Agilent Technologies
8510C Network Analyzer

Keyword Dictionary

Serial Numbers

**This manual applies directly to instruments with
this serial prefix number or above: 3031A.**

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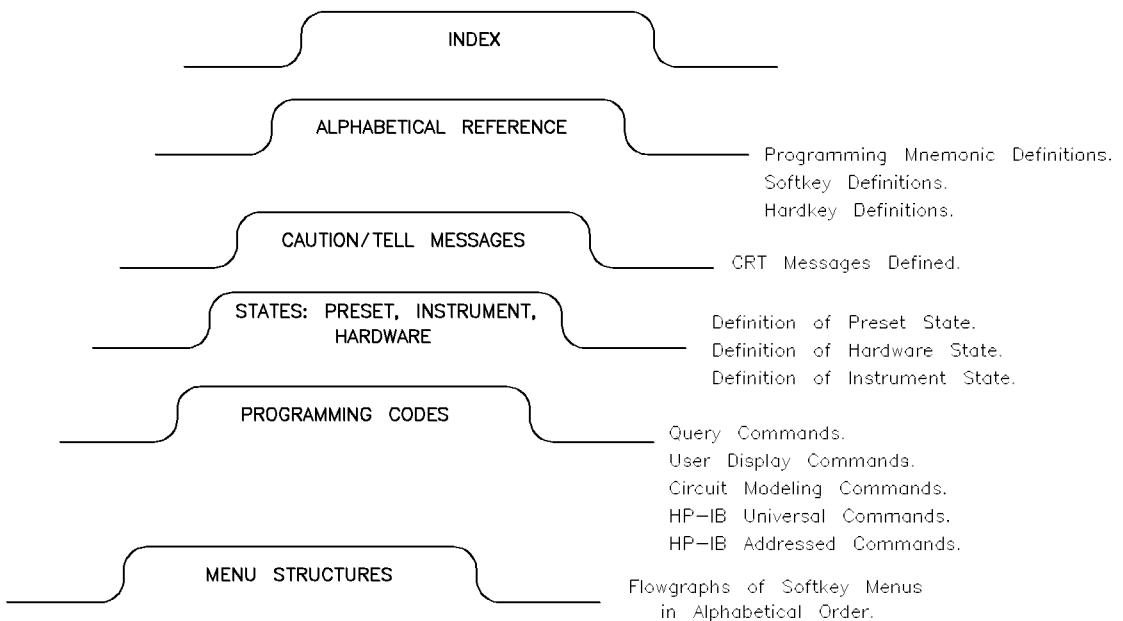
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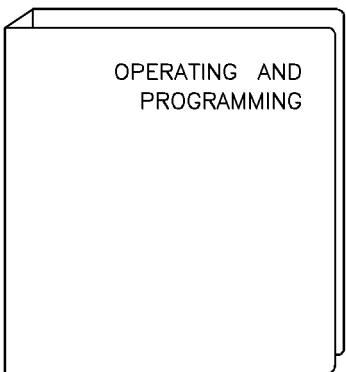
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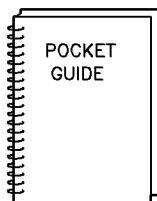
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HP 8510C DOCUMENTATION MAP

KEYWORD
DICTIONARY

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Front Panel Operation.
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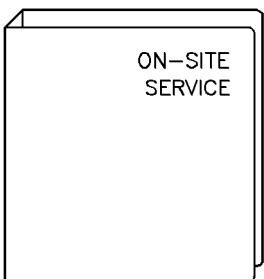Operating and Programming Applications and Examples
    for Transmission, Reflection, and Time Domain Measurements.
Circuit Modeling Program.
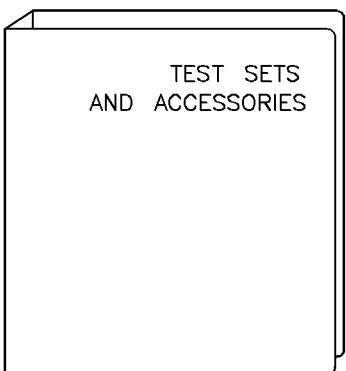General Applications (Product Notes).

INTRODUCTORY USER'S GUIDE

POCKET GUIDE

Example Procedures
to illustrate Operating Sequences.

Operating and Programming
Quick Reference.

ON–SITE SERVICE

System Installation.
Theory of Operation.
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TEST SETS AND ACCESSORIES

This binder contains tabs only. The following pieces
must be ordered separately:

Test Set Operation, Repair and Replaceable Parts.
Calibration Kit Operation and Repair.
Verification Kit Operation and Repair.
Adapter Set and Adapter Kit Operation and Repair.
Test Port Cables Operation and Repair.
Mounting Rack and Fixtures General Information.

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Introduction

This *Agilent 8510C Keyword Dictionary* is designed as an extension of the *Agilent 8510 Operating and Programming Manual* (Part Number 08510-90281). The two should be used together. Detailed explanations of 8510 network analyzer operation and functions appear in the Operating and Programming Manual. The Menu Structures chapter of this manual contains complete pictorial outlines of the 8510 menu structure together with programming mnemonics for each softkey.

The *Agilent 8510C Keyword Dictionary* expands upon the *Agilent 8510 Operating and Programming Manual* by providing a complete alphabetical list of 8510C front-panel hardkeys, menu softkeys, and programming mnemonics. Each entry also includes information about how to use the function in programmed operation.

To get the most from this dictionary, first study the following section, "Using the Dictionary", which explains each heading and the terms used in the actual entries.

In addition to the keyword listings, this manual also contains:

- 8510C programming codes
- 8510C query commands
- User display commands
- Circuit modeling program
- Other programming commands
- GPIB universal commands
- GPIB addressed commands
- Factory preset state values
- Hardware state values
- 8510C caution/tell messages
- Subject index

Typeface Conventions

The following conventions are used in the Agilent 8510C-series documentation:

Italics

Italic type is used for emphasis, and for titles of manuals and other publications. It is also used to designate a variable entry value.

`Computer`

Computer type is used for information displayed on the instrument and to designate a programming command or series of commands.

`[Hardkeys]`

Instrument keys are represented in "key cap." You are instructed to *press* a hardkey.

`Softkeys`

Softkeys are located along side of the display, and their functions depend on the current display. These keys are represented in "softkey." You are instructed to *select* a softkey.

Using the 8510 Keyword Dictionary

This section of the dictionary explains the notation used in the entries. The numbers in circles refer you to descriptions of each item on the following pages. ①`[FRONT PANEL KEY WORD]`, `SOFTKEY WORD`, or `GPIB MNEMONIC` ②Programming Code ③Main Menu ④Program Sequence ⑤Manual Sequence ⑥Description ⑦See Also

① Keyword Entry

There are three kinds of entries: `[Hardkeys]`, `Softkeys`, and `Programming Mnemonics`. The example shows `[FRONT PANEL]`, `SOFTKEY`, or `GPIB MNEMONIC`. These are typically followed by a short description of how the 8510C responds to the keypress or command.

`[HARDKEY]`

A hardkey entry refers to a front-panel key on the 8510C and gives the name of the key as it appears on the front-panel.

`SOFTKEYS`

A softkey entry refers to a command that appears on the right-hand side of the LCD/CRT display and is executed by pressing the corresponding key found immediately to the right. The name of the softkey given in the entry is as it appears on the LCD/CRT.

`PROGRAMMING MNEMONICS`

Mnemonic entries are those that can be executed only through the GPIB and require an external controller.

② Programming Code

The programming code is the mnemonic equivalent of the hard or softkey. It executes the command in a programming application. If the entry is a softkey or hardkey that can only be executed by pressing the key, the listing will show "None."

③ Main Menu

This indicates the hardkey (first-level menu) that must be pressed to access the softkey. Use this information to locate the pictorial representation of the menu structure (menu map) of the network analyzer. Refer to the tabbed chapter "MENU STRUCTURES" for the menu maps. If the entry is a hardkey or a programming mnemonic, no information is given for this category.

④ Program Sequence

Listed under this heading are the sequential programming commands to use to execute the function in programmed operation. Details on programming the 8510 network analyzer system, using an external controller, are given in the "INTRODUCTION to PROGRAMMING" chapter of the *Agilent 8510C Operating and Programming Manual*.

Conventions used in the program sequences are as follows:

`MNEMONIC;`   Program mnemonics must appear exactly as shown with no embedded spaces.

The semicolon (;) is the required terminator character for each program instruction.

The comma (,) is used to separate a series of values.

(italicized text) Lower case italicized text describes the range of values for a function or describes an action that must be performed by the operator.

or   The word "or" indicates an either/or path. One of the choices given must be selected before continuing.

value   A constant or a preassigned simple or complex variable transferred to the analyzer. If enclosed in brackets [ ], the entry is optional.

n   The lowercase letter "n", indicates that a variable single digit value is required. If enclosed in brackets [ ], the entry is optional.

[suffix]   Optional programmer entry units terminator for frequency, time, or voltage units.

                  If no optional terminator is specified, the units are the basic units of: Hz, second, or volt.

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⑤ Manual Sequence

This heading lists the hardkeys and softkeys that you must press to execute the function named in the entry. These keys are listed in the order that they must be pressed. The first key pressed is always a hardkey.

In the example, first press the hardkey STIMULUS (MENU). A menu appears on the right-hand side of the network analyzer LCD/CRT. Now select the softkey MORE . The stimulus menu continues and the softkey HOLD appears. Finally, select HOLD to execute the function.

Conventions used in describing complex operations are similar for both manual and program sequences. The following conventions are used in manual sequences only.

entry   Indicates that a numeric value is to be entered followed by one of these terminators:

               ■ (G/n) = Giga or nano.
               ■ (M/μ) = Mega or micro.
               ■ (k/m) = kilo or milli.
               ■ (x1) = basic units: Hz, s, dB, or V.

(text)   Text enclosed in parenthesis ( ), describes an action to be performed by the operator.

[text]   Text enclosed in brackets denotes optional actions that can be taken.

⑥ Description

Table

The letters "N/A" appear when the information is *not applicable* to the category.

Preset	The information in the table for *preset* is the state, mode, or value set on the network analyzer by pressing `FACTORY PRESET`. When a function is selected automatically by pressing `FACTORY PRESET`, the function name appears in the table.
	In the example, the continual mode is set by pressing `FACTORY PRESET`. This indicates that to operate the network analyzer in the hold mode, the command to "hold", must be given either by softkey or programming code.
	Details on the 8510 preset states are given in the *Agilent 8510 Operating and Programming Manual*. A list describing the factory preset state, mode, or value for each function begins in the tabbed section "STATES" at the end of this document.
Initialization	The information in the table for *initialization* is the state or value when the operating system program is first loaded from the operating system disk or upon power-up.
	In the example, the initialization state is the same as the preset state.
Coupled	The information in the table for *coupled* indicates whether channel 1 and channel 2 are coupled (the setting for one channel is automatically duplicated in the other channel), or uncoupled (each channel is set independently).
	"Always coupled" indicates that the channels cannot be set independently. In the example, `HOLD` is always coupled, indicating that if `HOLD` is selected for one channel then the other channel is in the hold mode also.
	"Always uncoupled" indicates that the channels are always set independently.
	"May be uncoupled" indicates that the two channels can be set independently, but only by selecting `UNCOUPLED CHANNELS` before setting the channels. Refer to the `COUPLED CHANNELS` entry in this dictionary for a list of coupled and uncoupled functions.
Range	The information in the table for *range* indicates the range of values that may be entered for the function.
Recalled	The entry in the table for *recalled* indicates whether selections made by pressing a hard or softkey or executing a programming command can be saved in an Instrument State Register and recalled when the register is recalled. If the entry is "yes", the function can be stored and recalled. If the information says "no", the function cannot be stored and recalled.
	In the example, `HOLD` can be stored and recalled so the entry is "yes".

Additional Descriptive Information

Additional information is supplied as required.

⑦ **See Also**

This is the area that lists other entries in this dictionary that can be consulted in connection with the entry. Occasionally, other documents are referenced. These documents (product notes) can be found in the *Agilent 8510C Operating and Programming Manual.*

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Menu Structures

Introduction

This section has diagrams showing the Agilent 8510C menu structure.

CAL SET SELECT MENU

CAL SET 1	CALS1
2	CALS2
3	CALS3
4	CALS4
5	CALS5
6	CALS6
7	CALS7
8	CALS8

FLATNESS CAL MENU

FLATNESS ON | OFF — FLATON / FLATOFF

CALIBRATE FLATNESS

CALIBRATE MENU

FLATNESS CALSTART — CALF

RECEIVER CAL MENU

INPUT PWR — RCVI
OUTPUT PWR THRU — RCVO
CAL KIT 1 3.5 mm B.2 — RCVK1
CAL KIT 2 2,4 mm A.3 — RCVK2
SAVE RCVR CAL — SAVR → CAL SET SELECT MENU

CAL MENU

CORRECTION ON | OFF — CORRON / CORROFF
RECEIVER CAL — CALRCVR *
CAL 1 3.5 mm B.2 — CAL1
CAL 2 2.4 mm A.3 — CAL2
RESUME CAL SEQUENCE — RESC
MORE

PORT EXTENSIONS MENU

VELOCITY FACTOR — VELOFACT
PORT 1 | 2 — PORT1 / PORT2

CAL MORE MENU

PORT EXTENSIONS
SET Z0 — SETZ
TRIM SWEEP — TRIS
MODIFY CAL SET → CAL MODIFY CAL SET MENU
MODIFY 1 3.5 mm B.2 — MODI1
MODIFY 2 2.4 mm A.3 — MODI2 → CAL MODIFY CAL KIT MENU
DELETE CAL SET — DELC

CAL TYPE MENU

SET FREQ. (LOW PASS) — SETF
CALIBRATE: RESPONSE — CALIRESP → RESPONSE CAL MENU
RESPONSE & ISOL'N — CALIRAI → RESPONSE & ISOLATION CAL MENU
S_{11} 1-PORT — CALIS111 → S_{11} 1-PORT CAL MENU
S_{22} 1-PORT — CALIS221 → S_{22} 1-PORT CAL MENU
ONE-PATH 2-PORT — CALIONE2 → ONE-PATH 2-PORT CAL MENU
FULL 2-PORT — CALIFUL2 → FULL 2-PORT CAL MENU
TRL 2-PORT — CALITRL2 → TRL 2-PORT CAL MENU

*Attempting to enter the RECEIVER CAL MENU without having completed a FLATNESS CAL, will put you into the FLATNESS CAL MENU. This menu actually resides within the Stimulus block, under Menu, Power Menu, and Power Flatness.

calmenu

FULL 2-PORT
REFLECTION CAL MENU

(S₁₁): OPEN	CLASS11A	
SHORT	CLASS11B	
LOADS	CLASS11C	→ CAL **LOADS MENU**
(S₂₂): OPEN	CLASS22A	
SHORT	CLASS22B	
LOADS	CLASS22C	→ CAL **LOADS MENU**
REFLECT'N DONE	REFD	

FULL 2-PORT
CAL MENU

REFLECT'N	REFL	
TRANS- MISSION	TRAN	
ISOLATION	ISOL	
SAVE 2-PORT CAL	SAV2	→ CAL **CAL SET SELECT MENU**

FULL 2-PORT
TRANSMISSION CAL MENU

FWD.TRANS THRU	FWDT
FWD.MATCH THRU	FWDM
REV.TRANS. THRU	REVT
REV.MATCH THRU	REVM
TRANS.	TRAD

ONE-PATH ISOLATION
CAL MENU

OMIT ISOLATION	OMII
FWD ISOL'N ISOL'N STD	FWDI
REV ISOL'N ISOL'N STD	REVI
ISOLATION DONE	ISOD

MODIFY CAL KIT MENU

- DEFINE STANDARD — DEFS
- SPECIFY CLASS — ①
- LABEL CLASS — ②
- TRL OPTION
- LABEL KIT — LABK → **TITLE MENU**
- KIT DONE (MODIFIED) — KITD → **CAL** CAL MORE MENU

STANDARD TYPE MENU

- STD TYPE: OPEN — STDTOPEN →
- SHORT — STDTSHOR → ④
- LOAD — STDTLOAD
- DELAY/ THRU — STDTDELA
- ARBITRARY IMPEDANCE — STDTARBI

TRL OPTIONS MENU

- CAL ZO: LINE Z0 — CALZLINE
- SYSTEM Z0 — CALZSYST
- SET REF.: THRU — SETRTHRU
- REFLECT — SETRREFL
- LOWBAND FREQUENCY — LOWF
- TRL OPTION DEFINED — TRLO

OPEN STANDARD DEFINITION MENU

- C0 — C0
- C1 — C1
- C2 — C2
- C3 — C3
- SPECIFY OFFSET → ③
- LABEL STD — LABS → **TITLE MENU**
- STD DONE (DEFINED) — STDD

DELAY/THRU STANDARD DEFINITION MENU

- SPECIFY OFFSET → ③
- LABEL STD — LABS
- STD DONE (DEFINED) — STDD

ARBITRARY IMPEDANCE STANDARD DEFINITION MENU

- TERMINAL IMPEDANCE — TERI
- FIXED — FIXE
- SLIDING — SLIL
- OFFSET — OFFS
- SPECIFY OFFSET → ③
- LABEL STD — LABS
- STD DONE (DEFINED) — STDD

SHORT STANDARD DEFINITION MENU ④

- L0 — L0
- L1 — L1
- L2 — L2
- L3 — L3
- SPECIFY OFFSET → ③
- LABEL STD — LABS → **TITLE MENU**
- STD DONE (DEFINED) — STDD

LOAD STANDARD DEFINITION MENU

- FIXED — FIXE
- SLIDING — SLIL
- OFFSET — OFFS
- SPECIFY OFFSET → ③
- LABEL STD — LABS → **TITLE MENU**
- STD DONE (DEFINED) — STDD

SPECIFY OFFSETS MENU ③

- OFFSET DELAY — OFFD
- OFFSET LOSS — OFFL
- OFFSET Z0 — OFFZ
- MINIMUM FREQUENCY — MINF
- MAXIMUM FREQUENCY — MAXF
- COAX — COAX
- WAVEGUIDE — WAVE
- STD OFFSET DONE → PREVIOUS MENU

SPECIFY CLASS MENU ①

- SPECIFY: S11A — SPECS11A
- S11B — SPECS11B
- S11C — SPECS11C
- SPECIFY: S22A — SPECS22A
- S22B — SPECS22B
- S22C — SPECS22C
- MORE
- CLASS DONE (SPEC'D) — CLAD

SPECIFY CLASS MORE 1 MENU

- SPECIFY: FWD.TRANS. — SPECFWDT
- REV.TRANS — SPECREVT
- FWD.MATCH — SPECFWDM
- REV.MATCH — SPECREVM
- FWD.ISOL'N — SPECFWDI
- REV.ISOL'N — SPECREVI
- MORE
- CLASS DONE (SPEC'D) — CLAD

SPECIFY CLASS MORE 2 MENU

- SPECIFY: RESPONSE — SPECRESP
- TRL THRU — SPECTRLT
- TRL REFLECT — SPECTRLR
- TRL LINE — SPECTRLL
- ADAPTER — SPECADAP
- CLASS DONE (SPEC'D) — CALD

LABEL CLASS MENU ②

- LABEL: S11A — LABES11A
- S11B — LABES11B
- S11C — LABES11C
- LABEL: S22A — LABES22A
- S22B — LABES22B
- S22C — LABES22C
- MORE
- LABEL DONE

LABEL CLASS MORE 1 MENU

- LABEL: FWD.TRANS. — LABEFWDT
- REV.TRANS — LABEREVT
- FWD.MATCH — LABEFWDM
- REV.MATCH — LABEREVM
- FWD.ISOL'N — LABEFWDI
- REV.ISOL'N — LABEREVI
- MORE
- LABEL DONE

LABEL CLASS MORE 2 MENU

- LABEL: RESPONSE — LABERESP
- TRL THRU — LABETRLT
- TRL REFLECT — LABETRLR
- TRL LINE — LABETRLL
- ADAPTER — LABEADAP
- LABEL DONE

calmckit_d

CONNECTOR
COMPENSATE MENU

MODIFY
CAL SET
TYPE MENU

ADAPTER
REMOVAL
MENU

CAL SET
SELECT MENU

CORRECTION ON	CORRON
OFF	CORROF
RECEIVE CAL	CALRCVR
CAL 1 3.5 mm B.2	CAL1
CAL 2 2.4 mm A.3	CAL2
RESUME CAL SEQUENCE	RESC
MORE	

PORT 1 connectors	CONP1
PORT 2 connectors	CONP2
ADAPTER 3.5 mm B.2	CONK1
ADAPTER 2.4 mm A.3	CONK2
COMPENSATE & SAVE	COMS

ADAPTER REMOVAL	ADAR
CONNECTOR COMPENSATE	CONC
FREQUENCY SUBSET	FRES
CHANGE CAL TYPE	CHAC

CAL SET for PORT 1	CALSPORT1
CAL SET for PORT 2	CALSPORT2
ADAPTER 3.5 mm B.2	ADAP1
ADAPTER 2.4 mm A.3	ADAP2
MODIFY & SAVE	MODS

1
2
3
4
5
6
7
8

FREQUENCY
SUBSET MENU

SUBSET: START	SUBSSTAR
STOP	SUBSSTOP
CENTER	SUBSCENT
SPAN	SUBSSPAN
CREATE & SAVE	CRES

CHANGE CAL
TYPE MENU

2-PORT to: S11 1-PORT	TWOPS11
S22 1-PORT	TWOPS22
CHANGE & SAVE	CHAS

CAL STDS
SELECT

	STANA
3.5/2.92	STANB
3.5/SMA	STANC
SMA/2.92	STAND
2.4/1.85	STANE
	STANF

PORT EXTENSIONS	
SET Z0	SETZ
TRIM SWEEP	TRIS
MODIFY CAL SET	
MODIFY 1 3.5 mm B.2	MODI1
MODIFY 2 2.4 mm A.3	MODI2
DELETE CAL SET	DELC

ONE-PATH
REFLECTION
CAL MENU

(S_{11}): OPEN	CLASS11A
SHORT	CLASS11B
LOADS	CLASS11C
REFLECT'N DONE	REFD

REFD ▶ CAL
$S_{11} \cdot S_{22}$ 1-PORT CAL MENU
LOADS MENU

ONE PATH 2-PORT
CAL MENU

REFLECT'N	REFL
TRANS- MISSION	TRAN
ISOLATION	ISOL
SAVE 2-PORT CAL	SAV2

SAV2 ▶ **CAL**
CAL SET
SELECT MENU

ONE-PATH
TRANSMISSION
CAL MENU

FWD.TRANS. THRU	FWDT
FWD.MATCH THRU	FWDM
TRANS. DONE	TRAD

ONE-PATH
ISOLATION
CAL MENU

OMIT ISOLATION	OMII
FWD ISOL'N ISOL'N STD	FWDI
ISOLATION DONE	ISOD

FREQUENCY RESPONSE
CAL MENU (7mm)

SHORT	STANA
OPEN	STANB
THRU	STANC
	STAND
	STANE
	STANF
	STANG
DONE RESPONSE	DONE

if used

DONE ——▶ CAL
**CAL SET
SELECT MENU**

RESPONSE & ISOLATION
CAL MENU (7mm)

RESPONSE	RAIRESP
ISOL'N STD	RAIISOL
SAVE RESP&ISOL	RAID

RESPONSE STANDARD
SELECT MENU (7mm)

SHORT	STANA
OPEN	STANB
THRU	STANC
DONE RESPONSE	DONE

RAID ——▶ CAL
**CAL SET
SELECT MENU**

DONE ——▶ RESPONSE &
ISOLATION CAL MENU

S_{11} 1-PORT CAL MENU

LOADS MENU

SLIDING LOAD MENU

(S_{11}): OPEN	CLASS11A
SHORT	CLASS11B
LOADS	CLASS11C
SAVE 1-PORT CAL	SAV1

CAL
CAL SET SELECT MENU

BROADBAND	STANA
SLIDING	STANB
LOWBAND	STANC
OFFSET	STAND
DONE LOADS	DONE

| SLIDE is SET | SLIS |
| SLIDING LOAD DONE | SLID |

OFFSET LOAD MENU

LOAD NO OFFSET	LOAN
LOAD OFFSET	LOAO
OFFSET LOAD DONE	OFLD

S_{22} 1-PORT CAL MENU

(S_{22}): OPEN	CLASS22A
SHORT	CLASS22B
LOADS	CLASS22C
SAVE 1-PORT CAL	SAV1

SAME AS S_{11} 1-PORT CAL MENU

TRL 2—PORT CAL MENU

THRU THRU	TRLT
S$_{11}$REFLECT SHORT	TRLR1
S$_{22}$REFLECT SHORT	TRLR2
ISOLATION	ISOL
LINE 2-18 LINE	TRLL ⟶
LOWBAND REFLECT'N	LOWR ⟶
SAVE TRL 2-PORT	SAVT ⟶

CAL
FULL 2-PORT
ISOLATION CAL MENU

CAL
FULL 2-PORT
REFLECTION CAL MENU

CAL
CAL SET SELECT

COPY

COPY MENU
- PLOT TO PRINTER — PRINALL
- PLOT TO PLOTTER
- LIST TRACE TO PRINTER
- SYS / OPER PARAMETERS
- DEFINE PRINT
- DEFINE PLOT
- DEFINE LIST
- ABORT PRINT/PLOT — ABORPRIP

MENUCOPY

PLOT TO PLOTTER MENU
- PLOT: ALL — PLOTALL
- DATA — PLOTDATA
- MEMORY — PLOTMEMO
- GRATICULE — PLOTGRAT
- MARKER(S) — PLOTMARK
- TITLE
- TEXT — PLOTTEXT
- LIMITS — PLOTLIMI

LIST TRACE TO PRINTER MENU
- LIST TRACE VALUES — LIST
- LIST ALL S PARAMETERS — LISALL

SYS / OPER PARAMETER MENU
- SYSTEM PARAMETERS — SYSP
- OPERATING PARAMETERS — OPEP

SYSTEM PARAMETERS MENU
- RESTORE DISPLAY — RESD
- PRINT PARAMETERS — PRIP
- PLOT PARAMETERS — PLOP

SYSTEM PARAMETER	ADDRESS	INTERFACE TYPE
8510 GPIB ADDRESS	16	GPIB (SYSTEM BUS)
SYSTEM BUS ADDRESS	17	GPIB (SYSTEM BUS)
PASS-THRU ADDRESS	31	
USER DISPLAY ADDRESS	31	GPIB (8510 BUS)
SOURCE GPIB ADDRESS	19	GPIB (8510 BUS)
SOURCE 2 GPIB ADDRESS	31	GPIB (8510 BUS)
TEST SET GPIB ADDRESS	20	GPIB (8510 BUS)
RF SWITCH ADDRESS	31	GPIB (8510 BUS)
POWER METER ADDRESS	13	GPIB (8510 BUS)
PLOTTER ADDRESS	5	GPIB (8510 BUS)
PRINTER ADDRESS	2	GPIB (8510 BUS)
DISC ADDRESS	INTERNAL	INTERNAL
SQR MASK (PRIMARY)	0	
SQR MASK (SECONDARY)	0	

SET PEN NUMBERS MENU
- SOFTKEYS PEN: 1 — PENNSOFT
- WARNING PEN: 2 — PENNWARN
- S11 DATA PEN: 3 — PENNS11D
- S22 DATA PEN: 4 — PENNS22D
- S21 DATA PEN: 5 — PENNS21D
- S12 DATA PEN: 6 — PENNS12D
- GRATICULE PEN: 1 — PENNGRAT
- MORE

SET PEN NUMBERS MORE MENU
- MARKERS PEN: 1 — PENNMARK
- NOT USED PEN: 2 — PENNNU09
- S11 MEM PEN: 3 — PENNS11M
- S22 MEM PEN: 4 — PENNS22M
- S21 MEM PEN: 5 — PENNS21M
- S12 MEM PEN: 6 — PENNS12M
- LIMITS — PENNLIMI
- STIMULUS PEN: 1 — PENNSTIM

DEFINE PRINT MENU
- PRINT TYPE MONOCHROME — PRINTYPEMONO
- COLOR — PRINTYPECOLR
- PRINT: PORTRAIT — PRINORIEPOR
- LANDSCAPE — PRINORIELAN
- AUTO FEED ON — PRINAUTFON
- OFF — PRINAUTFOFF
- SELECT — PRINFORF
- MORE

DEFINE PRINT MORE MENU
- PRINTER RESOLUTION — PRINRESO
- TOP MARGIN — PRINTOPMAR
- * LEFT MARGIN — PRINSIDMAR
- PTINT WIDTH — PRINWID

DEFINE PLOT MENU
- PLOT TYPE: MONOCHROME — PLOTTYPEMONO
- COLOR — PLOTTYPECOLR
- SET PEN NUMBERS
- DEFAULT PEN NUMBRS — DEFPENCOLR
- AUTO FEED ON — PLOTAUTFON
- OFF — PRINAUTFOFF
- FORM FEED — PRINFORF
- SELECT QUADRANT

OPERATING PARAMETERS MENU
- RESTORE DISPLAY — RESD
- PRINT PARAMETERS — PRIP
- PLOT PARAMETERS — PLOP

OPERATING PARAMETER	Channel 1	Channel 2
NUMBER of POINTS	201	201
SWEEP TIME	100.0 ms	100.0 ms
SOURCE POWER	10.0 dBm	10.0 dBm
POWER SLOPE	0.0 dB/GHz OFF	0.0 dB/GHz OFF
PORT 1 ATTEN.	0.0 dB	0.0 dB
PORT 2 ATTEN.	0.0 dB	0.0 dB
ELECTRICAL DELAY	0.0 s	0.0 s
PHASE OFFSET	0.0 deg.	0.0 deg.
MAGNITUDE SLOPE	0.0 dB/GHz	0.0 dB/GHz
MAGNITUDE PHASE	0.0 dB	0.0 dB
IF AVERAGING FACTOR	1.0 OFF	1.0 OFF
SMOOTHING APERTURE	0.0°/ SPAN OFF	0.0°/ SPAN OFF

- PAGE PARAMETERS — PAGP

OPERATING PARAMETER	Channel 1	Channel 2
PORT 1 EXTENSION	0.0 s	0.0 s
PORT 2 EXTENSION	0.0 s	0.0 s
ZO	50.0	50.0
CAL TYPE	UNDEFINED OFF	UNDEFINED OFF
GATE START	−500.0 ps	−500.0 ps
GATE STOP	500.0 ps	500.0 ps
WINDOW	NORMAL	NORMAL
GATE SHAPE	NORMAL OFF	NORMAL OFF
MARKER 1	4.0 GHz	4.0 GHz
MARKER 2	4.0 GHz	4.0 GHz
MARKER 3	4.0 GHz	4.0 GHz
MARKER 4	4.0 GHz	4.0 GHz
MARKER 5	4.0 GHz	4.0 GHz

- RESTORE DISPLAY — RESD
- PRINT PARAMETERS — PRIP
- PLOT PARAMETERS — PLOP
- PAGE PARAMETERS — PAGP

DEFINE LIST MENU
- LIST SKIP FACTOR — PRINSKIP
- LIST FORMAT
- AUTO FEED ON
- OFF
- FORM FEED

LIST FORMAT MENU
- STIMULUS WIDTH — LISSTIMWIDT
- DECIMAL POSITION — LISSTIMDECP
- UNITS
- COL1WIDT — LISCOL1WID
- DEC1POSI — LISCOL1DECP
- COL2WIDT — LISCOL2WID
- DEC2POSI — LISCOL2DECP
- COLUMN 1 WIDTH
- DECIMAL POSITION
- COLUMN 2 WIDTH
- DECIMAL POSITION

STIMULUS UNITS MENU
- UNITS: Giga — PRIUPICO
- Mega — PRIUNANO
- Kilo — PRIUMICR
- x 1 — PRIUMILLI
- Milli — PRIUUNIT
- Micro — PRIUKILO
- Nano — PRIUMEGA
- Pico — PRIUGIGA

SELECT QUADRANT MENU
- X — LEFT _ _ UPPER — LEFU
- _ _ LEFT X _ LOWER — LEFL
- X RIGHT _ _ UPPER — RIGU
- _ _ RIGHT _ X LOWER — RIGL
- X _ FULL X _ PAGE — FULP

*
The softkey "LEFT MARGIN" becomes "RIGHT MARGIN" when the print orientation is set to "LANDSCAPE". The programming code stays the same.

copymenu

DIRECTORY DISPLAY AND MENU

RESTORE DISPLAY → PREVIOUS MENU

USE KNOB OR STEP KEYS TO SELECT A FILE

```
FILE NAME  CONTENTS  TYPE CREATED

-> IS_FILTER INST STATE  BIN  90/12/13  01:37:18 <-

   IS_JOE    INST STATE  BIN  90/12/04  01:51:25

   IS_SETUP  INST STATE  BIN  90/12/06  02:36:08
```

3 FILES ON DISC

INSTRUMENT STATE SELECT MENU

INST STATE	
• 1	INSS1
• 2	INSS2
• 3	INSS3
• 4	INSS4
• 5	INSS5
• 6	INSS6
• 7	INSS7
USER PRESET • 8	INSS8

①

STORE DISC FILE DISPLAY AND MENU

REPLACE MENU

DISPLAY SECTION

ENTER (see FILE TYPES below) FILE NAME: THEN PRESS 'STORE'

SELECT LETTER

XX_

ABCDEFGHIJKLMNOPQRSTUVWXYZ 0123456789

↑

BACK SPACE

ERASE NAME

STORE FILE — DISF

FILE TYPES	CAL KIT	CK_	INST ALL	IA_
	CAL SET	CS_	RAW DATA	RD_
	CAL ALL	CA_	DATA	DD_
	MEMORY FILE	DM_	FORMATTED	FD_
	MEMORY ALL	MA_	DISPLAY	UD_
	INST STATE	IS_	DELAY TABLE	DT_
	HDW STATE	HS_	MACH. DUMP	MD_
	PROGRAM	PG_		

DISC MENU

DIRECTORY	DIRE
STORE	STOR
LOAD	LOAD
DELETE	DELE
UN-DELETE	UNDE
STORAGE IS INTERNAL — EXTERNAL	
SET UP DISC	

DISC MENU
MENUDISC

DATA TYPE SELECT MENU

INST STATE 1-8	
ALL	INSSALL
MEMORY 1-8	
ALL	MEMOALL
CAL SET 1-8	
ALL	CALSALL
CAL KIT 1-2	
MORE	

TO ① , ② OR ③

MEMORY SELECT MENU

MEMORY • 1	MEMO1
• 2	MEMO2
3	MEMO3
4	MEMO4
5	MEMO5
6	MEMO6
7	MEMO7
8	MEMO8

TO ① , ② OR ③

SETUP DISC MENU

| DISC UNIT NUMBER | DISCUNIT |
| DISC VOLUME | DISCVOL |

SEE NOTE

| INITIALIZE DOS DISC | |
| INITIALIZE LIF DISC | |

DATA TYPE SELECT MORE MENU

DATA: RAW	DATARAW
DATA	DATADATA
FORMATTED	DATAFORM
DELAY TABLE	DELT
USER DISPLAY	USED
HARDWARE STATE	HARS
MACHINE DUMP	MACD

INITIALIZE DOS DISC MENU

| INIT DOS? YES | |
| CANCEL | |

INITIALIZE LIF DISC MENU

| INIT LIF? YES | INID |
| CANCEL | |

CAL SET SELECT MENU

CAL SET • 1	CALS1
2	CALS2
3	CALS3
4	CALS4
5	CALS5
6	CALS6
7	CALS7
8	CALS8

CAL KIT SELECT MENU

| CAL KIT • 1 | CALK1 |
| • 2 | CALK2 |

REPLACE, LOAD, DELETE DISC FILE SELECT DISPLAY

OR ② OR ③

REPLACE LOAD DELETE

USE KNOB OR STEP KEYS TO SELECT A FILE

```
FILE NAME  CONTENTS  TYPE CREATED

-> IS_FILTER  BIN  90/12/13  09:31:52 <-

   IS_JOE    BIN  90/12/04  10:06:35

   IS_SETUP  BIN  90/12/06  10:13:37
```

3 INST STATE FILES ON DISC

REPLACE FILE — DISF
LOAD FILE — DISF
DELETE FILE — DISF

NOTE: THE SOFTKEYS 'DISC UNIT NUMBER' AND 'DISC VOLUME' DO NOT APPEAR IN THIS MENU IF THE INSTRUMENT HAS INTERNAL STORAGE SELECTED.

DISC

discmenu

DISPLAY MENU
- DISPLAY MODE
- ADJUST DISPLAY
- LIMITS
- DATA AND MEMORIES

EXTERNAL VIDEO MENU*
- SYNC ON GREEN
- COMPOSITE SYNC
- H,V SYNC
- POSITIVE SYNC
- NEGATIVE SYNC

ADJUST DISPLAY MENU
- INTENSITY
- BACKGROUND INTENSITY *
- MODIFY COLORS
- DEFAULT SETTINGS
- SAVE COLORS
- RECALL COLORS
- EXTERNAL VIDEO *

MODIFY COLORS MENU
- SOFTKEYS
- WARNING
- S11 DATA
- S22 DATA
- S21 DATA
- S12 DATA
- GRATICULE
- MORE

ADJUST COLOR MENU
- TINT — TINT
- BRIGHTNESS — CBRI
- COLOR — COLOR
- RESET COLOR — RSCO
- PREDEFINED COLORS

DISPLAY MODE MENU
- SINGLE PARAMETER
- DUAL CHAN OVERLAY
- DUAL CHAN SPLIT
- FOUR PARAM OVERLAY
- FOUR PARAM SPLIT

LIMIT LINES MENU
- ADD LIMIT
- DELETE LIMIT
- EDIT LIMIT — LIMIEDITSEG
- COPY LIMITS
- LIMITS ON / OFF — LIMILINON / LIMILINOFF
- LIMIT TEST ON / OFF — LIMITESTON / LIMITESTOFF

ADD LIMIT MENU
- ADD MAX LINE — LIMIADDLMAX
- ADD MIN LINE — LIMIADDLMIN
- ADD MAX POINT — LIMIADDPMAX
- ADD MIN POINT — LIMIADDPMIN
- ADD DONE

ADD MIN/MAX LINE MENU
- BEGIN STIMULUS — LIMIBEGSTIM
- END STIMULUS — LIMIENDSTIM
- BEGIN LIMIT — LIMIBEGSLIM
- END LIMIT — LIMIENDLIM
- MARKER ON
- EDIT DONE

DATA AND MEMORIES MENU
- DISPLAY: DATA
- MEMORY
- DATA and MEMORY
- MATH (/)
- MATH OPERATIONS
- SELECT DEFAULTS
- DATA→ MEMORY 1

MATH MENU
- PLUS (+)
- MINUS (-)
- MULTIPLY (*)
- DIVIDE (/)

MODIFY COLORS MORE MENU
- MARKERS
- NOT USED
- S11 MEM
- S22 MEM
- S21 MEM
- S12 MEM
- LIMITS
- STIMULUS

SELECT COLORS MENU
- WHITE
- RED
- YELLOW
- GREEN
- CYAN
- SALMON
- GREY
- BLACK

COPY TO MENU
- COPY TO: CHANNEL 1
- CHANNEL 2

DELETE LIMIT MENU
- YES — LIMIDELSEG
- CANCEL
- DELETE ALL LIMITS — LIMIDELALL

EDIT LIMIT POINT MENU
- STIMULUS
- LIMIT
- MARKER ON
- EDIT DONE

SELECT DEFAULTS MENU
- DEFAULT to MEMORY: 1
- 2
- 3
- 4
- 5
- 6
- 7
- MORE

SELECT DEFALUTS MORE MENU
- DEFAULT to MEMORY: 8
- DATA from CHANNEL 1
- CHANNEL 2

COPY TO MENU
- COPY TO: S11
- S21
- S12
- S22
- USER 1
- USER 1
- USER 1
- USER 4

NOTE:

* Softkey displayed only on 8510C equipped with CRT.

display

DOMAIN
MENU

DOMAIN

FREQUENCY	FREQ
TIME LOW PASS	TIML
TIME BAND PASS	TIMB
AUX. VOLT OUTPUT	AUXV
PULSE PROFILE	PULP
POWER	POWD
SPECIFY TIME	
SPECIFY GATE	

TIME
LOW PASS MENU

SET FREQ.
(LOW PASS)   SETF

* POWER
DOMAIN MENU

FREQUENCY of MEAS.	FREM
NEXT PT HIGHER	NEXTPHIGH
NEXT PT LOWER	NEXTPLOWE

SPECIFY TIME
MENU

LOW PASS:
STEP

IMPULSE

WINDOW:
MAXIMUM

NORMAL

MINIMUM

SPECIFY GATE
MENU

GATE ON	GATEON
OFF	GATEOFF
GATE: START	GATESTAR
STOP	GATESTOP
CENTER	GATECENT
SPAN	GATESPAN
GATE SHAPE	

GATE SHAPE
MENU

GATE SHAPE MAXIMUM	GATSMAXI
WIDE	GATSWIDE
NORMAL	GATSNORM
MINIMUM	GATSMINI

* STEP MODE must be selected in the Stimulus Menu
before using the Power Domain function.

o   n

FORMAT

LOG
MAG
LOGM

PHASE
PHAS

DELAY
DELA

SMITH
CHART
SMIC

MENU
MENUFORM

FORMAT MENU

SWR	SWR
LINEAR MAGNITUDE	LINM
LIN mkr on POLAR	LINP
LOG mkr on POLAR	LOGP
Re/Im mkr on POLAR	REIP
INVERTED SMITH	INVS
IMAGINARY	IMAG
REAL	REAL

LINE

ENTRY

ENTRY OFF

7 8 9 G/n — GHZ, NS, NM

4 5 6 M/u — MHZ,μS,μM

1 2 3 k/m — KHZ, MS, MV, MM

0 . +/− x1 — HZ, V, M

PRIOR MENU   BACKSPACE   =MARKER

HEWLETT PACKARD

8510C NETWORK ANALYZER
HEWLETT–PACKARD

CHANNEL 1   CHANNEL 2

MENUS
CAL   DOMAIN   DISPLAY   MARKER

STIMULUS
START   STOP
CENTER   SPAN
MENU

PARAMETER
S_{11} S_{12}
S_{21} S_{22}
MENU

FORMAT
LOG MAG   PHASE
DELAY   SMITH CHART
MENU

RESPONSE
SCALE   AUTO
REF VALUE   REF POSN
MENU

LINE

INSTRUMENT STATE
LOCAL   SAVE   RECALL   USER PRESET

AUXILIARY MENUS
COPY   DISC   SYSTEM

MEASUREMENT
RESTART

drat

LOCAL MENU

LOCAL
MORE MENU

LOCAL	

ADDRESS of 8510	ADDR8510
SYSTEM BUS	ADDRSYSB
SOURCE #1	ADDRSOUR
SOURCE #2	ADDRSOU2
TEST SET	ADDRTESS
RF SWITCH	ADDRRFS
POWERMETER	POWERMETER
MORE	

DISC	ADDRDISC
PLOTTER: HP-IB	ADDRPLOT
RS-232 PORT #1	PLOTRSP1
RS-232 PORT #2	PLOTRSP2
PRINTER: HP-IB	ADDRPRIN
RS-232 PORT #1	PRINRSP1
RS-232 PORT #2	PRINRSP2
PASS-THRU	ADDRPASS

MARKER MENU

MARKER 1	MARK1
2	MARK2
3	MARK3
4	MARK4
5	MARK5
all OFF	MARKOFF
△ MODE MENU	
MORE	

MARKER → MENUMARK

DELTA MODE MENU

△ REF = 1	DELR1
△ REF = 2	DELR2
△ REF = 3	DELR3
△ REF = 4	DELR4
△ REF = 5	DELR5
OFF	DELO

→ MARKER MENU

MARKER MORE MENU

TARGET VALUE	TARV
MARKER to TARGET	MARKTARG
MINIMUM	MARKMINI
MAXIMUM	MARKMAXI
SEARCH: LEFT	SEAL
RIGHT	SEAR
MORE	

MARKER MORE 2 MENU

MKR LIST ON	MKRLISTON
OFF	MKRLISTOFF
FOUR PARAM 1 MARKER	MKRLFOUP
5 MARKERS	MKRLFIVM
MARKERS: DISCRETE	MAKRDISK
CONTINUOUS	MARKCONT

PARAMETER

S11   S12
S21   S22
MENU
MENUPARA

PARAMETER MENU

USER 1 a1 USER1
USER 2 b2 USER2
USER 3 a1 USER3
USER 4 b2 USER4

REDEFINE PARAMETER

REDEFINE PARAMETER MENU

DRIVE
PHASE LOCK
NUMERATOR
DENOMI- NATOR
CONVERSION
PARAMETER LABEL   PARL
REDEFINE DONE   REDD

DRIVE MENU

DRIVE: PORT 1   DRIVPORT1
PORT 2   DRIVPORT2
NONE   DRIVNONE

PHASE LOCK MENU

LOCK to a1   LOCKA1
a2   LOCKA2
NONE   LOCKNONE

NUMERATOR MENU

NUMERATOR: b1   NUMEB1
b2   NUMEB2
a1   NUMEA1
a2   NUMEA2
SERVICE SELECTIONS

SERVICE SELECTIONS MENU

SERVICE: TEST CAL   SERVTESC
REF CAL   SERVREFC
DETECTOR GROUND   SERVDETG
ADC GROUND   SERVADCG
VCAL   SERVVCAL
VREF   SERVVREF
TEMP. 1   SERVTEMP1
TEMP. 2   SERVTEMP2

DENOMINATOR MENU

DENOM.: a1   DENOA1
a2   DENOA2
b1   DENOB1
NO RATIO   DENONOR

CONVERSION MENU

CONVERT to S   CONVS
1/S   CONV1S
Z   CONVZ
Y   CONVY

RESPONSE

SCALE
SCAL

AUTO
AUTO

REF VALUE
REFV

REF POSN
REFP

MENU
MENURESP

RESPONSE MENU

ELECTRICAL DELAY	ELED
AUTO DELAY	AUTD
PHASE OFFSET	PHAO
AVERAGING ON/restart	AVERON
OFF	AVEROFF
SMOOTHING ON	SMOOON
OFF	SMOOOFF
MORE	

RESPONSE MORE MENU

MAGNITUDE SLOPE	MAGS
MAGNITUDE OFFSET	MAGO
COAXIAL DELAY	COAD
WAVEGUIDE DELAY	WAVD
TABLE DELAY	TABD

SAVE/RECALL
MENU

SAVE

INST STATE	
• 1	SAVE 1
• 2	SAVE 2
• 3	SAVE 3
• 4	SAVE 4
• 5	SAVE 5
• 6	SAVE 6
• 7	SAVE 7
USER PRESET • 8	SAVE 8

SAVE/RECALL
MENU

SAVE/RECALL
MENU

RECALL

INST STATE	
• 1	RECA 1
• 2	RECA 2
• 3	RECA 3
• 4	RECA 4
• 5	RECA 5
• 6	RECA 6
• 7	RECA 7
MORE	

USER PRESET • 8	USERPRES
FACTORY PRESET	FACTPRES

POWER MENU

POWER SOURCE 1 — POWE
POWER SOURCE 2 — POW2
POWER SLOPE
ATTENUATOR PORT: 1 — ATTP1
2 — ATTP2
POWER FLATNESS

CALIBRATE FLATNESS MENU

FLATNESS CAL START

POWER SLOPE MENU

SLOPE SRC1 ON — SLOPON
OFF — SLOPOFF
SLOPE SRC2 ON — SLOP2ON
OFF — SLOP2OFF

NUMBER of POINTS MENU

POINTS: 51 — POIN51
101 — POIN101
201 — POIN201
401 — POIN401
801 — POIN801

POWER FLATNESS MENU

FLATNESS ON — FLATON
OFF — FLATOFF
CALIBRATE FLATNESS — CALF

STIMULUS

START — STAR
STOP — STOP
CENTER — CENT
SPAN — SPAN
MENU — MENUSTIM

STIMULUS MENU

POWER MENU
SWEEP/DWELL TIME / TIME — SWET or DWET
NUMBER of POINTS
FREQUENCY LIST — LISFREQ
SINGLE POINT — SINP
RAMP — RAMP
STEP — STEP
MORE

FREQUENCY LIST SEGMENT SELECT MENU

SINGLE SEGMENT — SSEG
ALL SEGMENTS — ASEG

STIMULUS MORE MENU

HOLD — HOLD
SINGLE — SING
NUMBER of GROUPS — NUMG
CONTINUAL — CONT
TRIGGER MODE
EDIT LIST — EDITLIST
COUPLED CHANNELS — COUC
UNCOUPLED CHANNELS — UNCC

TRIGGER MODE MENU

TRIGGER DELAY — TRID
TRIGGERING INTERNAL — EXITOFF
EXTERNAL — EXTTPOIN

EDIT FREQUENCY LIST DISPLAY AND MENU

hp

SEG   START (GHz)   STOP (GHz)   POINTS

SEGMENT — SEGM
EDIT — SEDI
DELETE — SDEL
ADD — SADD
DUPLICATE POINTS
CLEAR LIST
DONE — EDITDONE

DUPLICATES MODE MENU

DUPLICATES DELETED — DUPD
DUPLICATES MEASURES — DUPM

SEGMENT EDIT MENU

SEGMENT: START — STAR
STOP — STOP
CENTER — CENT
SPAN — SPAN
NUMBER of POINTS — POIN
STEP SIZE — STPSIZE
CW — CWFREQ
DONE — SDON

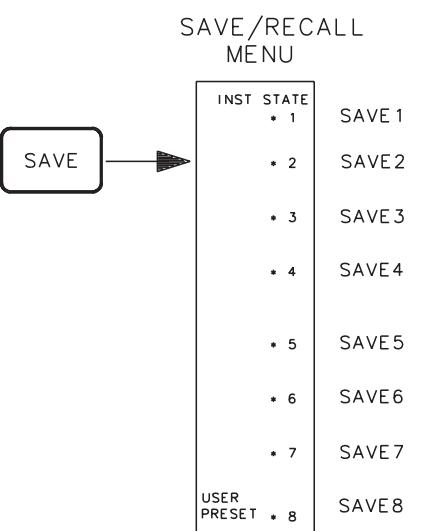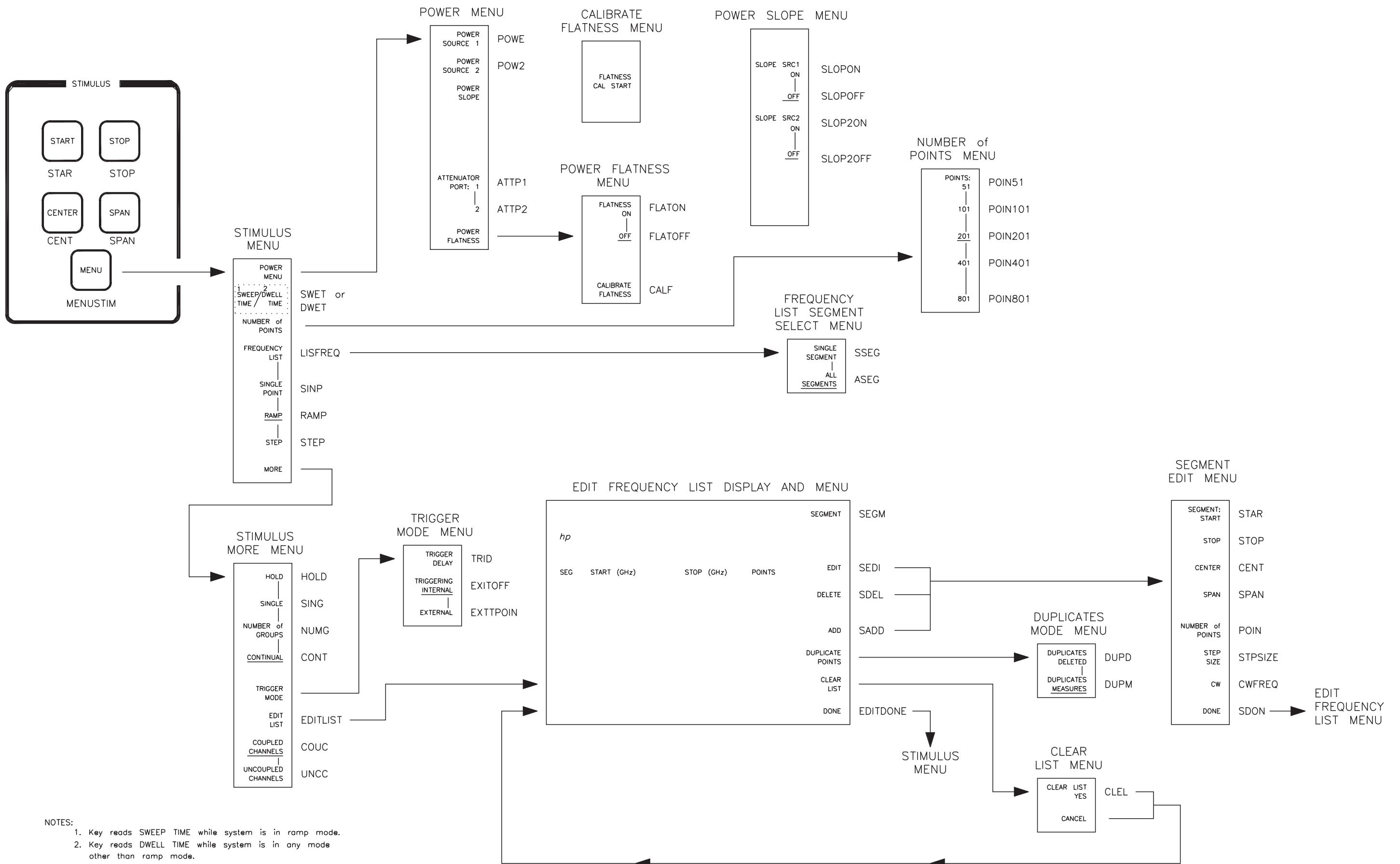EDIT FREQUENCY LIST MENU

STIMULUS MENU

CLEAR LIST MENU

CLEAR LIST YES — CLEL
CANCEL
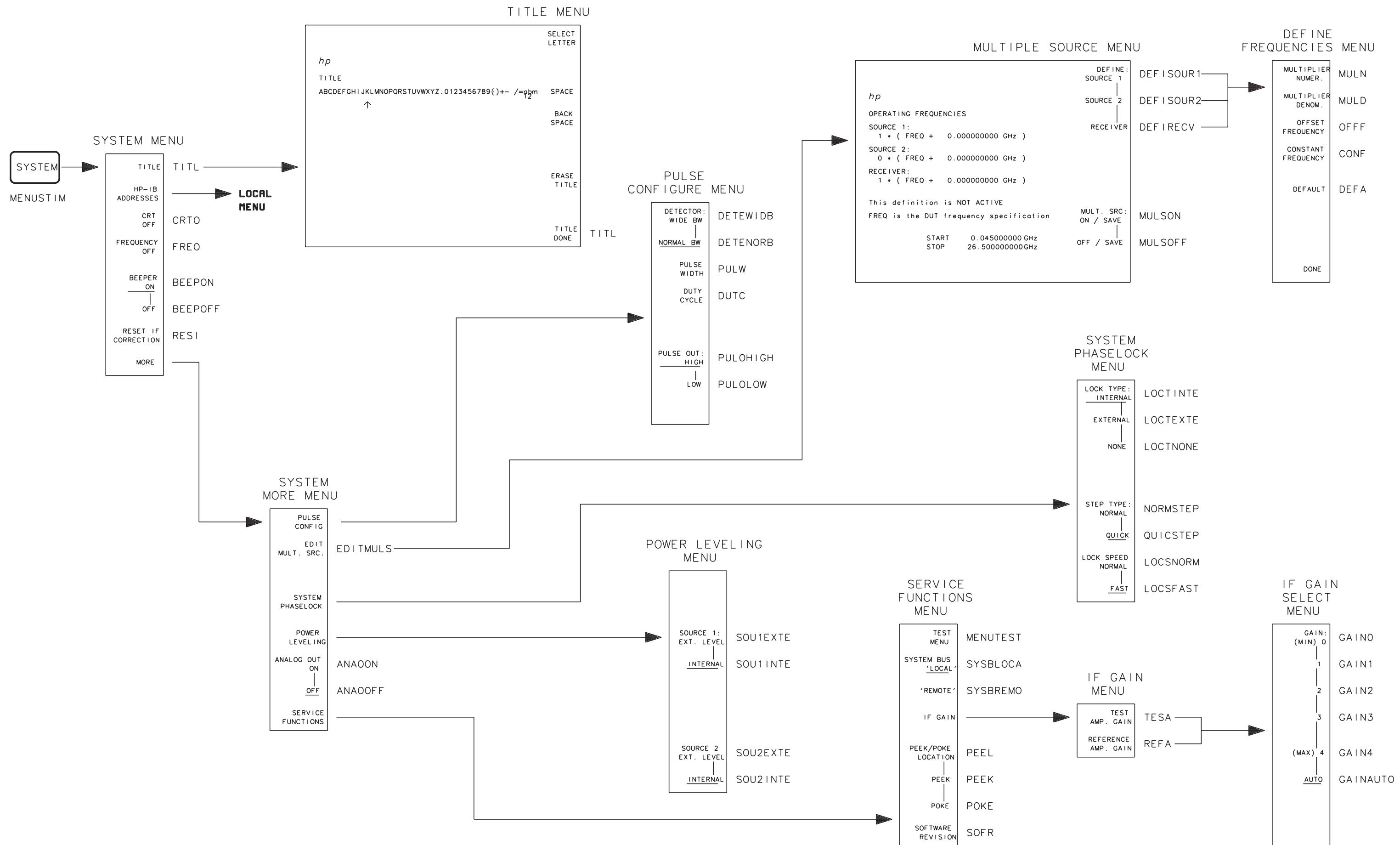
NOTES:
1. Key reads SWEEP TIME while system is in ramp mode.
2. Key reads DWELL TIME while system is in any mode other than ramp mode.

TITLE MENU

SELECT
LETTER

hp

TITLE
ABCDEFGHIJKLMNOPQRSTUVWXYZ.0123456789()+- /=ohm
↑12

SPACE

BACK
SPACE

ERASE
TITLE

TITLE
DONE

MULTIPLE SOURCE MENU

DEFINE:
SOURCE 1   DEFISOUR1

SOURCE 2   DEFISOUR2

RECEIVER   DEFIRECV

hp

OPERATING FREQUENCIES

SOURCE 1:
1 • (FREQ +   0.000000000 GHz)
SOURCE 2:
0 • (FREQ +   0.000000000 GHz)
RECEIVER:
1 • (FREQ +   0.000000000 GHz)

This definition is NOT ACTIVE

FREQ is the DUT frequency specification

START   0.045000000 GHz
STOP   26.500000000 GHz

MULT. SRC:
ON / SAVE   MULSON

OFF / SAVE   MULSOFF

DEFINE
FREQUENCIES MENU

MULTIPLIER
NUMER.   MULN

MULTIPLIER
DENOM.   MULD

OFFSET
FREQUENCY   OFFF

CONSTANT
FREQUENCY   CONF

DEFAULT   DEFA

DONE

SYSTEM MENU

SYSTEM   MENUSTIM

TITLE   TITL

HP-IB
ADDRESSES   LOCAL
               MENU

CRT
OFF   CRTO

FREQUENCY
OFF   FREO

BEEPER
ON   BEEPON

OFF   BEEPOFF

RESET IF
CORRECTION   RESI

MORE

PULSE
CONFIGURE MENU

DETECTOR:
WIDE BW   DETEWIDB

NORMAL BW   DETENORB

PULSE
WIDTH   PULW

DUTY
CYCLE   DUTC

PULSE OUT:
HIGH   PULOHIGH

LOW   PULOLOW

SYSTEM
PHASELOCK
MENU

LOCK TYPE:
INTERNAL   LOCTINTE

EXTERNAL   LOCTEXTE

NONE   LOCTNONE

STEP TYPE:
NORMAL   NORMSTEP

QUICK   QUICSTEP

LOCK SPEED
NORMAL   LOCSNORM

FAST   LOCSFAST

SYSTEM
MORE MENU

PULSE
CONFIG

EDIT
MULT. SRC.   EDITMULS

SYSTEM
PHASELOCK

POWER
LEVELING

ANALOG OUT
ON   ANAOON

OFF   ANAOOFF

SERVICE
FUNCTIONS

POWER LEVELING
MENU

SOURCE 1:
EXT. LEVEL   SOU1EXTE

INTERNAL   SOU1INTE

SOURCE 2
EXT. LEVEL   SOU2EXTE

INTERNAL   SOU2INTE

SERVICE
FUNCTIONS
MENU

TEST
MENU   MENUTEST

SYSTEM BUS
'LOCAL'   SYSBLOCA

'REMOTE'   SYSBREMO

IF GAIN

PEEK/POKE
LOCATION   PEEL

PEEK   PEEK

POKE   POKE

SOFTWARE
REVISION   SOFR

IF GAIN
MENU

TEST
AMP. GAIN   TESA

REFERENCE
AMP. GAIN   REFA

IF GAIN
SELECT
MENU

GAIN:
(MIN) 0   GAIN0

1   GAIN1

2   GAIN2

3   GAIN3

(MAX) 4   GAIN4

AUTO   GAINAUTO

2

Alphabetical List of Programming Codes

Introduction

Use this alphabetical list of the analyzer programming mnemonics as a quick reference to the syntax requirements and general function of the individual commands. Refer to the alphabetical reference for more information on the individual entries.

Notation

Symbols used in this document are:

KEYWORD
Upper case characters represent the program keywords that must be used exactly as shown with no embedded spaces.

[ ]
Square brackets indicate that whatever is enclosed in the bracket is optional.

[suffix]
Optional programmer entry units terminator for frequency and time units:

Frequency Suffix	Time Suffix	Voltage
GHz	fs	
MHz	ps	
kHz	ns	
Hz	us (μs)	
	ms	mV
	s	V

;
semicolon is the required terminator character for each program instruction.

,
the comma is used in program instructions to separate a series of values.

(range of values)
lower case text enclosed in parenthesis describes the range of values which may be input for the selected function.

value
a constant or a preassigned simple or complex numeric or string variable transferred to the analyzer.

variable
a simple or complex numeric or string variable which receives the value returned by the analyzer.

(Preset)
Value or state after a network analyzer FACTORY PRESET .

Example

GATECENT [value [time suffix]];   Mnemonic may be written as:

GATECENT;   Makes gate center the active function.

GATECENT 1;   Makes gate center the active function, sets gate center to 1 second. (If no units, default to basic units.)

GATECENT 1 ns;   Makes gate center the active function, sets gate center to 1 nanosecond.

Once a function is active, it remains active until (ENTRY OFF) or another active function is selected, and any value input will change its value. For example, sending the string STAR 10 GHz; makes start the active function. As long as the function is active, sending the string 2 GHz; will set the start function to 2 GHz.

Alphabetical List of Programming Codes

A

ABORPRIR;	Abort a print or plot output to RS-232 port 1 or 2.
ADAP1; ADAP2;	Specify calibration kit containing adapter in adapter removal modify calibration set.
ADAR;	Select adapter removal modify calibration set.
ADDR8510 [value];	GPIB address of analyzer (0 to 30).
ADDRDISC [value];	Disc unit System bus address (0 to 30).
ADDRPASS [value];	System bus address of device to send/receive data via analyzer system bus GPIB address (0 to 31).
ADDRPLOT [value];	Digital plotter system bus address (0 to 30).
ADDRPRIN [value];	Printer system bus address (0 to 30).
ADDRPOWE [value];	System bus address of power meter (0 to 30).
ADDRRFS [value];	System bus address of RF switch for dual test set switching.
ADDRSOUR [value];	Source #1 system bus address (0 to 31).
ADDRSOUR2 [value];	Source #2 system bus address (0 to 31).
ADDRSYSB [value];	GPIB address of analyzer system bus (0 to 30).
ADDRTESS [value];	Test set system bus address (0 to 31).
ANAOOFF;	Analog output off.
ANAOON;	Analog output on.
ASEG;	Measure all frequency list segments.
ATTP1 [value];	Port 1 attenuator (0 dB to 90 dB in 10 dB steps).
ATTP2 [value];	Port 2 attenuator. 8514, 8515 only, if attenuators installed (0 dB to 90 dB in 10 dB steps).

AUTD;	Automatic setting of electrical delay to balance phase.
AUTO;	Automatic selection of (REF VALUE) and (SCALE) for current channel to position trace for viewing.
AUXV;	Source set to start frequency; measurement synchronized to aux out. Stimulus controls set characteristics of digital ramp at AUX OUT connector.
AVEROFF;	Turn off averaging for selected channel (preset).
AVERON [value];	Turn on averaging for selected channel (1 to 4096; 1, 2, 4, 8, ... 4096 sequence).

B

BACI [value];	Set the background intensity of the LCD/CRT (0 to 100).
BEEPOFF;	Turn caution/warning beep off.
BEEPON;	Turn caution/warning beep on (preset).

C

C0 [value]; $\times 10^{-15}$ F C1 [value]; $\times 10^{-27}$ F/Hz C2 [value]; $\times 10^{-36}$ F/Hz^2 C3 [value]; $\times 10^{-45}$ F/Hz^3	Open circuit capacitance model values.
CAL1;	Begin measurement calibration using calibration kit 1.
CAL2;	Begin measurement calibration using calibration kit 2.
CALF;	Perform a flatness correction calibration routine.
CALIFUL2;	Select full 2-port calibration.
CALIONE2;	Select one-part 2-port calibration.
CALIRAI;	Select response and isolation calibration.
CALIRESP;	Select response calibration.
CALIS111;	Select S_{11} 1-port calibration.
CALIS221;	Select S_{22} 1-port calibration.
CALITRL2;	Select TRL 2-port calibration.
CALK1;	Calibration kit data type under (TAPE)/(DISC).
CALK2;	Calibration kit 2 data type under (TAPE)/(DISC).

Alphabetical List of Programming Codes

CALRCVR
Select receiver calibration.

CALS1;
CALS2;
CALS3;
CALS4;
CALS5;
CALS6;
CALS7;
CALS8;

Under (DISC), calibration set data type. Under (CAL), select or delete a calibration set. Under **ADAPTER REMOVAL**, specify port 1 and port 2 calibration set and storage for modified calibration set. Limited calibration set Instrument State.

Limited Calibration Set Instrument State
Parameter(s) corrected (1,2)
Frequency range (1)
Number of points (1)
Source power (3)
Sweep time (3)
Power slope (3)
Ramp/step/single sweep mode(3)
Trim sweep (3)

1. Correction turned off if changed and new parameter not included.
2. Does not turn Correction On if current parameter not included.
3. **CAUTION: CORRECTION MAY BE INVALID** is displayed if changed.

CALSALL;
Calibration sets 1 to 8 data type under (TAPE)/(DISC). (Usable only to disc.)

CALSPORT1;
CALSPORT2;

Select port 1 or port 2 calibration set in adapter removal modify calibration set, followed by **CALSn;** .

CALZLINE;
TRL Z_0 referenced to line Z_0.

CALZSYST;
TRL Z_0 referenced to system Z_0 (**SETZ;**)

CBRI [value];
Set the brightness of active color. (0 - 100)

CENT [value [suffix]];
Set center frequency stimulus value.

CHAC;
Change calibration type.

CHAN1;
Select (CHANNEL 1).

CHAN2;
Select (CHANNEL 2).

CHAS;
Change and save a 1-port calibration from a current 2-port calibration set, followed by **CALSn;**.

CLAD;
Current standard class is specified.

CLASS11A;
CLASS11B;
CLASS11C;
CLASS22A;
CLASS22B;
CLASS22C;

Select calibration standard class. Measure if single standard in class.

`CLEL;`	Clear frequency list.
`CLES;`	Clear analyzer status bytes to 0,0.
`COAD;`	Select coaxial (linear phase) electrical delay and port extensions (preset).
`COAX;`	Coaxial (linear phase) calibration standard.

`COLRSOFT;`
`COLRWARN;`
`COLRS11D;`
`COLRS22D;`
`COLRS21D;`
`COLRS12D;`
`COLRGRAT;`
`COLRMARK;`
`COLRLIMI;`
`COLRNU09;`
`COLRS11M;`
`COLRS22M;`
`COLRS21M;`
`COLRS12M;`
`COLRNU14;`
`COLRSTIM;`
	Select display element to modify.

`COLOR [value];`	Adjust the degree of whiteness in specified color. (0 - 100)
`COMPSYNC;`	Set external video synchronization to composite video.
`COMS;`	Connector compensation done; followed by `CAL SET [n]`.
`CONC;`	Select connector compensation.
`CONF [value];`	Constant frequency value, multiple source. (0 to end of source frequency range)
`CONK1;`	
`CONK2;`	Select the calibration kit used during connector compensation.
`CONP1;` `CONP2;`	
`CONT;`	Continual sweep. (Preset)
`CONV1S;`	Convert to 1/S.
`CONVS;`	Convert to S-parameter. (Preset)
`CONVY;`	Convert to Y.
`CONVZ;`	Convert to Z.

Alphabetical List of Programming Codes

CORROFF;	Correction off for current parameter set.
CORRON;	Correction on for current parameter set. (Follow with CALSn.)
COUC;	Couple channel 1 and channel 2 stimulus and calibration sets. (Preset)
CRES;	Create and save a frequency subset calibration set. Followed by CALn;.
CRTO;	Turn analyzer LCD/CRT off. (Preset turns on.)
CWFREQ [value [freq suffix]];	Frequency list CW frequency.

D

DATACHAN1;	Trace math uses data from channel 1. (dual channel mode)
DATACHAN2;	Trace math uses data from channel 2. (dual channel mode)
DATADATA;	Corrected data type under [TAPE]/[DISC].
DATAFORM;	Formatted Data type under [TAPE]/[DISC].
DATARAW;	Raw data type under [TAPE]/[DISC]. (All appropriate selected channel Raw Data arrays)
DATETIMEOFF;	Turn off real-time clock annotation.
DATETIMEON;	Turn on real-time clock annotation. (Preset).
DATI;	Transfer selected channel corrected data array to default trace memory.
DEBUOFF; DEBUON;	Turn off/on debug mode.
DEFA;	Multiple source default equation (Preset).
DEFC;	Select default display colors.
DEFIRECV;	Multiple source define receiver equation.
DEFISOUR1;	Multiple source define RF source #1 (test signal) equation.
DEFISOUR2;	Multiple source define LO source #2 (local oscillator) equation.
DEFM1; DEFM2; DEFM3; DEFM4; DEFM5; DEFM6; DEFM7; DEFM8;	Define memory used for memory operations on selected channel. Memories 1, 2, 3, 4 are non-volatile. Memories 5, 6, 7, 8 are volatile.
DEFPENCOLR;	Set default pen colors for plots.
DEFS stdno;	Define the number of the calibration standard to be modified. (stdno=1 to 21)

`DELA;`	Delay format.
`DELC;`	Delete calibration set, followed by `CALSn`.
`DELE;`	Delete tape/kdiscfile, followed by data type and `FILEn`.
`DELO;`	Δ mode off.

`DELR1;`
`DELR2;`
`DELR3;`
`DELR4;`
`DELR5;`
	Select Δ Ref = delta mode reference marker.

`DELT;`	Delay table data type under (TAPE)/(DISC).
`DENOA1;` a_1 `DENOA2;` a_2 `DENOB1;` b_1 `DENONOR;` b_2	Select denominator for current parameter.
`DETENORB;`	Select the 10 kHz IF path and detectors.
`DETEWIDB;`	Select the 3 MHz IF bandwidth path and detectors. Pulsed-RF applications.
`DIRE;`	Display directory for current tape cartridge or disc.
`DISCUNIT [value];`	Disc unit number under disc setup. Usually 0 (left drive); 1 (right drive).
`DISCVOL [value];`	Disc volume number under disc setup.
`DISF 'filename';`	Delete disc filename. Load disc filename. Store/replace disc filename. Select data type filename under disc store/load/delete operations. Seven characters. Do not include filename data type prefix.
`DISPDATA;`	Display current data only.
`DISPDATM;`	Display current data and memory.
`DISPMATH;`	Display current data with math.
`DISPMEMO;`	Display memory only.
`DIVI;`	Select complex divide trace math.
`DONE;`	Current standard class done during measurement calibration.
`DOWN;`	Decrease current active function one step.

