



# :COUPling:CHannel:BASE

## Syntax

:COUPling:CHannel:BASE CH1|CH2  
:COUPling:CHannel:BASE?

## Description

Set the base channel of coupling to CH1 or CH2.  
Query the current base channel of coupling.

## Parameter

Name	Type	Range	Default
--	Keyword	CH1 CH2	CH1

## Explanation

- 1. This command is only available when the coupling function is disabled (use the [:COUPling\[:STATe\] ON|OFF](#) command to disable the coupling function).
- 2. When frequency, phase or amplitude coupling is enabled, a green "\*" is displayed at the left of the frequency, phase or amplitude of the base channel of coupling.

## Return Format

The query returns CH1 or CH2.

## Example

The command below sets the base channel of coupling to CH2.  
:COUPling:CHannel:BASE CH2

The query below returns CH2.  
:COUPling:CHannel:BASE?

## Related Commands

[:COUPling\[:STATe\] ON|OFF](#)  
[:COUPling\[:STATe\]?](#)

# :COUPling:FREQuency:DEViation

## Syntax

:COUPling:FREQuency:DEViation <deviation>  
:COUPling:FREQuency:DEViation?

## Description

Set the frequency deviation of frequency coupling.  
Query the frequency deviation.

## Parameter

Name	Type	Range	Default
<deviation>	Consecutive Real Number	0 $\mu$ Hz to 160 MHz	0 $\mu$ Hz

## Return Format

The query returns the current frequency deviation in scientific notation.

## Example

The command below sets the frequency deviation to 100 Hz.  
:COUPling:FREQuency:DEViation 100

The query below returns 1.000000E+02.  
:COUPling:FREQuency:DEViation?

## Related Commands

[:COUPling\[:STATe\] ON|OFF](#)  
[:COUPling\[:STATe\]?](#)  
[:COUPling:FREQuency\[:STATe\] ON|OFF](#)  
[:COUPling:FREQuency\[:STATe\]?](#)

# :COUPling:FREQuency[:STATe]

## Syntax

:COUPling:FREQuency[:STATe] ON|OFF  
:COUPling:FREQuency[:STATe]?

## Description

Enable or disable frequency coupling.  
Query the status of frequency coupling.

## Parameter

Name	Type	Range	Default
--	Bool	ON OFF	OFF

## Explanation

You can also use the [:COUPling\[:STATe\] ON|OFF](#) command to enable or disable frequency, phase and amplitude couplings at the same time.

## Return Format

The query returns ON or OFF.

## Example

The command below enables frequency coupling.

:COUPling:FREQuency:STATe ON

The query below returns ON.

:COUPling:FREQuency:STATe?

## Related Commands

- [:COUPling\[:STATe\] ON|OFF](#)
- [:COUPling\[:STATe\]?](#)
- [:COUPling:FREQuency:DEViation <deviation>](#)
- [:COUPling:FREQuency:DEViation?](#)

# :COUPling:PHASe:DEViation

## Syntax

:COUPling:PHASe:DEViation <deviation>  
:COUPling:PHASe:DEViation?

## Description

Set the phase deviation of phase coupling.  
Query the phase deviation.

## Parameter

Name	Type	Range	Default
<deviation>	Consecutive Real Number	0° to 360°	0°

## Return Format

The query returns the current phase deviation in scientific notation.

## Example

The command below sets the phase deviation to 10°.  
:COUPling:PHASe:DEViation 10

The query below returns 1.000000E+01.  
:COUPling:PHASe:DEViation?

## Related Commands

[:COUPling\[:STATe\] ON|OFF](#)  
[:COUPling\[:STATe\]?](#)  
[:COUPling:PHASe\[:STATe\] ON|OFF](#)  
[:COUPling:PHASe\[:STATe\]?](#)

# :COUPling:PHASe[:STATe]

## Syntax

:COUPling:PHASe[:STATe] ON|OFF  
:COUPling:PHASe[:STATe]?

## Description

Enable or disable phase coupling.  
Query the status of phase coupling.

## Parameter

Name	Type	Range	Default
--	Bool	ON OFF	OFF

## Explanation

You can use the [:COUPling\[:STATe\] ON|OFF](#) command to enable or disable frequency, phase and amplitude couplings at the same time.

## Return Format

The query returns ON or OFF.

## Example

The command below enables phase coupling.  
:COUPling:PHASe:STATe ON

The query below returns ON.  
:COUPling:PHASe:STATe?

## Related Commands

- [:COUPling\[:STATe\] ON|OFF](#)
- [:COUPling\[:STATe\]?](#)
- [:COUPling:PHASe:DEViation <deviation>](#)
- [:COUPling:PHASe:DEViation?](#)

# :COUPling[:STATe]

## Syntax

:COUPling[:STATe] ON|OFF  
:COUPling[:STATe]?

## Description

Enable or disable the frequency, phase and amplitude couplings of the channel.  
Query the status of the three couplings.

## Parameter

Name	Type	Range	Default
--	Bool	ON OFF	OFF

## Explanation

You can also use the corresponding command to enable or disable frequency, phase or amplitude coupling respectively (refer to the **Related Commands** below).

## Return Format

The query returns the status of the three couplings in "FREQ:OFF,PHASE:OFF,AMPL:OFF" format.

## Example

The command below enables the three couplings.

:COUPling:STATe ON

The query below returns FREQ:ON,PHASE:ON,AMPL:ON.

:COUPling:STATe?

## Related Commands

[:COUPling:AMPL\[:STATe\] ON|OFF](#)

[:COUPling:AMPL\[:STATe\]?](#)

[:COUPling:FREQuency\[:STATe\] ON|OFF](#)

[:COUPling:FREQuency\[:STATe\]?](#)

[:COUPling:PHASe\[:STATe\] ON|OFF](#)

[:COUPling:PHASe\[:STATe\]?](#)

# :DISPlay:BRIGhtness

## Syntax

```
:DISPlay:BRIGhtness <brightness>|MINimum|MAXimum  
:DISPlay:BRIGhtness? [MINimum|MAXimum]
```

## Description

Set the brightness of the screen.  
Query the brightness setting.

## Parameter

Name	Type	Range	Default
<brightness>	Discrete	1% to 100%	50%

## Explanation

This setting is stored in non-volatile memory and will not be affected by "Preset" (\*RST).

## Return Format

The query returns the current brightness setting in percentage.

## Example

The command below sets the brightness to 80%.  
:DISPlay:BRIGhtness 80

The query below returns 80%.  
:DISPlay:BRIGhtness?



# :DISPlay:SAVer:IMMediate

## Syntax

:DISPlay:SAVer:IMMediate

## Description

Enter the screen saver mode immediately.

## Example

Send the command below and the instrument enters the screen saver mode immediately.

```
:DISPlay:SAVer:IMMediate
```

## Related Commands

[:DISPlay:SAVer\[:STATe\] ON|OFF](#)

[:DISPlay:SAVer\[:STATe\]?](#)

# :DISPlay:SAVer[:STATe]

## Syntax

:DISPlay:SAVer[:STATe] ON|OFF  
:DISPlay:SAVer[:STATe]?

## Description

Enable or disable the screen saver mode.  
Query the screen saver status.

## Parameter

Name	Type	Range	Default
--	Bool	ON OFF	ON

## Explanation

When the screen saver function is enabled, if you stop operating the instrument for up to 15 minutes, the instrument will enter the screen saver mode automatically.

## Return Format

The query returns ON or OFF.

## Example

The command below enables the screen saver function.  
:DISPlay:SAVer:STATe ON

The query below returns ON.  
:DISPlay:SAVer:STATe?

## Related Command

[:DISPlay:SAVer:IMMediate](#)

# :MEMory:STATe:DElete

## Syntax

:MEMory:STATe:DElete USER1|USER2|USER3|USER4|USER5|USER|6USER7|USER8|USER9|USER10

## Description

Delete the state file stored in the specified storage location.

## Parameter

Name	Type	Range	Default
--	Keyword	USER1 USER2 USER3 USER4 USER5 USER6 USER7 USER8 USER9 USER10	USER1

## Explanation

This command is only available when valid state file is currently stored in the specified storage location.

## Related Command

[:MEMory:STATe:VALid? USER1|USER2|USER3|USER4|USER5|USER|6USER7|USER8|USER9|USER10](#)

# :MEMory:STATe:LOCK

## Syntax

```
:MEMory:STATe:LOCK USER1|USER2|USER3|USER4|USER5|USER|6USER7|USER8|USER9|USER10,ON|OFF
:MEMory:STATe:LOCK? USER1|USER2|USER3|USER4|USER5|USER|6USER7|USER8|USER9|USER10
```

## Description

Lock or unlock the file stored in the specified storage location.  
Query whether the file stored in the specified storage location is locked.

## Parameter

Name	Type	Range	Default
--	Keyword	USER1 USER2 USER3 USER4 USER5 USER6 USER7 USER8 USER9 USER10	USER1
--	Bool	ON OFF	OFF

## Explanation

If the file stored in the specified storage location is locked, it can only be read and users can not modify or rename the file or store other file in that storage location.

## Return Format

The query returns ON or OFF.

## Example

The command below locks the file stored in USER2.  
:MEMory:STATe:LOCK USER2,ON

The query below returns ON.  
:MEMory:STATe:LOCK? USER2

# :MEMory:STATe:VALid?

## Syntax

:MEMory:STATe:VALid? USER1|USER2|USER3|USER4|USER5|USER|6USER7|USER8|USER9|USER10

## Description

Query whether the specified storage location currently contains a valid state file.

## Parameter

Name	Type	Range	Default
--	Keyword	USER1 USER2 USER3 USER4 USER5 USER6 USER7 USER8 USER9 USER10	USER1

## Return Format

The query returns 1 (valid) or 0 (invalid).

## Example

The query below returns 1.  
:MEMory:STATe:VALid? USER1

# :MMEMory:CATalog?

## Syntax

:MMEMory:CATabg?

## Description

Query all the files and folders under the current directory.

## Explanation

This command is only applicable to external memory.

## Return Format

Format: {space used, space left, "size, nature, name"...}. Wherein, the unit for the used space and space left is "Byte", the file nature is blank and the folder nature is DIR. For example,  
196608,1073004544,"4000,,000.RAF","1364,,3333.RSF","1364,,2222.RSF","1365,DIR,ABCD"

# :MMEMory:CDIRectory

## Syntax

:MMEMory:CDIRectory <directory\_name>  
:MMEMory:CDIRectory?

## Description

Modify the current directory to the directory specified in **<directory\_name>**.  
The query returns the current directory in character string.

## Parameter

Name	Type	Range	Default
<directory_name>	ASCII Character	Character string enclosed in double quotation marks, the length is limited to 300 characters	--

## Explanation

This command is only available for external memory. If the directory set does not exist, "Error generated by remote interface command!" is displayed.

## Return Format

The query returns the current directory in character string enclosed in double quotation marks.

## Example

The command below sets the current directory to D:\rigol.  
:MMEMory:CDIRectory "D:\rigol"

The query below returns "D:\rigol".  
:MMEMory:CDIRectory?

# :MMEMory:COPY

## Syntax

:MMEMory:COPY <directory\_name>,<file\_name>

## Description

Copy the file specified in <file\_name> under the current directory to the directory (not the current directory) specified in <directory\_name>.

## Parameter

Name	Type	Range	Default
<directory_name>	ASCII Character	Character string enclosed in double quotation marks, the length is limited to 300 characters	--
<file_name>	ASCII Character	Character string enclosed in double quotation marks (include suffix), the length is limited to 40 characters	--

## Explanation

This command is only applicable to external memory.  
The file specified in <file\_name> must be file under the current directory (you can use the [:MMEMory:CDIRectory <directory\\_name>](#) command to change the current directory).  
If the file specified in <file\_name> or the directory specified in <directory\_name> does not exist, "Error generated by remote interface command!" is displayed.

## Example

The command below copies the rigol1.RAF file under the current directory to D:\rigol.  
:MMEMory:COPY "D:\rigol","rigol1.RAF"



# :MMEMory:DElete

## Syntax

:MMEMory:DElete <file\_name>

## Description

Delete the file or folder specified in <file\_name> under the current directory.

## Parameter

Name	Type	Range	Default
<file_name>	ASCII Character	Character string enclosed in double quotation marks (include suffix), the length is limited to 40 characters	--

## Explanation

This command is only applicable to external memory. If the file specified in <file\_name> does not exist, "Error generated by remote interface command!" is displayed.

## Example

The command below deletes the rigol1.RAF file under the current directory.

```
:MMEMory:DElete "rigol1.RAF"
```

# :MMEMory:LOAD

## Syntax

:MMEMory:LOAD <file\_name>

## Description

Load the file specified in <file\_name> under the current directory.

## Parameter

Name	Type	Range	Default
<file_name>	ASCII Character	Character string enclosed in double quotation marks (include suffix), the length is limited to 40 characters	--

## Explanation

This command is only applicable to external memory.  
If the file specified in <file\_name> does not exist, "Error generated by remote interface command!" is displayed.  
The types of files available are state file (.RSF) and arbitrary waveform file (.RAF).  
The arbitrary waveform file is loaded to the current channel.

## Example

The command below loads the the rigol1.RAF file under the current directory.  
:MMEMory:LOAD "rigol1.RAF"

# :MMEMory:MDIRectory

## Syntax

:MMEMory:MDIRectory <dir\_name>

## Description

Create a folder using the filename specified in <dir\_name> under the current directory.

## Parameter

Name	Type	Range	Default
<dir_name>	ASCII Character	Character string enclosed in double quotation marks, the length is limited to 40 characters	--

## Explanation

This command is only applicable to external memory. If the filename specified already exists, "Error generated by remote interface command!" is displayed.

## Example

The command below creates a folder under the current directory using the name rigol1.

```
:MMEMory:MDIRectory "rigol1"
```

# :MMEMory:RDIRECTory?

## Syntax

:MMEMory:RDIRECTory?

## Description

Query the disk (except C disk) currently available.

## Explanation

This command is only applicable to external memory.

## Return Format

Format: "1,"D:"" (USB storage device is currently connected).

# :MMEMory:STORe

## Syntax

:MMEMory:STORe <file\_name>

## Description

Store the file under the current directory using the filename specified in <file\_name>.

## Parameter

Name	Type	Range	Default
<file_name>	ASCII Character	Character string enclosed in double quotation marks (include suffix), the length is limited to 40 characters	--

## Explanation

This command is only applicable to external memory. If the file specified in <file\_name> does not exist, "Error generated by remote interface command!" is displayed.  
The types of files available are state file (.RSF) and arbitrary waveform file (.RAF).  
Only the data of the current channel is stored when storing the arbitrary waveform file.

## Example

The command below stores the counter.RSF file under the current directory.  
:MMEMory:STORe "counter.RSF"

# :OUTPut[<n>]:IMPedance

## Syntax

```
:OUTPut[<n>]:IMPedance <ohms>|INFinity|MINimum|MAXimum
:OUTPut[<n>]:IMPedance? [MINimum|MAXimum]
```

## Description

Set the output impedance of the [Output1] or [Output2] connector at the front panel and the default unit is  $\Omega$ .  
Query the output impedance of the [Output1] or [Output2] connector.

## Parameter

Name	Type	Range	Default
<ohms>	Integer	1 $\Omega$ to 10000 $\Omega$	50 $\Omega$

## Explanation

Default setting: INFinity (HighZ)  
This command is completely compatible with the following commands.  
[:OUTPut\[<n>\]:LOAD <ohms>|INFinity|MINimum|MAXimum](#)  
[:OUTPut\[<n>\]:LOAD? \[MINimum|MAXimum\]](#)

## Return Format

The query returns the specific impedance value or INFINITY (HighZ).

## Example

The command below sets the output impedance of the [Output2] connector to 100  $\Omega$ .  
:OUTPut2:IMPedance 100

The query below returns 100.  
:OUTPut2:IMPedance?

## Related Commands

[:OUTPut\[<n>\]:LOAD <ohms>|INFinity|MINimum|MAXimum](#)  
[:OUTPut\[<n>\]:LOAD? \[MINimum|MAXimum\]](#)

# :OUTPut[<n>]:LOAD

## Syntax

```
:OUTPut[<n>]:LOAD <ohms>|INFinity|MINimum|MAXimum
:OUTPut[<n>]:LOAD? [MINimum|MAXimum]
```

## Description

Set the output impedance of the [Output1] or [Output2] connector at the front panel and the default unit is  $\Omega$ .  
Query the output impedance of the [Output1] or [Output2] connector.

## Parameter

Name	Type	Range	Default
<ohms>	Integer	1 $\Omega$ to 10000 $\Omega$	50 $\Omega$

## Explanation

Default setting: INFinity (HighZ)  
This command is completely compatible with the following commands.  
[:OUTPut\[<n>\]:IMPedance <ohms>|INFinity|MINimum|MAXimum](#)  
[:OUTPut\[<n>\]:IMPedance? \[MINimum|MAXimum\]](#)

## Return Format

The query returns the specific impedance value or INFINITY (HighZ).

## Example

The command below sets the output impedance of the [Output2] connector to 100  $\Omega$ .  
:OUTPut2:LOAD 100

The query below returns 100.  
:OUTPut2:LOAD?

## Related Commands

[:OUTPut\[<n>\]:IMPedance <ohms>|INFinity|MINimum|MAXimum](#)  
[:OUTPut\[<n>\]:IMPedance? \[MINimum|MAXimum\]](#)

# :OUTPut[<n>]:NOISe:SCALe

## Syntax

```
:OUTPut[<n>]:NOISe:SCALe <percent>|MINimum|MAXimum
:OUTPut[<n>]:NOISe:SCALe? [MINimum|MAXimum]
```

## Description

Set the scale of the noise superposed on the [Output1] or [Output2] connector.  
Query the scale of the noise superposed on the [Output1] or [Output2] connector.

## Parameter

Name	Type	Range	Default
<percent>	Consecutive Real Number	0% to 50%	10%

## Return Format

The query returns the current noise scale in scientific notation.

## Example

The command below sets the noise scale of the [Output2] connector to 15%.

```
:OUTPut2:NOISe:SCALe 15
```

The query below returns 1.500000E+01.

```
:OUTPut2:NOISe:SCALe?
```



# :OUTPut[<n>]:NOISe[:STATe]

## Syntax

```
:OUTPut[<n>]:NOISe[:STATe] ON|OFF
:OUTPut[<n>]:NOISe[:STATe]?
```

## Description

Enable or disable the noise superposition function of the [Output1] or [Output2] connector.  
Query the status of the noise superposition function of the [Output1] or [Output2] connector.

## Parameter

Name	Type	Range	Default
--	Bool	ON OFF	ON

## Return Format

The query returns ON or OFF.

## Example

The command below enables the noise superposition function of the [Output1] connector.  
:OUTPut:NOISe ON

The query below returns ON.  
:OUTPut:NOISe?

# :OUTPut[<n>]:POLarity

## Syntax

```
:OUTPut[<n>]:POLarity NORMal|INVerted
:OUTPut[<n>]:POLarity?
```

## Description

Set the output polarity of the [Output1] or [Output2] connector.  
Query the output polarity of the [Output1] or [Output2] connector.

## Parameter

Name	Type	Range	Default
--	Keyword	NORMal INVerted	NORMal

## Explanation

When the output polarity is set to INVerted, the waveform inverts relatively to the offset voltage.  
After the waveform is inverted, none of the offset voltages would change, the waveform displayed in the user interface is not inverted and the related sync signal is not inverted.

## Return Format

The query returns NORMAL or INVERTED.

## Example

The command below sets the output polarity of the [Output1] connector to INVerted.  
:OUTPut1:POLarity INVerted

The query returns INVERTED.  
:OUTPut1:POLarity?

# :OUTPut[<n>][:STATe]

## Syntax

:OUTPut[<n>][:STATe] ON|OFF  
:OUTPut[<n>][:STATe]?

## Description

Enable or disable the output of the [Output1] or [Output2] connector at the front panel.  
Query the status of the [Output1] or [Output2] connector.

## Parameter

Name	Type	Range	Default
--	Bool	ON OFF	OFF

## Return Format

The query returns ON or OFF.

## Example

The command below enables the [Output1] connector.  
:OUTPut ON

The query below returns ON.  
:OUTPut?

# :OUTPut[<n>]:SYNC:POLarity

## Syntax

```
:OUTPut[<n>]:SYNC:POLarity POSitive|NEGative
:OUTPut[<n>]:SYNC:POLarity?
```

## Description

Set the output polarity of the [Sync1] or [Sync2] connector.  
Query the output polarity of the [Sync1] or [Sync2] connector.

## Parameter

Name	Type	Range	Default
--	Keyword	POSitive NEGative	POSitive

## Return Format

The query returns POS or NEG.

## Example

The command below sets the output polarity of the [Sync2] connector to NEGative.  
:OUTPut2:SYNC:POLarity NEGative

The query below returns NEG.  
:OUTPut2:SYNC:POLarity?

# :OUTPut[<n>]:SYNC[:STATe]

## Syntax

```
:OUTPut[<n>]:SYNC[:STATe] ON|OFF
:OUTPut[<n>]:SYNC[:STATe]?
```

## Description

Enable or disable the sync signal on the [Sync1] or [Sync2] connector.  
The query returns ON or OFF.

## Parameter

Name	Type	Range	Default
--	Bool	ON OFF	ON

## Explanation

When the sync signal is disabled, the output level of the [Sync1] or [Sync2] connector is logic low level.

## Return Format

The query returns ON or OFF.

## Example

The command below disables the sync signal on the [Sync1] connector.

```
:OUTPut:SYNC OFF
```

The query below returns OFF.

```
:OUTPut:SYNC?
```

# [[:SOURce<n>]:APPLy:CUSTom

## Syntax

[[:SOURce<n>]:APPLy:CUSTom [<freq>[,<amp>[,<offset>[,<phase>]]]]

## Description

Output the user-defined waveform with the specified parameters (frequency, amplitude, DC offset and start phase).

## Parameter

Name	Type	Range <sup>1</sup>	Default
<freq>	Consecutive Real Number	1 μHz to 40 MHz	1 kHz
<amp>	Consecutive Real Number	--	5 Vpp
<offset>	Consecutive Real Number	--	0 V <sub>DC</sub>
<phase>	Consecutive Real Number	0° to 360°	0°

Note<sup>1</sup>: for different models, the ranges of the parameters are different. Besides, <amp> is limited by the impedance and frequency/period settings and <offset> is limited by the impedance and amplitude/high level settings (for details, refer to the User's Guide). The ranges listed in the table are for DG4162 when the impedance is set to "HighZ".

## Example

The command below sets the frequency, amplitude, DC offset and start phase of the user-defined waveform to 100 Hz, 2.5 Vpp, 0.5 V<sub>DC</sub> and 90° respectively.

:APPLy:CUSTom 100,2.5,0.5,90

# [[:SOURce<n>]:APPLY:HARMonic

## Syntax

[[:SOURce<n>]:APPLY:HARMonic [<freq>[,<amp>[,<offset>[,<phase>]]]]

## Description

Output a harmonic with specified frequency, amplitude, DC offset and start phase.

## Parameter

Name	Type	Range <sup>1</sup>	Default
<freq>	Consecutive Real Number	1 μHz to 80 MHz	1 kHz
<amp>	Consecutive Real Number	--	5 Vpp
<offset>	Consecutive Real Number	--	0 V <sub>DC</sub>
<phase>	Consecutive Real Number	0° to 360°	0°

Note<sup>1</sup>: for different models, the ranges of the parameters are different. Besides, <amp> is limited by the impedance and frequency/period settings and <offset> is limited by the impedance and amplitude/high level settings (for details, refer to the User's Guide). The ranges listed in the table are for DG4162 when the impedance is set to "HighZ" and the harmonic order is set to "2".

## Example

The command below sets the frequency, amplitude, DC offset and start phase of the harmonic to 100 Hz, 2.5 Vpp, 0.5 V<sub>DC</sub> and 90° respectively.

:APPLY:HARMonic 100,2.5,0.5,90

# [[:SOURce<n>]:APPLY:NOISe

## Syntax

[[:SOURce<n>]:APPLY:NOISe [<amp>[,<offset>]]

## Description

Output a noise with specified amplitude and DC offset.

## Parameter

Name	Type	Range <sup>1</sup>	Default
<amp>	Consecutive Real Number	0 Vpp to 10 Vpp (50 Ω)	5 Vpp
<offset>	Consecutive Real Number	--	0 V <sub>DC</sub>

Note<sup>1</sup>: <offset> is limited by the impedance and amplitude/high level settings (for details, refer to the User's Guide).

## Example

The command below sets the amplitude and DC offset of the noise to 2.5 Vpp and 0.5 V<sub>DC</sub> respectively.

`:APPLY:NOISe 2.5,0.5`



# [[:SOURce<n>]:APPLy:PULSe

## Syntax

[[:SOURce<n>]:APPLy:PULSe [<freq>[,<amp>[,<offset>[,<delay>]]]]

## Description

Output a pulse with specified frequency, amplitude, DC offset and delay.

## Parameter

Name	Type	Range <sup>1</sup>	Default
<freq>	Consecutive Real Number	1 μHz to 40 MHz	1 kHz
<amp>	Consecutive Real Number	--	5 Vpp
<offset>	Consecutive Real Number	--	0 V <sub>DC</sub>
<delay>	Consecutive Real Number	0 ns to pulse period	0 ns

Note<sup>1</sup>: for different models, the ranges of the parameters are different. Besides, <amp> is limited by the impedance and frequency/period settings and <offset> is limited by the impedance and amplitude/high level settings (for details, refer to the User's Guide). The ranges listed in the table are for DG4162 when the impedance is set to "HighZ".

## Example

The command below sets the frequency, amplitude, DC offset and delay of the pulse to 100 Hz, 2.5 Vpp, 0.5 V<sub>DC</sub> and 5 ms respectively.

```
:APPLy:PULSe 100,2.5,0.5,0.005
```

# [[:SOURce<n>]:APPLy:RAMP

## Syntax

[[:SOURce<n>]:APPLy:RAMP [<freq>[,<amp>[,<offset>[,<phase>]]]]

## Description

Output a ramp with specified frequency, amplitude, DC offset and start phase.

## Parameter

Name	Type	Range <sup>1</sup>	Default
<freq>	Consecutive Real Number	1 μHz to 4 MHz	1 kHz
<amp>	Consecutive Real Number	--	5 Vpp
<offset>	Consecutive Real Number	--	0 V <sub>DC</sub>
<phase>	Consecutive Real Number	0° to 360°	0°

Note<sup>1</sup>: for different models, the ranges of the parameters are different. Besides, <amp> is limited by the impedance and frequency/period settings and <offset> is limited by the impedance and amplitude/high level settings (for details, refer to the User's Guide). The ranges listed in the table are for DG4162 when the impedance is set to "HighZ".

## Example

The command below sets the frequency, amplitude, DC offset and start phase of the ramp to 100 Hz, 2.5 Vpp, 0.5 V<sub>DC</sub> and 90° respectively.

:APPLy:RAMP 100,2.5,0.5,90

# [[:SOURce<n>]:APPLy:SINusoid

## Syntax

[[:SOURce<n>]:APPLy:SINusoid [<freq>[,<amp>[,<offset>[,<phase>]]]]

## Description

Output a sine waveform with specified frequency, amplitude, DC offset and start phase.