`DRIVNONE;`	Select drive port for current parameter.
`DRIVPORT1;`	
`DRIVPORT2;`	
`DUPD;`	Frequency list delete duplicate points.
`DUPM;`	Frequency list measure duplicate points. (Preset)
`DUTC [value];`	Set the duty cycle of the internally generated trigger. Wideband IF option 008 only (0 to 100).
`DWET [value [time suffix]];`	Set the dwell time of frequency points in a frequency list (0 s to 10 s).

E

`EDITDONE;`	Edit frequency list done.
`EDITLIST;`	Edit frequency list.
`EDITMULS;`	Edit multiple source equations.
`ELED [value [time suffix]];`	Set electrical delay for current parameter on selected channel. (See `COAD;` and `WAVD;`)
`ENTO;`	Entry off.
`EXTTOFF;`	Select internal trigger.
`EXTTPOIN;`	Select external measurement trigger.
`EQUA;`	Set current active function equal to current active marker value.

F

```
FACTPRES;
```
Execute a factory preset.

```
FASC;
```
Select fast CW data aquisition (externally triggered).

```
FILE1;
FILE2;
FILE3;
FILE4;
FILE5;
FILE6;
FILE7;
FILE8;
```
Select data type file number under
TAPE /DISC store/load/delete operations.

```
FIRP;
```
First page of tape directory and operating parameters.

```
FIXE;
```
Define load standard type as fixed.

```
FLATOFF;
```
Turn off flatness correction calibration. (Preset)

```
FLATON;
```
Enable flatness correction calibration.

```
FORM1;
```
8510C internal binary (6 bytes/point).

```
FORM2;
```
IEEE 32 bit fp (8 bytes/point).

Alphabetical List of Programming Codes

FORM3;   IEEE 64 bit fp (16 bytes/point).
                     FORMAT OFF
                     DIM Data(Number of points,2)

                     INTEGER Preamble, Size
                     Output Nwa;"FORM3; OUTPDATA;"
                     Enter Nwa data;Preamble, Size, Data(*)

                     FORMAT OFF
                     Output Nwa;"FORM3;INPUDATA;"
                     Enter Nwa;Preamble, Size, Data(*)
                     Preamble=Standard Block Header, #A.
                     Size=Number of Bytes in Block.
                     Data(*)=x,y pairs.

FORM4;   ASCII (strings separated by comma).

                     FORMAT ON
                     DIM Data(Number of points,2)
                     Output Nwa;"FORM4; OUTPDATA;"
                     Enter Nwa data; Data(*)
                     Output Nwa;"FORM4; INPUDATA;";
                     Enter Nwa; Data(*)
                     Data(*)=x,y pairs.
                     Supress CR/LF after Output

FORM5;   MS-DOS 32 bit fp (8 bytes/point).

FOUPOVER;   Select four parameter overlay display format.

FOUPSPLI;   Select four parameter split display format.

FREM;   Selects operating frequency in power domain.

FREO;   Turn off display of frequency values. Turn on
                     by FACTORY PRESET or recall Instrument State.

FREQ;   Select Frequency Domain.

FRER;   Free-run selected sweep mode. (Preset)

FRES;   Begin creation of frequency subset, under
                     modify calibration set.

FREU;   Update frequency annotation with no sweep.

FULP;   Select full page plot.

FWDI;   Measure forward isolation standard.

FWDM;   Measure forward match standard.

FWDT;   Measure forward transmission standard.

G

`GAIN0;`
`GAIN1;`
`GAIN2;`
`GAIN3;`
`GAIN4;`
	Service only. Select ref or test IF gain.

`GAINAUTO;`	(Preset)
`GATECENT [value [time suffix]];`	Set gate center.
`GATEOFF;`	Turn off time domain gating.
`GATEON;`	Turn on time domain gating. Display Time Domain gate markers.
`GATESPAN [value [time suffix]];`	Set gate span.
`GATESTAR [value [time suffix]];`	Set gate start.
`GATESTOP [value [time suffix]];`	Set gate stop.

`GATSMAXI;`
`GATSMINI;`
`GATSNORM;`
`GATSWIDE;`
	Select gate shape.

`GREESYNC;`	External video set to synchronize on green.

H

`HARS;`	Hardware State data type under (TAPE)/(DISC). Complete multiple source Hardware State and GPIB addresses.
`HOLD;`	Hold mode; sweep stopped.
`HVSYNC;`	External video set to synchronize on horizontal and vertical.

I

Alphabetical List of Programming Codes

IMAG;   Imaginary Cartesian format.

INID;   Begin disc initialization.

INIT;   Begin tape initialization.

INPUCALC01;   Store measurement calibration error coefficient
INPUCALC02;   set real/imaginary pairs input via GPIB into
INPUCALC03;   analyzer memory. Select appropriate
INPUCALC04;   calibration type, input necessary coefficient sets
INPUCALC05;   (see **OUTPCALCn**), then issue **SAVC; CALSn;** to
INPUCALC06;   save in a calibration set. Issue **CORRON; CALSn;**
INPUCALC07;   to turn correction ON.
INPUCALC08;
INPUCALC09;
INPUCALC10;
INPUCALC11;
INPUCALC12;

INPUDATA;   Store selected channel corrected data trace
                         memory real/imaginary pairs input via GPIB.
                         To input to memory, **INPUDATA; DATI;**.

INPUDELA;   Input delay table real/imaginary pairs for
                         selected channel via GPIB.

INPUFORM;   Store selected channel formatted trace memory
                         input via GPIB.
                         Cartesian: x = basic units.
                         Cartesian: y = 0.
                         Polar and Smith: real/imaginary pairs.

INPUFREL;   Input frequency list via GPIB.

INPULEAS;   Store FORM1 analyzer Learn String, previously
                         output by **OUTPLEAS**, input via GPIB. Set
                         analyzer to Learn String state.

INPURAW1;   Store selected channel Raw Data trace memory
INPURAW2;   real/imaginary pairs input via GPIB. (See
INPURAW3;   **OUTPRAWn**)
INPURAW4;

INSS1;   Single Instrument State data type under
INSS2;   TAPE / DISC .
INSS3;
INSS4;
INSS5;
INSS6;
INSS7;
INSS8;

`INSSALL;`	All Instruments States 1-8 data type.
`INTE` [value];	Select the intensity level of the display (0 to 100).
`INVS;`	Inverted Smith chart format.
`ISOD;`	2-port isolation done.
`ISOL;`	Begin 2-port isolation calibration.

K

`KEYC` value;	Press analyzer front panel key. See `OUTPKEY`.
`KITD;`	Kit done (modified). Store current calibration kit definition.

L

L0 [value]; $\times 10^{-12}$H   Short circuit inductance model values.
L1 [value]; $\times 10^{-24}$H/Hz
L2 [value]; $\times 10^{-33}$H/Hz^2
L3 [value]; $\times 10^{-42}$H/Hz^3

LABEADAP ["string"];	Up to ten character standard class label.
LABEFWDI ["string"];	Standard class label is displayed only when
LABEFWDM ["string"];	more than one standard in class.
LABEFWDT ["string"];	
LABERESP ["string"];	
LABEREVI ["string"];	
LABEREVM ["string"];	
LABEREVT ["string"];	
LABES11A ["string"];	
LABES11B ["string"];	
LABES11C ["string"];	
LABES22A ["string"];	
LABES22B ["string"];	
LABES22C ["string"];	
LABETRLL ["string"];	
LABETRLR ["string"];	
LABETRLT ["string"];	

LABK ["string"];	Label kit. Up to ten character label for current calibration kit.
LABS ["string"];	Label standard. Up to ten character label for current calibration standard.
LASP;	Last page of tape directory.
LEFL;	Left lower plot.
LEFU;	Left upper plot.
LIMIADDLMAX;	Add a limit line to define maximum valid data.
LIMIADDLMIN;	Add a limit line to define minimum valid data.
LIMIADDPMAX;	Add a limit point to define maximum valid data.

LIMIADDPMIN;	Add a limit point to define minimum valid data.
LIMIBEGLIM;	Set the measurement value of the beginning of a limit segment.
LIMIBEGSTIM;	Set the stimulus value of the beginning of a limit segment.
LIMIDELALL;	Remove all entries from a limit line table.
LIMIDELSEG;	Remove an entry from a limit line table.
LIMIEDITSEG [segment number [suffix]];	Edit limit point or limit line segment table entry.
LIMIENDLIM [measurement value [suffix]];	Set the measurement value of the end of a limit segment.
LIMIENDSTIM [measurement value [suffix]];	Set the stimulus value of the end of a limit segment.
LIMILINEOFF;	Turn off the display of all limit lines and points.
LIMILINEON;	Turn on the display of all limit lines and points.
LIMITESTOFF;	Turn off testing for data that violates limits.
LIMITESTON;	Turn on testing for data that violates limits.
LINM;	Linear magnitude Cartesian format.
LINP;	Linear marker on Polar format.
LISALL;	List all S-parameters for the selected channel to a printer.
LISAUTFOFF;	Turn off the automatic paper feed on a printer for listing S-parameters.
LISAUTFON;	Turn on the automatic paper feed on a printer for listing S-parameters. (Preset)
LISFORF;	Immediately eject a page from a printer.
LISFREQ;	Select frequency list sweep mode.
LISSKIP [value];	Set the skip factor of a printed frequency list. (1 to 401, 4 = Preset)
LIST;	List trace values to printer.
LISCOL1DECP [value];	Set the number of digits after the decimal point in column 1 data. (1 to 15, 2 = Preset)
LISCOL2DECP [value];	Set the number of digits after the decimal point in column 2 data. (1 to 15, 2 = Preset)
LISCOL1WID [value];	Set the total number of characters printed in column 1. (1 to 15, 10 = Preset)
LISCOL2WID [value];	Set the total number of characters printed in column 2. (1 to 31, 10 = Preset)

`LISPARM;`	Print system parameters or operating parameters to a line printer.
`LISSTIMDECP [value];`	Set the number of digits after the decimal point printed for frequency data (1 to 15, 2 = Preset).
`LISSTIMWIDT [value];`	Set the total number of characters printed for frequency data. (1 to 31, 12 = Preset)
`LISSTIUGIGA;` GHz `LISSTIUKILO;` KHz `LISSTIUMEGA;` MHz `LISSTIUMICR;` μs `LISSTIUMILI;` ms, mV `LISSTIUNANO;` ns `LISSTIUPICA;` ps `LISSTIUUNIT;` Hz, s, V	Specify the units for the stimulus values on a data list.
`LOAD;`	Load tape/disc data file into analyzer memory.
`LOAN;`	Measure load no offset.
`LOAO;`	Measure load offset.

`LOCKA1;`
`LOCKA2;`
`LOCKNONE;`
	Select phaselock input for current parameter.

`LOCSFAST;`	Select fast system phaselock.
`LOCSNORM;`	Select normal system phaselock. (Preset)
`LOCTEXTE;`	Select system 1st IF phaselock to external LO.
`LOCTINTE;`	Select system 1st IF phaselock to internal LO. (Preset)
`LOCTNONE;`	Do not phaselock 1st IF.
`LOGM;`	Logarithmic magnitude Cartesian format.
`LOGP;`	Logarithmic marker on Polar format.
`LOWF [value [freq suffix]];`	Specify TRL lowband frequency.
`LOWPIMPU;`	Time Domain low pass, impulse.
`LOWPSTEP;`	Time Domain low pass, step.
`LOWR;`	Begin TRL 2-port lowband reflection calibration. (Full 2-port reflection)

M

`MACD;`	Machine dump data type under (TAPE)/(DISC). Complete instrument state and all memories. (Usable only to disc).
`MAGO [value];`	Set magnitude offset, dB, for current parameter on selected channel.
`MAGS [value];`	Set magnitude slope, dB/GHz, for current parameter on selected channel.

`MARK1 [value [suffix]];`
`MARK2 [value [suffix]];`
`MARK3 [value [suffix]];`
`MARK4 [value [suffix]];`
`MARK5 [value [suffix]];`
	Select active marker and move it to specified stimulus value.

`MARKCONT;`	Continuous markers (linear intepolation between measured points).
`MARKDISC;`	Discrete markers (only measured points). (Preset)
`MARKMAXI;`	Active marker to maximum trace value.
`MARKMINI;`	Active marker to minimum trace value.
`MARKOFF;`	Turn all markers off.
`MARKTARG;`	Active marker to target trace value. (Search starts from lowest stimulus value.)
`MAXF [value [freq suffix]];`	Maximum frequency of current calibration standard.

`MEMO1;`
`MEMO2;`
`MEMO3;`
`MEMO4;`
`MEMO5;`
`MEMO6;`
`MEMO7;`
`MEMO8;`
`MEMOALL;`
	Trace memory data type under (TAPE)/(DISC).

`MENUCAL;`	Present (CAL) menu.
`MENUCOPY;`	Present (COPY) menu.
`MENUDISC`	Present (DISC) menu.
`MENUDISP;`	Present (DISPLAY) menu.

Alphabetical List of Programming Codes

MENUDOMA;	Present (DOMAIN) menu.
MENUFORM;	Present (FORMAT) menu.
MENUMARK;	Present (MARKER) menu.
MENUOFF;	Turn off display of menus.
MENUON;	Turn on normal display of menus.
MENUPARA;	Present (PARAMENTER) menu.
MENUPRIO;	Present (PRIOR) menu.
MENURECA;	Present (RECALL) menu
MENURESP;	Present (RESPONSE) menu.
MENUSAVE;	Present (SAVE) menu.
MENUSTIM;	Present (STIMULUS) menu.
MENUSYST;	Present (SYSTEM) menu.
MENUTAPE;	Present (TAPE/DISC) menu.
MENUTEST;	Present test menu. (GPIB activity suspended.)
MINF [value [freq suffix]];	Minimum frequency of current calibration standard. (F_{co} for waveguide type.)
MINU;	Minus. Complex subtraction trace math for selected channel.
MKRLFIVM;	Select 5 marker display list.
MKRLFOUP;	Select marker list for four parameter display, the active marker per parameter.
MKRLISTOFF;	Turn the marker list off.
MKRLISTON;	Turn the marker list on. (Preset)
MODI1;	Modify 1 (calibration kit 1 label).
MODI2;	Modify 2 (calibration kit 2 label).
MODS;	Modify selected calibration sets and save, follow with CALSn;.
MONI;	For Service Use Only. (TEST or cycle LINE power to exit)
MULD [value];	Multiple source multipler denominator.
MULN [value];	Multiple source multiplier numerator.
MULSOFF;	Turn off multiple source and save into hardware state.
MULSON;	Turn on multiple source and save into hardware state.
MULT;	Multiply. Complex multiplication trace math for selected channel.

N

`NEGASYNC;`	Set external video synchronization to negative-logic TTL.
`NEXP;`	Next page tape directory.
`NEXTHIGH;`	Selects the next higher frequency point in power domain.
`NEXTLOWE;`	Selects the next lower frequency point in power domain.
`NORMSTEP;`	Select normal data aquistion cycle. (Preset for 8350 and 8340 series sources)
`NUMEA1;` `NUMEA2;` `NUMEB1;` `NUMEB2;`	Select numerator for current parameter.
`NUMG value;`	Number of groups. Execute the specified number of groups of sweeps.

O

Alphabetical List of Programming Codes

OFFD [value [time suffix]];   Offset delay of current calibration standard = physical length/C (C = 299.79 mm/s × Velocity Factor)

OFFF [value [freq suffix]];   Multiple source offset frequency.

OFFL [value];   Offset loss of current calibration standard (GΩ/s at 1 GHz) Series resistance per unit length. $RF = R@1GHz\sqrt{F/1GHz}$ (Not used for waveguide type.)

OFFS;   Define load or arbitrary impedance standard type as offset type.

OFFZ [value];   Real Z of offset calibration standard (Ω). (Use Z_0 for waveguide type.)

OFLD;   Offset load done.

OMII;   2-port omit isolation calibration step.

OPEP;   Display operating parameters.

OUTPACTI;   Output current active function value. (One FORM4 ASCII number.)

OUTPCALC01;
OUTPCALC02;
OUTPCALC03;
OUTPCALC04;
OUTPCALC05;
OUTPCALC06;
OUTPCALC07;
OUTPCALC08;
OUTPCALC09;
OUTPCALC10;
OUTPCALC11;
OUTPCALC12;   Output measurement calibration error coefficient set real/imaginary pairs for current calibration set to external controller via GPIB. (See table below for assignments.)

`OUTPDATA;`	Output selected channel corrected data array real/imaginary pairs.
`OUTPDELA;`	Output delay table real/imaginary pairs.
`OUTPERRO;`	Output number and message of current caution/tell message to external controller, clear status bytes, clear caution/tell message, no change to Status Request Mask. (See SRQM.)
`OUTPFORM;`	Output selected channel formatted data array pairs. Cartesian: x = basic units of selected format, y = 0. Polar and Smith: real/imaginary pairs.
`OUTPFREL;`	Output frequency list.
`OUTPIDEN;`	Output analyzer identification ASCII string. (Same string as displayed for `SOFR;`)
`OUTPKEY;`	Output integer number for last key pressed. (See "Alphabetical Reference.")
`OUTPLEAS;`	Output 4390-byte `FORM1` analyzer Learn String. (Same contents as Instrument State.)
`OUTPMARK;`	Output active marker trace value. (Two `FORM4` ASCII numbers.)
`OUTPMEMO;`	Output currently selected trace memory real/imaginary pairs.
`OUTPPLOT;`	Output complete screen including menu as variable-length HPGL strings to analyzer GPIB.

`OUTPRAW1;`
`OUTPRAW2;`
`OUTPRAW3;`
`OUTPRAW4;`
	Output trace data from currently selected channel Raw Data array real/imaginary pairs.

`OUTPSTAT;`	Output analyzer Status Bytes (2 ASCII integers), and clear Status Bytes. (See SQRM.)
`OUTPTITL;`	Output current active title, calibration kit label, standard label, standard class label or standards in class. ASCII string.
`OVER;`	Dual channel overlay display.

P

Alphabetical List of Programming Codes

PAGP;	Page parameters. Display next page of operating parameters list.
PARL ["string"];	Parameter label. Label current user parameter using up to eight characters. (User parameters only.)
PEEK;	Examine contents of memory specified by peek/poke location. Active function is contents of specified memory location. Service Use Only.
PEEL memory address;	Peek/poke location. Specify peek and poke memory address. Service Use Only.
PEN1; PEN2; PEN3; PEN4; PEN5; PEN6; PEN7; PEN8;	Select pen for current plot type for selected channel.
PENNMONO;	Monochromatic pen selection.
PENNSOFT; PENNWARN; PENNS11D; PENNS22D; PENNS21D; PENNS12D; PENNGRAT; PENNMARK; PENNNU09; PENNS11M; PENNS22M; PENNS21M; PENNS12M; PENNNU14; PENNSTIM;	Select pen colors for the various display elements to plot to a color plotter.
PHAO [value];	Phase offset for current parameter on selected channel.
PHAS;	Phase Cartesian format.
PLOP;	Plot current page of operating parameters listing using digital plotter.
PLOT4S;	Plot all four S-parameters using a digital plotter.
PLOTALL;	Plot complete measurement display including user display using digital plotter.
PLOTAUTFOFF;	Turn off the automatic paper feed on a plotter.
PLOTAUTFON;	Turn on the automatic paper feed on a plotter.
PLOTDATA;	Plot trace data only using a digital plotter.
PLOTFORF;	Immediately eject a page from a plotter.

PLOTGRAT;	Plot graticule only using digital plotter.
PLOTHPIB [value];	Set address of plotter on System bus. (1 - 30)
PLOTMARK;	Plot marker(s) only using digital plotter.
PLOTMEMO;	Plot the memory trace only using a digital plotter.
PLOTMENUOFF;	Turn off the ability to plot the softkey menus.
PLOTMENUON;	Plot the softkey menus only using a digital plotter.
PLOTRSP1;	Set the digital plotter interface connection to RS-232 port 1.
PLOTRSP2;	Set the digital plotter interface connection to RS-232 port 2.
PLOTTEXT;	Plot text only using digital plotter.
PLOTTITL;	Plot the title only using a digital plotter.
PLOTTRAC;	Plot trace only using digital plotter.
PLOTTYPECOLR;	Identify the plot type as a color plot. (Preset)
PLOTTYPEMONO;	Identify the plot type as monochromatic.
PLUS;	Plus. Complex addition trace math for selected channel.
POIN;	Make total number of measured points active function.
POIN [value];	Current frequency list segment edit.
POIN51; POIN101; POIN201; POIN401; POIN801;	Select number of points for both channels. (Preset)
POKE value;	Change contents of memory location specified by peek/poke location. Service Use Only.
PORT1 [value [time suffix]]; PORT2 [value [time suffix]];	Reference plane extensions. Additive with ELED; . (See COAD; and WAVD;) PORT1 extends S_{11}, S_{21}, S_{12}. PORT2 extends S_{22}, S_{12}, S_{21}.
POSISYNC;	Set external video synchronization to positive-logic TTL.
POWD;	Select power domain for the active channel.
POWE [value];	Set source #1 power dBm.
POW2 [value];	Set source #2 power dBm.
PREC;	`Press to Continue` softkey during one-path 2-port measurement.
PREP;	Previous page. Display previous page of tape directory.

Alphabetical List of Programming Codes

PRES;	Preset.
PRINALL;	Print the complete plot to a graphics printer.
PRINAUTFOFF;	Turn automatic form feed off in a graphics printer.
PRINAUTFON;	Turn automatic form feed on in a graphics printer. (Preset)
PRINFORF;	Immediately eject a page from a graphics printer.
PRINHPIB [value];	Set address of printer on system bus (1 to 31).
PRINMENUOFF;	Turn off the ability to print the softkey menus using a graphics printer.
PRINMENUON;	Print the softkey menus using a graphics printer.
PRINORIELAN;	Set the graphics printer page orientation to landscape.
PRINORIEPOR;	Set the graphics printer orientation to portrait (preset).
PRINRESO [value];	Set the printer resolution in dots per inch (0 to 400, 96 = Preset).
PRINRSP1;	Set the graphics printer interface connection to RS-232 port 1.
PRINRSP2;	Set the graphics printer interface connection to RS-232 port 2.
PRINSIDMAR [value];	Set either left or right margin distance of printer plots. Left margin set in portrait orientation, right margin set in landscape orientation (0 to 1.0 m).
PRINTOPMAR [value];	Set top margin distance for printer plots (0 to 1.0 m).
PRINTYPECOLR;	Define the print type as a plot dump to a color printer.
PRINTYPEMONO;	Define the print type as a plot dump to a single color printer.
PRINWID [value];	Set the total width of a printed plot (0 to 1.0 m).
PRIP;	Print parameters. Print current page of operating or system parameters using printer.
PULOHIGH;	Set pulse output active high.
PULOLOW;	Set pulse output active low.
PULP;	Select pulse profile domain.
PULW [value [time suffix]];	Set width of internally generated pulse. Wideband option 008 only. (0 ms to 40.88 ms)

Q

`QUICSTEP;`	Select the quick step phaselock mode.

R

`RAID;`	Response and isolation calibration done, followed by `CALSn;`.
`RAIRESP;`	Measure response standard in response and isolation calibration.
`RAIISOL;`	Measure isolation standard in response and isolation calibration.
`RAMP;`	Ramp sweep mode.
`RCVI;`	Measure receiver input power.
`RCVK1;` `RCVK2;`	Specify calibration kit to be used for THRU in receiver calibration.
`RCVO;`	Select receiver output power; measure if single standard in THRU class.
`REAL;`	Real Cartesian format.

`RECA1;`
`RECA2;`
`RECA3;`
`RECA4;`
`RECA5;`
`RECA6;`
`RECA7;`
`RECA8;`
	Recall previously stored Instrument State from specified internal memory. (Restores standard Basic parameter definitions; selects `DISPDATA;`.)

`RECO;`	Recall previously saved LCD/CRT colors.
`REDD;`	Redefine done. Store current parameter definition.
`REFA;`	Reference amplifier gain. See `GAINn`.
`REFD;`	Reflection done. All 2-port reflection standard classes are measured.
`REFL;`	Begin 2-port reflection measurement calibration steps.
`REFP [value];`	Reference position. (0 to 10)
`REFV [value];`	Reference value.
`REIP;`	Real/Imaginary on polar format.
`RESC;`	Resume calibration at point calibration menu structure was exited.
`RESD;`	Restore display after `DIRE`, `OPEP`, or `SYSP`.
`RESI;`	Reset IF correction. Initiate automatic IF gain calibration; reset timer.

Alphabetical List of Programming Codes

REST;	Measurement restart at beginning of group.
REVI;	Measure reverse isolation isolation standard.
REVM;	Begin reverse match measurement calibration step. Measure if single standard in class.
REVT;	Begin reverse transmission measurement calibration step. Measure if single standard in class.
RIGL;	Right lower plot quadrant.
RIGU;	Right upper plot quadrant.
RSCO;	Set the selected color to the default values.

S

S1; S12; S21; S22;	Select S-parameter on current channel.
SADD;	Add a frequency list segment.
SAV1;	Save 1-port measurement calibration; followed by `CALSn;`.
SAV2;	Save full 2-port measurement calibration; followed by `CALSn;`.
SAVC;	Store calibration coefficients loaded using `INPUCALCn`. Followed by `CALSn;`.
SAVE1; SAVE2; SAVE3; SAVE4; SAVE5; SAVE6; SAVE7; SAVE8;	Save current Instrument State in specified internal memory.
SAVR;	Save receiver calibration; follow with `CALSn;`.
SAVT;	Save TRL 2-port measurement calibration; followed by `CALSn;`.
SAVUASCI;	Select ASCII format for disc operation. (Preset)
SAVUBINA;	Select binary format for disc operation.

SCAL [value];	Scale Y-axis and Polar scale/division.
SDEL [value];	Delete current or specified frequency list segment. (value=1-31)
SDON;	Current frequency list segment edit done. If in frequency list sweep mode, update trace.
SEAL;	Active marker search left from current position for selected minimum, maximum, or target.
SEAR;	Active marker search right from current position for selected minimum, maximum, or target.
SEDI [value];	Edit current or specified frequency list segment.
SEGM [value];	Choose frequency list segment to edit.
SERVADCG; SERVDETG; SERVREFC; SERVTEMP1; SERVTEMP2; SERVTESC; SERVVCAL; SERVVREF;	Service Use Only.
SETDAY [value];	Set the day of the month for the real-time clock. (1 to 31)
SETF;	Set frequency low pass. Start/stop frequencies may change. Issue once after CAL1; or CAL2;. Included in TIML;.
SETHOUR [value];	Set the hour part of the real-time clock. (0 to 24)
SETMIN [value];	Set the minutes part of the real-time clock. (0 to 60)
SETMTH [value];	Set the month part of the real-time clock. (1 to 12)
SETYEAR [value];	Set the year part of the real-time clock. (00 to 99)
SETRREFL;	TRL reflection standard sets reference plane.
SETRTHRU;	TRL thru standard sets reference plane.
SETZ [value];	Set Z_0 of Smith Chart, Inverted Smith, load calibration standards, convert to Z and convert to Y. (Preset selects $Z_0 = 50 \ \Omega$.)

Alphabetical List of Programming Codes

SIMS;	In TRIG mode, with calibration standard selected, move Raw Data to calibration coefficient storage. (Simulate measurement of calibration standard).
SINC;	Single channel display.
SING;	Single sweep. Execute one group of sweeps, then hold.
SINP;	Single point mode. Use (CENTER) to set frequency.
SLID;	Sliding load done.
SLIL;	Specify the current standard load calibration standard as sliding.
SLIS;	Slide is set, measure one slide position. 5 slides minimum; 6-12 slides recommended.
SLOPOFF;	Source #1 (RF) power slope off.
SLOP2OFF;	Source #2 (LO) power slope off.
SLOPON [value];	Set source #1 (RF) power slope (dB/GHz).
SLOP2ON [value];	Set source #2 (LO) power slope (dB/GHz).
SMIC;	Smith Chart format.
SMOOOFF;	Smoothing off for selected channel.
SMOOON [value];	Smoothing on for selected channel. (Value = percent of span: 0.1, 0.2, 0.5, . . . 20 sequence.) Cartesian displays only.
SOFR;	Display operating system software revision.
SOFT1; SOFT2; SOFT3; SOFT4; SOFT5; SOFT6; SOFT7; SOFT8;	Press soft key. Execute current labeled function.
SOU1EXTE;	Select source 1 (RF) external leveling.
SOU2EXTE;	Select source 2 (LO) external leveling.
SOU1INTE;	Select source 1 (RF) internal leveling.
SOU2INTE;	Select source 2 (LO) internal leveling.
SPAN [value [suffix]];	Set stimulus span.

```
SPECADAP stanAno [, stanBno ... [, stanGno]];    Specify one to seven
SPECFWDI stanAno [, stanBno ... [, stanGno]];    standards in each class.
SPECFWDM stanAno [, stanBno ... [, stanGno]];    stanAno = stdno of first
SPECFWDT stanAno [, stanBno ... [, stanGno]];    standard in class;
SPECRESP stanAno [, stanBno ... [, stanGno]];    stanGno = stdno of
SPECREVI stanAno [, stanBno ... [, stanGno]];    seventh standard in class.
SPECREVM stanAno [, stanBno ... [, stanGno]];
SPECREVT stanAno [, stanBno ... [, stanGno]];
SPECS11A stanAno [, stanBno ... [, stanGno]];
SPECS11B stanAno [, stanBno ... [, stanGno]];
SPECS11C stanAno [, stanBno ... [, stanGno]];
SPECS22A stanAno [, stanBno ... [, stanGno]];
SPECS22B stanAno [, stanBno ... [, stanGno]];
SPECS22C stanAno [, stanBno ... [, stanGno]];
SPECTRLL stanAno [, stanBno ... [, stanGno]];
SPECTRLR stanAno [, stanBno ... [, stanGno]];
SPECTRLT stanAno [, stanBno ... [, stanGno]];
```

`SPLI;`	Dual channel split display format.
`SRQM` bytea,byteb;	Set SRQ mask. Mask selected bits of the Status Bytes to enable analyzer SRQ. Mask doesn't affect `OUTPSTAT`. bytea = primary status byte, 0-255; byteb = secondary status byte, 0-255.
`SSEG` [value];	Measure single frequency list segment. (value = segment number)

`STANA;`
`STANB;`
`STANC;`
`STAND;`
`STANE;`
`STANF;`
`STANG;`
	Measure calibration standard in class. (See Cal Kit Standard Class Assignments)

`STAR` [value [suffix]];	Set start stimulus value.
`STDD;`	Standard done (defined). All necessary characteristics of current standard are defined.

Alphabetical List of Programming Codes

STDTARBI; arbitrary impedance	Specify current standard type.
STDTDELA; delay/thru	
STDTLOAD; load	
STDTOPEN; open	
STDTSHOR; short	
STEP;	Step sweep mode.
STOIDISC;	Select external disc on system bus for store/load/delete operations.
STOIEXT;	Select external disc drive for store/load/delete operations.
STOIINT;	Select the internal disc drive for store/load/delete operations. (Preset)
STOITAPE;	Select internal tape for store/load/delete opeations. (Applies to HP 8510B only).
STOP [value [suffix]];	Set stop stimulus value.
STOR;	Store tape/disc data file.
STPSIZE [value [freq suffix]];	Specify current frequency list segment frequency step size.
SUBSCENT [value [suffix]];	Set frequency subset center frequency, part of modify calibration set.
SUBSSPAN [value [suffix]];	Set frequency subset span value, part of modify calibration set.
SUBSSTAR [value [suffix]];	Set frequency subset start frequency, part of modify calibration set.
SUBSSTOP [value [suffix]];	Set frequency subset stop frequency, part of modify calibration set.
SVCO;	Save the current LCD/CRT color selections in the "user's color" memory part of the hardware state.
SWET [value [time suffix]];	Set sweep time.
SWR;	SWR Cartesian format.
SYSBLOCA;	Analyzer system bus set to front panel (local) respose.
SYSBREMO;	Analyzer system bus set to remote response. (Automatic after 8510 addressed following Pass-Thru; includes Source Limited Instrument State Recall.)
SYSP;	Display system parameters.

T

`TABD;`	Use delay table for electrical delay.
`TARV [value];`	Specify current format target value for marker to target.
`TERI [value];`	Terminal impedance of arbitrary impedance type calibration standard (Ohms).
`TESA;`	Test amplifier gain. See `GAINn`.
`TIMB;`	Time band pass. Time Domain display with no frequency limitations.
`TIML;`	Time low pass. Time Domain display with harmonically related frequencies. (Includes execution of `SETF;`.)
`TINT [value];`	Set the tint for the color being modified. (0 - 100)
`TITL ["string"];`	Title.
`TRAD;`	Transmission done. All necessary 2-port transmission and match standard classes are measured.
`TRAN;`	Begin 2-port transmission measurement calibration steps.
`TRID [value [time suffix]];`	Set measurement trigger delay for all domains except pulse profile. Wideband IF option 008 only. (-1 us minimum to $+40.88$ ms maximum)
`TRIG;`	Select triggered data acquisition. Waits for GPIB Group Execute Trigger command to make next measurement, or `SIMS;`. Exit using `FRER;` or `PRES;`. See SRQM.
`TRIS [value];`	Trim sweep. (Applies to 8350-series and 8340-series sources only).
`TRLL;`	Measure TRL line calibration standard.
`TRLO;`	Modify calibration kit, TRL options defined.
`TRLR1;`	Measure TRL port 1 reflection standard.
`TRLR2;`	Measure TRL port 2 reflection standard.
`TRLT;`	Measure TRL thru standard.
`TWOPS11;`	Create an S_{11} 1-port calibration set from a currently active 2-port calibration set, part of modify calibration set.
`TWOPS22;`	Create an S_{22} 1-port calibration set from a currently active 2-port calibration set, part of modify calibration set.

U

`UNCC;`	Uncoupled channels.
`UNDE;`	Undelete last deleted tape/disc file.
`UP;`	Increase current active function one step.
`USED;`	User display tape/disc data type.
`USER1;` `USER2;` `USER3;` `USER4;`	Select user parameter.
`USERPRES;`	Execute a user preset.

V

`VELOFACT [value];`	Velocity factor used in supplementary distance displays for frequency domain electrical delay, port extensions, delay marker value, time domain marker value, and gate marker value. (Range 0.01 to 500; 1 = speed of light = 299.7925×10^6 m/s)

W

`WAIT;`	Hold off execution of next instruction until current instruction is complete.
`WAVD [cutoff freq [freq suffix]];`	Select waveguide phase for electrical delay and port extensions. Make cutoff frequency active function. (Standard rectangular waveguide phase.)
`WAVE;`	Waveguide calibration standard. (Standard rectangular waveguide.)
`WINDMAXI;` WINDOW: MAXIMUM. `WINDMINI;` WINDOW: MINIMUM. `WINDNORM;` WINDOW: NORMAL	Time domain window type.

Agilent 8510C Query Commands

NOTE: ␣ represents a single space

COMMAND	FUNCTION	RESPONSE
ANAO?;	Analog On/Off	1=on, 0=off
AVER?;	Averaging	1=on, 0=off
BEEP?;	Beeper	1=on, 0=off
CALI?;	Active Cal Type	"RECEIVER", "RESPONSE", "RESPONSE␣&␣ISOL'N", "S11␣1-PORT", "S22␣1-PORT", "2-PORT", "UNDEFINED"
CALS?;	Active Cal Set	0=no active cal set, or 1, 2, 3, 4, 5, 6, 7, 8
CALSDIRE?;	Stored Cal Sets	"<list of cal sets saved>" example: "1,2,3"
CALZ?;	TRL Cal Z_0	"THRU" or "SYSTEM"
CHAN?;	Selected Channel	1 or 2
CONV?;	Parameter Conversion	"S", "1/S", "Z", "Y"
CORR?;	Correction	0=off, 1=on
COUP?;	Coupled Channels	0=uncoupled, 1=coupled
CRT?;	LCD/CRT On/Off	0=off, 1=on
DATESTR?	Date/Time String	DD␣MMM␣YY
DATETIME?;	Date/Time Clock On/Off	0=off, 1=on
DEBU?;	Debug On/Off	0=off, 1=on
DEFM?;	Default Memory	1, 2, 3, 4, 5, 6, 7 or 8, or "DATA␣from␣CHANNEL 1", or "CHANNEL␣2"
DELM?;	Electrical Delay	"COAXIAL", "WAVEGUIDE", "TABLE"
DELR?;	Delta Ref Marker	0=Δ␣Mode␣Off or 1, 2, 3, 4, 5
DENO?;	Parameter Denominator	a1, a2, b1, or "NO␣RATIO"
DETE?;	Detector Bandwidth	"NORMAL␣BW" or "WIDE␣BW"
DISP?;	Display Trace	"DATA", "MEMORY", "DATA␣and␣MEMORY", "MATH␣(␣+␣)", "MATH␣(␣−␣)", "MATH␣(␣ ␣)", "MATH␣(␣/␣)",
DOMA?;	Domain	"FREQUENCY", "TIME␣LOW␣PASS", "TIME␣BAND␣PASS", "AUX.␣VOLT␣OUTPUT", or "PULSE␣PROFILE"
DRIV?;	Parameter Drive	"PORT␣1", "PORT␣2", "NONE"
DUPP?;	Duplicate Points	"DELETED", "MEASURED"

NOTE: ⊔ represents a single space (continued)

COMMAND	FUNCTION	RESPONSE
EXTT?;	Measurement Trigger mode	"INTERNAL" or "EXTERNAL"
FLAT?;	Flatness On/Off	0=off, 1=on
FORM?;	Format	"LOG⊔MAG", "PHASE", "DELAY", "SMITH⊔CHART", "SWR", "LINEAR⊔MAGNITUDE", "LIN⊔mkr⊔on⊔POLAR", "LOG⊔mkr⊔on⊔POLAR", "Re/Im⊔mkr⊔on⊔POLAR", "INVERTED⊔SMITH", "IMAGINARY", "REAL"
FREA?;	Frequency Annotation	0=frequency annotation off, 1=frequency annotation on
GATE?;	Gate On/Off	0=Gate Off, 1=Gate On
GATS?;	Gate Shape	"MAXIMUM", "WIDE", "NORMAL", "MINIMUM"
GROU?;	Sweep	"CONTINUAL", "HOLD"
IFGREFA?;	Ref IF gain	0, 1, 2, 3, 4, or "AUTO"
IFGTESA?;	Test IF gain	0, 1, 2, 3, 4, or "AUTO"
LIMILINE?	Limits on/off	0=off, 1=on
LIMIPASSFAIL?	Limit test pass/fail status	"PASS" "FAIL"
LIMISEGTYPE?	Returns type of active limit	"DELETED", "PMIN", "PMAX", "LMIN", "LMAX"
LIMITEST?	Limit test on/off	0=off, 1=on
LISTAUTF?;	List Autofeed On/Off	0=off, 1=on
LOAT?;	Load Type	"FIXED", "SLIDING", "OFFSET"
LOCK?;	Parameter Lock To	a1, a2, "NONE"
LOCKS?;	Lock Speed	"NORMAL", "FAST"
LOCT?;	System Phase Lock	"INTERNAL", "EXTERNAL", "NONE"
LOWP?;	Time Stimulus	"STEP", "IMPULSE"
LOWPSET?;	Set Freq (Low Pass)	0=no, 1=yes
MARK?;	Active Marker	0=All Off, 1, 2, 3, 4, 5
MARKMODE?;	Marker Mode	"CONTINUOUS", "DISCRETE"
MARKSEAR?;	Search Mode	"TARGET", "MINIMUM", "MAXIMUM"
MATH?;	Trace Math	"PLUS", "MINUS", "MULTIPLY", "DIVIDE"
MEDT?;	Cal Std Media Type	"COAX" or "WAVEGUIDE"
MENU?;	Menu On/Off	0=off, 1=on
MKRLIST?;	Marker List On/Off	0=off, 1=on
MKRLISTTYPE?;	Marker List Type	"FOUR⊔PARAM", "FIVE⊔MKR"
MULS?;	Multiple Source	0=off,1=on
NUME?;	Parameter Numerator	b1, b2, a1, a2, "TEST⊔CAL", "REF⊔CAL", "DETECTOR⊔GROUND", "ADC⊔GROUND", "VCAL", "VREF", "TEMP.⊔1", "TEMP.⊔2"
NUMS?;	Freq List Segments	<number of segments in frequency list>

NOTE: ⊔ represents a single space (continued)

COMMAND	FUNCTION	RESPONSE
PARA?;	Parameter	"S11", "S21", "S12", "S22", "USER1", "USER2", "USER3", "USER4"
PEN?;	Select Pen	1, 2, 3, 4, 5, 6, 7, 8
PLOTAUTF?;	Plotter Autofeed On/Off	0=off, 1=on
PLOTMENU?;	Plot Menus On/Off	0=off, 1=on
PLOTTYPE?;	Plotter Type	"MONOCHROME", "COLOR"
PRINAUTF?;	Printer Autofeed On/Off	0=off, 1=on
PRINMENU?;	Print Menus On/Off	0=off, 1=on
PRINORIE?;	Print Orientation	"PORTRAIT", "LANDSCAPE"
PRINTYPE?;	Printer Type	"MONOCHROME", "COLOR"
PULO?;	Pulse Output	"HIGH" or "LOW"
QUAD?;	Select Quadrant	"UPPER⊔LEFT", "LOWER⊔LEFT", "UPPER⊔RIGHT", "LOWER⊔RIGHT", "FULL⊔PAGE"
SAVU?;	Save Using	"ASCII", "BINARY"
SEG?;	Segment Measured	"ALL⊔SEGMENTS", "SINGLE⊔⊔SEGMENTS"
SETR?;	TRL Cal Ref. Plane	"THRU" or "REFLECT"
SLOP?;	Power Slope of RF Source 1	0=off, 1=on
SLOP2?;	Power Slope of LO Source 2	0=off, 1=on
SMOO?;	Smoothing	0=off, 1=on
SOU1LEV?;	Leveling Type of RF Source 1	"INTERNAL", "EXT.⊔LEVEL"
SOU2LEV?;	Leveling Type of LO Source 2	"INTERNAL", "EXT.⊔LEVEL"
STDT?;	Standard Type	"OPEN", "SHORT", "LOAD", "DELAY/THRU", "ARBITRARY⊔IMPEDANCE"
STES?;	Step Type	"QUICK", "NORMAL"
STOI?;	Storage is	"TAPE", "DISC" 8510C responds "TAPE" only.
STOIC?;	Storage is	8510C responds "INTERNAL", "EXTERNAL"
SWEM?;	Sweep Mode	"RAMP", "STEP", "SINGLE⊔POINT", "FREQUENCY⊔⊔LIST", "FAST⊔CW"
SYNM;	System Sync Mode	"TRIGGERED⊔STEP", "FREE⊔RUN"
SYSB?;	System Bus	"'LOCAL"', "'REMOTE"'
TIMESTR?;	Time String	HH:MM:SS
TRAM?;	Single/Dual Channel	"SINGLE⊔⊔⊔⊔CHANNEL", "SPLIT", "OVERLAY", "FOUR⊔PARAM⊔OVERLAY", "FOUR⊔PARAM⊔SPLIT"
WIND?;	Window	"MAXIMUM", "MINIMUM", "NORMAL"

User Display

(ADDRPASS 31; send data to system bus address)

CS;   Turn off measurement display.

DF;   Set to default state (PU, PA).

KP;   Turn off user display.

LB string CNTL C;   Label text. ASCII string terminated with CONTROL C.

PA x1,y1[,x2,y2 . . . [,xn,yn]]; Plot absolute.
$0 \leq x \leq 5377$,
$0 \leq y \leq 4095$.

PD;   Pen down.

PG;   Clear (erase) user display.

PR x1,y1[,x2,y2 . . . [,xn,yn]]; Plot relative.

PU;   Pen up.

RP;   Turn on user display.

RS;   Turn on measurement display.

Circuit Modeling Program

Statements

nnn **PORT** node (50 ohm termination)

nnn **R** node1 node2 resistance

nnn **L** node1 node2 inductance

nnn **C** node1 node2 capacitance

nnn **TL** node1 node2 Z len Er series corfreq shunt

nnn **FREQ** fstart fstop numsteps

nnn **FREQ LOWPASS** fstop numsteps

nnn **OUTPUT** Snn Send S-parameter data to 8510.

nnn **PLOT S** *nn* [,S*nn*] . . . Plot data on Controller LCD/CRT.

Note	nnn represents a line number.
	nn represents S-parameter notation.
	OUTPUT and PLOT can also be used as commands after the program has been RUN once.
	The controller key CLR I/O interupts an executing command and returns the program to user control.

Commands

CAT [volume specifier]

DEL

GET filename

HELP [statement or command]

LIST

RUN

SAVE

PURGE filename

OUTPUT Snn

PLOT Snn [, Snn] ...

END

BYE

EXIT

QUIT

GPIB Universal Commands

DCL	Device Clear.
LLO	Local Lockout, disables 8510 LOCAL key. Must be cancelled by GTL.
SPD	Disable Serial Poll.
SPE	Enable Serial Poll.
PPU	Not Used.

GPIB Addressed Commands

GET   Group Execute Trigger. (1.) After TRIG, Make next measurement. Bit 2 of Primary Status Byte set upon completion. (2.) During measurement using R/T test set with ONE-PATH 2-PORT error model, Continue measurement after reversing device. Bit 3 of Primary Status Byte set upon completion. (3) After FASC; data acquisition triggered by external input.

GTL   Go to Local. No response to 8510 instructions.

PPC   Not Used.

REN   Remote Enable. Enable all GPIB functions.

SDC   Selected Device Clear.

TCT   *Not used*

3

States: Preset, Instrument, Hardware

Factory Preset State/Values

The factory preset state consists of the default values selected for various functions. The following partial list the preset state or value associated with a function. If you have a question about a specific function, refer to the individual entry in the Alphabetical Description of Functions section.

- Selected Channel = 1, no menu displayed.

- (SAVE)/(RECALL) instrument states 1 through 8 are not changed by a `FACTORY PRESET`. Correction is turned off and the calibration sets are not changed.

- `SAVE COLORS` / `RECALL COLORS` are not changed by a `FACTORY PRESET`. The last colors selected for the display are the colors returned after `FACTORY PRESET` is completed.

Stimulus Functions

Maximum sweep range of source and test set.
Number of points = 201.
Source power = depends upon source.
Test set attenuation = 0 dB.
Sweep time = 166 ms.
Ramp sweep.
Continual sweep.
Flatness OFF.
Coupled channels.

Parameter Functions

Channel 1 = S_{11}
Channel 2 = S_{21}

Format Functions

Channel 1 = LOG MAG
Channel 2 = LOG MAG

Response Functions

Scale = 10 dB/division.
Reference value = 0 dB.
Reference position = 5.
Coaxial delay.
Electrical delay = 0 seconds.
Averaging OFF.
Smoothing OFF.
Phase offset = 0°
Magnitude offset = 0 dB.
Magnitude slopw = 0 dB/GHz.

Measurement Calibration Functions

Correction OFF.
$Z_0 = 50\Omega$.
Port extensions 1 and 2 are 0 s.
Trim sweep = 0.
Calibration sets 1 through 8 not changed.
Velocity factor = 1.

Domain Functions

Frequency domain.
Gate OFF.

Display Functions

Single channel, single parameter.
Display data.
Trace memories 1 through 8 not changed.
Marker list ON.
Real-time clock ON.

Marker Functions

Markers all OFF.
Delta marker mode OFF.

System Functions

GPIB addresses not changes.
Display ON.
IF gain = auto.

Copy Functions

Plots are full page.
Plot type = color.
Plotter auto-feed ON.
Printer lists all points.
Printer type = monochrome.
Printer orientation = portrait.
Printer auto-feed ON.
Printer resolution = 96 dpi.

Disc Functions

Storage = internal.
Save, using ASCII (not selectable).
Format = LIF.

Pulse and Waveguide Systems

After a `FACTORY PRESET` to set up one of these systems, you should recall a correct instrument state, or manually set these following functions:

- Sweep Mode = STEP.
- Set $Z_0 = 1$.
- Waveguide delay.
- Waveguide cutoff = depends upon band.
- Source number 1 power = depends upon band.
- Source number 2 power = depends upon band.
- Multiple source ON.

Instrument State

The instrument state consists of those functions that can be saved and recalled. Another way to define instrument state:

Those functions that multiple users of a single system are likely to set differently.

If you have a question about a specific function, refer to the individual entry in the Alphebetical Description of Functions.

Hardware State

In general, the hardware state functions are those that are required for configuration of the analyzer. These functions are not affected by either (USER PRESET), nor by FACTORY PRESET. Values or text shown in parenthesis are factory default settings.

- GPIB Addresses

    ADDRESS of 8510 (16)

    ADDRESS of SYSTEM BUS (17)

    ADDRESS of SOURCE #1 (19)

    ADDRESS of TEST SET (20)

    ADDRESS of PLOTTER (GPIB, 5)

    ADDRESS of PRINTER (GPIB, 1)

    ADDRESS of DISC (0)

    ADDRESS of SOURCE #2 (31)

    ADDRESS of PASS-THRU (31)

    ADDRESS of RF SWITCH (31)

    ADDRESS of POWERMETER (13)

- System phaselock type = internal.

- System phaselock speed = normal.

- System phaselock step type = reads source in system to determine.

- Multiple source values:

    RF Source #1
      Numerator = 0
      Denominator = 1
      Offset = 0
    LO Source #2
      Numerator = 0
      Denominator = 1
      Offset = 0
    Receiver
      Numerator = 1
      Denominator = 1
      Offset = 0

- GPIB Response to PRES; command (user preset).

- Warning beeper ON.

- Power level RF source #1 = 0 dBm.

- Power level RF source #2 = 0 dBm.

- LCD/CRT display colors:

  Background intensity = 0% (CRT only)
  Softkeys = bright white
  Warnings = bright red
  S_{11} data = bright yellow
  S_{22} data = bright green
  S_{21} data = bright cyan
  S_{12} data = bright salmon
  Graticule = dim gray
  Marker symbols = white
  S_{11} memory = medium yellow
  S_{22} memory = medium green
  S_{21} memory = medium cyan
  S_{12} memory = medium salmon
  Limits = orange
  Stimulus values = medium white

- External Video Synchronization = sync ON green, negative (CRT only)

4

Caution/Tell Messages

When a message appears, press (ENTRY OFF) to clear the message from the display or program OUTPERRO and read the error number. All "Tell" messages are error number 0.

1   OPTIONAL FUNCTION, NOT INSTALLED
Attempt to use option not available with current system. Time Domain Option not installed.

2   SYNTAX ERROR

3   INVALID KEY

4   SOURCE SYNTAX ERROR

5   TEST SET SYNTAX ERROR

6   SYSTEM BUS ADDRESS ERROR
Source or test set not connected to system bus. Check address selection at instrument and check analyzer address assignments.

7   SYSTEM BUS SRQ ERROR

8   FAILED PRETUNE
Pretune cycle not successfully completed. Possible causes are: failure in VTO or summing amplifier, bad IF detector or test set interconnect cable.

9   NO IF FOUND
Possible causes are: IF counter failed, defective sampler, weak VTO, or bad cable in IF path.

10   PHASE LOCK FAILURE
Pretune has been accomplished but phaselock is not achieved. Refer to the on-site service manual.

11   PHASE LOCK LOST
Phase lock established then lost. Refer to the on-site service manual.

12   VTO OVER-RANGE
VTO swept beyond its normal range. Refer to the on-site service manual.

13   SOURCE SWEEP SYNC ERROR

14   IF OVERLOAD
IF level is too high. Possible causes are: source power too high, test device output level too high.

In the normal ramp mode, the algorithm for autoranging the IF gain allows the gain to change one step at each point. If the response changes more than one IF gain step (about 15 dB), then the IF gain cannot follow the response and the message is issued that indicates a possible (but not definite) error. The error indication is displayed as the symbol O in the Enhancement Labels of the display.

15   ADC CAL FAILED
        The automatic calibration sequence for the analog-to-digital converter has failed.
        Refer to the on-site service manual.

16   IF CAL FAILED ON ?
        ? = TEST or REFERENCE. The IF calibration is out of limits. Refer to the on-site
        service manual.

17   ADC NOT RESPONDING
        Power-up message. The analog-to-digital converter is not responding. Refer to the
        on-site service manual.

18   AUTORANGE CAL FAILED ON ?
        One or more of the IF gain steps is out of limits. Refer to the on-site service manual.

19   SWEEP TIME TOO FAST
        Slow down the source sweep time.

20   UNABLE TO LOCK TO EXT 10 MHZ REFERENCE

21   NOT IMPLEMENTED IN SOURCE
        Requested function cannot be executed by source.

22   ERROR IN SAVING?
        ? = INST STATE, CAL SET, or MEMORY. A write error has been detected while
        saving data into analyzer internal memory. If repeated attempts fail, service is
        required.

23   CORRECTION OFF (MEMORY REALLOCATION)

24   CURRENT PARAMETER NOT IN CAL SET
        The recalled calibration set does not include the currently selected parameter.
        Correction is not turned on.

25   ADDITIONAL STANDARDS NEEDED

26   CORRECTION MAY BE INVALID
        Calibration set instrument state has changed. Correction is not turned off.

27   NO CALIBRATION CURRENTLY IN PROGRESS
Attemped `RESUME CAL` with no calibration in progress.

28   NO SPACE FOR NRE CAL; DELETE A CAL SET
You must delete at least one calibration set before you resume or restart
measurement calibration.

29   MORE SLIDES NEEDED

30   EXCEEDED 7 STANDARDS PER CLASS

31   NO ? FOUND
? = MEMORY or CAL SET.

32   ERROR IN RECALLING ?
? = INST STATE, CAL SET, or MEMORY. Possible analyzer memory malfunction.
If repeated attempts fail, service is required.

33   DATA OVERFLOW

34   ERROR IN DELETING CAL
Same as message number 32.

35   NO PRINTER CONNECTED

36   PRINT ABORTED

37   NO PLOTTER CONNECTED

38   PLOT ABORTED

39   NO TAPE IN DRIVE

40   TEST SET IS TOO HOT!!

41   ATTEMPTED ILLEGAL TEST SET OPERATION

42   READ ATTEMPTED WITHOUT SELECTING OUTPUT TYPE

43   WRITE ATTEMPTED WITHOUT SELECTING OUTPUT TYPE

44   DISK IS WRITE PROTECTED

45   BLOCK INPUT ERROR

46   BLOCK INPUT LENGTH ERROR

47   FILE NOT FOUND (TAPE)

48   TAPE INIT ABORTED

49   COMMAND OUT OF SEQUENCE

50   FILE ?
? = STORE, LOAD, DELETE, or UNDELETE

51   FILE ? ABORTED
? = STORE, LOAD, DELETE, or UNDELETE

52   LOAD ABORTED *data type* DATA MAY BE BAD

53   NO ROOM ON ?
? = TAPE or DISK. Data type to be stored exceeds available storage area.

54   UNABLE TO LOAD *stored data number of points* POINT
You are attempting to load `DATA: data type` stored with a different number of points than the current selection.

55   ? ERROR
? = TAPE FORMAT, TAPE DRIVE, TAPE PARITY, WRITE PROTECT, TAPE CHECKSUM, or UNKNOWN.

56   USING BACKUP DIRECTORY
Transfer important data files to new tape. Primary tape directory error.

57   DIRECTORY NOT DISPLAYED

58   PARAMETERS NOT DISPLAYED
You must display system or operating parameters before you attempt page, plot, or print operations.

59   TURN ? OFF BEFORE LOADING FILE
? = MEMORY or CORRECTION.

60   LOAD ERROR *data type* DATA MAY BE BAD

61   CAN ONLY LABEL USER PARAMETER

62   CORRECTION AND DOMAIN RESET

63   ILLEGAL '101 KEY
Keyboard error.

64   ILLEGAL '102 KEY
Keyboard error.

65   REQUESTED DATA NOT AVAILABLE
You tried to input/output raw data arrays that were not available due to the calibration type, or tried to input calibration coefficients without selecting the proper calibration type (see `INPURAW`, `OUTPRAW`), or tried to output a memory trace without turning on memory.

66   INSUFFICIENT MEMORY

67   *Not used*

68   COMMAND NOT IMPLEMENTED

69   CAL ABORTED (MEMORY REALLOCATION)

70   TURN OFF CORRECTION AND/OR TIME DOMAIN

71   CORRECTION RESET
Correction turned of due to change in instrument state. See calibration set instrument state.

72   DOMAIN RESET
Domain changed from time to frequency due to instrument state change. (Calibration set instrument state, or correction turned ON).

73   INCONSISTENT WITH CURRENT FORMAT

74   SLIDES ABORTED (MEMORY REALLOCATION)

75   SPECIFY CALSETS AND ADAPTER TO REMOVE

76	INVALID CALSET SELECTION
77	SELECT CALSET FOR PORT 1 FIRST
78	ILLEGAL UNIT OR VOLUME NUMBER
79	DISC HARDWARE PROBLEM
80	DISC IS UNFORMATTED - INITIALIZE IT
81	? INITIALIZATION FAILED ? = TAPE or DISK
82	DISC MEDIA WEARING OUT - REPLACE SOON
83	DISC IS WRONG FORMAT. INITIALIZE TO USE
84	NO *data type* FILES FOUND
85	*Generic error*
86	DATA MISSING IN FILE 'filename'
87	FILE 'filename' IS NOT CURRENT REVISION
88	FILE IS NOT *data type* DATA
89	REGISTER NUMBER ERROR IN FILE 'filename'
90	FILE 'filename' NOT FOUND ON DISC
91	DISC FILE IS NOT A RECOGNIZED FORMAT
92	UNIMPLEMENTED ASCII FILE TYPE
93	NO FILES FOUND ON DISC
94	OPERATION AVAILABLE WITH DISC ONLY Certain data types cannot be used in frequency list mode.
95	*Not used*
96	CANNOT ENTER TIME DOMAIN IN LIST MODE
97	TOO MANY SEGMENTS OR POINTS 801 points maximum, 28 segments maximum in frequency list mode.
98	FREQUENCY LIST EMPTY
99	BEYOND NON VOLATILE MEMORY LIMITS
100	LEARN STRING LENGTH ERROR
101	INVALID CALSET SELECTION
102	TARGET VALUE NOT FOUND
103	? IS NOT CURRENT STORAGE DEVICE ? = TAPE or DISK.
104	SYNTAX ERROR: ? Error is underlined on LCD/CRT.
105	NO FAST PHASE LOCK WITH THIS SOURCE
106	TURN ON CORRECTION BEFORE CREATING

107	SUBSET CANNOT CONTAIN MORE THAN 401 POINTS
108	PULSE CAL FAILURE ON ? ? = CHANNEL 1 or CHANNEL 2.
109	INVALID DURING PHASE
110	NOT AVAILABLE WHILE IN PULSE PROFILE
111	UNABLE TO RAMP WITH WIDEBAND DETECTORS
112	CAN'T UNCOUPLE IN SWEPT MULTIPLE SOURCE
113	UNABLE TO RAMP THIS DUAL SOURCE SETUP
114	MUST SELECT COUPLED STIMULUS FIRST
115	INVALID SETUP - CHECK SYSTEM BUS CONFIGURATION
116	OPERATION ABORTED
117	TRIGGER TOO FAST
118	TWO PORT CORRECTION NOT ACTIVE
119	CALIBRATION METHOD MAY BE INAPPROPRIATE
120	(source) FAILURE - FAULT INDICATOR ON
121	(source) FAILURE - RF UNLOCKED
122	(source) FAILURE - OVERMODULATION
123	(source) FAILURE - SELFTEST FAILURE
124	TO CHANGE FREQUENCY, USE 'EDIT LIST'
125	INCONSISTENT WITH CURRENT FUNCTION
126	IF NOT RESPONDING
127	SELECT DESIRED CAL TYPE
128	DATA BUFFER OVERFLOW
129	INCONSISTENT WITH CURRENT DISPLAY MODE
130	LOST PRETUNE
131	SYSTEM FREQ RANGE NOT ENOUGH FOR LPASS
132	QUICK STEP NOT VALID IN MULTIPLE SOURCE MODE
133	SYSTEM KEY NOT INSTALLED
134	DISC READ OR WRITE ERROR
135	*Not used*
136	FILE IS READ ONLY
137	DOS FORMATTING ON EXT DRIVE NOT ALLOWED
138	FILE '?' EXISTS - REPLACE IT?
139	CALSET ? RESET STATE, STATE INVALID
140	CALSET ? STATE MAY BE INVALID

141	NO DISC. CHECK DISC POWER, BUS ADDRESS
142	*Not used*
160	DISC COMMUNICATION ERROR
180	ACTIVE CALSET WRONG TYPE Active calibration set must be 1-port or 2-port to apply connector compensation.
181	SELECT PORT 1 AND/OR PORT 2 CONNECTORS Cannot save a modified calibration set unless either or both ports have been selected for compensation.
182	SELECTED PORT NOT IN CALSET The active calibration set doesn't include the port for which a compensation is attempted.
183	NO APPROPRIATE STANDARDS IN CLASS There are no standards defined in the selected calibration kit for use with connector compensation.
184	FUNCTION NOT VALID IN POWER DOMAIN
185	MUST USE STEP IN POWER DOMAIN
186	SOURCE CANNOT POWER SWEEP WITH 8510
187	FREQ LIST NOT VALID IN POWER DOMAIN
188	SINGLE POINT NOT VALID IN POWER DOMAIN
189	? WARNING - RF UNLEVELED
190	CALSET NOT VALID IN PRESENT DOMAIN
191	FLATNESS CORRECTION MUST BE PERFORMED
192	CALSET NOT VALID AT FREQ OF MEAS
193	USER1, USER2 INCORRECTLY DEFINED The User1 and User2 parameters must be defined to be a1 or b2 for receiver calibration.
194	CAN'T DO RECEIVER CAL IN POWER DOMAIN Receiver calibration can only be carried out in frequency domain.
195	SOURCE UNABLE TO CAL POWER FLATNESS
196	LIMITS NOT AVAILABLE FOR SMITH OR POLAR
197	ABORT - SOURCE UNABLE TO LEVEL POWER
198	THERE ARE NO LIMITS TO DELETE
199	NO LIMITS TO EDIT. USE 'ADD LIMIT'
200	NO SPACES AVAILABLE TO ADD NEW LIMIT
201	RAMP NOT VALID IN POWER DOMAIN

A

ABORT PRINT/PLOT

Stop a print or plot output to RS-232 port 1 or 2 or System Bus.

Programming Code

ABORPRIP

Main Menu

COPY

Program Sequence

ABORPRINP;

Manual Sequence

(COPY)
  ABORT PRINT/PLOT

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

A print or plot request using the System Bus, RS-232 port 1 or 2 is instantly stopped when this key is pressed or the programming command is issued. All data stored in the RS-232 printing buffer is also cleared. Note that any key press stops a print/plot request sent to a device connected to the System Bus. Also, prints/plots stop when the RS-232 printer buffer is full and waiting for more input.

A plot generated with an HP 7550 plotter connected to the System Bus, is not aborted by the ABORT PRINT/PLOT key. The data goes to the HP 7550 internal buffer and it does not listen to a GPIB abort.

Note This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

`ABORT PRINT/PLOT`

See Also

`PLOT TO PRINTER`, `PLOT TO PLOTTER`, `LIST TRACE VALUES`

`ADAPTER xx`

Specify calibration kit containing adapter in adapter removal modify calibration set. Where xx = the adapter class label and the calibration kit label for either calibration kit 1 or 2.

Programming Code

ADAP1 or ADAP2

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

During the adapter removal process, an estimate of the adapter's electrical length is needed. The estimate needs to be within 90° of the true phase value at each frequency, which is computed during the process.

The calibration kit that contains the adapter definition is selected by ADAP1 or ADAP2. Only one is needed. If more than one adapter is defined in the selected calibration kit, a menu providing the choices is displayed. No other characteristic of the adapter is used, other than the estimate of its electrical length, and whether it is of coax or waveguide type.

See Also

`ADAPTER REMOVAL`

ADAPTER REMOVAL

Select adapter removal modify calibration set.

Programming Code

ADAR

Main Menu

CAL

Program Sequence

```
ADAR;
  CALSPORT1; CALSn;
  CALSPORT2; CALSn;
    ADAP1; or ADAP2;
      MODS;
      CALSn;
```

Manual Sequence

CAL
 MORE
  MODIFY CAL SET
   ADAPTER REMOVAL
    CAL SET for PORT 1
     CAL SET n (n = 1 to 8)
    CAL SET for PORT 2
     CAL SET n (n = 1 to 8)
      ADAPTER xx (xx = class label and cal kit label for either cal kit 1 or 2)
       MODIFY & SAVE
        CAL SET n (n = 1 to 8)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Adapter removal is a post-calibration process for creating a calibration set for noninsertable devices. Two previous 2-port calibrations need to be made with a calibration adapter connected to port 1 in one case, and the same adapter connected to port 2 in the second case.

The adapter removal process creates a third calibration set with the effects of the adapter completely removed. The two calibration sets must have the same conditions (number of

ADAPTER REMOVAL

points, frequency range, etc.). In the frequency list mode, the internal logic checks for the same number of points, but does not check for the same frequency range.

See Also

ADAPTER XX , CAL SET n

ADD

Add frequency list segment.

Programming Code

SADD

Main Menu

STIMULUS

Program Sequence

```
EDITLIST;
  SADD;
    CENTER [value];
    SPAN [value];
    STPSIZE [value];
    SDON;
      EDITDONE;
        LISFREQ;
```

Manual Sequence

STIMULUS (MENU)
   MORE
    EDIT LIST
     ADD
      SEGMENT: START or
      STOP or
      CENTER or
      SPAN or
      NUMBER OF POINTS or
      STEP SIZE or
      CW
      DONE
     DONE

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	always coupled		

The last segment edited is added to the list for editing when the ADD key or SADD command is done. The commands that follow edit only this segment.

See Also

EDIT LIST

ADD DONE

Exit the Add Limits menu for limit lines or limit points.

Programming Code

None

Main Menu

DISPLAY

Manual Sequence

(DISPLAY)
 LIMITS
  ADD LIMIT
   ADD MAX LINE or
   ADD MIN LINE or
   ADD MAX POINT or
   ADD MIN POINT
  ADD DONE

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	always uncoupled		

Ends adding limit lines or points and returns to the prior menu.

ADD DONE

See Also

EDIT LIMIT

ADD LIMIT

Add a limit line or point.

Programming Code

Main Menu

DISPLAY

Manual Sequence

(select desired channel and stimulus parameter)

DISPLAY
  LIMITS
    ADD LIMIT
    ADD MAX LINE or
    ADD MIN LINE or
    ADD MAX POINT or
    ADD MIN POINT or
    ADD DONE

Description

Preset	N/A	**Range**	N/A
Initialization	N/A	**Recalled**	N/A
Coupled	always uncoupled		

A limit line segment or point is added to the currently selected limit table. The limit table is selected by choosing the desired channel and display parameter.

See Also

LIMITS ADD MAX LINE ADD MIN LINE ADD MAX POINT ADD MIN POINT

ADD MAX LINE

Add a limit line to define maximum valid data.

Programming Code

LIMIADDLMAX

Main Menu

DISPLAY

Program Sequence

```
LIMIADDLMAX
LIMIBEGLIM [measurement value [suffix]]
LIMIENDLIM [measurement value [suffix]]
LIMIBEGSTIM [stimulus value [suffix]]
LIMIENDSTIM [stimulus value [suffix]]
```

Manual Sequence

(DISPLAY)
 LIMITS
  ADD LIMIT
   ADD MAX LINE

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	yes
Coupled	always uncoupled		

Maximum limit lines define the values that the measurement data should not exceed, over a given domain range. A single maximum limit line is a straight line segment where the values of the beginning point and the ending point are specified both in domain units and in measurement value.

The default placement of a maximum limit line is a horizontal line that spans the entire display graph, drawn at a value about one-quarter of the way down from the top of the graph.

When PASS/FAIL is ON, the limit test will indicate FAIL if any measured data points lie vertically above the limit line.

See Also

LIMITS BEGIN STIMULUS END STIMULUS BEGIN LIMIT END LIMIT

ADD MAX POINT

Add a limit point to define maximum valid data.

Programming Code

LIMIADDPMAX

Main Menu

DISPLAY

Program Sequence

```
LIMIADDPMAX
LIMIBEGLIM [measurement value [suffix]]
LIMIBEGSTIM [stimulus value [suffix]]
```

Manual Sequence

(DISPLAY)
 LIMITS
  ADD LIMIT
   ADD MAX POINT

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	yes
Coupled	always uncoupled		

A maximum limit point is defined by both a measurement value and a stimulus value specified in domain units.

The default placement of a minimum limit point is the point marked by the center of the domain and the data value that is about one-quarter of the way down from the top of the display graph.

When PASS/FAIL is ON, the limit test will indicate FAIL if any value of the closest measured data point is greater than the specified maximum limit point.

See Also

LIMITS BEGIN STIMULUS END STIMULUS BEGIN LIMIT END LIMIT

ADD MIN LINE

Add a limit line to define minimum valid data.

Programming Code

LIMIADDLMIN

Main Menu

DISPLAY

Program Sequence

```
LIMIADDLMIN
LIMIBEGLIM [measurement value [suffix]]
LIMIENDLIM [measurement value [suffix]]
LIMIBEGSTIM [stimulus value [suffix]]
LIMIENDSTIM [stimulus value [suffix]]
```

Manual Sequence

(DISPLAY)
LIMITS
ADD LIMIT
ADD MIN LINE

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	yes
Coupled	always uncoupled		

Minimum limit lines define the values that the measurement data should not fall below, over a given domain range. A single minimum limit line is a straight line segment where the values of the beginning point and the ending point are specified both in domain units and in measurement value.

The default placement of a minimum limit line is a horizontal line that spans the entire display graph, drawn at a value about one-quarter of the way up from the bottom of the graph.

When PASS/FAIL is ON, the limit test will indicate FAIL if any measured data points lie vertically below the limit line.

See Also

LIMITS BEGIN STIMULUS END STIMULUS BEGIN LIMIT END LIMIT

ADD MIN POINT

Add a limit point to define minimum valid data.

Programming Code

LIMIADDPMIN

Main Menu

DISPLAY

Program Sequence

```
LIMIADDPMIN
LIMIBEGLIM [measurement value [suffix]]
LIMIBEGSTIM [stimulus value [suffix]]
```

Manual Sequence

DISPLAY
 LIMITS
  ADD LIMIT
  ADD MIN POINT

Description

Preset	N/A	**Range**	N/A
Initialization	N/A	**Recalled**	yes
Coupled	always uncoupled		

A minimum limit point is defined by both a measurement value and a stimulus value specified in domain units.

The default placement of a maximum limit point is the point marked by the center of the domain and the data value that is about one-quarter of the way up from the bottom of the display graph.

When PASS/FAIL is ON, the limit test will indicate FAIL if any value of the closest measured data point is less than the specified minimum limit point.

See Also

LIMITS BEGIN STIMULUS END STIMULUS BEGIN LIMIT END LIMIT

ADDRESS of 8510

GPIB address of the network analyzer.

Programming Code

ADDR8510

Main Menu

LOCAL or SYSTEM

Program Sequence

ADDR8510 [value];   *value = 00 to 30*

Manual Sequence

[LOCAL] or
[SYSTEM]
  HP-IB ADDRESSES
    ADDRESS of 8510 [entry] [x1]   (entry = 0 to 30)

Description

Preset	not changed	**Range**	0 to 30
Initialized	16	**Recalled**	no
Coupled	always coupled		

An external controller uses this address to communicate with the 8510 measurement control and data transfer functions.

The 8510 address is part of the Hardware State. It is not changed by power up, preset or recall.

See Also

HP-IB ADDRESSES

ADDRESS of DISC

Disk unit System Bus address.

Programming Code

ADDRDISC

Main Menu

LOCAL or SYSTEM

Program Sequence

ADDRDISC [value];   *value = 0 to 7*

Manual Sequence

[LOCAL]
  MORE or
[SYSTEM] HP-IB ADDRESSES
  MORE
    ADDRESS of DISC [entry] [x1] (entry = 0 to 7)

Description

Preset	not changed	Range	0 to 7
Initialized	0	Recalled	no
Coupled	always coupled		

Disk functions expect a disc drive at this address on the 8510 system bus. The DISC GPIB address is part of the Hardware State. It is not changed by power up, preset, or recall.

The 8510 uses the SUBSET/80 (SS/80) disc protocol.

See Also

HP-IB ADDRESSES , DISC UNIT NUMBER , DISC VOLUME

ADDRESS of PASS-THRU

System bus address of device to communicate with an external controller via GPIB.

Programming Code

ADDRPASS

Main Menu

LOCAL or SYSTEM

Program Sequence

ADDRPASS [value];   *value = 00 to 31*

Manual Sequence

[LOCAL]
 MORE or
[SYSTEM]
 HP-IB ADDRESSES
  MORE
   ADDRESS of PASS-THRU [entry] [x1]   (entry = 0 to 31)

Description

Preset	not changed	Range	0 to 31
Initialized	31	Recalled	no
Coupled	always coupled		

Pass-thru allows transfer of commands and data between an external controller connected to the 8510 GPIB and the network analyzer system instruments connected to the 8510 System Bus.

Data bytes written to the 8510 System Bus address (see ADDRESS of SYSTEM BUS) will be "passed through" without interpretation by the 8510 to the instrument on the 8510 System Bus whose address corresponds to the current value for ADDRESS of PASS-THRU .

If the instrument on the system bus is commanded to output data, the data bytes from the instrument will be "passed through" and be available at the 8510 System Bus address.

The sending instrument must terminate its output with a linefeed.

Address 31 is an illegal address for an instrument, but is used to address the 8510 user display area of memory. A separate section at the end of this dictionary is devoted to user display keywords and describes the HP-GL command subset which allows graphics and text to be written to the 8510 LCD/CRT.

ADDRESS of PASS-THRU

Except for pass-through address 31, GPIB activity at the 8510 System Bus address causes an automatic System Bus "LOCAL." After completion of a pass-thru operation, the next GPIB activity (GPIB command or 8510 instruction) at the 8510 GPIB address causes an automatic System Bus "REMOTE."

GPIB addressed or universal commands cannot be passed-through to an instrument on the System Bus.

The PASS-THRU address is part of the Hardware State. It is not changed by power up, preset, or recall.

See Also

HP-IB ADDRESSES, ADDRESS of SYSTEM BUS

ADDRESS of
  PLOTTER: HP-IB

Digital plotter System Bus address.

Programming Code

ADDRPLOT

Main Menu

SYSTEM or LOCAL

Program Sequence

ADDRPLOT [value];   *value = 00 to 30*

Manual Sequence

[LOCAL]
  MORE or
[SYSTEM]
  HP-IB ADDRESSES
    MORE
      ADDRESS of PLOTTER: HP-IB [entry] (x1)   (entry = 0 to 30)

Description

Preset	not changed	Range	0 to 30
Initialized	05	Recalled	no
Coupled	always coupled		

COPY functions expect the system digital plotter at this address on the 8510 System Bus.

The 8510 outputs variable length HP-GL strings using standard GPIB digital plotter protocol.

The plotter GPIB address is part of the Hardware State. It is not changed by power up, preset or recall.

See Also

HP-IB ADDRESSES , ADDRESS of PLOTTER: RS-232 PORT #1,
ADDRESS of PLOTTER: RS-232 PORT #2

ADDRESS of PLOTTER: RS-232 PORT #1

Specify that a digital plotter with a serial input port is connected to RS-232 port 1.

Programming Code

PLOTRSP1

Main Menu

LOCAL or SYSTEM

Program Sequence

    PLOTRSP1;

Manual Sequence

[LOCAL]
  MORE or
[SYSTEM]
  HP-IB ADDRESSES
    MORE
      ADDRESS of PLOTTER: RS-232 PORT #1

`ADDRESS of PLOTTER: RS-232 PORT #1`

Description

Preset	not changed	Range	N/A
Initialized	`ADDRESS of PLOTTER: HP-IB` address= 05	Recalled	no
Coupled	always coupled		

The plotter port selection is part of the Hardware State. It is not changed by power up, preset, or recall. If the address for a plotting device is set to one of the RS-232 ports and no device is actually connected, the analyzer is unable to determine the situation. Pressing `PLOT TO PLOTTER` causes the analyzer to report `PLOT COMPLETE` even though no plotting device is connected to the selected RS-232 port.

To work with the network analyzer RS-232 ports, set printers to the following:

Baud Rate: 9600 Baud

Word Size: 8 bits

Parity: None

Stop Bits: One

Handshaking: XON/XOFF

Some plotters have additional settings. They are as follows:

Duplex: Half

Mode: Standalone

Direct or   Direct
Modem:

Bypass: Off

On the rear-panel of the network analyzer are 9-pin male RS-232 connectors, identical to those used on most current personal computers. The Agilent 24542G three metre cable is a 9-pin female to 25-pin male RS-232 cable that works for most printers and plotters. The HP 7550A plotter requires an Agilent 24542H three meter RS-232 cable (9-pin female to 25-pin female).

Note   This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

`ADDRESS of PLOTTER: HP-IB` , `PLOT TO PLOTTER` , `ADDRESS of PRINTER: RS-232 PORT #1`

ADDRESS of PLOTTER: RS-232 PORT #2

Specify that a digital plotter with a serial input port is connected to RS-232 port 2.

Programming Code

PLOTRSP2

Main Menu

LOCAL or SYSTEM

Program Sequence

```
PLOTRSP2;
```

Manual Sequence

[LOCAL]
  MORE or
[SYSTEM]
  HP-IB ADDRESSES
    MORE
      ADDRESS of PLOTTER: RS-232 PORT #2

Description

Preset	not changed	Range	N/A
Initialized	ADDRESS of PLOTTER: HP-IB address= 05	Recalled	no
Coupled	always coupled		

The plotter port selection is part of the Hardware State. It is not changed by power up, preset, or recall. If the address for a plotting device is set to one of the RS-232 ports and no device is actually connected, the analyzer is unable to determine the situation. Pressing PLOT TO PLOTTER causes the analyzer to report PLOT COMPLETE even though no plotting device is connected to the selected RS-232 port.

Note   This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

ADDRESS of PLOTTER: HP-IB , ADDRESS of PLOTTER: RS-232 PORT #1, PLOT TO PLOTTER

ADDRESS of POWERMETER

Power meter System Bus address.

Programming Code

ADDRPOWE

Main Menu

LOCAL or SYSTEM

Program Sequence

ADDRPOWE [value]; *value = 0 to 30*

Manual Sequence

(LOCAL) or
(SYSTEM)
 HP-IB ADDRESSES
   ADDRESS of POWERMETER [entry (x1)]   (entry = 0 to 30)

Description

Preset	not changed	Range	0 to 30
Initialized	13	Recalled	no
Coupled	always coupled		

Flatness correction calibration routines (8360 series synthesizers only) expect a power meter (Agilent 437B, 438A, or 436A) on the System Bus. For proper operation, the power meter must be set up prior to initiating a flatness correction calibration routine.

The power meter GPIB address is part of the Hardware State. It is not changed by power up, preset, or recall.

See Also

CALIBRATE FLATNESS , HP-IB ADDRESSES

ADDRESS of PRINTER: HP-IB

Printer System Bus address.

Programming Code

ADDRPRIN

Main Menu

LOCAL or SYSTEM

Program Sequence

ADDRPRIN [value];   *value = 00 to 30*

Manual Sequence

[LOCAL]
 MORE or
[SYSTEM]
 HP-IB ADDRESSES
  MORE
   ADDRESS of PRINTER: HP-IB [entry] [x1]   (entry = 0 to 30)

Description

Preset	not changed	Range	0 to 30
Initialized	01	Recalled	no
Coupled	always coupled		

COPY functions expect the system printer at this address on the 8510 System Bus.

The 8510 uses standard GPIB line printer protocol.

The printer GPIB address is part of the Hardware State. It is not changed by power up, preset, or recall.

See Also

HP-IB ADDRESSES , ADDRESS of PRINTER: RS-232 PORT #1,
ADDRESS of PRINTER: RS-232 PORT #2

```
ADDRESS of
 PRINTER:
 RS-232 PORT #1
```

Specify that an RS-232 type printer is connected at RS-232 port 1.

Programming Code

PRINRSP1

Main Menu

LOCAL or SYSTEM

Program Sequence

```
PRINRSP1;
```

Manual Sequence

(LOCAL)
  `MORE` or
(SYSTEM)
  `HP-IB ADDRESSES`
    `MORE`
      `ADDRESS of PRINTER: RS-232 PORT #1`

Description

Preset	not changed	**Range**	N/A
Initialized	`ADDRESS of PRINTER: HP-IB` address = 01	**Recalled**	no
Coupled	always coupled		

The printer port selection is part of the Hardware State. It is not changed by power up, preset, or recall. If the address for a plotting device is set to one of the RS-232 ports and no device is actually connected, the analyzer is unable to determine the situation. Pressing `PLOT TO PLOTTER` causes the analyzer to report `PLOT COMPLETE` even though no plotting device is connected to the selected RS-232 port.

To work with the network analyzer RS-232 ports, set printers to the following:

Baud Rate: 9600 Baud

Word Size: 8 bits

Parity: None

Stop Bits: One

Handshaking: XON/XOFF

On the rear-panel of the network analyzer are 9-pin male RS-232 connectors, identical to those used on most current personal computers. The Agilent 24542G three metre cable is a 9-pin female to 25-pin male RS-232 cable that works for most printers and plotters.

Note	This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

ADDRESS of PRINTER: HP-IB , ADDRESS of PRINTER: RS-232 PORT #2 PLOT TO PRINTER , ADDRESS of PLOTTER: RS-232 PORT #1

ADDRESS of PRINTER: RS-232 PORT #2

Specify that an RS-232 type printer is connected at RS-232 port 2.

Programming Code

PRINRSP2

Main Menu

LOCAL or

Program Sequence

PRINRSP2;

`ADDRESS of PRINTER: RS-232 PORT #2`

Manual Sequence

(LOCAL)
  `MORE` or
(SYSTEM)
  `HP-IB ADDRESSES`
    `MORE`
      `ADDRESS of PRINTER: RS-232 PORT #2`

Description

Preset	not changed	Range	N/A
Initialized	`ADDRESS of PRINTER: HP-IB` address = 01	Recalled	no
Coupled	always coupled		

The printer port selection is part of the Hardware State. It is not changed by power up, preset, or recall. If the address for a plotting device is set to one of the RS-232 ports and no device is actually connected, the analyzer is unable to determine the situation. Pressing `PLOT TO PLOTTER` causes the analyzer to report `PLOT COMPLETE` even though no plotting device is connected to the selected RS-232 port.

Note   This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

`ADDRESS of PRINTER: HP-IB` , `ADDRESS of PRINTER: RS-232 PORT #1`

`ADDRESS of RF SWITCH`

RF switch System Bus address.

Programming Code

ADDRRFS

Main Menu

LOCAL or SYSTEM

Program Sequence

ADDRRFS [value]; *value = 00 to 31*

Manual Sequence

(LOCAL) or
(SYSTEM)
 HP-IB ADDRESSES
  ADDRESS of RF SWITCH [entry] (x 1) (entry = 0 to 31)

Description

Preset	not changed	**Range**	0 to 31
Initialized	31	**Recalled**	no
Coupled	always coupled		

The RF switch GPIB address is part of the Hardware State. It is not changed by power up, preset, or recall. This is for use in conjunction with multiple test sets, and switching the RF power. See ADDRESS of TEST SET for additional information.

See Also

HP-IB ADDRESSES , ADDRESS OF TEST SET

ADDRESS of SOURCE #1

Source #1 System Bus address.

Programming Code

ADDRSOUR

ADDRESS of SOURCE #1

Main Menu

LOCAL or SYSTEM

Program Sequence

ADDRSOUR [value];   *value = 00 to 31*

Manual Sequence

(LOCAL) or
(SYSTEM)
 HP-IB ADDRESSES
  ADDRESS of SOURCE #1 [entry] (x1)   (entry = 0 to 31)

Description

Preset	not changed	**Range**	0 to 30
Initialized	19	**Recalled**	no
Coupled	always coupled		

8510 measurement control functions expect the network analyzer source at this address on the 8510 System Bus. The address of a source on the System Bus should never be changed unless the analyzer is in the HOLD mode. First change the source address switch and then change the address entry to the analyzer. The system locks up when this sequence is not followed. In multiple source systems, take the system out of multiple source mode before making any changes.

Setting the softkey ADDRESS of SOURCE #1 to 31 indicates that there is no source on the 8510 System Bus. The system source functions are controlled by an external controller. No source tuning operations are attempted.

Phase lock operations use the current stimulus frequency settings, unless LOCK to NONE is selected. Stimulus frequency limits become 45 MHz to 40 GHz (999 GHz if no test set is connected) instead of the normal source or test set frequency limitations.

When the address of source #1 is changed back to the address of the instrument, press:

STIMULUS (MENU) MORE
 CONTINUAL

to restart the source.

If the 8510 is used in the hold mode without a source connected and the source address is set to anything other than 31, or if the source is turned off (regardless of setting), caution beeps result. Setting the address of source #1 to 31 eliminate the caution beeps.

The source #1 GPIB address is part of the Hardware State. It is not changed by power up, preset, or recall.

See Also

HP-IB ADDRESSES , TRIG

ADDRESS of SOURCE #2

Source #2 System Bus address.

Programming Code

ADDRSOU2

Main Menu

LOCAL or SYSTEM

Program Sequence

ADDRSOU2 [value]; *value = 0 to 31*

Manual Sequence

(LOCAL) or
(SYSTEM)
  HP-IB ADDRESSES
    ADDRESS of SOURCE # 2 [entry] (x1) (entry = 0 to 31)

Description

Preset	not changed	Range	0 to 31
Initialized	31	Recalled	no
Coupled	always coupled		

In multiple source mode, the 8510 talks to the second source at this address. The initialized address is 31. For multiple source operation, the recommended value is 18.

The address of a source on the System Bus should never be changed unless the analyzer is in the HOLD mode. First change the source address switch and then change the address entry to the analyzer. The system locks up when this sequence is not followed. In multiple source

`ADDRESS of SOURCE #2`

systems, take the system out of multiple source mode before making any changes. Changing the address of the second source must always be followed by an instrument preset.

The source #2 GPIB address is part of the Hardware State. It is not changed by power up, preset, or recall.

See Also

`HP-IB ADDRESSES`

`ADDRESS of SYSTEM BUS`

GPIB address of 8510 System Bus.

Programming Code

ADDRSYSB

Main Menu

SYSTEM or LOCAL

Program Sequence

ADDRSYSB [value];   *value = 00 to 30*

Manual Sequence

[LOCAL] or
[SYSTEM]
 `HP-IB ADDRESSES`
  `ADDRESS of SYSTEM BUS` [entry] [x1]   (entry = 0 to 30)

Description

Preset	not changed	**Range**	0 to 30
Initialized	17	**Recalled**	no
Coupled	always coupled		

An external controller uses this address to communicate with the 8510 System Bus.

The System Bus GPIB address is part of the Hardware State. It is not changed by power up, preset, or recall. It is not recommended to change this entry via GPIB because this can cause the 8510 to stop responding via GPIB.

See Also

HP-IB ADDRESSES , ADDRESS of PASS-THRU

ADDRESS of TEST SET

Test set System Bus address.

Programming Code

ADDRTESS

Main Menu

LOCAL or SYSTEM

Program Sequence

ADDRTESS [value];   *value = 00 to 31*

Manual Sequence

[LOCAL] or
[SYSTEM]
  HP-IB ADDRESSES
    ADDRESS of TEST SET [entry] [x1]   (entry = 0 to 31)

Description

Preset	not changed	Range	0 to 31
Initialized	20	Recalled	no
Coupled	always coupled		

8510 measurement control functions expect the test set at this address on the 8510 System Bus. If the test set is turned off or is not connected to the System Bus, a caution beep and an error message is displayed and the test set will not execute the command.

Setting the address of the test set to 31 indicates that the test set is not connected to the 8510 System Bus (signal routing is controlled manually or by an external controller). No test set signal path control functions are attempted.

The test set GPIB address is part of the Hardware State. It is not changed by power up, preset, or recall.

If the address of the RF switch is <31, changing the address of the test set will send commands via the System Bus to devices such as the Agilent 11713A driver.

Table A-1. 11713A Driver RF Switch Settings

Modulo of Test Set Address/4	Switch S9	Switch S0
0	OFF	OFF
1	OFF	ON
2	ON	OFF
3	ON	ON

See Also

HP-IB ADDRESSES , ADDRESS of PASS-THRU , ADDRESS of RF SWITCH

ADJUST DISPLAY

Present the adjust display menu.

Programming Code

None

Main Menu

DISPLAY

Manual Sequence

(DISPLAY)
ADJUST DISPLAY
INTENSITY or
BACKGROUND INTENSITY or
MODIFY COLORS or
DEFAULT COLORS or
SAVE COLORS or
RECALL COLORS or
EXTERNAL VIDEO

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Allows adjustment of different attributes of the LCD/CRT display. With the exception of external video synchronization, all other modified attributes can be saved and recalled by SAVE COLORS and RECALL COLORS .

Cycling power changes all color adjustments to the default defined settings. To recall previously modified color attributes, use the RECALL COLORS softkey.

(USER PRESET) does not affect the attributes.

Note	This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

DEFAULT COLORS , INTENSITY , BACKGROUND INTENSITY , MODIFY COLORS , SAVE COLORS , RECALL COLORS , EXTERNAL VIDEO

ALL SEGMENTS

Measure all frequency list segments.

Programming Code

ASEG

Main Menu

STIMULUS

Program Sequence

```
LISFREQ;
  ASEG; or
  SSEGn;  n = segment number
```

Manual Sequence

```
STIMULUS (MENU)
  FREQUENCY LIST
    ALL SEGMENTS or SINGLE SEGMENT
    (use knob, step, or numeric entry to select segment)
```

`ALL SEGMENTS`

Description

Preset	all segments	Range	N/A
Initialized	all segments	Recalled	yes
Coupled	always coupled		

When more than one segment is defined, after pressing the softkey `FREQUENCY  LIST`, the frequency list segment select menu appears. `ALL SEGMENTS` selects measurement of all segments in the current frequency list.

See Also

`FREQUENCY LIST`, `SINGLE SEGMENT`

`ANALOG OUT OFF`

Analog output off.

Programming Code

ANAOOFF

Main Menu

SYSTEM

Program Sequence

ANAOOFF;

Manual Sequence

(SYSTEM)
`MORE`
  `ANALOG OUT OFF` or `ANALOG OUT ON`

Description

Preset	analog out off	Range	N/A
Initialized	analog out off	Recalled	yes
Coupled	always uncoupled		

This function enables an analog voltage output that represents the displayed data. This signal represents the vertical axis only, and appears at the AUX OUT connector on the rear panel of the 85102 IF/Detector.

The analog output full-scale limit value is 7.8 V, so any displayed signal > 5 vertical divisions from the center reference line will "clip" the analog output signal (the center reference line represents an analog output of zero volts). In these cases, vary the scale/division and/or reference position to keep the displayed trace amplitude within the diplay limits, and thereby the analog output limits.

An analog output voltage of 1.56 V corresponds to a displayed signal amplitude of one vertical division on the display (the minimum resolution is 5 mV). This function is disabled when Aux. Volt Output Domain is selected.

If ANALOG OUT is ON when both channels are displayed (dual channel function), then only the selected channel is output.

See Also

AUX DOMAIN

ANALOG OUT ON

Analog output on.

Programming Code

ANAOON

Programming Sequence

ANAOON;

Description

Preset	analog out off	Range	N/A
Initialized	analog out off	Recalled	yes
Coupled	always uncoupled		

See Also

ANALOG OUT OFF

ATTENUATOR PORT: n

Test port attenuation in S-parameter test sets. Where n = 1 or 2.

Programming Code

ATTP1 or ATTP2

Main Menu

STIMULUS

Program Sequence

ATTP1 [value];   *value = 0, 10, 20, 30, 40, 50, 60, 70, 80, or 90*
ATTP2 [value];   *value = 0, 10, 20, 30, 40, 50, 60, 70, 80, or 90*

Manual Sequence

STIMULUS (MENU)
  POWER MENU
    ATTENUATOR PORT: 1 [entry] (x1) or
    ATTENUATOR PORT: 2 [entry] (x1)
            (entry = 0, 10, 20, 30, 40, 50, 60, 70, 80, or 90)

Description

Preset	0 dB	Range	0 to 90 dB, in 10 dB steps
Initialized	o dB	Recalled	yes
Coupled	always coupled		

This function allows changing the signal level at the test port of an S-parameter test set equipped with a step attenuator without changing the reference signal level. The test port attenuator range for these test sets is 0 to 90 dB in 10 dB steps.

If the entry is not an exact multiple of 10, then the attenuator is set to the next lower multiple of 10.

This instruction is ignored if the test set used is not equipped with a programmable step attenuator.

Attenuator settings are part of the Cal Set Limited Instrument State and are recalled with the calibration set. Changing either attenuator with correction on will not cause correction to be turned off but may result in measurement errors due to the change in signal levels.

See Also

ANALOG OUT OFF

(AUTO)

Automatic selection of the reference value and scaling factor for the selected channel.

Programming Code

AUTO

Program Sequence

AUTO;

Manual Sequence

(AUTO)

Description

Preset	display: data	Range	N/A
Initialized	display: data	Recalled	yes
Coupled	always coupled		

Selects values for a reference value (see (REF VALUE)) and a scale/division (see (SCALE)), to place the entire data trace within the graticule. Pressing (AUTO) does not change the current active function.

If DISPLAY: DATA and MEMORY is selected, then (AUTO) operates only on the data trace.

If DISPLAY: MEMORY is selected, then (AUTO) operates only on the memory trace.

AUTO DELAY

Automatic selection of electrical delay to balance phase.

Programming Code

AUTD

Main Menu

RESPONSE

AUTO DELAY

Program Sequence

AUTD;

Manual Sequence

(select channel)
(select parameter)
RESPONSE [MENU]
  AUTO DELAY
    ELECTRICAL DELAY to view delay value

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

This function automatically selects an electrical delay value that "flattens" the phase response in the region of the selected marker. The result should approximate a trace that has excess phase (or delay) removed.

If no marker is active, this function activates the last active marker (marker 1 = default).

See Also

ELECTRICAL DELAY

AUTO FEED OFF

Turn off the automatic form feed at the end of output to a printer/plotter.

Programming Code

LISAUTFOFF or PLOTAUTFOFF or PRINAUTFOFF

Main Menu

COPY

Program Sequence

LISAUTFOFF *or*
PLOTAUTFOFF; *or*
PRINAUTFOFF;

Manual Sequence

(COPY)
DEFINE LIST or
DEFINE PLOT or
DEFINE PRINT
    AUTO FEED OFF

Description

Preset	on	Range	N/A
Initialized	on	Recalled	yes
Coupled	always coupled		

See Also

AUTO FEED ON , FORM FEED , DEFINE LIST , DEFINE PLOT , DEFINE PRINT

AUTO FEED ON

Turn on the automatic form feed at the end of output to a printer/plotter.

Programming Code

LISAUTFON or PLOTAUTFON or PRINAUTFON

Main Menu

COPY

Program Sequence

LISAUTFON *or*
PLOTAUTFON; *or*
PRINAUTFON;

`AUTO FEED ON`

Manual Sequence

[COPY]
>`DEFINE LIST` or
>`DEFINE PLOT` or
>`DEFINE PRINT`
>>`AUTO FEED ON`

Description

Preset	on	**Range**	N/A
Initialized	on	**Recalled**	yes
Coupled	always coupled		

Use this feature with devices that can advance paper automatically (printer or plotter with a paper feed feature, such as an HP 7550A). Turn this feature off when you want to put more than one image on a sheet of paper.

See Also

`AUTO FEED OFF`, `FORM FEED`, `DEFINE LIST`, `DEFINE PLOT`, `DEFINE PRINT`

`AUX. VOLT OUTPUT`

Measurement synchronized to the AUX OUT BNC.

Programming Code

AUXV

Main Menu

DOMAIN

Program Sequence

```
FREQ;
RAMP; or STEP; or LISFREQ;
STAR [value [freq suffix]];
AUXV;
(use start/stop/center/span controls to set staircase)
(use sweep or dwell time to set time to gather data)
```

Manual Sequence

[DOMAIN] FREQUENCY
STIMULUS [MENU]
  RAMP or
  STEP or
  FREQUENCY LIST
[START] [entry]   (entry = desired measurement frequency and terminator)
[DOMAIN] AUX. VOLT OUTPUT
[START] [entry] or
[STOP] [entry] or
[CENTER] [entry] or
[SPAN] [entry]   (to set voltage sweep)
STIMULUS [MENU]
  SWEEP TIME [entry] or
  DWELL TIME [entry]   (to set time to gather data)

Description

Preset	frequency domain	Range	−10 V to +9.95 V with 4.88 mV minimum step 10 mA maximum current
Initialized	frequency domain	Recalled	yes
Coupled	maybe uncoupled		

If in the start/stop or center/span sweep mode, the frequency sweep is stopped at the current start frequency. If in SINGLE POINT mode, the frequency is not changed.

After selecting RAMP, the stimulus controls set the range, sweep time, and number of points of digital ramp staircase (x-axis) available at 8510 rear panel AUX. OUT ANALOG ±10 V connector.

AVERAGING OFF

Turn off averaging for selected channel.

Programming Code

AVEROFF

AVERAGING OFF

Main Menu

RESPONSE

Program Sequence

AVEROFF;

Manual Sequence

RESPONSE (MENU)
AVERAGING OFF

Description

Preset	averaging off	Range	N/A
Initialized	factor = 1	Recalled	yes
Coupled	always uncoupled		

When AVERAGING ON/restart is selected, the last selected averaging factor is recalled.

See Also

AVERAGING ON/restart

AVERAGING
ON/restart

Turn on or change averaging for selected channel.

Programming Code

AVERON

Main Menu

RESPONSE

Program Sequence

AVERON [value]; *value = 1 to 4096, 2n sequence*

Manual Sequence

RESPONSE [MENU]
AVERAGING ON/restart [entry] (x1) (entry = 1 to 4096, 2n sequence)

Description

Preset	averaging off	**Range**	1 to 4096
Initialized	averaging off	**Recalled**	yes
Coupled	always uncoupled		

Starts or restarts averaging with the current (or new) averaging factor. Any sweep in progress is aborted and restarted. When averaging is turned on for the current selected channel, the enhancement annotation A is displayed in the enhancement labels area of the LCD/CRT.

Averaging is always uncoupled, and must be turned on separately for each channel. Averaging is saved as part of the instrument state. Averaging is useful for noise reduction.

Selecting a calibration standard for measurement automatically initiates NUMBER of GROUPS (1 group in the step mode; n+1 groups in the ramp mode, where n is the current averaging factor) then returns to CONTINUOUS or HOLD as previously selected. See NUMBER of GROUPS.

If a value, not in a 1, 2, 4, 8, ... , 4096 sequence is entered, then the next lowest power of 2 number in the sequence is used as the averaging factor.

In dual-channel operation with 401-point and full 2-port error correction, the correction is reset if different averaging factors are used on the two channels. This happens because of lack of available memory. The same averaging factor must be used for both channels for 401-point, full 2-port error correction.

`AVERAGING ON/restart`

RAMP mode: Exponential running average with fast convergence algorithm. The displayed trace equals:

$\{(1/n) \times \text{current data}\} + \{(n\text{-}1) / n) \times \text{last trace}\}$

after n+1 groups (n = averaging factor).

STEP mode: Block (linear) average n readings at each point.

SINGLE POINT mode: Block average n readings.

Averaging is also automatically restarted by selecting MEASUREMENT (RESTART) or selecting a calibration standard for measurement or changing the averaging factor or selecting `NUMBER of GROUPS` or selecting a new parameter.

See `SINGLE` (step mode) or `NUMBER of GROUPS` (ramp mode) for program control of the averaging process during device measurement.

Averaging produces a theoretical increase in dynamic range:

Increase (dB) = $10 \log_{10}$ (Averaging Factor)

10 dB = $10 \log_{10} (10)$

36 dB = $10 \log_{10} (4096)$

The actual maximum increase is more nearly 15 to 20 dB, however, because noise is not just thermally related. Crosstalk and other sources of noise must also be considered.

See Also

`SINGLE` (step mode), `NUMBER of GROUPS` (ramp mode)

BACKGROUND INTENSITY

Set the background intensity of a CRT display (does not apply to an LCD display).

Programming Code

BACI

Main Menu

DISPLAY

Program Sequence

```
BACI [value];    value = 0 to 100
SAVC;
```

Manual Sequence

(DISPLAY)
 ADJUST DISPLAY
  BACKGROUND INTENSITY [entry (x1)]   (entry = 0 to 100)
  SAVE COLORS

Description

Preset	not changed	Range	0 to 100%
Initialized	0%	Recalled	yes, using
			SAVE COLORS ,
			RECALL COLORS
Coupled	always coupled		

Background intensity is measured in percentage of white, with 0% being black and 100% being white. The default value is 0%. Cycling power causes the default value to be selected. (USER PRESET) does not affect background intensity.

BACKGROUND INTENSITY

Note	This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

INTENSITY , MODIFY COLORS , EXTERNAL VIDEO , DEFAULT COLORS

BACK SPACE

On the Title menu, backspace to replace last character in the title.

Programming Code

None

Main Menu

SYSTEM

Manual Sequence

SYSTEM
  DISPLAY FUNCTIONS
    TITLE
    (use knob to select character)
      BACK SPACE to remove last character selected
      [other changes]
    TITLE DONE

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

TITLE , PARAMETER LABEL , LABEL: xx , LABEL KIT , LABEL STD

BACKSPACE

Backspace to replace the last character in active function entry.

Programming Code

None

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Part of the ENTRY area. If pressed immediately after selection of an active function, it clears the active function value from screen but it does not change the value of the active function.

This key has no effect if no active function is currently selected.

BEEPER OFF

Turn caution/warning beeper off.

Programming Code

BEEPOFF

Main Menu

SYSTEM

Program Sequence

```
BEEPOFF;
```

Manual Sequence

(SYSTEM) BEEPER OFF

`BEEPER OFF`

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	no
Coupled	always coupled		

Beeper status is part of the hardware state. It is not changed by power up, preset, or recall.

`BEEPER ON`

Turn caution/warning beeper on.

Programming Code

BEEPON

Main Menu

SYSTEM

Program Sequence

BEEPOFF;

Manual Sequence

(SYSTEM) `BEEPER ON`

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	no
Coupled	always coupled		

See Also

`BEEPER OFF`

BEGIN LIMIT

Set the measurement value of the beginning of a limit segment.

Programming Code

LIMIBEGLIM [measurement value [suffix]]

Main Menu

DISPLAY

Program Sequence

See ADD MAX LINE, ADD MIN LINE, ADD MAX POINT, ADD MIN POINT, or EDIT LIMIT.

Manual Sequence

(DISPLAY)
  LIMITS
    ADD MAX LINE or
    ADD MIN LINE or
    ADD MAX POINT or
    ADD MIN POINT
BEGIN LIMIT [entry] [x1]

or
LIMITS [entry] [x1]
  EDIT LIMIT
    BEGIN LIMIT [entry] [x1]

(entry = segment number to edit; x1 = fundamental measurement units)

Description

Preset	N/A	Range	±500
Initialization	N/A	Recalled	N/A
Coupled	always uncoupled		

The measurement value of a limit point, or the left end of a limit line segment, is set by making an entry. The value can be modified later by selecting the correct limit segment from the limit table, either by entering the LIMIT LINE menu or by using the LIMIEDITSEG GPIB command.

BEGIN LIMIT

See Also

LIMITS EDIT LIMIT

BEGIN STIMULUS

Set the stimulus value of the beginning of a limit segment.

Programming Code

LIMIBEGSTIM [stimulus value [suffix]]

Main Menu

DISPLAY

Program Sequence

See ADD MAX LINE , ADD MIN LINE , ADD MAX POINT , ADD MIN POINT , or EDIT LIMIT .

Manual Sequence

(DISPLAY)
 LIMITS
 ADD MAX LINE or
 ADD MIN LINE or
 ADD MAX POINT or
 ADD MIN POINT
BEGIN STIMULUS [entry] [x1]

or
LIMITS [entry] [x1]
 EDIT LIMIT
  BEGIN STIMULUS [entry] [x1]

(entry = segment number to edit; x1 = fundamental measurement units)

Description

Preset	N/A	Range	full domain
Initialization	N/A	Recalled	yes
Coupled	always uncoupled		

The domain value (horizontal position) of a limit point or the left end of a limit line segment is set by making an entry. The value can be modified later by selecting the correct limit segment from the limit table, either by entering the LIMIT LINE menu or by using the LIMIEDITSEG GPIB command.

See Also

LIMITS EDIT LIMIT

BLACK

Set the specified display element to black.

Programming Code

None

Main Menu

DISPLAY

Manual Sequence

(DISPLAY)
  ADJUST DISPLAY
  MODIFY COLORS
    (select display element)
    PREDEFINED COLORS
     BLACK
     [other changes]
    (PRIOR MENU)
   (PRIOR MENU)
  (PRIOR MENU)
  SAVE COLORS

Description

Preset	not changed	Range	N/A
Initialized	tint=0 brightness = 0% color = 0%	Recalled	yes, using SAVE COLORS , RECALL COLORS
Coupled	always coupled		

The color black has no usable range for tint or color.

BLACK

Note	This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

PREDEFINED COLORS MODIFY COLORS DEFAULT COLORS

BRIGHTNESS

Adjust the brightness of the color being modified.

Programming Code

CBRI

Main Menu

DISPLAY

Manual Sequence

[DISPLAY]
 ADJUST DISPLAY
 MODIFY COLORS
 (select display element)
 BRIGHTNESS [entry (x1)] (entry = 0 to 100)
 [other changes]
 [PRIOR MENU]
 [PRIOR MENU]
[PRIOR MENU]
SAVE COLORS

Description

Preset	not changed	Range	0 to 100%
Initialized	varies with color selected	Recalled	yes, using SAVE COLORS , RECALL COLORS
Coupled	always coupled		

A measure of the luminance of the color (very dim to intense). The brightness default setting varies with the color.

The most frequently occurring color deficiency is the inability to distinguish red, yellow, and green from one another. Confusion among these colors usually can be eliminated by increasing the brightness difference between the colors.

Note   This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

PREDEFINED COLORS   MODIFY COLORS   DEFAULT COLORS

C

C_n

Terms in open circuit capacitance model (varies with term, see below). Where n = 0, 1, 2, or 3.

Programming Code

C0 or C1 or C2 or C3

Main Menu

CAL

Program Sequence

```
MODI1; or MODI2;
 DEFS value;
  STDTOPEN;
     C0 [value];    value = ×10⁻¹⁵F
     C1 [value];    value = ×10⁻²⁷F/Hz
     C2 [value];    value = ×10⁻³⁶F/Hz²
     C3 [value];    value = ×10⁻⁴⁵F/Hz³
     [other changes]
       STDD;
      [other changes]
         KITD;
```

The value units are: $value = \times 10^{-15} F$, $value = \times 10^{-27} F/Hz$, $value = \times 10^{-36} F/Hz^2$, $value = \times 10^{-45} F/Hz^3$

Manual Sequence

(CAL) MORE
 MODIFY 1 xx (xx = cal kit 1 label) or
 MODIFY 2 xx (xx = cal kit 2 label)
  DEFINE STANDARD entry ×1 (entry = 1 − 21)
   STD TYPE: OPEN
      C_0 [entry] (X1) (entry = $\times 10^{-15}$ F)
      C_1 [entry] (X1) (entry = $\times 10^{-27}$ F/Hz)
      C_2 [entry] (X1) (entry = $\times 10^{-36}$ F/Hz²)
      C_3 [entry] (X1) (entry = $\times 10^{-45}$ F/Hz³)
       [other changes]
       STD DONE (DEFINED)

`C_n`

    [other changes]
    KIT DONE (MODIFIED)

Description

Preset	N/A	Range	−10 k to +10 k
Initialized	depends on cal kit	Recalled	N/A
Coupled	N/A		

Specify the capacitive phase shift of the open-circuit standard using:

$$C_{total} = C_0 + (C_1 \times f) + (C_2 \times f^2) + (C_3 \times f^3)$$

where:

  f is the current frequency in Hz,
  $C_0 = \times 10^{-15}$ Farads,
  $C_1 = \times 10^{-27}$ Farads,
  $C_2 = \times 10^{-36}$ Farads, and
  $C_3 = \times 10^{-45}$ Farads

Manual and program entries assume that the values are input in the specified units.

[CAL]

Presents the calibration menu.

Programming Code

MENUCAL

Program Sequence

    MENUCAL;

Manual Sequence

[CAL]
  CORRECTION ON or
  CORRECTION OFF or
  CAL 1 xx (xx = cal kit 1 label) or
  CAL 2 xx (xx = cal kit 2 label) or
  RESUME CAL SEQUENCE or
  MORE
    PORT EXTENSIONS or
    SET Z_0 or
    TRIM SWEEP or

MODIFY CAL SET or

MODIFY 1 xx (xx = cal kit 1 label) or

MODIFY 2 xx (xx = cal kit 2 label) or

DELETE CAL SET

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

CAL 1 xx, CAL 2 xx

CAL 1 xx

Begin measurement calibration sequence using calibration kit 1. Where xx = cal kit 1 label.

Programming Code

CAL1

Main Menu

CAL

Program Sequence

```
CAL1; or
CAL2;
  CALIRESP; or
  CALIRAI; or
  CALIS111; or
  CALIS221; or
  CALIONE2; or
  CALIFUL2; or
  CALITRL2;
     (measure calibration standards)
        DONE; or
        RAID; or
        SAV1; or
        SAV2; or
        SAVT;
```

`CAL 1 xx`

       `CALSn;` $n = 1\ to\ 8$

Manual Sequence

`CAL`
  `CAL 1 xx` (xx = cal kit 1 label) or
  `CAL 2 xx` (xx = cal kit 2 label)
   `CALIBRATE: RESPONSE` or
   `CALIBRATE: RESPONSE & ISOL'N` or
   `CALIBRATE: S`$_{11}$` 1-PORT` or
   `CALIBRATE: S`$_{22}$` 1-PORT` or
   `CALIBRATE: ONE-PATH 2-PORT` or
   `CALIBRATE: FULL 2-PORT` or
   `CALIBRATE: TRL 2-PORT`
    (measure calibration standards)
     `DONE: RESPONSE` or
     `SAVE RESP & ISOL'N` or
     `SAVE 1-PORT CAL` or
     `SAVE 2-PORT CAL` or
     `SAVE TRL 2-PORT`
      `CAL SET n`   (n = 1 to 8)

Description

Preset	not changed	**Range**	N/A
Initialized	3.5 mm	**Recalled**	N/A
Coupled	N/A		

Selecting CAL 1 or CAL 2 loads the specified calibration kit into active memory and presents the calibration set selection menu.

If the calibration kit has been modified (see `MODIFY 1` and `MODIFY 2`), and you did not change the cal kit label, an asterisk (*) replaces the last character of the calibration kit label. See `LABEL KIT`.

See Also

`MODIFY 1 xx`, `CALIBRATE: calibration type`, `LABEL KIT`

CAL 2 xx

Begin measurement calibration sequence using calibration kit 2. Where xx = cal kit 2 label.

Programming Code

CAL2

Description

Preset	not changed	Range	N/A
Initialized	2.4 mm	Recalled	N/A
Coupled	N/A		

See Also

CAL 1 xx , MODIFY 2 xx , LABEL KIT

CALIBRATE FLATNESS

Perform a flatness correction calibration routine.

Programming Code

CALF

Main Menu

STIMULUS

Program Sequence

(set up power meter)
(verify power meter address, see ADDRESS OF POWERMETER *)*
(set up the start/stop frequencies and measurement type S_{11}, S_{21}...)
[adjust the number of trace points]
(set source to slightly below maximum leveled power, see POWER SOURCE 1 *)*
(connect the power sensor to the active port)
CALF;
FLATON;

Manual Sequence

(set up power meter)
(verify power meter address, see ADDRESS OF POWERMETER)
(set up the start/stop frequencies and measurement type S_{11}, S_{21} ...)
[adjust the number of trace points]
(set source to slightly below maximum leveled power, see POWER SOURCE 1)
(connect the power sensor to the active port)
STIMULUS
  POWER MENU
  MORE
    CALIBRATE FLATNESS
    (wait for flatness correction routine to complete)
    FLATNESS ON
    (set test port power)
    [perform measurement calibration]
    (connect the DUT to the test port)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

This function enables the analyzer to set and control the power level at the test port. Flatness correction calibration compensates for path losses at each measurement frequency, as specified by the number of points. This function is only available to systems using an Agilent 8360 series synthesized sweeper. 8360 sources with firmware revisions of September 25th 1990 or earlier require a firmware upgrade to operate in this mode.

The following error messages may occur while using flatness correction:

- IF Overload - flatness correction is enabled before reducing the test port power level. The source may be unleveled while attempting to produce its maximum specified power plus flatness correction.
- No IF Found - flatness correction is enabled after reducing test port power level. The source may not be producing sufficient input power at the test set RF Input port for the analyzer to phase-lock to the signal.

These error messages should disappear when flatness correction is enabled with the appropriate test port power level setting. Note that flatness correction is still applied to an unleveled signal, the measurement for the unleveled portion of the frequency span is not valid since the flatness correction feature can not compensate for the inconsistant power variations that occur. The source must be leveled during calibration and after calibration or the results are incorrect.

**Table C-1.
Settable Test Port Power Ranges for
Common Source/Test Set Configurations[1]**

RF Source 8510 Test Set	83620A/83621A		83631A	83651A
	w/ 8514B	w/ 8515A	w/ 8515A	w/ 8517A
Frequency (GHz)	Test Port Power Levels [P_{max}/P_{min}] (dBm)			
0.05	+2.5 to −20.5	−3.5 to −26	−3.5 to −26	+1.5 to −21.5
2.0	+1 to −22.0	−6 to − 29	−6 to − 29	+0.5 to −23.5
20.0	−7.5 to −27	−13.5 to −30	−13.5 to −30	−7.5 to −30
26.5			−25 to −30	−13.5 to −30
40.0				−20 to −30
50.0				−27 to −30

[1]Data presented assumes no test set step attenuation. Since the test port flatness correction feature can not compensate for losses above 20 GHz with an Agilent 8516A, no data is provided.

Note   Refer to *Product Note 8510-16* and *Product Note 8360-2* for a complete description of the operation of the flatness correction calibration feature.

See Also

FLATNESS ON

CALIBRATE: FULL 2-PORT

Select full 2-port measurement calibration using current calibration kit.

Programming Code

CALIFUL2

Main Menu

CAL

Program Sequence

Measurement Calibration

```
CAL1; or CAL2;
  CALIFUL2;
    REFL;
 (measure S₁₁ standards)
 (measure S₂₂ standards)
    REFD;
     TRAN;
   (measure forward standards)
   (measure reverse standards)
      TRAD;
      ISOL;
    (measure forward standard)
    (measure reverse standard)
       ISOD;
  SAV2;
 CALSn;   n = 1 to 8
```

Measurements Using S-Parameter Test Sets

1. Connect the device; issue a `REST;` command. All four S-parameters are automatically measured.

2. Select display of any S-parameter and view the data.

3. Connect a new device and repeat the sequence.

Measurements Using Reflection/Transmission Test Sets

1. If the system is in the ramp sweep mode, send the averaging off command, `AVEROFF;`.

2. Connect the device then issue the `REST;` command. The prompt `CONNECT DEVICE FOR FORWARD MEASUREMENT` is displayed.

3. Issue the GPIB addressed command `GET`. S_{11} and S_{21} are measured, then sweep is stopped and bit 3 of the Primary Status Byte is set.

4. The prompt `CONNECT DEVICE FOR REVERSE MEASUREMENT` is displayed. Reverse the device, then issue the GPIB addressed command `GET`. S_{22} and S_{12} are measured, then sweep is stopped and bit 3 of the Primary Status Byte is set.

5. Select display of any S-parameter and view the data.

6. The prompt `CONNECT DEVICE FOR FORWARD MEASUREMENT` is displayed.

7. Connect a new device and repeat the sequence.

Note   The command `REST;` can be issued at any time to restart the measurement sequence.

For Reflection/Transmission test sets, averaging cannot be used in the ramp sweep mode unless the user actually reverses the device n + 1 times.

Manual Sequence

Measurement Calibration

CAL

 CAL 1 xx (xx = cal kit 1 label) or
 CAL 2 xx (xx = cal kit 2 label)
   CALIBRATE: FULL 2-PORT
    REFLECT'N
   (measure S_{11} standards)
   (measure S_{22} standards)
    REFLECT'N DONE
     TRANSMISSION
       (measure forward standards)
       (measure reverse standards)
     TRANS. DONE
      ISOLATION
       (measure forward standard)
       (measure reverse standard)
        ISOLATION DONE
          SAVE 2-PORT CAL
          CAL SET n   (n = 1 to 8)

Measurements Using S-Parameter Test Sets

1. Connect the device; press MEASUREMENT RESTART. All four S-parameters are automatically measured.

2. Select display of any S-parameter and view the data.

3. Connect a new device and press MEASUREMENT RESTART.

Measurements Using Reflection/Transmission Test Sets

1. If the system is in RAMP sweep mode, select AVERAGING OFF.

2. Connect the device; press MEASUREMENT RESTART.

   a. The prompt CONNECT DEVICE FOR FORWARD MEASUREMENT is displayed.

   b. Connect the device, then select PRESS to CONTINUE. S_{11} and S_{21} are measured, the trace is updated and the sweep is stopped.

   c. The prompt CONNECT DEVICE FOR REVERSE MEASUREMENT is displayed.

   d. Reverse the device, then select PRESS to CONTINUE. S_{22} and S_{12} are measured, the trace is updated and the sweep is stopped.

3. Select display of any S-parameter and view the data.

4. The prompt CONNECT DEVICE FOR FORWARD MEASUREMENT is displayed. Connect a new device and repeat the sequence.

Note	MEASUREMENT (RESTART) can be pressed at any time to restart the measurement sequence.
	For Reflection/Transmission test sets, averaging cannot be used in the ramp sweep mode unless the user actually reverses the device by n + 1 times.

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Full 2-Port measurement calibration requires twelve classes of standards to measure forward and reverse directivity, source match, reflection signal path frequency response, load match, transmission signal path frequency response, and transmission signal path isolation.

This procedure is most accurate when measuring 2-port devices, but all four S-parameters must be measured in order to provide corrected data for any parameter. It is used with the S-parameter test sets which provide automatic forward and reverse signal path switching. Reflection calibration is performed using three standard classes for each port (typically short, open, and load).

Transmission calibration uses four different standard classes (typically the same standard, a thru) to measure forward and reverse frequency response and load match. Forward and reverse transmission isolation use the same standard (an open transmission path).

For S-parameter test sets, the correct parameter is automatically selected during the measurement calibration and measurement sequences.

This procedure may be used with a reflection/transmission (one-path) test set when the forward and reverse signal paths cannot be assumed to be identical. All measurement calibration takes place with respect to Port 1 and the operator must manually reverse the device under test during measurement.

The order in which the standards are measured is not important.

FORWARD

E_{XF}

1 S_{21A} E_{TF} S_{21M}

RF IN

E_{DF} S_{11A} E_{LF}
E_{SF} S_{22A}

S_{11M} E_{RF} S_{12A}

PORT 1 PORT 2

REVERSE

S_{21A} E_{RR} S_{22M}

S_{11A} E_{SR}

S_{12M} E_{LR} S_{22A} E_{DR}

RF IN

E_{TR} S_{12A} 1

E_{XR}

Figure C-1. Full 2-Port Error Model Flowgraph

See Also

CAL 1 xx, CAL 2 xx

CALIBRATE: ONE-PATH 2-PORT

Select one-path 2-port measurement calibration using the current calibration kit.

Programming Code

CALIONE2

Main Menu

CAL

Program Sequence

Measurement Calibration

```
CAL1; or
CAL2;
  CALIONE2;
    REFL;
  (measure $S_{11}$ standards)
      REFD;
      TRAN;
    (measure forward standards)
      TRAD;
      ISOL;
    (measure forward standard)
        ISOD;
    SAV2;
  CALSn;    n = 1 to 8
```

Measurements Using Reflection/Transmission Test Sets

1. If the system is in the ramp sweep mode, issue `AVEROFF;`.
2. Connect the device and issue a `REST;` command.
3. The prompt `CONNECT DEVICE FOR FORWARD MEASUREMENT` is displayed.
4. Issue the GPIB addressed command `GET`. S_{11} and S_{21} are measured, bit 3 of the Primary Status Byte is set when the sweeps complete, the trace is updated, and the sweep is stopped.
5. The prompt `CONNECT DEVICE FOR REVERSE MEASUREMENT` is displayed.
6. Reverse the device, then issue the GPIB addressed command `GET`. S_{22} and S_{12} are measured, then the sweep is stopped and bit 3 of the Primary Status Byte is set, and finally the trace is updated.
7. Select display of any S-parameter and view the data.
8. The prompt `CONNECT DEVICE FOR FORWARD MEASUREMENT` is displayed.
9. Connect a new device and repeat the sequence.

Manual Sequence

Measurement Calibration

CAL
  CAL 1 xx (xx = cal kit 1 label) or
  CAL 2 xx (xx = cal kit 2 label)
    CALIBRATE: ONE-PATH 2-PORT
      REFLECT'N
      (measure S_{11} standards)
        REFLECT'N DONE
          TRANSMISSION
            (measure forward standards)
          TRANS. DONE
            ISOLATION
            (measure forward standard)
              ISOLATION DONE
                SAVE 2-PORT CAL
                  CAL SET n (n = 1 to8)

Measurements Using Reflection/Transmission Test Sets

1. If the system is in the ramp sweep mode, select AVERAGING OFF .
2. Connect the device; press MEASUREMENT (RESTART). The prompt CONNECT DEVICE FOR FORWARD MEASUREMENT is displayed.
3. Select PRESS to CONTINUE . S_{11} and S_{21} are measured, the sweep is stopped.
4. The prompt CONNECT DEVICE FOR REVERSE MEASUREMENT is displayed.
5. Reverse the device, then select PRESS to CONTINUE . S_{22} and S_{12} are measured, the trace is updated, the sweep is stopped.
6. Select display of any S-parameter and view the data.
7. The prompt CONNECT DEVICE FOR FORWARD MEASUREMENT is displayed.
8. Connect a new device and repeat the sequence.

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Typically, a one-path 2-port measurement calibration is used only with reflection/transmission test sets that require the device under test to be manually reversed to measure reverse parameters. This type of calibration requires six classes of standards to measure forward directivity, source match, load match, reflection signal path frequency response, transmission signal path frequency response, and transmission signal path isolation.

Reflection calibration is performed using three standard classes at port 1 (typically a short, open, and load). Transmission calibration uses two different standard classes (typically the

same standard - a thru) to measure forward frequency response and load match. Forward transmission isolation uses a single standard (an open transmission path).

The reverse transmission and reflection signal paths are assumed to be identical to the forward transmission and reflection signal paths, respectively.

This procedure is not recommended for use with S-parameter test sets. The correct parameter for measurement will be automatically selected but since the same forward error terms are used for both forward and reverse measurements, the measured data will be in error.

The order in which the standards are measured is not important.

MEASUREMENT (RESTART) can be pressed at any time to restart the measurement sequence.

For reflection/transmission test sets, averaging cannot be used in the ramp sweep mode unless the user actually reverses the device n + 1 times.

In a programmed sequence, note that all 12 error terms must be loaded before a SAVC; is issued.

Figure C-2.
One-Path 2-Port Error Model
(Forward error terms are duplicated for reverse measurements)

See Also

CAL 1 xx, CAL 2 xx

CALIBRATE: RESPONSE

Select frequency response measurement calibration for current parameter using current calibration kit.

Programming Code

CALIRESP

Main Menu

CAL

Program Sequence

```
CAL1; or CAL2;
  CALIRESP;
(measure reflection or transmission response standard)
    DONE;
      CALSn;    n = 1 to 8
```

Manual Sequence

```
[CAL]
  CAL 1 xx (xx = cal kit 1 label) or
  CAL 2 xx (xx = cal kit 2 label)
    CALIBRATE: RESPONSE
  (measure reflection or transmission response standard)
    DONE: RESPONSE
      CAL SET n    (n = 1 to 8)
```

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Response calibration requires a single standard class to measure the selected signal path frequency response exclusive of source/load match and directivity/isolation effects. Transmission parameters typically use a thru, and reflection parameters typically use either a short circuit or an open circuit. When DONE: RESPONSE is selected, data from the last standard measured is used to develop the error coefficient.

Both basic and user parameters can use this calibration method.

TRANSMISSION

RF IN $\bullet\longrightarrow\longrightarrow\bullet\, S_{21M}$
$\quad S_{21A} \qquad E_{TF}$

REFLECTION

RF IN $\bullet\longrightarrow\longrightarrow\bullet\, S_{11M}$
$\quad S_{11A} \qquad E_{RF}$

Figure C-3. Transmission and Reflection Response Error Models

See Also

STANA

CALIBRATE: RESPONSE & ISOL'N

Select response and isolation calibration using current calibration kit.

Programming Code

CALIRAI

Main Menu

CAL

Program Sequence

```
CAL1; or CAL2;
  CALIRAI;
    RAIRESP;
   (measure reflection or transmission response standard)
      RAIISOL;
     (measure reflection or transmission isolation standard)
        RAID;
          CALSn;    n = 1 to 8
```

Manual Sequence

(CAL)
CAL 1 xx (xx = cal kit 1 label) or
CAL 2 xx (xx = cal kit 2 label)
    RESPONSE & ISOL'N
    RESPONSE
    (measure reflection or transmission response standard)
    DONE RESPONSE
      ISOL'N STD
      (measure reflection or transmission isolation standard)
    SAVE RESP & ISOL
      CAL SET n   (n = 1 to 8)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

The response and isolation calibration requires two standard classes, and is more complete than response calibration. It is not as complete as the 1-port or 2-port calibrations.

It may be used for reflection measurements (source match is excluded), or for transmission measurements (source and load match are excluded).

It may be used with user parameters. Refer to Figure C-4, Transmission/ Reflection Response and Isolation Error Model.

Figure C-4. Transmission/Reflection Response and Isolation Error Model

CALIBRATE: S_{11} 1-PORT

Select S_{11} 1-port measurement calibration using current calibration kit.

Programming Code

CALIS111

Main Menu

CAL

Program Sequence

Example: Using a Standard 7mm Cal Kit

```
CAL1; or CAL2;
  CALIS111;
    CLASS11A;
      CLASS11B;
        CLASS11C;
          STANA;
            DONE;
              SAV1;
                CALSn;    n = 1 to 8
```

Manual Sequence

Example: Using a Standard 7mm Cal Kit

(CAL)
  CAL 1 xx (xx = cal kit 1 label) or
  CAL 2 xx (xx = cal kit 2 label)
    CALIBRATE: S_{11} 1-PORT
      S_{11}: OPEN
      S_{11}: SHORT
      S_{11}: LOADS
      BROADBAND
    DONE: LOADS
  SAVE 1-PORT CAL
  CAL SET n   (n = 1 to 8)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

An S_{11} 1-port measurement calibration requires three classes of standards to measure port 1 directivity, source match, and reflection signal path frequency response. The order in which the standards are measured is not important.

S_{11} is automatically selected during the measurement calibration sequence.

Figure C-5. Measuring Standards, S_{11} 1-Port

Figure C-6. 1-Port Error Model

See Also

(S_{11}): xxA

CALIBRATE: S_{22} 1-PORT

Select S_{22} 1-port measurement calibration using current calibration kit.

Programming Code

CALIS221

Main Menu

CAL

Program Sequence

```
CAL1; or CAL2;
  CALIS221;
 (measure S₂₂ standards)
    SAV1;
      CALSn;    n = 1 to 8
```

Manual Sequence

(CAL)
CAL 1 xx (xx = cal kit 1 label) or
CAL 2 xx (xx = cal kit 2 label)
  CALIBRATE: S_{22} 1-PORT
    S_{22}: OPEN
    S_{22}: SHORT
    S_{22}: LOADS
    BROADBAND
  DONE: LOADS

SAVE 1-PORT CAL
CAL SET n   (n = 1 to 8)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

An S_{22} 1-port measurement calibration requires three classes of standards to measure port 2 directivity, source match, and reflection signal path frequency response.

S_{22} is automatically selected during the measurement calibration sequence. If a Reflection/Transmission test set is used, all calibration takes place with respect to port 1.

The order in which the standards are measured is not important.

Figure C-7. S_{22} 1-Port Error Model Flowgraph

See Also

CALIBRATE: S_{11} 1-PORT

CALIBRATE:
TRL 2-PORT

Select TRL 2-port calibration using current calibration kit.

Programming Code

CALITRL2

Main Menu

CAL

Program Sequence

```
CAL1; or CAL2;
  CALITRL2;
    TRLT;
      TRLR1;
      TRLR2;
       ISOL;
       FWDI;
       REVI;
       ISOD;
       TRLL;
    SAVT;
  CALSn;    n = 1 -8
```

Manual Sequence

Example: Using a 7mm Cal Kit

(CAL)

`CAL 1 xx` (xx = cal kit 1 label) or

`CAL 2 xx` (xx = cal kit 2 label)

`CALIBRATE: TRL 2-PORT`

`THRU THRU`

`S`$_{11}$` REFLECT SHORT`

`S`$_{22}$` REFLECT SHORT`

`ISOLATION`

(measure forward standard)

(measure reverse standard)

`ISOLATION DONE`

`LINE 2-18 LINE`

`SAVE TRL 2-PORT`

`CAL SET n`   (n = 1 to 8)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Measurements Using S-Parameter Test Sets

1. Connect the device and select MEASURMENT RESTART . All Four S-parameters are automatically measured.
2. Select display of any S-parameter and view the data.
3. Connect a new device and select MEASURMENT RESTART .

This 2-Port measurement calibration is used with the S-parameter test sets which provide automatic forward and reverse signal path switching. This procedure cannot be used with reflection/transmission (one-path) test sets. The calibration requires six classes of standards (see SPECIFY CLASS) to measure source match, load match, forward and reverse directivity, reflection signal path frequency response, transmission signal path frequency response, and transmission signal path isolation.

This procedure gives the greatest accuracy when measuring 2-port devices, but all four S-parameters must be measured in order to provide corrected data for any parameter.

For S-parameter test sets, the correct parameter is automatically selected during the measurement calibration and measurement sequences. The order in which the standards are measured is not important.

See Also

CAL 1 xx , CAL 2 xx

CAL KIT n

Store, load, or delete selected calibration kit onto disc. Where n = 1 or 2.

Programming Code

CALK1 or CALK2

Main Menu

DISC

Program Sequence

See STORE .

```
STOIINT; or STOIEXT
  STOR; or LOAD; or DELE;
    CALK1; or CALK2;
      DISF "filename";    for Disc
```

`CAL KIT n`

Manual Sequence

> `DISC`
>> `STORAGE IS INTERNAL` or
>> `STORAGE IS EXTERNAL`
>>> `STORE` or `LOAD` or `DELETE`
>>>> `CAL KIT 1-2`
>>>>> `CAL KIT 1` or `CAL KIT 2`
>>>>>> [enter or select disc file]
>>>>>>> `STORE FILE` or `LOAD FILE` or `DELETE FILE`

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Older 8510A calibration kits are useable with 8510Bs and 8510Cs but they do not support all of the newer calibration types. The calibration kits designed for the 8510B may be used with any 8510A, but only to support 8510A calibration types.

Make sure the actual calibration kit being used matches the definition loaded into the 8510.

See Also

`STORE`

`CAL KIT 1-2`

Present calibration kit selection menu during disc operations calibration kit selection.

Programming Code

None

Main Menu

DISC

Manual Sequence

$\boxed{\text{DISC}}$
STORAGE IS INTERNAL or
STORAGE IS EXTERNAL
  STORE or LOAD or DELETE
    CAL KIT 1-2
      CAL KIT n (n = 1, 2)
        (enter or select disc file)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

CAL KIT 1, CAL KIT 2

CAL KIT 1, CAL KIT 2

Select the calibration kit used during receiver calibration.

Programming Code

RCVK1, RCVK2

Main Menu

CAL

Program Sequence

CALRCVR;
RCVK1; or
RCVK2;

`CAL KIT 1, CAL KIT 2`

Manual Sequence

(CAL)
`RECEIVER CAL`
`CAL KIT 1` or
`CAL KIT 2`

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Used during receiver calibration to select a calibration kit used to provide data on the THRU connecting Port 1 and Port 2 during measurement of the output power.

See Also

`RECEIVER CAL`

`CAL SET n`

Under the (CAL) key. Select calibration set to save results of measurement calibration and turn correction on, or delete a particular calibration set. Where n = 1 to 8.

Programming Code

CALS1 or CALS2 or CALS3 or CALS4 or CALS5 or CALS6 or CALS7 or CALS8

Main Menu

CAL

Program Sequence

See `CAL 1 xx` and `CAL 2 xx`.

```
CAL1; or CAL2;
```
(perform measurement calibration)
```
    CALSn;    n = 1 to 8
```

Or, see `CORRECTION ON`

```
CORRON;
  CALSn;    n = 1 to 8
```

Or, see `DELETE CAL SET`

```
DELC;
  CALSn;    n = 1 to 8
```

Manual Sequence

(CAL)
   `CAL 1 xx` (xx = cal kit 1 label) or
   `CAL 2 xx` (xx = cal kit 2 label)
    (perform measurement calibration)
     `CAL SET n`   (n = 1 to 8)

Or, see `CORRECTION ON` for more information.

(CAL)
   `CORRECTION ON`
    `CAL SET n` (n = 1 to 8)

Or, see `DELETE CAL SET` for more information.

(CAL)
   `MORE`
    `DELETE CAL SET`
     `CAL SET n` (n = 1 to 8)

Description

Preset	contents not changed	**Range**	N/A
Initialized	no cal sets allocated	**Recalled**	yes
Coupled	may be uncoupled		

After measurement calibration, selecting a calibration set causes the calibration coefficients, along with a limited instrument state to be stored in the specified calibration set and correction to be turned on.

`CAL SET n`

An asterisk (*) with the softkey label indicates that calibration coefficients are currently stored in that calibration set. Selecting a calibration set already used deletes the existing calibration coefficients, then stores the new calibration coefficients.

The calibraton set limited instrument state contains important network analyzer control settings at the time the calibration set was stored. Recalling a calibration set restores all of the stimulus settings at the time the calibration set was saved to the current instrument state.

The calibration set limited instrument state consists of:

■ Parameter(s) corrected.
    Parameters do not turn correction on if the parameter is not included.

■ Frequency range.
■ Number of points.
    Either of these turn correction off, if changed and new parameter is not included.

■ Source power.
■ Sweep time.
■ Power slope.
■ Ramp/Step/Single point.
■ Trim sweep.
    If any of these are changed, the prompt `CORRECTION MAY BE INVALID` is displayed.

■ Port attenuator.
    This is not saved, but warning message is displayed if changed.

Data Storage

808 x 12 error terms total data point storage available. Allows storage of two 401-point 2-Port calibration sets, or eight 401-point response calibration sets, or any combination such as one 401 point 2-Port calibration set and four 401-point response calibration sets. Table C-2 shows the maximum number of calibration sets of each type.

Table C-2. Calibration Sets Available

Calibration Type	Number of Points				
	51	101	201	401	801
Frequency Response	8	8	8	8	8
Response & Isolation	8	8	8	8	8
1-Port	8	8	8	8	8
2-Port	8	8	8	8	4

See Also

`CORRECTION ON` , `DELETE CAL SET`

`CAL SET n`

Under the (DISC) file select menu. Select the calibration set. Where n = 1 to 8.

Programming Code

CALS1 or CALS2 or CALS3 or CALS4 or CALS5 or CALS6 or CALS7 or CALS8

Main Menu

DISC

Program Sequence

See `STORE`.

```
STOIINT; or STOIEXT;
  STOR; or LOAD; or DELE;
    CALSn;        n = 1 to 8
      DISF "filename";    for Disc
```

Manual Sequence

(DISC)
  `STORAGE IS INTERNAL` or
  `STORAGE IS EXTERNAL`
  `STORE` or `LOAD` or `DELETE`
    `CAL SET 1-8`
      `CAL SET n`   (n = 1 to 8)
        (enter or select disc file)
          `STORE FILE` or `LOAD FILE` or `DELETE FILE`

Description

Preset	contents not changed	Range	N/A
Initialized	no cal sets allocated	Recalled	N/A
Coupled	may be uncoupled		

Select `CORRECTION OFF` for all parameters before loading calibration set.

See Also

`STORE`, `LOAD`

CAL SET 1-8

Present calibration set select menu during disc data type selection.

Programming Code

None

Main Menu

DISC

Manual Sequence

(DISC)
STORAGE IS INTERNAL or
STORAGE IS EXTERNAL
  STORE or LOAD or DELETE
    CAL SET 1-8
      CAL SET n (n = 1 to 8)
        (enter or select disc file)
          STORE FILE or LOAD FILE or DELETE FILE

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

CAL SET n , (DISC)

CAL SET ALL

Disc data type select all calibration sets 1 through 8.

Programming Code

CALSALL

Main Menu

DISC

Program Sequence

See STORE .

```
STOIINT; or STOIEXT;
  STOR; or LOAD; or DELE;
    CALSALL;
      DISF "filename";
```

Manual Sequence

> (DISC)
>   STORAGE IS INTERNAL or
>   STORAGE IS EXTERNAL
>   STORE or LOAD or DELETE
>   CAL SET ALL
>   (enter or select disc file)
>   STORE FILE or LOAD FILE or DELETE FILE

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Select CORRECTION OFF for all parameters before loading the calibration sets.

Only calibration sets that actually exist (those designated with an asterisk (*) will be stored during a store operation.

See Also

STORE

CAL SET for PORT 1

Specify port 1 calibration set in the adapter removal modify calibration set procedure. Followed by `CALSn`.

Programming Code

CALSPORT1

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

In the adapter removal process, the appropriate calibration sets need to be selected. The calibration set with port 1 in the final measurement configuration (and therefore the adapter on port 2) is the one to be selected by CALSPORT1. Likewise, the calibration set with port 2 in the final measurement configuration (and adapter on port 1) is selected by CALSPORT2.

`CALSPORT1` must be done first, and that calibration set becomes active. `CALSPORT2` must agree in number of points and frequency range, or an error occurs.

See Also

ADAPTER REMOVAL

CAL SET for PORT 2

Specify port 2 calibration set in the adapter removal modify calibration set procedure. Followed by `CALSn`.

Programming Code

CALSPORT2

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

ADAPTER REMOVAL , CAL SET for PORT 1

CAL Z_0: LINE Z_0

TRL error terms computed relative to line Z_0.

Programming Code

CALZLINE

Main Menu

CAL

Program Sequence

```
MODI1; or MODI2;
  CALZLINE; or CALZSYST;
[other option selections]
    TRL0;
  [other changes]
     KITD;
```

Manual Sequence

(CAL) MORE
 MODIFY 1 or MODIFY 2
  TRL OPTION
   CAL ZO: LINE ZO or
   CAL ZO: SYSTEM ZO
   [other option selections]
    TRL OPTION DEFINED
   [other changes]

`CAL Z`$_0$`: LINE Z`$_0$

       `KIT DONE (MODIFIED)`

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Program Sequence Description

During a TRL calibration, the line standard is assumed to have no reflections. This is the nominal assumption in the `CALZLINE` routine.

If the actual impedance differs (and is known) from the system Z_0, then selecting `CALZSYST` will cause a correction to occur during the TRL calibration process. If the line is coax, then an additional correction for impedance skin loss effects is used (according to offset Z_0 and offset loss). If a coaxial line is not used, then the loss term should be set to zero.

See Also

`CALIBRATE: TRL 2-PORT` , `MODIFY 1 xx` , `MODIFY 2 xx` , `TRL OPTION`

`CAL Z`$_0$`: SYSTEM Z`$_0$

Correct TRL error terms for specified Z_0 of line and loss effects to the system Z_0.

Programming Code

CALZSYST

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

`CALIBRATE: TRL 2-PORT` , `CAL Z`$_0$`: LINE Z`$_0$, `MODIFY 1 xx` , `MODIFY 2 xx` , `TRL OPTION`

(CENTER)

Select center/span stimulus mode; active function is current center stimulus value.

Programming Code

CENT

Program Sequence

```
CENT [value [suffix]];
```

Manual Sequence

(CENTER) [entry (x1)]   ((x1) = Hz, seconds, or volts)

Description

Preset	frequency domain start/stop stimulus mode	**Range**	see below
Initialized	same as Preset	**Recalled**	yes
Coupled	may be uncoupled		

In the Frequency Domain, center/span sets the frequency sweep; in the Time Domain, it sets the display upper and lower x-axis limits. In the Auxiliary Volt Output Domain, it sets the upper and lower limits of the AUX.VOLT OUTPUT $\pm$ 10V analog output.

FACTORY PRESET selects appropriate frequency range according to the test set.

Refer to SEGMENT: when using the GPIB mnemonic CENT with frequency list.

CHANGE & SAVE

Change and save a 1-port calibration set from a current 2-port calibration set.

Programming Code

CHAS

Main Menu

CAL

Program Sequence

```
CHAC;
TWOPS11; or
TWOPS22;
CHAS;
CALSn;
```

Manual Sequence

(CAL)
MORE
  MODIFY CAL SET
    CHANGE CAL TYPE
      2-PORT to: S11 1-PORT or
      2-PORT to: S22 1-PORT
        CHANGE & SAVE
        CAL SET n

Description

Preset	N/A		Range	N/A
Initialized	N/A		Recalled	N/A
Coupled	new cal set may be uncoupled			

A new 1-port calibration set referenced to either port 1 (S_{11}) or port 2 (S_{22}) is created and saved from a current 2-port calibration set. The 2-port calibration set is not modified.

See Also

CHANGE CAL TYPE , 2-PORT to: S11 1-PORT , 2-PORT to: S22 1-PORT

CHANGE CAL TYPE

Present the change calibration type menu.

Programming Code

CHAC

Main Menu

CAL

Program Sequence

```
CHAC;
TWOPS11;  or
TWOPS22;
CHAS;
CALSn;
```

Manual Sequence

CAL
MORE
  MODIFY CAL SET
    CHANGE CAL TYPE
      2-PORT to: S11 1-PORT or
      2-PORT to: S22 1-PORT
      CHANGE & SAVE
      CAL SET n

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

The reflection signal path error coefficients (frequency response, source match, and directivity) from the current 2-port calibration set are extracted and used to build a 1-port cal set. The new cal set set is referenced either to port 1 (S_{11}) or port 2 (S_{22}). This is useful when you want to measure S_{11}/S_{22} without taking the time to do a full 2-port error correction routine.

See Also

CHANGE & SAVE , 2-PORT to: S11 1-PORT , 2-PORT to: S22 1-PORT

$\boxed{\text{CHANNEL 1}}$

Sets channel 1 active so that uncoupled manual or program commands apply. Coupled functions apply to both channels.

Programming Code

CHAN1

Program Sequence

CHAN1;

Manual Sequence

$\boxed{\text{CHANNEL 1}}$ or $\boxed{\text{CHANNEL 2}}$

Description

Preset	channel 1 single channel coupled channels	Range	N/A
Initialized	same as Preset	Recalled	yes
Coupled	some functions may be uncoupled		

The indicator near the $\boxed{\text{CHANNEL 1}}$ or $\boxed{\text{CHANNEL 2}}$ keys lights to indicate the selected channel. In single channel display modes, the selected channel is displayed and controlled. In dual channel display modes, both channels are displayed, but only the selected channel is controlled by functions which are not coupled.

Changing the channel selection initiates a *measurement restart*.

Changing channels does not change the active function, although if the function is uncoupled, the value of the function for the selected channel is displayed.

CHANNEL 2

Sets channel 2 active so that uncoupled manual or program commands apply.

Programming Code

CHAN2

Program Sequence

```
CHAN2;
```

Description

Preset	channel 1 single channel coupled channels	Range	N/A
Initialized	same as Preset	Recalled	yes
Coupled	some functions may be uncoupled		

See Also

For a complete description, see CHANNEL 1. COUPLED CHANNELS

CLASS DONE (SPEC'D)

Current standard class is specified.