## Parameter

Name	Type	Range <sup>1</sup>	Default
<freq>	Consecutive Real Number	1 μHz to 160 MHz	1 kHz
<amp>	Consecutive Real Number	--	5 Vpp
<offset>	Consecutive Real Number	--	0 V <sub>DC</sub>
<phase>	Consecutive Real Number	0° to 360°	0°

Note<sup>1</sup>: for different models, the ranges of the parameters are different. Besides, <amp> is limited by the impedance and frequency/period settings and <offset> is limited by the impedance and amplitude/high level settings (for details, refer to the User's Guide). The ranges listed in the table are for DG4162 when the impedance is set to "HighZ".

## Example

The command below sets the frequency, amplitude, DC offset and start phase of the sine waveform to 100 Hz, 2.5 Vpp, 0.5 V<sub>DC</sub> and 90° respectively.

:APPLy:SINusoid 100,2.5,0.5,90

# [[:SOURce<n>]:APPLy:SQUare

## Syntax

[[:SOURce<n>]:APPLy:SQUare [<freq>[,<amp>[,<offset>[,<phase>]]]]

## Description

Output a square waveform with specified frequency, amplitude, DC offset and start phase.

## Parameter

Name	Type	Range <sup>1</sup>	Default
<freq>	Consecutive Real Number	1 μHz to 50 MHz	1 kHz
<amp>	Consecutive Real Number	--	5 Vpp
<offset>	Consecutive Real Number	--	0 V <sub>DC</sub>
<phase>	Consecutive Real Number	0° to 360°	0°

Note<sup>1</sup>: for different models, the ranges of the parameters are different. Besides, <amp> is limited by the impedance and frequency/period settings and <offset> is limited by the impedance and amplitude/high level settings (for details, refer to the User's Guide). The ranges listed in the table are for DG4162 when the impedance is set to "HighZ".

## Example

The command below sets the frequency, amplitude, DC offset and start phase of the square waveform to 100 Hz, 2.5 Vpp, 0.5 V<sub>DC</sub> and 90° respectively.

:APPLy:SQUare 100,2.5,0.5,90

# [[:SOURce<n>]:APPLY:USER

## Syntax

[[:SOURce<n>]:APPLY:USER [<freq>[,<amp>[,<offset>[,<phase>]]]]

## Description

Output an arbitrary waveform with specified frequency, amplitude, DC offset and start phase.

## Parameter

Name	Type	Range <sup>1</sup>	Default
<freq>	Consecutive Real Number	1 μHz to 40 MHz	1 kHz
<amp>	Consecutive Real Number	--	5 Vpp
<offset>	Consecutive Real Number	--	0 V <sub>DC</sub>
<phase>	Consecutive Real Number	0° to 360°	0°

Note<sup>1</sup>: for different models, the ranges of the parameters are different. Besides, <amp> is limited by the impedance and frequency/period settings and <offset> is limited by the impedance and amplitude/high level settings (for details, refer to the User's Guide). The ranges listed in the table are for DG4162 when the impedance is set to "HighZ".

## Explanation

When the current arbitrary waveform is DC, the instrument will directly pick up the offset parameter to modify the DC offset while the frequency, amplitude and phase parameters will be discarded.

## Example

The command below sets the frequency, amplitude, DC offset and start phase of the arbitrary waveform to 100 Hz, 2.5 Vpp, 0.5 V<sub>DC</sub> and 90° respectively.

:APPLY:USER 100,2.5,0.5,90

# [[:SOURce<n>]:APPLy?

## Syntax

[[:SOURce<n>]:APPLy?

## Description

Query the current configuration of the generator.

## Return Format

The query returns a character string enclosed in double quotation marks in "Waveform Name, Frequency, Amplitude, Offset, Start Phase/Delay" format.  
If the corresponding item does not exist, it will be replaced by "DEF". For example, "NOISE,DEF,5.000000E+00,0.000000E+00,DEF".

# [[:SOURce<n>]:BURSt:GATE:POLarity

## Syntax

[[:SOURce<n>]:BURSt:GATE:POLarity NORMal|INVerted  
[:SOURce<n>]:BURSt:GATE:POLarity?

## Description

Set the generator to output a burst when the gated signal at the **[Mod/FSK/Trig]** connector at the rear panel is high level or low level.  
Query the polarity setting.

## Parameter

Name	Type	Range	Default
--	Keyword	NORMal INVerted	NORMal

## Explanation

This command is only available in gated Burst mode.

## Return Format

The query returns NORM or INV.

## Example

The command below sets the polarity to INVerted, namely the instrument outputs a burst when the gated signal at the **[Mod/FSK/Trig]** connector at the rear panel is low level.  
[:BURSt:GATE:POLarity INVerted

The query below returns INV.  
[:BURSt:GATE:POLarity?

## Related Commands

[\[:SOURce<n>\]:BURSt:MODE TRIGgered|GATed|INFinity](#)  
[\[:SOURce<n>\]:BURSt:MODE?](#)

# [[:SOURce<n>]:BURSt:INTernal:PERiod

## Syntax

```
[[:SOURce<n>]:BURSt:INTernal:PERiod <period>|MINimum|MAXimum  
[:SOURce<n>]:BURSt:INTernal:PERiod? [MINimum|MAXimum]
```

## Description

Set the Burst period (namely the time from the start of a N cycle burst to the start of the next burst) and the default unit is "s".  
Query the Burst period.

## Parameter

Name	Type	Range	Default
<period>	Consecutive Real Number	$\geq 1\ \mu\text{s} + \text{waveform period}^1 \times \text{number of bursts}$	10 ms

Note<sup>1</sup> : waveform period is the period of the burst function (such as sine and square waveforms).

## Explanation

This command is only applicable to N cycle burst mode in internal trigger.  
If the burst period is too short, the generator will increase this period automatically to allow the output of the specified number of cycles.

## Return Format

The query returns the period in scientific notation.

## Example

The command below sets the burst period to 0.5 s.  
[:BURSt:INTernal:PERiod 0.5

The query below returns 5.000000E-01.  
[:BURSt:INTernal:PERiod?

## Related Commands

[\[:SOURce<n>\]:BURSt:MODE TRIGgered|GATed|INFinity](#)  
[\[:SOURce<n>\]:BURSt:MODE?](#)





# [[:SOURce<n>]:BURSt:MODE

## Syntax

[[:SOURce<n>]:BURSt:MODE TRIGGered|GATed|INFinity  
[:SOURce<n>]:BURSt:MODE?

## Description

Set the burst type to N cycle, gated or infinite.  
Query the burst type.

## Parameter

Name	Type	Range	Default
--	Keyword	TRIGGered GATed INFinity	TRIGGered

## Return Format

The query returns TRIG, GAT or INF.

## Example

The command below sets the burst type to GATed.  
[:SOURce: BURSt:MODE GATed

The query below returns GAT.  
[:SOURce: BURSt:MODE?

# [[:SOURce<n>]:BURSt:NCYCles

## Syntax

[[:SOURce<n>]:BURSt:NCYCles <cycles>|MINimum|MAXimum  
[[:SOURce<n>]:BURSt:NCYCles? [MINimum|MAXimum]

## Description

Set the cycles of the burst.  
Query the cycles of the burst.

## Parameter

Name	Type	Range	Default
<cycles>	Integer	1 to 1 000 000 (external or manual trigger) 1 to 500 000 (internal trigger)	1

## Explanation

This command is only available in N cycle burst mode.

## Return Format

The query returns an integer.

## Example

The command below sets the cycles of the burst to 100.  
[:BURSt:NCYCles 100

The query below returns 100.  
[:BURSt:NCYCles?

## Related Commands

[\[:SOURce<n>\]:BURSt:MODE TRIGgered|GATed|INFinity](#)  
[\[:SOURce<n>\]:BURSt:MODE?](#)

# [[:SOURce<n>]:BURSt:PHASe

## Syntax

```
[[:SOURce<n>]:BURSt:PHASe <phase>|MINimum|MAXimum  
[:SOURce<n>]:BURSt:PHASe? [MINimum|MAXimum]
```

## Description

Set the start phase of the burst and the default unit is "°".  
Query the start phase of the burst.

## Parameter

Name	Type	Range	Default
<phase>	Consecutive Real Number	0° to 360°	0°

## Explanation

For sine, square and ramp, 0° is the point where the waveform passes through 0 V (or DC offset value) positively.  
For arbitrary waveform, 0° is the first point of the waveform.  
For pulse and noise, start phase is not available.

## Return Format

The query returns the phase value in scientific notation.

## Example

The command below sets the start phase to 10°.  
[:BURSt:PHASe 10

The query below returns 1.000000E+01.  
:BURSt:PHASe?

# [[:SOURce<n>]:BURSt[:STATe]

## Syntax

[[:SOURce<n>]:BURSt[:STATe] ON|OFF  
[:SOURce<n>]:BURSt[:STATe]?

## Description

Enable or disable the Burst function.  
Query the status of the Burst function.

## Parameter

Name	Type	Range	Default
--	Bool	ON OFF	OFF

## Explanation

When Burst is enabled, Sweep or Mod will be disabled automatically (if it is currently enabled).

## Return Format

The query returns ON or OFF.

## Example

The command below enables the Burst function.  
[:BURSt ON

The query below returns ON.  
[:BURSt?

# [[:SOURce<n>]:BURSt:TDElay

## Syntax

```
[[:SOURce<n>]:BURSt:TDElay <delay>|MINimum|MAXimum  
[:SOURce<n>]:BURSt:TDElay? [MINimum|MAXimum]
```

## Description

Set the time from when the generator receives the trigger signal to starts to output the N cycle (or infinite) burst and the default unit is "s".  
Query the burst delay.

## Parameter

Name	Type	Range <sup>1</sup>	Default
<delay>	Consecutive Real Number	0 s to 85 s	0 s

Note<sup>1</sup>: when internal trigger source is selected, the delay of the N cycle burst is also limited by the carrier period, pulse period and the number of cycles.

## Explanation

This command is only available in N cycle and infinite burst modes.

## Return Format

The query returns the time value in scientific notation.

## Example

The command below sets the delay to 2.5 s.  
[:BURSt:TDElay 2.5

The query below returns 2.500000E+00.  
[:BURSt:TDElay?

## Related Commands

```
[[:SOURce<n>]:BURSt:MODE TRIGgered|GATed|INFinity  
[:SOURce<n>]:BURSt:MODE?
```

# **[[:SOURce<n>]:BURSt:TRIGger[:IMMediate]**

## **Syntax**

[[:SOURce<n>]:BURSt:TRIGger[:IMMediate]

## **Description**

Set the instrument to trigger immediately.

## **Explanation**

This command is only available when manual trigger source is selected.

# [[:SOURce<n>]:BURSt:TRIGGer:SLOPe

## Syntax

[[:SOURce<n>]:BURSt:TRIGGer:SLOPe POSitive|NEGative  
[:SOURce<n>]:BURSt:TRIGGer:SLOPe?

## Description

Set the generator to enable the burst output on the rising edge or falling edge of the external trigger signal.  
Query the edge type of the external trigger signal.

## Parameter

Name	Type	Range	Default
--	Keyword	POSitive NEGative	POSitive

## Explanation

This command is only available when external trigger source is selected.

## Return Format

The query returns POS or NEG.

## Example

The query below returns NEG.  
[:BURS:TRIG:SLOP NEG

## Related Commands

[\[:SOURce<n>\]:BURSt:MODE TRIGGered|GATed|INFinity](#)  
[\[:SOURce<n>\]:BURSt:MODE?](#)



# [[:SOURce<n>]:BURSt:TRIGger:SOURce

## Syntax

[[:SOURce<n>]:BURSt:TRIGger:SOURce INTernal|EXTernal|MANual  
[:SOURce<n>]:BURSt:TRIGger:SOURce?

## Description

Set the trigger source of the Burst to internal, external or manual.  
Query the trigger source of the Burst.

## Parameter

Name	Type	Range	Default
--	Keyword	INTernal EXTernal MANual	INTernal

## Return Format

The query returns INT, EXT or MAN.

## Example

The command below selects manual trigger source.  
[:BURSt:TRIGger:SOURce MANual

The query below returns MAN.  
[:BURSt:TRIGger:SOURce?

# [[:SOURce<n>]:BURSt:TRIGger:TRIGOut

## Syntax

[[:SOURce<n>]:BURSt:TRIGger:TRIGOut OFF|POSitive|NEGative  
[:SOURce<n>]:BURSt:TRIGger:TRIGOut?

## Description

Specify the edge type of the trigger output signal.  
Query the edge type of the trigger output signal.

## Parameter

Name	Type	Range	Default
--	Keyword	OFF POSitive NEGative	OFF

## Explanation

This command is only available when internal or manual trigger source is selected.

## Return Format

The query returns OFF, POS or NEG.

## Example

The command below sets the edge type of the trigger output signal to rising edge.  
[:BURSt:TRIGger:TRIGout POSitive

The query below returns POS.  
[:BURSt:TRIGger:TRIGout POSitive

## Related Commands

[\[:SOURce<n>\]:BURSt:TRIGger:SOURce INTernal|EXTernal|MANual](#)  
[\[:SOURce<n>\]:BURSt:TRIGger:SOURce?](#)

# [[:SOURce<n>]:FREQuency:CENTer

## Syntax

```
[[:SOURce<n>]:FREQuency:CENTer <frequency>|MINimum|MAXimum  
[:SOURce<n>]:FREQuency:CENTer? [MINimum|MAXimum]
```

## Description

Set the center frequency of the sweep and the default unit is "Hz".  
Query the center frequency of the sweep.

## Parameter

Name	Type	Range <sup>1</sup>	Default
<frequency>	Consecutive Real Number	Refer to the <b>Note</b> below	550 Hz

Note<sup>1</sup>: different sweep waveforms correspond to different center frequency ranges.  
Sine: 1 µHz to 160 MHz  
Square: 1 µHz to 50 MHz  
Ramp: 1 µHz to 4 MHz  
Arb: 1 µHz to 40 MHz (except DC in the built-in waveforms)

## Explanation

In the sweep mode, the start frequency, end frequency, center frequency and frequency span are interrelated and their relations fulfill the following equations.

$$\text{center frequency} = ( \mid \text{start frequency} + \text{end frequency} \mid ) / 2$$
$$\text{frequency span} = \text{end frequency} - \text{start frequency}$$

## Return Format

The query returns the center frequency in scientific notation.

## Example

The command below sets the center frequency to 600 Hz.  
[:FREQuency:CENTer 600

The query below returns 6.000000E+02.  
[:FREQuency:CENTer?

**Related Commands**

- [\[\[:SOURce<n>\]:FREQuency:SPAN <frequency>|MINimum|MAXimum](#)
- [\[\[:SOURce<n>\]:FREQuency:SPAN? \[MINimum|MAXimum\]](#)
- [\[\[:SOURce<n>\]:FREQuency:STARt <frequency>|MINimum|MAXimum](#)
- [\[\[:SOURce<n>\]:FREQuency:STARt? \[MINimum|MAXimum\]](#)
- [\[\[:SOURce<n>\]:FREQuency:STOP <frequency>|MINimum|MAXimum](#)
- [\[\[:SOURce<n>\]:FREQuency:STOP? \[MINimum|MAXimum\]](#)

# [[:SOURce<n>]:FREQuency[:FIXed]

## Syntax

[[:SOURce<n>]:FREQuency[:FIXed] <frequency>|MINimum|MAXimum  
[:SOURce<n>]:FREQuency[:FIXed]? [MINimum|MAXimum]

## Description

Set the frequency of the basic waveform and the default unit is "Hz".  
Query the frequency of the basic waveform.

## Parameter

Name	Type	Range <sup>1</sup>	Default
<frequency>	Consecutive Real Number	Refer to the <b>Note</b> blow	1 kHz

Note<sup>1</sup>: different waveforms correspond to different frequency ranges.  
Sine: 1 μHz to 160 MHz  
Square: 1 μHz to 50 MHz  
Ramp: 1 μHz to 4 MHz  
Pulse: 1 μHz to 40 MHz  
Arb: 1 μHz to 40 MHz  
Harmonic: 1 μHz to 80 MHz

## Return Format

The query returns the frequency in scientific notation.

## Example

The command below sets the frequency to 1.5 kHz.  
[:FREQuency 1500

The query below returns 1.500000E+03.  
[:FREQuency?

# [[:SOURce<n>]:FREQuency:SPAN

## Syntax

```
[[:SOURce<n>]:FREQuency:SPAN <frequency>|MINimum|MAXimum  
[:SOURce<n>]:FREQuency:SPAN? [MINimum|MAXimum]
```

## Description

Set the frequency span of the sweep and the default unit is "Hz".  
Query the frequency span.

## Parameter

Name	Type	Range	Default
<frequency>	Consecutive Real Number	Refer to the introduction in the User's Guide	900 Hz

## Explanation

In the sweep mode, the start frequency, end frequency, center frequency and frequency span are interrelated and their relations fulfill the following equations.

$$\text{center frequency} = ( \text{start frequency} + \text{end frequency} ) / 2$$
$$\text{frequency span} = \text{end frequency} - \text{start frequency}$$

## Return Format

The query returns the frequency span in scientific notation.

## Example

The command below sets the frequency span to 1100 Hz.  
[:FREQuency:SPAN 1100

The query below returns 1.100000E+03.  
[:FREQuency:SPAN?

## Related Commands

- [\[:SOURce<n>\]:FREQuency:CENTer <frequency>|MINimum|MAXimum](#)
- [\[:SOURce<n>\]:FREQuency:CENTer? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:FREQuency:STARt <frequency>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:FREQuency:STARt? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:FREQuency:STOP <frequency>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:FREQuency:STOP? \[MINimum|MAXimum\]](#)

# [[:SOURce<n>]:FREQuency:STARt

## Syntax

```
[[:SOURce<n>]:FREQuency:STARt <frequency>|MINimum|MAXimum  
[:SOURce<n>]:FREQuency:STARt? [MINimum|MAXimum]
```

## Description

Set the start frequency of the sweep and the default unit is "Hz".  
Query the start frequency of the sweep.

## Parameter

Name	Type	Range <sup>1</sup>	Default
<frequency>	Consecutive Real Number	Refer to the <b>Note</b> below	100 Hz

Note<sup>1</sup>: different sweep waveforms correspond to different start frequency ranges.  
Sine: 1 µHz to 160 MHz  
Square: 1 µHz to 50 MHz  
Ramp: 1 µHz to 4 MHz  
Arb: 1 µHz to 40 MHz (except DC in the built-in waveforms)

## Explanation

In the sweep mode, the start frequency, end frequency, center frequency and frequency span are interrelated and their relations fulfill the following equations.

$$\text{center frequency} = ( | \text{start frequency} + \text{end frequency} | ) / 2$$
$$\text{frequency span} = \text{end frequency} - \text{start frequency}$$

## Return Format

The query returns the start frequency in scientific notation.

## Example

The command below sets the start frequency to 500 Hz.  
[:FREQuency:STARt 500

The query below returns 5.000000E+02.  
[:FREQuency:STARt?



## Related Commands

[\[\[:SOURce<n>\]:FREQuency:CENTer <frequency>|MINimum|MAXimum](#)

[\[\[:SOURce<n>\]:FREQuency:CENTer? \[MINimum|MAXimum\]](#)

[\[\[:SOURce<n>\]:FREQuency:SPAN <frequency>|MINimum|MAXimum](#)

[\[\[:SOURce<n>\]:FREQuency:SPAN? \[MINimum|MAXimum\]](#)

[\[\[:SOURce<n>\]:FREQuency:STOP <frequency>|MINimum|MAXimum](#)

[\[\[:SOURce<n>\]:FREQuency:STOP? \[MINimum|MAXimum\]](#)

# [[:SOURce<n>]:FREQuency:STOP

## Syntax

```
[[:SOURce<n>]:FREQuency:STOP <frequency>|MINimum|MAXimum  
[:SOURce<n>]:FREQuency:STOP? [MINimum|MAXimum]
```

## Description

Set the end frequency of the sweep and the default unit is "Hz".  
The query returns the end frequency of the sweep.

## Parameter

Name	Type	Range <sup>1</sup>	Default
<frequency>	Consecutive Real Number	Refer to the <b>Note</b> below	1 kHz

Note<sup>1</sup>: different sweep waveforms correspond to different end frequency ranges.  
Sine: 1 µHz to 160 MHz  
Square: 1 µHz to 50 MHz  
Ramp: 1 µHz to 4 MHz  
Arb: 1 µHz to 40 MHz (except DC in the built-in waveforms)

## Explanation

In the sweep mode, the start frequency, end frequency, center frequency and frequency span are interrelated and their relations fulfill the following equations.

$$\text{center frequency} = ( | \text{start frequency} + \text{end frequency} | ) / 2$$
$$\text{frequency span} = \text{end frequency} - \text{start frequency}$$

## Return Format

The query returns the end frequency in scientific notation.

## Example

The command below sets the end frequency to 5 kHz.

```
:FREQuency:STOP 5000
```

The query below returns 5.000000E+03.

```
:FREQuency:STOP?
```

**Related Commands**

- [\[\[:SOURce<n>\]:FREQuency:CENTer <frequency>|MINimum|MAXimum](#)
- [\[\[:SOURce<n>\]:FREQuency:CENTer? \[MINimum|MAXimum\]](#)
- [\[\[:SOURce<n>\]:FREQuency:SPAN <frequency>|MINimum|MAXimum](#)
- [\[\[:SOURce<n>\]:FREQuency:SPAN? \[MINimum|MAXimum\]](#)
- [\[\[:SOURce<n>\]:FREQuency:STARt <frequency>|MINimum|MAXimum](#)
- [\[\[:SOURce<n>\]:FREQuency:STARt? \[MINimum|MAXimum\]](#)

# **[[:SOURce<n>]:FUNCTion:ARB:STEP**

## **Syntax**

[[:SOURce<n>]:FUNCTion:ARB:STEP

## **Description**

Enable the step-by-step output of arbitrary waveform.

## **Explanation**

In step-by-step output mode, the generator calculates the frequency (30.517578125 kHz) of the output signal automatically according to the waveform length (16,384) and sample rate. The generator outputs waveform point by point at this fixed frequency. The step-by-step output mode can prevent the loss of important waveform points. This command is only available when the arbitrary waveform function is enabled.

# [[:SOURce<n>]:FUNCTion:RAMP:SYMMetry

## Syntax

```
[[:SOURce<n>]:FUNCTion:RAMP:SYMMetry <symmetry>|MINimum|MAXimum  
[:SOURce<n>]:FUNCTion:RAMP:SYMMetry? [MINimum|MAXimum]
```

## Description

Set the symmetry of the ramp and the unit is %.  
Query the symmetry of the ramp.

## Parameter

Name	Type	Range	Default
<symmetry>	Consecutive Real Number	0% to 100%	50%

## Return Format

The query returns the symmetry in scientific notation.

## Example

The command below sets the symmetry of the ramp to 80%.  
:FUNCTion:RAMP:SYMMetry 80

The query below returns 8.000000E+01.  
:FUNCTion:RAMP:SYMMetry?

# [[:SOURce<n>]:FUNCTION[:SHAPE]

## Syntax

[[:SOURce<n>]:FUNCTION[:SHAPE] <wave>  
[:SOURce<n>]:FUNCTION[:SHAPE]?

## Description

Select waveform.  
Query the waveform currently selected.

## Parameter

Name	Type	Range
<wave>	Keyword	SINusoid SQUare RAMP PULSe NOISe USER HARMonic CUSTom DC ABSSINE ABSSINEHALF AMPANPULSE PPULSE SINETRA SINEVER STAIRDN STAIRUD STAIRUP TRAPEZIA BANDLIMITED BUTTCOMBIN CPULSE CWPULSE DAMPEDOSC DUALTONE GAMMA GATEVIBR LFMPULSE MCNOSIE NINRIPPLE ROUNDHAF ROUNDPM STEPRESP SWINGOSC TV VOICE THREEAM THREEFM THREEPM EEG EMG PULSILOGRAM RESSPEED LFPULSE TENS1 TENS2 TENS3 IGNITION ISO167502SP ISO1ISO76372TP2B ISO76372TP3A ISO76372TP3B ISO76372TP4 ISO76372TP5A ISO76372TP5B SCR CUBIC DIRICHLET ERF ERFC ERFCINV ERFINV EXPFALL EXPRISE GAUSS HAVERSINE LAGUERRE LORENTZ MAXWELL RAYLEIGH VERSIERA WEIBULL X2DATA COSH COSINT COT COTHCON COTCSCHPRO RECIPCON RECIPPRO SECCON SECPRO SECH SINC SINH SININT SQRT TAN TANH ACACOTHCON ACOTHPRO ACSCCON ACSCPRO ACSCHCON ACSCHPRO ASECCON ASECPRO ASECH BARTHANN BLACKMAN BLACKMANH BOHMANWIN BOXCAR CHEBWIN FLATTOPWIN HAMMING PARZENWIN TAYLORWIN TRIANG TUKEYWIN

## Explanation

This command selects the output waveform of the instrument when Mod, Sweep and Burst are disabled.  
This command selects the carrier waveform corresponding to the function when Mod, Sweep or Burst is currently enabled.  
When the **:FUNCTION DC** command is received, the instrument will disable Mod, Sweep or Burst if it is currently enabled.

## Return Format

The query returns SIN, SQU, RAMP, PULSE, NOISE, HARMONIC or CUSTOM.  
When waveform other than SINusoid|SQUare|RAMP|PULSe|NOISe|USER|HARMonic|CUSTom| is selected, the return value is the corresponding parameter in the table above.  
Note: when USER (arbitrary waveform) is currently selected, the query returns the return value corresponding to the built-in waveform currently selected in the arbitrary waveform.

## Example

The command below selects square waveform.

:FUNCTION SQUare

The query below returns SQU.

:FUNCTION?

# [[:SOURce<n>]:FUNCTion:SQUare:DCYCl

## Syntax

```
[[:SOURce<n>]:FUNCTion:SQUare:DCYCl <percent>|MINimum|MAXimum  
[:SOURce<n>]:FUNCTion:SQUare:DCYCl? [MINimum|MAXimum]
```

## Description

Set the duty cycle of the square waveform and the unit is %.  
Query the duty cycle of the square waveform.

## Parameter

Name	Type	Range <sup>1</sup>	Default
<percent>	Consecutive Real Number	Refer to the <b>Note</b> below	50%

Note<sup>1</sup>: the range of the duty cycle is limited by the frequency/period setting.  
frequency ≤ 10 MHz: 20% to 80%  
10 MHz < frequency ≤ 40 MHz: 40% to 60%  
frequency > 40 MHz: 50% (fixed)

## Return Format

The query returns the duty cycle in scientific notation.

## Example

The command below sets the duty cycle of the square waveform to 80%.  
:FUNCTion:SQUare:DCYCl 80% or :FUNCTion:SQUare:DCYCl 80

The query below returns 8.000000E+01.  
:FUNCTion:SQUare:DCYCl?