Programming Code

CLAD

Main Menu

CAL

Program Sequence

See MODIFY 1 xx and MODIFY 2 xx.

```
MODI1; or
MODI2;
 SPEC[class] [stanAno] [ , [stanBno]] . . . [ , [stanGno]];
 (stanA-Gno = stdno = 1 to 21)  (1 to 7 stds/class)
  CLAD;
```

CLASS DONE (SPEC'D)

    [other changes]
     KITD;

Manual Sequence

(CAL)
MORE
MODIFY 1 xx [xx = cal kit 1 label] or
MODIFY 2 xx [xx = cal kit 2 label]
 SPECIFY CLASS
 SPECIFY: *class* stanAno x1 [stanBno x1] ... [stanGno x1]
(stanA-Gno = stdno = 1 to 21) (1 to 7 stds/class)
 CLASS DONE (SPEC'D)
  [other changes]
  KIT DONE (MODIFIED)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

All necessary standards are assigned to the current class.

See Also

SPECIFY: xx , MODIFY 1 xx , MODIFY 2 xx

CLEAR LIST

Clear frequency list yes/no.

Programming Code

CLEL

Main Menu

STIMULUS

Program Sequence

```
EDITLIST;
 CLEL;
   EDITDONE;
```

Manual Sequence

STIMULUS MENU
 MORE
  EDIT LIST
   CLEAR LIST
    CLEAR LIST YES or
    CLEAR LIST NO

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	always		

All segments are deleted from the list.

If frequency list mode is active when the list is cleared, the sweep mode is not changed. The 8510 just continues to measure the old list.

See Also

FREQUENCY LIST

CLEAR LIST YES

Programming Code

None

Main Menu

STIMULUS

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	always		

See Also

For a complete description, see CLEAR LIST .

CLEAR LIST NO

Programming Code

None

Main Menu

STIMULUS

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	always		

See Also

For a complete description, see CLEAR LIST .

CLES

Clear 8510 Status Bytes, clear Service Request.

Main Menu

None (GPIB Only)

Program Sequence

    CLES;

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

This command sets 8510 Status Bytes to 0 and turns off SRQ and the "S" LED. It does not change the 8510 Status Request Mask.

See Also

OUTPSTAT, SRQM

COAX

Coaxial (linear phase) calibration standard.

Programming Code

COAX

Main Menu

CAL

Program Sequence

See MODIFY 1 xx or MODIFY 2 xx.

    MODI1; or
    MODI2;
    DEFS value;   value = stdno = 1 to 21
     STDT [std type];
        COAX;

`COAX`

    (specify other characteristics)
    STDD;
    [other changes]
     KITD;

Manual Sequence

CAL
`MORE`
`MODIFY 1 xx` [xx = cal kit 1 label] or
`MODIFY 2 xx` [xx = cal kit 2 label]
`DEFINE STANDARD entry x1` (entry = stdno = 1 to 22)
`STD TYPE:` [std type]
`SPECIFY OFFSET`
`COAX`
[specify other characteristics]
`STD OFFSET DONE`
`STD DONE (DEFINED)`
[other changes]
`KIT DONE (MODIFIED)`

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Specifies the current standard as exhibiting a linear phase shift versus frequency according to its offset delay, using

$$e^{-jnfd}$$

where d = delay in seconds
    n = 1 for transmission, 2 for reflection
    f = frequency in Hz

See Also

`DEFINE STANDARD` , `MODIFY 1 xx` , `MODIFY 2 xx`

COAXIAL DELAY

Select coaxial (linear phase) electrical delay.

Programming Code

COAD

Main Menu

RESPONSE

Program Sequence

COAD;

Manual Sequence

RESPONSE (MENU)
 MORE
  COAXIAL DELAY

Description

Preset	coaxial delay	Range	N/A
Initialized	coaxial delay	Recalled	yes
Coupled	uncoupled		

This command sets the mode for electrical delay to apply linear phase shift with frequency.

See Also

TABLE DELAY , WAVEGUIDE DELAY , ELECTRICAL DELAY

COLOR

Adjusts the degree of whiteness of the color being modified.

Programming Code

COLOR

Main Menu

DISPLAY

Program Sequence

COLOR [value];   *value = 0 to 100*

Manual Sequence

(DISPLAY)
  ADJUST DISPLAY
    MODIFY COLORS
      (select display element)
        COLOR [entry (x1)]   (entry = 0 to 100)
          [other changes]
        (PRIOR MENU)
       (PRIOR MENU)
      (PRIOR MENU)
    SAVE COLORS

Description

Preset	not changed	Range	0 to 100%
Initialized	varies with color selected	Recalled	yes, using SAVE COLORS , RECALL COLORS
Coupled	always coupled		

Defines how much white there is in a color. A scale from white (0% of color) to pure color (100% of color).

Cycling power changes all color adjustments to the default defined colors. To recall previously modified colors, use the RECALL COLORS softkey.

FACTORY PRESET does not affect color selection.

Note	This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

BRIGHTNESS , MODIFY COLORS , RESET COLOR , TINT , DEFAULT COLORS , PREDEFINED COLORS

COLUMN 1 DECIMAL POSITION

Adjust the number of digits after the decimal point in column 1 data.

Programming Code

LISCOL1DECP

Main Menu

COPY

Program Sequence

LISCOL1DECP [value];   *value = 1 to 15*

Manual Sequence

[COPY]
  DEFINE LIST
    LIST FORMAT
      COLUMN 1 DECIMAL POSITION [entry (x1)]   (entry = 1 to 15)

Description

Preset	2	Range	1 to 15
Initialized	2	Recalled	yes
Coupled	coupled to parameter and corresponding format		

Column 1 is the first column of information (scalar/real data) after the stimulus information column. For four parameter lists, column 1 is the first column given for each parameter.

COLUMN 1 DECIMAL POSITION

See Also

DEFINE LIST , COLUMN 1 WIDTH , COLUMN 2 DECIMAL POSITION , LIST SKIP FACTOR , LIST TRACE VALUES , LIST ALL S PARAMETERS

COLUMN 2 DECIMAL POSITION

Adjust the number of digits after the decimal point in column 2 data.

Programming Code

LISCOL2DECP

Main Menu

COPY

Program Sequence

LISCOL2DECP [value];   *value = 1 to 15*

Manual Sequence

(COPY)
  DEFINE LIST
    LIST FORMAT
      COLUMN 2 DECIMAL POSITION [entry (x1)]   (entry = 1 to 15)

Description

Preset	2	Range	1 to 15
Initialized	2	Recalled	yes
Coupled	coupled to parameter and corresponding format		

Column 2 is the second column (imaginary data) of information after the stimulus information column for formats with real, imaginary data. For four parameter lists, column 2 is the second column given for each parameter.

See Also

DEFINE LIST , COLUMN 2 WIDTH , COLUMN 1 DECIMAL POSITION , LIST SKIP FACTOR , LIST TRACE VALUES , LIST ALL S PARAMETERS

COLUMN 1 WIDTH

Adjust the total width of column 1 in a printed list.

Programming Code

LISCOL1WID

Main Menu

COPY

Program Sequence

LISCOL1WID [value];   *value = 1 to 15*

Manual Sequence

(COPY)
  DEFINE LIST
    LIST FORMAT
      COLUMN 1 WIDTH [entry (x1)] (entry = 1 to 15)

Description

Preset	10	Range	1 to 15
Initialized	10	Recalled	yes
Coupled	coupled to parameter and corresponding format		

Column 1 is the first column of information (scalar/real data) after the stimulus information column. For four parameter lists, column 1 is the first column given for each parameter. Column 1 width is the overall number of characters to be printed. The minus sign and decimal point are counted as characters. The column heading varies with the domain selected.

If the width in not large enough to contain the value, question marks are printed.

See Also

COLUMN 1 DECIMAL POSITION , LIST FORMAT , DEFINE LIST , COLUMN 2 WIDTH ,
LIST SKIP FACTOR , LIST TRACE VALUES , LIST ALL S PARAMETERS

COLUMN 2 WIDTH

Adjust the total width of column 2 in a printed list.

Programming Code

LISCOL2WID

Main Menu

COPY

Program Sequence

LISCOL2WID [value];   *value = 1 to 31*

Manual Sequence

COPY
  DEFINE LIST
    LIST FORMAT
      COLUMN 2 WIDTH [entry x1]   (entry = 1 to 31)

Description

Preset	10	Range	1 to 31
Initialized	10	Recalled	yes
Coupled	coupled to parameter and corresponding format		

Column 2 is the second column (imaginary data) of information after the stimulus information column for formats with real,imaginary data. For four parameter lists, column 2 is the second column given for each parameter. Column 2 width is the overall number of characters to be printed. The minus sign and decimal point are counted as characters. The column heading varies with the domain selected.

If the width in not large enough to contain the value, question marks are printed.

See Also

COLUMN 2 DECIMAL POSITION , LIST FORMAT , DEFINE LIST , COLUMN 1 WIDTH ,
LIST SKIP FACTOR , LIST TRACE VALUES , LIST ALL S PARAMETERS

COMPENSATE & SAVE

Connector compensation done; followed by CAL SET n.

Programming Code

COMS

Main Menu

CAL

Program Sequence

See CONNECTOR COMPENSATE (CONC).

Manual Sequence

See CONNECTOR COMPENSATE .

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Compensate and save causes the error terms in the active calibration set to be modified by adding a shunt susceptance at either or both ports. The susceptance calculated at each frequency is derived from a capacitance model for the selected connector pair. The capacitance coefficients are stored in one of the calibration kits as OPENs from the class ADAPTER

This command must be followed by CAL SET n or the modified error terms will be lost.

See Also

CONNECTOR COMPENSATE
CONNECTOR CAL KIT

COMPOSITE SYNC

Set synchronization to composite video to work with an external display device.

Programming Code

COMPSYNC

Main Menu

DISPLAY

Program Sequence

COMPSYNC;

Manual Sequence

[DISPLAY]
 ADJUST DISPLAY
  EXTERNAL VIDEO
   COMPOSITE SYNC

Description

Preset	not changed	Range	N/A
Initialized	sync on green negative sync	Recalled	yes
Coupled	always coupled		

This function does not affect the analyzer internal video display.

Use composite sync when the external display device requires a TTL-level composite sync. When enabled the synchronization signal is routed to the black BNC cable of the D1191A cable (supplied with the 8510C). To some external display devices, the polarity of the synchronization signal is significant. The composite signal may be either positive or negative logic.

Note   This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

H,V SYNC , SYNC ON GREEN , NEGATIVE SYNC , POSITIVE SYNC

CONNECTOR CAL KIT 1, CONNECTOR CAL KIT 2

Select the calibration kit used during connector compensation.

Programming Code

CONK1, CONK2

Main Menu

CAL

Program Sequence

CONC
CONK1; or
CONK2;

Manual Sequence

CAL
  MORE
    MODIFY CAL SET
      CONNECTOR COMPENSATE
        CAL KIT 1 or
        CAL KIT 2

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

This command, used during connector compensation, selects a calibration kit to provide the models for the connector pair mismatch. The model used is a frequency-dependent capacitance of the form:

$$C= C_0 + (C_1 \times F) + (C_2 \times F^2) + (C_3 \times F^3)$$

where F is the frequency and C_i are the coefficients of the model. The models are stored in the calibration kit as standards of the type OPEN, but are indentified for this purpose by including them in the ADAPTER class. Up to six models may be included in any calibration kit.

See Also

CONNECTOR COMPENSATE
MODIFY CAL KIT

CONNECTOR COMPENSATE

Select connector compensation.

Programming Code

CONC

Main Menu

CAL

Program Sequence

CONC;
CONP1; or
CONP2;
STANB; or
STANC; or
STAND; or
STANE; or
STANF;
COMS;
CALS n (n = 1 to 8)

Manual Sequence

(CAL)
  MORE
  MODIFY CAL SET
   CONNECTOR COMPENSATE
   PORT 1 connectors or
   PORT 2 connectors
   (choose standard)
  COMPENSATE & SAVE
   CAL SET n (n = 1 to 8)

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Connector compensation modifies the active calibration set to include a model, at either or both test port reference planes, for mechanically compatible but electrically dissimilar connectors. The model is derived from a capacitance polynomial selected from models stored in the active calibration kit.

No additional measurements are taken and the modified calibration set becomes active after the procedure has been completed.

See Also

COMPENSATE & SAVE
CONNECTOR CAL KIT

CONSTANT FREQUENCY

Specify constant frequency value, multiple source.

Programming Code

CONF

Main Menu

SYSTEM

Program Sequence

```
EDITMULS;
  DEFISOUR1;
    CONF [value];      see Range below
    [define other characteristics]
    MULSON;
    MULSOFF
```

Manual Sequence

SYSTEM
 MORE
 EDIT MULT. SRC
 DEFINE:
  SOURCE 1 or
  SOURCE 2 or
  RECEIVER
  CONSTANT FREQUENCY [entry x1]   (x1 = Hz)
 [define other characteristics]
  DONE
   MULT. SRC: ON/SAVE or
   MULT. SRC: OFF/SAVE

CONSTANT FREQUENCY

Description

Preset	no change	Range	0 Hz to end of the source frequency range
Initialized	same as offset freq.	Recalled	N/A
Coupled	always coupled		

This key makes the equation a constant value. It sets the numerator to zero and makes the given value the offset frequency.

See Also

EDIT MULT. SRC , DEFINE: SOURCE 1 , MULTIPLIER NUMERATOR , OFFSET FREQUENCY

CONTINUAL

Select continual sweep.

Programming Code

CONT

Main Menu

STIMULUS

Program Sequence

CONT;

Manual Sequence

STIMULUS (MENU)
  MORE
   CONTINUAL

Description

Preset	continual ramp	Range	N/A
Initialized	same as Preset	Recalled	yes
Coupled	always coupled		

The instrument executes the selected sweep mode data acquisition (ramp, step, single point, or frequency list) and the trace is continuously updated.

CONVERSION

Present conversion menu to select conversion for display of current basic or user parameter.

Programming Code

None

Main Menu

PARAMETER

Program Sequence

See REDEFINE PARAMETER .

Manual Sequence

```
(select basic or user parameter)
PARAMETER (MENU)
 REDEFINE PARAMETER
 CONVERSION
  CONVERT to S or
  CONVERT to 1/S or
  CONVERT to Y or
  CONVERT to Z
  [other changes]
   REDEFINE DONE
```

Description

Preset	standard basic and user parameters (Convert to S)	Range	N/A
Initialized	same as Preset	Recalled	yes
Coupled	always coupled		

Changes in parameter definition are executed immediately. REDEFINE DONE stores the current parameter definition.

See Also

REDEFINE PARAMETER

CONVERT to 1/S

Convert current parameter to 1/S.

Programming Code

CONV1S

Main Menu

PARAMETER

Program Sequence

See REDEFINE PARAMETER .

Manual Sequence

See CONVERSION

PARAMETER [MENU]
  REDEFINE PARAMETER
  CONVERSION
    CONVERT to 1/S
    [other changes]
    REDEFINE DONE

Description

Preset	standard basic and user parameters (Convert to S)	Range	N/A
Initialized	same as Preset	Recalled	yes
Coupled	always coupled		

Performs the complex inversion of the currently selected parameter.

See Also

CONVERSION , REDEFINE PARAMETER

CONVERT to S

Display S-parameter (no conversion).

Programming Code

CONVS

Main Menu

PARAMETER

Program Sequence

See REDEFINE PARAMETER .

Manual Sequence

PARAMETER (MENU)
REDEFINE PARAMETER
  CONVERSION
  CONVERT to S
  [other changes]
   REDEFINE DONE

Description

Preset	standard basic and user parameters (Convert to S)	Range	N/A
Initialized	same as Preset	Recalled	yes
Coupled	always coupled		

See Also

CONVERSION , REDEFINE PARAMETER

CONVERT to Y

Convert current parameter to Y-parameter.

Programming Code

CONVY

Main Menu

PARAMETER

Program Sequence

See REDEFINE PARAMETER .

Manual Sequence

PARAMETER (MENU)
REDEFINE PARAMETER
  CONVERSION
  CONVERT to Y
  [other changes]
   REDEFINE DONE

Description

Preset	standard basic and user parameters (Convert to S)	Range	N/A
Initialized	same as Preset	Recalled	yes
Coupled	always coupled		

Used only for reflection parameters to allow display of
$Y_{ij} = (1/Z_0) \times [(1 - S_{ij})/(1 + S_{ij})]$

On Cartesian displays, CONVERT to Y presents the 1-port immitance parameter which applies to the driven port with the undriven port terminated in Z_0. This is not the classical 2-port, 4-parameter Y parameter.

Select CONVERT to Y then displays the G value (Siemens) using the REAL format and the +jB value (Siemens) using the IMAGINARY format.

See Also

CONVERSION , REDEFINE PARAMETER

CONVERT to Z

Convert Current Parameter to Z-Parameter.

Programming Code

CONVZ

Main Menu

PARAMETER

Program Sequence

See REDEFINE PARAMETER .

Manual Sequence

PARAMETER (MENU)
  REDEFINE PARAMETER
  CONVERSION
  CONVERT to Z
  [other changes]
  REDEFINE DONE

Description

Preset	standard basic and user parameters (Convert to S)	Range	N/A
Initialized	same as Preset	Recalled	yes
Coupled	always coupled		

Used only for reflection parameters to allow display of
$Z_{ij} = Z_0 \times [(1 + S_{ij})/(1 - S_{ij})]$

On Cartesian displays, CONVERT to Z presents the one-port immittance parameter which applies to the driven port with the undriven port terminated in Z_0. Note that this is not the classical 2-port, four parameter, Z parameter.

Select CONVERT to Z then display the R value (ohms) using the REAL format and the +jB value (ohms) using the IMAGINARY format.

See Also

REDEFINE PARAMETER

$\boxed{\text{COPY}}$

Present copy menu.

Programming Code

MENUCOPY

Program Sequence

    MENUCOPY;

Manual Sequence

$\boxed{\text{COPY}}$
PLOT TO PRINTER or
PLOT: TO PLOTTER or
LIST TRACE VALUES or
SYS/OPER PARAMETERS or
DEFINE PRINT or
DEFINE PLOT or
DEFINE LIST or
ABORT PRINT/PLOT

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Any $\boxed{\text{COPY}}$ operation can be terminated by pressing any front panel hardkey (such as $\boxed{\text{ENTRY OFF}}$). The message "PLOT ABORTED" or "PRINT ABORTED" appears, although the plotter or printer may continue plotting for a short time due to buffering.

COPY LIMITS

Copy limit line tables from one channel or parameter to another.

Programming Code

Main Menu

DISPLAY

Manual Sequence

(select desired channel and stimulus parameter from which to copy)

DISPLAY
LIMITS
COPY LIMITS
CHANNEL 1 or
CHANNEL 2
S11 or
S21 or
S12 or
S22 or
USER 1 or
USER 2 or
USER 3 or
USER 4

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	always uncoupled		

The currently selected limit table is copied to create a new limit table for a selected parameter or user area. Select the limit table to copy FROM by choosing the desired channel and display parameter. Only the limit table entries are copied; display of limit lines or PASS/FAIL messages is not copied.

Note   The four S-parameters and four user parameters share the same limit table space. For example, this means that when limits are copied into S11 or USER 1, both S11 and USER 1 will have the same limits associated with them.

`COPY LIMITS`

However, display of limit lines/points and limit test PASS/FAIL messages function independently between S11/USER 1, and between the other combinations of S21/USER 2, S12/USER 3, and S22/USER 4.

See Also

`LIMITS`

`CORRECTION OFF`

Select correction off; display uncorrected data.

Programming Code

CORROFF

Main Menu

CAL

Program Sequence

CORROFF;

Manual Sequence

[CAL]
`CORRECTION OFF`

Description

Preset	correction off	Range	N/A
Initialized	correction off	**Recalled**	yes
Coupled	May be uncoupled		

If the channels are coupled, this command turns correction off for the current parameter and other parameters covered by the current calibration set.

If channels are uncoupled, correction is turned off only for the current parameter and other parameters covered by the current calibration set on the selected channel.

If correction is turned on for any displayed parameter, the enhancement annotation C will continue to be displayed. Otherwise, the annotation will be turned off.

CORRECTION ON

Select Correction On , select the calibration set; display error-corrected data.

Program Sequence

CORRON

Main Menu

CAL

Program Sequence

```
CORRON;
   CALSn;    n = 1 to 8
```

Manual Sequence

CAL
CORRECTION ON
CAL SET n (n = 1 to 8)

Description

Preset	correction off	Range	N/A
Initialized	correction off	Recalled	yes
Coupled	may be uncoupled		

Selecting CORRECTION ON and then a calibration set recalls the calibration set and its limited instrument state. If the current parameter is part of the calibration set, then the instrument is set to the limited calibration set instrument state. Correction is also turned on for all parameters covered by the calibration set, and corrected data is displayed.

If the current parameter is not part of the calibration set instrument state, the limited instrument state recall is executed but correction is not turned on.

When Correction is turned on for any displayed parameter (on either channel for dual display modes), the Enhancement Annotation C is displayed on the LCD/CRT.

Correction remains on until turned off (see CORRECTION OFF) or until the frequency range or number of points is changed. See list of calibration Set Limited Instrument State with CAL SET n .

When Time Low Pass Domain is active, CORRECTION ON , CAL SET n resets Time Low Pass Domain to Frequency Domain.

With HOLD selected, CORRECTION ON , CAL SET n does not cause the trace to be updated until CONTINUAL, SING , or NUMBER of GROUPS is executed.

`CORRECTION ON`

If `COUPLED` is selected, correction applies to all parameters covered on both channels.

If `UNCOUPLED` is selected, correction applies only to the parameters covered on the currently selected channel.

In dual-channel operation with 401-point, full 2-port error correction, correction will be reset if different averaging factors are used on the two channels, due to a lack of available memory. The same averaging factor must be used for both channels for 401-point, full 2-port error correction.

COUPLED CHANNELS

Couple Channel 1 and Channel 2 stimulus and calibration Sets.

Programming Code

COUC

Main Menu

STIMULUS

Program Sequence

`COUC;`

Manual Sequence

STIMULUS [MENU]
 `MORE`
  `COUPLED CHANNELS`

Description

Preset	uncoupled channels	**Range**	N/A
Initialized	uncoupled channels	**Recalled**	yes
Coupled	N/A		

All functions normally coupled apply to both Channel 1 and to Channel 2. Selecting `COUPLED CHANNELS` assumes that the functions listed in the calibration set limited instrument state (see `CAL SET n`) are the same for both channels and that a given parameter uses the same calibration set on both channels.

If the instrument state is changed from uncoupled channels to coupled channels, then the stimulus values for the current selected channel are applied to both channels, but correction is not turned on for the non-active channel.

Table C-3. Coupled and Uncoupled Functions

Always Coupled	Always Uncoupled	May Be Uncoupled
Number of Points	PARAMETER	Frequency Range
Ramp/Step/Single Point, Frequency List	FORMAT	Sweep Time
Measurement Markers	RESPONSE	Source Power
Attenuator Port 1, 2	DISPLAY Default Trace Memories	Power Slope
Hold/Single/# of Groups/Continual	DISPLAY Trace Fault Math	CORR. ON, Cal Sets
GPIB Addresses	Domain	Time Domain Gate Markers
	Time Domain Gate Shape	
	Time Domain Window Shape	
	Gate ON/OFF	

See Also

UNCOUPLED CHANNELS

CREATE & SAVE

Create and Save Frequency Subset.

Programming Code

CRES

Main Menu

CAL

Program Sequence

```
FRES;
(set frequency subset)
   CRES;
      CALSn;    n = 1 to 8
```

Manual Sequence

CAL
 MORE
  MODIFY CAL SET
   FREQUENCY SUBSET
    (set trace markers)
     CREATE & SAVE
      CAL SET n (n = 1 to 8)

Description

Preset	N/A		Range	N/A
Initialized	N/A		Recalled	Yes
Coupled	new cal set is always coupled			

One or more frequency list segments are created and the appropriate error coefficients for the current specified frequency subset are transferred to the new calibration set.

See Also

FREQUENCY LIST , FREQUENCY SUBSET , CHANGE & SAVE

CRT OFF

Turn 8510 LCD/CRT display off.

Programming Code

CRTO

Main Menu

SYSTEM

Program Sequence

CRTO;

Manual Sequence

SYSTEM
 DISPLAY FUNCTIONS
  CRT OFF

Description

Preset	turns LCD/CRT on	**Range**	N/A
Initialized	LCD/CRT on	**Recalled**	yes
Coupled	always coupled		

Filament power to the LCD/CRT is turned off, resulting in a blank display. External displays driven by the 8510 rear panel EXTERNAL DISPLAY output continue to function.

FACTORY PRESET or RECALL of instrument state with LCD/CRT on will turn LCD/CRT on.

CYAN

Set the specified display element to cyan (blue).

Programming Code

None

Main Menu

DISPLAY

Manual Sequence

DISPLAY
 ADJUST DISPLAY
  MODIFY COLORS
    (select display element)
    PREDEFINED COLORS
     CYAN
      [other changes]
     PRIOR MENU
    PRIOR MENU
   PRIOR MENU
   SAVE COLORS

`CYAN`

Description

Preset	not changed		Range	N/A
Initialized	tint = 53 brightness = 100% color = 100%		Recalled	yes, using `SAVE COLORS`, `RECALL COLORS`
Coupled	always coupled			

Cyan is the default color for S_{21} data (channel 2) and at a dimmer brightness of 70%, it is used for S_{21} memory.

Note	This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

`PREDEFINED COLORS`, `MODIFY COLORS`, `DEFAULT COLORS`

`DATA: DATA`

Disc data type select. Selected channel corrected data array.

Programming Code

DATADATA

Main Menu

DISC

Program Sequence

See `STORE`.

       (select channel)
       STOIINT; or STOIEXT;
        STOR; or LOAD; or DELE;
         DATADATA;
          DISF "filename";   *for disc*

Manual Sequence

   (select channel)
    `DISC`
     `STORAGE IS INTERNAL` or `STORAGE IS EXTERNAL`
      `STORE` or `LOAD` or `DELETE`
       `MORE`
        `DATA: DATA`
        (enter or select disc file)
         `STORE FILE` or `LOAD FILE` or `DELETE FILE`

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

`DATA: DATA`

See Also

`STORE`

`DATA: FORMATTED`

Disc data type select. Selected channel formatted data array.

Programming Code

DATAFORM

Main Menu

DISC

Program Sequence

See `STORE`

```
        (select channel)
        STOIINT; or STOIEXT;
          STOR; or LOAD; or DELE;
            DATAFORM;
                DISF "filename";
```

Manual Sequence

```
    (select channel)
      DISC
      STORAGE IS INTERNAL or STORAGE IS EXTERNAL
        STORE or LOAD or DELETE
          MORE
            DATA: FORMATTED
              (enter or select disc file)
                  STORE FILE or LOAD FILE or DELETE FILE
```

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

STORE

DATA from
 CHANNEL 1

When DUAL CHANNEL display modes are selected, trace math for selected channel uses current data from Channel 1 instead of data from memory.

Programming Code

DATACHAN1

Main Menu

DISPLAY

Program Sequence

OVER; or SPLI;
  CHAN1; or CHAN2;
    DATACHANn;   *n = 1, 2*

Manual Sequence

(DISPLAY)
  DISPLAY MODE
    DUAL CHAN OVERLAY or
    DUAL CHAN SPLIT
  (CHANNEL 1) or
  (CHANNEL 2)
  SELECT DEFAULTS
    MORE
    DATA from CHANNEL 1 or
    DATA from CHANNEL 2

Description

Preset	display:data	**Range**	N/A
Initialization	display:data	**Recalled**	yes
Coupled	may be uncoupled		

`DATA from CHANNEL 1`

Unpredictable results can occur when `SINGLE  CHANNEL` display modes are selected and the other channel is the specified default.

`DATA from CHANNEL 2`

When `DUAL CHANNEL` display modes are selected, trace math uses current data from Channel 2 instead of data from memory.

Programming Code

DATACHAN2

Main Menu

DISPLAY

Description

Preset	display:data	**Range**	N/A
Initialization	display:data	**Recalled**	yes
Coupled	may be uncoupled		

See Also

See `DATA from CHANNEL 1` for full description.

`DATA → MEMORY n`

Transfer selected channel corrected data to default trace memory.

Programming Code

DATI

Main Menu

DISPLAY

Program Sequence

        CHAN1; or CHAN2;
           (specify default memory if necessary)
               DATI;

Manual Sequence

    CHANNEL 1 or CHANNEL 2
    DISPLAY
       (specify default memory if necessary)
         DATA → MEMORY n

Description

Preset	memory 1 for channel 1	Range	N/A
	memory 2 for channel 2		
Initialization	same as Preset	Recalled	N/A
Coupled	always uncoupled		

The transfer of data from the selected channel corrected data array to the specified default memory occurs immediately. Thus, the stored trace may consist of parts of the previous and current sweeps. If this is a problem, use SINGLE or NUMBER of GROUPS, then select DATA → MEMORY after the instrument completes the sweep and enters the HOLD mode.

Data stored in a particular domain may be used for operations using any format in that domain. Unpredictable results occur when trace math is performed using a trace stored in a different domain, or with a different number of points. So memory operations are turned off if the domain or number of points is changed.

See Also

SPECIFY DEFAULTS

DATA: RAW

Disc data type select. Selected channel, current parameter raw data array(s).

Programming Code

DATARAW

Main Menu

DISC

Program Sequence

See STORE

```
        (select channel)
        STOIINT; or STOIEXT;
          STOR; or LOAD; or DELE;
            DATARAW;
              DISF "filename";
```

Manual Sequence

```
    (select channel)
      DISC
        STORAGE IS INTERNAL or STORAGE IS EXTERNAL
          STORE or LOAD or DELETE
            MORE
              DATA: RAW
                (enter or select disc file)
                  STORE FILE
```

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

If 2-Port correction is on, then all four of the raw data arrays for the selected channel are stored or loaded.

See Also

STORE

DATE/TIME FUNCTIONS

Present the date/time functions menu.

Programming Code

None, see the separate "set" functions.

Main Menu

SYSTEM

Manual Sequence

(SYSTEM)
DISPLAY FUNCTIONS
  DATE/TIME FUNCTIONS
    DATE/TIME ON or
    SET DAY or
    SET HOUR or
    SET MINUTE or
    SET MONTH or
    SET YEAR or
    DATE/TIME OFF

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Allows you to set the internal date/time clock of the analyzer. Cycling power or pressing preset does not affect the operation of the date/time clock.

Note	This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

DATE/TIME ON , SET DAY , SET HOUR , SET MINUTE , SET MONTH , SET YEAR

DATE/TIME OFF

Turn off date/time annotation on the display.

Programming Code

DATETIMEOFF

Main Menu

SYSTEM

Program Sequence

```
DATETIMEOFF;
```

Manual Sequence

[SYSTEM]
  DISPLAY FUNCTIONS
   DATE/TIME FUNCTIONS
     DATE/TIME OFF

Description

Preset	on	Range	N/A
Initialized	clock display on	Recalled	yes
Coupled	always coupled		

When PRINMENUON or PLOTMENUON, followed by the GPIB command to print or plot is issued, the date/time display is not printed/plotted regardless of setting.

Note   This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

DATE/TIME FUNCTIONS , DATE/TIME ON , PRINMENUON, PRINMENUOFF, PLOTMENUON, PLOTMENUOFF

DATE/TIME ON

Display the date/time annotation.

Programming Code

DATETIMEON

Main Menu

SYSTEM

Program Sequence

DATETIMEON;

Manual Sequence

SYSTEM
  DISPLAY FUNCTIONS
    DATE/TIME FUNCTIONS
      DATE/TIME ON

Description

Preset	on	Range	N/A
Initialized	clock display on	Recalled	yes
Coupled	always coupled		

If the clock display is on, the date and time are displayed at the lower right of the display whenever a softkey menu is not displayed. To view the clock, press (PRIOR MENU) until the softkey menu disappears.

In a programming sequence, the command DATETIMEON causes an immediate display of the date/time annotation (no softkeys are displayed). The date/time annotation remains until a subsequent GPIB command causes the softkeys to return. To always display the date/time annotation, send the command MENUOFF;, followed by DATETIMEON;. The date/time annotation remains until a MENUON; command.

Note   This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

DATE/TIME FUNCTIONS , DATE/TIME OFF , MENUON, PRINMENUON, PRINMENUOFF, PLOTMENUON, PLOTMENUOFF

DEBUOFF

Turn off debug mode.

Main Menu

None (GPIB Only)

Program Sequence

DEBUOFF;

Description

Preset	debuoff	Range	N/A
Initialization	debuoff	Recalled	no
Coupled	N/A		

The last 28 characters accepted at the 8510 GPIB interface are displayed in the Title Area of the 8510 display. When an instruction has completed execution, it is moved off the display line.

When a syntax error is detected, the instrument temporarily enters the debug mode with an arrow at the error in the data stream. Detection of a syntax error stops acceptance of data over the GPIB and sets bit 5 of the 8510 Primary Status byte. Press the 8510 (LOCAL) key or issue GPIB commands DCL, or SDC to restore normal operation.

Once turned on by DEBUON, this feature must be turned off using DEBUOFF, FACTORY PRESET , or by cycling 8510 line power.

Data block input following the block preamble #A is not displayed. Input at the Pass-Thru address is not displayed.

Since the instructions are buffered, instructions which are displayed may be awaiting completion of a previous instruction.

DEBUON

Turn off debug mode.

Program Sequence

DEBUON;

Main Menu

None (GPIB only)

Description

Preset	debuoff	Range	N/A
Initialization	debuoff	Recalled	no
Coupled	N/A		

See Also

See DEBUOFF for full description.

DEFAULT

Multiple source default equation.

Programming Code

DEFA

Main Menu

SYSTEM

Program Sequence

```
EDITMULS;
 DEFISOUR1; or
 DEFISOUR2; or
  DEFIRECV;
  DEFA;
[other definitions]
  MULSON; or
  MULSOFF;
```

`DEFAULT`

Manual Sequence

`SYSTEM`
`MORE`
  `EDIT MULT. SRC.`
    `DEFINE:  SOURCE 1` or
    `DEFINE:  SOURCE 2` or
    `DEFINE:  RECEIVER`
     `DEFAULT`
    `DONE`
     [other configurations]
    `MULT. SRCE:  ON/SAVE` or
    `MULT. SRCE:  OFF/SAVE`

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Change the selected equation to the default or initialized setting.

The default settings are:

SOURCE 1 = 1 × (FREQ + 0.0 GHz)

SOURCE 2 = 0 × (FREQ + 0.0 GHz)

RECEIVER = 1 × (FREQ + 0.0 GHz)

See Also

`EDIT MULTIPLE SOURCE` , `DEFINE: SOURCE 1`

DEFAULT COLORS

Set standard default colors.

Programming Code

DEFC

Main Menu

DISPLAY

Program Sequence

    DEFC;

Manual Sequence

(DISPLAY)
  ADJUST DISPLAY
   DEFAULT COLORS

Description

Preset	no change	Range	N/A
Initialized	see below	Recalled	no
Coupled	always coupled		

There are two ways to access the original factory-set display colors, cycle power or select DEFAULT COLORS . When power is cycled, the default colors are recalled from a default colors memory location that is separate from any of the instrument state memories.

The following is a list of the default color settings.

Table D-1. Default Settings for Display Elements

Display Element	Color	Tint	Brightness %	Color %
SOFTKEYS	white	0	100	0
WARNING	red	0	100	100
S_{11} DATA	yellow	14	100	100
S_{22} DATA	green	38	93	100
S_{21} DATA	cyan (blue)	53	100	100
S_{12} DATA	salmon	0	100	36
GRATICULE	grey	0	49	0
MARKERS	white	0	80	0
S_{11} MEM	yellow	14	70	100
S_{22} MEM	green	38	63	100
S_{21} MEM	cyan (blue)	53	70	100
S_{12} MEM	salmon	0	70	36
STIMULUS	white	0	90	0

The display intensity default setting is 83% and the background intensity setting is 0%.

See Also

MODIFY COLORS , SAVE COLORS , PREDEFINED COLORS

DEFAULT PEN NUMBRS

Set standard default pen numbers.

Programming Code

None

Main Menu

COPY

Manual Sequence

COPY
 DEFINE PLOT
  DEFAULT PEN NUMBRS

Description

Preset	see below	Range	N/A
Initialized	see below	Recalled	yes
Coupled	always coupled		

The following is a list of the default pen number assignments.

Table D-2. Default Pen Numbers

Display Element	Pen Number	Display Element	Pen Number
SOFTKEYS	1	MARKERS	1
WARNING	2	S_{11} MEM	3
S_{11} DATA	3	S_{22} MEM	4
S_{22} DATA	4	S_{21} MEM	5
S_{21} DATA	5	S_{12} MEM	6
S_{12} DATA	6	STIMULUS	1
GRATICULE	1		

DEFAULT to MEMORY: n

Specify memory used for trace math on selected channel. Specify memory to be output using OUTPMEMO . Where n = 1 to 8.

`DEFAULT to MEMORY: n`

Programming Code

DEFM1 or DEFM2 or DEFM3 or DEFM4 or DEFM5 or DEFM6 or DEFM7 or DEFM8

Main Menu

DISPLAY

Program Sequence

```
CHAN1; or CHAN2;
  DEFMn;      n = 1 to 8
```

Manual Sequence

[CHANNEL 1] or [CHANNEL 2]
[DISPLAY]
`MORE`
   `SELECT DEFAULTS`
(selected channel default memory is underlined)
  `DEFAULT to MEMORY: 1` or
  `DEFAULT to MEMORY: 2` or
  `DEFAULT to MEMORY: 3` or
  `DEFAULT to MEMORY: 4` or
  `MORE`
   `DEFAULT to MEMORY: 5` or
   `DEFAULT to MEMORY: 6` or
   `DEFAULT to MEMORY: 7` or
   `DEFAULT to MEMORY: 8` or
    `DATA → MEMORY n` (n = selected memory location).

For OUTPMEMO

```
DEFMn;      n = 1 to 8
  DISPDATM; or DISPMEMO;     turn on memory
    FORMn;      n = 1 to 8
      OUTPMEMO;
        (read data block from 8510 HP-IB)
```

For GPIB transfer to memory

```
DEFMn;      n = 1 to 8
  DISPDATM; or DISPMEMO;     turn on memory
    FORMn;      n = 1 to 8
      INPUDATA;
        (send data block to 8510 HP-IB)
          DATI;     store data into memory
```

Description

Preset	default to memory:1 for channel 1 default to memory:2 for channel 2	**R**ange	N/A
Initialization	same as Preset	**R**ecalled	yes
Coupled	always uncoupled		

Memory operations use a default memory array which can be selected independently for each parameter on each channel. After `FACTORY PRESET` these are the default memories for each channel/parameter:

Table D-3. Default Memory Settings for Channel/Parameters

Channel 1 Memory		Channel 2 Memory	
S_{11}	1	S_{11}	5
S_{21}	2	S_{21}	6
S_{12}	3	S_{12}	7
S_{22}	4	S_{22}	8

Trace math and GPIB memory operations both use the selected default memory. `DATA → MEMORY` stores the trace into the selected default memory.

Memories 1 through 4 are non-volatile and are therefore not lost when power is turned off. Memories 5 through 8 are volatile and should be used for GPIB operations. This is because they operate faster and because memories 1 through 4 have a wearout limit of greater than 10,000 save cycles.

DEFINE LIST

Present the define list menu.

Programming Code

None

Main Menu

COPY

DEFINE LIST

Manual Sequence

(COPY)
   DEFINE LIST
      (choose selections)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

The keys presented in this menu define how the printer on the System Bus presents the data when LIST TRACE VALUES or LIST ALL S PARAMETERS is selected.

See Also

LIST SKIP FACTOR , LIST FORMAT , STIMULUS: UNITS , AUTO FEED ON , FORM FEED

DEFINE PLOT

Present the define plot menu.

Programming Code

None

Main Menu

COPY

Manual Sequence

(COPY)
   DEFINE PLOT
      (choose selections)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

When `PLOT TO PLOTTER` is selected, the output to the digital plotter is defined by the selections chosen in the `DEFINE PLOT` and the `PLOT TO PLOTTER` menu. The marker list, if any marker is active, and the date/time annotation are plotted if they have been selected.

See Also

`PLOT: ALL PLOT: DATA`, `PLOT: MEMORY`, `PLOT: GRATICULE`, `PLOT: TEXT`, `PLOT: MARKER(S)`, `PLOT: TITLE`, `PLOT: ALL FOUR S PARAMETERS`, `PLOT TYPE: MONOCHROME`, `PLOT TYPE: COLOR`, PLOTMENUON, PLOTMENUOFF, `SET PEN NUMBERS`

DEFINE PRINT

Present the define print menu.

Programming Code

None

Main Menu

COPY

Manual Sequence

(COPY)
  `DEFINE PRINT`
    (choose selections)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

`DEFINE PRINT`

When `PLOT TO PRINTER` is selected, the output to the graphics printer is defined by selections chosen in the `DEFINE PRINT` menu.

Units for top, left, and right margin, and print width are in millimeters; $\boxed{\text{G/n}}$ = nanometers, $\boxed{\text{M/}\mu}$ = μmeters, $\boxed{\text{k/m}}$ = millimeters, and $\boxed{\text{x1}}$ = meters.

See Also

`PRINT TYPE MONOCHROME` , `PRINT TYPE COLOR` , `PRINT: PORTRAIT` , `PRINT: LANDSCAPE` , `LEFT MARGIN` , `RIGHT MARGIN` , `PRINT WIDTH` , `PRINTER RESOLUTION` , `TOP MARGIN` , `AUTO FEED ON` , PRINMENUON, PRINMENUOFF

`DEFINE: RECEIVER`

Multiple source define receiver equation.

Programming Code

DEFIRECV

Main Menu

SYSTEM

Program Sequence

```
EDITMULS;
 DEFISOUR1;
(edit equation)
 DEFISOUR2;
(edit equation)
 DEFIRECV;
(edit equation)
 MULSON; or
 MULSOFF;
```

Manual Sequence

SYSTEM
  MORE
   EDIT MULT. SRC
    DEFINE: SOURCE 1 or
    DEFINE: SOURCE 2 or
    DEFINE: RECEIVER
     MULTIPLIER NUMER. or
     MULTIPLIER DENOM. or
     OFFSET FREQUENCY or
     CONSTANT FREQUENCY or
     DEFAULT or
     DONE
      MULT SRC: on/save or
      MULT SRC: off/save

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

These commands define and initiate the equation editing process. Over GPIB, the appropriate command must precede the device editing commands. The definitions are not made a part of the Hardware State until MULT. SRCE:ON/SAVE is selected.

See Also

EDIT MULT. SRC

DEFINE: SOURCE 1

Multiple source define source #1 equation.

Programming Code

DEFISOUR1

Main Menu

SYSTEM

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

See DEFINE: RECEIVER for full description.

DEFINE: SOURCE 2

Multiple source define source #2 equation.

Programming Code

DEFISOUR2

Main Menu

SYSTEM

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

See DEFINE: RECEIVER for full description.

DEFINE STANDARD

Define the standard in the current calibration kit to be modified.

Programming Code

DEFS

Main Menu

CAL

Program Sequence

See MODIFY 1 xx and MODIFY 2 xx.

```
MODI1; or
MODI2;
 DEFS [value];      value = stdno = 1 to 21
  STDT "standard type";
 (specify standard characteristics)
  STDD;
 [other changes]
 KITD;
```

Manual Sequence

```
(CAL)
  MORE
    MODIFY 1 xx (where xx= cal kit 1 label) or
    MODIFY 2 xx (where xx=cal kit 2 label)
      DEFINE STANDARD entry (x1) (entry = stdno = 1 to 21)
        STD TYPE: (standard type)
          (specify standard characteristics)
            STD DONE (DEFINED)
              [other changes]
                KIT DONE (MODIFIED)
```

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Each standard in the calibration kit is assigned a standard number. Select the standard to be created, modified, or inspected by entering its number. Refer to the calibration kit manuals for definitions of the standard calibration kit contents.

DEFINE STANDARD

See Also

MODIFY 1 xx , MODIFY 2 xx

(DELAY)

Select Cartesian group delay format for current parameter on selected channel. (delay)

Programming Code

DELA

Program Sequence

> *(select channel)*
>> *(select parameter)*
>>> DELA;

Manual Sequence

> (select channel)
>> (select parameter)
>>> (DELAY)

Description

Preset	ref value=0ns ref posn=5ns scale=10ns/div	Range	N/A
Initialization	same as Preset	Recalled	yes
Coupled	always uncoupled coupled to parameter		

Uses the point-slope form for determining group delay:

$$t_g = - ((\phi_{n+1} - \phi_n) / (360 \times f_{step}))$$

where n is the current frequency point number and

$$f_{step} = (f_{span} / \text{number of points}).$$

If SMOOTHING OFF is selected, the aperture is equal to f_{step}.

The minimum aperture with SMOOTHING OFF is equal to f_{step}.

To increase the aperture, select fewer NUMBER OF POINTS or select SMOOTHING ON .

If `SMOOTHING ON` is selected, $\Delta\phi$ is accumulated over the specified percent of span prior to tg computation. This is represented as:

`delay`

in the Channel Identification area of the display. $\Delta\phi$, the change in degrees over f_{step}, must be less than 180 degrees or errors in the displayed group delay value result. (See `SMOOTHING ON` .)

Delay results are changed by `ELECTRICAL DELAY` and `PORT EXTENSIONS` .

Selecting (DELAY) recalls the last selected `RESPONSE` selections on that channel.

DELAY TABLE

Disc delay table data type.

Programming Code

DELT

Main Menu

DISC

Program Sequence

See `STORE` .

```
(select channel)
STOIINT; or STOIEXT;
 STOR; or LOAD; or DELE;
  DELT;
  DISF "filename";
```

Manual Sequence

```
(select channel)
  DISC
    STORAGE IS INTERNAL or STORAGE IS EXTERNAL
      STORE or LOAD or DELETE
        MORE
          DELAY TABLE
            (enter or select disc file)
              STORE FILE or LOAD FILE or DELETE FILE
```

DELAY TABLE

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Store, Load, Delete real, imaginary pairs of Table Delay data files.

See Also

STORE , TABLE DELAY

DELETE

Delete specified disc file.

Programming Code

DELE

Main Menu

DISC

Program Sequence

See STORE .

Manual Sequence

    DISC
      STORAGE IS INTERNAL or STORAGE IS EXTERNAL
        DELETE
          (select data type)
          (select file name)
              DELETE FILE

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See `UN-DELETE` to recover a deleted file.

See Also

`STORE`, `UN-DELETE`

DELETE ALL LIMITS

Remove all entries from a limit line table.

Programming Code

LIMIDELALL

Main Menu

DISPLAY

Program Sequence

(select desired channel and stimulus parameter)
LIMIDELALL

Manual Sequence

(select desired channel and stimulus parameter)
(DISPLAY)
  LIMITS
    DELETE LIMIT
      DELETE ALL LIMITS

`DELETE ALL LIMITS`

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	yes
Coupled	always uncoupled		

All limit segments or points are removed from the currently selected limit table. There are eight possible tables—one for each parameter, on both channels. To remove all limits, each parameter must be selected one at a time while using the DELETE ALL function. to remove all tables at once, use PRESET or INITIALIZATION.

See Also

`LIMITS`
`DELETE LIMIT`

`DELETE CAL SET`

Delete specified calibration set from internal memory.

Programming Code

DELC

Main Menu

CAL

Program Sequence

```
DELC;
    CALSn;      n = 1 to 8
```

Manual Sequence

(CAL)
  `MORE`
   `DELETE CAL SET`
    `CAL SET n` (n = 1 to 8)

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Delete an existing calibration set to make room for a new calibration set. A deleted calibration set cannot be recovered.

See Also

STORE

DELETE FILE

Delete disc filename.

Programming Code

DISF

Main Menu

DISC

Program Sequence

```
STOIINT; or STOIEXT;
  DELE;
 (select data type)
   DISF "filename";
```

Manual Sequence

```
DISC
  STORAGE IS INTERNAL or STORAGE IS EXTERNAL
   DELETE
    (select data type)
    (select file name)
     DELETE FILE
```

DELETE FILE

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

STORE FILE

DELETE LIMIT

Remove an entry from a limit line table.

Programming Code

LIMIDELSEG

Main Menu

DISPLAY

Program Sequence

(select desired channel and stimulus parameter)
LIMIEDITSEG [segment number [suffix]]
LIMIDELSEG

Manual Sequence

(select desired channel and stimulus parameter)
[DISPLAY]
  LIMITS [entry] [x1] *(entry = segment number)*
    DELETE LIMIT
      YES

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	yes
Coupled	always uncoupled		

A selected segment or point is removed from the currently selected limit table. Both the limit table and desired table entry must be selected.

See Also

LIMITS
DELETE ALL LIMITS

Δ MODE MENU

Present delta mode menu.

Programming Code

None

Main Menu

MARKER

Manual Sequence

(MARKER)
  MARKER n   (n = 1 to 5) (select active marker)
    Δ MODE MENU
      Δ REF = n   (n = 1 to 5) (select reference marker)

Description

Preset	Δ mode off	Range	N/A
Initialization	same as Preset	Recalled	yes
Coupled	always uncoupled		

In the Δ MARKER mode, the marker readout shows the difference in stimulus and parameter values between the active marker and the reference marker. If the active marker and the reference marker are the same, then the marker readout is zero.

See Also

MARKER n , Δ OFF , Δ = n

Δ OFF

Select delta marker mode off.

Programming Code

DELO

Main Menu

MARKER

Program Sequence

DELO;

Manual Sequence

(MARKER)
Δ MODE MENU
Δ OFF

Description

Preset	Δ off	Range	N/A
Initialization	Δ off	Recalled	N/A
Coupled	N/A		

The blinking Δ annotation near the reference marker and the active entry annotation are erased.

Δ REF = n

Select reference marker for delta marker mode. Where n = 1 to 5.

Programming Code

DELR1 or DELR2 or DELR3 or DELR4 or DELR5

Main Menu

MARKER

Program Sequence

DELRn; $n = 1$ to 5

Manual Sequence

> (MARKER)
> MARKER n   (n = 1 to 5)
> Δ MODE MENU
> Δ REF = n   (n = 1 to 5)

Description

Preset	Δ off	Range	N/A
Initialization	Δ off	Recalled	yes
Coupled	always coupled		

When a reference marker is first selected, the Active Entry marker readout shows:

`active marker number - reference marker number`

to indicate that the marker readout shows the difference in stimulus and parameter values between the active marker and the reference marker (see MARKER n).

The blinking Δ symbol appears beside the reference marker, and the marker menu is displayed with the Reference marker identified. If the active marker and the reference marker are the same, then the marker readout is zero.

Stimulus entries apply to the Active marker.

To select a different Active marker, press a key on the Marker menu. To select a different Reference marker, press a key on the Δ Mode menu.

For MARKER to TARGET in Δ mode, the search begins at the reference marker instead of the lowest stimulus value.

See Also

Δ MODE MENU , MARKER , = MARKER

DENOMINATOR

Present denominator menu to select denominator for current basic or user parameter.

Programming Code

None

Main Menu

PARAMETER

Program Sequence

See REDEFINE PARAMETER .

Manual Sequence

(select basic or user parameter)
PARAMETER (MENU)
REDEFINE PARAMETER
DENOMINATOR
DENOM.: a_1 or
DENOM.: a_2 or
DENOM.: b_1 or
DENOM.: NO RATIO
[other changes]
REDEFINE DONE

Description

Preset	standard basic and user parameters	Range	N/A
Initialization	same as Preset	Recalled	basic parameters: no user parameters: yes
Coupled	always coupled		

See REDEFINE PARAMETER for standard basic and user parameter definitions. Parameter definition changes are executed immediately.

REDEFINE DONE stores current parameter definition.

See Also

REDEFINE PARAMETER

DENOM.: a_1

Select a_1 as the denominator for the current parameter.

Programming Code

DENOA1

Main Menu

PARAMETER

Program Sequence

See REDEFINE PARAMETER .

Manual Sequence

See DENOMINATOR .

Description

Preset	standard basic and user parameters	Range	N/A
Initialization	same as Preset	Recalled	basic parameters: no user parameters: yes
Coupled	always coupled		

Note that DENOMINATOR b_2 is not available.

To redefine a parameter with denominator b_2, select NUMERATOR b_2 then select CONVERSION , CONVERT to 1/S .

If a_1 is the numerator, the denominator defaults to NO RATIO. If a_1/x is desired, define x/a_1 and use 1/S.

See Also

DENOMINATOR , REDEFINE PARAMETER

`DENOM.: a₂`

Select a_2 as the denominator for the current parameter.

Programming Code

DENOA2

Main Menu

PARAMETER

Description

Preset	standard basic and user parameters	Range	N/A
Initialization	same as Preset	Recalled	basic parameters: no user parameters: yes
Coupled	always coupled		

See Also

See `DENOM.:a₁` for full description.

`DENOM.: b₁`

Select b_1 as the denominator for the current parameter.

Programming Code

DENOB1

Main Menu

PARAMETER

Description

Preset	standard basic an user parameters	Range	N/A
Initialization	same as Preset	Recalled	basic parameters: no user parameters: yes
Coupled	always coupled		

See Also

See `DENOM.:a`$_1$ for full description.

DENOM.: NO RATIO

Select no ratio for the current parameter (denominator=1).

Programming Code

DENONOR

Main Menu

PARAMETER

Description

Preset	standard basic and user parameters	Range	N/A
Initialization	same as Preset	Recalled	basic parameters: no user parameters: yes
Coupled	always coupled		

See Also

See `DENOM.:a`$_1$ for full description.

DETECTOR: NORMAL BW

Select the 10 kHz IF path and detectors.

Programming Code

DETENORB

`DETECTOR: NORMAL BW`

Main Menu

SYSTEM

Program Sequence

```
DETENORB;
```

Manual Sequence

SYSTEM
`MORE`
  `PULSE CONFIG`
    `DETECTOR: NORMAL BW`

Description

Preset	frequency domain: normal BW	**Range**	N/A
Initialized	same as Preset	**Recalled**	yes
Coupled	always coupled		

Option 008, Wideband IF, provides a second selectable set of IF detectors for pulsed-RF measurement applications. To return the network analyzer system to standard system BW detection, select this function.

This function is always set for non-Option 008 systems.

See Also

`DETECTOR: WIDE BW`, `PULSE WIDTH`, `DUTY CYCLE`, `PULSE OUT: HIGH`, `PULSE OUT: LOW`

`DETECTOR: WIDE BW`

Select the 3 MHz IF bandwidth path and detectors.

Programming Code

DETEWIDB

Note	Wideband IF option 008 only.

Main Menu

SYSTEM

Program Sequence

DETEWIDB;

Manual Sequence

[SYSTEM]
MORE
  PULSE CONFIG
    DETECTOR: WIDE BW

Description

Preset	frequency domain: normal BW	Range	N/A
Initialized	same as Preset	Recalled	yes
Coupled	always coupled		

Option 008, Wideband IF, provides a second selectable set of IF detectors for pulsed-RF measurement applications. In the Pulse Profile Domain, the IF bandwidth is always set to wide. The wide bandwidth detectors allow the measurement of responses with pulse widths of 1 μs or greater.

See Also

DETECTOR: NORMAL BW , PULSE WIDTH , DUTY CYCLE , PULSE OUT: HIGH , PULSE OUT: LOW , *Pulsed-RF User's Guide*

DIRECTORY

Display directory for current disc.

Programming Code

DIRE

Main Menu

DISC

Program Sequence

```
STOIINT; or STOIEXT;
  DIRE;
```

Manual Sequence

DISC
  STORAGE IS INTERNAL or
  STORAGE IS EXTERNAL
  DIRECTORY
    RESTORE DISPLAY or
(use knob to scroll through files)

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Selecting RESTORE DISPLAY or pressing any hardkey restores the measurement display.

The disc directory cannot be printed, plotted, or output via the analyzer GPIB.

Directory Examples

Disc Directory

FILE_NAME	CONTENTS	TYPE

The disc filename listed in the directory consists of a three-character prefix
(see the DISC Menu Structure) that is used by the analyzer to determine data
type. It is not necessary for the user to include this prefix in the filename for
any disc store, load, or delete operation.

$\boxed{\text{DISC}}$

Present the disc menu.

Programming Code

MENUDISC

Program Sequence

MENUDISC;

Manual Sequence

$\boxed{\text{DISC}}$
   DIRECTORY or
   STORE or
   LOAD or
   DELETE or
   UN-DELETE or
   STORAGE IS INTERNAL or STORAGE IS EXTERNAL
   SET UP DISC

Description

Preset	internal, LIF	Range	N/A
Initialized	same as Preset	Recalled	N/A
Coupled	N/A		

Results are unpredictable if the STORE , LOAD , or DELETE operations are aborted by pressing any analyzer front panel key. *DO NOT* eject the disc while the disc LED is on, damage to the disc drive can result.

Magnetic media has a finite life: back up important files using another disc.

Store the disc in a location safe for magnetic materials.

The disc must be initialized before use. See INITIALIZE DISC .

The disc write protect must be disabled before data can be stored.

See Also

DELETE , LOAD , STORE

DISC UNIT NUMBER

Disc unit number. Usually 0 (left drive), 1 (right drive).

Programming Code

DISCUNIT

Main Menu

DISC

Program Sequence

DISCUNIT [value];   *value = 0 to 15*
DISCVOL [value];   *value = 0 to 7*

Manual Sequence

[DISC]
  STORAGE IS EXTERNAL
   SETUP DISC
    DISC UNIT NUMBER entry [x1]   (entry = 0 to 15)
    DISC VOLUME entry [x1]   (entry = 0 to 7)

Description

Preset	not changed	Range	0 to 15
Initialization	0	Recalled	N/A
Coupled	N/A		

The disc unit number and volume number are part of the Hardware State. They are not changed by power-up, preset (any kind), or [RECALL].

For DISCUNIT: A disc drive may contain more than one disc unit. A particular unit is selected using this command.

For DISCVOL: A large disc unit may be divided into volumes. This is usually a hardware setting on the disc drive. A particular volume is selected using this command.

DISC VOLUME

Disc volume number.

Programming Code

DISCVOL

Main Menu

DISC

Description

Preset	not changed	Range	0 to 7
Initialization	0	Recalled	N/A
Coupled	N/A		

See DISC UNIT NUMBER for full description.

See Also

ADDRESS of DISC

(DISPLAY)

Present display menu.

Programming Code

MENUDISP

Program Sequence

MENUDISP;

Manual Sequence

(DISPLAY)
  DISPLAY MODE
  ADJUST DISPLAY or
  DISPLAY: DATA or
  DISPLAY: MEMORY or
  DISPLAY: DATA and MEMORY or
  DISPLAY: MATH (operator) or

$\boxed{\text{DISPLAY}}$

> DATA → MEMORY n or
> SELECT DEFAULTS

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

DISPLAY FUNCTIONS

Present the display functions menu.

Programming Code

None

Main Menu

SYSTEM

Manual Sequence

$\boxed{\text{SYSTEM}}$
> DISPLAY FUNCTIONS
> > TITLE or
> > DATE/TIME FUNCTIONS or
> > CRT OFF or
> > FREQUENCY OFF

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

DISPLAY: DATA

Display current data for selected channel.

Programming Code

DISPDATA

Main Menu

DISPLAY

Program Sequence

(select channel)
  DISPDATA;

Manual Sequence

(select channel)
  [DISPLAY]
    DISPLAY: DATA

Description

Preset	display:data	Range	N/A
Initialization	display:data	Recalled	yes
Coupled	always uncoupled		

The parameter label is displayed in the Channel Identification area of the display.

The MARKER value is the current trace value at the Active Marker position.

DISPLAY: MATH (operator)

Display selected channel data with default math using default memory.

`DISPLAY: MATH(operator)`

Programming Code

DISPMATH

Main Menu

DISPLAY

Program Sequence

> *(select channel)*
>   DISPMATH;

Manual Sequence

> (select channel)
>   [DISPLAY]
>   `DISPLAY: MATH (operator)`

Description

Preset	display:data math (/)	Range	N/A
Initialization	same as Preset	Recalled	no (instrument state RECALL turns math off)
Coupled	not part of P/F/R always uncoupled		

The parameter label (operator) is displayed in the Channel Identification area of the display. The [MARKER] value gives the current trace value at the Active Marker position after math is applied.

The trace will be in error if the memory trace was stored with a different `NUMBER of POINTS` than is currently selected. Math will not turn on if the current number of points is different, and will turn off if points is changed.

[RECALL] of instrument state selects `DISPLAY: DATA` .

See Also

`MATH OPERATIONS`

DISPLAY: DATA and MEMORY

Display selected parameter data and respective active memory trace.

Programming Code

DISPDATM

Main Menu

DISPLAY

Program Sequence

(select channel)
(select parameter)
DISPDATM;

Manual Sequence

(select channel)
[DISPLAY]
  DISPLAY: DATA and MEMORY

Description

Preset	display: data	Range	N/A
Initialized	display: data	Recalled	yes
Coupled	always uncoupled		

The parameter label and the M annotation is displayed in the Channel Identification area of the display. The current data trace is annotated by a number 1 through 4, depending on the parameter. The memory trace is not annotated, but note that the color for the M annotation matches the color of the memory trace.

The marker reads only the current data trace when DISPLAY: DATA and MEMORY is selected.

The traces must be viewed in the same domain (frequency, time, or voltage) as when the memory was stored. Changing the domain does not change the domain of the stored memory trace. Further, the traces must be viewed using the same number of frequency points as was stored for the memory trace.

The display returns to display data trace only, whenever an instrument state is recalled, memory is turned off, the domain is changed, a calibration set is recalled, or the number of points is changed.

DISPLAY: DATA and MEMORY

See Also

DISPLAY: DATA , DISPLAY: MEMORY DISPLAY MATH (+/-)

DISPLAY: MEMORY

Display current parameter selected channel memory.

Programming Code

DISPMEMO

Main Menu

DISPLAY

Program Sequence

> *(select channel)*
>   DISPMEMO;

Manual Sequence

> (select channel)
>   (DISPLAY)
>   DISPLAY: MEMORY

Description

Preset	display:data	Range	N/A
Initialization	same as Preset	Recalled	no
Coupled	always uncoupled		

The annotation M only is displayed in the Channel Identification area of the display. In this state only, the (MARKER) readout gives the current memory trace value at the Active Marker position.

The trace is in error if the memory trace was stored with a different NUMBER of POINTS than is currently selected. Math does not turn on if the current number of points is different, and will turn off if points is changed.

(RECALL) of instrument state selects DISPLAY: DATA .

DISPLAY MODE

Present the various type of display modes for selection.

Programming Code

None

Main Menu

DISPLAY

Manual Sequence

(DISPLAY)
  DISPLAY MODE
    SINGLE PARAMETER or
    DUAL CHAN OVERLAY or
    DUAL CHAN SPLIT or
    FOUR PARAM OVERLAY or
    FOUR PARAM SPLIT

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

The different display modes.

DIVIDE (/)

Select complex division trace math for selected parameter.

Programming Code

DIVI

DIVIDE (/)

Main Menu

DISPLAY

Program Sequence

> *(select channel)*
> > DIVI;

Manual Sequence

> (select channel)
> > DISPLAY
> MORE
> > MATH OPERATIONS
> > > DIVIDE (/)

Description

Preset	math (/) for channels 1 & 2	Range	N/A
Initialization	same as Preset	Recalled	yes
Coupled	always uncoupled		

Provides vector normalization. The softkey label becomes MATH (/) .

DOMAIN

Present domain menu.

Programming Code

MENUDOMA

Program Sequence

MENUDOMA;

Manual Sequence

> DOMAIN
> > FREQUENCY or
> > TIME LOW PASS or
> > TIME BAND PASS or
> > AUX. VOLT OUTPUT or
> > PULSE PROFILE

SPECIFY TIME or
SPECIFY GATE

Description

Preset	frequency domain for channels 1 & 2	Range	N/A
Initialization	same as Preset	Recalled	yes
Coupled	always uncoupled, except pulse profile may be uncoupled		

When switching from Pulse Profile to Time Band Pass or to Time Low Pass, the trace first represents the inverse Fourier transform of the Pulse Profile Domain response. The 8510 begins to sweep the last Frequency Domain stimulus settings, then, when the sweep is complete, the trace is updated to show the transform of the Frequency Domain response.

DONE: xx

Standard class done during measurement calibration. Where xx = standard class label.

Programming Code

DONE

Main Menu

CAL

Program Sequence

Example: RESPONSE, 3.5 mm Cal Kit

```
S11;
   CAL1;
      CALIRESP;
         STANA;
            DONE;
               CALSn;    n = 1 to 8
```

`DONE: xx`

Manual Sequence

Example: RESPONSE, 3.5 mm Cal Kit

S11
CAL
    CAL 1 3.5 mm B.1
      RESPONSE
       SHORT
         DONE RESPONSE
           CAL SET n   (n = 1 to 8)

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

This keyword appears on the Standard Selection menu which is displayed when there is more than one standard in the class. When it is selected, the following things happen:

1. Logic checks that all necessary standards in the class have been measured.

2. The appropriate error terms are computed.

3. The class label is underlined to signify that the standard class is complete.

4. Control is passed to the next procedure.

If the complete current frequency range is not covered by the standards thus far selected, then the message `CAUTION: ADDITIONAL STANDARDS NEEDED` is displayed and bit 1 of the Primary Status byte is set.

If standards in the class overlap in frequency coverage (see `MINIMUM FREQUENCY` and `MAXIMUM FREQUENCY`), then data from the last standard measured in the overlapping frequency area is used to develop the error coefficients.

In the RESPONSE cal, `DONE` must be followed by `CAL SET n` or error coefficients are lost.

DONE

Multiple source define frequencies menu.

Programming Code

None

Main Menu

SYSTEM

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

DONE or (PRIOR MENU) returns to Multiple Source menu. Changed source and receiver definitions are not stored in the Hardware State until MULT. SRCE: ON/SAVE or MULT. SRCE: OFF/SAVE is selected.

See Also

EDIT MULT. SRC

DONE

Edit frequency list menu. Completes the frequency list entry process.

Programming Code

EDITDONE

Main Menu

STIMULUS

`DONE`

Program Sequence

> `EDITLIST;`
>> *(enter frequency list segments)*
>>> `EDITDONE`

Manual Sequence

STIMULUS [MENU]
`MORE`
  `EDIT LIST`
  (enter frequency list segments)
`DONE`

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

When editing or creating a frequency list, this should be the last key or GPIB mnemonic executed.

`FACTORY PRESET` clears frequency list.

See Also

`EDIT LIST`, `SEGMENT`

`DONE LOADS`

Necessary standards on the loads menu have been measured.

Programming Code

DONE

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

If standards thus far measured do not cover the current frequency range, a caution message is displayed.

See Also

CALIBRATE: S11 1-PORT

DRIVE

Present drive menu to select port at which the stimulus (drive) is applied for current basic or user parameter.

Programming Code

None

Main Menu

PARAMETER

Program Sequence

See REDEFINE PARAMETER .

Manual Sequence

(select basic or user parameter)
 PARAMETER (MENU)
  REDEFINE PARAMETER
   DRIVE
    DRIVE: PORT 1 or
    DRIVE: PORT 2 or
    DRIVE: None
     [other changes]
      REDEFINE DONE

`DRIVE`

Description

Preset	standard basic and user parameters	Range	N/A
Initialization	same as Preset	Recalled	basic parameters: no user parameters: no
Coupled	always uncoupled		

Parameter definition changes are executed immediately. `REDEFINE DONE` stores current parameter definition.

See Also

`REDEFINE PARAMETER`

`DRIVE: NONE`

Do not drive either port 1 or port 2; do not attempt 1st IF phase lock.

Programming Code

DRIVNone

Main Menu

PARAMETER

Program Sequence

See `REDEFINE PARAMETER` .

Manual Sequence

See `DRIVE` .

Description

Preset	standard basic and user parameters	Range	N/A
Initialization	same as Preset	Recalled	basic parameters: no user parameters: yes
Coupled	always uncoupled		

The indicator adjacent to a_1 or a_2 on the test set lights to show the drive port.

For Reflection/Transmission test sets, only `DRIVE: PORT 1` is valid.

See Also

`DRIVE`, `REDEFINE PARAMETER`

DRIVE: PORT n

Select port 1 as the drive port. Where n = 1 or 2.

Programming Code

DRIVPORT1 or DRIVPORT2

Main Menu

PARAMETER

Description

Preset	standard basic and user parameters	Range	N/A
Initialization	same as Preset	Recalled	basic parameters: no user parameters: yes
Coupled	always uncoupled		

DUAL CHAN OVERLAY

Select overlay dual channel display.

Programming Code

OVER

Main Menu

DISPLAY

DUAL CHAN OVERLAY

Program Sequence

OVER;

Manual Sequence

(DISPLAY)
 DISPLAY MODE
 DUAL CHAN OVERLAY

Description

Preset	single channel single param	Range	N/A
Initialized	single channel single param	Recalled	yes
Coupled	N/A		

The current Channel 1 and Channel 2 measurement displays are presented, in full size in the same display area. Uncoupled functions apply to the currently selected channel.

See Also

DUAL CHAN SPLIT

DUAL CHAN SPLIT

Select dual channel split display format.

Programming Code

SPLI

Main Menu

DISPLAY

Program Sequence

SPLI;

Manual Sequence

(DISPLAY)
> DISPLAY MODE
> > DUAL CHANNEL SPLIT

Description

Preset	single channel	Range	N/A
Initialized	single channel	Recalled	yes
Coupled	N/A		

The current Channel 1 and Channel 2 measurement displays are presented, with Channel 1 on the left and Channel 2 on the right. Uncoupled functions apply to the currently selected channel.

See Also

DUAL CHAN OVERLAY

DUPLICATE POINTS

Presents duplicate points mode menu.

Programming Code

None

Main Menu

STIMULUS

Program Sequence

```
EDITLIST;
 DUPD; or
 DUPM;
  EDITDONE;
```

DUPLICATE POINTS

Manual Sequence

STIMULUS (MENU)
  MORE
    EDIT LIST
      DUPLICATE POINTS
        DUPLICATES DELETED or
        DUPLICATES MEASURED
         DONE

Description

Preset	duplicates measured	**Range**	N/A
Initialization	duplicates measured	**Recalled**	yes
Coupled	always coupled		

The frequency list is recreated so that duplicate points are deleted or measured; this happens independently of sweep mode. If the sweep mode is FREQUENCY LIST , then the data trace is updated. Use DELETE DUPLICATES for measuring group delay where measurements at duplicate frequency points cause errors in the group delay trace.

DUPLICATES DELETED and DUPLICATES MEASURED are part of the Cal Set Limited Instrument State, so the selection must be made before the calibration is started.

See Also

FREQUENCY LIST

DUPLICATES DELETED

Frequency list delete duplicate points.

Programming Code

DUPD

Main Menu

STIMULUS

Description

Preset	duplicates measured	Range	N/A
Initialization	duplicates measured	Recalled	yes
Coupled	always coupled		

See Also

See DUPLICATE POINTS for full description.

DUPLICATES MEASURED

Frequency list measure duplicate points.

Programming Code

DUPM

Main Menu

STIMULUS

Description

Preset	duplicates measured	Range	N/A
Initialization	duplicates measured	Recalled	yes
Coupled	always coupled		

See Also

See DUPLICATE POINTS for full description.

DUTY CYCLE

Set the upper limit of the ratio of the "on" pulse time to the total pulse period of the signal at the rear panel PULSE OUTPUT BNC.

Programming Code

DUTC

Note	Wideband IF option 008 only.

Main Menu

SYSTEM

Program Sequence

DUTC [value];   *value = 0 to 100*

Manual Sequence

(SYSTEM)
MORE
  PULSE CONFIG
    DUTY CYCLE [entry (x1)]   (entry = 0 to 100)

Description

Preset	10%	**Range**	0 to 100%
Initialized	10%	**Recalled**	N/A
Coupled	N/A		

Applies to internal triggering only. When the combination of the pulse width and duty cycle limit approaches the measurement cycle time, the pulse off part of the measurement cycle time is increased to satisfy the duty cycle limit. The limit is a maximum limit. The actual duty cycle can be less than the value, but not greater than the value.

See Also

DETECTOR: NORMAL BW , DETECTOR: WIDE BW , PULSE WIDTH , PULSE OUT: HIGH , PULSE OUT: LOW

DWELL TIME

Set the amount of time the analyzer waits after its ready before meaking a measurement.

Programming Code

DWET

Main Menu

STIMULUS

Program Sequence

DWET [value[time suffix]];   *value = 0s to 10 s*

Manual Sequence

STIMULUS (MENU)
 FREQUENCY LIST or
 SINGLE POINT or
 STEP
 DWELL TIME [entry [time suffix]]   (entry = 0 s to 10 s)

Description

Preset	0s	Range	0s to 10 s
Initialized	0s	Recalled	N/A
Coupled	may be uncoupled		

This function applies to synthesized sources in the step sweep mode only. It replaces the SWEEP TIME softkey selection when step sweep is activated.

For Frequency Domain step sweep mode, dwell time (in milliseconds) between time that the network analyzer is tuned at the new data point and initiation of data measurement is:

Sweep Time (ms)/Number of Points

to allow the device under test to respond to the new tuned frequency.

See Also

SWEEP TIME

E

EDIT

Edit present edit frequency list menu.

Programming Code

SEDI

Main Menu

STIMULUS

Program Sequence

```
EDITLIST;
 SEDI [value];
(define segment)
    SDON;
EDITDONE;
```

Manual Sequence

```
STIMULUS (MENU)
  MORE
    EDIT LIST
      SEGMENT entry (x1)
        EDIT
        (define segment)
      DONE
  DONE
```

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	always coupled		

From the front panel, the edit key edits the active segment. Over GPIB, the edit command edits the segment specified by the value following the command (e.g. SEDI3 edits segment 3).

EDIT

If edit is selected and the list is empty, then the next higher segment with default values is
added for the editing.

See Also

EDIT LIST , SEGMENT

EDIT DONE

Exit the Edit menu for limit lines or limit points.

Programming Code

None

Main Menu

DISPLAY

Manual Sequence

(DISPLAY) LIMITS EDIT LIMIT EDIT DONE

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	always coupled		

Ends editing of limit lines or points and returns to the prior menu.

See Also

ADD LIMIT

EDIT LIMIT

Edit limit point or limit line segment table entry.

Programming Code

LIMIEDITSEG [segment number [suffix]]]

Main Menu

DISPLAY

Program Sequence

(select desired channel and stimulus parameter)
LIMIEDITSEG [segment number [suffix]]]
LIMIBEGLIM [measurement value [suffix]]] or
LIMIENDLIM [measurement value [suffix]]] or
LIMIBEGSTIM [stimulus value [suffix]]] or
LIMIENDSTIM [stimulus value [suffix]]]

Manual Sequence

(select desired channel and stimulus parameter)
[DISPLAY]
  LIMITS [entry] [X1] *(entry = segment number to edit)*
    EDIT LIMIT
      BEGIN LIMIT [entry] (x1) *(x1 = measurement units)*
      END LIMIT [entry] (x1) *(x1 = measurement units)*
      BEGIN STIMULUS [entry] (x1) *(x1 = domain units)*
      END STIMULUS [entry] (x1) *(x1 = domain units)*

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	always uncoupled		

The domain and measurement values for limit line segments or limit points can be edited by selecting the desired limit table and table entry. Choose the table by selecting a channel and stimulus parameter. Make an entry after entering the limit line menu or by using the LIMIEDITSEG command.

`EDIT LIMIT`

See Also

`LIMITS` `DELETE LIMIT` `DELETE ALL LIMITS`

`EDIT LIST`

Edit frequency list.

Programming Code

EDITLIST

Main Menu

STIMULUS

Program Sequence

```
EDITLIST;
 CLEL;
 SADD;
(enter frequency list segment)
   SDON;
EDITDONE;
 LISFREQ;
```

Manual Sequence

```
STIMULUS (MENU)
  MORE
    EDIT LIST
      SEGMENT or
      EDIT or
      DELETE or
      ADD or
      DUPLICATE POINTS or
      CLEAR LIST or
    DONE
   DONE
   FREQUENCY LIST
```

Description

Preset	clears frequency list	Range	801 points or 31 segments
Initialization	clears frequency list	Recalled	yes
Coupled	always coupled		

The EDIT LIST key starts the process of creating or editing a frequency list. The EDITLIST GPIB command must be the first command in any sequence that adds, deletes, or edits the frequency list.

Figure E-1. Edit Frequency List Menu

See Also

FREQUENCY LIST, DUPLICATE POINTS

EDIT MULT. SRC

Edit multiple source equations.

Programming Code

EDITMULS

Main Menu

SYSTEM

Program Sequence

```
EDITMULS;
 DEFA;
 MULSON; or
 MULSOFF;
```

Manual Sequence

(SYSTEM)
  MORE
    EDIT MULT. SRC
      DEFINE: and/or
      MULT. SRC: ON/SAVE or
      MULT. SRC: OFF/SAVE

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

This key starts the process of editing the multiple source equations. These equations are part of the Hardware State. They are not changed by preset, power on, or instrument state recall.

Any programming sequence to edit the multiple source equations must start with EDITMULS.

See Also

MULT. SRC: OFF/SAVE , MULT. SRC: ON/SAVE , DEFINE: SOURCE 1

ELECTRICAL DELAY

Programming Code

ELED

Main Menu

RESPONSE

Program Sequence

(select channel)
(select parameter)
(select coax or waveguide type)
ELED [value [time suffix]];

Manual Sequence

(select channel)
  (select parameter)
    (select coax or waveguide type)
RESPONSE (MENU)
ELECTRICAL DELAY entry (x1) ((x1) = seconds)

Description

Set electrical delay for current parameter on selected channel.

Preset	electrical delay=0 seconds for all basic and user parameters, channel 1 and 2	Range	+1 second to −1 second with femtosecond resolution
Initialization	same as Preset	Recalled	yes
Coupled	separate for each parameter on each channel		

ELECTRICAL DELAY allows a time/phase shift that is independent of PORT EXTENSIONS . It produces an effect upon Phase, Delay, and Time Domain traces in any format. Separate values for electrical delay are Saved/Recalled for each Basic and User parameter on each channel (total eight separate memories).

`ELECTRICAL DELAY`

The enhancement annotation D is displayed on the LCD/CRT when `TABLE DELAY` is selected, or the sum of Electrical Delay and Port Extensions is non-zero for any displayed parameter. The supplementary display below the active entry value shows the corresponding physical length of transmission line which exhibits the characteristic:

delay = physical length / C

where C $\quad$ = the current velocity factor (= one, after Preset) $\times$

$\qquad$ the speed of light in free space

$\qquad$ = 299.79 Mm/s

The phase shift applied to the measurement can be either linear or dispersive, depending upon the `COAXIAL DELAY` or `WAVEGUIDE DELAY` selection. This function is disabled by table delay.

See Also

`COAXIAL DELAY`, `OFFSET DELAY`, `PORT EXTENSIONS`, `TABLE DELAY`, `VELOCITY FACTOR`, `WAVEGUIDE DELAY`

`END LIMIT`

Set the measurement value of the end of a limit segment.

Programming Code

`LIMIENDLIM [measurement value [suffix] ]]`

Main Menu

DISPLAY

Program Sequence

See `ADD MAX LINE`, `ADD MIN LINE`, `ADD MAX POINT`, `ADD MIN POINT`, or `EDIT LIMIT`.

Manual Sequence

(DISPLAY) `LIMITS` `ADD MAX LINE` or `ADD MIN LINE` or `ADD MAX POINT` or `ADD MIN POINT` `END LIMIT` [entry] [x1]

or `LIMITS` [entry] [x1] `EDIT LIMIT` `END LIMIT` [entry] [x1]

(entry = segment number to edit; x1 = fundamental measurement units)

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	±500
Coupled	always uncoupled		

The measurement value of the right end of a limit line segment, is set by making an entry. The value can be modified later by selecting the correct limit segment from the limit table, either by entering the LIMIT LINE menu or by using the LIMIEDITSEG GPIB command.

See Also

LIMITS EDIT LIMIT

END STIMULUS

Set the stimulus value of the end of a limit segment.

Programming Code

LIMIENDSTIM [stimulus value [suffix]]]

Main Menu

DISPLAY

Program Sequence

See ADD MAX LINE, ADD MIN LINE, ADD MAX POINT, ADD MIN POINT, or EDIT LIMIT.

Manual Sequence

(DISPLAY) LIMITS ADD LIMIT ADD MAX LINE or ADD MIN LINE or ADD MAX POINT or ADD MIN POINT BEGIN STIMULUS [entry] [x1]

or LIMITS [entry] [x1] EDIT LIMIT BEGIN STIMULUS [entry] [x1]

(entry = segment number to edit; x1 = fundamental measurement units)

`END STIMULUS`

Description

Preset	N/A	Range	full domain
Initialization	N/A	Recalled	yes
Coupled	always uncoupled		

The domain value (horizontal position) of a limit point or the right end of a limit line segment is set by making an entry. The value can be modified later by selecting the correct limit segment from the limit table, either by entering the LIMIT LINE menu or by using the `LIMIEDITSEG` GPIB command.

See Also

`LIMITS` `EDIT LIMIT`

(ENTRY OFF)

Turn off active function and active entry display.

Programming Code

ENTO

Program Sequence

`ENTO;`

Manual Sequence

(ENTRY OFF)

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

This keyword clears the Active Entry area of the 8510 LCD/CRT, including Caution/Tell messages, and disables the Active Function entry. The value of last active function is not changed.

Under GPIB control, Caution/Tell messages are cleared from the LCD/CRT display using `OUTPERRO`.

ERASE TITLE

Erase current title.

Programming Code

None

Main Menu

SYSTEM

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

TITLE

= MARKER

Set current active function value equal to the value of the current active marker.

Programming Code

EQUA

Program Sequence

        MARKn; [value [freq or time suffix]];   *n = 1 to 5*
          (select active function)
            EQUA;

Manual Sequence

MARKER
  MARKER n   (n = 1 to 5)
     (position marker)
       (select active function)
  = MARKER

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

The current active function (see list of functions below) is assigned the active marker value. The marker value and the trace are updated.

If no active marker is currently selected, then the most recently active marker is turned on (MARKER 1 after FACTORY PRESET) and its value is used.

If the current active function is not appropriate, the message INCONSISTENT WITH CURRENT ACTIVE FUNCTION is displayed.

Valid functions are:

START	REF VALUE
STOP	ELECTRICAL DELAY
CENTER	PHASE OFFSET
SPAN	PORT EXTENSIONS
(any frequency entry)	WAVEGUIDE CUTOFF

EXTERNAL VIDEO

Present the video synchronization menu. (This softkey applies only to a CRT display.)

Programming Code

None

Main Menu

DISPLAY

Manual Sequence

$\boxed{\text{DISPLAY}}$
  ADJUST DISPLAY
    EXTERNAL VIDEO
      SYNC ON GREEN or
      COMPOSITE SYNC or
      H, V SYNC or
      POSITIVE SYNC or
      NEGATIVE SYNC

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

The various synchronization options provide the capability to work with external display devices. An external display device able to synchronize on a 25.5 kHz horizontal scan rate is compatible with the network analyzer.

The D1191A cable is provided with the 8510C to connect external display devices. Connect the cable to the rear-panel EXTERNAL DISPLAY multi-pin connector. Refer to Table E-1.

Table E-1. External Display Cable Connections

Mode	BNC Cable Signal	
	Red Green Blue	Sync
SYNC ON GREEN	R G B	on green/white BNC
COMPOSITE SYNC	R G B	on black/white BNC
H, V SYNC	R G B	horizontal (H) on black/white BNC vertical (V) on brown/white BNC

Note   This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

COMPOSITE SYNC , H, V SYNC , NEGATIVE SYNC , POSITIVE SYNC , SYNC ON GREEN

FACTORY PRESET

Execute a system preset. Set the analyzer to initialized values.

Programming Code

FACTPRES

Main Menu

RECALL

Program Sequence

FACTPRES;

Manual Sequence

(RECALL)
MORE
  FACTORY PRESET

Description

Preset	see tabbed section STATES	Range	same as Preset
Initialization	same as Preset	Recalled	same as Preset
Coupled	same as Preset		

Factory preset initializes all the instruments connected to the System Bus. The frequency range is determined by the capabilities of the source and test set, all other instrument parameters are determined by the analyzer. A complete list of the factory preset state values is given in the tabbed section STATES.

See Also

(USER PRESET), INST STATE n

FASC

Execute fast CW data acquisition and data output.

Main Menu

None (GPIB Only)

Program Sequence

```
SINP;
```
(set CW frequency, parameter, channel)
```
FASC;
```
(wait for Bit 2 of Primary Status Byte)
```
GET 716    (HP-IB group execute trigger)
```
(controller ENTER *statement)*
(issue hardware trigger)

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Selecting Fast CW allows data acquisition and output to be controlled by a TTL pulse applied to the TRIGGER IN connector on the analyzer rear panel.

After issuance of the GPIB group execute trigger, status bit is cleared then the falling edge of the trigger input initiates the selected measurement. The data point is transferred to the Raw Data Array, and, if a controller enter statement is active, the data point is output to the controller in FORM1 format. If a controller enter statement is not active, the data point is stored in the next available element. To exit the Fast CW mode select a sweep mode (Ramp or Step).

If multiple hardware triggers are received before data is read, data is output on a first-in/first-out basis. If more than the current number of points is measured before the data is read, the buffer overflows, the message SWEEP TIME TOO FAST is displayed, status bit is set, and the mode is stopped. You need to reissue the GET command to restart the data aquisition cycle.

FIXED

Define load type as fixed.

Programming Code

FIXE

Main Menu

CAL

Program Sequence

See MODIFY 1 xx and MODIFY 2 xx .

Manual Sequence

See STD TYPE: LOAD.

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

When the standard is selected during the measurement calibration sequence, the load is treated as fixed load requiring a single measurement to obtain a value for directivity.

See Also

STD TYPE: LOAD , MODIFY 1 xx , MODIFY 2 xx

FLATNESS OFF

Turn off flatness correction calibration.

Programming Code

FLATOFF

Main Menu

STIMULUS

Program Sequence

```
FLATOFF;
```

Manual Sequence

STIMULUS (MENU)
  POWER MENU
  MORE
    FLATNESS OFF

Description

Preset	flatness off	Range	N/A
Initialized	flatness off	Recalled	yes
Coupled	always coupled		

When FLATNESS OFF is selected, the ability to compensate for insertion losses and to control power at the test port is disabled. When flatness correction calibration is off the softkey POWER SOURCE 1 controls the output power of the source into the test set.

The flatness correction calibration feature of 8510/8360 series systems allows you to set and control the power level at the point in the system where the test device is inserted. Refer to CALIBRATE FLATNESS for information on how this feature works.

See Also

CALIBRATE FLATNESS for a complete description. POWER SOURCE 1

FLATNESS ON

Enable flatness correction calibration.

Programming Code

FLATON

Main Menu

STIMULUS

Program Sequence

FLATON;

Manual Sequence

STIMULUS [MENU]
  POWER MENU
  MORE
    CALIBRATE FLATNESS
    FLATNESS ON

Description

Preset	flatness off	**Range**	N/A
Initialized	flatness off	**Recalled**	yes
Coupled	always coupled		

When FLATNESS ON is selected, a table of power corrections versus frequency is used to set and control source output power to establish a near constant power at the measurement port. The table is created when an 8510/8360 series system performs a calibrate flatness routine. If no flatness correction table is available or the frequency range requested is outside the frequency range used during the flatness correction calibration, no flatness correction is applied (0 dB correction applied).

When FLATNESS ON is enabled, the softkey POWER SOURCE 1 controls the power produced at the test port.

See Also

CALIBRATE FLATNESS for a complete description.

FORM1

Input/output 8510 internal binary format real/imaginary pairs (6 bytes/data point).

Main Menu

None (GPIB Only)

Description

Preset	form1	**Range**	N/A
Initialization	form1	**Recalled**	form1
Coupled	N/A		

This mnemonic specifies the data block format used to transfer data via the GPIB. It is good practice to precede each INPU or OUTP instruction with one of the FORM specifiers.

SAVE/RECALL and LEARN STRING always selects FORM1.

#A is standard block header.

Bytea and byteb hold number of bytes to follow.

Imag/real data point is three, 16 bit words for each data point:

Bits 7 to 15 of LSB provide additional resolution; not used.

FORM1 is internal binary representation used for fast I/O and is not intended to be modified by the user.

7 to 15 of LSB may not be accepted on input.

See Also

FORM2, FORM3, FORM4, FORM5

FORM2

Input/output IEEE 32-bit floating point format real/imaginary pairs (8 bytes/data point).

Main Menu

None (GPIB Only)

Description

Preset	form1	Range	N/A
Initialization	form1	Recalled	no
Coupled	N/A		

#A is standard block header.

Bytea and byteb integer number of bytes to follow.

Real data point is 32 bit word for each data point,

Imag data point is 32 bit word for each data point:

32 bit IEEE 728 standard data block transfer format with 1 bit sign, 8 bit biased exponent, 23 bit fraction whose complete value, n, is interpreted as follows:

If exp = 255 and mant < > 0, then n = not a number.
If exp = 255 and mant = 0, then n = -1^s × infinity.
If 0 < exp < 255, then n = -1^s × 2(exp−127) × (1.mant).
If exp = 0 and mant < > 0, then n= -1^s × 2(−126) × (0.mant).
If exponent = 0 and f = 0, then n = -1^s × 0.

See Also

FORM1 , FORM3, FORM4, FORM5

FORM3

Input/output IEEE 64-bit floating point format real/imaginary pairs (16 bytes/data point).

Main Menu

None (GPIB Only)

Description

Preset	form1	Range	N/A
Initialization	form1	Recalled	no
Coupled	N/A		

Example: FORM3

```
FORMAT OFF
DIM Data (Number of Points, 2)
Listen Nwa; "FORM3; OUTPDATA;"
Talk Nwa_data; Preamble, Size, Data(*)
  .
  .
  .
Listen Nwa; "FORM3; INPUDATA;"
Listen Nwa; Preamble, Size, Data (*)

Preamble = Standard Block Header, #A
Size = Number of Bytes in Block.
```

#A is standard block header.

Bytea and byteb integer number of bytes to follow.

Real data point is 64 bit word for each data point;

Imag data point is 64 bit word for each data point:

64 bit IEEE 728 standard data block transfer format with 1 bit sign, 11 bit biased exponent, 52 bit fraction whose complete value, n, is interpreted as follows:

If $\exp = 2047$ and $\text{mant} <> 0$, then $n = $ not a number.
If $\exp = 2047$ and $\text{mant} = 0$, then $n = -1^s \times$ infinity.
If $0 < \exp < 2047$, then $n = -1^s \times 2(\exp-127) \times (1.\text{mant})$.
If $\exp = 0$ and $\text{mant} <> 0$, then $n = -1^s \times 2(-126) \times (0.\text{mant})$.
If $\text{exponent} = 0$ and $f = 0$, then $n = -1^s \times 0$.

See Also

FORM1, FORM2, FORM4, FORM5

FORM4

Input/output ASCII format (strings separated by comma).

Main Menu

None (GPIB Only)

Description

Preset	form1	Range	N/A
Initialization	form1	Recalled	no
Coupled	N/A		

Example: FORM4

```
FORMAT ON
DIM Data (Number of points, 2)
Listen Nwa; "FORM4; OUTPDATA;"
Talk Nwa_data; Data(*)

FORMAT ON
DIM Data (Number of points, 2)
Listen Nwa; "FORM4; INPUDATA;";  (suppress line feed)
Talk Nwa_data; Data(*)
```


The real and the imaginary ASCII values are:

Sxxx.yyyyyyyyyyyyyyyESzz

where

S = unforced sign (− if negative and blank if positive)

x = 3 digits to the left of the decimal point (leading blanks for (3 digits followed by sign, if applicable, and 1 or 2 digits)

y = 15 significant digits to the right of the decimal point

E = exponential notation

z = 2 significant digits for exponent

Each data point is two 24-character strings (first real then imag), with each string separated by a comma and the pair of values terminated by a line feed. EOI is asserted on the last byte of the data block.

When using FORM4 for transfers from the controller to the analyzer via the 8510 GPIB, suppress the line feed which normally terminates the INPU(data type) instruction.

See Also

FORM1, FORM2, FORM3, FORM5

FORM5

Input/output MS-DOS 32 bit floating point format real/imaginary pairs (8 bytes/data point).

Main Menu

None (GPIB Only)

Description

Preset	form15	Range	N/A
Initialization	form1	Recalled	no
Coupled	N/A		

#A is standard block header.

Bytea and byteb integer number of bytes to follow.

Real data point is 32 bit word for each data point;

Imag data point is 32 bit word for each data point:

32 bit MS-DOS (Intel) standard data block transfer format with 1 bit sign, 8 bit biased exponent, 23 bit fraction. FORM5 sends the mantissa bytes for each number in the reverse order of FORM2 (LSB first versus MSB first).

See Also

FORM1, FORM2, FORM3, FORM4

FORMAT (MENU)

Present format menu.

Programming Code

MENUFORM

Program Sequence

MENUFORM;

Manual Sequence

FORMAT (MENU)
SWR or
LINEAR MAGNITUDE or
LIN mkr on POLAR or
LOG mkr on POLAR or
Re/Im mkr on POLAR or
INVERTED SMITH or
IMAGINARY or
REAL or
PRIOR MENU to exit

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

FORM FEED

Immediately eject a page from a printer/plotter.

Programming Code

LISFORF or PLOTFORF or PRINFORF

Main Menu

COPY

Program Sequence

```
LISFORF  or
PLOTFORF;  or
PRINFORF;
```

Manual Sequence

(COPY)
```
DEFINE PLOT or
DEFINE PRINT or
DEFINE LIST
   FORM FEED
```

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

AUTO FEED OFF, AUTO FEED ON, DEFINE LIST, DEFINE PLOT, DEFINE PRINT

FOUR PARAM 1 MARKER/

Display the value of the current active marker value for each parameter.

Programming Code

MKRLFOUP

Main Menu

MARKER

Program Sequence

```
MARKn;
FOUPOVER; or
FOUPSPLI;
MKRLISTON;
MKRLFOUP;
```

Manual Sequence

(MARKER)
 (select a marker)
(DISPLAY)
    DISPLAY MODE
        FOUR PARAM OVERLAY or
        FOUR PARAM SPLIT
(MARKER)
MORE
MORE
    MKR LIST ON
        FOUR PARAM 1 MARKER/

Description

Preset	single parameter: five marker dual channel: five marker four parameter: 1 marker/	Range	N/A
Initialized	same as Preset	Recalled	yes
Coupled	always uncoupled		

The value of the currently active marker is displayed for each of the four parameters. The annotations appear only when the display is set to four parameter overlay or split.

In a programming sequence, the command MKRLISTON; causes an immediate display of the marker value list (no softkeys are displayed). The list remains until a subsequent GPIB

`FOUR PARAM 1 MARKER/`

command causes the softkeys to return. To always display the marker annotations, send the command `MENUOFF;`, followed by `MKRLISTON;`. The marker annotations remain until a `MENUON` command.

When `PRINMENUON` or `PLOTMENUON`, followed by the GPIB command to print or plot, is issued, the marker list is not printed/plotted regardless of setting.

Note	This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

`MKR LIST ON`, `MKR LIST OFF`, `FOUR PARAM 5 MARKERS`, `PRINMENUON`, `PRINMENUOFF`, `PLOTMENUON`, `PLOTMENUOFF`

`FOUR PARAM`
` 5 MARKERS`

Display all active (up to five) marker values for the current selected parameter.

Programming Code

MKRLFIVM

Main Menu

MARKER

Program Sequence

```
MARKn [stimulus value[suffix]];   for n = 1 to 5
MKRLISTON;
MKRLFIVM;
```

Manual Sequence

(MARKER)
(select all five markers)
`MORE`
`MORE`
  `MKR LIST ON`
    `FOUR PARAM 5 MARKERS`
  (PRIOR MENU)
(PRIOR MENU)
(PRIOR MENU)

Description

Preset	single parameter: five marker	Range	N/A
	dual channel: five marker		
	four parameter: 1 marker/		
Initialized	same as Preset	Recalled	yes
Coupled	always uncoupled		

The current "active" marker is noted by the ▶ symbol next to the marker label on the marker list. The five marker list can be used for either, single channel single parameter, or single channel four parameter displays.

As shown in the program sequence, the command `MKRLISTON`; causes an immediate display of all five marker value annotations (no softkeys are displayed). The annotation remains until a subsequent GPIB command causes the softkeys to return. To always display the marker annotations, send the command `MENUOFF`;, followed by `MKRLISTON`;. The marker annotations remain until a `MENUON`; command.

When `PRINMENUON` or `PLOTMENUON`, followed by the GPIB command to print or plot, is issued, the marker list is not printed/plotted regardless of setting.

Note   This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

MKR LIST ON , MKR LIST OFF , FOUR PARAM 1 MARKER/ , PRINMENUON, PRINMENUOFF, PLOTMENUON, PLOTMENUOFF

FOUR PARAM OVERLAY

Select four parameter overlay display format for a single channel.

Programming Code

FOUPOVER

Main Menu

DISPLAY

Program Sequence

    FOUPOVER;

Manual Sequence

(DISPLAY)
  DISPLAY MODE
    FOUR PARAM OVERLAY

Description

Preset	single channel single parameter	Range	N/A
Initialized	same as Preset	Recalled	yes
Coupled	always uncoupled		

All four parameters (S_{11}, S_{12}, S_{21}, and S_{22}) for the currently active channel are displayed in an overlay format. Each channel can have a unique four parameter format and each parameter can have its own format and response settings, as well as, an individual calibration set.

A marker list containing either, all five markers active on one parameter, or one active marker on all four parameters, can be displayed.

Note	This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

FOUR PARAM SPLIT , SINGLE PARAMETER , DUAL CHAN OVERLAY , DUAL CHAN SPLIT

FOUR PARAM SPLIT

Select four parameter split display format.

Programming Code

FOUPSPLI

Main Menu

DISPLAY

Program Sequence

    FOUPSPLI;

Manual Sequence

(DISPLAY)
  DISPLAY MODE
    FOUR PARAM SPLIT

Description

Preset	single channel single parameter	Range	N/A
Initialized	same as Preset	Recalled	yes
Coupled	always uncoupled		

All four parameters (S_{11}, S_{12}, S_{21}, and S_{22}) for the currently active channel are displayed with separate graticules. Each channel can have a unique four parameter format and each parameter can have its own format and response settings, as well as, an individual calibration set.

A marker list containing either, all five markers active on one parameter, or one active marker on all four parameters, can be displayed.

Note	This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

FOUR PARM OVERLAY , SINGLE PARAMETER , DUAL CHAN OVERLAY , DUAL CHAN SPLIT

FRER

Select free-run sweep mode.

Main Menu

None (GPIB Only)

Program Sequence

FRER;

Description

Preset	FRER	Range	N/A
Initialization	FRER	Recalled	yes
Coupled	N/A		

Used after TRIG to restore normal operation.

Sets TRIGGER MODE: EXTERNAL to TRIGGER MODE: INTERNAL .

Selected RAMP , STEP , or SINGLE POINT data acquisition continues (CONTINUAL or HOLD).

See Also

TRIG, TRIGGER MODE: EXTERNAL

FREQUENCY

Measure and display Frequency Domain for selected channel.

Programming Code

FREQ

Main Menu

DOMAIN

Program Sequence

> *(select channel)*
>> FREQ;

Manual Sequence

> (select channel)
>> (DOMAIN)
>>> FREQUENCY

Description

Preset	frequency domain for channel 1 and channel 2	Range	N/A
Initialization	same as Preset	Recalled	yes
Coupled	always uncoupled		

The measured characteristic is displayed versus frequency. Start, stop, center, span and other stimulus controls apply to the frequency sweep.

Switching from TIME LOW PASS or TIME BAND PASS to FREQUENCY automatically selects DISPLAY: DATA .

FREQUENCY LIST

Select frequency list sweep mode for both channels.

Programming Code

LISFREQ

Main Menu

STIMULUS

Program Sequence

LISFREQ;

FREQUENCY LIST

Manual Sequence

STIMULUS (MENU)
  FREQUENCY LIST
    SINGLE SEGEMENT or
    ALL SEGEMENTS

Description

Preset	ramp	Range	401 points maximum
Initialization	ramp	Recalled	yes
Coupled	always coupled		

Frequency list is a sweep mode that steps the source through a list of unique frequencies. The operation always starts with the lowest frequency and progresses to the highest in the list.

If no list is specified, the LCD/CRT displays Frequency List Empty.

Averaging is accomplished in the same way as in the STEP Sweep Mode.

The start, stop, center, span, and number of points keys are not active in the frequency list mode.

See Also

STEP , EDIT LIST , SEGMENT

FREQUENCY OFF

Turn off display of frequency annotations.

Programming Code

FREO

Main Menu

SYSTEM

Program Sequence

FREO;

Manual Sequence

(SYSTEM)
    FREQUENCY OFF

Description

Preset	restores normal frequency domain displays and preset frequency values	Range	N/A
Initialization	same as Preset	Recalled	yes
Coupled	N/A		

All stimulus functions operate normally except that the start, stop, center, and span display values are set to 0.000000000 GHz and the marker frequency value is blanked. Time Domain and Aux. Voltage Output Domain stimulus displays are not changed.

(RECALL) of Instrument State stored without FREQUENCY OFF restores normal Frequency Domain displays.

Not part of Cal Set Limited Instrument State.

FREQUENCY OF MEAS

Selects operating frequency in power domain.

Programming Code

FREM

Main Menu

DOMAIN

Program Sequence

POWD;
    FREM [value [suffix]];

FREQUENCY OF MEAS

Manual Sequence

DOMAIN
  POWER
    FREQENCY of MEAS. [entry] [X1] *(X1 = Hz)*

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Power domain requires selection of a single frequency for operation. If a calibration is turned on, the frequency chosen must be in the calibration set. The selected frequency is shown below the display next to the x-axis power range.

The proper calibration factor at the selected frequency is applied to the power domain data.

See Also

POWER

FREQUENCY SUBSET

Begin creation of frequency subset.

Programming Code

FRES

Main Menu

CAL

Program Sequence

```
FRES;
  (set frequency subset)
    CRES;
      CALSn  n = 1 to 8
```

Manual Sequence

CAL
  MORE
    MODIFY CAL SET
      FREQUENCY SUBSET
        (set trace markers)
        (set frequency subset)
          CREATE & SAVE
           CAL SET n (n = 1 to 8)

Description

Preset	correction off	Range	N/A
Initialization	correction off	Recalled	yes
Coupled	subsets always coupled		

With correction on, selecting FREQUENCY SUBSET causes the Frequency Subset menu to be displayed and markers to appear on the trace. Select SUBSET: START , SUBSET: STOP , SUBSET: CENTER , or SUBSET: SPAN and use the knob, step keys, and numeric entry to set the trace markers to appropriate points on the trace.

When the frequency subset is correct, press CREATE & SAVE , then select a calibration set. The appropriate existing calibration set error coefficients are transferred to the new calibration set and corrected data is displayed in the frequency list sweep mode.

The actual frequencies in this subset may be examined by selecting STIMULUS MENU , MORE , EDIT LIST . Recall the original frequency sweep by selecting the original calibration set.

See Also

CREATE & SAVE , FREQUENCY LIST , SUBSET: CENTER , SUBSET: SPAN , SUBSET: START , SUBSET: STOP

FREU

Update Frequency Annotation With No Sweep.

Main Menu

None (GPIB Only)

Program Sequence

```
HOLD;
    (change frequency sweep)
        FREU;
```

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

This command forces the 8510 to read the current stimulus state from the source and then update the current entry channel with the new data.

The start/stop and center/span frequency annotation is updated at the end of each sweep. If in HOLD, changes to the frequency annotation will not be made. FREU; provides a means to update the source settings and the display annotation without actually taking a sweep.

See Also

HOLD

FWD ISOL'N
ISOL'N STD

Measure forward isolation measurement calibration standard.

Programming Code

FWDI

Main Menu

CAL

Program Sequence

See `ISOLATION`.

Manual Sequence

See `ISOLATION`.

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Isolation always uses a single standard to measure transmission signal path crosstalk. The isolation calibration is most effective when at least as much averaging is used as during the measurement (see `ISOLATION`).

S_{21} is selected, the standard is measured, and the class label is annotated as complete.

Table F-1. Select Standard Class

Mnemonic	Standard Class
CLASS11A	(S_{11}): S_{11} 1st xx[1]
CLASS11B	(S_{11}): S_{11} 2nd xx[1]
CLASS11C	(S_{11}): S_{11} 3rd xx[1]
CLASS22A	(S_{11}): S_{22} 1st xx[1]
CLASS22B	(S_{11}): S_{22} 2nd xx[1]
CLASS22C	(S_{11}): S_{22} 3rd xx[1]
FWDT	FWD.TRANS xx[1]
REVT	REV.TRANS xx[1]
FWDM	FWD.MATCH xx[1]
REVM	REVM.MATCH xx[1]
FWDI	FWD.ISOL'N xx[1]
REVI	REV.ISOL'N xx[1]
TRLT	THRU xx[1]
TRLR1	S_{11} REFLECT xx[1]
TRLR2	S_{22} REFLECT xx[1]
TRLL	LINE xx[1]

1 xx=standard class label

See Also

ISOLATION

FULL PAGE

Select full page plot of measurement display on digital plotter.

Programming Code

FULP

Main Menu

COPY

Manual Sequence

⌜COPY⌟
    DEFINE PLOT
    SELECT QUADRANT
        FULL PAGE

Program Sequence

FULP;

Description

Preset	full page	Range	N/A
Initialization	full page	Recalled	N/A
Coupled	always coupled		

Softkey label annotation is updated; the next PLOT: (plot type) selection is plotted on full page.

See Also

SELECT QUADRANT , DEFINE PLOT

(FWD ISOLATION CLASS LABEL)

Measure isolation standard in response and isolation calibration.

Programming Code

RAIISOL

Main Menu

CAL

`(FWD ISOLATION CLASS LABEL)`

Program Sequence

```
CAL1; or CAL2;
  CALIRAI;
    RAIRESP;
    (measure reflection or transmission response standard)
      RAISOL;
      (measure reflection or transmission isolation standard)
        RAID;
          CALSn;    n = 1 to 8
```

Manual Sequence

`(CAL)`

`CAL 1 xx` (where xx=cal kit 1 label) or
`CAL 2 xx` (where xx=cal kit 2 label)
  `CALIBRATE: RESPONSE & ISOL'N`
    `RESPONSE`
    (measure reflection or transmission response standard)
    `DONE RESPONSE`
      `ISOL'N STD`
    (measure reflection or transmission isolation standard)
    `SAVE RESP & ISOL`
      `CAL SET n`   (n = 1 to 8)

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Isolation always uses a single standard to measure transmission signal path crosstalk, E_x, or Directory E_d, depending upon the parameter selected. This step is most effective when averaging is used. The standard is measured and the class label is annotated as complete.

See Also

`CALIBRATE: RESPONSE & ISOL'N`

FWD. MATCH xx

Measure forward match measurement calibration standard. Where xx = standard class label.

Programming Code

FWDM

Main Menu

CAL

Program Sequence

See TRANSMISSION .

Manual Sequence

See TRANSMISSION .

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

In the 2-port measurement calibration sequence, S_{11} of the forward match standard (usually the thru) is measured to produce the error coefficient data for the Forward Load Match error coefficient, ELF. Since the label for the standard class and standard(s) are user-definable, the FWDM mnemonic is used to select the standard class for measurement.

If a single standard comprises the class, S_{11} is selected, the standard is measured, logic checks that the standard covers the complete current frequency range, and the class label is annotated as complete. When TRANS. DONE is selected, the single standard does not cover the complete current frequency range then the message
CAUTION: ADDITIONAL STANDARDS NEEDED is displayed and bit 1 of the Primary Status byte is set.

If the FWD. MATCH standard class uses more than one standard, then the mnemonic selects S_{11} and presents the standard selection menu. See STANA through STANG to specify which standard to measure.

Table F-2. Select Standard Class

Mnemonic	Standard Class
CLASS11A	(S_{11}): S_{11} 1st xx[1]
CLASS11B	(S_{11}): S_{11} 2nd xx[1]
CLASS11C	(S_{11}): S_{11} 3rd xx[1]
CLASS22A	(S_{11}): S_{22} 1st xx[1]
CLASS22B	(S_{11}): S_{22} 2nd xx[1]
CLASS22C	(S_{11}): S_{22} 3rd xx[1]
FWDT	FWD.TRANS xx[1]
REVT	REV.TRANS xx[1]
FWDM	FWD.MATCH xx[1]
REVM	REVM.MATCH xx[1]
FWDI	FWD.ISOL'N xx[1]
REVI	REV.ISOL'N xx[1]
TRLT	THRU xx[1]
TRLR1	S_{11} REFLECT xx[1]
TRLR2	S_{22} REFLECT xx[1]
TRLL	LINE xx[1]

1 xx=standard class label

See Also

TRANSMISSION

FWD. TRANS. xx

Measure forward transmission measurement calibration standard. Where xx=class label.

Programming Code

FWDT

Main Menu

CAL

Program Sequence

See TRANSMISSION .

Manual Sequence

See TRANSMISSION .

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

In the 2-port measurement calibration sequence, S_{21} of the forward transmission standard (usually the thru) is measured to produce the error coefficient data for the transmission signal path frequency response error coefficient, ETF. (Isolation, Source Match and Load Match are also used in developing the 2-port ETF.) Since the label for the standard class and standard(s) are user-definable, the FWDT mnemonic is used to select the standard class for measurement.

If a single standard comprises the class, S_{21} is selected, the standard is measured, logic checks that the standard covers the complete current frequency range, and the class label is annotated as complete. When TRANS. DONE is selected, the single standard does not cover the complete current frequency range then the message CAUTION: ADDITIONAL STANDARDS NEEDED is displayed and bit 1 of the Primary Status byte is set.

If the FWD. TRANS standard class uses more than one standard, then the mnemonic selects S_{21} and presents the standard selection menu. See STANA through STANG to specify which standard to measure.

See Also

TRANSMISSION

G

GAIN: (MIN) 0

Service use only. Select test or reference IF gain.

Programming Code

GAIN0

Main Menu

SYSTEM

Program Sequence

```
TESA;   or
REFA;
  GAINn;    n = 1 to 4 or AUTO
```

Manual Sequence

```
(SYSTEM)
  SERVICE FUNCTIONS
    IF GAIN
      TEST AMP. GAIN or
      REFERENCE AMP. GAIN
        GAIN : (MIN) 0  or
        GAIN : 1  or
        GAIN : 2  or
        GAIN : 3  or
        GAIN : (MAX) 4  or
        GAIN : AUTO
          PRIOR MENU to exit
```

`GAIN: (MIN) 0`

Description

Preset	gain: auto, test and reference IF Gain	Range	N/A
Initialization	same as Preset	Recalled	N/A
Coupled	always coupled		

Allows manual or program selection of IF gain setting or selection of normal automatic IF gain autoranging. Changes are executed immediately.

If the IF gain is set too high, the message `CAUTION : IF OVERLOAD` is displayed and bit 1 of the Primary Status Byte is set.

`GAIN: 1`

Service use only. Select test or reference IF gain.

Programming Code

GAIN1

Main Menu

SYSTEM

Description

Preset	gain: auto, test and reference IF Gain	Range	N/A
Initialization	same as Preset	Recalled	N/A
Coupled	always coupled		

See Also

See `GAIN: (MIN) 0` for full description.

GAIN: 2

Service use only. Select test or reference IF gain.

Programming Code

GAIN2

Main Menu

SYSTEM

Description

Preset	gain: auto, test and reference IF Gain	Range	N/A
Initialization	same as Preset	Recalled	N/A
Coupled	always coupled		

See Also

See GAIN: (MIN) 0 for full description.

GAIN: 3

Service use only. Select test or reference IF gain.

Programming Code

GAIN3

Main Menu

SYSTEM

Description

Preset	gain: auto, test and reference IF Gain	Range	N/A
Initialization	same as Preset	Recalled	N/A
Coupled	always coupled		

See Also

See GAIN: (MIN) 0 for full description.

`GAIN: (MAX) 4`

Service use only. Select test or reference IF gain.

Programming Code

GAIN4

Main Menu

SYSTEM

Description

Preset	gain: auto, test and reference IF Gain	Range	N/A
Initialization	same as Preset	Recalled	N/A
Coupled	always coupled		

See Also

See `GAIN: (MIN) 0` for full description.

`GAIN: AUTO`

Service use only. Select test or reference IF gain.

Programming Code

GAINAUTO

Main Menu

SYSTEM

Description

Preset	gain: auto, test and reference IF Gain	Range	N/A
Initialization	same as Preset	Recalled	N/A
Coupled	always coupled		

See Also

See `GAIN: (MIN) 0` for full description.

GATE: CENTER

Select center/span gate markers; active function is current GATE CENTER value.

Programming Code

GATECENT

Note	Time Domain Option 010 only

Main Menu

DOMAIN

Program Sequence

GATECENT [value [time suffix]];

Manual Sequence

(DOMAIN)
  SPECIFY GATE
    GATE CENTER entry (x1) ((x1) = seconds)

Description

Preset	gate center=0 seconds	**Range**	N/A
Initialization	gate center=0 seconds	**Recalled**	yes
Coupled	may be uncoupled		

In any domain, the gate center marker value can be displayed. The gate markers are displayed only if a Time Domain mode is selected. The gate center marker is the middle marker.

When the position of any gate marker is changed, and GATE ON is selected, the message COMPUTING GATE COEFFICIENTS is displayed and gate markers will not respond to the knob. The gate marker position is updated upon completion of the computation.

GATE OFF

Turn off Time Domain gating for selected channel.

Programming Code

GATEOFF

Note	Time Domain Option 010 only

Main Menu

DOMAIN

Program Sequence

GATEOFF;

Manual Sequence

(DOMAIN)
    SPECIFY GATE
      GATE OFF

Description

Preset	gate off	Range	N/A
Initialization	same as Preset	Recalled	yes
Coupled	always uncoupled		

The softkey label annotation is updated and the trace is updated. The enhancement annotation G disappears. The gate markers are turned off.

See Also

GATE ON

GATE ON

Turn on Time Domain gating for selected channel.

Programming Code

GATEON

Note	Time Domain Option 010 only

Main Menu

DOMAIN

Program Sequence

GATEON;

Manual Sequence

(DOMAIN)
  SPECIFY GATE
    GATE ON

Description

Preset	gate off	Range	N/A
Initialization	same as Preset	Recalled	yes
Coupled	always coupled		

The message COMPUTING GATE COEFFICIENTS appears, the softkey label annotation is updated, all data for the selected parameter is acquired, the gating operation is applied, then the trace is updated. With GATE ON, only the time response within the current gate markers is used to generate the trace.

The gated data may be displayed in the Frequency Domain or the Time Domain. When gating is turned on for a displayed channel, the enhancement annotation G is displayed on the LCD/CRT.

Gate markers move with ELECTRICAL DELAY, and PORT 1, PORT 2 PORT EXTENSIONS.

GATE SHAPE

Present gate shape select menu.

Programming Code

None

Note	Time Domain Option 010 only

Main Menu

DOMAIN

Program Sequence

None

Manual Sequence

(DOMAIN)
  SPECIFY GATE
    GATE SHAPE
      GATE SHAPE MAXIMUM or
      GATE SHAPE WIDE or
      GATE SHAPE NORMAL or
      GATE SHAPE MINIMUM

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

GATE SHAPE MAXIMUM , GATE SHAPE MINIMUM , GATE SHAPE NORMAL , GATE SHAPE WIDE

GATE SHAPE MAXIMUM

Select gate shape for selected channel.

Programming Code

GATSMAXI

Note	Time Domain Option 010 only

Main Menu

DOMAIN

Program Sequence

```
GATSMAXI; or
GATSMINI; or
GATSNORM; or
GATSWIDE;
```

Manual Sequence

DOMAIN
  SPECIFY GATE
    GATE SHAPE
      GATE SHAPE MAXIMUM or
      GATE SHAPE MAXIMUM or
      GATE SHAPE WIDE or
      GATE SHAPE NORMAL or
      GATE SHAPE MINIMUM
        PRIOR MENU to exit

Description

Preset	gate shape normal	Range	N/A
Initialization	gate shape normal	Recalled	yes
Coupled	always uncoupled		

The softkey annotation is updated, and if GATE ON , the specified gate shape is applied to the data and the trace is updated.

Each gate shape has a different passband flatness, cutoff rate, and sidelobe levels. T1 indicates the gate span which is the time between the gate start and stop indicators. T2 is the time between the edge of the gate passband and the −6 dB gate stop time. T3, equal to T2, is the

time between the gate stop time and the point where the filter first reaches the level of the highest gate sidelobe. The gate characteristics for each gate shape are listed in Table G-1.

Table G-1. Gate Characteristics

Gate Shape	Passband Ripple	Sidelobe Levels	Cutoff Time T2 = T3	Minimum Gate Span
Minimum	±0.40 dB	−24 dB	$0.6/f_{span}$	$1.2/f_{span}$
Normal	±0.04 dB	−45 dB	$1.4/f_{span}$	$2.8/f_{span}$
Wide	±0.02 dB	−52 dB	$4.0/f_{span}$	$8.0/f_{span}$
Maximum	±0.01 dB	−80 dB	$11.2/f_{span}$	$22.4/f_{span}$
$f_{span} = GHz$				

The passband ripple and sidelobe levels describe the gate (filter) shape. The cutoff time indicates how fast the gate filter rolls off. For each gate shape, there is also a minimum gate span ($T1_{min} = 2$ x T2) which gives a filter passband of zero. Entering a gate span smaller than minimum produces a distorted filter shape that has no passband, does not have a narrower shape, may have higher sidelobe levels, and gives an incorrect indication of gate start and stop times. Therefore it is important to always select a gate span that is higher than the minimum value. As Table G-1 indicates, the cutoff time and the minimum gate span are inversely proportional to the frequency span of the measurement.

For best results using gating, always center the gate around the response(s) that you want to retain in the measurement and make the gate span wide enough to include all of those responses. It is also desirable to use the widest gate shape possible.

GATE SHAPE MINIMUM

Select gate shape for selected channel.

Programming Code

GATSMINI

Note   Time Domain Option 010 only

Main Menu

DOMAIN

Description

Preset	gate shape normal	Range	N/A
Initialization	gate shape normal	Recalled	yes
Coupled	always uncoupled		

See Also

See GATE SHAPE MAXIMUM for full description.

GATE SHAPE NORMAL

Select gate shape for selected channel.

Programming Code

GATSNORM

Note   Time Domain Option 010 only

Main Menu

DOMAIN

Description

Preset	gate shape normal	Range	N/A
Initialization	gate shape normal	Recalled	yes
Coupled	always uncoupled		

See Also

See GATE SHAPE MAXIMUM for full description.

GATE SHAPE WIDE

Select gate shape for selected channel.

Programming Code

GATSWIDE

| **Note** | Time Domain Option 010 only |

Main Menu

DOMAIN

Description

Preset	gate shape normal	Range	N/A
Initialization	gate shape normal	Recalled	yes
Coupled	always uncoupled		

See Also

See GATE SHAPE MAXIMUM for full description.

GATE: SPAN

Select center/span gate markers; active function is current GATE SPAN value.

Programming Code

GATESPAN

| **Note** | Time Domain Option 010 only |

Main Menu

DOMAIN

Program Sequence

GATESPAN [value [time suffix]];

Manual Sequence

> DOMAIN
>> SPECIFY GATE
>>> GATE SPAN entry x1 (x1 = seconds)

Description

Preset	gate span=1 ns	**Range**	maximum gate span=1 ms
Initialization	gate span=1 ns	**Recalled**	yes
Coupled	may be uncoupled		

In any domain, the gate span marker value is displayed. The gate markers are displayed only if Time Domain is selected.

GATE: START

Select start/span gate markers; active function is current GATE START value.

Programming Code

GATESTAR

Note   Time Domain Option 010 only

Main Menu

DOMAIN

`GATE: START`

Program Sequence

`GATESTAR [value [time suffix] ];`

Manual Sequence

> (DOMAIN)
>> `SPECIFY GATE`
>>> `GATE START` [entry] (x1)   ((x1) = seconds)

Description

Preset	−500 ps	Range	+1 to −1 ms
Initialization	−500ps	Recalled	yes
Coupled	may be uncoupled		

In any domain, the gate start marker value is displayed. The gate markers are displayed only if Time Domain is selected.

`GATE: STOP`

Select stop/span gate markers; active function is current `GATE STOP` value.

Programming Code

GATESTOP

Note   Time Domain Option 010 only

Main Menu

DOMAIN

Program Sequence

`GATESTOP [value [time suffix]];`

Manual Sequence

(DOMAIN)
  SPECIFY GATE
    GATE START [entry] (x1) ((x1) = seconds)

Description

Preset	500 ps	Range	+1 to −1ms
Initialization	500 ps	Recalled	yes
Coupled	may be uncoupled		

In any domain, the gate stop marker value is displayed. The gate markers are displayed only if Time Domain is selected.

GRATICULE

Modify the color of the graticule on the display.

Programming Code

COLRGRAT

Main Menu

DISPLAY

Programming Sequence

```
COLRGRAT;
 TINT [value]; or
 CBRI [value]; or
 COLOR [value]; or
 RSCO;
SVCO;
```

Manual Sequence

(DISPLAY)
 ADJUST DISPLAY
  MODIFY COLORS
   GRATICULE
    TINT or
    BRIGHTNESS or
    COLOR or

GRATICULE

> RESET COLORS or
> PREDEFINED COLORS
> [PRIOR MENU]
[PRIOR MENU]
SAVE COLORS

Description

Preset	grey	**Range**	see MODIFY COLORS
Initialization	grey	**Recalled**	yes, using SAVE COLORS RECALL COLORS
Coupled	always coupled		

The color of the graticule can be changed to any color, tint, and brightness combination.

Cycling power changes all color adjustments to the default defined colors. To recall previously modified colors, use the RECALL COLORS softkey.

FACTORY PRESET does not affect color selection.

See Also

MODIFY COLORS , DEFAULT COLORS , PREDEFINED COLORS , SAVE COLORS , RESET COLOR

GRATICULE PEN: n

Select pen number to plot the graticule. Where n = 1 to 10.

Programming Code

PENNGRAT

Main Menu

COPY

Programming Sequence

> PENNGRAT [value];   *value = 1 to 10*

Manual Sequence

(COPY)
 DEFINE PLOT
  SET PEN NUMBERS
   GRATICULE PEN: n [entry (x1)]   (entry = 1 to 10)
    (other selections)
    (PRIOR MENU)
   (PRIOR MENU)
 PLOT TO PLOTTER
  (select information to plot)

Description

Preset	pen 1	Range	1 to 10
Initialization	pen 1	Recalled	yes
Coupled	always coupled		

The default pen number is 1.

See Also

SET PEN NUMBERS for a complete description.

GREEN

Set the specified display element to green.

Programming Code

None

Main Menu

DISPLAY

Manual Sequence

(DISPLAY)
 ADJUST DISPLAY
  MODIFY COLORS
   (select display element)
    PREDEFINED COLORS
     GREEN
      [other changes]

`GREEN`

> [PRIOR MENU]
> [PRIOR MENU]
> [PRIOR MENU]
> SAVE COLORS

Description

Preset	not changed	Range	N/A
Initialized	tint = 38 brightness = 93% color = 100%	Recalled	yes, using SAVE COLORS RECALL COLORS
Coupled	always coupled		

Green is the default color for S_{22} data and at dimmer brightness of 63%, it is also used for S_{22} memory trace.

Note	This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

`PREDEFINED COLORS` , `MODIFY COLORS`

`GREY`

Set the specified display element to grey.

Programming Code

None

Main Menu

DISPLAY

Manual Sequence

[DISPLAY]
  ADJUST DISPLAY
   MODIFY COLORS
     (select display element)
      PREDEFINED COLORS
       GREY
        [other changes]
      [PRIOR MENU]

G-18   Keyword Dictionary

PRIOR MENU
PRIOR MENU
SAVE COLORS

Description

Preset	not changed		**Range**	N/A
Initialized	tint = 0 brightness = 49% color = 0%		**Recalled**	yes, using SAVE COLORS RECALL COLORS
Coupled	always coupled			

Grey is the default color for the graticule.

Note	This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

PREDEFINED COLORS , MODIFY COLORS

HARDWARE STATE

Disc data type select complete multiple source Hardware State.

Programming Code

HARS

Main Menu

DISC

Program Sequence

```
        (select channel)
        STOIINT; or STOIEXT;
          STOR; or LOAD; or DELE;
            HARS;
              DISF "filename";
```

Manual Sequence

```
     (select channel)
       [DISC]
         STORAGE IS INTERNAL or STORAGE IS EXTERNAL
           STORE or LOAD or DELETE
             MORE
               HARDWARE STATE
                 (enter or select disc file)
                   STORE FILE or LOAD FILE or DELETE FILE
```

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

The Hardware State consists of:

■ All GPIB Addresses.

HARDWARE STATE

- System phaselock type (internal, external, or none); speed (fast or slow); and step type (normal or quick).
- Multiple source setup.
- Beeper on/off.

Several hardware-dependent functions such as GPIB addresses, disc volume, unit, format information, and the multiple source equations are stored in the Hardware State. Loading a Hardware State allows a particular hardware setup to be recreated.

Hardware States may be stored on disc.

See Also

MULT. SRCE. OFF/SAVE , MULT. SRCE. ON/SAVE , STORE

HOLD

Select hold mode for both channels; sweep stopped.

Programming Code

HOLD

Main Menu

STIMULUS

Program Sequence

HOLD;

Manual Sequence

STIMULUS (MENU)
   MORE
    HOLD

Description

Preset	continual	Range	N/A
Initialization	continual	Recalled	yes
Coupled	always coupled		

HOLD causes the raw data array(s) to be held (not updated) and the enhancement label H to appear in the enhancement label area of the LCD/CRT.

If any of the following is executed, the displayed trace is updated:

- Format changes
- Response changes
- Domain changes
- Display changes
- Domain changes, and
- completion of INPU (data type) GPIB operations.

If the channel or parameter is changed and raw data for the new selection is not available, the trace is zeroed (x,y = 0,0). All basic parameter raw data is available when 2-port correction is on, when and at least one group of sweeps is taken prior to HOLD .

MEASUREMENT (RESTART) has no effect.

HP-IB ADDRESSES

Present address menu.

Programming Code

None

Main Menu

SYSTEM

Main Menu

GPIB ADDRESSES MENU

Manual Sequence

(SYSTEM)
  HP-IB ADDRESSES
    ADDRESS of 8510 or
    ADDRESS of SYSTEM BUS or
    ADDRESS of SOURCE #1 or
    ADDRESS of SOURCE #2 or
    ADDRESS of TEST SET or
    ADDRESS of RF SWITCH or
    ADDRESS of POWERMETER or
    MORE
    ADDRESS of DISC or
    ADDRESS of PLOTTER: HP-IB or
    ADDRESS of PLOTTER: RS-232 PORT 1 or
    ADDRESS of PLOTTER: RS-232 PORT 2 or
    ADDRESS of PRINTER: HP-IB or
    ADDRESS of PRINTER: RS-232 PORT 1 or

`HP-IB ADDRESSES`

> `ADDRESS of PRINTER: RS-232 PORT 2` or
> `ADDRESS of PASS-THRU`

Description

Preset	not changed	Range	N/A
Initialization	see below	Recalled	not changed
Coupled	always coupled		

Current addresses are shown in the system parameters listing (see `SYSTEM PARAMETERS`). Selecting an "address of key" makes the device address the active function. Enter a numeric and (x1) to change the address. Address changes are accomplished the next time the device is addressed by the analyzer. Instrument addresses are initialized as follows:

ADDRESS of 8510	16
ADDRESS of SYSTEM BUS	17
ADDRESS of SOURCE #1	19
ADDRESS of SOURCE #2	31
ADDRESS of TEST SET	20
ADDRESS of RF SWITCH	31
ADDRESS of POWERMETER	13
ADDRESS of PLOTTER	5
ADDRESS of PRINTER	1
ADDRESS of DISC	0
ADDRESS of PASS-THRU	31
ADDRESS of RF SWITCH	31

See Also

(LOCAL), `SYSTEM PARAMETERS`

HP-IB CONFIGURE

Present the GPIB configure menu.

Programming Code

None

Main Menu

(SYSTEM)

Manual Sequence

(SYSTEM)
  HP-IB CONFIGURE
    HP-IB USES USR PRESET or
    HP-IB USES FACTORY PRESET

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

HP-IB USES FACTORY PRESET

Set the GPIB response to the PRES; command to be a factory preset.

Programming Code

None

Main Menu

(SYSTEM)

HP-IB USES FACTORY PRESET

Program Sequence

None

Manual Sequence

(SYSTEM)
 HP-IB CONFIGURE
  HP-IB USES FACTORY PRESET

Description

Preset	not changed	Range	N/A
Initialization	factory	Recalled	yes
Coupled	always coupled		

When the GPIB command PRES; is sent, the analyzer can respond in one of two ways: by executing a "user" preset or a "factory" preset. A factory preset response issues an instrument preset to all instruments connected to the System Bus and initializes the analyzer to all of its factory defined defaults.

See Also

(USER PRESET), FACTORY PRESET , tabbed section "STATES"

HP-IB USES
 USR PRESET

Set the GPIB response to the PRES; command to be a user preset.

Programming Code

PRES

Main Menu

(SYSTEM)

Program Sequence

None

Manual Sequence

[SYSTEM]
HP-IB CONFIGURE
HP-IB USES USR PRESET

Description

Preset	not changed	**Range**	N/A
Initialization	factory	**Recalled**	yes
Coupled	always coupled		

When the GPIB command PRES; is sent, the analyzer can respond in one of two ways: by executing a "user" preset or a "factory" preset. A user preset response recalls Instrument State 8. Whatever instrument state is stored in Instrument State 8 is state that is set on the analyzer.

See Also

[USER PRESET], INST STATE n , FACTORY PRESET , tabbed section "STATES"

H,V SYNC

Set synchronization to horizontal, vertical sync to work with an external display device.

Programming Code

HVSYNC

Main Menu

DISPLAY

Program Sequence

HVSYNC;

`H,V SYNC`

Manual Sequence

(DISPLAY)
  `ADJUST DISPLAY`
    `EXTERNAL VIDEO`
      `H, V SYNC`

Description

Preset	not changed	**Range**	N/A
Initialized	sync on green negative sync	**Recalled**	yes
Coupled	always coupled		

This function does not affect the analyzer internal video display.

Use horizontal, vertical sync when an external display device requires separate TTL-compatible synchronization signals. When enabled the synchronization signal is routed to the black BNC cable of the Agilent D1191A cable that connects to the rear panel EXTERNAL DISPLAY connector.

After selecting `H,V SYNC`, check and set, if necessary, the polarity of the synchronization signal. External video displays require either a positive or negative-logic signal.

Note	This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

`EXTERNAL VIDEO`, `COMPOSITE SYNC`, `SYNC ON GREEN`

IF GAIN

Present IF gain select menu.

Programming Code

None

Main Menu

SYSTEM

Manual Sequence

(SYSTEM)
  SERVICE FUNCTIONS
    IF GAIN
      TEST AMP. GAIN or
      REF AMP. GAIN

Description

Preset	gain: auto	Range	N/A
Initialization	gain: auto	Recalled	N/A
Coupled	N/A		

See Also

REFERENCE AMP. GAIN, TEST AMP. GAIN

IMAGINARY

Select display of imaginary part of complex data for current parameter on selected channel.

Programming Code

IMAG

Main Menu

FORMAT

Program Sequence

```
(select channel)
  (select parameter)
     IMAG;
```

Manual Sequence

(select channel)
  (select parameter)
    FORMAT (MENU)
     IMAGINARY

Description

Preset	ref value=0.0 scale=10.0 ref posn=5	Range	N/A
Initialization	same as Preset	Recalled	yes
Coupled	always uncoupled		

Presents a Cartesian display of the imaginary part of the measured data,

$$S_{ij} = R_{ij} + jX_{ij}$$

where X_{ij} is the imaginary part and $_{ij}$ is the selected S-parameter.

For TIME LOW PASS the imaginary part is zero. (In some cases the trace may show a small non-zero offset, but this should be ignored.)

INITIALIZE DISC

Initialize disc in disc drive.

Programming Code

None

Main Menu

DISC

Program Sequence

INID;

Manual Sequence

> [DISC]
>> STORAGE IS INTERNAL or STORAGE IS EXTERNAL
>>> SET UP DISC
>>>> INITIALIZE DISC
>>>>> (disable write protect notch)
>>>>>> (insert disc into slot or active drive
>>>>>>> INIT DISC: YES

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

INIT DISC: YES initializes the disc for 8510 operations. The disc is initialized as a Logical Interchange Format (LIF) disc.

The amount of time to initialize a disc will take 90 seconds to 20 minutes or more, depending on the size of the disc.

See Also

ADDRESS of DISC, DISC UNIT NUMBER, DISC VOLUME, STORE

`INIT DISC: NO`

Do not start data disc initialization process.

Programming Code

None

Main Menu

DISC

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

See `INITIALIZE DISC` for full description.

`INIT DISC: YES`

Start data disc initialization process.

Programming Code

INID

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

See `INITIALIZE DISC` for full description.

INPUCALCn

Store calibration error coefficient set real/imaginary pairs into 8510 calibration set memory.
Where n = 01 to 12.

Main Menu

None (GPIB Only)

Program Sequence

```
CORROFF;
(select appropriate instrument state)
 CAL1; or CAL2;
    (select cal type)
      HOLD;
       FORMn;     n = 1 to 4
          INPUCALCn;    n = 01 to 12
           (send data block to 8510 HP-IB)
               INPUCALCn; repeat for each term needed for cal type
                 SAVC;
                   CALSn;    n = 1 to 8
                     CONT; or SING; or NUMG value;
```

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Allows accuracy enhancement measurement calibration error coefficients to be transferred into 8510 Cal Set memory from an external controller via the GPIB.

See `OUTPCALCn` for assignment of error coefficient sets to error terms in the accuracy enhancement math.

If inputting `ONE-PATH 2-port` calibration coefficients, you must issue `CALIFUL2;` and then load all 12 error coefficient sets before saving calibration constants (`SAVC;`).

Memory space to accept calibration coefficient sets is only available when a calibration type has been selected. If not, the message `REQUESTED DATA NOT AVAILABLE` is displayed and the data will be treated as general instructions, causing a syntax error.

When all coefficient sets necessary for the accuracy enhancement error model in use are input, issue `SAVC; CALSn;` to store coefficients in the calibration set memory. The trace is updated following the next group of sweeps. The calibration set instrument state saved with the calibration set reflects the instrument state at the time that `SAVC;` is issued.

Also see `CAL SET n` for listing of the calibration set limited instrument state.

See Also

OUTPCALCn

INPUDATA

Store real/imaginary pairs into selected channel corrected data memory.

Main Menu

None (GPIB Only)

Program Sequence

> *(select channel)*
>   HOLD;
>   FORMn;
>   INPUDATA;
>   *(send data block to 8510 HP-IB)*

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Allows trace data to be transferred into 8510 selected channel corrected data memory from an external controller via the GPIB.

`HOLD` avoids overwriting the data just input by the next sweep.

When input is complete, a processing cycle is initiated to update the LCD/CRT trace.

Use `DATA→MEMORY` to store corrected data trace into default trace memory.

See Also

OUTPDATA

INPUDELA

Store real/imaginary pairs into selected channel corrected table delay.

Main Menu

None (GPIB Only)

Program Sequence

> *(select channel)*
> > HOLD;
> > > FORMn;
> > > > INPUDELA;
> > > > *(send data block to 8510 HP-IB)*

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Allows trace data to be transferred into 8510 selected channel table delay memory from an external controller via the GPIB.

`HOLD` avoids overwriting the data just input by the next sweep.

When input is complete, a processing cycle is initiated to update the LCD/CRT trace. Each point is multiplied by the information in the delay table.

Use `DATA→MEMORY` to store corrected data trace into default trace memory.

See Also

OUTPDELA

INPUFREL

Store frequency list previously output by `OUTPFREL`.

Main Menu

None (GPIB Only)

Program Sequence

        FORMn *n = 1 to 4*
          INPUFREL;
              (send data block to 8510 HP-IB)
                 LISFREQ;

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Allows input of a frequency list previously read from the 8510 using `OUTPFREL;`. When the frequency list is loaded in this manner, it cannot be edited or stored and recalled as part of an instrument state. If `EDIT LIST` is pressed, the list will be shown as `EMPTY`.

This is not the recommended method of creating a frequency list. For most applications, refer to `EDIT LIST` to define a frequency list.

See Also

`OUTPFREL`, `EDIT LIST`

INPUFORM

Store formatted data pairs into selected channel corrected data memory.

Main Menu

None (GPIB Only)

Program Sequence

(select channel and appropriate FORMAT)
    HOLD;
      FORMn;   *n = 1 to 4*
        INPUFORM;
          (send data block to 8510 HP-IB)

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Allows trace data to be transferred into 8510 selected channel formatted data memory from an external controller via the GPIB.

Cartesian format: x = basic units

              y = 0

Polar and Smith format: real/imaginary pairs.

`HOLD` avoids overwriting the data just input by the next sweep.

When input is complete, a processing cycle is initiated to update the LCD/CRT trace.

See Also

OUTPFORM

INPULEAS

Store `FORM1` 8510 learn string previously output by `OUTPLEAS`. Set 8510 to learn string state.

Main Menu

None (GPIB Only)

Program Sequence

    INPULEAS;
      FORM1 *send binary data block to 8510 HP-IB*

INPULEAS

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Allows binary data block output using `OUTPLEAS` to be loaded into 8510 current Instrument State memory from an external contoller via the GPIB. Upon completion, the 8510 system is set to the Instrument State represented by the learn string. Various errors could occur if the learn string has been modified or if the System Parameters have been changed.

See Also

`OUTPLEAS`

INPURAWn

Store real/imaginary pairs into selected channel raw data memory. Where n = 1 to 4.

Main Menu

None (GPIB Only)

Program Sequence

(select channel)
`CORRON;`
` CALSn;`
`  HOLD;`
`  FORMn;` *n = 1 to 4*
`  INPURAWn;` *n = 1 to 4*
(send data block to 8510 HP-IB)

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Allows trace data to be transferred into 8510 selected channel raw data memory from an external controller via the GPIB. See also `OUTPRAWn` for a description of Raw Array allocation for various machine states.

If Raw 2, 3, or 4 is to be input, a 2-port calibration must be turned on. If not, the message REQUESTED DATA NOT AVAILABLE is displayed and the data will be treated as general instructions, causing a syntax error.

HOLD avoids overwriting the data just input by the next group of sweeps.

When input is complete, a processing cycle is initiated to update the LCD/CRT trace.

See Also

OUTPRAWn

INPUT PWR

Measure input power for receiver calibration.

Programming Code

RCVI

Main Menu

CAL

Program Sequence

See RECEIVER CAL (CALRCVR)

Manual Sequence

See RECEIVER CAL.

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

In the receiver calibration sequence, the input power (a1) is measured with a known stimulus (from flatness calibration) applied to Port 1. Although no standards are required, in order to obtain good results, Port 1 should be well-matched.

See Also

RECEIVER CAL

INST STATE n

(RECALL) specified instrument state. Where n = 1 to 8.

Programming Code

RECA1 or RECA2 or RECA3 or RECA4 or RECA5 or RECA6 or RECA7 or RECA8

Main Menu

RECALL

Program Sequence

RECAn; *where n = 1 to 8*

Manual Sequence

(RECALL)
  INST STATE n (where n = 1 to 8)

Description

Preset	not changed	Range	N/A
Initialization	not changed	Recalled	N/A
Coupled	N/A		

The 8510 system is set to the state stored in the specified instrument state memory.

After loading the program disc, all registers 1 through 7 are initialized to the preset state and register 8 is initialized to the power-up state.

Instrument State register 8 is specified as the "user preset" register. You can set the analyzer to the state desired and save this state in register 8. When you press the green front panel key (USER PRESET), it recalls register 8.

See Also

(RECALL), (SAVE), (USER PRESET), FACTORY PRESET

INST STATE n

(SAVE) current instrument state in specified memory. Where n = 1 to 8.

Programming Code

SAVE1 or SAVE2 or SAVE3 or SAVE4 or SAVE5 or SAVE6 or SAVE7 or SAVE8

Main Menu

SAVE

Program Sequence

SAVEn;   *where n = 1 to 8*

Manual Sequence

(SAVE)
   INST STATE n (where n = 1 to 8)

Description

Preset	not changed	Range	N/A
Initialization	not changed	Recalled	N/A
Coupled	N/A		

Instrument State register 8 is specified as the "user preset" register. You can set the analyzer to the state desired and save this state in register 8. When you press the green front panel key (USER PRESET), it recalls register 8.

See Also

(RECALL), (SAVE), (USER PRESET), FACTORY PRESET

INST STATE n

$\boxed{\text{DISC}}$ data type select single instrument state. Where n = 1 to 8. (See $\boxed{\text{SAVE}}$ and $\boxed{\text{RECALL}}$ for memory operations.)

Programming Code

INSS1 or INSS2 or INSS3 or INSS4 of INSS5 or INSS6 or INSS7 or INSS8

Main Menu

DISC

Program Sequence

See STORE .

```
(select channel)
    STOIINT; or STOIEXT;
     STOR; or LOAD; or DELE;
     INSSn     n = 1 to 8
    DISF "filename";
```

Manual Sequence

```
(select channel)
  DISC
    STORAGE IS INTERNAL  or  STORAGE IS EXTERNAL
      STORE or LOAD or DELETE
        MORE
          INST STATE n    (where n = 1 to 8)
            (enter or select disc file)
              STORE FILE  or  LOAD FILE  or  DELETE FILE
```

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

$\boxed{\text{RECALL}}$, $\boxed{\text{SAVE}}$, STORE

INST STATE 1-8

Present instrument state select menu during disc data type selection.

Programming Code

None

Main Menu

DISC

Manual Sequence

    (select channel)
     DISC
       STORAGE IS INTERNAL or STORAGE IS EXTERNAL
        STORE or LOAD or DELETE
         MORE
          INST STATE 1-8
           (enter or select disc file)
            STORE FILE or LOAD FILE or DELETE FILE

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

INST STATE ALL

Disc data type select all instrument states.

Programming Code

INSSALL

Main Menu

DISC

`INST STATE ALL`

Program Sequence

See `STORE` .

```
        (select channel)
        STOIINT; or STOIEXT;
          STOR; or LOAD; or DELE;
            INSSALL
              DISF "filename";
```

Manual Sequence

```
    (select channel)
      (DISC)
        STORAGE IS INTERNAL or STORAGE IS EXTERNAL
          STORE or LOAD or DELETE
            MORE
              INST STATE ALL
                (enter or select disc file)
                  STORE FILE or LOAD FILE or DELETE FILE
```

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Contents of all instrument state registers 1 through 8 on one disc file.

See Also

(RECALL), (SAVE), `STORE`

INTENSITY

Select the overall intensity level of the display.

Programming Code

INTE

Main Menu

DISPLAY

Program Sequence

INTE [value];   *value = 0 to 100*

Manual Sequence

(DISPLAY)
ADJUST DISPLAY
    INTENSITY [entry (x1)]   (entry = 0 to 100)

Description

Preset	not changed	Range	0 to 100%
Initialized	83%	Recalled	no
Coupled	always coupled		

Cycling power returns the intensity to 83%. Intensity is measured in percentage of brightness, with 0% being no brightness (dark) and 100% being brightest. The default value is 83%. FACTORY PRESET does not affect intensity. SAVE COLORS and RECALL COLORS does not save/recall the intensity setting.

Note   This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

BACKGROUND INTENSITY , MODIFY COLORS , EXTERNAL VIDEO

INVERTED SMITH

Select inverted Smith format for current parameter on selected channel.

Programming Code

INVS

Main Menu

FORMAT

Program Sequence

> *(select channel)*
>> *(select parameter)*
>>> INVS;

Manual Sequence

> (select channel)
>> (select parameter)
>>> FORMAT [MENU]
>>>> INVERTED SMITH

Description

Preset	rev value=1 scale=0.2/ ref posn is not meaningful	Range	N/A
Initialization	same as Preset	Recalled	yes
Coupled	always uncoupled		

Sometimes termed an Admittance chart, the Inverted Smith Chart format changes the display and measurement marker readout to:

$1/S_{ij} = G_{ij} + jB_{ij}$

where S_{ij} is the selected parameter.