# [[:SOURce<n>]:HARMonic:AMPL

## Syntax

[[:SOURce<n>]:HARMonic:AMPL <sn>,<value>|MINimum|MAXimum  
[:SOURce<n>]:HARMonic:AMPL? <sn>[,MINimum|MAXimum]

## Description

Set the amplitude of the specified order of harmonic.  
Query the amplitude of the specified order of harmonic.

## Parameter

Name	Type	Range	Default
<sn>	Integer	2 to 16	2
<value>	Integer	Limited by the impedance and frequency settings, please refer to the User's Guide	1.2647 Vpp

## Return Format

The query returns the amplitude of the specified order of harmonic in scientific notation.

## Example

The command below sets the amplitude of the second order of harmonic to 2.5 Vpp.  
[:HARMonic:AMPL 2,2.5

The query below returns 2.500000E+00.  
[:HARMonic:AMPL? 2

# [[:SOURce<n>]:HARMonic:ORDER

## Syntax

[[:SOURce<n>]:HARMonic:ORDER <value>|MINimum|MAXimum  
[:SOURce<n>]:HARMonic:ORDER? [MINimum|MAXimum]

## Description

Set the order of the harmonic.  
Query the order of the harmonic.

## Parameter

Name	Type	Range <sup>1</sup>	Default
<value>	Integer	Refer to the <b>Note</b> below	2

Note<sup>1</sup>: 2 to the maximum output frequency ÷ fundamental waveform frequency of the instrument; it should be an integer and the maximum is 16.

## Return Format

The query returns the order of the harmonic in scientific notation.

## Example

The command below sets the order of the harmonic to 7.  
[:HARMonic:ORDER 7

The query below returns 7.000000E+00.  
[:HARMonic:ORDER?

# [[:SOURce<n>]:HARMonic:PHASe

## Syntax

```
[[:SOURce<n>]:HARMonic:PHASe <sn>,<value>|MINimum|MAXimum  
[:SOURce<n>]:HARMonic:PHASe? <sn>[,MINimum|MAXimum]
```

## Description

Set the phase of the specified order of harmonic.  
Query the phase of the specified order of harmonic.

## Parameter

Name	Type	Range	Default
<sn>	Integer	2 to 16	2
<value>	Integer	0° to 360°	0°

## Return Format

The query returns the phase of the specified order of harmonic in scientific notation.

## Example

The command below sets the phase of the second order of harmonic to 90°.  
[:HARMonic:PHASe 2,90

The query below returns 9.000000E+01.  
:HARMonic:PHASe? 2

# [[:SOURce<n>]:HARMonic:TYPe

## Syntax

```
[[:SOURce<n>]:HARMonic:TYPe EVEN|ODD|ALL|USER  
[:SOURce<n>]:HARMonic:TYPe?
```

## Description

Set the harmonic type to EVEN, ODD, ALL or USER.  
Query the harmonic type.

## Parameter

Name	Type	Range	Default
--	Keyword	EVEN ODD ALL USER	EVEN

## Return Format

The query returns EVEN, ODD, ALL or USER.

## Example

The command below sets the harmonic type to ODD.  
[:HARMonic:TYPe ODD

The query below returns ODD.  
[:HARMonic:TYPe?

# [[:SOURCE<n>]:MARKer:FREQuency

## Syntax

[[:SOURCE<n>]:MARKer:FREQuency <frequency>|MINimum|MAXimum  
[:SOURCE<n>]:MARKer:FREQuency? [MINimum|MAXimum]

## Description

Set the mark frequency and the default unit is "Hz".  
Query the mark frequency.

## Parameter

Name	Type	Range	Default
<frequency>	Consecutive Real Number	Limited by the start frequency and end frequency	550 Hz

## Return Format

The query returns the frequency in scientific notation.

## Example

The command below sets the mark frequency to 800 Hz.  
[:MARKer:FREQuency 800

The query below returns 8.000000E+02.  
[:MARKer:FREQuency?

# [[:SOURce<n>]:MARKer[:STATe]

## Syntax

[[:SOURce<n>]:MARKer[:STATe] ON|OFF  
[:SOURce<n>]:MARKer[:STATe]?

## Description

Enable or disable the frequency mark function of the sweep.  
Query the status of the frequency mark function.

## Parameter

Name	Type	Range	Default
--	Bool	ON OFF	OFF

## Explanation

The frequency mark function is not available in step sweep mode.

## Return Format

The query returns ON or OFF.

## Example

The command below enables the frequency mark function of the sweep.  
[:MARKer ON

The query below returns ON.  
[:MARKer?

# [[:SOURce<n>]:MOD[:STATe]

## Syntax

[[:SOURce<n>]:MOD[:STATe] ON|OFF  
[:SOURce<n>]:MOD[:STATe]?

## Description

Enable or disable the modulation function.  
Query the status of the modulation function.

## Parameter

Name	Type	Range	Default
--	Bool	OFF ON	OFF

## Explanation

When Mod is enabled, Sweep or Burst will be disabled automatically (if it is currently enabled).

## Return Format

The query returns ON or OFF.

## Example

The command below enables the modulation function.  
[:MOD ON

The query below returns ON.  
[:MOD?

# [[:SOURce<n>]:MOD:TYPE

## Syntax

[[:SOURce<n>]:MOD:TYPE AM|FM|PM|ASK|FSK|PSK|PWM|BPSK|QPSK|3FSK|4FSK|OSK  
[:SOURce<n>]:MOD:TYPE?

## Description

Select the modulation mode.  
Query the modulation mode.

## Parameter

Name	Type	Range	Default
--	Keyword	AM FM PM ASK FSK PSK PWM BPSK QPSK 3FSK 4FSK OSK	AM

## Explanation

PWM is only available when Pulse is enabled.  
OSK is only available when Sine is enabled.

## Return Format

The query returns AM, FM, PM, ASK, FSK, PSK, PWM, BPSK, QPSK, 3FSK, 4FSK or OSK.

## Example

The command below selects FSK.  
[:MOD:TYPE FSK

The query below returns FSK.  
[:MOD:TYPE?



# [[:SOURce<n>]:MOD:AM[:DEPT h]]

## Syntax

[[:SOURce<n>]:MOD:AM[:DEPT h] <depth>|MINimum|MAXimum  
[:SOURce<n>]:MOD:AM[:DEPT h]? [MINimum|MAXimum]

## Description

Set the AM modulation depth in percentage.  
Query the AM modulation depth.

## Parameter

Name	Type	Range	Default
<depth>	Consecutive Real Number	0% to 120%	100%

## Explanation

The range of <depth> is from 0% to 120% and setting without % is supported.  
In 0% modulation, the output amplitude is half of the specified value.  
In 100% modulation, the output amplitude is equal to the specified value.  
In >100% modulation, the output amplitude of the instrument would not exceed 10 Vpp (50 Ω load).

## Return Format

The query returns the modulation depth in scientific notation.

## Example

The command below sets the modulation depth to 80%.  
[:MOD:AM 80

The query below returns 8.000000E+01.  
[:MOD:AM?

# [[:SOURce<n>]:MOD:AM:INTernal:FREQuency

## Syntax

[[:SOURce<n>]:MOD:AM:INTernal:FREQuency <frequency>|MINimum|MAXimum  
[:SOURce<n>]:MOD:AM:INTernal:FREQuency? [MINimum|MAXimum]

## Description

Set the frequency of the AM modulating waveform and the default unit is "Hz".  
Query the frequency of the AM modulating waveform.

## Parameter

Name	Type	Range	Default
<frequency>	Consecutive Real Number	2 mHz to 50 kHz	100 Hz

## Explanation

This comamnd is only available when internal modulation source is selected.

## Return Format

The query returns the frequency in scientific notation.

## Example

The comamnd below sets the frequency of the modulating waveform to 25 Hz.  
[:MOD:AM:INTernal:FREQuency 25

The query below returns 2.500000E+01.  
[:MOD:AM:INTernal:FREQuency?

## Related Commands

[\[:SOURce<n>\]:MOD:AM:SOURce INTernal|EXTernal](#)  
[\[:SOURce<n>\]:MOD:AM:SOURce?](#)

# [[:SOURce<n>]:MOD:AM:INTernal:FUNCTion

## Syntax

[[:SOURce<n>]:MOD:AM:INTernal:FUNCTion SINusoid|SQUare|TRIangle|RAMP|NRAMp|NOISe|USER  
[:SOURce<n>]:MOD:AM:INTernal:FUNCTion?

## Description

Select the AM modulating waveform.  
Query the AM modulating waveform.

## Parameter

Name	Type	Range	Default
--	Keyword	SINusoid SQUare TRIangle RAMP NRAMp NOISe USER	SINusoid

## Explanation

This command is only available when internal modulation source is selected.

## Return Format

The query returns SIN, SQU, TRI, RAMP, NRAM, NOIS or USER.

## Example

The command below selects square waveform as the modulating waveform.  
[:MOD:AM:INTernal:FUNCTion SQUare

The query below returns SQU.  
[:MOD:AM:INTernal:FUNCTion?

## Related Commands

[\[:SOURce<n>\]:MOD:AM:SOURce INTernal|EXTernal](#)  
[\[:SOURce<n>\]:MOD:AM:SOURce?](#)

# [[:SOURce<n>]:MOD:AM:SOURce

## Syntax

[[:SOURce<n>]:MOD:AM:SOURce INTernal|EXTernal  
[:SOURce<n>]:MOD:AM:SOURce?

## Description

Set the AM modulation source to INTernal or EXTernal.  
Query the AM modulation source.

## Parameter

Name	Type	Range	Default
--	Keyword	INTernal EXTernal	INTernal

## Return Format

The query returns INT or EXT.

## Example

The command below sets the modulation source to EXTernal.  
[:MOD:AM:SOURce EXTernal

The query below returns EXT.  
[:MOD:AM:SOURce?

# [[:SOURce<n>]:MOD:FM[:DEViation]

## Syntax

```
[[:SOURce<n>]:MOD:FM[:DEViation] <deviation>|MINimum|MAXimum  
[:SOURce<n>]:MOD:FM[:DEViation]? [MINimum|MAXimum]
```

## Description

Set the frequency deviation of FM and the default unit is "Hz".  
Query the frequency deviation of FM.

## Parameter

Name	Type	Range	Default
<deviation>	Consecutive Real Number	Refer to the <b>Explanation</b> below	1 kHz

## Explanation

- The frequency deviation should fulfill the following requirements.
- It should be lower than or equal to the carrier frequency.
  - Frequency deviation + carrier frequency ≤ the upper limit of the current carrier frequency + 1 kHz.

## Return Format

The query returns the deviation in scientific notation.

## Example

The command below sets the frequency deviation to 800 Hz.  
[:MOD:FM 800

The query below returns 8.000000E+02.  
[:MOD:FM?

# [[:SOURce<n>]:MOD:FM:INTernal:FREQuency

## Syntax

[[:SOURce<n>]:MOD:FM:INTernal:FREQuency <frequency>|MINimum|MAXimum  
[:SOURce<n>]:MOD:FM:INTernal:FREQuency? [MINimum|MAXimum]

## Description

Set the frequency of the FM modulating waveform and the default unit is "Hz".  
Query the frequency of FM modulating waveform.

## Parameter

Name	Type	Range	Default
<frequency>	Consecutive Real Number	2 mHz to 50 kHz	100 Hz

## Explanation

This command is only available when internal modulation source is selected.

## Return Format

The query returns the frequency in scientific notation.

## Example

The command below sets the frequency of the modulating waveform to 25 Hz.  
[:MOD:FM:INTernal:FREQuency 25

The query below returns 2.500000E+01.  
[:MOD:FM:INTernal:FREQuency?

## Related Commands

[\[:SOURce<n>\]:MOD:FM:SOURce INTernal|EXTernal](#)  
[\[:SOURce<n>\]:MOD:FM:SOURce?](#)

# [[:SOURce<n>]:MOD:FM:INTernal:FUNCTion

## Syntax

[[:SOURce<n>]:MOD:FM:INTernal:FUNCTion SINusoid|SQUare|TRIangle|RAMP|NRAmp|NOISe|USER  
[:SOURce<n>]:MOD:FM:INTernal:FUNCTion?

## Description

Select the FM modulating waveform.  
Query the FM modulating waveform.

## Parameter

Name	Type	Range	Default
--	Keyword	SINusoid SQUare TRIangle RAMP NRAmp NOISe USER	SINusoid

## Explanation

This command is only available when internal modulation source is selected.

## Return Format

The query returns SIN, SQU, TRI, RAMP, NRAM, NOIS or USER.

## Example

The command below selects square waveform as the modulating waveform.  
[:MOD:FM:INTernal:FUNCTion SQUare

The query below returns SQU.  
[:MOD:FM:INTernal:FUNCTion?

## Related Commands

[\[:SOURce<n>\]:MOD:FM:SOURce INTernal|EXTernal](#)  
[\[:SOURce<n>\]:MOD:FM:SOURce?](#)

# [[:SOURce<n>]:MOD:FM:SOURce

## Syntax

```
[[:SOURce<n>]:MOD:FM:SOURce INTernal|EXTernal  
[:SOURce<n>]:MOD:FM:SOURce?
```

## Description

Set the FM modulation source to INTernal or EXTernal.  
Query the FM modulation source.

## Parameter

Name	Type	Range	Default
--	Keyword	INTernal EXTernal	INTernal

## Return Format

The query returns INT or EXT.

## Example

The command below sets the modulation source to EXTernal.  
[:MOD:FM:SOURce EXTernal]

The query below returns EXT.  
[:MOD:FM:SOURce?]



# [[:SOURce<n>]:MOD:PM[:DEViation]]

## Syntax

[[:SOURce<n>]:MOD:PM[:DEViation] <deviation>|MINimum|MAXimum  
[:SOURce<n>]:MOD:PM[:DEViation]? [MINimum|MAXimum]

## Description

Set the phase deviation of PM and the default unit is "°".  
Query the phase deviation of PM.

## Parameter

Name	Type	Range	Default
<deviation>	Consecutive Real Number	0° to 360°	90°

## Return Format

The query returns the phase deviation in scientific notation.

## Example

The command below sets the phase deviation to 180°.  
[:MOD:PM 180

The query below returns 1.800000E+02.  
[:MOD:PM?

# [[:SOURce<n>]:MOD:PM:INTernal:FREQuency

## Syntax

[[:SOURce<n>]:MOD:PM:INTernal:FREQuency <frequency>|MINimum|MAXimum  
[:SOURce<n>]:MOD:PM:INTernal:FREQuency?

## Description

Set the frequency of the PM modulating waveform and the default unit is "Hz".  
Query the frequency of PM modulating waveform.

## Parameter

Name	Type	Range	Default
<frequency>	Consecutive Real Number	2 mHz to 50 kHz	100 Hz

## Explanation

This command is only available when internal modulation source is selected.

## Return Format

The query returns the frequency in scientific notation.

## Example

The command below sets the frequency of the modulating waveform to 25 Hz.  
[:MOD:PM:INTernal:FREQuency 25

The query below returns 2.500000E+01.  
[:MOD:PM:INTernal:FREQuency?

## Related Commands

[\[:SOURce<n>\]:MOD:PM:SOURce INTernal|EXTernal](#)  
[\[:SOURce<n>\]:MOD:PM:SOURce?](#)

# [[:SOURce<n>]:MOD:PM:INTernal:FUNCTion

## Syntax

[[:SOURce<n>]:MOD:PM:INTernal:FUNCTion SINusoid|SQUare|TRIangle|RAMP|NRAMp|NOISe|USER  
[:SOURce<n>]:MOD:PM:INTernal:FUNCTion?

## Description

Select the PM modulating waveform.  
Query the PM modulating waveform.

## Parameter

Name	Type	Range	Default
--	Keyword	SINusoid SQUare TRIangle RAMP NRAMp NOISe USER	SINusoid

## Explanation

This command is only available when internal modulation source is selected.

## Return Format

The query returns SIN, SQU, TRI, RAMP, NRAM, NOIS or USER.

## Example

The command below selects square waveform as the modulating waveform.  
[:MOD:PM:INTernal:FUNCTion SQUare

The query below returns SQU.  
[:MOD:PM:INTernal:FUNCTion?

## Related Commands

[\[:SOURce<n>\]:MOD:PM:SOURce INTernal|EXTernal](#)  
[\[:SOURce<n>\]:MOD:PM:SOURce?](#)

# [[:SOURce<n>]:MOD:PM:SOURce

## Syntax

[[:SOURce<n>]:MOD:PM:SOURce INTernal|EXTernal  
[:SOURce<n>]:MOD:PM:SOURce?

## Description

Set the PM modulation source to source to INTernal or EXTernal.  
Query the PM modulation source.

## Parameter

Name	Type	Range	Default
--	Keyword	INTernal EXTernal	INTernal

## Return Format

The query returns INT or EXT.

## Example

The command below sets the modulation source to EXTernal.  
[:MOD:PM:SOURce EXTernal]

The query below returns EXT.  
[:MOD:PM:SOURce?

# [[:SOURce<n>]:MOD:ASKey:AMPLitude

## Syntax

```
[[:SOURce<n>]:MOD:ASKey:AMPLitude <amplitude>|MINimum|MAXimum  
[:SOURce<n>]:MOD:ASKey:AMPLitude? [MINimum|MAXimum]
```

## Description

Set the amplitude of the ASK modulating waveform and the default unit is "Vpp".  
Query the amplitude of the ASK modulating waveform.

## Parameter

Name	Type	Range	Default
<amplitude>	Consecutive Real Number	0 Vpp to 10 Vpp (HighZ)	2 Vpp

## Return Format

The query returns the amplitude in scientific notation.

## Example

The command below sets the amplitude of the modulating waveform to 2.5 Vpp.  
[:MOD:ASKey:AMPLitude 2.5

The query below returns 2.500000E+00.  
[:MOD:ASKey:AMPLitude?

# [[:SOURce<n>]:MOD:ASKey:INTernal[:RATE]

## Syntax

[[:SOURce<n>]:MOD:ASKey:INTernal[:RATE] <frequency>|MINimum|MAXimum  
[:SOURce<n>]:MOD:ASKey:INTernal[:RATE]? [MINimum|MAXimum]

## Description

Set the ASK rate and the default unit is "Hz".  
Query the ASK rate.

## Parameter

Name	Type	Range	Default
<frequency>	Consecutive Real Number	2 mHz to 1 MHz	100 Hz

## Explanation

This command is only available when internal modulation source is selected.

## Return Format

The query returns the rate in scientific notation.

## Example

The command below sets the ASK rate to 500 Hz.  
[:MOD:ASKey:INTernal 500

The query below returns 5.000000E+02.  
[:MOD:ASKey:INTernal?

## Related Commands

[\[:SOURce<n>\]:MOD:ASKey:SOURce INTernal|EXTernal](#)  
[\[:SOURce<n>\]:MOD:ASKey:SOURce?](#)

# [[:SOURce<n>]:MOD:ASKey:SOURce

## Syntax

[[:SOURce<n>]:MOD:ASKey:SOURce INTernal|EXTernal  
[:SOURce<n>]:MOD:ASKey:SOURce?

## Description

Set the ASK modulation source to INTernal or EXTernal.  
Query the ASK modulation source.

## Parameter

Name	Type	Range	Default
--	Keyword	INTernal EXTernal	INTernal

## Return Format

The query returns INT or EXT.

## Example

The command below sets the modulation source to EXTernal.  
[:MOD:ASKey:SOURce EXTernal]

The query below returns EXT.  
[:MOD:ASKey:SOURce?

# [[:SOURce<n>]:MOD:ASKey:POLarity

## Syntax

[[:SOURce<n>]:MOD:ASKey:POLarity POSitive|NEGative  
[:SOURce<n>]:MOD:ASKey:POLarity?

## Description

Select the positive or negative polarity of the modulating waveform to control the amplitude output.  
Query the ASK modulating polarity.

## Parameter

Name	Type	Range	Default
--	Keyword	POSitive NEGative	POSitive

## Return Format

The query returns POS or NEG.

## Example

The command below selects the negative polarity of the modulating waveform to control the amplitude output.  
[:MOD:ASKey:POLarity NEGative

The query below returns NEG.  
[:MOD:ASKey:POLarity?



# [[:SOURce<n>]:MOD:FSKey[:FREQuency]

## Syntax

[[:SOURce<n>]:MOD:FSKey[:FREQuency] <frequency>|MINimum|MAXimum  
[:SOURce<n>]:MOD:FSKey[:FREQuency]? [MINimum|MAXimum]

## Description

Set the FSK hop frequency.  
Query the FSK hop frequency.

## Parameter

Name	Type	Range	Default
<frequency>	Consecutive Real Number	Refer to the <b>Explanation</b> below	100 Hz

## Explanation

For different carrier waveforms, the frequency ranges <frequency> are different.  
Sine: 1 µHz to 160 MHz  
Square: 1 µHz to 50 MHz  
Ramp: 1 µHz to 4 MHz  
Arb: 1 µHz to 40 MHz (except DC in the built-in waveforms)

## Return Format

The query returns the frequency in scientific notation.

## Example

The command below sets the FSK hop frequency to 300 Hz.  
[:MOD:FSKey 300

The query below returns 3.000000E+02.  
[:MOD:FSKey?

# [[:SOURce<n>]:MOD:FSKey:INTernal:RATE

## Syntax

```
[[:SOURce<n>]:MOD:FSKey:INTernal:RATE <rate>|MINimum|MAXimum  
[:SOURce<n>]:MOD:FSKey:INTernal:RATE? [MINimum|MAXimum]
```

## Description

Set the FSK rate and the default unit is "Hz".  
Query the FSK rate.

## Parameter

Name	Type	Range	Default
<frequency>	Consecutive Real Number	2 mHz to 1 MHz	100 Hz

## Explanation

This command is only available when internal modulation source is selected.

## Return Format

The query returns the rate in scientific notation.

## Example

The command below sets the FSK rate to 150 Hz.  
[:MOD:FSKey:INTernal:RATE 150

The query below returns 1.500000E+02.  
[:MOD:FSKey:INTernal:RATE?

## Related Commands

```
[[:SOURce<n>]:MOD:FSKey:SOURce INTernal|EXTernal  
[:SOURce<n>]:MOD:FSKey:SOURce?
```

# [[:SOURce<n>]:MOD:FSKey:SOURce

## Syntax

[[:SOURce<n>]:MOD:FSKey:SOURce INTernal|EXTernal  
[:SOURce<n>]:MOD:FSKey:SOURce?

## Description

Set the FSK modulation source to INTernal or EXTernal.  
Query the FSK modulation source.

## Parameter

Name	Type	Range	Default
--	Keyword	INTernal EXTernal	INTernal

## Return Format

The query returns INT or EXT.

## Example

The command below sets the modulation source to EXTernal.  
[:MOD:FSKey:SOURce EXTernal]

The query below returns EXT.  
[:MOD:FSKey:SOURce?]

# [[:SOURce<n>]:MOD:FSKey:POLarity

## Syntax

[[:SOURce<n>]:MOD:FSKey:POLarity POSitive|NEGative  
[:SOURce<n>]:MOD:FSKey:POLarity?

## Description

Select the positive or negative polarity of the modulating waveform to control the frequency output.  
Query the FSK modulating polarity.

## Parameter

Name	Type	Range	Default
--	Keyword	POSitive NEGative	POSitive

## Return Format

The query returns POS or NEG.

## Example

The command below selects the negative polarity of the modulating waveform to control the frequency output.  
[:MOD:FSKey:POLarity NEGative

The query below returns NEG.  
[:MOD:FSKey:POLarity?

# [[:SOURce<n>]:MOD:PSKey:INTernal:RATE

## Syntax

[[:SOURce<n>]:MOD:PSKey:INTernal:RATE <rate>|MINimum|MAXimum  
[:SOURce<n>]:MOD:PSKey:INTernal:RATE? [MINimum|MAXimum]

## Description

Set the PSK rate and the default unit is "Hz".  
Query the PSK rate.

## Parameter

Name	Type	Range	Default
<rate>	Consecutive Real Number	2 mHz to 1 MHz	100 Hz

## Explanation

This command is only available when internal modulation source is selected.

## Return Format

The query returns the rate in scientific notation.

## Example

The command below sets the PSK rate to 150 Hz.  
[:MOD:PSKey:INTernal:RATE 150

The query below returns 1.500000E+02.  
[:MOD:PSKey:INTernal:RATE?

## Related Commands

[\[:SOURce<n>\]:MOD:PSKey:SOURce INTernal|EXTernal](#)  
[\[:SOURce<n>\]:MOD:PSKey:SOURce?](#)

# [[:SOURce<n>]:MOD:PSKey:PHASe

## Syntax

[[:SOURce<n>]:MOD:PSKey:PHASe <phase>|MINimum|MAXimum  
[[:SOURce<n>]:MOD:PSKey:PHASe [MINimum|MAXimum]

## Description

Set the phase of the PSK modulating waveform.  
Query the phase of the PSK modulating waveform.

## Parameter

Name	Type	Range	Default
<phase>	Consecutive Real Number	0° to 360°	180°

## Return Format

The query returns the phase in scientific notation.

## Example

The command below sets the phase of the PSK modulating waveform to 90°.  
[:MOD:PSKey:PHASe 90

The query below returns 9.000000E+01.  
[:MOD:PSKey:PHASe?

# [[:SOURce<n>]:MOD:PSKey:POLarity

## Syntax

[[:SOURce<n>]:MOD:PSKey:POLarity POSitive|NEGative  
[:SOURce<n>]:MOD:PSKey:POLarity?

## Description

Select the positive or negative polarity of the modulating waveform to control the phase output.  
Query the PSK modulating polarity.

## Parameter

Name	Type	Range	Default
--	Keyword	POSitive NEGative	POSitive

## Return Format

The query returns POS or NEG.

## Example

The command below selects the negative polarity of the modulating waveform to control the phase output.  
[:MOD:PSKey:POLarity NEGative

The query below returns NEG.  
[:MOD:PSKey:POLarity?

# [[:SOURce<n>]:MOD:PSKey:SOURce

## Syntax

[[:SOURce<n>]:MOD:PSKey:SOURce INTernal|EXTernal  
[:SOURce<n>]:MOD:PSKey:SOURce?

## Description

Set the PSK modulation source to INTernal or EXTernal.  
Query the PSK modulation source.

## Parameter

Name	Type	Range	Default
--	Keyword	INTernal EXTernal	INTernal

## Return Format

The query returns INT or EXT.

## Example

The command below sets the modulation source to EXTernal.  
[:MOD:PSKey:SOURce EXTernal]

The query below returns EXT.  
[:MOD:PSKey:SOURce?



# [[:SOURce<n>]:MOD:BPSKey:INTernal:RATE

## Syntax

[[:SOURce<n>]:MOD:BPSKey:INTernal:RATE <rate>|MINimum|MAXimum  
[:SOURce<n>]:MOD:BPSKey:INTernal:RATE? [MINimum|MAXimum]

## Description

Set the BPSK rate.  
Query the BPSK rate.

## Parameter

Name	Type	Range	Default
<rate>	Consecutive Real Number	2 mHz to 1 MHz	100 Hz

## Return Format

The query returns the rate in scientific notation.

## Example

The command below sets the BPSK rate to 150 Hz.  
[:MOD:BPSKey:INTernal:RATE 150

The query below returns 1.500000E+02.  
[:MOD:BPSKey:INTernal:RATE?

# [[:SOURce<n>]:MOD:BPSKey:PHASe

## Syntax

[[:SOURce<n>]:MOD:BPSKey:PHASe <phase>|MINimum|MAXimum  
[:SOURce<n>]:MOD:BPSKey:PHASe? [MINimum|MAXimum]

## Description

Set the BPSK phase.  
Query the BPSK phase.

## Parameter

Name	Type	Range	Default
<phase>	Consecutive Real Number	0° to 360°	180°

## Return Format

The query returns the phase in scientific notation.

## Example

The command below sets the BPSK phase to 90°.  
[:MOD:BPSKey:PHASe 90

The query below returns 9.000000E+01.  
[:MOD:BPSKey:PHASe?

# [[:SOURce<n>]:MOD:BPSKey:DATA

## Syntax

```
[[:SOURce<n>]:MOD:BPSKey:DATA 01|10|PN15|PN21  
[:SOURce<n>]:MOD:BPSKey:DATA?
```

## Description

Set the modulation source of BPSK.  
Query the modulation source of BPSK.

## Parameter

Name	Type	Range	Default
--	Keyword	01 10 PN15 PN21	PN15

## Return Format

The query returns 01, 10, PN15 or PN21.

## Example

The command below sets the modulation source to PN21.  
[:MOD:BPSKey:DATA PN21

The query below returns PN21.  
[:MOD:BPSKey:DATA?

# [[:SOURce<n>]:MOD:QPSKey:INTernal:RATE

## Syntax

[[:SOURce<n>]:MOD:QPSKey:INTernal:RATE <rate>|MINimum|MAXimum  
[:SOURce<n>]:MOD:QPSKey:INTernal:RATE? [MINimum|MAXimum]

## Description

Set the QPSK rate.  
Query the QPSK rate.

## Parameter

Name	Type	Range	Default
<rate>	Consecutive Real Number	2 mHz to 1 MHz	100 Hz

## Return Format

The query returns the rate in scientific notation.

## Example

The command below sets the QPSK rate to 150 Hz.  
[:MOD:QPSKey:INTernal:RATE 150

The query below returns 1.500000E+02.  
[:MOD:QPSKey:INTernal:RATE?

# [[:SOURce<n>]:MOD:QPSKey:PHASe1

## Syntax

[[:SOURce<n>]:MOD:QPSKey:PHASe1 <phase>|MINimum|MAXimum  
[:SOURce<n>]:MOD:QPSKey:PHASe1? [MINimum|MAXimum]

## Description

Set the QPSK modulating phase 1.  
Query the QPSK modulating phase 1.

## Parameter

Name	Type	Range	Default
<phase>	Consecutive Real Number	0° to 360°	45°

## Return Format

The query returns the phase in scientific notation.

## Example

The command below sets the QPSK modulating phase 1 to 90°.  
[:MOD:QPSKey:PHASe1 90

The query below returns 9.000000E+01.  
[:MOD:QPSKey:PHASe1?

# [[:SOURce<n>]:MOD:QPSKey:PHASe2

## Syntax

[[:SOURce<n>]:MOD:QPSKey:PHASe2 <phase>|MINimum|MAXimum  
[:SOURce<n>]:MOD:QPSKey:PHASe2? [MINimum|MAXimum]

## Description

Set the QPSK modulating phase 2.  
Query the QPSK modulating phase 2.

## Parameter

Name	Type	Range	Default
<phase>	Consecutive Real Number	0° to 360°	135°

## Return Format

The query returns the phase in scientific notation.

## Example

The command below sets the QPSK modulating phase 2 to 180°.  
[:MOD:QPSKey:PHASe2 180

The query below returns 1.800000E+02.  
[:MOD:QPSKey:PHASe2?

# [[:SOURce<n>]:MOD:QPSKey:PHASe3

## Syntax

[[:SOURce<n>]:MOD:QPSKey:PHASe3 <phase>|MINimum|MAXimum  
[:SOURce<n>]:MOD:QPSKey:PHASe3? [MINimum|MAXimum]

## Description

Set the QPSK modulating phase 3.  
Query the QPSK modulating phase 3.

## Parameter

Name	Type	Range	Default
<phase>	Consecutive Real Number	0° to 360°	225°

## Return Format

The query returns the phase in scientific notation.

## Example

The command below sets the QPSK modulating phase 3 to 280°.  
[:MOD:QPSKey:PHASe3 280

The query below returns 2.800000E+02.  
[:MOD:QPSKey:PHASe3?

# [[:SOURce<n>]:MOD:QPSKey:DATA

## Syntax

```
[[:SOURce<n>]:MOD:QPSKey:DATA PN15|PN21  
[:SOURce<n>]:MOD:QPSKey:DATA?
```

## Description

Set the modulation source of QPSK.  
Query the modulation source of QPSK.

## Parameter

Name	Type	Range	Default
--	Keyword	PN15 PN21	PN15

## Return Format

The query returns PN15 or PN21.

## Example

The command below sets the modulation source to PN21.  
[:MOD:QPSKey:DATA PN21

The query below returns PN21.  
[:MOD:QPSKey:DATA?



# [[:SOURce<n>]:MOD:3FSKey:INTernal:RATE

## Syntax

[[:SOURce<n>]:MOD:3FSKey:INTernal:RATE <rate> | MINimum | MAXimum  
[:SOURce<n>]:MOD:3FSKey:INTernal:RATE? [MINimum | MAXimum]

## Description

Set the 3FSK rate.  
Query the 3FSK rate.

## Parameter

Name	Type	Range	Default
<rate>	Consecutive Real Number	2 mHz to 1 MHz	100 Hz

## Return Format

The query returns the rate in scientific notation.

## Example

The command below sets the 3FSK rate to 150 Hz.  
[:MOD:3FSKey:INTernal:RATE 150

The query below returns 1.500000E+02.  
[:MOD:3FSKey:INTernal:RATE?

# [[:SOURce<n>]:MOD:3FSKey[:FREQuency]

## Syntax

[[:SOURce<n>]:MOD:3FSKey[:FREQuency] <n>,<frequency>|MINimum|MAXimum  
[:SOURce<n>]:MOD:3FSKey[:FREQuency]? <n>[,MINimum|MAXimum]

## Description

Set the hop frequencies of 3FSK.  
Query the hop frequencies of 3FSK.

## Parameter

Name	Type	Range	Default
<n>	Integer	1 to 2	1
<frequency>	Consecutive Real Number	Refer to the <b>Explanation</b> below	100 Hz

## Explanation

For different carrier waveforms, the frequency ranges <frequency> are different.  
Sine: 1 μHz to 160 MHz  
Square: 1 μHz to 50 MHz  
Ramp: 1 μHz to 4 MHz  
Arb: 1 μHz to 40 MHz (except DC in the built-in waveforms)

## Return Format

The query returns the frequency in scientific notation.

## Example

The command below sets the 3FSK hop frequency 1 to 300 Hz.  
[:MOD:3FSKey 1, 300]

The query below returns 3.000000E+02.  
[:MOD:3FSKey? 1]

# [[:SOURce<n>]:MOD:4FSKey:INTernal:RATE

## Syntax

[[:SOURce<n>]:MOD:4FSKey:INTernal:RATE <rate>|MINimum|MAXimum  
[:SOURce<n>]:MOD:4FSKey:INTernal:RATE? [MINimum|MAXimum]

## Description

Set the 4FSK rate.  
Query the 4FSK rate.

## Parameter

Name	Type	Range	Default
<rate>	Consecutive Real Number	2 mHz to 1 MHz	100 Hz

## Return Format

The query returns the rate in scientific notation.

## Example

The command below sets the 4FSK rate to 150 Hz.  
[:MOD:4FSKey:INTernal:RATE 150

The query below returns 1.500000E+02.  
[:MOD:4FSKey:INTernal:RATE?

# [[:SOURce<n>]:MOD:4FSKey[:FREQuency]

## Syntax

[[:SOURce<n>]:MOD:4FSKey[:FREQuency] <n>,<frequency>|MINimum|MAXimum  
[:SOURce<n>]:MOD:4FSKey[:FREQuency]? <n>[,MINimum|MAXimum]

## Description

Set the hop frequencies of 4FSK.  
Query the hop frequencies of 4FSK.

## Parameter

Name	Type	Range	Default
<n>	Integer	1 to 3	1
<frequency>	Consecutive Real Number	Refer to the <b>Explanation</b> below	100 Hz

## Explanation

For different carrier waveforms, the frequency ranges <frequency> are different.  
Sine: 1 μHz to 160 MHz  
Square: 1 μHz to 50 MHz  
Ramp: 1 μHz to 4 MHz  
Arb: 1 μHz to 40 MHz (except DC in the built-in waveforms)

## Return Format

The query returns the frequency in scientific notation.

## Example

The command below sets the 4FSK hop frequency 1 to 300 Hz.  
[:MOD:4FSKey 1, 300]

The query below returns 3.000000E+02.  
[:MOD:4FSKey? 1]

# [[:SOURCE<n>]:MOD:OSKey:SOURce

## Syntax

[[:SOURCE<n>]:MOD:OSKey:SOURce INTernal|EXTernal  
[:SOURCE<n>]:MOD:OSKey:SOURce?

## Description

Set the OSK modulation source to INTernal or EXTernal.  
Query the OSK modulation source.

## Parameter

Name	Type	Range	Default
--	Keyword	INTernal EXTernal	INTernal

## Return Format

The query returns INT or EXT.

## Example

The command below sets the modulation source to EXTernal.  
[:MOD:OSKey:SOURce EXTernal]

The query below returns EXT.  
[:MOD:OSKey:SOURce?

# [[:SOURce<n>]:MOD:OSKey:INTernal:RATE

## Syntax

[[:SOURce<n>]:MOD:OSKey:INTernal:RATE <rate>|MINimum|MAXimum  
[:SOURce<n>]:MOD:OSKey:INTernal:RATE? [MINimum|MAXimum]

## Description

Set the OSK rate and the default unit is "Hz".  
Query the OSK rate.

## Parameter

Name	Type	Range	Default
<rate>	Consecutive Real Number	2 mHz to 1 MHz	1 kHz

## Explanation

This command is only available when internal modulation source is selected.

## Return Format

The query returns the rate in scientific notation.

## Example

The command below sets the OSK rate to 500 Hz.  
[:MOD:OSKey:INTernal:RATE 500

The query below returns 5.000000E+02.  
[:MOD:OSKey:INTernal:RATE?

## Related Commands

[\[:SOURce<n>\]:MOD:OSKey:SOURce INTernal|EXTernal](#)  
[\[:SOURce<n>\]:MOD:OSKey:SOURce?](#)

# [[:SOURce<n>]:MOD:OSKey:TIME

## Syntax

[[:SOURce<n>]:MOD:OSKey:TIME <time>|MINimum|MAXimum  
[:SOURce<n>]:MOD:OSKey:TIME? [MINimum|MAXimum]

## Description

Set the oscillate period of OSK.  
Query the oscillate period of OSK.

## Parameter

Name	Type	Range <sup>1</sup>	Default
<time>	Consecutive Real Number	8 ns to 200 s	100 μs

Note<sup>1</sup>: the range of the oscillate period is limited by the current OSK rate.

## Return Format

The query returns the period in scientific notation.

## Example

The command below sets the OSK oscillate period to 150 μs.  
[:MOD:OSKey:TIME 0.00015

The query below returns 1.500000E-04.  
[:MOD:OSKey:TIME?

# [[:SOURce<n>]:MOD:PWM:INTernal:FREQuency

## Syntax

[[:SOURce<n>]:MOD:PWM:INTernal:FREQuency <frequency>|MINimum|MAXimum  
[:SOURce<n>]:MOD:PWM:INTernal:FREQuency?

## Description

Set the frequency of the PWM modulating waveform.  
Query the frequency of the PWM modulating waveform.

## Parameter

Name	Type	Range	Default
<frequency>	Consecutive Real Number	2 mHz to 50 kHz	100 Hz

## Return Format

The query returns the frequency in scientific notation.

## Example

The command below sets the frequency of the PWM modulating waveform to 300 Hz.  
[:MOD:PWM:INTernal:FREQuency 300

The query below returns 3.000000E+02.  
[:MOD:PWM:INTernal:FREQuency?



# [[:SOURce<n>]:MOD:PWM:INTernal:FUNction

## Syntax

[[:SOURce<n>]:MOD:PWM:INTernal:FUNction SINusoid|SQUare|TRIangle|RAMP|NRAMP|NOISe|USER  
[:SOURce<n>]:MOD:PWM:INTernal:FUNction?

## Description

Select the PWM modulating waveform.  
Query the PWM modulating waveform.

## Parameter

Name	Type	Range	Default
--	Keyword	SINusoid SQUare TRIangle RAMP NRAMP NOISe USER	SINusoid

## Explanation

This command is only available when internal modulation source is selected.

## Return Format

The query returns SIN, SQU, TRI, RAMP, NRAM, NOIS or USER.

## Example

The command below selects square waveform as the modulating waveform.  
[:MOD:PWM:INTernal:FUNction SQUare

The query below returns SQU.  
[:MOD:PWM:INTernal:FUNction?

## Related Commands

[\[:SOURce<n>\]:MOD:PWM:SOURce INTernal|EXTernal](#)  
[\[:SOURce<n>\]:MOD:PWM:SOURce?](#)

# [[:SOURce<n>]:MOD:PWM:SOURce

## Syntax

[[:SOURce<n>]:MOD:PWM:SOURce INTernal|EXTernal  
[:SOURce<n>]:MOD:PWM:SOURce?

## Description

Set the PWM modulation source to INTernal or EXTernal.  
Query the PWM modulation source.

## Parameter

Name	Type	Range	Default
--	Keyword	INTernal EXTernal	INTernal

## Return Format

The query returns INT or EXT.

## Example

The command below sets the modulation source to EXTernal.  
[:MOD:PWM:SOURce EXTernal]

The query below returns EXT.  
[:MOD:PWM:SOURce?

# [[:SOURce<n>]:MOD:PWM[:DEViation]:DCYCl

## Syntax

```
[[:SOURce<n>]:MOD:PWM[:DEViation]:DCYCl <percent>|MINimum|MAXimum  
[:SOURce<n>]:MOD:PWM[:DEViation]:DCYCl? [MINimum|MAXimum]
```

## Description

Set the duty cycle deviation of PWM.  
Query the duty cycle deviation of PWM.

## Parameter

Name	Type	Range	Default
<percent>	Consecutive Real Number	0% to 50%	20%

## Explanation

The duty cycle deviation <percent> fulfills the following requirements:  
The duty cycle deviation can not exceed the duty cycle of the current pulse.  
The duty cycle deviation is limited by the minimum duty cycle and the current edge time.

## Return Format

The query returns the duty cycle deviation in scientific notation.

## Example

The command below sets the duty cycle deviation to 45%.  
[:MOD:PWM:DCYCl 45%

The query below returns 4.500000E+01.  
[:MOD:PWM:DCYCl?

# [[:SOURce<n>]:MOD:PWM[:DEViation][:WIDTh]

## Syntax

[[:SOURce<n>]:MOD:PWM[:DEViation][:WIDTh] <deviation>|MINimum|MAXimum  
[:SOURce<n>]:MOD:PWM[:DEViation][:WIDTh]? [MINimum|MAXimum]

## Description

Set the pulse width deviation of PWM.  
Query the pulse width deviation of PWM.

## Parameter

Name	Type	Range	Default
<deviation>	Consecutive Real Number	0 ns to 500 ks	200 μs

## Explanation

The pulse width deviation <deviation> fulfills the following requirements:  
The pulse width deviation can not exceed the current pulse width.  
The pulse width deviation is limited by the minimum pulse width and the current edge time.

## Return Format

The query returns the current pulse width deviation in scientific notation.

## Example

The command below sets the pulse width deviation to 10 μs.  
[:MOD:PWM 0.00001

The query below returns 1.000000E-05.  
[:MOD:PWM?

# [[:SOURce<n>]:PERiod[:FIXed]

## Syntax

[[:SOURce<n>]:PERiod[:FIXed] <period>  
[:SOURce<n>]:PERiod[:FIXed]?

## Description

Set the period of the basic waveform and the default unit is "s".  
Query the period of the basic waveform.

## Parameter

Name	Type	Range	Default
<period>	Consecutive Real number	Refer to the <b>Explanation</b> below	1 ms

## Explanation

Different waveforms correspond to different period ranges.  
Sine: 6.2 ns to 1.0000 Ms  
Square: 20.0 ns to 1.0000 Ms  
Ramp: 250.0 ns to 1.0000 Ms  
Pulse: 25.0 ns to 1.0000 Ms  
Arb: 25.0 ns to 1.0000 Ms  
Harmonic: 12.5 ns to 1.0000 Ms

## Return Format

The query returns the period in scientific notation.

## Example

The command below sets the period to 100 ms.  
[:PERiod 0.1

The query below returns 1.000000E-01.  
[:PERiod?

# [[:SOURce<n>]:PHASe[:ADJust]

## Syntax

[[:SOURce<n>]:PHASe[:ADJust] <phase>|MINimum|MAXimum  
[:SOURce<n>]:PHASe[:ADJust]? [MINimum|MAXimum]

## Description

Set the start phase of the basic waveform.  
Query the start phase.

## Parameter

Name	Type	Range	Default
<phase>	Consecutive Real Number	0° to 360°	0°

## Return Format

The query returns the phase in scientific notation.

## Example

The command below sets the start phase to 90°.  
[:PHASe 90

The query below returns 9.000000E+01.  
:PHASe?

# [ :SOURce<n> ]:PHASe:INITiate

## Syntax

[ :SOURce<n> ]:PHASe:INITiate

## Description

Execute align phase.

## Explanation

This setting is invalid when any of the two channels is in modulation mode.

# [[:SOURce<n>]:PULSe:DCYCl

## Syntax

[[:SOURce<n>]:PULSe:DCYCl <percent>|MINimum|MAXimum  
[[:SOURce<n>]:PULSe:DCYCl? [MINimum|MAXimum]

## Description

Set the pulse duty cycle and the unit is %.  
Query the pulse duty cycle.

## Parameter

Name	Type	Range	Default
<percent>	Consecutive Real Number	Refer to the <b>Explanation</b> below	50%

## Explanation

This parameter is related to the pulse width and when any of them is changed, the other will be modified automatically.  
The pulse duty cycle is limited by the minimum pulse width (4 ns) and pulse period.  
pulse duty cycle  $\geq 100 \times \text{minimum pulse width} \div \text{pulse period}$   
pulse duty cycle  $\leq 100 \times (1 - 2 \times \text{minimum pulse width} \div \text{pulse period})$

## Return Format

The query returns the duty cycle in scientific notation.

## Example

The command below sets the duty cycle to 60%.  
[:PULSe:DCYCl 60

The query below returns 6.000000E+01.  
[:PULSe:DCYCl?

## Related Commands

[\[:SOURce<n>\]:PULSe:HOLD WIDTH|DUTY](#)  
[\[:SOURce<n>\]:PULSe:HOLD?](#)  
[\[:SOURce<n>\]:PULSe:WIDTH <seconds>|MINimum|MAXimum](#)  
[\[:SOURce<n>\]:PULSe:WIDTH? \[MINimum|MAXimum\]](#)



# [[:SOURce<n>]:PULSe:DELaY

## Syntax

[[:SOURce<n>]:PULSe:DELaY <delay>|MINimum|MAXimum  
[[:SOURce<n>]:PULSe:DELaY? [MINimum|MAXimum]

## Description

Set the delay of the pulse and the default unit is "s".  
Query the delay of the pulse.

## Parameter

Name	Type	Range	Default
<delay>	Consecutive Real Number	0 ns to pulse period	0 ns

## Return Format

The query returns the delay of the pulse in scientific notation.

## Example

The command below sets the delay of the pulse to 8 ms.

```
:PULSe:DELaY 0.008
```

The query below returns 8.000000E-03.

```
:PULSe:DELaY?
```

# [[:SOURce<n>]:PULSe:HOLD

## Syntax

```
[[:SOURce<n>]:PULSe:HOLD WIDTHh|DUTY
[:SOURce<n>]:PULSe:HOLD?
```

## Description

Select the pulse width or duty cycle of the pulse.  
Query the pulse parameter currently selected.

## Parameter

Name	Type	Range	Default
--	Discrete	WIDTHh DUTY	DUTY

## Explanation

The pulse width and duty cycle are related and when any one of them is changed, the other will be modified automatically.

## Return Format

The query returns WIDT or DUTY.

## Example

The command below selects pulse width.  
[:PULSe:HOLD WIDTHh

The query below returns WIDT.  
[:PULSe:HOLD?

## Related Commands

- [\[:SOURce<n>\]:PULSe:DCYClE <percent> \[MINimum|MAXimum](#)
- [\[:SOURce<n>\]:PULSe:DCYClE? \[MINimum|MAXimum\]](#)
- [\[:SOURce<n>\]:PULSe:WIDTh <seconds> \[MINimum|MAXimum](#)
- [\[:SOURce<n>\]:PULSe:WIDTh? \[MINimum|MAXimum\]](#)

# [[:SOURce<n>]:PULSe:TRANSition[:LEADIng]

## Syntax

[[:SOURce<n>]:PULSe:TRANSition[:LEADIng] <seconds>|MINimum|MAXimum  
[:SOURce<n>]:PULSe:TRANSition[:LEADIng]? [MINimum|MAXimum]

## Description

Set the leading (rising) edge time of the pulse and the default unit is "s".  
Query the leading edge time of the pulse.

## Parameter

Name	Type	Range	Default
<seconds>	Consecutive Real Number	Refer to the <b>Explanation</b> below	1.9531 μs

## Explanation

The range available is limited by the pulse width currently specified. The relation fulfills the inequality: leading/falling edge time ≤ 0.625 × pulse width.  
DG4000 will automatically adjust the edge time to match the specified pulse width if the value currently set exceeds the limit value.

## Return Format

The query returns the time in scientific notation and the default unit is "s".

## Example

The command below sets the leading edge time to 10 μs.

`:PULSe:TRANSition 0.00001`

The query below returns 1.000000E-05.

`:PULSe:TRANSition?`

# [[:SOURce<n>]:PULSe:TRANsition:TRAIling

## Syntax

[[:SOURce<n>]:PULSe:TRANsition:TRAIling <seconds>|MINimum|MAXimum  
[:SOURce<n>]:PULSe:TRANsition:TRAIling? [MINimum|MAXimum]

## Description

Set the trailing (falling) edge time of the pulse and the default unit is "s".  
Query the trailing edge time of the pulse.

## Parameter

Name	Type	Range	Default
<seconds>	Consecutive Real Number	Refer to the <b>Explanation</b> below	1.9531 μs

## Explanation

The range available is limited by the pulse width currently specified. The relation fulfills the inequality: leading/falling edge time ≤ 0.625 × pulse width.  
DG4000 will automatically adjust the edge time to match the specified pulse width if the value currently set exceeds the limit value.

## Return Format

The query returns the time in scientific notation and the default unit is "s".

## Example

The command below sets the trailing edge time to 10 μs.  
[:PULSe:TRANsition:TRAIling 0.00001

The query below returns 1.000000E-05.  
:PULSe:TRANsition:TRAIling?

# [[:SOURce<n>]:PULSe:WIDTh

## Syntax

```
[[:SOURce<n>]:PULSe:WIDTh <seconds>|MINimum|MAXimum  
[:SOURce<n>]:PULSe:WIDTh? [MINimum|MAXimum]
```

## Description

Set the pulse width and the default unit is "s".  
Query the pulse width.

## Parameter

Name	Type	Range	Default
<seconds>	Consecutive Real Number	Refer to the <b>Explanation</b> below	500 $\mu$ s

## Explanation

This parameter is related to the duty cycle and when any of them is changed, the other will be modified automatically.  
The pulse width is limited by the minimum pulse width (4 ns) and pulse period.  
pulse width  $\geq$  minimum pulse width  
pulse width  $\leq$  pulse period - 2  $\times$  minimum pulse width

## Return Format

The query returns the pulse width in scientific notation.

## Example

The command below sets the pulse width to 600  $\mu$ s.  
[:PULSe:WIDTh 0.0006

The query below returns 6.000000E-04.  
[:PULSe:WIDTh?

## Related Commands

- [\[:SOURce<n>\]:PULSe:HOLD WIDTh|DUTY](#)
- [\[:SOURce<n>\]:PULSe:HOLD?](#)
- [\[:SOURce<n>\]:PULSe:DCYCl <percent>|MINimum|MAXimum](#)
- [\[:SOURce<n>\]:PULSe:DCYCl? \[MINimum|MAXimum\]](#)

# [[:SOURce<n>]:SWEep:HTIME:STARt

## Syntax

[[:SOURce<n>]:SWEep:HTIME:STARt <seconds>|MINimum|MAXimum  
[:SOURce<n>]:SWEep:HTIME:STARt? [MINimum|MAXimum]

## Description

Set the start hold of the sweep and the unit is "s".  
Query the start hold of the sweep.

## Parameter

Name	Type	Range	Default
<seconds>	Consecutive Real Number	0 s to 300 s	0 s

## Return Format

The query returns the time value in scientific notation.

## Example

The command below sets the start hold to 1 s.  
[:SWEep:HTIME:STARt 1

The query returns 1.000000E+00.  
[:SWEep:HTIME:STARt?

# [[:SOURce<n>]:SWEep:HTIME:STOP

## Syntax

[[:SOURce<n>]:SWEep:HTIME:STOP <seconds>|MINimum|MAXimum  
[:SOURce<n>]:SWEep:HTIME:STOP? [MINimum|MAXimum]

## Description

Set the end hold of the sweep and the default unit is "s".  
Query the end hold of the sweep.

## Parameter

Name	Type	Range	Default
<seconds>	Consecutive Real Number	0 s to 300 s	0 s

## Return Format

The query returns the time value in scientific notation.

## Example

The command below sets the end hold to 1 s.  
[:SWEep:HTIME:STOP 1

The query below returns 1.000000E+00.  
[:SWEep:HTIME:STOP?

# [[:SOURce<n>]:SWEep:RTIME

## Syntax

[[:SOURce<n>]:SWEep:RTIME <seconds>|MINimum|MAXimum  
[:SOURce<n>]:SWEep:RTIME? [MINimum|MAXimum]

## Description

Set the return time of the sweep and the default unit is "s".  
Query the return time.

## Parameter

Name	Type	Range	Default
<seconds>	Consecutive Real Number	0 s to 300 s	0 s

## Return Format

The query returns the time value in scientific notation.

## Example

The command below sets the return time to 5 s.  
[:SWEep:RTIME 5

The query returns 5.000000E+00.  
[:SWEep:RTIME?



# [[:SOURce<n>]:SWEep:SPACing

## Syntax

[[:SOURce<n>]:SWEep:SPACing LINear|LOGarithmic|STEp  
[:SOURce<n>]:SWEep:SPACing?

## Description

Set the sweep type to LINear, LOGarithmic or STEp.  
Query the sweep type.

## Parameter

Name	Type	Range	Default
--	Keyword	LINear LOGarithmic STEp	LINear

## Return Format

The query returns LIN, LOG or STE.

## Example

The command below selects log sweep.  
[:SWEep:SPACing LOGarithmic

The query returns LOG.  
[:SWEep:SPACing?