Selection of [REF VALUE] of 0.05 or less changes the display format to a Polar display.

The reference value represents the correspondingly scaled Polar display outer circle value.

Selecting INVERTED SMITH recalls the last selected response selections on that channel.

ISOLATION

After selection of 2-port measurement calibration, begin isolation calibration sequence.

Programming Code

ISOL

Main Menu

CAL

Program Sequence

```
CAL1; or
CAL2;
  CALIFUL2; or
  CALIONE2; or
  CALITRL2;
    ISOL;
      OMII; or
      FWDI; and
      REVI;
        ISOD;
          [other calibration steps]
            SAV2; or
            SAVT;
              CALSn;    n = 1 to 8
```

Manual Sequence

```
(CAL)
  CAL 1 xx (where xx=cal kit 1 label) or
  CAL 2 xx (where xx=cal kit 2 label)
    CALIBRATE: FULL 2-PORT or
    CALIBRATE: ONE-PATH 2-PORT or
    CALIBRATE: TRL 2-PORT
      ISOLATION
        OMIT ISOLATION or
        FWD ISOL'N ISOL'N STD and
        REV ISOL'N ISOL'N STD
          ISOLATION DONE
            [other calibration steps]
              SAVE 2-PORT CAL or
                CAL SET n    (n = 1 to 8)
```

`ISOLATION`

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	cal coefficients not saved/recalled until calsn executed
Coupled	N/A		

Forward and Reverse Isolation each require measurement of one standard to measure repeatable transmission signal path crosstalk. None of the standard class or standard characteristics are user-definable.

The usual standard used for isolation calibration is an open transmission signal path with fixed Z_0 terminations on the test and transmission return ports, however terminations with similar match to the device under test may be used. `FORWARD ISOLATION` selects S_{21} and `REVERSE ISOLATION` selects S_{12}. This allows measurement of system crosstalk and the transmission noise floor.

Isolation calibration is most effective when a large averaging factor is used during this part of the measurement calibration (see sequence in `RESUME CAL`), and a similar averaging factor is used during measurement of low level signals. Since the transmission noise floor without averaging is mainly random noise, errors in the measurement of low level signals will result if no averaging or a small averaging factor is used during calibration.

See Also

`RESUME CAL SEQUENCE` , `FWD ISOL'N ISOL'N STD` , `REV ISOL'N ISOL'N STD`

ISOLATION DONE

2-port isolation calibration sequence is complete.

Programming Code

ISOD

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	cal coefficients not saved/recalled until CALSn executed
Coupled	N/A		

See Also

See ISOLATION for full description.

KEYC

Press 8510 front panel key.

Main Menu

None (GPIB Only)

Program Sequence

KEYC [value]; *value = 1 to 98 = single ASCII integer*

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Allows selection of 8510 hardkey or softkey active function by inputting an integer number via the 8510 GPIB. This method of controlling the 8510 is used for service functions and is not recommended for normal operation.

Table K-1. KEYC Selections

KeyC	Key Name	KeyC	Key Name
1	CHANNEL 1	60	SYSTEM
4	S_{11}	62	MEASUREMENT RESTART
5	S_{12}	64	G/n
6	LOG MAG	65	9
7	PHASE	66	8
8	CHANNEL 2	67	7
12	S_{21}	70	SOFTKEY 1
13	S_{22}	71	SOFTKEY 5
14	DELAY	72	M/μ
15	SMITH	73	6
16	CAL	74	5
17	DOMAIN	75	4
18	DISPLAY	76	ENTRY OFF
19	MARKER	78	SOFTKEY 2
20	PARAMETER MENU	79	SOFTKEY 6
22	FORMAT MENU	80	k/m
26	USER PRESET	81	3
27	LOCAL	82	2
28	SAVE	83	1
29	RECALL	84	STEP (down)
32	SCALE	86	SOFTKEY 3
33	AUTO	87	SOFTKEY 7
35	START	88	x1
36	CENTER	89	$+/-$
40	REF VALUE	90	.
41	REF POSN	91	0
43	STOP	92	STEP (up)
44	SPAN	93	PRIOR MENU
48	RESPONSE MENU	94	SOFTKEY 4
51	STIMULUS MENU	95	SOFTKEY 8
58	COPY	97	= MARKER
59	DISC	98	BACKSPACE

KIT DONE (MODIFIED)

The calibration kit is completely specified; store modified calibration kit in internal non-volatile memory.

Programming Code

KITD

Main Menu

CAL

Program Sequence

```
MODI1; or
MODI2;
    (modify characteristics and assignments)
      KITD;
```

Manual Sequence

[CAL]
  MORE
    MODIFY 1 xx (where xx=cal kit 1 label) or
    MODIFY 2 xx (where xx=cal kit 2 label)
      (modify characteristics and assignments)
        KIT DONE (MODIFIED)

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Characteristics of all standards, standard labels, standard class assignments, standard class labels, and the kit label are complete; replace the selected cal kit 1 or cal kit 2 in non-volatile memory with the with the current modified calibration kit. Characteristics not changed during the modify calibration kit sequence retain the existing values.

If KIT DONE (MODIFIED) is not selected, the current calibration kit definition will be replaced with the existing cal kit 1 or cal kit 2 definition the next time CAL 1 xx, CAL 2 xx, MODIFY 1 xx, or MODIFY 2 xx is selected.

`KIT DONE (MODIFIED)`

See Also

`MODIFY 1 xx`, `MODIFY 2 xx`

L_n

Terms in short circuit dc inductance model (varies with term). Part of short circuit calibration kit definition. Where n = 0, 1, 2, or 3.

Programming Code

L0, L1 , L2, or L3

Main Menu

CAL

Program Sequence

```
MODI1; or MODI2;
 DEFS value;
  STDTSHOR;
    L0 [value];    value = x10⁻¹²H
    L1 [value];    value = x10⁻²⁴H/Hz
    L2 [value];    value = x10⁻³³H/Hz²
    L3 [value];    value = x10⁻⁴²H/Hz³
  [other changes]
    STDD;
  [other changes]
KITD;
```

```
MODI1; or MODI2;
 DEFS value;
  STDTSHOR;
```
    L0 [value]; $value = x10^{-12}H$
    L1 [value]; $value = x10^{-24}H/Hz$
    L2 [value]; $value = x10^{-33}H/Hz^2$
    L3 [value]; $value = x10^{-42}H/Hz^3$
```
  [other changes]
    STDD;
  [other changes]
KITD;
```

Manual Sequence

```
(CAL)
  MORE
    MODIFY 1 xx (where xx=cal kit 1 label) or
    MODIFY 2 xx (where xx=cal kit 2 label)
      DEFINE STANDARD entry (x1) (entry = 1 to 21)
       STD TYPE: SHORT
```
         L_0 entry (x1) ((x1) = $x10^{-12}H$)
         L_1 entry (x1) ((x1) = $x10^{-24}H/Hz$)
         L_2 entry (x1) ((x1) = $x10^{-33}H/Hz^2$)
         L_3 entry (x1) ((x1) = $x10^{-42}H/Hz^3$)
         [other changes]

L_n

```
      STD DONE (DEFINED)
    [other changes]
      KIT DONE (DEFINED)
```

Description

Preset	no effect	**Range**	±10,000, scaled by appropriate exponent
Initialization	see 7 mm and 3.5 mm cal kits	**Recalled**	N/A
Coupled	N/A		

Specify the series inductive phase shift of the short circuit standard using

$$L_{total} = L_0 + (L_1 \times f) + (L_2 \times f^2) + (L_3 \times f^3)$$

where f is the current frequency in Hz, $L_0 = x10^{-12}$ Henries, $L_1 = x10^{-24}$ Henries, $L_2 = x10^{-33}$ Henries, and $L_3 = x10^{-42}$ Henries.

Manual and program entries assume that the values are input in the specified units.

See Also

```
STD TYPE: SHORT
```

LABEL: ADAPTER

Label standard class.

Programming Code

LABEADAP

Main Menu

CAL

Program Sequence

See `MODIFY 1 xx` and `MODIFY 2 xx`.

```
   MODI1; or MODI2;
    LABEclass type "class label";
   class type = various types of labels, class label = "ASCII string"
   [other changes]
   KITD;
```

Manual Sequence

CAL
MORE
MODIFY 1 xx (where xx=cal kit 1 label) or
MODIFY 2 xx (where xx=cal kit 2 label)
LABEL CLASS
LABEL: $S_{11}A$ or
LABEL: $S_{11}B$ or
LABEL: $S_{11}C$ or
LABEL: $S_{22}A$ or
LABEL: $S_{22}B$ or
LABEL: $S_{22}C$ or
MORE
LABEL: FWD. TRANS. or
LABEL: REV. TRANS. or
LABEL: FWD. MATCH or
LABEL: REV. MATCH or
LABEL: FWD. ISOL'N or
LABEL: REV. ISOL'N or
MORE
LABEL: RESPONSE or
LABEL: TRL THRU or
LABEL: TRL REFLECT or
LABEL: TRL LINE or
LABEL: ADAPTER
(enter class label, see TITLE)
LABEL DONE (SPEC'D)
[other changes]
KIT DONE (MODIFIED)

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

This label is displayed on the Standard Class Selection menu only when two or more standards are assigned to the class. If only one standard is assigned to the class, then the standard label is displayed (see LABEL STD).

The string must be enclosed in quotation marks when input via the 8510 GPIB.

`LABEL: ADAPTER`

See Also

`MODIFY 1 XX` , `MODIFY 2 xx`

LABEL: FWD. ISOL'N

Standard class label.

Programming Code

LABEFWDI

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

See `LABEL: ADAPTER` for full description.

LABEL: FWD. MATCH

Standard class label.

Programming Code

LABEFWDM

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

See LABEL: ADAPTER for full description.

LABEL: FWD. TRANS.

Standard class label.

Programming Code

LABEFWDT

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

See LABEL: ADAPTER for full description.

LABEL: RESPONSE

Standard Class Label

Programming Code

LABERESP

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

See LABEL: ADAPTER for full description.

LABEL: REV. ISOL'N

Standard class label.

Programming Code

LABEREVI

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

See LABEL: ADAPTER for full description.

LABEL: REV. MATCH

Standard class label.

Programming Code

LABEREVM

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

See LABEL: ADAPTER for full description.

LABEL: REV. TRANS.

Standard class label.

Programming Code

LABEREVT

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

See LABEL: ADAPTER for full description.

LABEL: $S_{11}A$

Standard class label.

Programming Code

LABES11A

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

See LABEL: ADAPTER for full description.

LABEL: $S_{11}B$

Standard class label.

Programming Code

LABES11B

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

See LABEL: ADAPTER for full description.

LABEL: S$_{11}$C

Standard class label.

Programming Code

LABES11C

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

See LABEL: ADAPTER for full description.

LABEL: S$_{22}$A

Standard class label.

Programming Code

LABES22A

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

See LABEL: ADAPTER for full description.

LABEL: $S_{22}B$

Standard class label.

Programming Code

LABES22B

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

See LABEL: ADAPTER for full description.

LABEL: $S_{22}C$

Standard class label.

Programming Code

LABES22C

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

See LABEL: ADAPTER for full description.

LABEL CLASS

Present label class menu.

Programming Code

None

Main Menu

CAL

Program Sequence

None

Manual Sequence

CAL
  MORE
    MODIFY 1 xx (where xx=cal kit 1 label) or
    MODIFY 2 xx (where xx=cal kit 2 label)
      LABEL CLASS
        LABEL : (class)
          (enter class label, see TITLE)
            LABEL DONE (SPEC'D)
              [other changes]
                KIT DONE (MODIFIED)

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

If there is only one standard in the class, then the standard label appears on the class select menu.

If there are two or more standards in the class, then the class label appears on the class select menu.

See Also

MODIFY 1 xx, MODIFY 2 xx, LABEL: (class)

LABEL DONE

All standard classes are labeled; return to modify calibration kit menu.

Programming Code

None

Main Menu

CAL

Program Sequence

See `LABEL: (class)`.

Manual Sequence

See `LABEL: (class)`.

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

`MODIFY 1 xx`, `MODIFY 2 xx`, `LABEL: (class)`

LABEL KIT

Label current calibration kit.

Programming Code

LABK

Main Menu

CAL

Program Sequence

See `MODIFY 1 xx` and `MODIFY 2 xx`.

```
MODI1; or MODI2;
  LABK kit label;     kit label = ASCII string
     [other changes]
        KITD;
```

Manual Sequence

(CAL)
  `MORE`
    `MODIFY 1 xx` (where xx=cal kit 1 1abel) or
    `MODIFY 2 xx` (where xx=cal kit 2 label)
     `LABEL KIT`
      (enter kit label, see TITLE)
       [other changes]
        `KIT DONE (MODIFIED)`

Description

Preset	not changed	**Range**	N/A
Initialization	see below	**Recalled**	N/A
Coupled	N/A		

This label is displayed on the Calibration menu with the `CAL 1` or `CAL 2` softkey labels.

If a calibration standard has been modified and the `LABEL CAL KIT` operation is not done immediately prior to `KIT DONE (MODIFIED)` operation in the `MODIFY 1 xx` or `MODIFY 2 xx` sequence, an asterisk (*) replaces the last character in the calibration kit label.

The string must be enclosed in quotation marks when input via the 8510 GPIB.

The labels 7-mm and 3.5-mm name the connector family and the label B.1, for example, designates the revision of the characteristics of the calibration standards. If the letter in the revision label is different, the mechanical configuration of the kit differs; if the numeric is different, the characteristics of the standards or the standard class assignements have changed. Refer to the appropriate calibration kit operating and service manual for details.

See Also

`MODIFY 1 xx`, `MODIFY 2 xx`

LABEL STD

Label current calibration standard.

Programming Code

LABS

Main Menu

CAL

Program Sequence

See `MODIFY 1 xx` and `MODIFY 2 xx`.

```
MODI1; or MODI2;
  DEFSn;        n = stdno = 1 to 21
    LABS standard label;   standard label =  ASCII string
      [other changes to current standard]
        STDD;
          [other changes]
            KITD;
```

Manual Sequence

`CAL`
  `MORE`
   `MODIFY 1 xx` (where xx=cal kit 1 label) or
   `MODIFY 2 xx` (where xx=cal kit 2 label)
    `DEFINE STANDARD` entry `x1` (entry = stdno = 1 to 21)
     `STD TYPE: (std type)`
      `LABEL STD`
       (enter new standard label, see TITLE)
        [other changes to current standard]
         `STD DONE (DEFINED)`
          [other changes]
           `KIT DONE (MODIFIED)`

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

If there is only one standard in the class, then the standard label appears on the class select menu.

The string must be enclosed in quotation marks when input via the 8510 GPIB.

See Also

MODIFY 1 xx, MODIFY 2 xx

LEFT LOWER

Select lower left quadrant for plot. Using digital plotter on 8510 system bus.

Programming Code

LEFL

Main Menu

COPY

Program Sequence

LEFL;

Manual Sequence

[COPY]
  DEFINE PLOT
    SELECT QUADRANT
      LEFT LOWER

Description

Preset	full page	Range	N/A
Initialization	full page	Recalled	yes
Coupled	always coupled		

See Also

SELECT QUADRANT

LEFT MARGIN

Adjust the margin to the left side of printer plots (portrait orientation only).

Programming Code

PRINSIDMAR

Main Menu

COPY

Program Sequence

PRINSIDMAR [value];   *value = 0 to 1.0*

Manual Sequence

COPY
  DEFINE PRINT
    PRINT: PORTRAIT
    MORE
      LEFT MARGIN [entry k/m]   (entry = 0 to 1000, k/m = mm)

Description

Preset	portrait: 25.4 mm	Range	0 to 1.0m
Initialized	25.4 mm	Recalled	yes
Coupled	always coupled		

When the printer plot is set to "portrait" orientation, LEFT MARGIN specifies an offset in millimetres from the left hardclip limit of the printer to the left side of the paper.

See Also

PRINT: PORTRAIT , PRINT: LANDSCAPE , DEFINE PRINT

LEFT UPPER

Select left upper quadrant for plot using digital plotter on 8510 system bus.

Programming Code

LEFU

Main Menu

COPY

Program Sequence

LEFU;

Manual Sequence

COPY
  DEFINE PLOT
    SELECT QUADRANT
      LEFT UPPER

Description

Preset	full page	Range	N/A
Initialization	full page	Recalled	yes
Coupled	always coupled		

See Also

SELECT QUADRANT .

LIMITS

Presents menu for setting and controlling limit lines and points.

Programming Code

None.

Main Menu

DISPLAY

Manual Sequence

(DISPLAY)
  LIMITS

Description

Preset	all cleared	**Range**	N/A
Initialization	all cleared	**Recalled**	N/A
Coupled	always uncoupled		

Four types of limits (maximum line, minimum line, maximum point, minimum point) can be set to allow automatic PASS/FAIL testing of the measurement data. Up to 12 limits can be stored for each of four parameters, channel 1 and channel 2 (eight sets of 12 limits). Use the numeric keypad, the data knob, or the step keys to select the limit line segment or limit point to be deleted or modified.

By turning MARKER ON , the =MARKER softkey can be used to set the stimulus value to that of the marker.

See Also

ADD LIMITS
DELETE LIMIT
EDIT LIMIT
COPY LIMITS
LIMITS ON/OFF
LIMIT TEST ON/OFF

LIMITS (COLOR)

Modify the color of limit lines and points on the display.

Programming Code

COLRLIMI

Main Menu

DISPLAY

Programming Sequence

```
COLRLIMI;
   TINT [value]; or
   CBRI [value]; or
   COLOR [value]; or
   RSCO;
SVCO;
```

Manual Sequence

```
(DISPLAY)
  ADJUST DISPLAY
   MODIFY COLORS
        MORE
        LIMITS
        TINT or
        BRIGHTNESS or
        COLOR or
        RESET COLORS or
        PREDEFINED COLORS
      (PRIOR MENU)
     (PRIOR MENU)
    (PRIOR MENU)
  SAVE CRT SETTINGS
```

Description

Preset	orange	Range	see MODIFY COLORS
Initialization	orange	Recalled	yes, using SAVE COLORS RECALL COLORS
Coupled	always coupled		

`LIMITS` **(COLOR)**

The color of limit lines and points can be changed to any combination of color, tint, and brightness. Cycling power changes all color adjustments to the default defined colors. To recall previously modified colors, use `RECALL COLORS` .

`FACTORY PRESET` does not affect color selection.isplay.

See Also

`MODIFY COLORS`
`DEFAULT COLORS`
`PREDEFINED COLORS`
`SAVE COLORS` ing Sequence
`RESET COLOR`

`LIMITS` **(plotter menu)**

Plot limits on digital plotter.

Programming Code

PLOTLIMI

Main Menu

COPY

Program Sequence

(select pen)
(select quadrant)
  PLOTLIMI;

Manual Sequence

`COPY`
 `DEFINE PLOT`
 (choose plot definitions)
`COPY`
 `PLOT TO PLOTTER`
  `PLOT: LIMITS`

Description

Preset	plot: all	Range	N/A
Initialization	plot: all	Recalled	N/A
Coupled	N/A		

The limits are plotted using the current quadrant and pen selections to the digital plotter. If dual channel display is selected, then both channels are plotted using the in dependent pen selections.

See Also

DEFINE PLOT , ADDRESS OF PLOTTER: HP-IB , ADDRESS OF PLOTTER: RS-232 PO RT 1, ADDRESS OF PLOTTER: RS-232 PORT 2, PLOT: MEMORY ,LIMITS

LIMITS PEN: n

Modify the color of the limits display on the screen.

Programming Code

PENNLIMI

Main Menu

DISPLAY

Programming Sequence

```
PENLNLIMI;
 TINT [value]; or
 CBRI [value]; or
 COLOR [value]; or
 RSCO;
SVCO;
```

Manual Sequence

(DISPLAY)
ADJUST DISPLAY
  MODIFY COLORS
   MORE
      LIMITS PEN: n
    TINT or
    BRIGHTNESS or

LIMITS PEN: n

    COLOR or
    RESET COLORS or
    PREDEFINED COLORS
    [PRIOR MENU]
  [PRIOR MENU]
  SAVE COLORS

Description

Preset	orange	Range	see MODIFY COLORS
Initialization	orange	Recalled	yes, using
			SAVE COLORS
			RECALL COLORS
Coupled	always coupled		

The color of a limit measurement display can be changed to any color, tint, and brightness co mbination. Cycling power changes all color adjustments to the default defined colors. To recall previously modified colors, use the RECALL COLORS softkey. FACTORY PRESET does not affect color selection.

See Also

MODIFY COLORS, DEFAULT COLORS, PREDEFINED COLORS, SAVE COLORS, RESET COLOR

LIMITS OFF

Turn off the display of all limit lines and points.

Programming Code

LIMILINEOFF

Main Menu

DISPLAY

Program Sequence

LIMILINEOFF

Manual Sequence

(select desired channel and stimulus parameter)
(DISPLAY)
  LIMITS
    LIMITS OFF

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	yes
Coupled	always coupled		

The display of all limit lines and points is turned off for the currently selected channel and display parameter.

See Also

LIMITS
LIMITS ON

LIMITS ON

Turn on display of all limit lines and points.

Programming Code

LIMILINEON

Main Menu

DISPLAY

Program Sequence

LIMILINEON

`LIMITS ON`

Manual Sequence

(select desired channel and stimulus parameter)
[DISPLAY]
  `LIMITS`
    `LIMITS ON`

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

The display of all limit lines and points is turned ON for the currently selected channel and display parameter.

See Also

`LIMITS`
`LIMITS OFF`

`LIMIT TEST OFF`

Turn off testing for data that violates limits.

Programming Code

`LIMITESTOFF`

Main Menu

DISPLAY

Program Sequence

`LIMITESTOFF`

Manual Sequence

(select desired channel and stimulus parameter)

DISPLAY
  LIMIT TEST
    LIMITS
      OFF

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	yes
Coupled	always coupled		

Automatic testing is turned OFF for data outside the area designated by the limits.

See Also

LIMITS
LIMIT TEST ON

LIMIT TEST ON

Turn ON testing for data that violates limits.

Programming Code

LIMITESTON

Main Menu

DISPLAY

Program Sequence

LIMITESTON

`LIMIT TEST ON`

Manual Sequence

(select desired channel and stimulus parameter)
[DISPLAY]
  `LIMITS`
    `LIMIT TEST`
     `ON`

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	yes
Coupled	always coupled		

Automatic testing is turned ON for data outside the area designated by the limits.

See Also

`LIMITS`
`LIMIT TEST OFF`

`LIN mkr on POLAR`

Select linear marker readout on Polar display format for current parameter on selected channel.

Programming Code

LINP

Main Menu

FORMAT

Program Sequence

(select channel);
  (select parameter);
    LINP;

Manual Sequence

(select channel)
 (select parameter)
FORMAT (MENU)
LIN mkr on POLAR

Description

Preset	ref value=1 scale=0.2/	**Range**	N/A
Initialization	same as Preset	**Recalled**	yes
Coupled	always uncoupled		

The marker readout is a complex number consisting of the linear magnitude value (see LINEAR MAGNITUDE) and the phase angle (see (PHASE)).

Selecting LIN mkr on POLAR recalls the last selected response selections on that channel.

LINE xx

Measure TRL line calibration standard class. Where xx = class or standard label.

Programming Code

TRLL

Main Menu

CAL

`LINE xx`

Program Sequence

```
CAL1; or CAL2;
  CALITRL2;
    TRLT;
    TRLR1;
    TRLR2;
    ISOL;
        measure isolation standards
      TRLL;
        SAVT;
            CALSn;  n = 1 to 8
```

Manual Sequence

`CAL`
  `CAL 1 xx` (where xx=cal kit 1 label) or
  `CAL 2 xx` (where xx=cal kit 2 label)
    `TRL 2-PORT`
     `THRU THRU` or
     S_{11} `REFLECT SHORT` or
     S_{22} `REFLECT SHORT` or
     `LINE 2-18 LINE`
      `DONE`

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

The second line of the softkey name is the user definable standard label, if one standard is assigned to the TRL LINE class, or TRL LINE class label if only one standard is assigned.

These keys cause the set of measurements needed to compute the error coefficients. They may be made in any order. TRLT and TRLL will cycle through a series of S-parameter measurements, and then leave the system in S_{11}. TRLR1 and TRLR2 measure and automatically select just one S-parameter.

See Also

`CALIBRATE TRL 2-PORT`

LINEAR MAGNITUDE

Select linear magnitude display format for current parameter on selected channel.

Programming Code

LINM

Main Menu

FORMAT

Program Sequence

>> *(select channel)*
>> *(select parameter)*
>> LINM;

Manual Sequence

> (select channel)
> (select parameter)
> FORMAT [MENU]
> LINEAR MAGNITUDE

Description

Preset	ref value=0 scale=1 ref posn=0	Range	N/A
Initialization	same as Preset	Recalled	yes
Coupled	always uncoupled		

Allows display of linear magnitude on a Cartesian display using

Linear Magnitude $= (x^2 + y^2)^{0.5}$

where x and y are the real and imaginary parts of the measured parameters.

Selecting LINEAR MAGNITUDE recalls the last selected response selections on that channel.

LIST ALL
S PARAMETERS

Print all S-parameters for the selected channel to a printer.

Programming Code

LISALL

Main Menu

COPY

Program Sequence

LISTALL;

Manual Sequence

(COPY)
DEFINE LIST
(set definition of list)
(COPY)
LIST TRACE VALUES
LIST ALL S PARAMETERS

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

The trace value at each frequency point is printed in tabular form for each of the four S-parameters. The number of values printed is dependent on the "list skip factor" setting. At the default value setting of skip factor, 51 points are printed (one full 8.5 x 11 inch page). The format of the printed list can be adjusted.

See Also

LIST FORMAT, LIST SKIP FACTOR, DEFINE LIST, LIST TRACE VALUES, FORMAT (MENU)

LIST FORMAT

Present the list format menu.

Programming Code

None

Main Menu

COPY

Manual Sequence

COPY
  DEFINE LIST
    LIST FORMAT
        STIMULUS: UNITS or
        STIMULUS: WIDTH or
        STIMULUS: DECIMAL POSITION or
        COLUMN 1 WIDTH or
        COLUMN 2 WIDTH or
        COLUMN 1 DECIMAL POSITION or
        COLUMN 2 DECIMAL POSITION

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

The keys presented in this menu adjust the printed tabular format of the trace values at each frequency point. The basic units and number of columns are dependent on the selected format for each parameter. In LOG MAG, DELAY, and PHASE formats, the stimulus column and column 1 are the only columns printed for the parameter(s) specifed. POLAR and SMITH formats are printed with stimulus, column 1 and column 2 information for the parameter(s) specified.

The default units change with the domain and corresponding format selected.

See Also

DEFINE LIST , STIMULUS: UNITS , LIST SKIP FACTOR

LIST PARAMETERS

Print system parameters or operating parameters to line printer.

Programming Code

PRIP or LISPARM

Main Menu

COPY

Program Sequence

See OPERATING PARAMETERS or SYSTEM PARAMETERS .

Manual Sequence

See OPERATING PARAMETERS or SYSTEM PARAMETERS .

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

OPERATING PARAMETERS , SYSTEM PARAMETERS

LIST SKIP FACTOR

Set the number of frequency points to print in the data list.

Programming Code

LISSKIP

Main Menu

COPY

Program Sequence

LISSKIP [value];   *value = 1 to 801*

Manual Sequence

[COPY]
 DEFINE LIST
   LIST SKIP FACTOR [entry [x1]]   (entry = 1 to 801)

Description

Preset	4	Range	1 to 801
Initialized	N/A	Recalled	N/A
Coupled	N/A		

When the skip factor = 1, all frequency points are printed. When the skip factor = 2, every odd frequency point is printed, and so on with larger skip factors. At skip factor = 4 (default value) with 201 frequency points of data, the list contains 51 points of information, one full (8.5 x 11 inch) page.

See Also

STIMULUS FORMAT , COLUMN 1 WIDTH , DECIMAL POSITION

LIST TRACE VALUES

List trace values for current parameter on selected channel to printer.

Programming Code

LIST

LIST TRACE VALUES

Main Menu

COPY

Program Sequence

LIST;

Manual Sequence

COPY
    LIST TRACE VALUES
       LIST TRACE VALUES or
       LIST ALL S PARAMETERS

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

The trace value at each frequency point is listed in tabular form in the basic units of the selected format. See OUTPMARK.

See Also

COPY, OUTPMARK

LOAD

Load specified data type from specified file from disc to 8510 memory.

Programming Code

LOAD

Main Menu

DISC

Program Sequence

See STORE .

Manual Sequence

$\boxed{\text{DISC}}$

  STORAGE IS INTERNAL or STORAGE IS EXTERNAL

    LOAD

      INST STATE 1-8 or

      INST STATE ALL or

      MEMORY 1-8 or

      MEMORY ALL or

      CAL SET 1-8 or

      CAL SET ALL or

      CAL KIT 1-2 or

      MORE

        DATA: RAW or

        DATA: DATA or

        DATA: FORMATTED or

        DELAY TABLE or

        USER DISPLAY or

        HARDWARE STATE or

        MACHINE DUMP

          (enter or select disc file)

            STORE FILE or LOAD FILE or DELETE FILE

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

CORRECTION OFF must be selected before loading calibration sets. DISPLAY: DATA must be selected before loading memory traces.

See Also

STORE

LOAD FILE

Load disc filename.

Programming Code

DISF

Main Menu

DISC

Program Sequence

See STORE .

```
STOIINT; or STOIEXT;
 LOAD;
(select data type)
   DISF filename;
```

Manual Sequence

DISC
  STORAGE IS INTERNAL or STORAGE IS EXTERNAL
    LOAD
      (select data type)
        (select disc file name)
          LOAD FILE

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

The LOAD FILE directory consists only of files for the current selected file type. Use the knob to specify the file to be loaded.

See Also

STORE FILE

LOAD NO OFFSET

Measure load with no offset.

Programming Code

LOAN

Main Menu

CAL

Program Sequence

```
CAL1;
 CALIS111;
  CLASS11C;
   STAND;
    LOAN;
     LOAO;
      OFLD;
       DONE;
     [measure other 1-port standards]
         SAV1;
          CALSn;  n = 1 to 8
```

Manual Sequence

For S_{11} 1-port

> CAL
> CAL 1 xx (where xx=cal kit 1 label)
> S_{11} 1-PORT
> S_{11}: LOADS
>   OFFSET
>   LOAD NO OFFSET
>   LOAD OFFSET
>   OFFSET LOAD DONE
>   [measure other 1-port standards]
>   SAVE 1-PORT CAL
>   CAL SET n (n = 1 to 8)

`LOAD NO OFFSET`

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Offset load is a standard type that requires two sets of measurements. One set of measurements is of a fixed load, and a second set of measurements of the same load offset by a section of precision line. From these measurements, a more ideal value for the directivity error term is computed (dependent only on the quality of the precision line). Measurement can be made in either order.

`LOAD OFFSET`

Measure load with offset.

Programming Code

LOAO

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

See `LOAD NO OFFSET` for full description.

LOCAL

Set 8510 system to local (front panel) control. Present address menu.

Programming Code

None, see GPIB commands GTL, REN, and LLO.

Program Sequence

Use standard GPIB conventions to set or change 8510 GPIB Local/Remote status.

Manual Sequence

LOCAL
  ADDRESS of 8510 or
  ADDRESS of SYSTEM BUS or
  ADDRESS of SOURCE #1 or
  ADDRESS of TEST SET or
  ADDRESS of PLOTTER or
  ADDRESS of PRINTER or
  ADDRESS of DISC or
  MORE
    ADDRESS of SOURCE #2 or
    ADDRESS of PASS-THRU or
    ADDRESS of RF SWITCH
  PRIOR MENU (to exit)

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

If not in Remote (R indicator not lighted), presents the GPIB Addresses menu. See
HP-IB ADDRESSES .

If in Remote (R indicator lit), suspends GPIB activity until the next GPIB listen command is
received, extinguishes the R indicator, and presents the GPIB Addresses Menu. LOCAL does
not change GPIB Listen status (L indicator).

See HP-IB ADDRESSES for use of this menu.

See Also

HP-IB ADDRESSES

LOCK SPEED: FAST

Select system phaselock mode.

Programming Code

LOCSFAST

Main Menu

SYSTEM

Program Sequence

```
        LOCSNORM; or
        LOCKFAST;
```

Manual Sequence

(SYSTEM), MORE
  SYSTEM PHASELOCK ,
    LOCK SPEED: NORMAL or
    LOCK SPEED: FAST

Description

Preset	lock speed: normal	Range	N/A
Initialization	lock speed: normal	Recalled	no[1]
Coupled	N/A		

1 Part of Hardware State

This selection allows you to increase stepped measurement speed with a tradeoff of decreased frequency accuracy. This selection has no effect on ramp mode. It does speed up step, single point, and frequency list modes.

LOCK SPEED: NORMAL

Select system phaselock mode.

Programming Code

LOCSNORM

Description

Preset	lock speed: normal	**Range**	N/A
Initialization	lock speed: normal	**Recalled**	no[1]
Coupled	N/A		

1 Part of Hardware State

See Also

See LOCK SPEED: FAST for full description.

LOCK to a_1

Select a_1 as phaselock input.

Programming Code

LOCKA1

Main Menu

PARAMETER

Program Sequence

See REDEFINE PARAMETER .

Manual Sequence

See PHASE LOCK .

`LOCK to a₁`

Description

Preset	standard basic and user parameters	Range	N/A
Initialization	same as Preset	Recalled	basic parameters: no user parameters: yes
Coupled	N/A		

If phaselock is not found (except if `LOCK to None` is selected), then the message `CAUTION: NO IF FOUND` (or others) is displayed and bit 1 of the Primary Status byte is set.

Selected phaselock input must be greater than the level specified in the 8510 performance specifications.

Selecting `LOCK to None` causes the 8510 to skip the phaselock portion of the data acquisition cycle. The data to be measured is assumed to be present at the appropriate a_1, b_1, a_2, and b_2, 20 MHz IF inputs.

See Also

`PHASE LOCK`, `REDEFINE PARAMETER`

`LOCK to a₂`

Select a_2 as phaselock input.

Programming Code

LOCKA2

Description

Preset	standard basic and user parameters	Range	N/A
Initialization	same as Preset	Recalled	basic parameters: no user parameters: yes
Coupled	N/A		

See Also

See `LOCK to a₁` for full description.

LOCK to None

Do not attempt receiver phaselock.

Programming Code

LOCKNONE

Description

Preset	standard basic and user parameters	Range	N/A
Initialization	same as Preset	Recalled	basic parameters: no user parameters: yes
Coupled	N/A		

LOCK TYPE: EXTERNAL

Select system first IF phaselock, external LO source.

Programming Code

LOCTEXTE

Main Menu

SYSTEM

Program Sequence

```
LOCTINTE; or
LOCTEXTE; or
LOCTNONE;
```

Manual Sequence

SYSTEM
  MORE
    SYSTEM PHASELOCK
      LOCK TYPE:
        INTERNAL or
        EXTERNAL or
        NONE

`LOCK TYPE: EXTERNAL`

Description

Preset	unchanged	Range	N/A
Initialization	internal	Recalled	no
Coupled	always		

The selection defines the phaselock for the entire system. It works in combination with individual parameter definitions. If `LOCK TYPE: None` is selected, then no phaselock is attempted. If external or internal is selected, then the phaselock definitions of the individual parameters will not be overridden.

This selection is part of the Hardware State definition. It is not changed by preset, power on, or instrument preset.

`LOCK TYPE: INTERNAL`

Select system first IF phaselock, internal LO source.

Programming Code

LOCTINTE

Description

Preset	unchanged	Range	N/A
Initialization	internal	Recalled	no
Coupled	always		

See Also

See `LOCK TYPE: EXTERNAL` for full description.

LOCK TYPE: None

Do not phaselock first IF.

Programming Code

LOCTNONE

Description

Preset	unchanged	Range	N/A
Initialization	internal	Recalled	no
Coupled	always		

See Also

See LOCK TYPE: EXTERNAL for full description.

LOG MAG

Select Cartesian logarithmic (dB) magnitude display format for current parameter on selected channel.

Programming Code

LOGM

Program Sequence

> (select channel)
>> (select parameter)
>>> LOGM;

Manual Sequence

> (select channel)
>> (select parameter)
>>> LOG MAG

$\boxed{\text{LOG MAG}}$

Description

Preset	log mag for channels 1 and 2 ref value = 0 dB scale = 10 dB/ ref posn = 5	Range	N/A
Initialization	same as Preset	Recalled	yes
Coupled	always uncoupled		

Allows display of logarithmic magnitude on a Cartesian display using

LOG MAG = $20 \log_{10} (x^2 + y^2)^{0.5}$

where x and y are the real and imaginary parts of the measured data.

The marker readout is given in dB.

Selecting $\boxed{\text{LOG MAG}}$ recalls the last selected response selections on that channel.

LOG mkr on POLAR

Select logarithmic marker readout on Polar format for current parameter on selected channel.

Programming Code

LOGP

Main Menu

FORMAT

Program Sequence

> (select channel)
> > (select parameter)
> > > LOGP;

Manual Sequence

(select channel)
  (select parameter)
    FORMAT $\boxed{\text{MENU}}$
      LOG mkr on POLAR

Description

Preset	ref value=0 scale=0.2/	**Range**	N/A
Initialization	same as Preset	**Recalled**	yes
Coupled	always uncoupled		

The marker readout is a complex number consisting of a logarithmic magnitude value (see (LOG MAG)) and the phase angle (see (PHASE)).

Selecting `LOG mkr on POLAR` recalls the last selected response selections on that channel.

LOW PASS: IMPULSE

Select Time Domain low pass impulse mode for selected channel.

Programming Code

LOWPIMPU

Note   Time Domain option 010 only

Main Menu

DOMAIN

Program Sequence

```
TIML;   SETF is included in TIML
   LOWPIMPU;
```

Manual Sequence

(DOMAIN)
  TIME LOW PASS
    SET FREQ. (LOW PASS)
      SPECIFY TIME
        LOW PASS: IMPULSE

`LOW PASS: IMPULSE`

Description

Preset	real format	**Range**	N/A
Initialization	real format	**Recalled**	yes
Coupled	always uncoupled		

The trace responds to impulse stimulus.

When `TIME BAND PASS` is selected, `LOW PASS: IMPULSE` and `LOW PASS:  STEP` have no effect on the trace.

Table L-1. Approximate Formulas for Step Rise Time and Impulse Width

LOW PASS	
$$\text{STEP RISE TIME (10\% to 90\%)} = \frac{0.45}{\text{FREQ SPAN}} \times \begin{array}{l} \text{1.0 MINIMUM WINDOW} \\ \text{2.2 NORMAL WINDOW} \\ \text{3.3 MAXIMUM WINDOW} \end{array}$$	
$$\text{IMPULSE WIDTH (50\%)} = \frac{0.60}{\text{FREQ SPAN}} \times \begin{array}{l} \text{1.0 MINIMUM WINDOW} \\ \text{1.6 NORMAL WINDOW} \\ \text{2.4 MAXIMUM WINDOW} \end{array}$$	
BAND PASS	
$$\text{IMPULSE WIDTH (50\%)} = \frac{1.20}{\text{FREQ SPAN}} \times \begin{array}{l} \text{1.0 MINIMUM WINDOW} \\ \text{1.6 NORMAL WINDOW} \\ \text{2.4 MAXIMUM WINDOW} \end{array}$$	

`LOW PASS:  STEP`

Select Time Domain low pass step mode for selected channel.

Programming Code

LOWPSTEP

Note	Time Domain option 010 only

Main Menu

DOMAIN

Program Sequence

TIML;   SETF *is included in* TIML
   LOWPSTEP;

Manual Sequence

(DOMAIN)
  TIME LOW PASS
    SET FREQ. (LOW PASS)
      SPECIFY TIME
        LOW PASS: STEP

Description

Preset	low pass: step real format	Range	N/A
Initialization	same as Preset	Recalled	yes
Coupled	always uncoupled		

Trace shows response to impulse stimulus.

When TIME BAND PASS is selected, LOW PASS: IMPULSE and LOW PASS: STEP have no effect on the trace.

LOWBAND FREQUENCY

Maximum low frequency value to use lowband reflect'n process in TRL 2-port.

Programming Code

LOWF

Main Menu

CAL

`LOWBAND FREQUENCY`

Program Sequence

```
CAL1; or CAL2;
 LOWF [value];
[other option selections]
   TRLO;
[other changes]
KITD;
```

Manual Sequence

(CAL)
  `MORE`
    `MODIFY 1 xx` (where xx = cal kit 1 label) or
    `MODIFY 2 xx` (where xx = cal kit 2 label)
     `TRL OPTION`
      `LOWBAND FREQUENCY` [value] ((x1) = Hz)
       [other option selections]
        `TRL OPTION DEFINED`
         [other changes]
          `KIT DONE (MODIFIED)`

Description

Preset	no change	**Range**	0 to 999 GHz
Initialization	part of cal kit definition	**Recalled**	part of cal kit definition
Coupled	always coupled		

Lowband frequency determines the maximum frequency that the lowband reflection calibration approach uses during the TRL calibration process. This lowband calibration is optional and is done only if the frequencies chosen are not practical for TRL.

See Also

`TRL OPTION`, `LOWBAND REFLECT'N`

LOWBAND REFLECT'N

Begin optional lowband part of TRL 2-port calibration.

Programming Code

LOWR

Main Menu

CAL

Program Sequence

```
CAL1; or CAL2;
 CALITRL2;
(measure TRL Thru, Reflects, Line)
  LOWR;
 (measure Full 2-port Reflection Cal Stds.)
   REFD;
 SAVT;
CALSn;  n = 1 to 8
```

Manual Sequence

```
 CAL 1  or  CAL 2
   CALIBRATE: TRL 2-PORT
     (measure TRL Thru, Reflects, Line)
      LOWBAND REFLECTION
        (measure Full 2-port Reflection Cal Stds)
         REFLECT'N DONE
           SAVE TRL 2-PORT
             CAL SET n (n = 1 to 8)
```

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

In the TRL calibration process, sometimes a set of frequencies may be too low to be appropriately done by the normal TRL process. This optional process, lowband calibration, is used in place of the TRL process up to the maximum frequency defined in the calibration kit (lowband frequency). See FULL 2-PORT REFLECTION Cal menu.

`LOWBAND REFLECT'N`

It can only be done, after all the TRL measurements have been completed but before the "save TRL 2-port." It will begin a conventional reflection process using class $S_{11}A$, $S_{11}B$, $S_{11}C$, $S_{22}A$, $S_{22}B$, and $S_{22}C$. Once completed, then execute `SAVE TRL 2-PORT`.

Once this process is started, the TRL standards cannot be measured, or it causes the whole process to restart, and all past measurements are lost.

See Also

`CALIBRATE: FULL 2-PORT`, `CALIBRATE: TRL 2-PORT`, `REFLECTION`

MACHINE DUMP

Disc data type select complete machine dump.

Programming Code

MACD

Main Menu

DISC

Program Sequence

See STORE .

```
STOIINT; or STOIEXT;
 STOR; or LOAD; or DELE;
 MACD;
DISF "filename";
```

Manual Sequence

[DISC]
STORAGE IS INTERNAL or STORAGE IS EXTERNAL
STORE or LOAD or DELETE
 MORE
  MACHINE DUMP
   (enter or select disc file)
    STORE FILE or LOAD FILE or DELETE FILE

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

A machine dump transfers all the 8510 data registers that are currently loaded. This includes the following:

Current Instrument State   Cal Kits 1 - 2

MACHINE DUMP

Instrument States 1 - 8   Hardware State
Cal Sets 1 - 8   Memories 1 - 8
User Graphics Display

■ Only the registers that actually contain data are saved, and the saved size is the actual size of the register, not the largest possible size of the register.

■ Loading a Machine Dump is not guaranteed to purge all information from non-volatile memory, due to "intelligent" Machine Dump transfers. Loading a program disc or the non-volatile memory read/write test purges all non-volatile memory.

See Also

STORE

MAGNITUDE OFFSET

Set magnitude offset for current parameter on selected channel.

Programming Code

MAGO

Main Menu

RESPONSE

Program Sequence

        MAGO [value];

Manual Sequence

  RESPONSE MENU
   MORE
    MAGNITUDE OFFSET [entry]

Description

Preset	magnitude offset = 0 dB channel 1 and channel 2	Range	−500 to +500 dB
Initialized	same as Preset	Recalled	yes
Coupled	always uncoupled		

MAGNITUDE OFFSET adds a constant magnitude offset across the frequency range. There is a separate entry for each parameter on each channel. Table delay disables magnitude offset.

Non-zero magnitude offset causes the D enhancement annotation to be displayed.

MAGNITUDE SLOPE

Set magnitude slope for current parameter on selected channel.

Programming Code

MAGS

Main Menu

RESPONSE

Program Sequence

MAGS [value];

Manual Sequence

RESPONSE MENU
 MORE
  MAGNITUDE SLOPE [entry (x1)]   ((x1) = dB/GHz)

Description

Preset	magnitude slope = 0 dB/GHz	Range	−500 to +500 dB/GHz
Initialized	same as Preset	Recalled	yes
Coupled	always uncoupled		

Magnitude slope adds a linear offset to the displayed trace. Its value is zero at the start frequency and is the value selected at the stop frequency. All line stretcher functions (electrical delay, phase offset, magnitude slope, magnitude offset) are applied after error correction but before Time Domain. Therefore, they affect both the data arrays and the formatted arrays. There is a separate value for each parameter on each channel. Table delay disables magnitude slope.

Non-zero magnitude slope causes the D enhancement annotation to be displayed.

See Also

MAGNITUDE OFFSET

$\boxed{\text{MARKER}}$

Present marker menu; turn on last selected marker.

Programming Code

MENUMARK

Program Sequence

MENUMARK;

Manual Sequence

$\boxed{\text{MARKER}}$
MARKER 1 or
MARKER 2 or
MARKER 3 or
MARKER 4 or
MARKER 5 or
all OFF or
Δ MODE MENU or
MORE
TARGET VALUE or
MARKER to TARGET or
MARKER to MINIMUM or
MARKER to MAXIMUM or
SEARCH: LEFT or
SEARCH: RIGHT or
MORE
MKR LIST ON or
MKR LIST OFF or
FOUR PARAM 1 MARKER/ or
FOUR PARAM 5 MARKERS or
MARKERS DISCRETE or
MARKERS CONTINUOUS

Description

Preset	marker all off	Range	N/A
Initialized	marker all off	Recalled	yes
Coupled	always coupled if domain is same for both channels		

Pressing (MARKER) with all markers off, turns on the last marker that was turned on (1 if after FACTORY PRESET). The Marker Menu is displayed, and marker becomes the active function. The knob moves the marker from point to point, while STEP moves the marker by one x-axis division. A numeric entry from the front panel or via GPIB moves the active marker to the point nearest to the specified stimulus value and the stimulus value is displayed.

If another active function is selected, the marker and the marker value continues to be displayed in the channel identification area.

With DUAL CHANNEL selected, the marker active function value pertains to the selected channel.

See Also

MARKER n

MARKER n

Select active stimulus marker. Where n = 1 to 5.

Programming Code

MARK1 or MARK2 or MARK3 or MARK4 or MARK5

Main Menu

MARKER

Program Sequence

    MARKn [stimulus value [suffix]];   *n = 1 to 5*

Manual Sequence

    (MARKER),
     MARKER 1 or
     MARKER 2 or
     MARKER 3 or
     MARKER 4 or
     MARKER 5 entry (x1) ((x1) = Hz or seconds or volts)

`MARKER n`

Description

Preset	marker all off	**Range**	N/A
Initialized	marker all off	**Recalled**	yes
Coupled	always coupled if domain is the same for both channels		

Pressing one of the marker selection keys makes the selected marker the active function, and updates the softkey annotation. The marker readout in the Channel Identification area shows the measured value at the marker position and the Active Function display shows the stimulus value. If the Δ marker mode is selected (see `Δ REF = n`), the readouts show the difference between the active marker and the reference marker.

The knob moves the active marker from point to point, while STEP moves the active marker by one x-axis division. A numeric entry from the front panel or via GPIB moves the active marker to the point nearest to the specified stimulus value and the stimulus value is displayed.

In Δ marker mode, the knob, STEP keys, and numeric entries move the active marker relative to the reference marker. If another active function is selected, the marker value continues to be displayed in the channel identification area.

With dual channel selected, the marker active function value pertains to the selected channel.

Markers are positioned by the stimulus value. The marker stimulus value may be entered using the numeric keys or via GPIB with full resolution, but the stimulus value in the Active Function area is displayed to the data measurement resolution (the stimulus value of the closest actual data point).

For dual channel, coupled channels displays with the same domain selected, markers on both traces move simultaneously. If different domains are selected, only the marker for the selected channel is moved.

For dual channel, uncoupled channel displays and for dual channel, coupled channels with Time Domain on both channels, both markers are positioned to the same stimulus value (closest actual data point). If the stimulus value is out of range on one channel, then the marker for that channel is positioned at the appropriate end of the trace.

If `AVERAGING ON`, the marker value is the averaged value.

If `SMOOTHING ON`, the marker value is the smoothed value.

Figure M-1. Marker Sequence

MARKER all OFF

Turn all measurement markers off.

Programming Code

MARKOFF

Main Menu

MARKER

`MARKER all OFF`

Program Sequence

`MARKOFF;`

Manual Sequence

(MARKER)
  `all OFF`

Description

Preset	marker all off	Range	N/A
Initialized	marker all off	Recalled	yes
Coupled	always coupled if domain is the same for both channels		

All measurement marker annotations are turned off.

See Also

`MARKER n`

`MARKER ON`

Turn ON a marker to help set limit lines or points.

Programming Code

Main Menu

DISPLAY

Manual Sequence

(select desired channel and stimulus parameter)
(DISPLAY)
  `LIMITS`
    `EDIT LIMIT` or
    `ADD LIMIT`
      `ADD MAX LINE` or
      `ADD MIN LINE` or
      `ADD MAX POINT` or
      `ADD MIN POINT`

`MARKER ON`

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	always uncoupled		

This command turns on a marker to help setting the values in limit tables. It turns on the last active marker (1 through 5). After the marker is turned on, the marker can be positioned by making an entry. This value can be added to the selected limit table by pressing `=MARKER`.

See Also

`LIMITS`
`ADD LIMIT`
`EDIT LIMIT`
`ADD MAX LINE`
`ADD MIN LINE`
`ADD MAX POINT`
`ADD MIN POINT`

`MARKERS`

Modify the color of the markers on the display.

Programming Code

COLRMARK

Main Menu

DISPLAY

Programming Sequence

```
COLRMARK;
 TINT [value]; or
 CBRI [value]; or
 COLOR [value]; or
 RSCO;
SVCO;
```

`MARKERS`

Manual Sequence

(DISPLAY)
  `ADJUST DISPLAY`
    `MODIFY COLORS`
      `MARKERS`
        `TINT` or
        `BRIGHTNESS` or
        `COLOR` or
        `RESET COLORS` or
        `PREDEFINED COLORS`
      (PRIOR MENU)
    (PRIOR MENU)
    `SAVE COLORS`

Description

Preset	white	Range	see `MODIFY COLORS`
Initialization	white	Recalled	yes, using `SAVE COLORS` `RECALL COLORS`
Coupled	always coupled		

The color of the markers can be changed to any color, tint, and brightness combination.

Cycling power changes all color adjustments to the default defined colors. To recall previously modified colors, use the `RECALL COLORS` softkey.

`FACTORY PRESET` does not affect color selection.

See Also

`MODIFY COLORS`, `DEFAULT COLORS`, `PREDEFINED COLORS`, `SAVE COLORS`, `RESET COLOR`

MARKERS: CONTINUOUS

Select continuous markers.

Programming Code

MARKCONT

Main Menu

MARKER

Description

Preset	discrete	Range	N/A
Initialization	discrete	Recalled	yes
Coupled	always coupled		

Continuous markers use a linear interpolation between points. Readouts are not always of measured data, and must be treated accordingly.

See Also

MARKERS: DISCRETE

MARKERS: DISCRETE

Select discrete markers.

Programming Code

MARKDISC

Main Menu

MARKER

`MARKERS: DISCRETE`

Program Sequence

`MARKDISC`

Manual Sequence

(MARKER)
  `MORE`
   `MARKERS: DISCRETE` or
   `MARKERS: CONTINUOUS`

Description

Preset	marker discrete	**Range**	N/A
Initialized	marker discrete	**Recalled**	yes
Coupled	always coupled		

Discrete markers are positioned only at measured data points. Therefore, all readouts are actual measured data.

See Also

`MARKERS: CONTINUOUS`

`MARKERS PEN: n`

Select pen number to plot the markers. Where n = 1 to 10.

Programming Code

PENNMARK

Main Menu

COPY

Programming Sequence

`PENNMARK [value];`   *value = 1 to 10*

Manual Sequence

[COPY]
  DEFINE PLOT
    SET PEN NUMBERS
      MARKERS PEN: n [entry [x1]]   (entry = 1 to 10)
        (other selections)
      [PRIOR MENU]
    [PRIOR MENU]
  PLOT TO PLOTTER
    (select information to plot)

Description

Preset	pen 1	**Range**	1 to 10
Initialization	pen 1	**Recalled**	yes
Coupled	always coupled		

The default pen number is 1.

See Also

SET PEN NUMBERS for a complete description.

MARKER to MAXIMUM

Move active marker to maximum trace value on selected channel and select search mode.

Programming Code

MARKMAXI

Main Menu

MARKER

Program Sequence

        MARKn; $n = 1\ to\ 5$
          MARKMAXI;

`MARKER to MAXIMUM`

Manual Sequence

[MARKER]
(select marker)
  `MORE`
   `MARKER to MAXIMUM`

Description

Preset	marker all off	**Range**	N/A
Initialized	marker all off	**Recalled**	yes
Coupled	always coupled if domain is the same for both channels		

Once `MARKER to MAXIMUM` is selected, pressing `SEARCH: LEFT` or `SEARCH: RIGHT` causes the marker to begin searching left or right for the next maximum.

For Cartesian displays, the active (or last active) marker moves to maximum x-axis value; in Polar and Smith formats, to maximum magnitude value.

See Also

`MARKER n` , `SEARCH: LEFT` , `SEARCH: RIGHT`

`MARKER to MINIMUM`

Move active marker to minimum trace value of selected channel and select marker search mode.

Programming Code

MARKMINI

Main Menu

MARKER

Program Sequence

     MARKn;   *n = 1 to 5*
      MARKMINI;

Manual Sequence

(MARKER)
(select marker)
  MORE
   MARKER to MINIMUM

Description

Preset	marker all off	Range	N/A
Initialized	marker all off	Recalled	yes
Coupled	always coupled if domain is the same for both channels		

Once MARKER to MINIMUM is selected, pressing SEARCH: LEFT or SEARCH: RIGHT causes the marker to begin searching left or right for the next minimum.

For Cartesian displays, the active (or last active) marker moves to the minimum x-axis value; in Polar and Smith formats, to the minimum magnitude value.

See Also

MARKER n , SEARCH: LEFT , SEARCH: RIGHT

MARKER to TARGET

Active marker to target trace value. Search starts from lowest stimulus value.

Programming Code

MARKTARG

Main Menu

MARKER

Program Sequence

MARKTARG;

Manual Sequence

(MARKER)
MORE
TARGET VALUE [entry]
MARKER TO TARGET

Description

Preset	marker all off	Range	N/A
Initialized	marker all off	Recalled	yes
Coupled	always coupled if domain is the same for both channels		

Place marker at the trace point nearest to target value (as set by TARGET VALUE) and select marker search mode.

In discrete marker mode, the marker is placed at the trace point closest to the target value. In continuous mode, the marker uses linear interpolation to get as close as possible to the target value.

If delta marker mode is not selected, the search starts at the lowest stimulus value and stops at the first occurrence of the target value. If the delta marker mode is selected, the search starts at the stimulus value of the reference marker and stops at the first occurrance of the target value.

The message TARGET VALUE NOT FOUND is displayed if the target value does not exist in the specified search region.

Once MARKER to TARGET is selected, pressing SEARCH: LEFT or SEARCH: RIGHT causes the marker to begin searching left or right for the next target value.

MATH OPERATIONS

Present math operations select menu.

Programming Code

None

Main Menu

DISPLAY

Manual Sequence

(select channel)
DISPLAY
  MATH OPERATIONS
  PLUS (+) or
  MINUS (−) or
  MULTIPLY (*) or
  DIVISION (/)

Description

Preset	divide (/) channel 1 and channel 2	Range	N/A
Initialized	same as Preset	Recalled	yes
Coupled	always uncoupled		

See Also

PLUS (+) , MINUS (−) , MULTIPLY (*) , DIVIDE (/)

MAXIMUM FREQUENCY

Specify maximum frequency of current calibration standard (Hz).

Programming Code

MAXF

Main Menu

CAL

Program Sequence

See MODIFY 1 xx and MODIFY 2 xx .

Manual Sequence

See `MODIFY 1 xx` and `MODIFY 2 xx` .

Description

Preset	N/A	Range	0 to 999 GHz
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Each calibration standard is specified as to the maximum and minimum frequencies over which its characteristics apply.

See Also

`MODIFY 1 xx` , `MODIFY 2 xx`

MEASUREMENT (RESTART)

Restart measurement.

Programming Code

REST

Program Sequence

REST;

Manual Sequence

MEASUREMENT (RESTART)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	always coupled		

The measurement to produce the displayed data for the current parameter(s) is restarted by aborting the sweep in progress, then restarting data acquisition at the beginning of the group (see `NUMBER of GROUPS`). Restarts averaging.

No effect if `HOLD` is selected.

MEMORY n

Disc data type select single trace memory. Where n = 1 to 8.

Programming Code

MEMO1

Main Menu

DISC

Program Sequence

See STORE

```
STOIINT; or STOIEXT;
  STOR; or LOAD; or DELE;
    MEMOn;  n = 1 to 8
       DISF "filename"
```

Manual Sequence

DISC

STORAGE IS INTERNAL or STORAGE IS EXTERNAL
STORE or LOAD or DELETE
 MEMORY 1 - 8
  MEMORY 1 or
  MEMORY 2 or
  MEMORY 3 or
  MEMORY 4 or
  MEMORY 5 or
  MEMORY 6 or
  MEMORY 7 or
  MEMORY 8
   (enter or select disc file)
    STORE FILE or LOAD FILE or DELETE FILE

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Store/Load single trace memory from a disc file. Select DISPLAY: DATA before loading memory.

`MEMORY n`

See Also

`STORE`

MEMORY 1-8

Present trace memory select menu during disc data type select.

Programming Code

None

Main Menu

DISC

Program Sequence

None

Manual Sequence

See `MEMORY 1` through `MEMORY 8`

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

`MEMORY n`

MEMORY ALL

Disc data type select all trace memories 1 through 8.

Programming Code

MEMOALL

Main Menu

DISC

Program Sequence

See STORE.

```
    (select channel)
   STOIINT; or STOIEXT;
    STOR; or LOAD; or DELE;
     MEMOALL;
       DISF "filename";
```

Manual Sequence

```
  (select channel)
   [DISC]
    STORAGE IS INTERNAL or STORAGE IS EXTERNAL
     STORE or LOAD or DELETE
      MORE
       MEMORY ALL
        (enter or select disc file)
         STORE FILE or LOAD FILE or DELETE FILE
```

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Store/Load/Delete all eight trace memories using a single disc file. Select DISPLAY: DATA before loading memories from disc.

See Also

STORE

MENUOFF

Turn off display of softkey menus.

Main Menu

None (GPIB only)

Program Sequence

MENUOFF;

Description

Preset	menu on	Range	N/A
Initialized	menu on	Recalled	yes
Coupled	always coupled		

Disable or enable generation of menus.

MENUON

Turn on display of softkey menus. For a complete description, see `MENUOFF` .

Main Menu

None (GPIB only)

Description

Preset	menu on	Range	N/A
Initialized	menu on	Recalled	yes
Coupled	always coupled		

MINIMUM FREQUENCY

Specify mimimum frequency of current calibration standard (Hz). (F_{co} for Waveguide Standards.)

Programming Code

MINF

Main Menu

CAL

Program Sequence

See MODIFY 1 xx and MODIFY 2 xx.

Manual Sequence

See MODIFY 1 xx and MODIFY 2 xx.

Description

Preset	N/A	Range	0 to 999 GHz
Initialized	N/A	Recalled	part of cal set definition
Coupled	N/A		

Each calibration standard is specified as to the maximum and minimum frequencies over which its characteristics apply.

For waveguide type standards, this entry is used to compute dispersion using:

$$\lambda_g = \lambda_f / (1 - (f_{co} / f)^2)^{0.5}$$

where f_{co} is the TE_{10} propagation mode cutoff frequency. It is the same as the cutoff frequency for waveguide standards. See WAVEGUIDE.

See Also

MODIFY 1 xx, MODIFY 2 xx

MINUS (−)

Select complex subtraction trace math for selected parameter.

Programming Code

MINU

Main Menu

DISPLAY

Program Sequence

```
(select channel)
 MINU;
```

Manual Sequence

(select channel)
[DISPLAY]
 MORE
  MATH OPERATIONS
   MINUS (−)

Description

Preset	math (/)	Range	N/A
Initialized	math (/)	Recalled	yes
Coupled	always uncoupled		

Selects vector subtraction for trace math, providing crosstalk or baseline removal for detailed repeatablity tests.

Softkey becomes MATH (-) .

MKR LIST OFF

Turn the marker list off.

Programming Code

MKRLISTOFF

Main Menu

MARKER

Program Sequence

    MKRLISTOFF;

Manual Sequence

(MARKER)
MORE
MORE
    MKR LIST OFF

Description

Preset	list on	Range	N/A
Initialized	list on	Recalled	yes
Coupled	always coupled		

See Also

MKR LIST ON , MKR LIST: FOUR PARAM , MKR LIST: FIVE MKR , PRINMENUON, PRINMENUOFF, PLOTMENUON, PLOTMENUOFF

MKR LIST ON

Turn on the selected marker list.

Programming Code

MKRLISTON

Main Menu

DISPLAY

Program Sequence

MKRLISTON;

Manual Sequence

[DISPLAY]
MORE
  MKR LIST ON
      (select the marker list)

Description

Preset	list on	Range	N/A
Initialized	list on	Recalled	yes
Coupled	always coupled		

Two types of marker values list can be displayed: one marker per parameter (four parameter displays only) or five markers active on one parameter (can be in single parameter or four parameter display modes).

In a programming sequence, if either the PLOTMENUON or PRINMENUON command is issued prior to the MKRLON command, the marker list is not printed or plotted when a print/plot command is issued.

See Also

MKR LIST OFF, MKR LIST: FOUR PARAM, MKR LIST: FIVE PARAM PRINMENUON, PRINMENUOFF, PLOTMENUON, PLOTMENUOFF

MODIFY 1 xx

Begin modify calibration kit sequence. Where xx = cal kit 1 label.

Programming Code

MODI1

Main Menu

CAL

Program Sequence

See Figure M-2.

Manual Sequence

CAL
MORE
MODIFY 1 xx (where xx = cal kit 1 label) or
MODIFY 2 xx (where xx = cal kit 2 label)
DEFINE STANDARD entry x1 (entry = stdno = 1 to 21)
STD TYPE: xx (where xx = standard type)
(specify standard characteristics), (see STD TYPE: xx)
LABEL STD
(enter std label) (see TITLE)
STD DONE (DEFINED)
(repeat for each modified standard)
SPECIFY CLASS
SPECIFY: [class] stanAno x1 [stanBno x1] ... (stanGno x1)
(standA to Gno = stdno = 1 to 21 (1 to 7 stds/class)
CLASS DONE (SPEC'D)
(repeat for each modified class)
LABEL CLASS
LABEL: (class)
(enter class label, see TITLE)
LABEL DONE (SPEC'D)
(repeat for each modified class label)
LABEL KIT
(enter modified cal kit label, see TITLE)
KIT DONE (MODIFIED)

`MODIFY 1 xx`

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Used to change the configuration of an existing calibration kit. Selecting `KIT DONE (MODIFIED)` replaces the presently selected calibration kit 1 or 2 in network analyzer non-volatile memory. Characteristics and assignments not modified during the sequence between `MODIFY 1 xx` or `MODIFY 2 xx` and `KIT DONE (MODIFIED)` are maintained.

Selecting `STD DONE (MODIFIED)` followed by `KIT DONE (MODIFIED)` without labeling the kit automatically replaces the last letter of the calibration kit label with an asterisk (*) to indicate that the kit has been modified. Thus, the LABEL KIT operation should be done last.

Figure M-2. Modify Calibration Kit Sequence

MODIFY 2 xx

Begin modify calibration kit sequence. Where xx = cal kit 2 label.

Programming Code

MODI2

`MODIFY 2 xx`

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

For a complete description, see `MODIFY 1 xx`

`MODIFY CAL SET`

Present calibration set modification procedure.

Programming Code

None

Main Menu

CAL

Program Sequence

See `ADAPTER REMOVAL` .

Manual Sequence

See `ADAPTER REMOVAL` .

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

This starts the post-calibration process to modify existing calibration sets.

See Also

ADAPTER REMOVAL

MODIFY & SAVE

Adapter removal. Modify calibration set and save. Follow with CAL SET n .

Programming Code

MODS

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

After the two calibration sets containing the data with the adapter and the adapter class have been selected, MODIFY & SAVE combines the data to form a new calibration set. It must be followed by CAL SET n or error coefficients are lost.

The limited instrument state of the new calibration set is the same as the calibration set selected for port 1 (CAL SET for PORT 1).

See Also

ADAPTER REMOVAL

MODIFY COLORS

Present the list of display elements for which the color can be modified.

Programming Code

None

Main Menu

DISPLAY

Manual Sequence

DISPLAY
   ADJUST DISPLAY
     MODIFY COLORS
       (select display element)
        (adjust color)
        [other changes]
       PRIOR MENU
      PRIOR MENU
    PRIOR MENU
   SAVE COLORS

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Color is comprised of three parameters:

- TINT - The continuum of hues on the color wheel, ranging from red, through green and blue, and back to red.
- BRIGHTNESS - A measure of the luminescence of the color (very dim to intense).
- COLOR - The degree of whiteness of the color. A scale from white to pure color.

Cycling power changes all color adjustments to the default defined colors. To recall previously modified and saved colors, use the RECALL COLORS softkey.

FACTORY PRESET, does not affect color selection.

Note   This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

BACKGROUND INTENSITY , DEFAULT COLORS , INTENSITY , RECALL COLORS , SAVE COLORS ,
EXTERNAL VIDEO

MONI

For service use only.

Main Menu

None (GPIB Only)

Program Sequence

MONI;

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Must cycle line power to exit.

MORE

Present next page of current menu.

Programming Code

None

Program Sequence

Not programmed.

MORE

Manual Sequence

MORE

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

MULT. SRC: OFF/SAVE

Turn off multiple source and save Hardware State.

Programming Code

MULSOFF

Main Menu

SYSTEM

Program Sequence

```
EDITMULS;
(define equations)
MULSON;    or
MULSOFF;
```

Manual Sequence

```
(SYSTEM)
 MORE
 EDIT MULT. SRC
 (edit equations)
 MULT. SRC: OFF/SAVE or
 MULT. SRC: ON/SAVE
```

Description

Preset	no change	Range	N/A
Initialized	off	Recalled	no
Coupled	always		

Before leaving the multiple source menus, either OFF/SAVE or ON/SAVE must be selected. If not, all definition changes are lost.

As well as turning the function on or off, these keys save the equation definitions in the Hardware State. Note that changes can be made and saved with the mode off (using MULSOFF). This means that at power-up the equations are defined but not active.

As with other items in the Hardware State, the equation definitions here are not modified by preset, power-on, or instrument state recall.

See Also

EDIT MULT. SRC

MULT. SRC: ON/SAVE

Turn on multiple source and save Hardware State.

Programming Code

MULSON

Main Menu

SYSTEM

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

See MULT. SRC: OFF/SAVE for a full description.

MULTIPLIER
DENOMINATOR

Multiple source multiplier denominator.

Programming Code

MULD

Main Menu

SYSTEM

Program Sequence

```
EDITRULS;:
 DEFISOUR1;
   MULN [value];
   MULD [value];
     [define other equations]
       MULSOFF; or
       MULSON;
```

Manual Sequence

SYSTEM
 MORE
 EDIT MULT. SRC
 DEFINE:
 SOURCE 1 or
 SOURCE 2 or
 RECEIVER
  MULTIPLIER NUMER. [entry] or
  MULTIPLIER DENOM. [entry] or
   DONE
    MULT. SRC: OFF/SAVE or
    MULT. SRC: ON/SAVE

Description

Preset	no change	Range	0 to 99
Initialized	source 1=1	Recalled	N/A
	source 2=1		
	receiver=1		
Coupled	always coupled		

The numerator or denominator of the equation multiplier is modified. The equation to be modified is chosen before this point.

The general equation format is:

$$A/B \ (Freq + C)$$

where A is the numerator of the equation multiplier, B is the denominator of the equation multiplier, Freq is the measurement frequency, and C is the offset frequency.

These values are part of the Hardware State and are not changed by preset, power-on or instrument state recall.

See Also

CONSTANT FREQUENCY , DEFINE: SOURCE 1 , EDIT MULTIPLE SOURCE , OFFSET FREQUENCY

MULTIPLIER NUMERATOR

Multiple source multiplier numerator.

Programming Code

MULN

Main Menu

SYSTEM

Description

Preset	no change	Range	0 to 99
Initialized	source 1=0 source 2=0 receiver=1	Recalled	N/A
Coupled	always coupled		

See Also

See MULTIPLIER DENOMINATOR for a complete description.

MULTIPLY (*)

Select complex vector multiplication trace math for selected parameter.

Programming Code

MULT

Main Menu

DISPLAY

Program Sequence

```
(select channel)
 MULT;
```

Manual Sequence

(select channel)
[DISPLAY]
  MORE
   MATH OPERATIONS
   MULTIPLY (*)

Description

Preset	math (/)	Range	N/A
Initialized	math (/)	Recalled	yes
Coupled	always uncoupled		

Selects vector multiplication for trace math. Softkey becomes MATH (*) .

See Also

MATH OPERATIONS

NEGATIVE SYNC

Set synchronization to sync on a negative-logic TTL signal to an external display device.

Programming Code

NEGASYNC

Main Menu

DISPLAY

Program Sequence

NEGASYNC;

Manual Sequence

[DISPLAY]
ADJUST DISPLAY
EXTERNAL VIDEO
NEGATIVE SYNC

Description

Preset	not changed	Range	N/A
Initialized	sync on green negative sync	Recalled	yes
Coupled	always coupled		

This function does not affect the analyzer internal video display.

Use negative sync when an external display device requires negative logic, TTL-compatible synchronization.

Note	This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

NEGATIVE SYNC

See Also

EXTERNAL VIDEO , POSITIVE SYNC , COMPOSITE SYNC

NEXT PT HIGHER

Selects the next higher frequency point in power domain.

Programming Code

NEXTHIGH

Main Menu

DOMAIN

Program Sequence

```
POWD;
    NEXTHIGH;
```

Manual Sequence

(DOMAIN)
 POWER
  NEXT PT HIGHER

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

This command is used to select the next higher frequency point in power domain. Using this ensures that the frequency selected is in the active calibration set. The proper calibration factor at the selected frequency is applied to the power domain data.

See Also

POWER
FREQ. of MEASUREMENT

NEXT PT LOWER

Selects the next lower frequency point in power domain.

Programming Code

NEXTLOWE

Main Menu

DOMAIN

Program Sequence

```
POWD;
    NEXTLOWE;
```

Manual Sequence

DOMAIN
 POWER
  NEXT PT LOWER

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

This command is used to select the next lower frequency point in power domain. Using this ensures that the frequency selected is in the active calibration set. The proper calibration factor at the selected frequency is applied to the power domain data.

See Also

POWER
FREQ. of MEASUREMENT

NUMBER of GROUPS

Measurement restart, take the specified number of groups of sweeps, then hold.