# [[:SOURce<n>]:SWEep:STATe

## Syntax

[[:SOURce<n>]:SWEep:STATe OFF|ON  
[:SOURce<n>]:SWEep:STATe?

## Description

Enable or disable the sweep function.  
Query the status of the sweep function.

## Parameter

Name	Type	Range	Default
--	Bool	ON OFF	OFF

## Explanation

When Sweep is enabled, Mod or Burst will be disabled automatically (if it is currently enabled).

## Return Format

The query returns OFF or ON.

## Example

The command below enables the sweep function.  
[:SWEep:STATe ON

The query below returns ON.  
[:SWEep:STATe?

# [[:SOURce<n>]:SWEep:STEP

## Syntax

[[:SOURce<n>]:SWEep:STEP <steps>|MINimum|MAXimum  
[:SOURce<n>]:SWEep:STEP? [MINimum|MAXimum]

## Description

Set the step number of step sweep.  
Query the step number of step sweep.

## Parameter

Name	Type	Range	Default
<steps>	Integer	2 to 2048	2

## Return Format

The query returns the step number in scientific notation.

## Example

The command below sets the step number to 5.

:SWEep:STEP 5

The query below returns 5.000000E+00.

:SWEep:STEP?

# [[:SOURce<n>]:SWEep:TIME

## Syntax

```
[[:SOURce<n>]:SWEep:TIME <seconds>|MINimum|MAXimum  
[:SOURce<n>]:SWEep:TIME? [MINimum|MAXimum]
```

## Description

Set the sweep time and the default unit is "s".  
Query the sweep time.

## Parameter

Name	Type	Range	Default
<seconds>	Consecutive Real Number	1 ms to 300 s	1 s

## Return Format

The query returns the time value in scientific notation.

## Example

The command below sets the sweep time to 5 s.  
[:SWEep:TIME 5

The query below returns 5.000000E+00.  
[:SWEep:TIME?

# **[[:SOURce<n>]:SWEep:TRIGger[:IMMediate]**

## **Syntax**

[[:SOURce<n>]:SWEep:TRIGger[:IMMediate]

## **Description**

Set the instrument to trigger immediately.

## **Explanation**

This command is only available when manual trigger source is selected.

## **Related Commands**

[\[:SOURce<n>\]:SWEep:TRIGger:SOURce INTernal|EXTernal|MANual](#)  
[\[:SOURce<n>\]:SWEep:TRIGger:SOURce?](#)

# [[:SOURce<n>]:SWEep:TRIGger:SLOPe

## Syntax

[[:SOURce<n>]:SWEep:TRIGger:SLOPe POSitive|NEGative  
[:SOURce<n>]:SWEep:TRIGger:SLOPe?

## Description

Set the generator to enable the sweep output on the rising (POSitive) or falling (NEGative) edge of the external trigger signal.  
Query the edge type of the external trigger signal for the sweep output.

## Parameter

Name	Type	Range	Default
--	Keyword	POSitive NEGative	POSitive

## Explanation

This command is only available when external trigger source is selected.

## Return Format

The query returns POS or NEG.

## Example

The command below sets the edge type to falling edge.  
[:SWEep:TRIGger:SLOPe NEGative

The query returns NEG.  
[:SWEep:TRIGger:SLOPe?

## Related Commands

[\[:SOURce<n>\]:SWEep:TRIGger:SOURce INTernal|EXTernal|MANual](#)  
[\[:SOURce<n>\]:SWEep:TRIGger:SOURce?](#)

# [[:SOURce<n>]:SWEep:TRIGger:SOURce

## Syntax

[[:SOURce<n>]:SWEep:TRIGger:SOURce INTernal|EXTernal|MANual  
[:SOURce<n>]:SWEep:TRIGger:SOURce?

## Description

Set the trigger source of the sweep to INTernal, EXTernal or MANual.  
Query the trigger source.

## Parameter

Name	Type	Range	Default
--	Keyword	INTernal EXTernal MANual	INTernal

## Return Format

The query returns INT, EXT or MAN.

## Example

The command below selects manual trigger source.  
[:SWEep:TRIGger:SOURce MANual

The query below returns MAN.  
[:SWEep:TRIGger:SOURce?

# [[:SOURce<n>]:SWEep:TRIGger:TRIGOut

## Syntax

[[:SOURce<n>]:SWEep:TRIGger:TRIGOut OFF|POSitive|NEGative  
[:SOURce<n>]:SWEep:TRIGger:TRIGOut?

## Description

Set the edge type of the sweep trigger output to rising (POSitive) or falling (NEGative) edge or disable the trigger output signal (OFF).  
Query the edge type of the sweep trigger output.

## Parameter

Name	Type	Range	Default
--	Keyword	OFF POSitive NEGative	OFF

## Explanation

This command is only available when internal or manual trigger source is selected.

## Return Format

The query returns OFF, POS or NEG.

## Example

The command below sets the trigger output edge to falling edge.  
[:SWEep:TRIGger:TRIGout NEGative

The query below returns NEG.  
[:SWEep:TRIGger:TRIGout?

## Related Commands

[\[:SOURce<n>\]:SWEep:TRIGger:SOURce INTernal|EXTernal|MANual](#)  
[\[:SOURce<n>\]:SWEep:TRIGger:SOURce?](#)



# [[:SOURce<n>]:VOLTage[:LEVel][:IMMediate][:AMPLitude]

## Syntax

[[:SOURce<n>]:VOLTage[:LEVel][:IMMediate][:AMPLitude] <amplitude>|MINimum|MAXimum  
[:SOURce<n>]:VOLTage[:LEVel][:IMMediate][:AMPLitude]? [MINimum|MAXimum]

## Description

Set the amplitude of the basic waveform and the default unit is "Vpp".  
Query the amplitude of the basic waveform.

## Parameter

Name	Type	Range	Default
<amplitude>	Consecutive Real Number	Refer to the <b>Explanation</b> below	5 Vpp

## Explanation

The amplitude range is limited by the impedance and frequency/period settings (refer to the related User's Guide).

## Return Format

The query returns to the amplitude in scientific notation.

## Example

The command below sets the amplitude to 2.5 Vpp.  
[:VOLTage 2.5

The query below returns 2.500000E+00.  
[:VOLTage?

# [[:SOURce<n>]:VOLTage[:LEVel][:IMMediate]:HIGH

## Syntax

[[:SOURce<n>]:VOLTage[:LEVel][:IMMediate]:HIGH <voltage>|MINimum|MAXimum  
[:SOURce<n>]:VOLTage[:LEVel][:IMMediate]:HIGH? [MINimum|MAXimum]

## Description

Set the high level of the basic waveform and the default unit is "V".  
Query the high level of the basic waveform.

## Parameter

Name	Type	Range	Default
<voltage>	Consecutive Real Number	The current low level to 10 V (HighZ) / 5 V (50 Ω)	2.5 V

## Return Format

The query returns the high level in scientific notation.

## Example

The command below sets the high level to 5 V.  
[:VOLTage:HIGH 5

The query below returns 5.000000E+00.  
[:VOLTage:HIGH?

## Related Commands

[\[:SOURce<n>\]:VOLTage\[:LEVel\]\[:IMMediate\]:LOW <voltage>|MINimum|MAXimum](#)  
[\[:SOURce<n>\]:VOLTage\[:LEVel\]\[:IMMediate\]:LOW? \[MINimum|MAXimum\]](#)

# [[:SOURce<n>]:VOLTage[:LEVel][:IMMediate]:LOW

## Syntax

[[:SOURce<n>]:VOLTage[:LEVel][:IMMediate]:LOW <voltage>|MINimum|MAXimum  
[:SOURce<n>]:VOLTage[:LEVel][:IMMediate]:LOW? [MINimum|MAXimum]

## Description

Set the low level of the basic waveform and the default unit is "V".  
Query the low level of the basic waveform.

## Parameter

Name	Type	Range	Default
<voltage>	Consecutive Real Number	-10 V (HighZ) / -5 V (50 Ω) to the current high level	-2.5 V

## Return Format

The query returns the low level in scientific notation.

## Example

The command below sets the low level to -5 V.  
[:VOLTage:LOW -5

The query below returns -5.000000E+00.  
[:VOLTage:LOW?

## Related Commands

[\[:SOURce<n>\]:VOLTage\[:LEVel\]\[:IMMediate\]:HIGH <voltage>|MINimum|MAXimum](#)  
[\[:SOURce<n>\]:VOLTage\[:LEVel\]\[:IMMediate\]:HIGH? \[MINimum|MAXimum\]](#)

# [[:SOURce<n>]:VOLTage[:LEVel][:IMMediate]:OFFSet

## Syntax

[[:SOURce<n>]:VOLTage[:LEVel][:IMMediate]:OFFSet <voltage>|MINimum|MAXimum  
[:SOURce<n>]:VOLTage[:LEVel][:IMMediate]:OFFSet? [MINimum|MAXimum]

## Description

Set the DC offset voltage and the default unit is "V<sub>DC</sub>".  
Query the DC offset voltage.

## Parameter

Name	Type	Range	Default
<voltage>	Consecutive Real Number	Refer to the <b>Explanation</b> below	0 V <sub>DC</sub>

## Explanation

The offset range is limited by the impedance and amplitude/high level settings (refer to the related User's Guide).

## Return Format

The query returns the offset voltage in scientific notation.

## Example

The command below sets the offset voltage to 100 mV<sub>DC</sub>.

`:VOLTage:OFFSet 0.1`

The query returns 1.000000E-01.

`:VOLTage:OFFSet?`

# [[:SOURce<n>]:VOLTage:UNIT

## Syntax

```
[[:SOURce<n>]:VOLTage:UNIT VPP|VRMS|DBM  
[:SOURce<n>]:VOLTage:UNIT?
```

## Description

Set the amplitude unit to VPP, VRMS or DBM.  
Query the amplitude unit.

## Parameter

Name	Type	Range	Default
--	Keyword	VPP VRMS DBM	VPP

## Explanation

DBM is not available when the impedance is set to HighZ.

## Return Format

The query returns VPP, VRMS or DBM.

## Example

The command below sets the amplitude unit to VRMS.  
[:VOLTage:UNIT VRMS

The query below returns VRMS.  
[:VOLTage:UNIT?

# **:SYSTem:BEEPer[:IMMediate]**

## **Syntax**

:SYSTem:BEEPer[:IMMediate]

## **Description**

The beeper generates a beep immediately.

## **Explanation**

This command is only available when the beeper is enabled (refer to the [:SYSTem:BEEPer:STATe ON|OFF](#) command).

## **Related Commands**

[:SYSTem:BEEPer:STATe ON|OFF](#)  
[:SYSTem:BEEPer:STATe?](#)

# :SYSTem:BEEPer:STATe

## Syntax

:SYSTem:BEEPer:STATe ON|OFF  
:SYSTem:BEEPer:STATe?

## Description

Enable or disable the beeper.  
Query the status of the beeper.

## Parameter

Name	Type	Range	Default
--	Bool	ON OFF	ON

## Return Format

The query returns ON or OFF.

## Example

The command below enables the beeper.  
:SYSTem:BEEPer:STATe ON

The query below returns ON.  
:SYSTem:BEEPer:STATe?

# :SYSTem:COMMunicate:LAN:AUTOip[:STATe]

## Syntax

:SYSTem:COMMunicate:LAN:AUTOip[:STATe] ON|OFF  
:SYSTem:COMMunicate:LAN:AUTOip[:STATe]?

## Description

Enable or disable the AUTOIP mode.  
Query the status of the AUTOIP mode.

## Parameter

Name	Type	Range	Default
--	Bool	ON OFF	ON

## Return Format

The query returns ON or OFF.

## Example

The command below enables the AUTOIP mode.  
:SYSTem:COMMunicate:LAN:AUTOip ON

The query below returns ON.  
:SYSTem:COMMunicate:LAN:AUTOip?



# :SYSTem:COMMUnicate:LAN:DHCP[:STATe]

## Syntax

:SYSTem:COMMUnicate:LAN:DHCP[:STATe] ON|OFF  
:SYSTem:COMMUnicate:LAN:DHCP[:STATe]?

## Description

Enable or disable the DHCP mode.  
Query the status of the DHCP mode.

## Parameter

Name	Type	Range	Default
--	Bool	ON OFF	ON

## Explanation

In DHCP mode, the DHCP server in the current network assigns LAN parameters (such as IP address) for the generator.

## Return Format

The query returns ON or OFF.

## Example

The command below enables the DHCP mode.  
:SYSTem:COMMUnicate:LAN:DHCP ON

The query below returns ON.  
:SYSTem:COMMUnicate:LAN:DHCP?

# :SYSTem:COMMUnicate:LAN:DNS

## Syntax

:SYSTem:COMMUnicate:LAN:DNS <address>  
:SYSTem:COMMUnicate:LAN:DNS?

## Description

Set the DNS address for the generator.  
Query the DNS address.

## Parameter

Name	Type	Range <sup>1</sup>	Default
<address>	ASCII Character String	0.0.0.0 to 255.255.255.255	--

Note<sup>1</sup>: according to the TCP/IP protocol, the effective range of DNS is from 0.0.0.0 to 223.255.255.255 and the first segment of number can not be 127.

## Explanation

This command is only available when manual IP mode is enabled (refer to the [:SYSTem:COMMUnicate:LAN:STATic\[:STATe\] ON|OFF](#) command).  
The setting is only valid when the instrument is connected to the LAN successfully.  
Generally, users do not need to set the domain name server address of the network and the setting of this parameter can be ignored.

## Return Format

The query returns the current domain name server address in nnn.nnn.nnn.nnn format.

## Example

The command below sets the DNS address to 202.106.46.151.  
:SYSTem:COMMUnicate:LAN:DNS 202.106.46.151

The query below returns 202.106.46.151.  
:SYSTem:COMMUnicate:LAN:DNS?

## Related Commands

[:SYSTem:COMMUnicate:LAN:STATic\[:STATe\] ON|OFF](#)

[:SYSTem:COMMunicate:LAN:STATic\[:STATe\]?](#)

# :SYSTem:COMMunicate:LAN:GATEway

## Syntax

:SYSTem:COMMunicate:LAN:GATEway <address>  
:SYSTem:COMMunicate:LAN:GATEway?

## Description

Set the default gateway for the generator.  
Query the default gateway.

## Parameter

Name	Type	Range <sup>1</sup>	Default
<address>	ASCII Character String	0.0.0.0 to 255.255.255.255	--

Note<sup>1</sup>: according to the TCP/IP protocol, the effective range of the default gateway is from 0.0.0.0 to 223.255.255.255 and the first segment of number can not be 127.

## Explanation

This command is only available when manual IP mode is enabled (refer to the [:SYSTem:COMMunicate:LAN:STATic\[:STATe\] ON|OFF](#) command).  
The setting is only valid when the instrument is connected to the LAN successfully.

## Return Format

The query returns the current default gateway in nnn.nnn.nnn.nnn format.

## Example

The command below sets the default gateway to 172.16.3.1.  
:SYSTem:COMMunicate:LAN:GATEway 172.16.3.1

The query below returns 172.16.3.1.  
:SYSTem:COMMunicate:LAN:GATEway?

# :SYSTem:COMMUnicate:LAN:IPADdress

## Syntax

:SYSTem:COMMUnicate:LAN:IPADdress <ip\_addr>  
:SYSTem:COMMUnicate:LAN:IPADdress?

## Description

Set the IP address for the generator.  
Query the IP address.

## Parameter

Name	Type	Range <sup>1</sup>	Default
<ip_addr>	ASCII Character String	0.0.0.0 to 255.255.255.255	--

Note<sup>1</sup>: according to the TCP/IP protocol, the effective range of the IP address is from 0.0.0.0 to 223.255.255.255 and the first segment of number can not be 127.

## Explanation

This command is only available when manual IP mode is enabled (refer to the [:SYSTem:COMMUnicate:LAN:STATic\[:STATe\] ON|OFF](#) command).  
The setting is only valid when the instrument is connected to the LAN successfully.

## Return Format

The query returns the current IP address in nnn.nnn.nnn.nnn format.

## Example

The command below sets the IP address to 172.16.3.145.  
:SYSTem:COMMUnicate:LAN:IPADdress 172.16.3.145

The query below returns 172.16.3.145.  
:SYSTem:COMMUnicate:LAN:IPADdress?

## Related Commands

[:SYSTem:COMMUnicate:LAN:STATic\[:STATe\] ON|OFF](#)  
[:SYSTem:COMMUnicate:LAN:STATic\[:STATe\]?](#)

# **:SYSTem:COMMunicate:LAN:MAC?**

## **Syntax**

:SYSTem:COMMunicate:LAN:MAC?

## **Description**

Query the MAC address.

## **Return Format**

The query returns the MAC address, such as 00-14-0E-42-12-CF.

# :SYSTem:COMMUnicate:LAN:SMASk

## Syntax

:SYSTem:COMMUnicate:LAN:SMASk <mask>  
:SYSTem:COMMUnicate:LAN:SMASk?

## Description

Set the subnet mask for the generator.  
Query the subnet mask.

## Parameter

Name	Type	Range	Default
<mask>	ASCII Character String	0.0.0.0 to 255.255.255.255	--

## Explanation

This command is only available when manual IP mode is enabled (refer to the [:SYSTem:COMMUnicate:LAN:STATic\[:STATe\] ON|OFF](#) command).  
The setting is only valid when the instrument is connected to the LAN successfully.

## Return Format

The query returns the current subnet mask in nnn.nnn.nnn.nnn format.

## Example

The command below sets the subnet mask to 255.255.255.0.  
:SYSTem:COMMUnicate:LAN:SMASk 255.255.255.0

The query below returns 255.255.255.0.  
:SYSTem:COMMUnicate:LAN:SMASk?

## Related Commands

[:SYSTem:COMMUnicate:LAN:STATic\[:STATe\] ON|OFF](#)  
[:SYSTem:COMMUnicate:LAN:STATic\[:STATe\]?](#)

# :SYSTem:COMMUnicate:LAN:STATic[:STATe]

## Syntax

:SYSTem:COMMUnicate:LAN:STATic[:STATe] ON|OFF  
:SYSTem:COMMUnicate:LAN:STATic[:STATe]?

## Description

Enable or disable the ManualIP mode.  
Query the status of the ManualIP mode.

## Parameter

Name	Type	Range	Default
--	Bool	ON OFF	OFF

## Explanation

In this mode, the LAN parameters (such as the IP address) of the generator are defined by users.

## Return Format

The query returns ON or OFF.

## Example

The command below enables the ManualIP mode.  
:SYSTem:COMMUnicate:LAN:STATic ON

The query below returns ON.  
:SYSTem:COMMUnicate:LAN:STATic?



# **:SYSTem:COMMunicate:USB:INFormation?**

## **Syntax**

:SYSTem:COMMunicate:USB:INFormation?

## **Description**

Query the USB information.

## **Return Format**

The query returns the USB information in character string, such as :USB0::0X1AB1::0X0640::DG41620000::INSTR.

# :SYSTem:COMMUnicate:USB[:SELF]:CLASs

## Syntax

:SYSTem:COMMUnicate:USB[:SELF]:CLASs COMPuter|PRINter  
:SYSTem:COMMUnicate:USB[:SELF]:CLASs?

## Description

Set the type of the instrument connected to the USB Device interface to COMPuter or PRINter.  
Query the type of the instrument connected to the USB Device interface.

## Parameter

Name	Type	Range	Default
--	Keyword	COMPuter PRINter	COMPuter

## Explanation

DG4000 provides a USB Device interface at the rear panel. Computer or Printer can be connected to this interface to control the instrument remotely or print the content on the screen.

## Return Format

The query returns COMP or PRIN.

## Example

The command below sets the type of the instrument to COMPuter.  
:SYSTem:COMMUnicate:USB:CLASs COMPuter

The query below returns COMP.  
:SYSTem:COMMUnicate:USB:CLASs?

# :SYSTem:CSCopy

## Syntax

:SYSTem:CSCopy CH1,CH2|CH2,CH1

## Description

Copy the configuration state of CH1 (CH2) to CH2 (CH1).

## Parameter

Name	Type	Range	Default
--	Keyword	CH1,CH2 CH2,CH1	CH1,CH2

## Explanation

DG4000 supports state copy or waveform copy between its two channels, namely copy the state (parameters and output configuration) or arbitrary waveform parameters of one channel to the other or swap the states of the two channels. State includes waveform (except volatile waveform) and waveform parameters (such as frequency and amplitude), functions (such as modulation, sweep and burst) as well as output configurations (such as sync, impedance and polarity) of the channel.

The channel copy function is not available in coupling mode.

## Example

The command below copies the configuration state of CH1 to CH2.

```
:SYSTem:CSCopy CH1,CH2
```

# :SYSTem:CWCopy

## Syntax

:SYSTem:CWCopy CH1|CH2,CH2|CH1

## Description

Copy the arbitrary waveform data (not include the waveform parameters) of CH1 (CH2) to CH2 (CH1).

## Parameter

Name	Type	Range	Default
--	Keyword	CH1,CH2 CH2,CH1	CH1,CH2

## Explanation

DG4000 supports state copy or waveform copy between its two channels, namely copy the state (parameters and output configuration) or arbitrary waveform parameters of one channel to the other or swap the states of the two channels. Waveform copy is only available when both of the channels select arbitrary waveform. The channel copy function is not available in coupling mode.

## Example

The command below copies the waveform of CH1 to CH2.

:SYSTem:CWCopy CH1,CH2

# :SYSTem:ERRor?

## Syntax

:SYSTem:ERRor?

## Description

Query the error event queue.

## Return Format

The query returns the error event information, such as -113, "Undefined header; keyword cannot be found". If error does not exist, the query returns 0, "No Error".

# :SYSTem:KLOCK

## Syntax

```
:SYSTem:KLOCK[:STATe] ON|OFF
:SYSTem:KLOCK[:STATe]?
```



## Description

Lock or unlock the front panel remotely.  
Query whether the front panel is in remote lock mode.

## Parameter

Name	Type	Range	Default
--	Bool	ON OFF	OFF

## Explanation

By default, the remote lock mode of the front panel is disabled (OFF) and  is displayed at the upper right corner of the screen. You can press **Burst** to return to local operation mode. When the remote lock mode of the front panel is enabled,  is displayed at the upper right corner of the screen and at this point, you can not return to local operation mode by pressing **Burst**.

## Return Format

The query returns ON or OFF.

## Example

The command below enables the remote lock mode.  
:SYSTem:KLOCK ON

The query below returns ON.  
:SYSTem:KLOCK?

# :SYSTem:LANGuage

## Syntax

:SYSTem:LANGuage ENGLish|SCHinese  
:SYSTem:LANGuage?

## Description

Set the system language to English (ENGLish) or simplified Chinese (SCHinese).  
Query the system language.

## Parameter

Name	Type	Range	Default
--	Keyword	ENGLish SCHinese	ENGLish

## Return Format

The query returns ENG or SCH.

## Example

The command below sets the system language to ENGLish.  
:SYSTem:LANGuage ENGLish

The query below returns ENGL.  
:SYSTem:LANGuage?

# :SYSTem:POWeron

## Syntax

:SYSTem:POWeron DEFault|LAsT  
:SYSTem:POWeron?

## Description

Set the configuration to be used by the instrument at power-on to DEFault or LAsT.  
Query the configuration to be used by the instrument at power-on.

## Parameter

Name	Type	Range	Default
--	Keyword	DEFault LAsT	DEFault

## Return Format

The query returns DEFAULT or LAST.

## Example

The command below sets the configuration to be used by the instrument at power-on to LAsT.  
:SYSTem:POWeron LAsT

The query below returns LAST.  
:SYSTem:POWeron?



# :SYSTem:POWSet

## Syntax

:SYSTem:POWSet AUTO|USER  
:SYSTem:POWSet?

## Description

Set the start-up mode after the instrument is powered on to auto (AUTO) or manual (USER).  
Query the start-up mode after the instrument is powered on.

## Parameter

Name	Type	Range	Default
--	Keyword	AUTO USER	AUTO

## Explanation

Auto (AUTO): the instrument starts automatically after power-on.  
Manual (USER): users need to press the power switch at the front panel to start the instrument after power-on.

## Return Format

The query returns AUTO or USER.

## Example

The command below sets the start-up mode to manual (USER).  
:SYSTem:POWSet USER

The query below returns USER.  
:SYSTem:POWSet?

# :SYSTem:PRESet

## Syntax

:SYSTem:PRESet DEFault|USER1|USER2|USER3|USER4|USER5|USER6|USER7|USER8|USER9|USER10

## Description

Restore the system to its default state (DEFault) or user-defined state (USER1, USER2, USER3, USER4, USER5, USER6, USER7, USER8, USER9 or USER10).

## Parameter

Name	Type	Range	Default
--	Keyword	DEFault USER1 USER2 USER3 USER4 USER5 USER6 USER7 USER8 USER9 USER10	DEFault

## Explanation

When resorting the instrument to user-defined state, this command is only valid when valid state file is stored in the specified storage location.

## Example

The command below restores the system to its default state.

:SYSTem:PRESet DEFault

# :SYSTem:RESTART

## Syntax

:SYSTem:RESTART

## Description

Restart the instrument.

# :SYSTem:ROSCillator:SOURce

## Syntax

:SYSTem:ROSCillator:SOURce INTernal|EXTernal  
:SYSTem:ROSCillator:SOURce?

## Description

Set the reference clock source to INTernal or EXTernal.  
Query the reference clock source.

## Parameter

Name	Type	Range	Default
--	Keyword	INTernal EXTernal	INTernal

## Explanation

DG4000 provides internal 10MHz clock source and accepts external clock source input from the **[10MHz In/Out]** connector at the rear panel. It can also output clock source from the **[10MHz In/Out]** connector for other devices.

## Return Format

The query returns INT or EXT.

## Example

The command below sets the reference clock source to EXTernal (this setting is valid when the system detects external clock source).  
:SYSTem:ROSCillator:SOURce EXTernal

The query below returns EXT.  
:SYSTem:ROSCillator:SOURce?

# :SYSTem:SHUTDOWN

## Syntax

:SYSTem:SHUTDOWN

## Description

Shut down the instrument.

# **:SYSTem:VERSion?**

## **Syntax**

:SYSTem:VERSion?

## **Description**

Query and return the SCPI version information.

## **Return Format**

The query returns the SCPI version information, such as 1999.0.

# [::TRACe]:DATA:DAC16

## Syntax

[::TRACe]:DATA:DAC16 VOLATILE,<flag>,<binary\_block\_data>

## Description

Download the waveform edited into the DDRII.

## Explanation

This command consists of two parts. The first part is the command character string ([::TRACe]:DATA:DAC16 VOLATILE,<flag>,) and the second part is the binary data (<binary\_block\_data>).

<flag> represents the data transmission state and can be set to "CON" or "END". "CON": there are still data packets after the current one; "END": this is the last data packet and the data transmission is finished.

<binary\_block\_data> is the binary data to be downloaded and the range is from 0000 to 3FFF. The data length must be 16 kpts (32 kBytes).

The binary data block starts with #.

For example, send **::DATA:DAC16 VOLATILE,CON,#532768binary data**

The number **5** following **#** represents that the data length information **32768** holds 5 characters and **32768** represents the number of bytes of the **binary data**. As each waveform point holds two bytes, the number of bytes must be an even number.

When the <flag> in the command received is END, the instrument will automatically switch to arbitrary waveform output.

If the total length of the waveform to be downloaded is 16 kpts and the waveform is downloaded into the instrument in one operation, users can edit the data on the instrument. Otherwise, local editing is not supported.

# [[:TRACe]:DATA:DAC

## Syntax

[[:TRACe]:DATA:DAC VOLATILE,[<binary\_block\_data>|<value>,<value>,<value>...]

## Description

Download binary data block or decimal DAC value to the volatile memory.

## Explanation

<binary\_block\_data> is the binary data to be downloaded. The range is from 0000 to 3FFF and the data length is 4 Bytes (2 pts) to 32768 Bytes (16 kpts). The binary data block starts with #.

For example, send **:DATA:DAC VOLATILE,#516384binary data**

The number **5** following **#** represents that the data length information **16384** holds 5 characters and **16384** represents the number of bytes of the **binary data**. As each waveform point holds two bytes, the number of bytes must be an even number.

<value>,<value>,<value>...: represent the decimal DAC to be downloaded. When the data does not start with #, the decimal DAC value can be sent in character string format.

For example, send **:DATA:DAC VOLATILE,0,16883,8192,0,16383**

5 data points are sent totally.

For data with less than 16384 points, the instrument will extend the data to 16384 points using uniform interpolation automatically.

After this command is sent, the instrument will switch the current channel to output volatile waveform automatically and modify the interpolation mode and the number of editable points. The data downloaded using this command can be edited on the instrument.



# [[:TRACe]:DATA[:DATA]

## Syntax

[[:TRACe]:DATA[:DATA] VOLATILE,<value>{,<value>}

## Description

Download the floating voltage values to the volatile memory. The range of the number of the floating points is from -1 to +1 and the data length can not exceed 512 kpts.

## Parameter

Name	Type	Range	Default
<value>	Consecutive Real number	-1 to 1	--

## Explanation

Each time, 1 to 16384 (16k) points can be downloaded.  
-1 and 1 correspond to the maximum and minimum of the waveform respectively (assume that the offset is set to 0). For example, when the amplitude is set to 5 Vpp, 1 corresponds to 2.5 V and -1 corresponds to -2.5 V.  
This command will overwrite the previous waveform in the volatile memory without generating any error.  
After the command is sent, the instrument will switch the current channel to output volatile waveform automatically and modify the interpolation mode and the number of editable points at the same time. The data downloaded using this command can be edited on the instrument.

## Example

The command below downloads 4 points (-0.5, -0.25, 0.25 and 0.5) to the volatile memory.  
[:DATA VOLATILE,-0.5,-0.25,0.25,0.5

# [[:TRACe]:DATA:POINts:INTerpolate

## Syntax

```
[[:TRACe]:DATA:POINts:INTerpolate LINear|OFF  
[:TRACe]:DATA:POINts:INTerpolate?
```

## Description

Set the interpolation method between the defined waveform points.  
Query the interpolation method.

## Parameter

Name	Type	Range	Default
--	Keyword	LINear OFF	OFF

## Explanation

LINear: linear interpolation. The waveform editor will connect the two defined points with a straight line.  
OFF: disable the interpolation. The waveform editor will hold a constant voltage level between the two points and create a step waveform.  
The interpolation method can be modified only when the instrument is in volatile waveform output mode.

## Return Format

The query returns LINEAR or OFF.

## Example

The command below selects linear interpolation method.  
[:DATA:POINts:INTerpolate LINear

The query below returns LINEAR.  
[:DATA:POINts:INTerpolate?

# [[:TRACe]:DATA:POINts

## Syntax

```
[[:TRACe]:DATA:POINts VOLATILE, <value>|MINimum|MAXimum  
[:TRACe]:DATA:POINts? VOLATILE[,MINimum|MAXimum]
```

## Description

Set the number of the initial points of the edited waveform.  
Query the number of the initial points of the edited waveform.

## Parameter

Name	Type	Range	Default
<value>	Integer	2 to 16384	--

## Explanation

This command changes the current output to volatile waveform output automatically and initialize the volatile waveform to 0.  
After sending this command, you can send the [\[:TRACe\]:DATA:VALue VOLATILE,<point>,<data>](#) command to modify the voltage of the specified point.

## Return Format

The query returns an integer between 2 and 16384.

# [[:TRACe]:DATA:VALue?

## Syntax

[[:TRACe]:DATA:VALue? VOLATILE,<point>

## Description

Query the decimal integer value of a certain point in the volatile memory.

## Parameter

Name	Type	Range	Default
<point>	Integer	1 to 16384	--

## Explanation

This command is only available when the current output waveform is volatile.

## Return Format

The query returns a decimal number.

## Example

The command below queries the decimal integer value of point 1 and returns 0.

`:DATA:VALue? VOLATILE,1`

# [[:TRACe]:DATA:VALue

## Syntax

[[:TRACe]:DATA:VALue VOLATILE,<point>,<data>

## Description

Modify the decimal integer value of a certain point in the volatile memory.

## Parameter

Name	Type	Range	Default
<point>	Integer	1 to 16384	--
<data>	Integer	0 to 16383	--

## Explanation

This command is only available when the current output waveform is volatile.

## Example

The command below changes point 1 to 10.

`:DATA:VALue VOLATILE,1,10`

The query below returns 10.

`:DATA:VALue? VOLATILE,1`

## Related Command

[\[:TRACe\]:DATA:VALue? VOLATILE,<points>](#)

# **[[:TRACe]:DATA:LOAD?**

## **Syntax**

```
[[:TRACe]:DATA:LOAD? VOLATILE  
[:TRACe]:DATA:LOAD? <num>
```

## **Description**

Query the number of arbitrary waveform data packets in the volatile memory.  
Load the specified data packet in the volatile memory.

## **Explanation**

First, send the [:TRACe]:DATA:LOAD? VOLATILE command to acquire the total number of data packets and the command returns a decimal number.

Then, send the [:TRACe]:DATA:LOAD? <num> command to load the data of the num<sup>th</sup> data packet, wherein, the range of num is from 1 to the number of data packets.

# Syntax

SCPI commands present a hierarchical tree structure and contain multiple sub-systems, each of which is made up of a root keyword and one or more sub-keywords. The command string usually starts with ":", the keywords are separated by ":" and are followed by the parameter settings available, "?" is added at the end of the command string to indicate query and the command and parameter are separated by "space".

For example,

[:COUPling:AMPL:DEViation <deviation>](#)

[:COUPling:AMPL:DEViation?](#)

**COUPling** is the root keyword of the command. **AMPL** and **DEViation** are the second-level and third-level keywords respectively. The command string starts with ":" which separates the multiple-level keywords. **<deviation>** represents the parameter available for setting, "?" represents query and the command **:COUPling:AMPL:DEViation** and parameter **<deviation>** are separated by "space".

"," is generally used for separating different parameters contained in the same command, for example,

[:MMEMory:COPY <directory\\_name>,<file\\_name>](#)

# Symbol Description

The following four symbols are not the content of SCPI commands and will not be sent with the commands, but are usually used to describe the parameters in the commands.

## Braces { }

The parameters enclosed in braces are optional and can be ignored or set for one or more times. For example, In the [\[:TRACe\]:DATA\[:DATA\] VOLATILE,<value>{,<value>}](#) command, the floating point voltage in **{,<value>}** can be omitted or be set to one or more values.

## Vertical Bar |

The vertical bar is used to separate multiple parameters and one of the parameters must be selected when sending the command. For example,

In the [:DISPlay:SAVer\[:STATe\] ON|OFF](#) command, the command parameters available are "ON" and "OFF".

## Triangle Brackets < >

The parameter enclosed in the triangle brackets must be replaced by an effective value. For example, Send the [:DISPlay:BRIGhtness <brightness>|MINimum|MAXimum](#) command in **:DISPlay:BRIGhtness 10** format.

## Square Brackets [ ]

The content (parameter or keyword) enclosed in the square brackets can be omitted. When the parameter is omitted, the instrument will set the parameter to its default. For example,

for the [\[:SOURce<n>\]:MOD\[:STATe\]?](#) command,

sending any of the four commands below can generate the same effect:

`:MOD?`

`:MOD:STATe?`

`:SOURce1:MOD?`

`:SOURce1:MOD:STATe?`



# Parameter Type

The command parameters introduced in this manual include 6 types: Bool, Keyword, Integer, Consecutive Real Number, Discrete and ASCII Character String.

## Bool

The parameter could be "ON" or "OFF". For example,  
[:DISPlay:SAVer\[:STATe\] ON|OFF](#)

## Keyword

The parameter could be any of the values listed. For example,  
[\[:SOURce<n>\]:BURSt:GATE:POLarity NORMal|INVerted](#)  
The parameter could be "NORMal" or "INVerted".

## Integer

Unless otherwise noted, the parameter can be any integer within the effective value range. Note that do not set the parameter to a decimal, otherwise errors will occur. For example,  
[:OUTPut\[<n>\]:LOAD <ohms>|INFinity|MINimum|MAXimum](#)  
<ohms> can be set to any integer between 1 and 10000.

## Consecutive Real Number

The parameter could be any value within the effective value range according to the accuracy requirement (the default accuracy contains up to 6 digits after the decimal points). For example,  
[\[:SOURce<n>\]:MOD:AM\[:DEPT h\] <depth>|MINimum|MAXimum](#)  
<depth> can be set to any real number between 0 and 120.

## Discrete

The parameter could only be one of the specified values and these values are discontinuous. For example,  
[\[:SOURce<n>\]:MOD\[:STATe\] ON|OFF](#)  
<n> could only be set to 1 or 2.

## ASCII Character String

The parameter should be the combinations of ASCII characters. For example,  
[:MMEMory:MDIRectory <dir\\_name>](#)  
<dir\_name> is a character string.

**Explanation:** in DG4000 command system, some commands contain the **MAXimum** and **MINimum** parameters. For example,

[\[:SOURce<n>\]:MOD:ASKey:AMPLitude <amplitude>|MINimum|MAXimum](#)  
[\[:SOURce<n>\]:MOD:ASKey:AMPLitude? \[MINimum|MAXimum\]](#)

1. If **MAXimum** is used as the parameter for a setup command, the specified generator parameter will be set to the maximum.
2. If **MINimum** is used as the parameter for a setup command, the specified generator parameter will be set to the minimum.
3. If **MAXimum** is used as the parameter for a query command, the command will query the maximum of the specified generator parameter.
4. If **MINimum** is used as the parameter for a query command, the command will query the minimum of the specified generator parameter.

# Command Abbreviation

Since all commands are case-insensitive, you can use any of them. But if abbreviation is used, all the capital letters in the command must be written completely. For example,

[:SYSTem:COMMunicate:USB:INFormation?](#)

can be abbreviated to

`:SYST:COMM:USB:INF?`

# COUNter Command Subsystem

[:COUNter:ATTenuation 1X|10X](#)

[:COUNter:ATTenuation?](#)

[:COUNter:AUTO](#)

[:COUNter:COUPing AC|DC](#)

[:COUNter:COUPing?](#)

[:COUNter:GATetime AUTO|USER1|USER2|USER3|USER4|USER5|USER6](#)

[:COUNter:GATetime?](#)

[:COUNter:HF ON|OFF](#)

[:COUNter:HF?](#)

[:COUNter:IMPedance 50|1M](#)

[:COUNter:IMPedance?](#)

[:COUNter:LEVE <value>|MINimum|MAXimum](#)

[:COUNter:LEVE? \[MINimum|MAXimum\]](#)

[:COUNter:MEASure?](#)

[:COUNter:SENSitive <value>|MINimum|MAXimum](#)

[:COUNter:SENSitive? \[MINimum|MAXimum\]](#)

[:COUNter\[:STATe\] ON|OFF](#)

[:COUNter\[:STATe\]?](#)

[:COUNter:STATistics:CLEAr](#)

[:COUNter:STATistics:DISPlay DIGITAL|CURVE](#)

[:COUNter:STATistics:DISPlay?](#)

[:COUNter:STATistics\[:STATe\] ON|OFF](#)

[:COUNter:STATistics\[:STATe\]?](#)

# COUPling Command Subsystem

[:COUPling:AMPL:DEViation <deviation>](#)

[:COUPling:AMPL:DEViation?](#)

[:COUPling:AMPL\[:STATe\] ON|OFF](#)

[:COUPling:AMPL\[:STATe\]?](#)

[:COUPling:CHannel:BASE CH1|CH2](#)

[:COUPling:CHannel:BASE?](#)

[:COUPling:FREQuency:DEViation <deviation>](#)

[:COUPling:FREQuency:DEViation?](#)

[:COUPling:FREQuency\[:STATe\] ON|OFF](#)

[:COUPling:FREQuency\[:STATe\]?](#)

[:COUPling:PHASe:DEViation <deviation>](#)

[:COUPling:PHASe:DEViation?](#)

[:COUPling:PHASe\[:STATe\] ON|OFF](#)

[:COUPling:PHASe\[:STATe\]?](#)

[:COUPling\[:STATe\] ON|OFF](#)

[:COUPling\[:STATe\]?](#)

# DISPlay Command Subsystem

[:DISPlay:BRIGhtness <brightness>|MINimum|MAXimum](#)

[:DISPlay:BRIGhtness? \[MINimum|MAXimum\]](#)

[:DISPlay:SAVer:IMMediate](#)

[:DISPlay:SAVer\[:STATe\] ON|OFF](#)

[:DISPlay:SAVer\[:STATe\]?](#)

# IEEE 488.2 Common Commands

\*IDN?

\*RCL USER1|USER2|USER3|USER4|USER5|USER|6USER7|USER8|USER9|USER10

\*RST

\*SAV USER1|USER2|USER3|USER4|USER5|USER6|USER7|USER8|USER9|USER10

\*TRG

# MEMory Command Subsystem

[:MEMory:STATe:DELeTe USER1|USER2|USER3|USER4|USER5|USER|6USER7|USER8|USER9|USER10](#)

[:MEMory:STATe:LOCK USER1|USER2|USER3|USER4|USER5|USER|6USER7|USER8|USER9|USER10,ON|OFF](#)

[:MEMory:STATe:LOCK? USER1|USER2|USER3|USER4|USER5|USER|6USER7|USER8|USER9|USER10](#)

[:MEMory:STATe:VALId? USER1|USER2|USER3|USER4|USER5|USER|6USER7|USER8|USER9|USER10](#)

# MMEMory Command Subsystem

[:MMEMory:CATabg? :MMEMory:CDIRectory <directory\\_name>](#)

[:MMEMory:CDIRectory?](#)

[:MMEMory:COPY <directory\\_name>,<file\\_name>](#)

[:MMEMory:DElete <file\\_name>](#)

[:MMEMory:LOAD <file\\_name>](#)

[:MMEMory:MDIRectory <dir\\_name>](#)

[:MMEMory:RDIRectory?](#)

[:MMEMory:STORe <file\\_name>](#)

Note: the MMEMory command subsystem is only applicable to external memory. If no USB storage device is currently connected to DG4000, "Error generated by remote interface command!" will be displayed when any of the commands in the MMEMory command subsystem is sent.



# OUTPut Command Subsystem

:OUTPut[<n>] commands are used to set and control the output parameters and state of the channel. <n> is the number of the channel (1 or 2) and if it is not set, the operation will be executed on CH1 by default.

[:OUTPut\[<n>\]:IMPedance <ohms>|INFinity|MINimum|MAXimum](#)

[:OUTPut\[<n>\]:IMPedance? \[MINimum|MAXimum\]](#)

[:OUTPut\[<n>\]:LOAD <ohms>|INFinity|MINimum|MAXimum](#)

[:OUTPut\[<n>\]:LOAD? \[MINimum|MAXimum\]](#)

[:OUTPut\[<n>\]:NOISe:SCALe <percent>|MINimum|MAXimum](#)

[:OUTPut\[<n>\]:NOISe:SCALe? \[MINimum|MAXimum\]](#)

[:OUTPut\[<n>\]:NOISe\[:STATe\] ON|OFF](#)

[:OUTPut\[<n>\]:NOISe\[:STATe\]?](#)

[:OUTPut\[<n>\]:POLarity NORMal|INVerted](#)

[:OUTPut\[<n>\]:POLarity?](#)

[:OUTPut\[<n>\]\[:STATe\] ON|OFF](#)

[:OUTPut\[<n>\]\[:STATe\]?](#)

[:OUTPut\[<n>\]:SYNC:POLarity POSitive|NEGative](#)

[:OUTPut\[<n>\]:SYNC:POLarity?](#)

[:OUTPut\[<n>\]:SYNC\[:STATe\] ON|OFF](#)

[:OUTPut\[<n>\]:SYNC\[:STATe\]?](#)

# SOURce Command Subsystem

[ :SOURce<n> ] commands are used to set the related parameters of basic waveforms, arbitrary waveforms, harmonics as well as the output signals of Mod, Sweep and Burst. Wherein, **<n>** represents the corresponding channel (1 or 2) and if it is not set, the operation will be executed on CH1 by default.

The following types are contained:

[\[ :SOURce<n> \]:APPLy](#)

[\[ :SOURce<n> \]:BURSt](#)

[\[ :SOURce<n> \]:FREQuency](#)

[\[ :SOURce<n> \]:FUNCtion](#)

[\[ :SOURce<n> \]:HARMonic](#)

[\[ :SOURce<n> \]:MARKer](#)

[\[ :SOURce<n> \]:MOD](#)

[\[ :SOURce<n> \]:PERiod](#)

[\[ :SOURce<n> \]:PHASe](#)

[\[ :SOURce<n> \]:PULSe](#)

[\[ :SOURce<n> \]:SWEEp](#)

[\[ :SOURce<n> \]:VOLTage](#)

# SYSTem Command Subsystem

[:SYSTem:BEEPer\[:IMMediate\]](#)

[:SYSTem:BEEPer:STATe ON|OFF](#)

[:SYSTem:BEEPer:STATe?](#)

[:SYSTem:COMMUnicate:LAN:AUTOip\[:STATe\] ON|OFF](#)

[:SYSTem:COMMUnicate:LAN:AUTOip\[:STATe\]?](#)

[:SYSTem:COMMUnicate:LAN:DHCP\[:STATe\] ON|OFF](#)

[:SYSTem:COMMUnicate:LAN:DHCP\[:STATe\]?](#)

[:SYSTem:COMMUnicate:LAN:DNS <address>](#)

[:SYSTem:COMMUnicate:LAN:DNS?](#)

[:SYSTem:COMMUnicate:LAN:GATeWay <address>](#)

[:SYSTem:COMMUnicate:LAN:GATeWay?](#)

[:SYSTem:CoMMUnicate:LAN:IPADdress <ip address>](#)

[:SYSTem:COMMUnicate:LAN:IPADdress?](#)

[:SYSTem:COMMUnicate:LAN:MAC?](#)

[:SYSTem:COMMUnicate:LAN:SMASk <mask>](#)

[:SYSTem:COMMUnicate:LAN:SMASk?](#)

[:SYSTem:COMMUnicate:LAN:STATic\[:STATe\] ON|OFF](#)

[:SYSTem:COMMUnicate:LAN:STATic\[:STATe\]?](#)

[:SYSTem:COMMUnicate:USB:INFormation?](#)

[:SYSTem:COMMUnicate:USB\[:SELF\]:CLASs COMPuter|PRINter](#)

[:SYSTem:COMMUnicate:USB\[:SELF\]:CLASs?](#)

[:SYSTem:CSCopy CH1,CH2|CH2,CH1](#)

[:SYSTem:CWCopY CH1|CH2,CH2|CH1](#)

[:SYSTem:ERRor?](#)

[:SYSTem:KLOCK\[:STATe\] ON|OFF](#)

[:SYSTem:KLOCK\[:STATe\]?](#)

[:SYSTem:LANGuage ENGLISH|SCHinese](#)

[:SYSTem:LANGuage?](#)

[:SYSTem:POWeron DEFault|LAST](#)

[:SYSTem:POWeron?](#)

[:SYSTem:POWSet AUTO|USER](#)

[:SYSTem:POWSet?](#)

[:SYSTem:PRESet DEFault|USER1|USER2|USER3|USER4|USER5|USER6|USER7|USER8|USER9|USER10](#)

[:SYSTem:RESTART](#)

[:SYSTem:ROSCillator:SOURce INTernal|EXTernal](#)

[:SYSTem:ROSCillator:SOURce?](#)

[:SYSTem:SHUTDOWN](#)

[:SYSTem:VERSion?](#)

# TRACe Command Subsystem

[\[ :TRACe\]:DATA:DAC16 VOLATILE,<flag>,<binary\\_block\\_data>](#)

[\[ :TRACe\]:DATA:DAC VOLATILE,\[<binary\\_block\\_data>|<value>,<value>,<value>...\]](#)

[\[ :TRACe\]:DATA\[:DATA\] VOLATILE,<value>{,<value>}](#)

[\[ :TRACe\]:DATA:POINts:INTerpolate LINear|OFF \[ :TRACe\]:DATA:POINts:INTerpolate?](#)

[\[ :TRACe\]:DATA:POINts VOLATILE,<value>|MINimum|MAXimum](#)

[\[ :TRACe\]:DATA:POINts? VOLATILE\[,MINimum|MAXimum\]](#)

[\[ :TRACe\]:DATA:VALue? VOLATILE,<point>](#)

[\[ :TRACe\]:DATA:VALue VOLATILE,<point>,<data>](#)

[\[ :TRACe\]:DATA:LOAD? VOLATILE](#)

[\[ :TRACe\]:DATA:LOAD? <num>](#)

# Programming Preparations

First make sure your computer has installed the VISA library of NI (download it from <http://www.ni.com/visa/>). Here, the default installation path is C:\Program Files\IVI Foundation\VISA.

Here, the USB Device interface of the generator is used to communicate with the PC and please use the USB cable to connect the USB Device interface at the rear panel of the generator to the USB interface of the PC.

After successful connection, turn on the instrument. A "**Found New Hardware Wizard**" dialog box appears on the PC at the first connection. Please follow the instructions to install the "USB Test and Measurement Device" (the installation procedures are as follows).

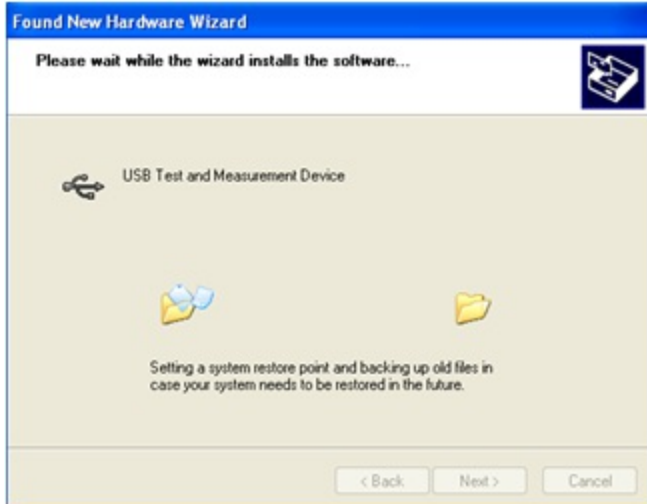
1. Select "Install from a list or specific location (Advanced)";
2. Click "Next";



3. Select "Do not search. I will choose the device to install.";
4. Click "Next";



5. Select "USB Test and Measurement Device";
6. Click "Next";



7. When the installation finishes, click "Finish".

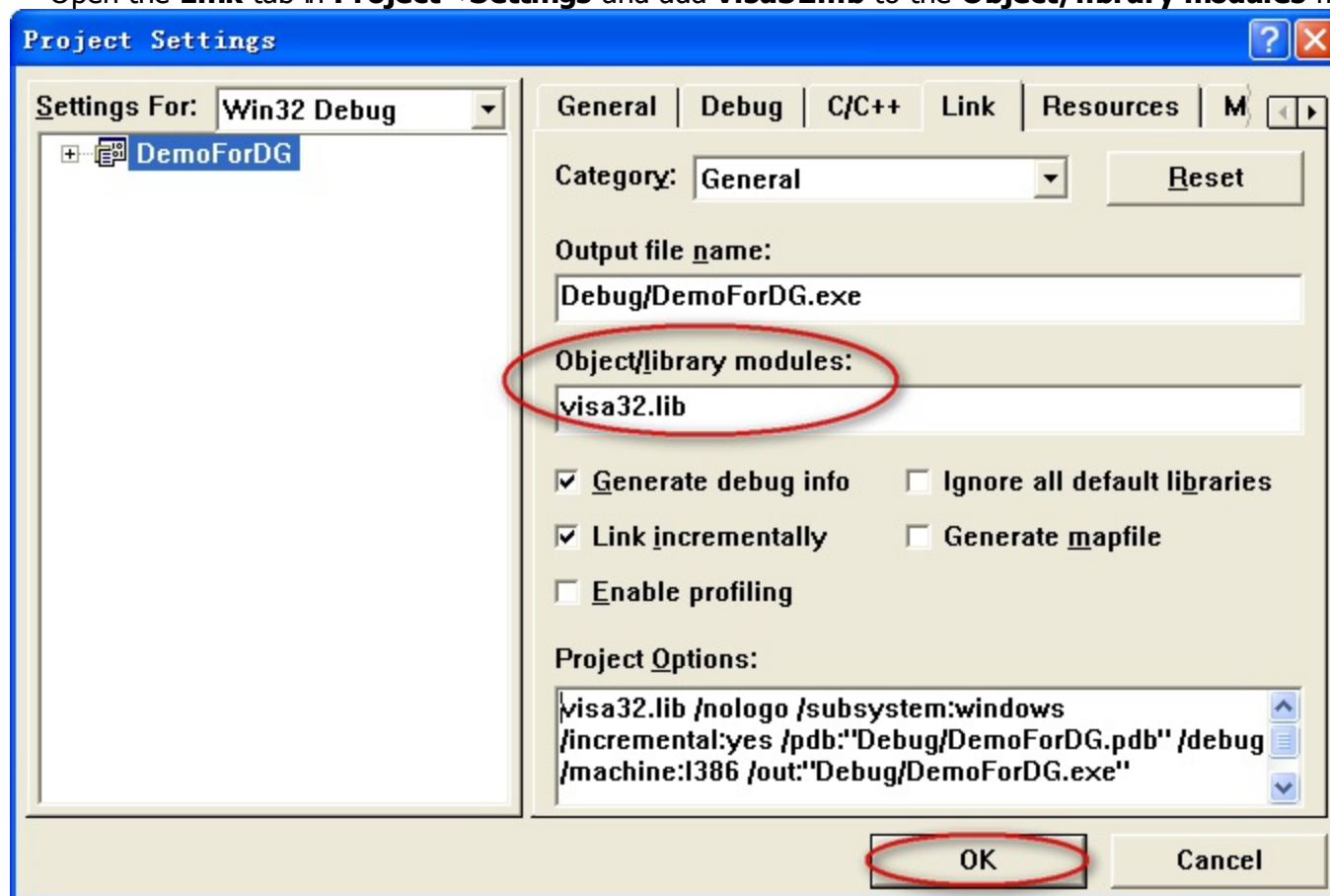


By now, the programming preparations are finished. In the following part, the programming demos in Visual C++ 6.0, Visual Basic 6.0 and LabVIEW 8.6 development environments are introduced in detail.