Programming Code

NUMG

Main Menu

STIMULUS

Program Sequence

NUMG value;   *value = 1 to 4096*

Manual Sequence

STIMULUS [MENU]
  MORE
    NUMBER of GROUPS entry [x1] (entry = 1 to 4096)

Description

Preset	continual	Range	N/A
Initialization	continual	Recalled	yes
Coupled	always coupled		

One group of sweeps is required to present new data for the present instrument state. For example, if a dual channel display with different parameters is selected, then a minimum of two sweeps constitute one group of sweeps. For a single channel display with 2-port correction on, a minimum of four sweeps constitute one group because all four parameters must be measured.

When [x1] is pressed, the specified number of groups of sweeps is executed. When the groups are complete, bit 4 of the Primary Status Byte is set.

After NUMBER of GROUPS is manually selected, and the groups are in progress, MEASUREMENT RESTART will restart with the first group. Exit NUMBER of GROUPS by selecting CONTINUAL, SING, or HOLD.

After NUMBER of GROUPS is issued to the 8510 GPIB, GPIB activity is held off until the specified number of groups is complete.

NUMBER of POINTS

Present specify number of points menu.

Programming Code

None

Main Menu

STIMULUS

Manual Sequence

STIMULUS
MORE
  NUMBER of POINTS
    POINTS: 51 or
    POINTS: 101 or
    POINTS: 201 or
    POINTS: 401 or
    POINTS: 801

Description

Preset	201 points	**Range**	N/A
Initialization	201 points	**Recalled**	yes
Coupled	always coupled		

See Also

POINTS: n

NUMERATOR

Present numerator menu to select numerator for current basic or user parameter.

Programming Code

None

Main Menu

PARAMETER

Program Sequence

See REDEFINE PARAMETER .

Manual Sequence

(select basic or user parameter),
   PARAMETER (MENU)
     REDEFINE PARAMETER
      NUMERATOR
        NUMERATOR: a_1 or
        NUMERATOR: a_2 or
        NUMERATOR: b_1 or
        NUMERATOR: b_2 or
        SERVICE SELECTIONS
        [other changes]
          REDEFINE DONE

Description

Preset	standard basic and user parameters	Range	N/A
Initialization	same as Preset	Recalled	basic parameters: no user parameters: yes
Coupled	always coupled		

See REDEFINE PARAMETER for standard basic and user parameter definitions.

FACTORY PRESET selects standard basic and user parameter definitions. Not all combinations of numerator and denominator are possible. Use CONVERT to 1/S for the cases not otherwise available.

Parameter definition changes are executed immediately. REDEFINE DONE stores current parameter selection.

See Also

REDEFINE PARAMETER

NUMERATOR: a_1

Select a_1 as the numerator.

Programming Code

NUMEA1

Main Menu

PARAMETER

Program Sequence

See REDEFINE PARAMETER .

Manual Sequence

See NUMERATOR .

Description

Preset	standard basic and user parameters	Range	N/A
Initialization	same as Preset	Recalled	basic parameters: no user parameters: yes
Coupled	always coupled		

If NUMERATOR: a_1 is selected, no DENOMINATOR is allowed. Use convert to 1/S to get a_1 as the numerator.

See Also

REDEFINE PARAMETER

NUMERATOR: a_2

Select a_2 as the numerator.

Programming Code

NUMEA2

Main Menu

PARAMETER

Description

Preset	standard basic and user parameters	Range	N/A
Initialization	same as Preset	Recalled	basic parameters: no user parameters: yes
Coupled	always coupled		

See Also

See NUMERATOR: a_1 for full description.

NUMERATOR: b_1

Select b_1 as the numerator.

Programming Code

NUMEB1

Main Menu

PARAMETER

Description

Preset	standard basic and user parameters	Range	N/A
Initialization	same as Preset	Recalled	basic parameters: no user parameters: yes
Coupled	always coupled		

See Also

See NUMERATOR: a_1 for full description.

NUMERATOR: b_2

Select b_2 as the numerator.

Programming Code

NUMEB2

Main Menu

PARAMETER

Description

Preset	standard basic and user parameters	Range	N/A
Initialization	same as Preset	Recalled	basic parameters: no user parameters: yes
Coupled	always coupled		

See Also

See NUMERATOR: a_1 for full description.

OFFSET

Define load or arbitrary impedance standard as offset type.

Programming Code

OFFS

Main Menu

CAL

Program Sequence

See MODIFY 1 xx or MODIFY 2 xx.

Manual Sequence

```
(CAL)
  MORE
    MODIFY 1 xx (where xx = kit 1 label) or
    MODIFY 2 xx (where xx = cal kit 2 label)
      DEFINE STANDARD
        STD TYPE: LOAD
          FIXED or
          SLIDING or
          OFFSET or
          LABEL STD or
          STD DONE DEFINED
            [other changes]
              KIT DONE MODIFIED
```

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

`OFFSET`

See text for `LOAD NO OFFSET`. During a modify calibration kit sequence, OFFSET is used to specify that when this load standard is selected during a calibration sequence, it is treated as an offset load. The offset load then requires two sets of measurements to compute an ideal load.

The offset delay defined in the offset portion of the standard is used as the value of offset between load with offset and load with no offset.

See Also

`LOAD NO OFFSET`, `STD TYPE:LOAD`

`OFFSET DELAY`

Specify offset delay (ps) of current calibration standard.

Programming Code

OFFD

Main Menu

CAL

Program Sequence

See `MODIFY 1 xx` and `MODIFY 2 xx`.

Manual Sequence

See `MODIFY 1 xx` and `MODIFY 2 xx`.

Description

Preset	N/A	Range	±1 s
Initialized	N/A	Recalled	part of cal kit definition
Coupled	N/A		

If the calibration standard is offset from the reference plane, enter its offset delay in picoseconds:

delay = physical length ε_r

where the speed of light in free space = 299.79 Mm/second and

ε_r = Propogation Constant = 1.00064 in standard air

For all standard types, enter the one-way travel time. This value is used to model the phase response of the standard using a linear (Coax type) or standard rectangular waveguide (Waveguide type; see MINIMUM FREQUENCY) model.

A value for offset delay can be approximated using the port extensions function. Select CAL MORE PORT EXTENSIONS PORT 1 , then use the knob to adjust the reference plane extension value until the supplementary length display matches the physical length of the offset device. Enter the primary time display value (in picoseconds) as the value for offset delay.

See Also

MODIFY 1 xx , MODIFY 2 xx

OFFSET FREQUENCY

Multiple source offset frequency.

Programming Code

OFFF

Main Menu

SYSTEM

Program Sequence

```
EDITMULS;
  DEFISOUR1;
    OFFF[value];
    define other equations]
      MULSOFF; or
      MULSON;
```

Manual Sequence

SYSTEM
  MORE
    EDIT MULT. SRC
      DEFINE: SOURCE 1 or
      DEFINE: SOURCE 2 or
      DEFINE: RECEIVER
        OFFSET FREQUENCY entry
          DONE
            MULT. SRC: OFF/SAVE or
            MULT. SRC: ON/SAVE

OFFSET FREQUENCY

Description

Preset	not changed	Range	−2.147483648 to +40 GHz
Initialized	source 1 = 0 source 2 = 0 receiver = 0	Recalled	N/A
Coupled	yes		

Used to modify the offset frequency of the selected equation. The general equation is:

A/B (Freq + C)

where A is the numerator, B is the denominator, Freq is the measurement frequency, and C is the offset frequency.

This value is part of the Hardware State and is not changed by power-on, preset, or instrument state recall.

See Also

EDIT MULT. SRC, CONSTANT FREQUENCY, DEFINE: SOURCE 1, MULTIPLIER NUMERATOR

OFFSET LOAD DONE

Offset load done.

Programming Code

OFLD

Main Menu

CAL

Program Sequence

See S_{11} 1-PORT.

Manual Sequence
(S_{11} 1-port)

(CAL)
 CAL 1 xx (where xx = cal kit)
  S_{11} 1-PORT
   S_{11}: LOADS
    OFFSET

LOAD NO OFFSET
LOAD OFFSET
OFFSET LOAD DONE
[measure other standards]
SAVE 1-PORT CAL
CAL SET n (n = 1 to 8)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

S_{11} 1-PORT

OFFSET LOSS

Offset loss $(G\Omega/s)$ of current calibration standard.

Programming Code

OFFL

Main Menu

CAL

Program Sequence

See MODIFY 1 xx and MODIFY 2 xx.

Manual Sequence

See MODIFY 1 xx and MODIFY 2 xx.

`OFFSET LOSS`

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

If the calibration standard is offset from the reference plane, enter its offset loss in GΩ/second (Ω/nanosecond) at 1 GHz. If the standard type is coaxial short or an open, enter the one-way skin loss. This value is used to model the magnitude response of the coaxial type standard; this value is not used (assummed zero) for waveguide type standards.

The algorithm assumes that the loss varies as the square root of the frequency. Offset loss is entered in terms of ohms per second at 1 GHz. This value is related to the more common loss in dB per unit length.

Offset Loss in GΩ/s at 1 GHz = R (Ω)/ delay (ns)

Convert from dB/unit length as follows:

R(Ω) at 1 GHz = $10^D - 100$ where

$$D = \frac{40 - [\text{loss (dB/m)} * \text{length (m)}]}{Z_0}$$

(loss (dB/m) is a negative value)

See Also

`MODIFY 1 xx` , `MODIFY 2 xx`

`OFFSET Z`$_0$

Impedance (ohms) of transmission line between reference plane and termination of current offset calibration standard.

Programming Code

OFFZ

Main Menu

CAL

Program Sequence

See `MODIFY 1 xx` and `MODIFY 2 xx`.

Manual Sequence

See `MODIFY 1 xx` and `MODIFY 2 xx`.

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

For coaxial type standards, specify the real (resistive) part of the impedance of the transmission line preceeding the termination. For waveguide type standards, always specify the terminating impedance as 1Ω.

Calibration coefficient errors will result if `SET Z₀` and `OFFSET Z₀` are not equal (but actually are), as in the case of a waveguide offset short.

See Also

`MODIFY 1 xx`, `MODIFY 2 xx`

OMIT ISOLATION

Omit isolation calibration step.

Programming Code

OMII

Main Menu

CAL

Program Sequence

See `ISOLATION`.

`OMIT ISOLATION`

Manual Sequence

See `ISOLATION` .

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Omits both forward and reverse isolation calibration steps, followed by `ISOLATION DONE` . Useful to speed up the measurement calibration sequence when measuring low forward and reverse insertion loss devices.

See Also

`ISOLATION`

`OPERATING PARAMETERS`

Display first page of operating parameters on the analyzer LCD/CRT.

Programming Code

OPEP

Main Menu

COPY

Program Sequence

```
OPEP;
  RESD; or
  LISPARM; or PRIP; or
  PLOP; or
  PAGP;
```

Manual Sequence

(COPY)
    SYS/OPER PARAMETERS
      OPERATING PARAMETERS
        RESTORE DISPLAY or
            LIST PARAMETERS or
          PLOT PARAMETERS or
          PAGE PARAMETERS

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Provides two pages of documentation for the present system state. Refer to Table O-1 and Table O-2.

Table O-1. Typical Operating Parameters Displays (first page)

```
                                                              RESTORE
                                                              DISPLAY
  hp                                                             LIST
                                                              PARAMETERS
  OPERATING PARAMETER     Channel 1        Channel 2
                                                                PLOT
                                                              PARAMETERS
  NUMBER of POINTS        201              201
  SWEEP TIME              100.0 ms         100.0 ms
  SOURCE 1 POWER          10.0 dBm         10.0 dBm
  SOURCE 1 POWER SLOPE    0.0 dB/GHz       0.0 dB/GHz
                          OFF              OFF
  SOURCE 2 POWER          10.0 dBm         10.0 dBm
  SOURCE 2 POWER SLOPE    0.0 dB/GHz       0.0 dB/GHz
                          OFF              OFF
  PORT 1 ATTEN.           0.0 dB           0.0 dB
  PORT 2 ATTEN.           0.0 dB           0.0 dB

  ELECTRICAL DELAY        0.0 s            0.0 s
  PHASE OFFSET            0.0 °            0.0 °
  MAGNITUDE SLOPE         0.0 dB/GHz       0.0 dB/GHz
  MAGNITUDE OFFSET        0.0 dB           0.0 dB
  IF AVERAGING FACTOR     1.0              1.0
                          OFF              OFF


                                                                PAGE
                                                              PARAMETERS
```

Table O-2. Typical Operating Parameters Displays (second page)

```
                                                     RESTORE
                                                     DISPLAY
     hp                                                 LIST
                                                     PARAMETERS
     OPERATING PARAMETER    Channel 1      Channel 2
     SMOOTHING APERTURE     0.0 % SPAN     0.0 % SPAN     PLOT
                            OFF            OFF         PARAMETERS
     PORT 1 EXTENSION       0.0 s          0.0 s
     PORT 2 EXTENSION       0.0 s          0.0 s
     Z_0                    50.0 Ω         50.0 Ω
     CAL TYPE               UNDEFINED      UNDEFINED
                             OFF            OFF
     GATE START             −500.0 ps      −500.0 ps
     GATE STOP              500.0 ps       500.0 ps
     WINDOW                 NORMAL         NORMAL
     GATE SHAPE             NORMAL         NORMAL
                             OFF            OFF
     MARKER 1               4.0 GHz        4.0 GHz
     MARKER 2               4.0 GHz        4.0 GHz
     MARKER 3               4.0 GHz        4.0 GHz
     MARKER 4               4.0 GHz        4.0 GHz
     MARKER 5               4.0 GHz        4.0 GHz


                                                       PAGE
                                                     PARAMETERS
```

OUTPACTI

Output current value of current active function in basic units of the function.

Main Menu

None (GPIB Only)

Program Sequence

(select active function)
  `OUTPACTI;`
(read one ASCII number from 8510 HP-IB)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Allows the value of the active function to be transferred to an external controller via the 8510 GPIB.

See FORM4. A single ASCII format number terminated with a line feed with EOI asserted on last byte.

If no active function is displayed, then a blank string six characters long is output.

See Also

FORM4

OUTPCALCn

Output calibration error coefficient set real/imaginary pairs. Where n= 01 to 12.

Main Menu

None (GPIB Only)

Program Sequence

```
(select channel)
CORRON;     turn correction on before outputting coefficients
CALSn;     n = 1 to 8
 HOLD;
   FORMn;     n = 1 to 5
     OUTPCALCn;     n = 01 to 12
       (read data block from 8510 HP-IB)
           (repeat for each error coefficient set used for calibration type)
```

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Allows accuracy enhancement measurement calibration error coefficients to be output from 8510 calibration set memory to an external controller via the 8510 GPIB. Each of the error coefficient sets are used as error terms for the selected error model as shown in Table O-3.

If the calibration coefficient set is not assigned for the current error model, the FORM1, FORM2, and FORM3 block length will be zero and the message REQUESTED DATA NOT AVAILABLE is displayed.

Table O-3. Internal Calibration Error Coefficient Storage

Input/Output Mnemonic	Calibration Type			
	Response	Response and Isolation	1-port	2-port
CALC01	E_R or E_T	E_D or E_X	E_D	E_{DF}
CALC02		E_R or E_T	E_S	E_{SF}
CALC03			E_R	E_{RF}
CALC04				E_{XF}
CALC05				E_{LF}
CALC06				E_{TF}
CALC07				E_{DR}
CALC08				E_{SR}
CALC09				E_{RR}
CALC010				E_{XR}
CALC011				E_{LR}
CALC012				E_{TR}

"Exx" terms in these models are error terms, and the subscripts indicate the source of the error:

First subscript
D = Directivity
S = Source match
L = Load match
X = Isolation (crosstalk)
R = Reflection signal-path tracking
T = Transmission signal-path tracking

Second Subscript
F = Forward
R = Reverse

See Also

INPUCALCn

OUTPDATA

Output real/imaginary pairs from selected channel corrected data memory.

Main Menu

None (GPIB Only)

Program Sequence

(select channel)
(select parameter)
    `HOLD;`
    `FORMn;`   *n = 1 to 5*
    `OUTPDATA;`
(read data block from 8510 HP-IB)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Allows data to be output from the 8510 corrected data array for the selected channel to an external controller via the 8510 GPIB.

See Also

`INPUDATA`

OUTPDELA

Output real/imaginary pairs from selected channel delay table memory.

Main Menu

None (GPIB Only)

Program Sequence

(select channel)
    `FORMn;`   *n = 1 to 5*
    `OUTPDELA;`
(read data block from 8510 HP-IB)

OUTPDELA

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Allows output of the analyzer delay table array for the selected channel to an external controller via the 8510 GPIB.

See Also

INPUDELA

OUTPERRO

Output error number and message, clear caution/tell messages.

Main Menu

None (GPIB Only)

Program Sequence

(select active function)
```
OUTPERRO;
   (read one positive integer ASCII number
    and up to 50 character string from 8510 HP-IB)
```

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Allows output of the error number and message to an external controller via the 8510 GPIB. Clears Caution/Tell message from LCD/CRT.

The output string is up to a six digit integer number followed by a comma, then an up to 50 character ASCII string enclosed in quotation marks, terminated with a line feed, with EOI asserted on last byte. A blinking message includes the blink on and blink off characters.

Integer, "50 char max. ASCII format string"

Caution/Tell messages are listed in a separate section at the end of this dictionary.

Note that during remote operation, caution messages are cleared by reading the error number only. Caution messages are overwritten only by "fatal" error messages, in which system operation is halted completely. If multiple error messages, then messages are structured last in, first out.

OUTPFORM

Output current parameter from selected channel formatted data memory.

Main Menu

None (GPIB Only)

Program Sequence

(select channel)
  (select parameter)
    `HOLD;`
      `FORMn;`   *n = 1 to 5*
        `OUTPFORM;`
          (read data block from 8510 HP-IB)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Allows data to be output from the 8510 formatted data array for the selected parameter on the selected channel to an external controller via the 8510 GPIB.

Cartesian format: (x = basic units, y = 0)

Polar and Smith format: real/imaginary pairs

See Also

`INPUFORM, FORMn`

OUTPFREL

Output current frequency list via GPIB

Main Menu

None (GPIB Only)

Program Sequence

```
DIM FREL (1: No_of_Points)
 FORMn;    n = 1 to 5
 OUTPFREL;
(read data block from HP-IB)
```

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Allows the complete frequency list to be output to an external controller via the GPIB. The data block consists of the Preamble (#A), Size value (FORM 1,2,3,5) and the list of frequencies in the current frequency list in the order of measurement.

See Also

INPUFREL

OUTPIDEN

Output 8510 GPIB identification code.

Main Menu

None (GPIB Only)

Program Sequence

```
OUTPIDEN;
  (read ASCI FORMAT string from 8510 HP-IB)
```

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Output specific identification code via 8510 GPIB.

The string "8510C.(revision).(release);(date)" is available, terminated by line feed with EOI asserted on last byte. This string is identical to the string displayed in the active entry area after line power up sequence, or displayed by pressing SYSTEM , SERVICE FUNCTIONS , SOFTWARE REVISION .

OUTPKEY

Output integer number for last key pressed.

Main Menu

None (GPIB Only)

Program Sequence

```
OUTPKEY;
    (read one positive integer ASCII number from 8510 HP-IB)
```

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

When an 8510 hardkey or softkey is pressed, bit 2 of the Extended Status byte is set. OUTPKEY allows determination of which key was last pressed by reading its assigned number.

See KEYC for list of key assignments.

A single ASCII format integer number terminated with a line feed with EOI asserted on last byte.

See Also

KEYC

OUTPLEAS

Output 8510 learn string.

Main Menu

None (GPIB Only)

Program Sequence

```
OUTPLEAS;
    (read binary data block from 8510 HP-IB)
```

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Allows binary data block representing the current Instrument State (does not include Hardware State) to be output to an external controller via the 8510 GPIB.

This string is not intended for manipulation or modification; FORM 1 is always selected. The format for FORM1 is shown below:

#A is standard block header.

Bytea and byteb hold number of bytes to follow.

Imag/real data point is three, 16 bit words for each data point:

Bits 7 to 15 of LSB provide additional resolution; not used.

The number of bytes varies with the firmware revision code used. For the 8510B versions (B.04.00, B.05.00, and B.05.11) the number of bytes is 4698. For 8510C versions the number of bytes is 6256.

See Also

INPULEAS, FORM1

OUTPMARK

Output active marker trace value.

Main Menu

None (GPIB Only)

Program Sequence

(select active marker)
   OUTPMARK;
     (read two ASCII numbers from 8510 HP-IB)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Allows the value of the current active marker, or the last marker turned on, if markers are all off to be transferred to an external controller through the 8510 GPIB.

The output format is: two ASCII format numbers, separated by a comma, terminated with a line feed, with EOI asserted on last byte.

Table O-4. Marker Units for all Display Formats

Format	Marker Basic Units	Outpmark A,B Value
LOG MAG	dB	dB, 0
PHASE	degrees (°)	degrees, 0
DELAY	seconds (s)	seconds, 0
SMITH CHART	$R \pm jX$ (Ω)	ohms, ohms
SWR	(unitless)	SWR, 0
LINEAR MAGNITUDE	ρ (unitless) (reflection)	lin mag, 0
	τ (unitless) (transmission)	lin mag, 0
LIN mkr on POLAR	$\rho \angle \varphi$ (reflection)	lin mag, degrees
	$\tau \angle \Theta°$ (transmission)	lin mag, degrees
LOG mkr on POLAR	$dB \angle \varphi°$	log mag, degrees
Re/lm mkr on POLAR	$x \pm jy$ (unitless)	real, imag
INVERTED SMITH	$g \pm jB$	Siemens, Siemens
REAL	x (unitless)	real, 0
IMAGINARY	jy (unitless)	imag, 0

See Also

MARKERn, FORM4

OUTPMEMO

Output currently selected trace memory real/imaginary pairs.

Main Menu

None (GPIB Only)

Program Sequence

DEFMn;   *n = 1 to 8   select default memory*
 DISPMEMO or DISPDATM;   *turn on memory*
 FORMn;   *n = 1 to 5*
 OUTPMEMO;
(read data block from 8510 HP-IB)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Allows data to be output from the default memory for the selected channel to an external controller via the 8510 GPIB.

If memory is not turned on (see `DISPLAY: MEMORY` and `DISPLAY: DATA` and `DISPLAY: MEMORY`), then a zero length data block is output and the message `REQUESTED DATA NOT AVAILABLE` is displayed. Data from Corrected Data array is output. See `OUTPDATA`.

See `DEFMn` and `INPUDATA` to write GPIB data to the selected memory.

See Also

`DEFMn`

OUTPPLOT

Output complete screen including menu in plotter format to GPIB.

Main Menu

None (GPIB Only)

Program Sequence

`OUTPPLOT;`

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See `PLOT: ALL` (everything is plotted) for standard plot outputs.

Outputs variable length strings of HP-GL commands, terminated by a line feed, with EOI asserted on last byte of the last command string. The last string consists of the PU (pen up) command followed by a line feed.

See ALso

PLOT: ALL

OUTPRAWn

Output real/imaginary pairs from selected channel specified raw data memory. Where n = 1 to 4.

Main Menu

None (GPIB Only)

Program Sequence

> *(select channel)*
>   HOLD;
>   FORMn;   *n = 1 to 5*
>   OUTPRAWn;   *n = 1 to 4*
> *(read data block from 8510 HP-IB)*

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Allows trace data to be transferred from 8510 selected channel Raw Data memory to an external controller via the GPIB.

In dual channel or single parameter displays, with correction off, or with correction on using response or 1-port accuracy enhancement, Raw Data array 1 holds data for the current parameter for the selected channel.

With four parameter display or correction on using 2-port accuracy enhancement:

Raw Data Array 1 S_{11} data

Raw Data Array 2 S_{21} data

Raw Data Array 3 S_{12} data

Raw Data Array 4 S_{22} data

If dual channel `UNCOUPLED CHANNELS` is selected, then there are separate raw arrays for each channel; the specified array for the selected channel is output.

See Also

`INPURAWn`

OUTPSTAT

Output 8510 status bytes; clear status bytes.

Main Menu

None (GPIB Only)

Program Sequence

```
OUTPSTAT;
    (read two positive integer ASCII numbers from 8510 HP-IB)
```

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See SRQM for Primary and Extended Status byte assignments.

Two ASCII format integers of three digits each, the first for the Primary Staus byte, the second for the Extended Status byte, each 0-255, separated by a comma, terminated with line feed, with EOI asserted on last byte. Status byte set to 0,0 , SRQM is not changed.

See Also

`SRQM`

OUTPTITL

Output current title string.

Main Menu

None (GPIB Only)

Program Sequence

```
TITL;     (selects title to be output)
 OUTPTITL;
(read ASCII character string from 8510 HP-IB)
```

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Allows the present title string to be output from the analyzer memory via the 8510 GPIB.

To select the title to be output, make it the active function.

Any title or label function may be used. See TITL, PARL, LABK, LABS, LABE (std class) , and others.

Up to 50 character string, enclosed in quotation marks, terminated by line feed, with EOI asserted on last byte.

See Also

TITLE

OUTPUT PWR

Measure output power for receiver calibration.

Programming Code

RCVO

Main Menu

CAL

Program Sequence

See RECEIVER CAL (CALRCVR).

Manual Sequence

See RECEIVER CAL.

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

In the receiver calibration sequence, the output power (b2) is measured with a known stimulus (from flatness calibration) applied to Port 1. A THRU standard is used, and its known loss characteristics (from the active calibration kit) are used to calculate the calibration coefficient when the calibration is saved. If several standards of the class are defined, then a standard selection menu is offered.

See Also

RECEIVER CAL

To select the title to be output, make it the active function.

Any title or label function may be used. See TITL, PARL, LABK, LABS, LABE (std class), and others.

Up to 50 character string, enclosed in quotation marks, terminated by line feed, with EOI asserted on last byte.

See Also

TITLE

P

PAGE PARAMETERS

Display next page of operating parameters on 8510 LCD/CRT.

Programming Code

PAGP

Main Menu

COPY

Program Sequence

See OPERATING PARAMETERS .

Manual Sequence

See OPERATING PARAMETERS .

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

If the last page is displayed, PAGE PARAMETERS presents the first page.

See Also

OPERATING PARAMETERS

PARAMETER LABEL

Label current user parameter.

Programming Code

PARL

Main Menu

PARAMETER

Program Sequence

See REDEFINE PARAMETER .

Manual Sequence

PARAMETER (MENU)
   (select user parameter)
     REDEFINE PARAMETER
      PARAMETER LABEL
       (enter parameter label, see TITLE)
       [other changes]
         REDEFINE DONE

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Labels for the basic parameters, S_{11}, S_{21}, S_{12}, and S_{22} cannot be changed.

See Also

REDEFINE PARAMETERS

PARAMETER (MENU)

Present parameter menu.

Programming Code

MENUPARA

Program Sequence

MENUPARA;

Manual Sequence

PARAMETER (MENU)
 USER 1 a_1 or
 USER 2 b_2 or
 USER 3 a_2 or
 USER 4 b_1 or
 REDEFINE PARAMETER

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

PEEK

Examine 8510 memory location contents.

Programming Code

PEEK

Main Menu

SYSTEM

`PEEK`

Program Sequence

```
PEEL value;      value = memory address
  PEEK;
```

Manual Sequence

`[SYSTEM]`
  `SERVICE FUNCTIONS`
    `PEEK/POKE LOCATION` entry `[x1]`
  (entry = memory address)
      `PEEK`   (memory contents are displayed.)

Caution   `PEEK` is intended for service applications. Changing contents of a memory location, or in certan circumstances, inspecting the contents, can lead to unpredictable operation.

The active function is current contents of specified memory location.

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

`PEEK/POKE LOCATION`

`PEEK/POKE LOCATION`

Specify peek and poke 8510 memory location.

Programming Code

PEEL

Main Menu

SYSTEM

Program Sequence

PEEL value; $value = memory\ address$

Manual Sequence

(SYSTEM)
    SERVICE FUNCTIONS
       PEEK/POKE LOCATION entry (x1)
    (entry = memory address)

Caution   PEEK and POKE are intended for service applications. Changing contents of a memory location, or, in certain circumstances inspecting the contents, can lead to unpredictable operation.

The active function is current memory address.

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

PEEK , POKE

(PHASE)

Select cartesian phase display for current parameter on selected channel.

Programming Code

PHAS

$\boxed{\text{PHASE}}$

Program Sequence

> *(select channel)*
>> *(select parameter)*
>>> `PHAS;`

Manual Sequence

> (select channel)
>> (select parameter)
>>> $\boxed{\text{PHASE}}$

Description

Preset	ref value=0° scale=100°/ ref posn=5	**Range**	N/A
Initialization	same as Preset	**Recalled**	yes
Coupled	always uncoupled		

The trace is presented as modulo 180

Degrees = ATN (Imag/Real)

The phase trace is affected by `ELECTRICAL DELAY`, `PORT EXTENSIONS`, and `PHASE OFFSET`.

`PHASE LOCK`

Present phaselock menu to select reference used for phaselock of current basic or user parameter.

Programming Code

None

Main Menu

PARAMETER

Program Sequence

See `REDEFINE PARAMETER`.

Manual Sequence

(select basic or user parameter)
  PARAMETER (MENU)
    `REDEFINE PARAMETER`
     `PHASE LOCK`
      `LOCK to a₁` or
      `LOCK to a₂` or
      `LOCK to None`
       [other changes]
        `REDEFINE DONE`

Description

Preset	standard basic and user parameters	Range	N/A
Initialization	same as Preset	Recalled	basic parameters: no user parameters: yes
Coupled	always uncoupled		

Parameter definition changes are executed immediately. `REDEFINE DONE` stores current parameter definition.

See Also

`REDEFINE PARAMETER`, `LOCK to a₁`, `LOCK to a₂`, `LOCK to None`

`PHASE OFFSET`

Phase offset for the current parameter on the selected channel.

Programming Code

PHAO

Main Menu

RESPONSE

Program Sequence

(select channel)
    PHAO [value];   *value = −360 to +360*

Manual Sequence

RESPONSE (MENU)
  PHASE OFFSET entry (x1) ((x1) = degrees; entry = ±360 degrees)

Description

Preset	phase offset=0 channel 1 and channel 2	**Range**	−360° to +360°
Initialization	same as Preset	**Recalled**	yes
Coupled	separate for each parameter on each channel		

The phase offset value is added to the current phase value for each point of the current trace on the selected channel prior to the modulo 180 computation.

In time domain low pass step mode, do not use PHASE OFFSET , or limit use to 0, 180, or 360 degree values.

Non-zero phase offset causes the D enhancement anotation to be displayed.

PLOT: ALL

Plot current measurement display including user-display on a digital plotter.

Programming Code

PLOTALL

Main Menu

COPY

Program Sequence

> *(select quadrant)*
> *(select pen)*
> PLOTALL;

Manual Sequence

COPY
  DEFINE PLOT
    (choose plot definitions)
COPY
  PLOT TO PLOTTER
   PLOT: ALL

Description

Preset	plot: all	**Range**	N/A
Initialization	plot: all	**Recalled**	N/A
Coupled	N/A		

The complete current measurement display (except for the softkey menu) is plotted, using the current quadrant and pen selections on the digital plotter.

If dual channel display is selected, then both channels are plotted using the pen selections.

PLOT: ALL plots the marker(s), graticule, text and trace.

See Also

DEFINE PLOT , ADDRESS OF PLOTTER: HP-IB , ADDRESS OF PLOTTER: RS-232 PORT 1 ,
ADDRESS OF PLOTTER: RS-232 PORT 2 , PLOT: DATA , PLOT ALL FOUR S-PARAMETERS

PLOT: DATA

Plot data trace only on digital plotter.

Programming Code

PLOTTRAC

Main Menu

COPY

Program Sequence

> (select pen)
> > (select quadrant)
> > > PLOTDATA;

Manual Sequence

COPY
   DEFINE PLOT
    (choose plot definitions)
COPY
   PLOT TO PLOTTER
    PLOT: DATA

Description

Preset	plot: all	Range	N/A
Initialization	plot: all	Recalled	N/A
Coupled	N/A		

The trace is plotted using the current quadrant and pen selections to the digital plotter.

If dual channel display is selected, then both channels are plotted using the independent pen selections.

See Also

DEFINE PLOT , COPY , ADDRESS OF PLOTTER: HP-IB ,
ADDRESS OF PLOTTER: RS-232 PORT 1 , ADDRESS OF PLOTTER: RS-232 PORT 2

PLOT: GRATICULE

Plot graticule only on digital plotter.

Programming Code

PLOTGRAT

Main Menu

COPY

Program Sequence

```
(select pen)
    (select quadrant)
        PLOTGRAT;
```

Manual Sequence

(COPY)
   DEFINE PLOT
      (choose plot definitions)
(COPY)
   PLOT TO PLOTTER
    PLOT: GRATICULE

Description

Preset	plot: all	Range	N/A
Initialization	plot: all	Recalled	N/A
Coupled	N/A		

The graticule (Cartesian, Polar, or Smith) only is plotted using the current quadrant and pen selections to the digital plotter.

If dual channel display is selected, then both channels are plotted using the independent pen selections.

See Also

DEFINE PLOT , (COPY), ADDRESS OF PLOTTER: HP-IB ,
ADDRESS OF PLOTTER: RS-232 PORT 1 , ADDRESS OF PLOTTER: RS-232 PORT 2

PLOT: MARKER(S)

Plot markers only on digital plotter.

Programming Code

PLOTMARK

Main Menu

COPY

Program Sequence

> *(select pen)*
> > *(select quadrant)*
> > > PLOTMARK;

Manual Sequence

(COPY)
  DEFINE PLOT
    (choose plot definitions)
(COPY)
  PLOT TO PLOTTER
   PLOT: MARKER(S)

Description

Preset	plot: all	Range	N/A
Initialization	plot: all	Recalled	N/A
Coupled	N/A		

The marker(s) are plotted using the current quadrant and pen selections to the digital plotter.

If dual channel display is selected, then both channels are plotted using the independent pen selections.

See Also

DEFINE PLOT , ADDRESS OF PLOTTER: HP-IB , ADDRESS OF PLOTTER: RS-232 PORT 1 , ADDRESS OF PLOTTER: RS-232 PORT 2 , PLOT: MEMORY , (MARKER)

PLOT: MEMORY

Plot memory traces only on digital plotter.

Programming Code

PLOTMEMO

Main Menu

COPY

Program Sequence

> *(select pen)*
>> *(select quadrant)*
>>> PLOTMEMO;

Manual Sequence

(COPY)
   DEFINE PLOT
     (choose plot definitions)
(COPY)
   PLOT TO PLOTTER
    PLOT: MEMORY

Description

Preset	plot: all	**Range**	N/A
Initialization	plot: all	**Recalled**	N/A
Coupled	N/A		

The memory traces are plotted using the current quadrant and pen selections to the digital plotter.

If dual channel display is selected, then both channels are plotted using the independent pen selections.

See Also

DEFINE PLOT , (COPY), ADDRESS OF PLOTTER: HP-IB ,
ADDRESS OF PLOTTER: RS-232 PORT 1 , ADDRESS OF PLOTTER: RS-232 PORT 2

PLOTMENUOFF

Turn off the plot menus function over the GPIB.

Main Menu

None (GPIB Only)

Program Sequence

```
PLOTMENUOFF;
```

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

PLOTMENUON, DATE TIME ON, MKR LIST ON, PRINMENUON, ADDRESS OF PLOTTER: HP-IB,
ADDRESS OF PLOTTER: RS-232 PORT 1, ADDRESS OF PLOTTER: RS-232 PORT 2

PLOTMENUON

Plot the current softkey menu on the display when a plot command is issued over the GPIB.

Main Menu

None (GPIB Only)

Program Sequence

```
PLOTMENUON;
PLOTALL;
```

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

If this command is issued, the displayed softkey menu is plotted, but the date/time and marker list annotations are not plotted even if they are currently selected. This command has no effect on plots initiated by using the front panel keys.

See Also

PRINMENUON, DATE TIME ON , MKR LIST ON , PLOTMENUOFF, ADDRESS OF PLOTTER: HP-IB , ADDRESS OF PLOTTER: RS-232 PORT 1 , ADDRESS OF PLOTTER: RS-232 PORT 2

PLOT PARAMETERS

Plot operating parameters or system parameters on digital plotter.

Programming Code

PLOP

Main Menu

COPY

Program Sequence

See OPERATING PARAMETERS or SYSTEM PARAMETERS .

Manual Sequence

See OPERATING PARAMETERS or SYSTEM PARAMETERS .

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

(COPY), OPERATING PARAMETERS , SYSTEM PARAMETERS , ADDRESS OF PLOTTER: HP-IB , ADDRESS OF PLOTTER: RS-232 PORT 1 , ADDRESS OF PLOTTER: RS-232 PORT 2

PLOT: TEXT

Plot text only on digital plotter.

Programming Code

PLOTTEXT

Main Menu

COPY

Program Sequence

> *(select pen)*
>> *(select quadrant)*
>>> PLOTTEXT;

Manual Sequence

[COPY]
  DEFINE PLOT
    (choose plot definitions)
[COPY]
  PLOT TO PLOTTER
   PLOT: TEXT

Description

Preset	plot: all	Range	N/A
Initialization	plot: all	Recalled	N/A
Coupled	N/A		

The text of the measurement display is plotted using the current quadrant and pen selections to the digital plotter.

If dual channel display is selected, then both channels are plotted using the independent pen selections.

See Also

DEFINE PLOT , [COPY], ADDRESS OF PLOTTER: HP-IB ,
ADDRESS OF PLOTTER: RS-232 PORT 1 , ADDRESS OF PLOTTER: RS-232 PORT 2

PLOT: TITLE

Plot title only on digital plotter.

Programming Code

PLOTTITL

Main Menu

COPY

Program Sequence

PLOTTITL;

Manual Sequence

(COPY)
  DEFINE PLOT
    (choose plot definitions)
(COPY)
  PLOT TO PLOTTER
    PLOT: TITLE

Description

Preset	N/All	Range	N/A
Initialized	N/Al	Recalled	N/A
Coupled	N/A		

The title of the measurement display is plotted using the current quadrant and pen selections to the digital plotter.

See Also

DEFINE PLOT, SELECT QUADRANT, ADDRESS OF PLOTTER: HP-IB,
ADDRESS OF PLOTTER: RS-232 PORT 1, ADDRESS OF PLOTTER: RS-232 PORT 2

PLOT TO PLOTTER

Present the plot to plotter menu.

Programming Code

None

Main Menu

COPY

Manual Sequence

(COPY)
 PLOT TO PLOTTER
    PLOT: ALL or
    PLOT: DATA or
    PLOT: MEMORY or
    PLOT: GRATICULE or
    PLOT: TITLE or
    PLOT: MARKER(S) or
    PLOT: TEXT or
    PLOT: ALL FOUR S PARAMETERS

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

PLOT TO PLOTTER presents the action keys that plot the specified element(s) as set by the define plot menu.

If the address for a plotting device is set to one of the RS-232 ports and no device is actually connected, the analyzer is unable to determine the situation. Pressing PLOT TO PLOTTER causes the analyzer to report PLOT COMPLETE even though no plotting device is connected to the selected RS-232 port.

See Also

PLOT TO PRINTER, DEFINE PLOT, ABORT PRINT/PLOT, ADDRESS OF PLOTTER

PLOT TO PRINTER

The plot defined by the define print menu is output to a graphics printer.

Programming Code

PRINALL

Main Menu

COPY

Program Sequence

    PRINALL;

Manual Sequence

(COPY)
 PLOT TO PRINTER

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

If the address for a printing device is set to one of the RS-232 ports and no device is actually connected, the analyzer is unable to determine the situation. Pressing PLOT TO PRINTER causes the analyzer to report PLOT COMPLETE even though no plotting device is connected to the selected RS-232 port.

See Also

PLOT TO PLOTTER, DEFINE PRINT, ABORT PRINT/PLOT, ADDRESS OF PRINTER, MKR LIST ON, DATE/TIME ON, PRINMENUON, PRINMENUOFF

PLOT TYPE: COLOR

Define the plot type as a plot dump to a color plotter.

Programming Code

PLOTTYPECOLR

Main Menu

COPY

Program Sequence

```
PLOTTYPECOLR;
```

Manual Sequence

[COPY]
　DEFINE PLOT
　　　PLOT TYPE: COLOR

Description

Preset	color	Range	N/A
Initialized	color	Recalled	yes
Coupled	always coupled		

See Also

PLOT TYPE: MONOCHROME , DEFINE PLOT , PRINT TYPE MONOCHROME , PRINT TYPE COLOR

PLOT TYPE: MONOCHROME

Define the plot type as a plot dump using a single color (monochrome).

Programming Code

PLOTTYPEMONO

Main Menu

COPY

Program Sequence

```
PLOTTYPEMONO;
```

Manual Sequence

(COPY)
   DEFINE PRINT
      PLOT TYPE: MONOCHROME

Description

Preset	color	Range	N/A
Initialized	color	Recalled	yes
Coupled	always coupled		

The entire plot is done with a single pen. Use this primarily for making plots that photocopy uniformly.

See Also

PLOT TYPE: COLOR , DEFINE PLOT , PRINT TYPE MONOCHROME , PRINT TYPE COLOR

PLUS (+)

Select complex addition trace math for selected parameter.

Programming Code

PLUS

`PLUS (+)`

Main Menu

DISPLAY

Program Sequence

(select channel)
  `PLUS;`

Manual Sequence

(select channel)
  `DISPLAY`
  `MORE`
    `MATH OPERATIONS`
      `PLUS (+)`

Description

Preset	math (/)	Range	N/A
Initialization	math (/)	Recalled	yes
Coupled	always uncoupled		

Selects vector addition for trace math. Softkey becomes `MATH (+)` .

`POINTS: n`

Select number of points for both channels. Where n = 51, 101, 201, 401, or 801.

Programming Code

POIN51 or POIN101 or POIN201 or POIN401 or PONI801

Main Menu

STIMULUS

Program Sequence

  `POINn;`   *n = 51, 101, 201, 401, or 801*

Manual Sequence

STIMULUS [MENU]

  NUMBER of POINTS

    POINTS: 51 or

    POINTS: 101 or

    POINTS: 201 or

    POINTS: 401 or

    POINTS: 801

Description

Preset	201 points channel 1 and channel 2	Range	N/A
Initialization	same as Preset	Recalled	yes
Coupled	always coupled		

POINTS: n is part of the calibration set limited instrument state.

POINTS: n changes the number of points measured in a sweep for ramp or stepped mode operation. In frequency list mode, the number of points for the current segment is specified. After calibration, the number of points may be reduced. Increasing the number of points causes automatic selection of:

Correction Off	if correction is on.
Display: Data	if display has math operation, data and memory, or memory selected.
Frequency Domain	if time is set to low pass.

POKE

Change 8510 memory location contents.

Programming Code

POKE

`POKE`

Main Menu

SYSTEM

Program Sequence

PEEL value; $value = memory\ address$

  POKE value; $value = new\ memory\ contents$

Manual Sequence

(SYSTEM)
  SERVICE FUNCTIONS
    PEEK/POKE LOCATION entry (x1) (entry = memory address)
      POKE entry (x1) (entry = new memory contents)

Caution   `POKE` is intended for service applications. Use of this function can damage the 8510 operating system, making it necessary to reload the system program.

The active function is current contents of specified memory location. See `PEEK/POKE LOCATION` .

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

`PEEK/POKE LOCATION`

PORT n

Linear phase reference plane extensions for both channels. Where n = 1 or 2.

Programming Code

PORT1 or PORT2

Main Menu

CAL

Program Sequence

```
PORT1  [value [time suffix]]; or
PORT2  [value [time suffix]];
```

Manual Sequence

CAL
  MORE
    PORT EXTENSIONS
      PORT 1 entry (x1)   ((x1) = seconds)
          PORT 2 entry (x1)   ((x1) = seconds)

Description

Preset	port 1 = 0 s port 2 = 0 s	**Range**	−1 to +1 second with femtosecond resolution
Initialization	same as Preset	**Recalled**	yes
Coupled	always coupled		

Used during the measurement sequence to effectively move the reference plane away from the calibration plane. Does not affect measurement calibration.

Linear (coaxial) phase shift is independent of ELECTRICAL DELAY. See ELECTRICAL DELAY.

PORT 1 extends S_{11} (x2 displayed value), S_{21}, S_{12}

PORT 2 extends S_{22} (x2 displayed value), S_{12}, S_{21}

Port extensions produce an effect upon phase, delay, and time domain traces in all formats.

When either sum of PORT EXTENSIONS is non-zero for any displayed parameter, enhancement annotation D is displayed in the enchancement labels area of the LCD/CRT.

For the standard User Parameters definitions:

PORT 1 or PORT 2 extends a_1;

PORT 1 and PORT 2 extend b_2;

`PORT n`

> `PORT 1` or `PORT 2` do not extend a_2;
>
> `PORT 1` extends b_1;
>
> `PORT 2` does not extend b_1.

For redefined user parameters, the reference extension is x2 displayed value if the numerator and denominator are the same port, and x1 displayed value if the numerator and denominator are different ports.

See Also

`ELECTRICAL DELAY`

`PORT EXTENSIONS`

Present port extensions menu.

Programming Code

None

Main Menu

CAL

Manual Sequence

> `CAL`
>> `MORE`
>>> `PORT EXTENSIONS`
>>>> `PORT 1` or `PORT 2`

Description

Preset	port 1 = 0 s	Range	−1 to +1 second with
	port 2 = 0 s		femtosecond resolution
Initialization	same as Preset	Recalled	yes
Coupled	always coupled		

See Also

`PORT 1`, `PORT 2`

PORT 1 connectors, PORT 2 connectors

Select connector pairs to compensate the test port.

Programming Code

CONP1, CONP2

Main Menu

CAL

Program Sequence

```
CONC;
  CONP1; or
  CONP2;
    STANB; or
    STANC; or
    STAND; or
    STANE; or
    STANF;
      COMS;
        CALS[n]  (n = 1 to 8)
```

Manual Sequence

CAL
  MORE
    MODIFY CAL SET
      CONNECTOR COMPENSATE
        PORT 1 connectors or
        PORT 2 connectors
        (choose standard)
      COMPENSATE & SAVE
        CAL SET [n] (n = 1 to 8)

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

During connector compensation, this command is used to test the port to be compensated. It must be followed by a choice of connector pair from a Standards menu. You must

PORT 1 connectors, PORT 2 connectors

select and highlight either PORT1 connectors or PORT2 connectors before you press
COMPENSATE & SAVE.

See Also

CONNECTOR COMPENSATE
COMPENSATE & SAVE

POSITIVE SYNC

Set synchronization to sync on a positive-logic TTL signal to an external display device.

Programming Code

POSISYNC

Main Menu

DISPLAY

Program Sequence

POSISYNC;

Manual Sequence

(DISPLAY)
MORE
   ADJUST DISPLAY
      EXTERNAL VIDEO
         POSITIVE SYNC

Description

Preset	not changed	Range	N/A
Initialized	sync on green negative sync	Recalled	yes
Coupled	always coupled		

This function does not affect the analyzer internal video display.

Use positive sync when an external display device requires positive logic, TTL-compatible
synchronization.

| Note | This function is not implemented on an 8510B with firmware (6.0 or greater) revisions only. |

See Also

EXTERNAL VIDEO , NEGATIVE SYNC , COMPOSITE SYNC

POWER

Select power domain for the active channel.

Programming Code

POWD

Main Menu

DOMAIN

Program Sequence

POWD;

Manual Sequence

(select channel)
DOMAIN
  POWER

Description

Preset	frequency domain	Range	N/A
Initialization	frequency domain	Recalled	N/A
Coupled	may be uncoupled		

In power domain, the swept variable is source power, which is displayed as the horizontal axis of a rectangular display. The instrument operates at a single frequency that is either that of the active marker on entry to power domain or defaults to 2 GHz if no marker is active. The frequency may be changed by FREQ. of MEASUREMENT, NEXT PT HIGHER, or NEXT PT LOWER.

See Also

FREQ. of MEASUREMENT

POWER LEVELING

Present source power leveling menu.

Programming Code

None

Main Menu

SYSTEM

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

SOURCE 1: EXT. LEVEL , SOURCE 2: EXT. LEVEL

POWER MENU

Present power menu to select source power, power slope, and test port attenuation.

Programming Code

None

Main Menu

STIMULUS

Manual Sequence

STIMULUS (MENU)
POWER MENU
POWER SOURCE 1 or
POWER SOURCE 2
SLOPE ON or
SLOPE OFF or
ATTENUATOR PORT: 1 or
ATTENUATOR PORT: 2

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

The power level and slope can be independently set for either of the two sources the analyzer is capable of controlling. In multiple source system configurations, source 1 is known as the RF source and source 2 is know as the LO source.

See Also

STIMULUS [MENU]

POWER SOURCE 1

Set RF source power dBm.

Programming Code

POWE

Main Menu

STIMULUS

Program Sequence

POWE [value]; $value = dB$

Manual Sequence

STIMULUS [MENU]
  POWER [MENU]
    POWER SOURCE 1 entry [x1]   ([x1] = dB)

Description

Preset	depends on source	Range	N/A
Initialization	depends on source	Recalled	yes
Coupled	always coupled		

Range and resolution are dependent upon the source. Entries beyond the range of the source are set to the appropriate minimum or maximum value.

`POWER SOURCE 1`

Momentary phaselock errors may occur as the source changes its output power level.

When the softkey `FLATNESS ON` is enabled, `POWER SOURCE 1` controls the power produced at the test port to the extent possible. When the softkey `FLATNESS OFF` is enabled, `POWER SOURCE 1` controls the power produced at the outpue of the RF source.

See Also

POWER (MENU), `CALIBRATE FLATNESS`

`POWER SOURCE 2`

Set LO source power dBm.

Programming Code

POW2

Main Menu

STIMULUS

Program Sequence

POW2 [value]; $value = dB$

Manual Sequence

STIMULUS (MENU)
  POWER (MENU)
    `POWER SOURCE 2` [entry (x1)] ((x1) = dB)

Description

Preset	depends on source	Range	N/A
Initialization	depends on source	Recalled	yes
Coupled	always coupled		

Range and resolution are dependent upon the source. Entries beyond the range of the source are set to the appropriate minimum or maximum value.

Momentary phaselock errors may occur as the source changes its output power level.

PREDEFINED COLORS

Present the color predefined color palette.

Programming Code

None

Main Menu

DISPLAY

Manual Sequence

(DISPLAY)
  ADJUST DISPLAY
    MODIFY COLORS
      (select display element)
       PREDEFINED COLORS
        (select color)
        [other changes]
        (PRIOR MENU)
      (PRIOR MENU)
    (PRIOR MENU)
  SAVE COLORS

Description

Preset	not changed	**Range**	N/A
Initialized	see table below	**Recalled**	yes, using SAVE COLORS , RECALL COLORS
Coupled	always coupled		

The following is a table listing of the predefined colors.

Table P-1. Predefined Color Settings

Color	Tint	Brightness %	Color %
white	0	100	0
red	0	100	100
yellow	14	100	100
green	38	93	100
cyan (blue)	53	100	100
salmon	0	100	36
grey	0	49	0

Note   This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

MODIFY COLORS , TINT , BRIGHTNESS , COLOR , DEFAULT COLORS

PRESS to CONTINUE

Continue measurement after reversing device under test.

Programming Code

PREC

Main Menu

None

Program Sequence

Detect 8510 Primary Status Byte bit 3 set. Use GPIB addressed command GET (group execute trigger) to continue measurement.

Manual Sequence

(device reversal)
PRESS to CONTINUE

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Used in ONE-PATH 2-PORT manual measurement sequence. Bit 3 of primary status byte is set to indicate that manual device reversal is required.

MEASUREMENT (RESTART) prepares the system to restart the first group, ready to measure forward parameters, then sets bit 3 of the Primary Status Byte.

Ramp mode averaging cannot be used practically with ONE-PATH 2-PORT accuracy enhancement. Averaging in ramp sweep requires multiple sweeps to reach the fully averaged value. PRESS to CONTINUE takes only two sweeps to acquire forward data, one for reflection and one for transmission, then the device is reversed and data for the reverse signal path is taken. Thus, averaging would require n+1 device reversals.

Step mode averaging may be used because only one group of sweeps is required to produce fully averaged data.

See Also

CALIBRATE: ONE-PATH 2-PORT

PRINMENUOFF

Turn off the plot menus function.

Main Menu

None (GPIB Only)

Program Sequence

PRINMENUOFF

PRINMENUOFF

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

PRINMENUON, DATE TIME ON , MKR LIST ON , PLOTMENUOFF

PRINMENUON

The current softkey menu on the display is plotted to a printer when a print command is issued over the GPIB.

Main Menu

None (GPIB Only)

Program Sequence

```
PRINMENUON;
PRINALL;
```

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

If this command is issued the displayed softkey menu is plotted to a printer, but the date/time and marker list annotations are not plotted even if they are currently selected. This command has no effect on printer plots initiated by using the front panel keys.

See Also

PLOTMENUON, DATE TIME ON , MKR LIST ON , PRINMENUOFF

PRINT: LANDSCAPE

Define the print orientation as landscape (horizontal).

Programming Code

PRINORIELAN

Main Menu

COPY

Program Sequence

PRINORIELAN;

Manual Sequence

COPY
  DEFINE PRINT
    PRINT: LANDSCAPE

Description

Preset	portrait	Range	N/A
Initialized	portrait	Recalled	yes
Coupled	always coupled		

Figure P-1. Landscape Printer Orientation

See Also

PRINT: PORTRAIT, DEFINE PRINT, TOP MARGIN, RIGHT MARGIN, PRINT WIDTH

PRINT: PORTRAIT

Define the print orientation as portrait (vertical).

Programming Code

PRINORIEPOR

Main Menu

COPY

Program Sequence

    PRINORIEPOR;

Manual Sequence

(COPY)
DEFINE PRINT
PRINT: PORTRAIT

Description

Preset	portrait	Range	N/A
Initialized	portrait	Recalled	yes
Coupled	always coupled		

Figure P-2. Portrait Printer Orientation

See Also

PRINT: LANDSCAPE, DEFINE PRINT, TOP MARGIN, RIGHT MARGIN, PRINT WIDTH

PRINT TYPE COLOR

Define the print type as a plot dump to a color printer.

Programming Code

PRINTYPECOLR

Main Menu

COPY

Program Sequence

```
PRINTYPECOL;
```

Manual Sequence

[COPY]
  DEFINE PRINT
    PRINT TYPE COLOR

Description

Preset	monochrome	Range	N/A
Initialized	monochrome	Recalled	yes
Coupled	always coupled		

See Also

PRINT TYPE MONOCHROME , DEFINE PRINT , PLOT TYPE: MONOCHROME , PLOT TYPE: COLOR

PRINT TYPE MONOCHROME

Define the print type as a plot dump to a single color (monochrome) printer.

Programming Code

PRINTYPEMONO

Main Menu

COPY

Program Sequence

PRINTYPEMONO;

Manual Sequence

COPY
DEFINE PRINT
PRINT TYPE MONOCHROME

Description

Preset	monochrome	Range	N/A
Initialized	monochrome	Recalled	yes
Coupled	always coupled		

See Also

PRINT TYPE COLOR, DEFINE PRINT, PLOT TYPE: COLOR, PLOT TYPE: MONOCHROME

PRINT WIDTH

Set the desired width of a printed plot in millimetres.

Programming Code

PRINWID

Main Menu

COPY

PRINT WIDTH

Program Sequence

PRINWID [value];   *value = 0 to 1.0*

Manual Sequence

(COPY)
  DEFINE PRINT
    PRINT WIDTH [entry (k/m)]   (entry = 0 to 1000, (k/m) = mm)

Description

Preset	portrait: 152.4 mm landscape: 228.6 mm	Range	0 to 1.0m
Initialized	same as Preset	Recalled	yes
Coupled	always coupled		

See Also

DEFINE PRINT , PRINT: PORTRAIT , PRINT: LANDSCAPE , PRINTER RESOLUTION

PRINTER
  RESOLUTION

Set the resolution of the printer, in dots per inch.

Programming Code

PRINRESO

Main Menu

COPY

Program Sequence

PRINRESO [value];   *value = 0 to 400*

Manual Sequence

[COPY]
   DEFINE PRINT
      PRINTER RESOLUTION [entry [x1]]   (entry = 0 to 400)

Description

Preset	portrait: 96 landscape: 96	Range	0 to 400 dpi
Initialized	same as Preset	Recalled	yes
Coupled	always coupled		

Printer resolution can be set from 0 to 400 dpi. The following table lists the various printers and their respective resolution settings so that you can match the settings.

Table P-2. Recommended Printer Resolutions for Various HP Printers

Printer Type	Resolution (dpi)
QuietJet Series	96 192
ThinkJet	96
PaintJet and PaintJet XL	90 180
DeskJet	75 100 150 300
LaserJet Series	75 100 150 300

See Also

PRINT TYPE MONOCHROME , DEFINE PRINT , PRINT: PORTRAIT , PRINT: LANDSCAPE , the respective printer manuals

$\boxed{\text{PRIOR MENU}}$

Present prior menu.

Programming Code

MENUPRIO

Program Sequence

MENUPRIO;

Manual Sequence

$\boxed{\text{PRIOR MENU}}$

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Provides a means to "back up" through the menu levels to the main menu. If the current menu displayed is the top level (main) menu, then pressing $\boxed{\text{PRIOR MENU}}$ either blanks the menu area of the LCD/CRT or displays the marker value list. If the menu area is blank, pressing $\boxed{\text{PRIOR MENU}}$ presents the last main menu.

PULSE CONFIG

Presents pulse configuration menu

Programming Code

None

Main Menu

SYSTEM

Manual Sequence

SYSTEM
  MORE
  PULSE CONFIG
    DETECTOR: WIDE BW or
    DETECTOR: NORMAL BW or
    PULSE WIDTH or
    DUTY CYCLE or
    PULSE OUT: HIGH or
    PULSE OUT: LOW

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

PULSE PROFILE , DETECTOR: WIDE BW , DETECTOR: NORMAL BW , DUTY CYCLE ,
PULSE OUT: HIGH/LOW .

PULSE OUT: HIGH

Select pulse output active high at the rear-panel AUX OUT or PULSE OUT (Option 008)
BNC connector.

Programming Code

PULOHIGH;

Main Menu

SYSTEM

`PULSE OUT: HIGH`

Program Sequence

PULOHIGH; or PULOLOW;

Manual Sequence

SYSTEM
  `MORE`
   `PULSE CONFIG`
    `PULSE OUT: HIGH` or
    `PULSE OUT: LOW`

Description

Preset	pulse out: high	Range	N/A
Initialization	pulse out: high	Recalled	yes
Coupled	always coupled		

See Also

`PULSE PROFILE`

`PULSE OUT: LOW`

Select pulse output active low.

Programming Code

PULOLOW;

Description

Preset	pulse out: high	Range	N/A
Initialization	pulse out: high	Recalled	yes
Coupled	always coupled		

See Also

See `PULSE OUT: HIGH` for full description.

PULSE PROFILE

Select pulse profile domain.

Programming Code

PULP

Main Menu

DOMAIN

Program Sequence

PULP;

Manual Sequence

[DOMAIN]
    PULSE PROFILE

Description

Preset	frequency	**Range**	N/A
Initialization	frequency	**Recalled**	yes
Coupled	may be uncoupled		

Selects the pulse profile domain, in which the analyzer is tuned to a single frequency and a repetitive sampling technique (one measurement per pulse) is used to create a plot of the response as a function of time in synchronization with the pulse. The pulse profile measurement frequency will be the start frequency at the time PULSE PROFILE is selected. By activating a marker, this frequency is displayed with the marker value in the active entry area.

When external triggering is selected, the TTL trigger input defines time = 0 seconds for each pulse. Then the internal analyzer timing logic determines the timing of the measurements required to produce the pulse profile.

The start time, number of points, and pulse width is used to set the time span being measured and to set the measurement resolution period (the time between data points).

See Also

[DOMAIN]

PULSE WIDTH

Set width of internally-generated pulse at the rear-panel PULSE OUT.

Programming Code

PULW;

Note	Wideband IF Option 008

Main Menu

SYSTEM

Program Sequence

PULW [value[time suffix]];

Manual Sequence

SYSTEM
  MORE
   PULSE CONFIG
    PULSE WIDTH entry   (entry = 0 to 40.88 ms)

Description

Preset	10 μs	**Range**	0 to 40.88 ms
Initialization	10 μs	**Recalled**	N/A
Coupled	N/A		

When the wideband detectors and internal triggering are selected in the Frequency Domain (they are always selected in the Pulse Profile Domain), the "on" time for the TTL signal at the rear panel PULSE OUT connector is set. The pulse is always allowed to complete.

Pulse width is used along with number of points to set the pulse profile sample resolution, the pulse profile minimum span and miminum start time.

The duty cycle function, along with the pulse width, set the maximum allowed duty cycle percent. If the instrument measurement cycle time is shorter than the time set by the pulse width and the duty cycle limit, the measurement cycle increases the pulse off time to satisfy the duty cycle limit.

See Also

DETECTOR: WIDE BW , DUTY CYCLE

R

RAMP

Select ramp sweep mode for both channels.

Programming Code

RAMP

Main Menu

STIMULUS

Program Sequence

RAMP;

Manual Sequence

STIMULUS [MENU]
  RAMP

Description

Preset	ramp	Range	N/A
Initialization	ramp	Recalled	yes
Coupled	always coupled		

Selects continuous linear analog sweeps beginning at the start frequency and ending at the stop frequency at the rate determined by the sweep time, measuring data at frequency intervals set by the number of points.

As the frequency sweep is narrowed, internal 8510 logic changes the source band switch points to, when possible, move the band switch points outside of the frequency range being swept.

TRIM SWEEP (used only with Agilent 834x and 8350 series sources) requires different settings for each different frequency range to obtain best frequency accuracy.

Table R-1. The Number of Sweeps Taken

Channel 1 COUPLED to Channel 2		
Sweep Mode/Step Type	Number of Parameters per Sweep	Display Mode
RAMP	1 parameter/sweep	all modes
Step Type Normal	4 parameters/sweep	2 port correction used or 4 parameter displays or Dual channel displays
Step Type Quick	2 parameters/sweep	4 parameter displays or Dual channel displays

For applications using *uncoupled* channels, the number of sweeps is multiplied by a factor of two; channel 1 sweeps, then channel 2 sweeps.

When the `TRIG` command is sent, the triggered data aquistion mode is entered and the analyzer waits for the GPIB command `GET`. `GET` causes the number of sweeps required to update all required data.

Note that a sweep indicator appears when the analyzer is in the dual channel or four parameter display mode and the sweep time is >0.5 s.

See Also

`SWEEP TIME` , `TRIM SWEEP` , TRIG

`REAL`

Select display of real part of complex data for current parameter on selected channel.

Programming Code

REAL

Main Menu

FORMAT

Program Sequence

> *(select channel)*
>> *(select parameter)*
>>> REAL;

Manual Sequence

(select channel)
(select parameter)
FORMAT MENU
REAL

Description

Preset	rev value=0 scale=10/ ref posn=5	Range	N/A
Initialization	same as Preset	Recalled	yes
Coupled	always uncoupled		

Presents a Cartesian display of the real part of the measured data,

$S_{ij} = R_{ij} + jX_{ij}$

Where Real $= R_{ij}$ is the real part and ij is the selected parameter.

RECALL

Present recall instrument state menu.

Programming Code

MENURECA

Program Sequence

MENURECA;

Manual Sequence

RECALL
INST STATE 1 or
INST STATE 2 or
INST STATE 3 or
INST STATE 4 or
INST STATE 5 or
INST STATE 6 or
INST STATE 7 or
MORE
USER PRESET *8 or
FACTORY PRESET

$\boxed{\text{RECALL}}$

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

If correction was turned on when the instrument state was saved, then the instrument state is recalled and the correction is turned on after completion of the first group of sweeps. If the calibration set(s) have been changed and no longer apply to the instrument state, then various messages are displayed and correction is not turned on. Recall automatically selects DISPLAY: DATA .

Includes all parameter/format/response selections, except basic parameter redefinitions (see REDEFINE PARAMETER). Not saved, but are recalled according to the present test set capabilities.

FACTORY PRESET initializes all instruments on the System Bus and sets the analyzer to a predefined state similar to the operating system initialization. Frequency parameters are defined by the source and test set used.

See Also

INST STATE n

RECALL COLORS

Recall previously saved LCD/CRT colors.

Programming Code

RECO

Main Menu

DISPLAY

Program Sequence

    RECO;

Manual Sequence

DISPLAY
 ADJUST DISPLAY
  RECALL COLORS

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Note This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

MODIFY COLORS , SAVE COLORS

RECEIVER CAL

Select receiver calibration.

Programming Code

CALRCVR

Main Menu

CAL

Program Sequence

```
CALRCVR;              measure input power
   RCVI;
   RCVO;              measure output power using THRU statement
      SAVR;           n = 1 to 8
         CALS[n]
```

RECEIVER CAL

Manual Sequence

(CAL)
  RECEIVER CAL
    INPUT PWR
      OUTPUT PWR
        SAVE RCVR CAL
          CAL SET n   (n = 1 to 8)

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Receiver calibration provides a means of ensuring that the input (a1) and output (b2) are displayed in absolute power units (dBm). A flatness calibration (qv) is an essential prerequisite. If you have not performed a flatness calibration since power-up, pressing RECEIVER CAL will take you to the CALIBRATE FLATNESS menu.

Receiver calibration requires two measurements:

1. The input power for which no standard is required (although to get satisfactory results, Port 1 should be matched—a thru connection to Port 2 usually is adequate.

2. The output power for which a thru (as defined in the active calibration kit) must be connected.

The correct parameter is selected automatically during the calibration. The order in which the measurements are made is not important.

See Also

CALIBRATE FLATNESS
SAVE RCVR CAL
INPUT PWR
OUTPUT PWR

RED

Set the specified display element to red.

Main Menu

DISPLAY

Manual Sequence

DISPLAY
  ADJUST DISPLAY
   MODIFY COLORS
      (select display element)
        PREDEFINED COLORS
          RED
            [other changes]
              PRIOR MENU
            PRIOR MENU
          PRIOR MENU
        SAVE COLORS

Description

Preset	not changed	Range	N/A
Initialized	tint = 0 brightness = 100% color = 100%	Recalled	yes, using SAVE COLORS , RECALL COLORS
Coupled	always coupled		

The warning text is defaulted to red.

Note	This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

PREDEFINED COLORS , MODIFY COLOR

REDEFINE DONE

Redefine parameter sequence for current parameter is complete. Store new parameter definition.

Programming Code

REDD

Main Menu

PARAMETER

Program Sequence

See REDEFINE PARAMETER.

Manual Sequence

See REDEFINE PARAMETER.

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

REDEFINE PARAMETER

REDEFINE PARAMETER

Change definition of current basic or user parameter.

Programming Code

None

Main Menu

PARAMETER

Manual Sequence

(select basic or user parameter)
PARAMETER (MENU)
REDEFINE PARAMETER
(select drive port)
(select phase lock)
(select numerator)
(select denominator)
(select conversion)
(label parameter, user parameters only)
REDEFINE DONE

Description

Preset	standard basic and user parameter definitions	Range	N/A
Initialization	same as Preset	Recalled	basic parameters: no (except conversion) user parameters: yes
Coupled	always coupled		

REDEFINE PARAMETER presents a menu which allows selection of signal path, ratio, and data conversion conditions for the currently selected Basic (S_{11}, S_{21}, S_{12}, S_{22}) parameter or User (a_1, b_1, a_2, b_2) parameter.

Parameter changes are executed immediately, and can be selected in any sequence.

REDEFINE DONE stores current parameter definition. Selecting another basic or user parameter prior to REDEFINE DONE restores the standard parameter definition.

Basic parameter redefinitions (except CONVERSION) are not Saved/Recalled as part of Instrument State. (RECALL) restores standard basic parameter definitions.

Table R-2 lists the standard parameter definitions selected by FACTORY PRESET when an S-parameter test set responds on the System Bus. If a reflection/transmission test set (or no test set) responds, these standard definitions are set so that $S_{22} = S_{11}$ and $S_{12} = S_{21}$.

Figure R-1. Redefine Parameter Key Sequence

Table R-2. Standard Parameter Definitions (S-Parameter Test Sets)

Softkey	Parameters							
	Basic				User			
	S_{11}	S_{21}	S_{12}	S_{22}	a_1	b_2	a_2	b_1
DRIVE PORT	1	1	2	2	1	1	1	1
PHASE LOCK	a_1	a_1	a_2	a_2	a_1	a_1	a_1	a_1
NUMERATOR	b_1	b_2	b_1	b_2	a_1	b_2	a_2	b_1
DENOMINATOR	a_1	a_1	a_2	a_2	<—NO RATIO—>			
CONVERSION	S	S	S	S	S	S	S	S
For reflection/transmission test sets, or no test set, $S_{22} = S_{11}$ and $S_{12} = S_{21}$.								

(REF POSN)

Cartesian display reference position.

Programming Code

REFP

Program Sequence

REFP [value];   *value = 0 to 10*

Manual Sequence

(REF POSN) entry (x1) (entry = 0 to 10)

Description

Preset	see below	Range	N/A
Initialization	see below	Recalled	yes
Coupled	always uncoupled		

The reference position is the point about which SCALE expands or contracts the trace.

For Cartesian displays, the current (REF POSN) for Channel 1 is indicated by the > symbol at the left side of the graticule, and the (REF POSN) for Channel 2 is indicated by the < symbol at the right side of the graticule.

For Polar and Smith displays, the (REF POSN) is the outer circle and this function has no meaning.

Use the knob, STEP keys, or numeric (x1) (bottom horizontal grid line = 0; top = 10) to move the reference position line. To return the line to an integer location, either enter an integer or use a STEP key repeatedly to move the reference position to the top or bottom graticule line.

FACTORY PRESET selects the appropriate (REF POSN) location for each format.

$\boxed{\text{REF VALUE}}$

Cartesian, Smith, or Polar reference position value.

Programming Code

REFV

Program Sequence

REFV [value];   *value = basic units for format*

Manual Sequence

$\boxed{\text{REF VALUE}}$ entry $\boxed{\text{x1}}$ ($\boxed{\text{x1}}$ = basic units for format)

Description

Preset	see below	**R**ange	depends upon format
Initialization	see below	**R**ecalled	yes
Coupled	always uncoupled		

The trace is positioned relative to the reference position, so changing $\boxed{\text{REF VALUE}}$ causes the trace to move but does not change the marker value.

For Polar and Smith displays, changing $\boxed{\text{REF VALUE}}$ also changes SCALE/division.

For Smith and inverted Smith displays, $\boxed{\text{REF VALUE}}$ and $\boxed{\text{SCALE}}$ values are given in units of the LIN mkr on POLAR format.

The sequence $\boxed{\text{REF VALUE}}$, $\boxed{\text{= MARKER}}$ sets the $\boxed{\text{REF VALUE}}$ equal to the marker value, thus moving the trace so that the marker data point is at the reference position.

FACTORY PRESET selects the appropriate $\boxed{\text{REF VALUE}}$ values for each format.

REFERENCE AMP. GAIN

Service only. Manually select reference IF amplifier gain.

Programming Code

REFA

Main Menu

SYSTEM

Program Sequence

```
REFA;
  GAINn;        n = 1 to 4 or AUTO
```

Manual Sequence

```
[SYSTEM]
  IF GAIN
    REFERENCE AMP. GAIN
      GAIN: n   (n = 1 to 4 or AUTO)
```

Description

Preset	reference amp. gain gain auto	Range	1,2,3,4, auto
Initialization	reference amp. gain	Recalled	yes
Coupled	always coupled		

REFLECT'N

After selection of 2-port measurement calibration, begin reflection calibration sequence.

Programming Code

REFL

REFLECT'N

Main Menu

CAL

Program Sequence

```
CAL1; or CAL2;
  CALIFUL2; or CALIONE2;
    REFL;
        (measure 1-port standards)
          REFD;
              (transmission and isolation calibration steps)
                SAV2;
                  CALSn;          n = 1 to 8
```

Manual Sequence

(CAL)
CAL 1 xx (where xx=cal kit 1 label) or
CAL 2 xx (where xx=cal kit 2 label)
 FULL 2-PORT or
ONE-PATH 2-PORT
  REFLECT'N
    (measure 1-port standards)
      REFLECT'N DONE
        (transmission and isolation calibration steps)
          SAVE 2-PORT CAL
            CAL SET n   (n = 1 to 8)

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

REFLECT'N and REFLECT'N DONE begin and terminate the 1-port calibration sequences
in the FULL 2-PORT and ONE-PATH 2-PORT calibration. Reflection calibration requires
three classes of standards to measure directivity, source match, and reflection signal path
frequency response for each port using identical techniques as the S_{11} 1-PORT and S_{22} 1-port
calibrations.