# Visual C++ 6.0 Programming Demo

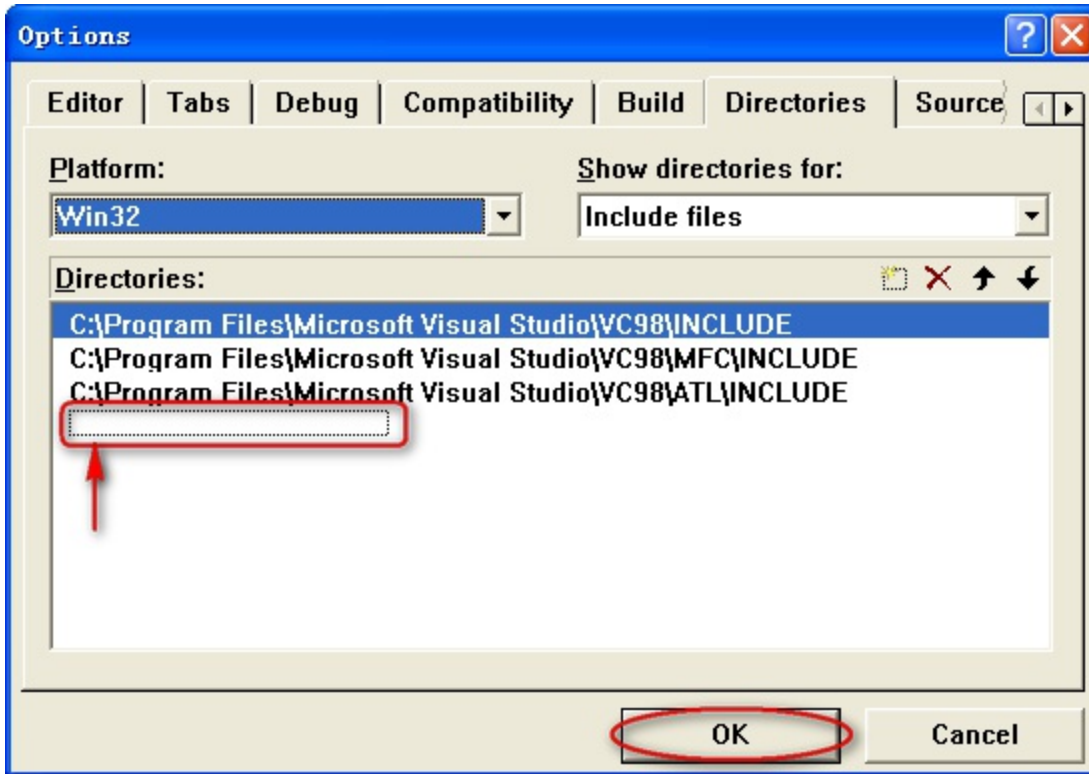
Enter the Visual C++6.0 programming environment and follow the steps below.

1. Build a MFC project based on dialog box.
2. Open the **Link** tab in **Project**→**Settings** and add **visa32.lib** to the **Object/library modules** manually.



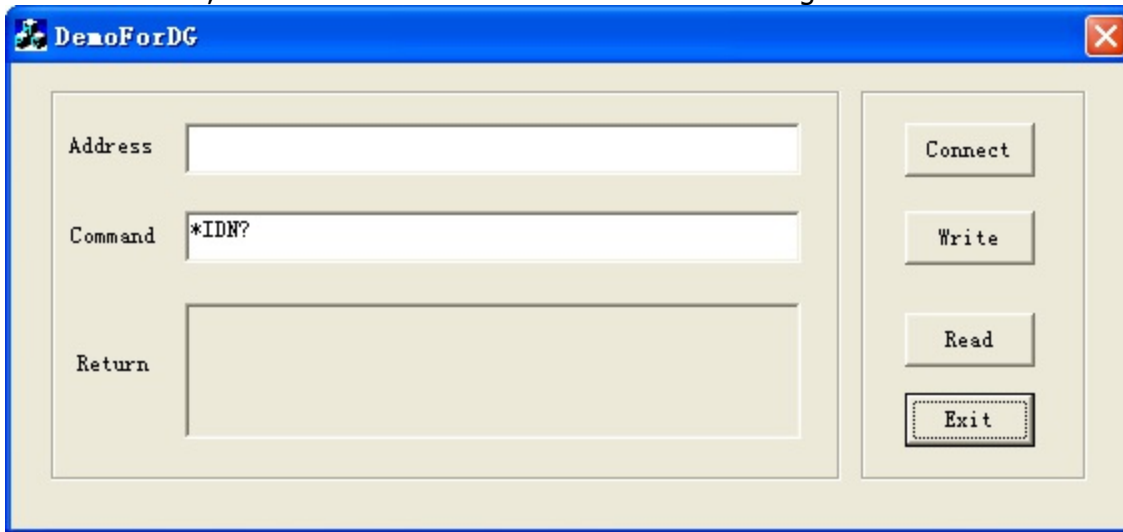
3. Open the **Directories** tab in **Tools**→**Options**.  
Select **Include files** in **Show directories for** and double-click at the place pointed out by the red arrow in **Directories** to add the path of **Include**: C:\Program Files\IVI Foundation\VISA\WinNT\include.  
Select **Library files** in **Show directories for** and double-click at the place pointed out by the red arrow in **Directories** to add the path of **Lib**: C:\Program Files\IVI Foundation\VISA\WinNT\lib\msc.





Note: at present, VISA library has been added.

4. Add the **Text**, **Edit** and **Button** controls as shown in the figure below.



5. Add the control variables.  
Open the **Member Variables** tab in **View**→**ClassWizard** and add the following three variables:  
Instrument address: CString m\_strInstrAddr  
Command: CString m\_strCommand  
Return Value: CString m\_strResult

6. Encapsulate the read and write operations of VISA.

- 1) Encapsulate the write operation of VISA for easier operation.  
bool CDemoForDGDlg::InstrWrite(CString strAddr, CString strContent) //Write //operation  
{

```

    ViSession defaultRM,instr;
    ViStatus status;
    ViUInt32 retCount;
    char * SendBuf = NULL;
    char * SendAddr = NULL;
    bool bWriteOK = false;
    CString str;

```

```

// Change the address's data style from CString to char*
SendAddr = strAddr.GetBuffer(strAddr.GetLength());
strcpy(SendAddr, strAddr);
strAddr.ReleaseBuffer();

// Change the command's data style from CString to char*
SendBuf = strContent.GetBuffer(strContent.GetLength());
strcpy(SendBuf, strContent);
strContent.ReleaseBuffer();

//open a VISA resource
status = viOpenDefaultRM(&defaultRM);
if (status < VI_SUCCESS)
{
    AfxMessageBox("No VISA resource was opened!");
    return false;
}

status = viOpen(defaultRM, SendAddr, VI_NULL, VI_NULL, &instr);

//Write command to the instrument
status = viWrite(instr, (unsigned char *)SendBuf, strlen(SendBuf), &retCount);

//Close the system
status = viClose(instr);
status = viClose(defaultRM);

return bWriteOK;
}

2) Encapsulate the read operation of VISA for easier operation.
bool CDemoForDGDlg::InstrRead(CString strAddr, CString *pstrResult) //Read //operation
{
    ViSession defaultRM, instr;
    ViStatus status;
    ViUInt32 retCount;
    char * SendAddr = NULL;
    unsigned char RecBuf[MAX_REC_SIZE];
    bool bReadOK = false;
    CString str;

    // Change the address's data style from CString to char*
    SendAddr = strAddr.GetBuffer(strAddr.GetLength());
    strcpy(SendAddr, strAddr);
    strAddr.ReleaseBuffer();

    memset(RecBuf, 0, MAX_REC_SIZE);

    //Open a VISA resource
    status = viOpenDefaultRM(&defaultRM);
    if (status < VI_SUCCESS)
    {
        // Error Initializing VISA...exiting
        AfxMessageBox("No VISA resource was opened!");
        return false;
    }
}

```

```

//Open the instrument
status = viOpen(defaultRM, SendAddr, VI_NULL, VI_NULL, &instr);

//Read from the instrument
status = viRead(instr, RecBuf, MAX_REC_SIZE, &retCount);

//close the system
status = viClose(instr);
status = viClose(defaultRM);

(*pstrResult).Format("%s",RecBuf);

return bReadOK;
}

```

## 7. Add the control message response codes.

1) Connect to the instrument

```

void CDemoForDGDlg::OnBtConnectInstr() // Connect to the instrument
{

```

```

    // TODO: Add your control notification handler code here

```

```

    ViStatus status;

```

```

    ViSession defaultRM;

```

```

    ViString expr = "?*";

```

```

    ViPFindList findList = new unsigned long;

```

```

    ViPUInt32 retcnt = new unsigned long;

```

```

    ViChar instrDesc[1000];

```

```

    CString strSrc = "";

```

```

    CString strInstr = "";

```

```

    unsigned long i = 0;

```

```

    bool bFindDG = false;

```

```

    status = viOpenDefaultRM(&defaultRM);

```

```

    if (status < VI_SUCCESS)

```

```

    {

```

```

        // Error Initializing VISA...exiting

```

```

        MessageBox("No VISA instrument was opened ! ");

```

```

        return ;

```

```

    }

```

```

    memset(instrDesc,0,1000);

```

```

    // Find resource

```

```

    status = viFindRsrc(defaultRM,expr,findList, retcnt, instrDesc);

```

```

    for (i = 0;i < (*retcnt);i++)

```

```

    {

```

```

        // Get instrument name

```

```

        strSrc.Format("%s",instrDesc);

```

```

        InstrWrite(strSrc,"*IDN?");

```

```

        ::Sleep(200);

```

```

        InstrRead(strSrc,&strInstr);

```

```

    // If the instrument(resource) belongs to the DG series then jump out //from the loop

```

```

        strInstr.MakeUpper();

```

```

        if (strInstr.Find("DG") >= 0)

```

```

        {

```

```

        bFindDG = true;
        m_strInstrAddr = strSrc;
        break;
    }

    //Find next instrument
    status = viFindNext(*findList,instrDesc);
}

if (bFindDG == false)
{
    MessageBox("Didn't find any DG!");
}
UpdateData(false);
}

```

## 2) Write Operation

```

void CDemoForDGDlg::OnBtWrite()           //Write operation
{

    // TODO: Add your control notification handler code here

    UpdateData(true);

    if (m_strInstrAddr.IsEmpty())

    {

        MessageBox("Please connect to the instrument first!");

    }

    InstrWrite(m_strInstrAddr,m_strCommand);

    m_strResult.Empty();

    UpdateData(false);

}

```

## 3) Read Operation

```

void CDemoForDGDlg::OnBtRead()           //Read operation
{

    // TODO: Add your control notification handler code here
    UpdateData(true);
    InstrRead(m_strInstrAddr,&m_strResult);
    UpdateData(false);

}

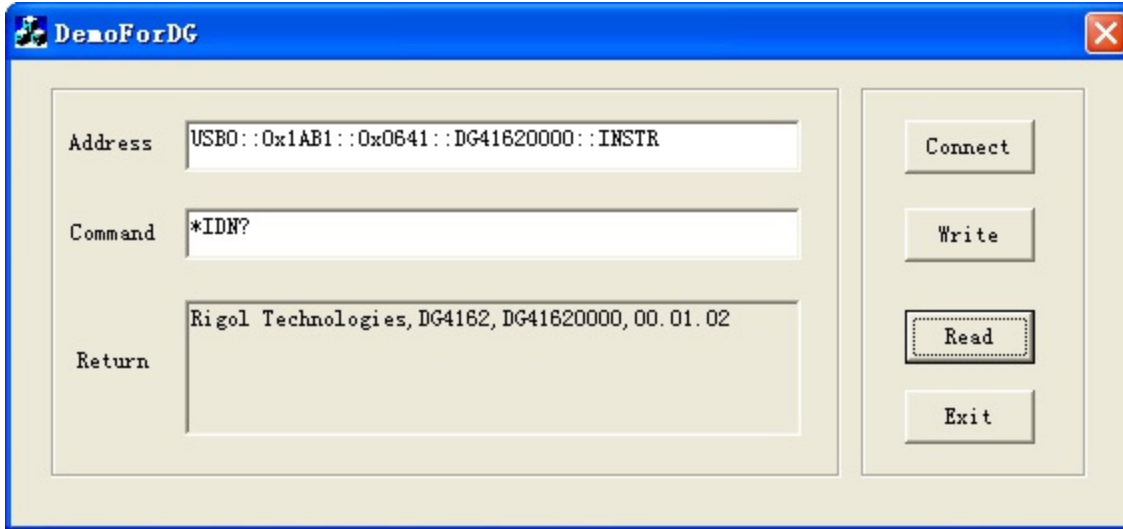
```

## 8. Execution Result

- 1) Click "Connect" to search for the generator;
- 2) Input "\*IDN?" in the "Command" edit box;

- 3) Click "Write" to write the command into the generator;
- 4) Click "Read" to read the return value.

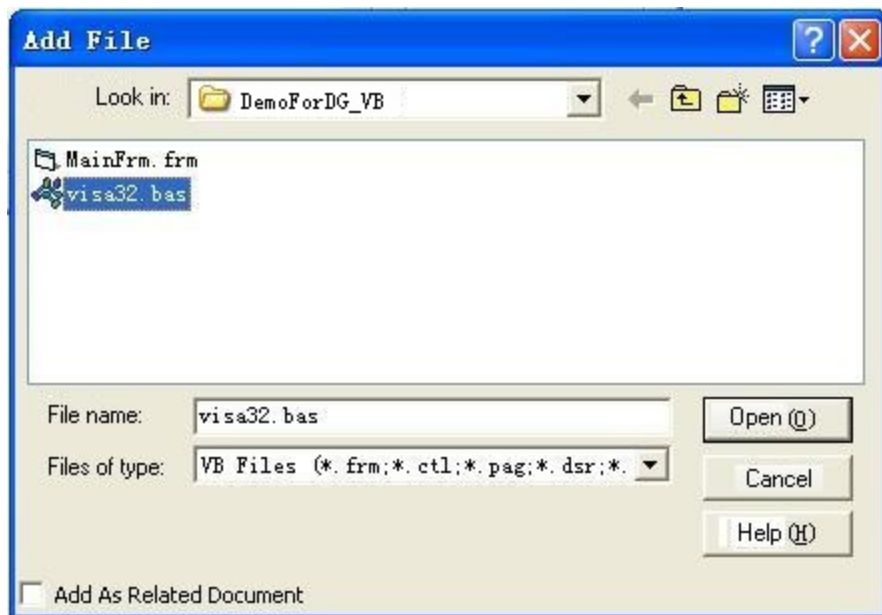
The execution result is as shown in the figure below.



# Visual Basic 6.0 Programming Demo

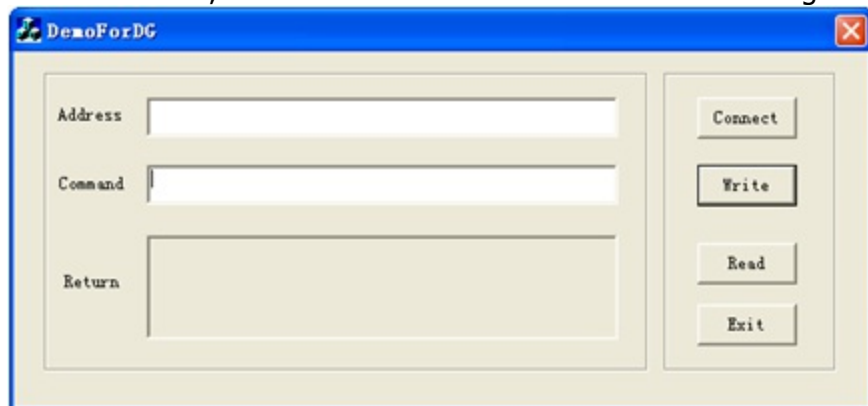
Enter the Visual Basic 6.0 programming environment and follow the steps below.

1. Build a standard application program project (Standard EXE).
2. Open **Project**→**Add File...** and add **visa32.bas** which contains all VISA functions and constant statements to the project.



Then add the **Declare Sub Sleep Lib "kernel32" (ByVal dwMilliseconds As Long) statement** into the **visa32.bas**, or create a new module to declare the **Sleep** function.

3. Add the **Text**, **Edit** and **Button** controls as shown in the figure below.



4. Encapsulate the write and read operations of VISA.
  - 1) Encapsulate the write operation of VISA for easier operation.

```
'-----  
'Function Name : InstrWrite  
'Function : Send command to the instrument  
'Input : rsrcName,instrument(resource) name  
         strCmd,Command  
'-----
```

```
Public Sub InstrWrite(rsrcName As String, strCmd As String)  
    Dim status As Long  
    Dim dftRM As Long  
    Dim sesn As Long  
    Dim rSize As Long
```

```

'Initialize the system
status = viOpenDefaultRM(dfItRM)
'Failed to initialize the system
If (status < VI_SUCCESS) Then
    MsgBox " No VISA resource was opened ! "
    Exit Sub
End If
'Open the VISA instrument
status = viOpen(dfItRM, rsrcName, VI_NULL, VI_NULL, sesn)
'Failed to open the instrument
If (status < VI_SUCCESS) Then
    MsgBox "Failed to open the instrument ! "
    Exit Sub
End If

'Write command to the instrument
status = viWrite(sesn, strCmd, Len(strCmd), rSize)
'Failed to write to the instrument
If (status < VI_SUCCESS) Then
    MsgBox " Failed to write to the instrument ! "
    Exit Sub
End If

'Close the system
status = viClose(sesn)
status = viClose(dfItRM)

End Sub

```

2) Encapsulate the read operation of VISA for easier operation.

```

'-----
'Function Name : InstrRead
'Function : Read the return value from the instrument
'Input : rsrcName,Resource name
'Return : The string gotten from the instrument
'-----

Public Function InstrRead(rsrcName As String) As String
    Dim status As Long
    Dim dfItRM As Long
    Dim sesn As Long
    Dim strTemp0 As String * 256
    Dim strTemp1 As String
    Dim rSize As Long

    'Begin by initializing the system
    status = viOpenDefaultRM(dfItRM)
    'Initial failed
    If (status < VI_SUCCESS) Then
        MsgBox " Failed to open the instrument! "
        Exit Function
    End If
    'Open the instrument
    status = viOpen(dfItRM, rsrcName, VI_NULL, VI_NULL, sesn)
    'Open instrument failed
    If (status < VI_SUCCESS) Then
        MsgBox " Failed to open the instrument! "

```

```
Exit Function
End If
```

```
' Read from the instrument
```

```
status = viRead(sesn, strTemp0, 256, rSize)
```

```
' Read failed
```

```
If (status < VI_SUCCESS) Then
```

```
    MsgBox " Failed to read from the instrument! "
```

```
Exit Function
```

```
End If
```

```
'Close the system
```

```
status = viClose(sesn)
```

```
status = viClose(dfItRM)
```

```
' Remove the space at the end of the string
```

```
strTemp1 = Left(strTemp0, rSize)
```

```
InstrRead = strTemp1
```

```
End Function
```

## 5. Add the control event codes.

1) Connect to the instrument

```
' Connect to the instrument
```

```
Private Sub CmdConnect_Click()
```

```
    Const MAX_CNT = 200
```

```
    Dim status As Long
```

```
    Dim dfItRM As Long
```

```
    Dim sesn As Long
```

```
    Dim fList As Long
```

```
    Dim buffer As String * MAX_CNT, Desc As String * 256
```

```
    Dim nList As Long, retCount As Long
```

```
    Dim rsrcName(19) As String * VI_FIND_BUFLen, instrDesc As String * VI_FIND_BUFLen
```

```
    Dim i, j As Long
```

```
        Dim strRet As String
```

```
    Dim bFindDG As Boolean
```

```
'Initialize the system
```

```
status = viOpenDefaultRM(dfItRM)
```

```
' Initialize failed
```

```
If (status < VI_SUCCESS) Then
```

```
    MsgBox " No VISA resource was opened ! "
```

```
Exit Sub
```

```
End If
```

```
' Find instrument resource
```

```
Call viFindRsrc(dfItRM, "USB?*INSTR", fList, nList, rsrcName(0))
```

```
' Get the list of the instrument(resource)
```

```
strRet = ""
```

```
bFindDG = False
```

```
For i = 0 To nList - 1
```

```
    ' Get the instrument name
```

```
    InstrWrite rsrcName(i), "*IDN?"
```

```
    Sleep 200
```

```
    strRet = InstrRead(rsrcName(i))
```

```
    ' Continue to switch the resource until find a DG instrument
```

```
    strRet = UCase(strRet)
```

```
    j = InStr(strRet, "DG")
```



```

    If (j >= 0) Then
        bFindDG = True
        Exit For
    End If

    Call viFindNext(fList + i - 1, rsrcName(i))
Next i
'Display
If (bFindDG = True) Then
    TxtInsAddr.Text = rsrcName(i)
Else
    TxtInsAddr.Text = ""
End If
End Sub

```

## 2) Write Operation

'Write the command to the instrument

```

Private Sub CmdWrite_Click()
    If (TxtInsAddr.Text = "") Then
        MsgBox ("Please write the instrument address ! ")
    End If

```

```

        InstrWrite TxtInsAddr.Text, TxtCommand.Text
    End Sub

```

## 3) Read Operation

'Read the return value from the instrument

```

Private Sub CmdRead_Click()
    Dim strTemp As String
    strTemp = InstrRead(TxtInsAddr.Text)
    TxtReturn.Text = strTemp
End Sub

```

## 6. Execution Result

- 1) Click "Connect" to search for the generator;
- 2) Input "\*IDN?" in the "Command" edit box;
- 3) Click "Write" to write the command into the generator;
- 4) Click "Read" to read the return value.

The execution result is as shown in the figure below.

DemoForDG

Address

USB0::0x1AB1::0x0641::DG41620000::INSTR

Command

\*IDN?

Return

Rigol Technologies,DG4162,DG41620000,00.01.02

Connect

Write

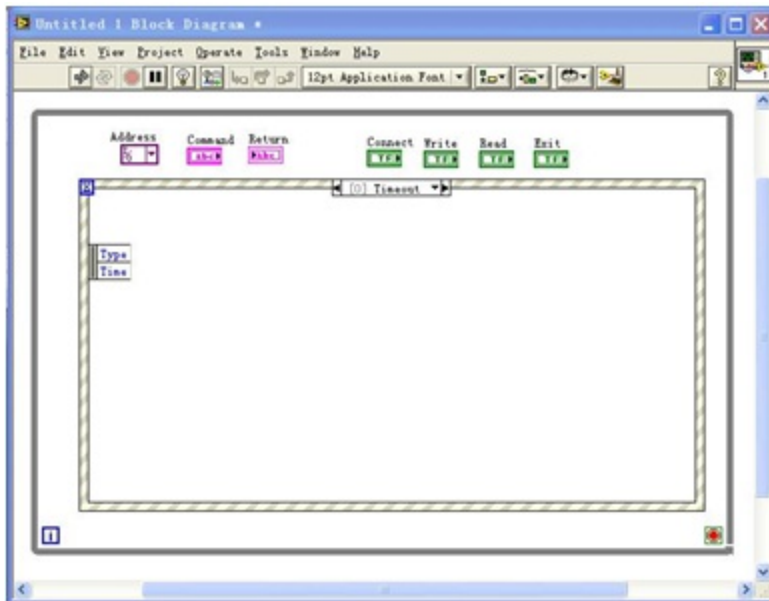
Read

Exit

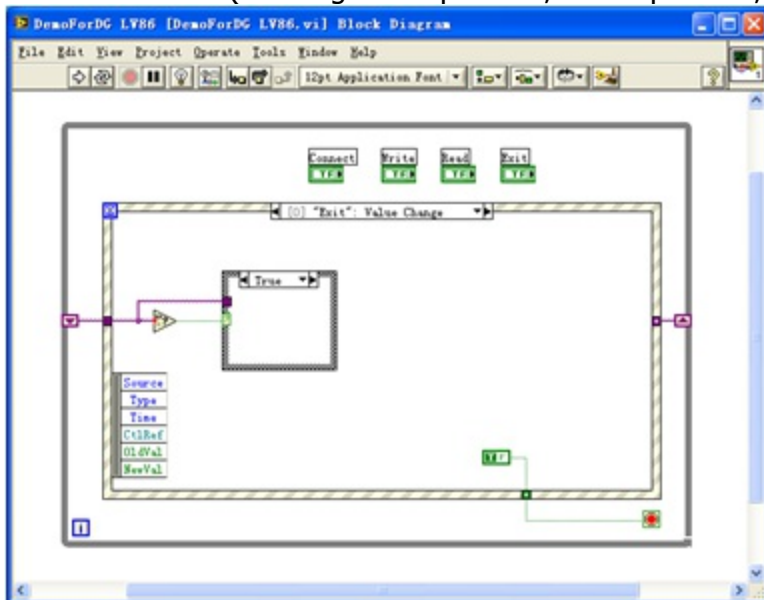
# LabVIEW 8.6 Programming Demo

Enter the Labview 8.6 programming environment and follow the steps below.

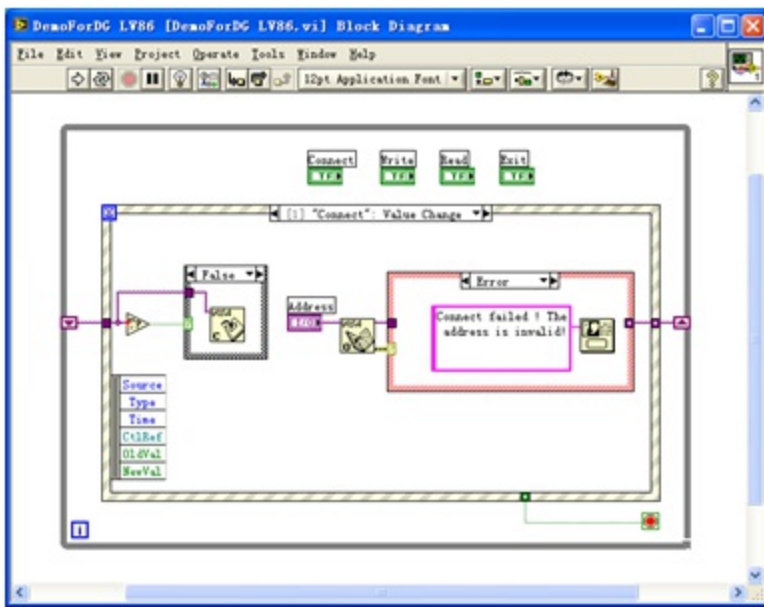
## 1. Create the event structure



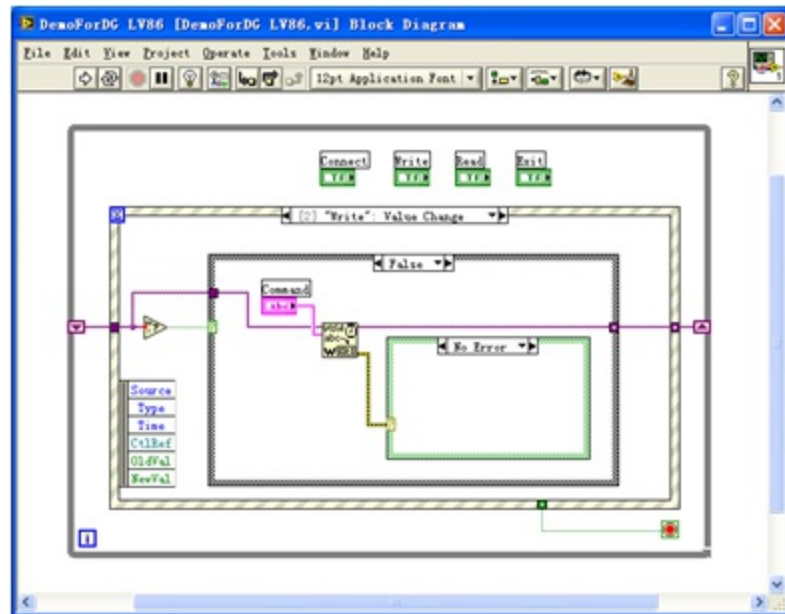
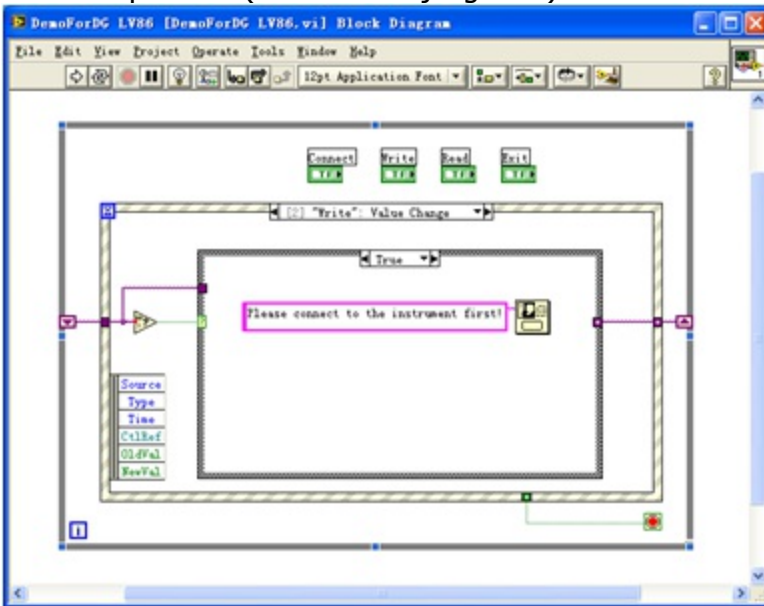
## 2. Add the events (including read operation, write operation, connect to the instrument and exit)



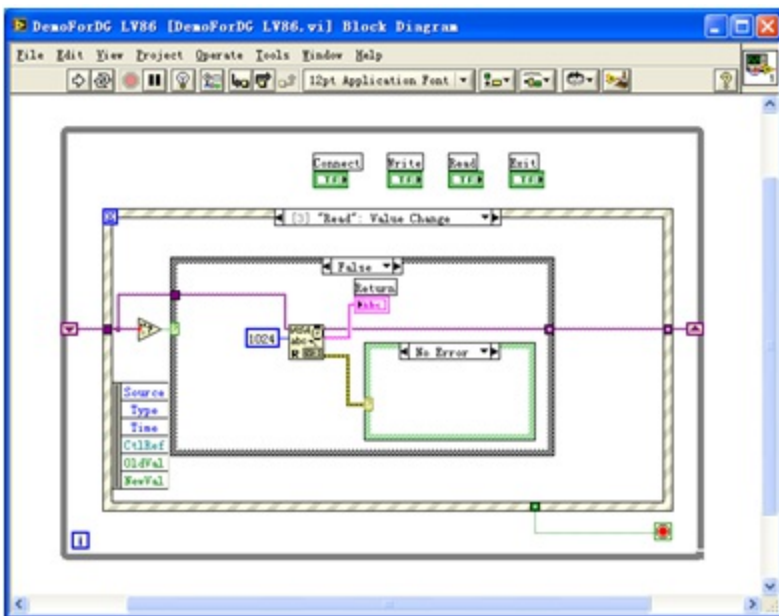
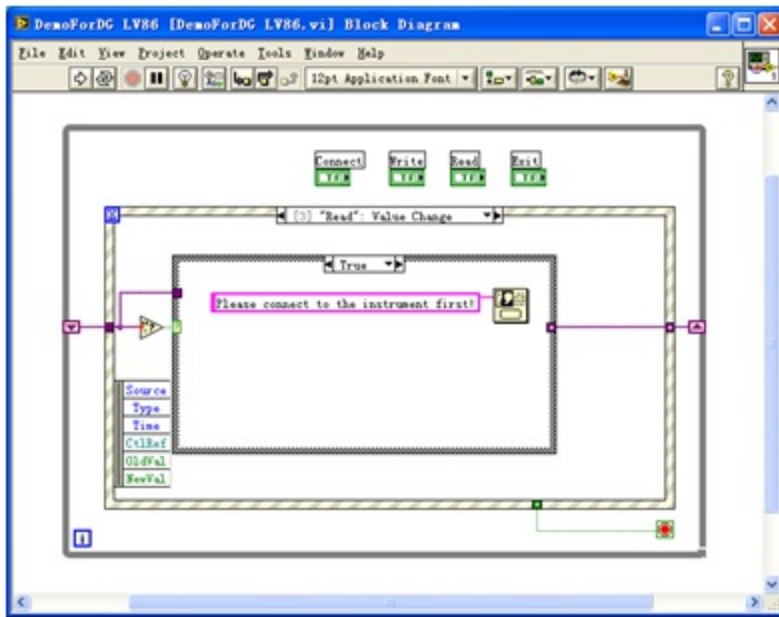
## 3. Connect to the instrument



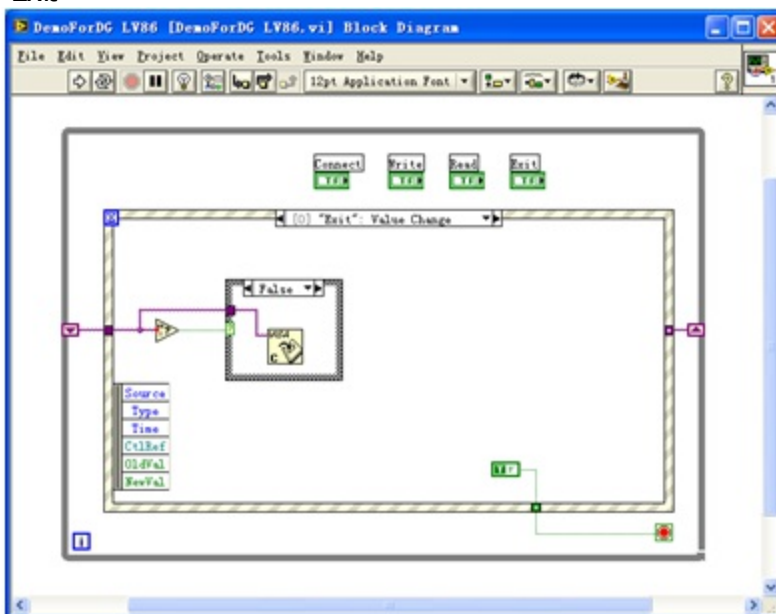
4. Write Operation (include error judgment)



5. Read Operation (include error processing)




## 6. Exit



## 7. Execution Result

Address

 USB0::0x1AB1::0x0641::DG41620000::INSTR

Command

\*IDN?

Return

Rigol Technologies, DG4162, DG41620000, 00.01.02

Connect

Write

Read

Exit

# [[:SOURCE<n>]:APPLY

- [[:SOURCE<n>]:APPLY:CUSTom [<freq>[,<amp>[,<offset>[,<phase>]]]] [[:SOURCE<n>]:APPLY:HARMonic [<freq>[,<amp>[,<offset>[,<phase>]]]]
- [[:SOURCE<n>]:APPLY:NOISe [<amp>[,<offset>]]
- [[:SOURCE<n>]:APPLY:PULSe [<freq>[,<amp>[,<offset>[,<delay>]]]]
- [[:SOURCE<n>]:APPLY:RAMP [<freq>[,<amp>[,<offset>[,<phase>]]]]
- [[:SOURCE<n>]:APPLY:SINusoid [<freq>[,<amp>[,<offset>[,<phase>]]]]
- [[:SOURCE<n>]:APPLY:SQUare [<freq>[,<amp>[,<offset>[,<phase>]]]]
- [[:SOURCE<n>]:APPLY:USER [<freq>[,<amp>[,<offset>[,<phase>]]]]
- [[:SOURCE<n>]:APPLY?

# **[[:SOURce<n>]:BURSt**

- [\[:SOURce<n>\]:BURSt:GATE:POLarity NORMal|INVerted](#)
- [\[:SOURce<n>\]:BURSt:GATE:POLarity?](#)
- [\[:SOURce<n>\]:BURSt:INTernal:PERiod <period> |MINimum|MAXimum](#)
- [\[:SOURce<n>\]:BURSt:INTernal:PERiod? \[MINimum|MAXimum\]](#)
- [\[:SOURce<n>\]:BURSt:MODE TRIGGered|GATed|INFinity](#)
- [\[:SOURce<n>\]:BURSt:MODE?](#)
- [\[:SOURce<n>\]:BURSt:NCYCles <cycles> |MINimum|MAXimum](#)
- [\[:SOURce<n>\]:BURSt:NCYCles? \[MINimum|MAXimum\]](#)
- [\[:SOURce<n>\]:BURSt:PHASe <phase> |MINimum|MAXimum](#)
- [\[:SOURce<n>\]:BURSt:PHASe? \[MINimum|MAXimum\]](#)
- [\[:SOURce<n>\]:BURSt\[:STATe\] ON|OFF](#)
- [\[:SOURce<n>\]:BURSt\[:STATe\]?](#)
- [\[:SOURce<n>\]:BURSt:TDELay <delay> |MINimum|MAXimum](#)
- [\[:SOURce<n>\]:BURSt:TDELay? \[MINimum|MAXimum\]](#)
- [\[:SOURce<n>\]:BURSt:TRIGger\[:IMMediate\]](#)
- [\[:SOURce<n>\]:BURSt:TRIGger:SLOPe POSitive|NEGative](#)
- [\[:SOURce<n>\]:BURSt:TRIGger:SLOPe?](#)
- [\[:SOURce<n>\]:BURSt:TRIGger:SOURce INTernal|EXTernal|MANual](#)
- [\[:SOURce<n>\]:BURSt:TRIGger:SOURce?](#)
- [\[:SOURce<n>\]:BURSt:TRIGger:TRIGOut OFF|POSitive|NEGative](#)
- [\[:SOURce<n>\]:BURSt:TRIGger:TRIGOut?](#)



# [[:SOURCE<n>]:FREQUENCY

[\[:SOURCE<n>\]:FREQUENCY:CENTER <frequency> |MINimum|MAXimum](#)

[\[:SOURCE<n>\]:FREQUENCY:CENTER? \[MINimum|MAXimum\]](#)

[\[:SOURCE<n>\]:FREQUENCY\[:FIXed\] <frequency> |MINimum|MAXimum](#)

[\[:SOURCE<n>\]:FREQUENCY\[:FIXed\]? \[MINimum|MAXimum\]](#)

[\[:SOURCE<n>\]:FREQUENCY:SPAN <frequency> |MINimum|MAXimum](#)

[\[:SOURCE<n>\]:FREQUENCY:SPAN? \[MINimum|MAXimum\]](#)

[\[:SOURCE<n>\]:FREQUENCY:START <frequency> |MINimum|MAXimum](#)

[\[:SOURCE<n>\]:FREQUENCY:START? \[MINimum|MAXimum\]](#)

[\[:SOURCE<n>\]:FREQUENCY:STOP <frequency> |MINimum|MAXimum](#)

[\[:SOURCE<n>\]:FREQUENCY:STOP? \[MINimum|MAXimum\]](#)

# [ :SOURCE<n> ]:FUNCTION

[\[ :SOURCE<n> \]:FUNCTION:ARB:STEP](#)

[\[ :SOURCE<n> \]:FUNCTION:RAMP:SYMMetry <symmetry> |MINimum|MAXimum](#)

[\[ :SOURCE<n> \]:FUNCTION:RAMP:SYMMetry? \[MINimum|MAXimum\]](#)

[\[ :SOURCE<n> \]:FUNCTION\[:SHAPE\] <wave>](#)

[\[ :SOURCE<n> \]:FUNCTION\[:SHAPE\]?](#)

[\[ :SOURCE<n> \]:FUNCTION:SQUare:DCYCle <percent> |MINimum|MAXimum](#)

[\[ :SOURCE<n> \]:FUNCTION:SQUare:DCYCle? \[MINimum|MAXimum\]](#)

# [[:SOURce<n>]:HARMonic

[\[:SOURce<n>\]:HARMonic:AMPL <sn>,<value>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:HARMonic:AMPL? <sn>\[,MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:HARMonic:ORDER <value>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:HARMonic:ORDER? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:HARMonic:PHASe <sn>,<value>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:HARMonic:PHASe? <sn>\[,MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:HARMonic:TYPe EVEN|ODD|ALL|USER](#)

[\[:SOURce<n>\]:HARMonic:TYPe?](#)

**[[:SOURce<n>]:MARKer**

[\[:SOURce<n>\]:MARKer:FREQuency <frequency>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MARKer:FREQuency? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MARKer\[:STATE\] ON|OFF](#)

[\[:SOURce<n>\]:MARKer\[:STATe\]?](#)

# **[[:SOURCE<n>]:MOD**

[\[:SOURCE<n>\]:MOD\[:STATe\] ON|OFF](#)

[\[:SOURCE<n>\]:MOD\[:STATe\]?](#)

[\[:SOURCE<n>\]:MOD:TYPe AM|FM|PM|ASK|FSK|PSK|PWM|BPSK|QPSK|3FSK|4FSK|OSK](#)

[\[:SOURCE<n>\]:MOD:TYPe?](#)

## **AM**

[\[:SOURCE<n>\]:MOD:AM\[:DEPT h\] <depth>|MINimum|MAXimum](#)

[\[:SOURCE<n>\]:MOD:AM\[:DEPT h\]? \[MINimum|MAXimum\]](#)

[\[:SOURCE<n>\]:MOD:AM:INTernal:FREQuency <frequency>|MINimum|MAXimum](#)

[\[:SOURCE<n>\]:MOD:AM:INTernal:FREQuency? \[MINimum|MAXimum\]](#)

[\[:SOURCE<n>\]:MOD:AM:INTernal:FUNCTion SINusoid|SQUare|TRIangle|RAMP|NRAMp|NOISe|USER](#)

[\[:SOURCE<n>\]:MOD:AM:INTernal:FUNCTion?](#)

[\[:SOURCE<n>\]:MOD:AM:SOURce INTernal|EXTernal](#)

[\[:SOURCE<n>\]:MOD:AM:SOURce?](#)

## **FM**

[\[:SOURCE<n>\]:MOD:FM\[:DEVIation\] <deviation>|MINimum|MAXimum](#)

[\[:SOURCE<n>\]:MOD:FM\[:DEVIation\]? \[MINimum|MAXimum\]](#)

[\[:SOURCE<n>\]:MOD:FM:INTernal:FREQuency <frequency>|MINimum|MAXimum](#)

[\[:SOURCE<n>\]:MOD:FM:INTernal:FREQuency? \[MINimum|MAXimum\]](#)

[\[:SOURCE<n>\]:MOD:FM:INTernal:FUNCTion SINusoid|SQUare|TRIangle|RAMP|NRAMp|NOISe|USER](#)

[\[:SOURCE<n>\]:MOD:FM:INTernal:FUNCTion?](#)

[\[:SOURCE<n>\]:MOD:FM:SOURce INTernal|EXTernal](#)

[\[:SOURCE<n>\]:MOD:FM:SOURce?](#)

## **PM**

[\[:SOURCE<n>\]:MOD:PM\[:DEVIation\] <deviation>|MINimum|MAXimum](#)

[\[:SOURCE<n>\]:MOD:PM\[:DEVIation\]? \[MINimum|MAXimum\]](#)

[\[:SOURCE<n>\]:MOD:PM:INTernal:FREQuency <frequency>|MINimum|MAXimum](#)

[\[:SOURCE<n>\]:MOD:PM:INTernal:FREQuency? \[MINimum|MAXimum\]](#)

[\[:SOURCE<n>\]:MOD:PM:INTernal:FUNCTion SINusoid|SQUare|TRIangle|RAMP|NRAMp|NOISe|USER](#)

[\[:SOURCE<n>\]:MOD:PM:INTernal:FUNCTion?](#)

[\[:SOURCE<n>\]:MOD:PM:SOURce INTernal|EXTernal](#)

[\[:SOURCE<n>\]:MOD:PM:SOURce?](#)

## **ASK**

[\[:SOURCE<n>\]:MOD:ASKey:AMPLitude <amplitude>|MINimum|MAXimum](#)

[\[:SOURCE<n>\]:MOD:ASKey:AMPLitude? \[MINimum|MAXimum\]](#)

[\[:SOURCE<n>\]:MOD:ASKey:INTernal\[:RATE\] <frequency>|MINimum|MAXimum](#)

[\[:SOURCE<n>\]:MOD:ASKey:INTernal\[:RATE\]? \[MINimum|MAXimum\]](#)

[\[:SOURCE<n>\]:MOD:ASKey:SOURce INTernal|EXTernal](#)

[\[:SOURCE<n>\]:MOD:ASKey:SOURce?](#)

[\[:SOURCE<n>\]:MOD:ASKey:POLarity POSitive|NEGative](#)

[\[:SOURCE<n>\]:MOD:ASKey:POLarity?](#)

## **FSK**

[\[:SOURCE<n>\]:MOD:FSKey\[:FREQuency\] <frequency>|MINimum|MAXimum](#)

[\[:SOURCE<n>\]:MOD:FSKey\[:FREQuency\]? \[MINimum|MAXimum\]](#)

[\[:SOURCE<n>\]:MOD:FSKey:INTernal:RATE <rate>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:FSKey:INTernal:RATE? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:FSKey:SOURce INTernal|EXTernal](#)

[\[:SOURce<n>\]:MOD:FSKey:SOURce?](#)

[\[:SOURce<n>\]:MOD:FSKey:POLarity POSitive|NEGative](#)

[\[:SOURce<n>\]:MOD:FSKey:POLarity?](#)

PSK

[\[:SOURce<n>\]:MOD:PSKey:INTernal:RATE <rate>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:PSKey:INTernal:RATE? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:PSKey:PHASe <phase>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:PSKey:PHASe? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:PSKey:POLarity POSitive|NEGative](#)

[\[:SOURce<n>\]:MOD:PSKey:POLarity?](#)

[\[:SOURce<n>\]:MOD:PSKey:SOURce INTernal|EXTernal](#)

[\[:SOURce<n>\]:MOD:PSKey:SOURce?](#)

BPSK

[\[:SOURce<n>\]:MOD:BPSKey:INTernal:RATE <rate>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:BPSKey:INTernal:RATE? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:BPSKey:PHASe <phase>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:BPSKey:PHASe? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:BPSKey:DATA 01|10|PN15|PN21](#)

[\[:SOURce<n>\]:MOD:BPSKey:DATA?](#)

QPSK

[\[:SOURce<n>\]:MOD:QPSKey:INTernal:RATE <rate>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:QPSKey:INTernal:RATE? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:QPSKey:PHASe1 <phase>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:QPSKey:PHASe1? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:QPSKey:PHASe2 <phase>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:QPSKey:PHASe2? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:QPSKey:PHASe3 <phase>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:QPSKey:PHASe3? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:QPSKey:DATA PN15|PN21](#)

[\[:SOURce<n>\]:MOD:QPSKey:DATA?](#)

3FSK

[\[:SOURce<n>\]:MOD:3FSKey:INTernal:RATE <rate>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:3FSKey:INTernal:RATE? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:3FSKey\[:FREQuency\] <n>,<frequency>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:3FSKey\[:FREQuency\]? <n>\[,MINimum|MAXimum\]](#)

4FSK

[\[:SOURce<n>\]:MOD:4FSKey:INTernal:RATE <rate>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:4FSKey:INTernal:RATE? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:4FSKey\[:FREQuency\] <n>,<frequency>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:4FSKey\[:FREQuency\]? <n>\[,MINimum|MAXimum\]](#)

OSK

[\[:SOURce<n>\]:MOD:OSKey:SOURce INTernal|EXTernal](#)

[\[:SOURce<n>\]:MOD:OSKey:SOURce?](#)

[\[:SOURce<n>\]:MOD:OSKey:INTernal:RATE <rate>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:OSKey:INTernal:RATE? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:OSKey:TIME <time>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:OSKey:TIME? \[MINimum|MAXimum\]](#)

## PWM

[\[:SOURce<n>\]:MOD:PWM:INTernal:FREQuency <frequency>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:PWM:INTernal:FREQuency? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:PWM:INTernal:FUNCTion SINusoid|SQUare|TRIangle|RAMP|NRAMP|NOISe|USER](#)

[\[:SOURce<n>\]:MOD:PWM:INTernal:FUNCTion?](#)

[\[:SOURce<n>\]:MOD:PWM:SOURce INTernal|EXTernal](#)

[\[:SOURce<n>\]:MOD:PWM:SOURce?](#)

[\[:SOURce<n>\]:MOD:PWM\[:DEViation\]:DCYCl <percent>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:PWM\[:DEViation\]:DCYCl? \[MINimum|MAXimum\]](#)

[\[:SOURce<n>\]:MOD:PWM\[:DEViation\]\[:WIDTh\] <deviation>|MINimum|MAXimum](#)

[\[:SOURce<n>\]:MOD:PWM\[:DEViation\]\[:WIDTh\]? \[MINimum|MAXimum\]](#)

**[[:SOURce<n>]:PERiod**

[[:SOURce<n>]:PERiod[:FIXed] <period>

[[:SOURce<n>]:PERiod[:FIXed]?



**[[:SOURCE<n>]:PHASE**

[[:SOURCE<n>]:PHASE[:ADJUST] <phase> | MINimum | MAXimum

[[:SOURCE<n>]:PHASE[:ADJUST]? [MINimum | MAXimum]

[[:SOURCE<n>]:PHASE:INITiate

# [[:SOURce<n>]:PULSe

[[:SOURce<n>]:PULSe:DCYCle <percent>|MINimum|MAXimum

[[:SOURce<n>]:PULSe:DCYCle? [MINimum|MAXimum]

[[:SOURce<n>]:PULSe:DELaY <delay>|MINimum|MAXimum

[[:SOURce<n>]:PULSe:DELaY? [MINimum|MAXimum]

[[:SOURce<n>]:PULSe:HOLD WIDTHh|DUTY

[[:SOURce<n>]:PULSe:HOLD?

[[:SOURce<n>]:PULSe:TRANSition[:LEADing] <seconds>|MINimum|MAXimum

[[:SOURce<n>]:PULSe:TRANSition[:LEADing]? [MINimum|MAXimum]

[[:SOURce<n>]:PULSe:TRANSition:TRAILing <seconds>|MINimum|MAXimum

[[:SOURce<n>]:PULSe:TRANSition:TRAILing? [MINimum|MAXimum]

[[:SOURce<n>]:PULSe:WIDTHh <seconds>|MINimum|MAXimum

[[:SOURce<n>]:PULSe:WIDTHh? [MINimum|MAXimum]

# [:SOURce<n>]:SWEep

- [\[:SOURce<n>\]:SWEep:HTIME:START <seconds> | MINimum | MAXimum](#)
- [\[:SOURce<n>\]:SWEep:HTIME:START? \[MINimum | MAXimum\]](#)
- [\[:SOURce<n>\]:SWEep:HTIME:STOP <seconds> | MINimum | MAXimum](#)
- [\[:SOURce<n>\]:SWEep:HTIME:STOP? \[MINimum | MAXimum\]](#)
- [\[:SOURce<n>\]:SWEep:RTIME <seconds> | MINimum | MAXimum](#)
- [\[:SOURce<n>\]:SWEep:RTIME? \[MINimum | MAXimum\]](#)
- [\[:SOURce<n>\]:SWEep:SPACing LINear | LOGarithmic | STEP](#)
- [\[:SOURce<n>\]:SWEep:SPACing?](#)
- [\[:SOURce<n>\]:SWEep:STATE OFF | ON](#)
- [\[:SOURce<n>\]:SWEep:STATE?](#)
- [\[:SOURce<n>\]:SWEep:STEP <steps> | MINimum | MAXimum](#)
- [\[:SOURce<n>\]:SWEep:STEP? \[MINimum | MAXimum\]](#)
- [\[:SOURce<n>\]:SWEep:TIME <seconds> | MINimum | MAXimum](#)
- [\[:SOURce<n>\]:SWEep:TIME? \[MINimum | MAXimum\]](#)
- [\[:SOURce<n>\]:SWEep:TRIGger\[:IMMediate\]](#)
- [\[:SOURce<n>\]:SWEep:TRIGger:SLOPe POSitive | NEGative](#)
- [\[:SOURce<n>\]:SWEep:TRIGger:SLOPe?](#)
- [\[:SOURce<n>\]:SWEep:TRIGger:SOURce INTernal | EXTernal | MANual](#)
- [\[:SOURce<n>\]:SWEep:TRIGger:SOURce?](#)
- [\[:SOURce<n>\]:SWEep:TRIGger:TRIGOut OFF | POSitive | NEGative](#)
- [\[:SOURce<n>\]:SWEep:TRIGger:TRIGOut?](#)

# [[:SOURce<n>]:VOLTage

[\[:SOURce<n>\]:VOLTage\[:LEVel\]\[:IMMediate\]\[:AMPLitude\] <amplitude> | MINimum | MAXimum](#)

[\[:SOURce<n>\]:VOLTage\[:LEVel\]\[:IMMediate\]\[:AMPLitude\]? \[MINimum | MAXimum\]](#)

[\[:SOURce<n>\]:VOLTage\[:LEVel\]\[:IMMediate\]:HIGH <voltage> | MINimum | MAXimum](#)

[\[:SOURce<n>\]:VOLTage\[:LEVel\]\[:IMMediate\]:HIGH? \[MINimum | MAXimum\]](#)

[\[:SOURce<n>\]:VOLTage\[:LEVel\]\[:IMMediate\]:LOW <voltage> | MINimum | MAXimum](#)

[\[:SOURce<n>\]:VOLTage\[:LEVel\]\[:IMMediate\]:LOW? \[MINimum | MAXimum\]](#)

[\[:SOURce<n>\]:VOLTage\[:LEVel\]\[:IMMediate\]:OFFSet <voltage> | MINimum | MAXimum](#)

[\[:SOURce<n>\]:VOLTage\[:LEVel\]\[:IMMediate\]:OFFSet? \[MINimum | MAXimum\]](#)

[\[:SOURce<n>\]:VOLTage:UNIT VPP|VRMS|DBM](#)

[\[:SOURce<n>\]:VOLTage:UNIT?](#)