If REFLECT'N DONE is pressed before all classes are measured, then the message CAUTION:
ADDITIONAL STANDARDS NEEDED is displayed and bit 1 of the Primary Status Byte is set.

See Also

CALIBRATE: S$_{11}$ 1-PORT

REFLECT'N DONE

Two-port reflection calibration sequence is complete. Compute reflection error coefficients.

Programming Code

REFD

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

See Also

See REFLECT'N for full description.

Re/Im mkr on POLAR

Select real/imaginary marker readout on Polar display format for current parameter on selected channel.

Programming Code

REIP

Main Menu

FORMAT

Program Sequence

> *(select channel)*
> *(select parameter)*
> REIP;

Re/Im mkr on POLAR

Manual Sequence

(select channel)
(select parameter)
FORMAT (MENU)
Re/Im mkr on POLAR

Description

Preset	rev value=1 scale 0.2/	Range	N/A
Initialization	same as Preset	Recalled	yes
Coupled	always uncoupled		

REPLACE FILE

Replace disc file.

Programming Code

DISF

Main Menu

DISC

Program Sequence

See STORE .

```
STOIINT; or STOIEXT;
 STOR;
(select data type)
  DISF "filename";
```

Manual Sequence

(DISC)
STORAGE IS INTERNAL or STORAGE IS EXTERNAL
STORE
(select data type)
REPLACE (MENU)
(select disc file name)
REPLACE FILE

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Under program control, if the disc file name is the same as a file already on the disc, the file is replaced. If the file doesn't currently exist, a new file is created.

For manual operation, the replace file directory consists only of files for the current selected file type. Use the knob to select the file to be replaced.

See Also

STORE

REPLACE MENU

Present directory for data type.

Programming Code

None

Main Menu

DISC

Program Sequence

See REPLACE FILE

Manual Sequence

See REPLACE FILE

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

The displayed directory consists only of files for the current selected data type.

REPLACE MENU

See Also

REPLACE FILE , STORE

RESET COLOR

Set the selected display element and color selected to the default value.

Programming Code

RSCO

Main Menu

DISPLAY

Program Sequence

RSCO;

Manual Sequence

(DISPLAY)
  ADJUST DISPLAY
    MODIFY COLORS
      (select display element)
        RESET COLOR

Description

Preset	N/A	Range	See DEFAULT COLORS
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Note   This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

TINT , BRIGHTNESS , COLOR

RESET
IF CORRECTION

Initiate automatic IF gain calibration sequence before starting next group of sweeps.

Programming Code

RESI

Main Menu

SYSTEM

Program Sequence

RESI;

Manual Sequence

(SYSTEM)
    RESET IF CORRECTION

Description

Preset	normal time-dependent basis	Range	N/A
Initialization	same as Preset	Recalled	N/A
Coupled	N/A		

IF gain calibration sequence normally occurs on a time-dependent basis, but this resets the 5-minute timer, causing the next IF cal sequence to occur at the start of the next group.

(RESPONSE CLASS
LABEL)

Select response class of response or response and isolation calibration. Measure if single standard in class.

Programming Code

RAIRESP

(RESPONSE CLASSLABEL)

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

There are two standard classes, each of which can have multiple standard elements, for the response and isolation calibrations. The actual labels on the softkeys are user defined. The standard class for (RESPONSE CLASS LABEL) is the same as the response class (also used for response only cal), and the ISOL'N STD standard class is the forward isolation class.

If more than one standard element has been defined for either class, an additional menu with these choices is displayed.

See Also

CALIBRATE: RESPONSE & ISOL'N

RESPONSE (MENU)

Present response menu.

Programming Code

MENURESP

Program Sequence

MENURESP;

Manual Sequence

RESPONSE (MENU)
ELECTRICAL DELAY or
PHASE OFFSET or
AVERAGING ON/restart or
AVERAGING OFF or
SMOOTHING ON or
SMOOTHING OFF

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

RESTORE DISPLAY

Restore measurement display after directory, operating parameters, or system parameters listing.

Programming Code

RESD

Main Menu

COPY or DISC

Program Sequence

See SYSTEM PARAMETERS , OPERATING PARAMETERS , DIRECTORY .

Manual Sequence

See SYSTEM PARAMETERS , OPERATING PARAMETERS , DIRECTORY .

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Pressing any front panel key or RESTORE DISPLAY restores the normal measurement display.

See Also

SYSTEM PARAMETERS , OPERATING PARAMETERS , DIRECTORY

RESUME CAL SEQUENCE

Resume measurement calibration sequence after leaving the CAL menu structure to invoke or change any function.

Programming Code

RESC

Main Menu

CAL

Main Menu

See below

Program Sequence

Using full 2-port calibration

```
CAL1; or CAL2;
  CALIFUL2;
    REFL;
        (measure standards)
          REFD;
            TRAN;
                (measure standards)
                  TRAD;
                    AVERON 1024;
                      RESC;
                        ISOL;
                            (measure standards)
                              ISOD;
                                SAV2;
                                  CALSn;          n = 1 to 8
```

Manual Sequence

Using full 2-port calibration

[CAL]
CAL 1 or CAL 2
  CALIBRATE: FULL 2-PORT
    REFLECT'N
        (measure standards)
          REFLECT'N DONE
            TRANSMISSION
                (measure standards)

```
TRANS. DONE
  RESPONSE MENU
    AVERAGING ON/restart 1024  (x1)
    (CAL)
      RESUME CAL SEQUENCE
      ISOLATION
      (measure standards)
        ISOLATION DONE
          SAVE 2-PORT CAL
            CAL SET n  (n = 1 to 8)
```

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

The measurement calibration sequence is re-entered at the class selection level. Classes which are complete are not affected. If all necessary standards in the class have not been measured, measurement data for the partially completed class is lost.

For this reason, always complete measurement of all standards in the currently selected class before leaving the calibration menu structure.

REV ISOL'N ISOL'N STD

Measure reverse isolation measurement calibration standard.

Programming Code

REVI

Main Menu

CAL

Program Sequence

See ISOLATION .

Manual Sequence

See ISOLATION .

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Isolation always uses a single standard to measure transmission signal path crosstalk, EXR. The isolation calibration is most effective when averaging is used (see ISOLATION). S_{12} is selected, the standard is measured, and the class label is annotated as complete.

Table R-3. Select Standard Class

Mnemonic	Standard Class
CLASS11A	(S_{11}): S_{11} 1st xx[1]
CLASS11B	(S_{11}): S_{11} 2nd xx[1]
CLASS11C	(S_{11}): S_{11} 3rd xx[1]
CLASS22A	(S_{22}): S_{22} 1st xx[1]
CLASS22B	(S_{22}): S_{22} 2nd xx[1]
CLASS22C	(S_{22}): S_{22} 3rd xx[1]
FWDT	FWD.TRANS xx[1]
REVT	REV.TRANS xx[1]
FWDM	FWD.MATCH xx[1]
REVM	REVM.MATCH xx[1]
FWDI	FWD.ISOL'N xx[1]
REVI	REV.ISOL'N xx[1]
TRLT	THRU xx[1]
TRLR1	S_{11} REFLECT xx[1]
TRLR2	S_{22} REFLECT xx[1]
TRLL	LINE xx[1]

1 xx=standard class label

See Also

ISOLATION

REV. MATCH xx

Measure reverse match measurement calibration standard. Where xx = class label.

Programming Code

REVM

Main Menu

CAL

Program Sequence

See TRANSMISSION .

Manual Sequence

See TRANSMISSION .

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

In the 2-port measurement calibration sequence, S_{22} of the reverse match standard (usually the thru) is measured to produce the error coefficient data for the reverse load match error coefficient, ELR. Since the label for the standard class and standard(s) are user-definable, the REVM mnemonic is used to select the standard class for measurement.

If a single standard comprises the class, S_{22} is selected, the standard is measured, logic checks that the standard covers the complete current frequency range, and the class label is annotated as complete.

When TRANS. DONE is selected, the single standard does not cover the complete current frequency range. The message CAUTION: ADDITIONAL STANDARDS NEEDED is displayed and bit 1 of the Primary Status byte is set.

If the REV. MATCH standard class uses more than one standard, then the mnemonic selects S_{22} and presents the standard selection menu. See STANA through STANG to specify which standard to measure.

`REV. MATCH xx`

See Also

`TRANSMISSION`

REV. TRANS. xx

Measure reverse transmission measurement calibration standard. Where xx = class label.

Programming Code

REVT

Main Menu

CAL

Program Sequence

See `TRANSMISSION` .

Manual Sequence

See `TRANSMISSION` .

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

In the 2-port measurement calibration sequence, S_{12} of the forward transmission standard (usually the thru) is measured to produce the error coefficient data for the reverse transmission signal path frequency response error coefficient, ETR. (Isolation, source match and load match are also used in developing 2-port ETR.) Since the label for the standard class and standard(s) are user-definable, the `REVT` mnemonic is used to select the standard class for measurement.

If a single standard comprises the class, S_{12} is selected, the standard is measured, logic checks that the standard covers the complete current frequency range, and the class label is annotated as complete.

When `TRANS. DONE` is selected, the single standard does not cover the complete current frequency range. The message `CAUTION: ADDITIONAL STANDARDS NEEDED` is displayed and bit 1 of the Primary Status Byte is set.

If the REV. TRANS. standard class uses more than one standard, then the mnemonic selects S_{12} and presents the standard selection menu. See STANA through STANG to specify which standard to measure.

See Also

TRANSMISSION

RIGHT LOWER

Select right lower quadrant for plot using digital plotter on 8510 System Bus.

Programming Code

RIGL

Main Menu

COPY

Program Sequence

RIGL;

Manual Sequence

[COPY]
   DEFINE PLOT
    SELECT QUADRANT
     RIGHT LOWER

Description

Preset	full page	Range	N/A
Initialization	full page	Recalled	yes
Coupled	always coupled		

See Also

SELECT QUADRANT

RIGHT MARGIN

Add a margin to the right side of printer plots (landscape orientation only).

Programming Code

PRINSIDMAR

Main Menu

COPY

Program Sequence

PRINSIDMAR [value];   *value = 0 to 1.0*

Manual Sequence

COPY
  DEFINE PRINT
  MORE
    RIGHT MARGIN [entry k/m]   (entry = 0 to 1000, k/m = mm)

Description

Preset	portrait: 12.7 mm landscape: 12.7 mm	Range	0 to 1.0m
Initialized	same as Preset	Recalled	yes
Coupled	always coupled		

When the printer plot is set to "landscape" orientation, RIGHT MARGIN specifies an offset in millimetres to the right side of the paper.

See Also

PRINT: LANDSCAPE , PRINT: PORTRAIT , DEFINE PRINT

RIGHT UPPER

Select right upper quadrant for plot using digital plotter on 8510 System Bus.

Programming Code

RIGU

Program Sequence

RIGU;

Manual Sequence

(COPY)
   DEFINE PLOT
     SELECT QUADRANT
       RIGHT UPPER

Description

Preset	full page	Range	N/A
Initialization	full page	Recalled	yes
Coupled	always coupled		

See Also

SELECT QUADRANT

S

$\boxed{\text{S11}}$

Select basic S-parameter on selected channel.

Programming Code

S11

Program Sequence

S11;

Manual Sequence

$\boxed{\text{S11}}$

Description

Preset	channel 1: S_{11}	Range	N/A
	channel 2: S_{21}		
Initialized	same as Preset	Recalled	yes
Coupled	always uncoupled		

Selecting a parameter recalls the last selected *FORMAT and RESPONSE* characteristics for that parameter on the selected channel.

See `REDEFINE PARAMETER` for standard basic parameter definitions.

Redefined basic parameters (except `CONVERSION`) cannot be saved or recalled.

See Also

`REDEFINE PARAMETER`

S12

Select basic S-parameter on selected channel.

Programming Code

S12

Program Sequence

S12;

Manual Sequence

S12

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

S11 for full description.

S21

Select basic S-parameter on selected channel.

Programming Code

S21

Program Sequence

S21;

Manual Sequence

S21

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

$\boxed{\text{S11}}$ for full description.

$\boxed{\text{S22}}$

Select basic S-parameter on selected channel.

Programming Code

S22

Program Sequence

S22;

Manual Sequence

$\boxed{\text{S22}}$

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

$\boxed{\text{S11}}$ for full description.

S_{11} DATA

Modify the color of S_{11} data on the display.

Programming Code

COLRS11D

Main Menu

DISPLAY

Programming Sequence

```
COLRS11D;
 TINT [value]; or
 CBRI [value]; or
 COLOR [value]; or
 RSCO;
SVCO;
```

Manual Sequence

DISPLAY
 ADJUST DISPLAY
  MODIFY COLORS
   S_{11} DATA
    TINT or
    BRIGHTNESS or
    COLOR or
    RESET COLORS or
    PREDEFINED COLORS
   PRIOR MENU
 PRIOR MENU
 SAVE COLORS

Description

Preset	yellow	Range	see MODIFY COLORS
Initialization	yellow	Recalled	yes, using
			SAVE COLORS
			RECALL COLORS
Coupled	always coupled		

The color of S_{11} data can be changed to any color, tint, and brightness combination.

Cycling power changes all color adjustments to the default defined colors. To recall previously modified colors, use the RECALL COLORS softkey.

FACTORY PRESET does not affect color selection.

See Also

MODIFY COLORS , DEFAULT COLORS , PREDEFINED COLORS , SAVE COLORS , RESET COLOR

S_{12} DATA

Modify the color of S_{12} data on the display.

Programming Code

COLRS12D

Main Menu

DISPLAY

Programming Sequence

```
COLRS12D;
 TINT [value]; or
 CBRI [value]; or
 COLOR [value]; or
 RSCO;
SVCO;
```

Manual Sequence

(DISPLAY)
  ADJUST DISPLAY
    MODIFY COLORS
      S_{12} DATA
        TINT or
        BRIGHTNESS or
        COLOR or
        RESET COLORS or
        PREDEFINED COLORS
      (PRIOR MENU)
    (PRIOR MENU)
    SAVE COLORS

S$_{12}$ DATA

Description

Preset	salmon	Range	see MODIFY COLORS
Initialization	salmon	Recalled	yes, using
			SAVE COLORS
			RECALL COLORS
Coupled	always coupled		

The color of S$_{12}$ data can be changed to any color, tint, and brightness combination.

Cycling power changes all color adjustments to the default defined colors. To recall previously modified colors, use the RECALL COLORS softkey.

FACTORY PRESET does not affect color selection.

See Also

MODIFY COLORS , DEFAULT COLORS , PREDEFINED COLORS , SAVE COLORS , RESET COLOR

S$_{21}$ DATA

Modify the color of S$_{21}$ data on the display.

Programming Code

COLRS21D

Main Menu

DISPLAY

Programming Sequence

```
COLRS21D;
 TINT [value]; or
 CBRI [value]; or
 COLOR [value]; or
 RSCO;
SVCO;
```

Manual Sequence

(DISPLAY)
  ADJUST DISPLAY
    MODIFY COLORS
      S$_{21}$ DATA
        TINT or
        BRIGHTNESS or
        COLOR or
        RESET COLORS or
        PREDEFINED COLORS
      (PRIOR MENU)
    (PRIOR MENU)
    SAVE COLORS

Description

Preset	cyan	Range	see MODIFY COLORS
Initialization	cyan	Recalled	yes, using
			SAVE COLORS
			RECALL COLORS
Coupled	always coupled		

The color of S$_{21}$ data can be changed to any color, tint, and brightness combination.

Cycling power changes all color adjustments to the default defined colors. To recall previously modified colors, use the RECALL COLORS softkey.

FACTORY PRESET does not affect color selection.

See Also

MODIFY COLORS , DEFAULT COLORS , PREDEFINED COLORS , SAVE COLORS , RESET COLOR

S$_{22}$ DATA

Modify the color of S$_{22}$ data on the display.

Programming Code

COLRS22D

Main Menu

DISPLAY

Programming Sequence

```
COLRS22D;
 TINT [value]; or
 CBRI [value]; or
 COLOR [value]; or
 RSCO;
SVCO;
```

Manual Sequence

(DISPLAY)
 ADJUST DISPLAY
  MODIFY COLORS
   S$_{22}$ DATA
    TINT or
    BRIGHTNESS or
    COLOR or
    RESET COLORS or
    PREDEFINED COLORS
   (PRIOR MENU)
 (PRIOR MENU)
 SAVE COLORS

Description

Preset	green	Range	see MODIFY COLORS
Initialization	green	Recalled	yes, using
			SAVE COLORS
			RECALL COLORS
Coupled	always coupled		

The color of S$_{22}$ data can be changed to any color, tint, and brightness combination.

Cycling power changes all color adjustments to the default defined colors. To recall previously modified colors, use the RECALL COLORS softkey.

FACTORY PRESET does not affect color selection.

See Also

MODIFY COLORS , DEFAULT COLORS , PREDEFINED COLORS , SAVE COLORS , RESET COLOR

S$_{11}$ MEM

Modify the color of S$_{11}$ memory on the display.

Programming Code

COLRS11M

Main Menu

DISPLAY

Programming Sequence

```
COLRS11D;
 TINT [value]; or
 CBRI [value]; or
 COLOR [value]; or
 RSCO;
SVCO;
```

Manual Sequence

(DISPLAY)
  ADJUST DISPLAY
    MODIFY COLORS
      S$_{11}$ MEM
        TINT or
        BRIGHTNESS or
        COLOR or
        RESET COLORS or
        PREDEFINED COLORS
      (PRIOR MENU)
    (PRIOR MENU)
    SAVE COLORS

S$_{11}$ MEM

Description

Preset	dim yellow	Range	see MODIFY COLORS
Initialization	dim yellow	Recalled	yes, using
			SAVE COLORS
			RECALL COLORS
Coupled	always coupled		

The color of S$_{11}$ memory can be changed to any color, tint, and brightness combination.

Cycling power changes all color adjustments to the default defined colors. To recall previously modified colors, use the RECALL COLORS softkey.

FACTORY PRESET does not affect color selection.

See Also

MODIFY COLORS , DEFAULT COLORS , PREDEFINED COLORS , SAVE COLORS , RESET COLOR

S$_{12}$ MEM

Modify the color of S$_{12}$ memory on the display.

Programming Code

COLRS12M

Main Menu

DISPLAY

Programming Sequence

```
COLRS12M;
 TINT [value]; or
 CBRI [value]; or
 COLOR [value]; or
 RSCO;
SVCO;
```

Manual Sequence

(DISPLAY)
  ADJUST DISPLAY
    MODIFY COLORS
      S_{12} MEM
        TINT or
        BRIGHTNESS or
        COLOR or
        RESET COLORS or
        PREDEFINED COLORS
      (PRIOR MENU)
    (PRIOR MENU)
    SAVE COLORS

Description

Preset	dim salmon	Range	see MODIFY COLORS
Initialization	dim salmon	Recalled	yes, using
			SAVE COLORS
			RECALL COLORS
Coupled	always coupled		

The color of S_{12} memory can be changed to any color, tint, and brightness combination.

Cycling power changes all color adjustments to the default defined colors. To recall previously modified colors, use the RECALL COLORS softkey.

FACTORY PRESET does not affect color selection.

See Also

MODIFY COLORS , DEFAULT COLORS , PREDEFINED COLORS , SAVE COLORS , RESET COLOR

S_{21} MEM

Modify the color of S_{21} memory on the display.

Programming Code

COLRS21M

Main Menu

DISPLAY

Programming Sequence

```
COLRS21M;
 TINT [value]; or
 CBRI [value]; or
 COLOR [value]; or
 RSCO;
SVCO;
```

Manual Sequence

DISPLAY
  ADJUST DISPLAY
   MODIFY COLORS
    S_{21} MEM
     TINT or
     BRIGHTNESS or
     COLOR or
     RESET COLORS or
     PREDEFINED COLORS
    PRIOR MENU
  PRIOR MENU
  SAVE COLORS

Description

Preset	dim cyan	Range	see MODIFY COLORS
Initialization	dim cyan	Recalled	yes, using
			SAVE COLORS
			RECALL COLORS
Coupled	always coupled		

The color of S_{21} memory can be changed to any color, tint, and brightness combination.

Cycling power changes all color adjustments to the default defined colors. To recall previously modified colors, use the RECALL COLORS softkey.

FACTORY PRESET does not affect color selection.

See Also

MODIFY COLORS , DEFAULT COLORS , PREDEFINED COLORS , SAVE COLORS , RESET COLOR

S$_{22}$ MEM

Modify the color of S$_{22}$ memory on the display.

Programming Code

COLRS22M

Main Menu

DISPLAY

Programming Sequence

```
COLRS22M;
 TINT [value]; or
 CBRI [value]; or
 COLOR [value]; or
 RSCO;
SVCO;
```

Manual Sequence

DISPLAY
  ADJUST DISPLAY
    MODIFY COLORS
      S$_{22}$ MEM
        TINT or
        BRIGHTNESS or
        COLOR or
        RESET COLORS or
        PREDEFINED COLORS
      PRIOR MENU
    PRIOR MENU
    SAVE COLORS

Description

Preset	dim green	**Range**	see MODIFY COLORS	
Initialization	dim green	**Recalled**	yes, using	
			SAVE COLORS	
			RECALL COLORS	
Coupled	always coupled			

The color of S$_{22}$ memory can be changed to any color, tint, and brightness combination.

Cycling power changes all color adjustments to the default defined colors. To recall previously modified colors, use the RECALL COLORS softkey.

FACTORY PRESET does not affect color selection.

See Also

MODIFY COLORS , DEFAULT COLORS , PREDEFINED COLORS , SAVE COLORS , RESET COLOR

S$_{11}$ DATA PEN: n

Select pen number to plot S$_{11}$ data. Where n = 1 to 10.

Programming Code

PENNS11D

Main Menu

COPY

Programming Sequence

PENNS11D [value];   *value = 1 to 10*

Manual Sequence

(COPY)
  DEFINE PLOT
    SET PEN NUMBERS
      S$_{11}$ DATA PEN: n [entry (x1)]   (entry = 1 to 10)
        (other selections)
      (PRIOR MENU)
    (PRIOR MENU)
  PLOT TO PLOTTER
    (select information to plot)

S-14 Keyword Dictionary

Description

Preset	pen 3	Range	1 to 10
Initialization	pen 3	Recalled	yes
Coupled	always coupled		

The default pen number is 3.

See Also

SET PEN NUMBERS for a complete description.

S_{12} DATA PEN: n

Select pen number to plot S_{12} data. Where n = 1 to 10.

Programming Code

PENNS12D

Main Menu

COPY

Programming Sequence

    PENNS12D [value];   *value = 1 to 10*

Manual Sequence

[COPY]
  DEFINE PLOT
    SET PEN NUMBERS
      S_{12} DATA PEN: n [entry (x1)] (entry = 1 to 10)
      (other selections)
      [PRIOR MENU]
    [PRIOR MENU]
  PLOT TO PLOTTER
    (select information to plot)

S_{12} DATA PEN: n

Description

Preset	pen 6	Range	1 to 10
Initialization	pen 6	Recalled	yes
Coupled	always coupled		

The default pen number is 6.

See Also

SET PEN NUMBERS for a complete description.

S_{21} DATA PEN: n

Select pen number to plot S_{21} data. Where n = 1 to 10.

Programming Code

PENNS21D

Main Menu

COPY

Programming Sequence

> PENNS21D [value];   *value = 1 to 10*

Manual Sequence

(COPY)
  DEFINE PLOT
    SET PEN NUMBERS
      S_{21} DATA PEN: n [entry (x1)]   (entry = 1 to 10)
        (other selections)
      (PRIOR MENU)
    (PRIOR MENU)
  PLOT TO PLOTTER
    (select information to plot)

Description

Preset	pen 5	Range	1 to 10
Initialization	pen 5	Recalled	yes
Coupled	always coupled		

The default pen number is 5.

See Also

SET PEN NUMBERS for a complete description.

S_{22} DATA PEN: n

Select pen number to plot S_{22} data. Where n = 1 to 10.

Programming Code

PENNS22D

Main Menu

COPY

Programming Sequence

PENNS22D [value];   *value = 1 to 10*

Manual Sequence

COPY
 DEFINE PLOT
  SET PEN NUMBERS
   S_{22} DATA PEN: n [entry x1]   (entry = 1 to 10)
    (other selections)
   PRIOR MENU
  PRIOR MENU
 PLOT TO PLOTTER
  (select information to plot)

S$_{22}$ DATA PEN: n

Description

Preset	pen 4	Range	1 to 10
Initialization	pen 4	Recalled	yes
Coupled	always coupled		

The default pen number is 4.

See Also

SET PEN NUMBERS for a complete description.

S$_{11}$ MEM PEN: n

Select pen number to plot S$_{11}$ memory. Where n = 1 to 10.

Programming Code

PENNS11M

Main Menu

COPY

Programming Sequence

PENNS11M [value];   *value = 1 to 10*

Manual Sequence

[COPY]
 DEFINE PLOT
  SET PEN NUMBERS
   S$_{11}$ MEM PEN: n [entry (x1)]   (entry = 1 to 10)
    (other selections)
    [PRIOR MENU]
   [PRIOR MENU]
 PLOT TO PLOTTER
  (select information to plot)

Description

Preset	pen 3	Range	1 to 10
Initialization	pen 3	Recalled	yes
Coupled	always coupled		

The default pen number is 3.

See Also

SET PEN NUMBERS for a complete description.

S_{12} MEM PEN: n

Select pen number to plot S_{12} memory. Where n = 1 to 10.

Programming Code

PENNS12M

Main Menu

COPY

Programming Sequence

PENNS12M [value];   *value = 1 to 10*

Manual Sequence

(COPY)
  DEFINE PLOT
    SET PEN NUMBERS
      S_{12} MEM PEN: n [entry (x1)]   (entry = 1 to 10)
      (other selections)
      (PRIOR MENU)
    (PRIOR MENU)
  PLOT TO PLOTTER
    (select information to plot)

S_{12} MEM PEN: n

Description

Preset	pen 6	Range	1 to 10
Initialization	pen 6	Recalled	yes
Coupled	always coupled		

The default pen number is 6.

See Also

SET PEN NUMBERS for a complete description.

S_{21} MEM PEN: n

Select pen number to plot S_{21} memory. Where n = 1 to 10.

Programming Code

PENNS21M

Main Menu

COPY

Programming Sequence

PENNS21M [value];   *value = 1 to 10*

Manual Sequence

(COPY)
  DEFINE PLOT
    SET PEN NUMBERS
      S_{21} MEM PEN: n [entry (x1)]   (entry = 1 to 10)
      (other selections)
      (PRIOR MENU)
    (PRIOR MENU)
  PLOT TO PLOTTER
    (select information to plot)

Description

Preset	pen 5	Range	1 to 10
Initialization	pen 5	Recalled	yes
Coupled	always coupled		

The default pen number is 5.

See Also

SET PEN NUMBERS for a complete description.

S$_{22}$ MEM PEN: n

Select pen number to plot S$_{22}$ memory. Where n = 1 to 10.

Programming Code

PENNS22M

Main Menu

COPY

Programming Sequence

PENNS22M [value];   *value = 1 to 10*

Manual Sequence

(COPY)
 DEFINE PLOT
  SET PEN NUMBERS
   S$_{22}$ MEM PEN: n [entry (x1)]   (entry = 1 to 10)
    (other selections)
   (PRIOR MENU)
  (PRIOR MENU)
 PLOT TO PLOTTER
  (select information to plot)

`S₂₂ MEM PEN: n`

Description

Preset	pen 4	Range	1 to 10
Initialization	pen 4	Recalled	yes
Coupled	always coupled		

The default pen number is 4.

See Also

`SET PEN NUMBERS` for a complete description.

S_{11}REFLECT xx

Measure TRL port 1 reflection standard. Where xx = the class label.

Programming Code

TRLR1

Main Menu

CAL

Program Sequence

```
CAL1; or CAL2;
  CALITRL2;
    TRLT;
    TRLR1;
    TRLR2;
    ISOL;
       (measure isolation standards)
      TRLL;
        SAVT;
          CALSn;  n = 1 to 8
```

Manual Sequence

$\boxed{\text{CAL}}$

CAL 1 xx (where xx = cal kit 1 label) or

CAL 2 xx (where xx = cal kit 2 label)

  TRL 2-PORT

    THRU THRU or

    S_{11} REFLECT SHORT or

    S_{22} REFLECT SHORT or

    LINE 2-18 LINE

      DONE

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

The second line of the softkey name for these is, user definable (standard label). If one standard is assigned to the TRL LINE class or TRL LINE class label if only one standard is assigned.

These keys cause the set of measurements needed to compute the error coefficients. They may be made in any order. THRU xx (TRLT) and LINE xx (TRLL) cycle through a series of S-parameter measurements, and leave the system in S_{11}. S_{11}REFLECT xx (TRLR1) and S_{22}REFLECT xx (TRLR2 measure and automatically selects one S-parameter only.

See Also

CALIBRATE TRL 2-PORT

S_{22}REFLECT xx

Measure TRL port 2 reflection standard. Where xx = the class label.

Programming Code

TRLR2

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

S_{11}REFLECT for full description.

(S_{11}): xxA

Select calibration standard class; if single standard in class, measure standard. Where xx = the class label.

Programming Code

CLASS11A

Main Menu

CAL

Program Sequence

S_{11} 1-port, 7 mm Calibration Kit Example

```
CAL1; or CAL2;
  CALIS111;
    CLASS11A;
      CLASS11B;
        CLASS11C;
          STANA;
            DONE;
              SAV1;
                CALSn;    n = 1 to 8
```

Manual Sequence

S_{11} 1-port, 7 mm Calibration Kit Example

[CAL]
   CAL 1 xx (xx=cal kit 1 label) or
   CAL 2 xx (xx=cal kit 2 label)
    S_{11} 1-PORT
     S_{11}: OPEN
      S_{11}: SHORT
       S_{11}: LOADS
        BROADBAND
         DONE: LOADS
          SAVE 1-PORT CAL
           CAL SET n (n = 1 to 8)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

In the S_{11} 1-PORT, S_{22} 1-PORT, and 2-PORT REFLECTION measurement calibration
sequences, three classes of standards (usually a short, an open, and a load) are measured
at each port to produce the error coefficient data. Since the labels for each standard are
user-definable, these mnemonics are used to select the standard class for measurement.

If a class uses more than one standard, then selecting the softkey or the mnemonic only
presents the standard selection menu. See STANA through STANG, to specify which standard to
measure.

If a single standard comprises the class, the standard is measured, logic checks that the
standard covers the complete current frequency range, and the class label is annotated as
complete. If the single standard does not cover the complete current frequency range then
the message CAUTION: ADDITIONAL STANDARDS NEEDED is displayed and bit 1 of the Primary
Status byte is set.

$(S_{11}):$ xxA

Table S-1. Select Standard Class

Mnemonic	Standard Class
CLASS11A	(S_{11}): S_{11} 1st xx[1]
CLASS11B	(S_{11}): S_{11} 2nd xx[1]
CLASS11C	(S_{11}): S_{11} 3rd xx[1]
CLASS22A	(S_{22}): S_{22} 1st xx[1]
CLASS22B	(S_{22}): S_{22} 2nd xx[1]
CLASS22C	(S_{22}): S_{22} 3rd xx[1]
FWDT	FWD.TRANS xx[1]
REVT	REV.TRANS xx[1]
FWDM	FWD.MATCH xx[1]
REVM	REVM.MATCH xx[1]
FWDI	FWD.ISOL'N xx[1]
REVI	REV.ISOL'N xx[1]
TRLT	THRU xx[1]
TRLR1	S_{11} REFLECT xx[1]
TRLR2	S_{22} REFLECT xx[1]
TRLL	LINE xx[1]

1 xx=standard class label

See Also

MODIFY 1 xx , MODIFY 2 xx , CALIBRATE: (calibration type)

$(S_{11}):$ xxB

Select calibration standard class; if single standard in class, measure standard. Where xx = the class label.

Programming Code

CLASS11B

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

(S_{11}): xxA for full description.

(S_{11}): xxC

Select calibration standard class; if single standard in class, measure standard. Where xx = the class label.

Programming Code

CLASS11C

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

(S_{11}): xxA for full description.

$(S_{22}):$ `xxA`

Select calibration standard class; if single standard in class, measure standard. Where xx = the class label.

Programming Code

CLASS22A

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

$(S_{11}):$ `xxA` for full description.

$(S_{22}):$ `xxB`

Select calibration standard class; if single standard in class, measure standard. Where xx = the class label.

Programming Code

CLASS22B

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

(S_{11}): xxA for full description.

(S_{22}): xxC

Select calibration standard class; if single standard in class, measure standard. Where xx = the class label.

Programming Code

CLASS22C

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

(S_{11}): xxA for full description.

SALMON

Set the specified display element to salmon.

Main Menu

DISPLAY

Manual Sequence

DISPLAY
 ADJUST DISPLAY
  MODIFY COLORS
    (select display element)
      PREDEFINED COLORS
        SALMON
         [other changes]

SALMON

PRIOR MENU

PRIOR MENU

PRIOR MENU

SAVE COLORS

Description

Preset	not changed	Range	N/A
Initialized	tint = 0 brightness = 100% color = 36%	Recalled	yes, using SAVE COLORS , RECALL COLORS
Coupled	always coupled		

The default value for S_{12} data trace display element is salmon and a dimmer brightness of 75%, it is used for S_{12} memory trace.

Note This function is not implemented on an 8510B with firmware (6.0 or greater) revisions only.

See Also

PREDEFINED COLORS , MODIFY COLOR , DEFAULT COLORS

SAVC

Store calibration error coefficients sets loaded via 8510 GPIB.

Main Menu

None (GPIB ONLY)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Select calibration type, load error coefficient sets into 8510 memory using INPUCALCn. Then issue SAVC and CALSn. Follow with CORRON; CALSn; to turn correction on. Correction is turned on and corrected data is displayed.

The Calibration Set Limited Instrument State saved with the calibration set reflects the instrument state at the time that SAVC is issued.

See Also

INPUCALCn, CAL SET n

(SAVE)

Present save instrument state menu.

Programming Code

MENUSAVE

Program Sequence

MENUSAVE;

Manual Sequence

(SAVE)
INST STATE 1 or
INST STATE 2 or
INST STATE 3 or
INST STATE 4 or
INST STATE 5 or
INST STATE 6 or
INST STATE 7 or
USER PRESET *8

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

If correction is turned on, then the references to the calibration set(s) are saved, but not the actual contents of the calibration sets.

Includes all Parameter/Format/Response selections, except that Basic Parameter redefinitions are not saved (see REDEFINE PARAMETER).

See Also

INST STATE n

`SAVE 1-PORT CAL`

1-port measurement calibration sequence is complete. Compute reflection calibration errors coefficients.

Programming Code

SAV1

Main Menu

CAL

Program Sequence

See `CALIBRATE: S₁₁ 1-PORT` and `CALIBRATE: S₂₂ 1-PORT`.

Manual Sequence

See `CALIBRATE: S₁₁ 1-PORT` and `CALIBRATE: S₂₂ 1-PORT`.

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Must be followed by `CAL SET n` or error coefficients are lost.

`SAVE 2-PORT CAL`

2-port measurement calibration sequence is complete. Compute remaining calibration error coefficients.

Programming Code

SAV2

Main Menu

CAL

Program Sequence

See `CALIBRATE: FULL 2-PORT` and `CALIBRATE: ONE-PATH 2-PORT` .

Manual Sequence

See `CALIBRATE: FULL 2-PORT` and `CALIBRATE: ONE-PATH 2-PORT` .

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Must be followed by `CAL SET n` or error coefficients are lost.

SAVE COLORS

Save the current color selections in the "user's color" part of the Hardware State.

Programming Code

SVCO

Main Menu

DISPLAY

Program Sequence

(select display element)
(select color)
[other changes]
SVCO;

SAVE COLORS

Manual Sequence

[DISPLAY]
  ADJUST DISPLAY
    MODIFY COLORS
      (select display element)
      (select color)
      [other changes]
        [PRIOR MENU]
      [PRIOR MENU]
    [PRIOR MENU]
  SAVE COLORS

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

The setting saved by the SAVE COLORS softkey are recalled by the RECALL COLORS softkey. If the current color selections are not saved, the selections are lost when power is cycled. SAVE COLORS does not change the default colors recalled at power-up.

Note	This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

RECALL COLORS , PREDEFINED COLORS , MODIFY COLORS , DEFAULT COLORS

SAVE RCVR CAL

Save receiver calibration. Follow by CAL SET n

Programming Code

SAVR

Main Menu

CAL

Program Sequence

See `RECEIVER CAL` (CALRCVR).

Manual Sequence

See `RECEIVER CAL`.

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

`SAVE RCVR CAL` causes the corrections to be calculated for absolute input and output power and prepared for storage in a calibration set. It must be followed by `CAL SET n` or the coefficients are lost.

See Also

`RECEIVER CAL`
`CAL SET n`

SAVE RESP & ISOL

Response and isolation calibration done. Followed by `CAL SET n`

Programming Code

RAID

Main Menu

CAL

`SAVE RESP & ISOL`

Program Sequence

See `CALIBRATE: RESPONSE & ISOL'N`

Manual Sequence

See `CALIBRATE: RESPONSE & ISOL'N`

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

`SAVE RESP&ISOL` causes the error terms to be computed and prepared for saving into a calibration set. It must be followed by `Cal Set n`, or error coefficients are lost.

See Also

`CALIBRATE: RESPONSE & ISOL'N`

`SAVE TRL 2-PORT`

Save TRL 2-port measurement calibration. Followed by `CAL SET n`.

Programming Code

SAVT

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Error terms are computed (if all needed measurements have been made), and prepared for storage in a calibration set.

Must be followed by `CAL SET n` or error coefficients are lost.

See Also

CALIBRATE: TRL 2-PORT , LOWBAND REFLECTION

SCALE

Select Cartesian Y-axis and Polar scale/division.

Programming Code

SCAL

Program Sequence

SCAL [value]; (value = basic units of format)

Manual Sequence

SCALE [entry] (x1 = basic units of format)

Description

Preset	see below	Range	depends on format
Initialized	see below	Recalled	yes
Coupled	always uncoupled		

For Polar displays, SCALE and REF VALUE interact.

For Smith and Inverted Smith displays, SCALE and REF VALUE are given in units of the LIN mkr on Polar format.

FACTORY PRESET selects appropriate SCALE values for each format.

It is used with the S-parameter test sets which provide automatic forward and reverse signal path switching.

SEARCH: LEFT

Active marker searches left from current position for selected min, max, or target.

Programming Code

SEAL

Main Menu

MARKER

Program Sequence

SEAL;

Manual Sequence

> (MARKER)
> > MORE
> > > TARGET VALUE
> > > > (input value)
> > > > > SEARCH: LEFT or
> > > > > SEARCH: RIGHT

Description

Preset	marker to target search	Range	N/A
Initialized	same as Preset	Recalled	N/A
Coupled	N/A		

Search left/right pertains to one of the following: marker to target, marker to minimum, or marker to maximum. The search mode is highlighted, and can be different for channel 1 and channel 2. The mode is selected by pressing the associated softkey.

Selecting MARKER to TARGET searches for the first target value. Search left or right then searches for the target value starting at the current stimulus value for the marker, and moving in the appropriate direction.

Selecting MARKER to MAXIMUM finds the global maximum value. Search left or right then searches for the local maximum in the region specified (e.g. from the current marker stimulus value to the lowest or highest stimulus value).

Note that a local maximum is defined as a point on the trace that is greater than its left and right neighbor points. In other words, it is a peak in its immediate region.

MARKER to MINIMUM functions in a similar manner.

See Also

MARKER to MAXIMUM , MARKER to MINIMUM , MARKER to TARGET

SEARCH: RIGHT

Active marker search right from current position for selected min, max, or target.

Programming Code

SEAR

Main Menu

MARKER

Program Sequence

SEAR;

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

See SEARCH: LEFT for full description.

SEGMENT

Choose the active segment.

Programming Code

SEGM

`SEGMENT`

Main Menu

STIMULUS

Program Sequence

```
EDITLIST;
  SEGM [value];     value = 1 to 30
    SDEL;
      EDITDONE;
```

Manual Sequence

`STIMULUS`
  `MORE`
    `EDIT LIST`
      `SEGMENT` entry (x1)   (entry = 1 to 30)
        `EDIT` or
        `DELETE`
          (define segment)
        `DONE`

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

This key allows you to specify the active segment (shown by the arrow). This is the segment that is edited if `EDIT` is selected, and is the segment that is deleted when `DELETE` is pressed.

Selecting this as the active function also turns on the knob, `STEP ↑` and `STEP ↓` are for scrolling through the list.

See Also

`EDIT LIST`

SEGMENT: CENTER

Specify the center frequency value of the current segment.

Programming Code

CENT

Main Menu

STIMULUS

Program Sequence

```
        EDITLIST;
          SADD;
            STAR [value];
            STOP [value];
            POIN [value];
          SDON; or
          SADD;
            CENT [value];
            SPAN [value];
            STPSIZE [value];
          SDON;
                EDITDONE
```

Manual Sequence

STIMULUS (MENU)
  MORE
   EDIT LIST
    EDIT or
    ADD
    SEGMENT: START [entry] ((x1) = Hz) or
    SEGMENT: STOP [entry] ((x1) = Hz) or
    SEGMENT: CENTER [entry] ((x1) = Hz) or
    SEGMENT: SPAN [entry] ((x1) = Hz) or
    SEGMENT: NUMBER of POINTS [entry] ((x1) = integer # of points) or
    SEGMENT: STEP SIZE [entry] ((x1) = Hz) or
    SEGMENT: CW [entry] ((x1) = Hz) or
   DONE
  DONE

`SEGMENT: CENTER`

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

These are the keys and commands used to edit the active segment:

`SEGMENT: DONE` : This command completes the segment editing process. When received, the new frequency values from the segment are sorted into the frequency list. If Frequency List mode is currently selected, the new segment is measured.

`SEGMENT: NUMBER OF POINTS` : Specifies number of points in current segment.

`SEGMENT: SPAN` : Specifies frequency span in current segment.

`SEGMENT: START` : Specifies start frequency of current segment.

`SEGMENT: STEP SIZE` : This command changes the step size of the current segment. Changing the step size alters the stop value of the segment and the number of points so that the segment is divided into an integral number of steps.

`SEGMENT:  STOP` : Specifies stop frequency in current segment.

See Also

`FREQUENCY LIST` , `SEGMENT`

`SEGMENT: CW`

Change the current segment to a single frequency and specify that frequency.

Programming Code

CWFREQ

Main Menu

STIMULUS

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

SEGMENT: CENTER for full description.

SEGMENT: DONE

Incorporate the new segment into the frequency list.

Programming Code

SDON

Main Menu

STIMULUS

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

SEGMENT: CENTER for full description.

SEGMENT: NUMBER of POINTS

Specify the number of segment points in the current segment.

Programming Code

POIN

Main Menu

STIMULUS

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

SEGMENT: CENTER for full description.

SEGMENT: SPAN

Specify the frequency span of the current segment.

Programming Code

SPAN

Main Menu

STIMULUS

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

SEGMENT: CENTER for full description.

SEGMENT: START

Specify the start frequency of the current segment.

Programming Code

STAR

Main Menu

STIMULUS

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

SEGMENT: CENTER for full description.

SEGMENT: STEP SIZE

Specify the current frequency list segment step size.

Programming Code

STPSIZE

Main Menu

STIMULUS

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

SEGMENT: CENTER for full description.

SEGMENT: STOP

Specify the stop frequency of the current segment.

Programming Code

STOP

Main Menu

STIMULUS

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

SEGMENT: CENTER for full description.

SELECT DEFAULTS

Present select trace math defaults menu.

Programming Code

None

Main Menu

DISPLAY

Manual Sequence

(DISPLAY)
  SELECT DEFAULTS
    MATH OPERATIONS or
    DEFAULT to MEMORY: 1 or
    DEFAULT to MEMORY: 2 or
    DEFAULT to MEMORY 3 or
    DEFAULT to MEMORY: 4 or
    DATA from CHANNEL 1 or
    DATA from CHANNEL 2

Description

Preset	default to memory: 1 and math (/) for Channel 1	Range	N/A
	default to memory: 2 and math (/) for Channel 2		
Initialized	same as Preset	Recalled	yes
Coupled	always uncoupled		

See Also

DISPLAY: MATH (operator)

SELECT LETTER

Current selected character is added to title.

Programming Code

None

Main Menu

TITLE

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Current selected character is indicated by the up arrow (↑) beneath the character. The up arrow position is controlled by the knob.

SELECT QUADRANT

Present plot quadrant select menu.

Programming Code

None

Main Menu

COPY

Manual Sequence

(COPY)
DEFINE PLOT
SELECT QUADRANT
LEFT UPPER or
LEFT LOWER or
RIGHT UPPER or
RIGHT LOWER or
FULL PAGE

Description

Preset	full page	Range	N/A
Initialized	full page	Recalled	yes
Coupled	always coupled		

SERVICE FUNCTIONS

Present service functions select menu.

Programming Code

None

Main Menu

SYSTEM

Manual Sequence

(SYSTEM)
MORE
  SERVICE FUNCTIONS
    SOFTWARE REVISION or
    SYSTEM BUS 'LOCAL' or
    SYSTEM BUS 'REMOTE' or
    IF GAIN or
    PEEK/POKE LOCATION or
    PEEK or
    POKE or
  TEST MENU

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

SERVICE SELECTIONS

Service use only. Selects display of various internal test points.

Programming Code

None

Main Menu

PARAMETER

Program Sequence

Figure S-1. Service Selections Program Sequence

Manual Sequence

(select Basic or User parameter)
  PARAMETER (MENU)
    REDEFINE PARAMETER
      NUMERATOR
        SERVICE SELECTIONS
          SERVICE: TEST CAL or
          SERVICE: REF CAL or
          SERVICE: DETECTOR GROUND or
          SERVICE: ADC GROUND or
          SERVICE: VCAL or
          SERVICE: VREF
          SERVICE: TEMP. 1 or
          SERVICE: TEMP. 2 or
          [other changes]
            REDEFINE DONE

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

SERVICE: ADC GROUND

Service use only.

Programming Code

SERVADCG

Main Menu

PARAMETER

Description

Preset	standard basic and user parameter definitions	Range	N/A
Initialized	same as Preset	Recalled	basic parameters: no user parameters: yes
Coupled	always coupled		

See Also

SERVICE SELECTIONS

SERVICE: DETECTOR GROUND

Service use only.

Programming Code

SERVDETG

Main Menu

PARAMETER

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

`SERVICE: DETECTOR GROUND`

See Also

See `SERVICE: ADC GROUND` for full description.

SERVICE: REF CAL

Service use only.

Programming Code

SERVREFC

Main Menu

PARAMETER

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

See `SERVICE: ADC GROUND` for full description.

SERVICE: TEMP.1

Service use only.

Programming Code

SERVTEMP1

Main Menu

PARAMETER

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

See SERVICE: ADC GROUND for full description.

SERVICE: TEMP.2

Service use only.

Programming Code

SERVTEMP2

Main Menu

PARAMETER

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

See SERVICE: ADC GROUND for full description.

SERVICE: TEST CAL

Service use only.

Programming Code

SERVTESC

Main Menu

PARAMETER

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

See `SERVICE: ADC GROUND` for full description.

SERVICE: VCAL

Service use only.

Programming Code

SERVVCAL

Main Menu

PARAMETER

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

See `SERVICE: ADC GROUND` for full description.

SERVICE: VREF

Service use only.

Programming Code

SERVVREF

Main Menu

PARAMETER

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

See SERVICE: ADC GROUND for full description.

SET DAY

Set the day of the month entry in the date/time annotation.

Programming Code

SETDAY

Main Menu

SYSTEM

Program Sequence

SETDAY [n]; $n = 1$ to 31

`SET DAY`

Manual Sequence

`[SYSTEM]`
`DISPLAY FUNCTIONS`
   `DATE/TIME FUNCTIONS`
      `SET DAY` [entry `[x1]`] (entry = 1 to 31)

Description

Preset	not changed	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

When `SET DAY` is activated, the display is annotated automatically with a running date/time calendar at the lower right of the LCD/CRT.

Note	This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

`DATE/TIME ON`, `DATE/TIME FUNCTIONS`

`SET FREQ.`
`(LOW PASS)`

Set frequency range for Time Domain low pass mode.

Programming Code

SETF

Note	Applies to Time Domain Option 010 Only

Main Menu

CAL or DOMAIN

Program Sequence

In the (CAL) menu.

> *(select number of points)*
>> CAL1; or CAL2;
>>> *(set STOP frequency)*
>>>> SETF;
>>>>> *(select calibration type)*

Manual Sequence

In the (CAL) Menu.

(CAL)
> (select number of points)
>> CAL 1 xx (where xx = cal kit 1 label) or
>> CAL 2 xx (where xx = cal kit 2 label)
>>> (set stop frequency)
>>>> SET FREQ. (LOW PASS)
>>>>> (select calibration type)

Program Sequence

In the (DOMAIN) menu.

> *(select number of points)*
>> *(set stop frequency)*
>>> TIML; (SETF *is included* in TIML)
>>>> LOWPSTEP; or LOWPIMPU;

Manual Sequence

In the (DOMAIN) menu.

(DOMAIN)
> (select number of points)
>> (set stop frequency)
>>> (DOMAIN)
>>>> TIME LOW PASS
>>>>> SET FREQ. (LOW PASS)
>>>>>> SPECIFY TIME
>>>>>>> LOW PASS: STEP or
>>>>>>>> LOW PASS: IMPULSE

SET FREQ. (LOW PASS)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Set the stop frequency, then select SET FREQ (LOW PASS) which automatically sets the frequency sweep to:

$F_{start} = F_{stop}/Number\ of\ Points$

where the start frequency to rounded to nearest Hz, or 45 MHz whichever is greater, then F_{stop} is set to:

$F_{stop} = Number\ of\ Points \times F_{start}$

in order to obtain the harmonically related frequency steps necessary for time low pass domain modes.

SET FREQ. (LOW PASS) may be used at any time, from the Calibration Menu or the Domain Menu. If it has been selected once, selecting it again has no effect unless the frequency range or number of points has been changed. Selecting SET FREQ. (LOW PASS) with correction on, causes correction to be turned off if the frequency range changes.

Table S-2. Minimum Frequency Ranges for Time Low Pass

Number of Points	Minimum Frequency Range (GHz)		
	Start	Stop	
		2-point	1-point
51	0.045	1.170	2.295
101	0.045	2.295	4.545
201	0.045	4.545	9.045
401	0.045	18.045	36.045

SET HOUR

Set the hour entry in the date/time annotation.

Programming Code

SETHOUR

Main Menu

SYSTEM

Program Sequence

SETHOUR [n]; $n = 0 \text{ to } 24$

Manual Sequence

[SYSTEM]
DISPLAY FUNCTIONS
    DATE/TIME FUNCTIONS
        SET HOUR [entry [x1]]   (entry = 0 to 24)

Description

Preset	not changed	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

When SET HOUR is activated, the display is annotated automatically with a running date/time calender at the lower right of the LCD/CRT. The 24-hour style clock is used rather than the 12-hour am/pm designation.

Note   This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

DATE/TIME FUNCTIONS , DATE/TIME ON

SET MINUTE

Set the minutes and seconds entry in the date/time annotation.

Programming Code

SETMIN

Main Menu

SYSTEM

Program Sequence

SETMIN [n]; $n = 0 \ to \ 60$

Manual Sequence

SYSTEM
DISPLAY FUNCTIONS
    DATE/TIME FUNCTIONS
        SET MINUTE [entry x1]   (entry = 0 to 60)

Description

Preset	not changed	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

When SET MINUTE is activated, the display is annotated automatically with a running date/time calender at the lower right of the LCD/CRT. The seconds part of the annotation is automatically reset to zero every time the minutes part is changed.

Note   This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

DATE/TIME FUNCTIONS , DATE/TIME ON

SET MONTH

Set the month entry in the date/time annotation.

Programming Code

SETMTH

Main Menu

SYSTEM

Program Sequence

SETMTH [n];   *n = 1 to 12*

Manual Sequence

[SYSTEM]
DISPLAY FUNCTIONS
   DATE/TIME FUNCTIONS
      SET MONTH [entry (x1)]   (entry = 1 to 12)

Description

Preset	not changed	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

When SET MONTH is activated, the display is annotated automatically with a running date/time calender at the lower right of the LCD/CRT. The 8510 automatically converts the month number to the corresponding three letter abbrevation in the running date/time display.

Note   This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

DATE/TIME FUNCTIONS , DATE/TIME ON

SET PEN NUMBERS

Present pen number select menu.

Programming Code

See individual elements.

Main Menu

COPY

Manual Sequence

(COPY)
  DEFINE PLOT
    SET PEN NUMBERS
      SOFTKEYS PEN: n or
      WARNING PEN: n or
      S11 DATA PEN: n or
      S22 DATA PEN: n or
      S21 DATA PEN: n or
      S12 DATA PEN: n or
      GRATICULE PEN: n or
      MORE
      MARKERS PEN: n or
      S11 MEM PEN: n or
      S22 MEM PEN: n or
      S21 MEM PEN: n or
      S12 MEM PEN: n or
      STIMULUS PEN: n

Description

Preset	see DEFAULT PEN NUMBRS	Range	N/A
Initialized	same as Preset	Recalled	yes
Coupled	always uncoupled		

Refer to plotter operating manual for plotter response to selection of non-existent pen.

You can select numerous color combinations for plotted material by how you load the pen carousel. In general, avoid using yellow pens because yellow does not show up on white paper very well and it does not photocopy well either.

The following are recommended color selections based on usage.

Table S-3. To Match the Default Display Colors

Color	Pen Size	Pen Slot	Plots
Black	3	1	Grid, Markers, Stimulus values.
Red	3	2	Warnings.
Orange	3	3	S_{11} data and memory.
Green	3	4	S_{22} data and memory.
Aqua	3	5	S_{21} data and memory.
Red-Violet	3	6	S_{12} data and memory.

Table S-4.
To Get the Greatest Contrast for
Originals and Photocopies
(Dual Channel Plots[1])

Color	Pen Size	Pen Slot	Plots
Black	3	1	Grid, Markers, Stimulus values.
Green	3	2	S_{21} memory.
Aqua	7	3	S_{11} data.
Red-Violet	3	5	S_{11} memory.
Red	7	6	S_{21} data.

[1] The thicker pens are recommended for the data traces so they are emphasized. If you plot all four s-parameters, you may want to select the size 3 pens for all. The smaller size of the individual plots makes it diffcult to read the thicker pens.

See Also

DEFINE PLOT , SELECT QUADRANT

SET REF.: REFLECT

Set the measurement reference plane in TRL by the reflection standard.

Programming Code

SETRREFL

`SET REF.: REFLECT`

Main Menu

CAL

Program Sequence

See `TRL OPTION`

Manual Sequence

See `TRL OPTION`

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

During the TRL process, one of two approaches can be used to set the measurement reference plane:

1. If the thru is zero-length, or relatively short compared to the difference between the thru and line (less than 2 to 3 times longer), or the phase characteristics of the reflection are not well known, select `SET REF.: THRU`.

2. If the thru is physically long and the phase of the reflection is well known, select `SET REF.: REFLECT`.

See Also

`CALIBRATE: TRL 2-PORT`

`SET REF.: THRU`

Set the measurement reference plane in TRL by the thru standard.

Programming Code

SETRTHRU

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

SET REF.: REFLECT for full description.

SET UP DISC

Brings up the menu that allows disc initialization and disc unit, volume number, and disc format to be set.

Main Menu

DISC

Manual Sequence

(DISC)
  STORAGE IS INTERNAL or STORAGE IS EXTERNAL
    SET UP DISC

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

DISC UNIT NUMBER, DISC VOLUME, INITIALIZE DISC, SAVE USING ASCII,
SAVE USING BINARY

SET YEAR

Set the year entry in the date/time annotation.

Programming Code

SETYEAR

Main Menu

SYSTEM

Program Sequence

SETYEAR [n]; $n = 00$ to 99

Manual Sequence

[SYSTEM]
DISPLAY FUNCTIONS
    DATE/TIME FUNCTIONS
        SET YEAR [entry (x1)]   (entry = 0 to 99)

Description

Preset	not changed	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

When SET YEAR is activated, the LCD/CRT is annotated automatically with a running date/time calender at the lower right of the display. Only the last two digits of the year are shown.

Note This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

DATE/TIME FUNCTIONS , DATE/TIME ON

SET Z_0

Set system Z_0.

Programming Code

SETZ

Main Menu

CAL

Program Sequence

SETZ [value]; *value = ohms*

Manual Sequence

    CAL
      MORE
        SET Z_0 [entry] (x1 = ohms)

Description

Preset	$Z_0=50\Omega$	Range	N/A
Initialized	$Z_0=50\Omega$	Recalled	yes
Coupled	always coupled		

Z_0 is used as:

■ The center point in the Smith and Inverted Smith formats.

■ Z_0 in the load type calibration standard models.

■ Z_0 in the REDEFINE PARAMETER , CONVERT to Z and CONVERT to Y definitions.

SIMS

Simulate standard measurement. Transfers raw data into selected calibration coefficient array.

Main Menu

None (GPIB ONLY)

Program Sequence

```
(select instrument state)
    TRIG;
      CAL1; or CAL2;
        (select calibration type)
            (select standard)
            (wait for Bit 2 of Primary Status Byte)
                SDC NWA (Selected Device Clear)
                  INPURAW1;
                    (send real, imaginary pairs)
                        SIMS;
                          (repeat for each required standard)
                              DONE or SAVn; CALSn;  n = 1 to 8
                                FRER;
```

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

This allows data to be used in any calibration supplied from an external computer.

To begin the calibration procedure, the analyzer is set to the `TRIG` mode. When data is normally measured during calibration, a request for trigger occurs (see SRQM - BIT #2). Instead of responding with a GPIB trigger, do a device clear (CLEAR 716 in HP BASIC), input raw data of the simulated standard, and then execute a `SIMS` command. This causes the input raw data to be used in place of measured data.

Repeat the standard selection, selected device clear, input data, and issue a `SIMS` command; for each required standard of the calibration type. Finally save the calibration set. Use `FRER`; to return to the selected sweep mode.

See Also

SRQM, TRIG

SINGLE

Execute a single group of sweeps, then hold.

Programming Code

SING

Main Menu

STIMULUS

Program Sequence

SING;

Manual Sequence

STIMULUS [MENU]
  MORE
    SINGLE

Description

Preset	continual	Range	N/A
Initialized	continual	Recalled	yes
Coupled	always coupled		

Operational equivalent to NUMBER of GROUPS 1 . Bit 4 of the Primary Status byte is set upon completion of data acquisition.

After a SING command is issued to the 8510 interface bus, bus activity is held off until the group is complete.

SINGLE PARAMETER

Display the active channel current selected parameter on the display.

Programming Code

SINC

Main Menu

DISPLAY

Program Sequence

(select parameter)
SINC;

Manual Sequence

(select parameter)
[DISPLAY]
   DISPLAY MODE
      SINGLE PARAMETER

Description

Preset	single channel single parameter	**Range**	N/A
Initialized	same as Preset	**Recalled**	yes
Coupled	always uncoupled		

Note	This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

SINGLE CHANNEL , FOUR PARAM OVERLAY , FOUR PARAM SPLIT , DUAL CHANNEL OVERLAY ,
DUAL CHANNEL SPLIT

SINGLE POINT

Select single point mode.

Programming Code

SINP

Main Menu

STIMULUS

Program Sequence

```
FREQ;
 SINP;
 CENT [value [freq or time suffix] ];
```

Manual Sequence

(DOMAIN)
   FREQUENCY
STIMULUS (MENU)
   SINGLE POINT
      CENTER [entry] ((x1) = Hz)

Description

Preset	ramp	Range	N/A
Initialized	ramp	recalled	yes
Coupled	always coupled		

In the Frequency Domain, the center frequency of the current sweep is selected. Use the (CENTER) function to set the CW measurement frequency. Measurement data is taken once each time interval defined by the sweep time setting. Only the first point of the trace is new data; the remaining points are replicates of the first.

SINGLE SEGMENT

Measure single frequency list segment.

Programming Code

SSEG

Main Menu

STIMULUS

Program Sequence

```
LISFREQ;
 SSEGn;  n = segment number
```

Manual Sequence

STIMULUS (MENU)
  FREQUENCY LIST
    SINGLE SEGMENT
      (enter segment number), (x1)

Description

Preset	all segments	Range	N/A
Initialized	all segments	Recalled	yes
Coupled	always coupled		

After pressing FREQUENCY LIST , the Frequency List Segment Select menu appears.
SINGLE SEGMENT causes the Edit List Display to appear with Segment as the active function.

When SINGLE SEGMENT is selected directly after preset, Segment 1 is active. Thereafter, the last selected segment is active. Enter the segment number to be measured using the knob, step keys, or numeric entry.

If CORRECTION ON is selected, correction is applied to the current segment.

See Also

ALL SEGMENTS , FREQUENCY LIST

SLIDE is SET

Measure one position of sliding load.

Programming Code

SLIS

Main Menu

CAL

Program Sequence

See STANA through STANG and SLID.

Manual Sequence

See STANA through STANG and SLIDING LOAD DONE .

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

For best accuracy in measuring directivity, the slide is moved to result in five to eight unique points distributed over the full 360° at each frequency point. This is accomplished by moving the sliding element over its full range in five to eight unequally spaced increments. If the sliding load has these increments marked on the housing, use the labeled increments, beginning with the slide closest to the test port.

If ramp mode is selected, and averaging is on, averaging is restarted and n+1 sweeps are taken.

Any number (more than five) of sliding load positions may be measured.

See Also

SLIDING , SLIDING LOAD DONE , STANA through STANG

SLIDING

Define load type as sliding.

Programming Code

SLIL

Main Menu

CAL

Program Sequence

See `MODIFY 1 xx` and `MODIFY 2 xx` .

Manual Sequence

See STD TYPE: LOAD.

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

During a modify calibration kit sequence, this keyword is used to specify that when the standard is selected during the measurement calibration sequence, the standard is treated as a sliding load, requiring multiple measurements to obtain the value for directivity.

See Also

`FIXED` , `MODIFY 1 xx` , `MODIFY 2 xx` , `STANA` through `STANG`, `STD TYPE: LOAD`

SLIDING LOAD DONE

Measurement of the sliding load is complete.

Programming Code

SLID

Main Menu

CAL

Program Sequence

Standard 7 mm example

```
CAL1; or CAL2;
(select 1-port or 2-port Reflection calibration)
    STANC;
 (position load element)
    SLIS;    (repeat at 5 to 8 positions of sliding load)
    SLID;
  [measure other standards]
   SAVEn;   n = 1 or 2
 CALSn;     n = 1 to 8
```

Manual Sequence

Standard 7 mm Example

CAL 1xx or CAL 2xx (where xx = cal kit label)
  (select 1-port or 2-port calibration)
   LOADS
     SLIDING
       (position load element)
         SLIDE is SET (repeat at 5 to 8 positions of sliding load)
           SLIDING LOAD DONE
             [measure other standards]
             (SAVE) (calibration type)
               CAL SET n   (n = 1 to 8)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

SLIDING LOAD DONE

A minimum of five slide positions (six to eight are recommended) are used to compute the center of the circle of points at each frequency and thus obtain the value for the directivity error coefficient.

After five slide positions are measured, the operator message changes from:

POSITION SLIDE THEN PRESS KEY TO MEASURE to:

PRESS "DONE" IF FINISHED WITH STANDARDS.

Any number (more than five) of sliding load positions may be measured.

See Also

SLIDING , SLIDE is SET , STANA through STANG

SLOPE SRC1 OFF

Turn off stimulus source #1 power slope.

Programming Code

SLOPOFF

Main Menu

STIMULUS

Program Sequence

    SLOPOFF; or

Manual Sequence

STIMULUS [MENU]
POWER MENU
 SLOPE SRC1 OFF

Description

Preset	slope off	Range	N/A
Initialized	slope off	Recalled	yes
Coupled	may be uncoupled		

See Also

SLOPE SRC1 ON for full description.

SLOPE SRC2 OFF

Turn stimulus source #2 power slope.

Programming Code

SLOP2OFF

Main Menu

STIMULUS

Program Sequence

SLOP2OFF;

Manual Sequence

STIMULUS (MENU)
POWER MENU
 SLOPE SRC2 OFF

Description

Preset	slope off	Range	N/A
Initialized	slope off	Recalled	yes
Coupled	may be uncoupled		

See Also

SLOPE SRC2 ON for full description.

SLOPE SRC1 ON

Set stimulus power slope (dB/GHz) for source #1.

Programming Code

SLOPON

`SLOPE SRC1 ON`

Main Menu

STIMULUS

Program Sequence

SLOPON [value]; $value = dB/GHz$

Manual Sequence

STIMULUS (MENU)
POWER MENU
  SLOPE SRC1 ON [entry] ((x1) = dB/GHz)

Description

Preset	slope off	**Range**	depends on source
Initialized	slope off	**Recalled**	yes
Coupled	may be uncoupled		

Controls the stimulus power slope function of source 1 only. Power at the beginning of the sweep is equal to the current power setting increasing by the selected dB/GHz to the end of the sweep. Use this function to increase the power in the upper frequency range to compensate for increased signal path losses.

Range and resolution are dependent upon the characteristics of the source; the source UNLEVELED indicator may light at high output levels.

See Also

POWER MENU

SLOPE SRC2 ON

Set stimulus power slope (dB/GHz) for source #2.

Programming Code

SLOP2ON

Main Menu

STIMULUS

Program Sequence

SLOP2ON [value]; *value = dB/GHz*

Manual Sequence

STIMULUS MENU
POWER MENU
 SLOPE SRC2 ON [entry] (x1 = dB/GHz)

Description

Preset	slope off	**Range**	depends on source
Initialized	slope off	**Recalled**	yes
Coupled	may be uncoupled		

Controls the stimulus power slope function of source 2 only. Power at the beginning of the sweep is equal to the current power setting increasing by the selected dB/GHz to the end of the sweep. Use this function to increase the power in the upper frequency range to compensate for increased signal path losses.

Range and resolution are dependent upon the characteristics of the source; the source UNLEVELED indicator may light at high output levels.

See Also

POWER MENU

SMITH CHART

Select Smith Chart format for current parameter on selected channel.

Programming Code

SMIC

$\boxed{\text{SMITH CHART}}$

Program Sequence

(select channel)
  (select parameter)
    SMIC;

Manual Sequence

(select channel)
 (select parameter)
  $\boxed{\text{SMITH CHART}}$

Description

Preset	rev value=1 scale=0.2 reference position is not meaningful	Range	N/A
Initialized	same as Preset	Recalled	yes
Coupled	always uncoupled		

This format changes the display and measurement marker readout to:

$$S_{ij} = R_{ij} + jX_{ij}$$

where S_{ij} is the selected parameter.

The $\boxed{\text{REF VALUE}}$ represents the correspondingly scaled Polar display outer circle value. Selection of a reference value of 0.05 or less changes the display format to a Polar display.

Pressing $\boxed{\text{SMITH CHART}}$ recalls the last selected response selections on that channel.

At less than $4\mu U$, Smith charts are replaced with a Polar chart. The marker always reads impedance.

SMOOTHING OFF

Select smoothing off for selected channel.

Programming Code

SMOOOFF

Main Menu

RESPONSE

Program Sequence

```
SMOOOF; or
SMOOON [value];  (value = percent of span)
```

Manual Sequence

(select channel)
  RESPONSE (MENU)
    SMOOTHING OFF or
    SMOOTHING ON [entry] ((x1) = percent of span)

Description

Preset	smoothing off	**Range**	0.1 to 20.0% of span
	smoother aperture 0.1% of SPAN		
Initialized	same as Preset	**Recalled**	N/A
Coupled	always uncoupled		

Smoothing is a linear moving average of adjacent points on the trace. The presently selected smoothing aperture is displayed in percent of sweep width. The stimulus aperture (the width of the linear moving average) is displayed in parenthesis (Hz, seconds, or volts depending upon the domain selected). When smoothing is turned on and has a non-zero value for the displayed channel, the enhancement annotation "S" is displayed on the LCD/CRT.

When Smith or Polar formats are selected, the smoothing aperture is displayed but the trace is not smoothed.

Percent of span: 1, 2, 5, ... sequence from 0.1 to 20 using STEP keys.

Table S-5. Smoothing Aperture

% Span	Number of Points				
	801	401	201	101	51
0.1	1	1	1	1	1
0.2	3	1	1	1	1
0.5	6	3	1	1	1
1.0	9	5	3	1	1
2.0	21	9	5	3	1
5.0	41	21	11	5	3
10.0	81	41	21	11	5
20.0	161	81	41	21	11

SMOOTHING ON

Select smoothing on for selected channel.

Programming Code

SMOOON

Main Menu

RESPONSE

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

SMOOTHING OFF for full description.

SOFTKEYS

Modify the color of the softkeys on the display.

Programming Code

COLRSOFT

Main Menu

DISPLAY

Programming Sequence

```
COLRSOFT;
 TINT [value]; or
 CBRI [value]; or
 COLOR [value]; or
 RSCO;
SVCO;
```

Manual Sequence

(DISPLAY)
  ADJUST DISPLAY
    MODIFY COLORS
      SOFTKEYS
        TINT or
        BRIGHTNESS or
        COLOR or
        RESET COLORS or
        PREDEFINED COLORS
      (PRIOR MENU)
    (PRIOR MENU)
    SAVE COLORS

Description

Preset	white	Range	see MODIFY COLORS
Initialization	white	Recalled	yes, using
			SAVE COLORS
			RECALL COLORS
Coupled	always coupled		

The color of the softkeys can be changed to any color, tint, and brightness combination.

Cycling power changes all color adjustments to the default defined colors. To recall previously modified colors, use the RECALL COLORS softkey.

FACTORY PRESET does not affect color selection.

See Also

MODIFY COLORS , DEFAULT COLORS , PREDEFINED COLORS , SAVE COLORS , RESET COLOR

SOFTKEYS PEN: n

Select pen number to plot the softkeys. Where n = 1 to 10.

Programming Code

PENNSOFT

Main Menu

COPY

Programming Sequence

> PENNSOFT [value];   *value = 1 to 10*

Manual Sequence

(COPY)
  DEFINE PLOT
    SET PEN NUMBERS
      SOFTKEYS PEN: n [entry (x1)]   (entry = 1 to 10)
        (other selections)
        (PRIOR MENU)
      (PRIOR MENU)
  PLOT TO PLOTTER
    (select information to plot)

Description

Preset	pen 1	**Range**	1 to 10
Initialization	pen 1	**Recalled**	yes
Coupled	always coupled		

The default pen number is 1.

See Also

SET PEN NUMBERS for a complete description.

SOFTn

Press softkey; execute current labeled function. Where n = 1 to 8.

Main Menu

None (GPIB ONLY)

Program Sequence

SOFTn; *n = 1 to 8*

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

These mnemonics are included to provide completeness, but it is not recommended that these be used in normal operation.

SOFTWARE REVISION

Display 8510 operating system software revision (firmware).

Programming Code

SOFR

Main Menu

SYSTEM

Program Sequence

SOFR;

Manual Sequence

[SYSTEM]
MORE
  SERVICE FUNCTIONS
    SOFTWARE REVISION

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

The software revision also appears in the active entry area at the end of the line power up sequence.

See Also

OUTPIDEN

SOURCE 1: INTERNAL

Select source 1 internal leveling.

Programming Code

SOU1INTE

Main Menu

SYSTEM

Program Sequence

SOU1INTE;

Manual Sequence

(SYSTEM)
MORE
POWER LEVELING
SOURCE 1: INTERNAL

Description

Preset	not changed	Range	N/A
Initialized	internal	Recalled	no
Coupled	always		

The primary source (source 1) will level its power using its internal leveling. This selection is part of the Hardware State and is not changed by power-up or preset or instrument state recall.

SOURCE 1: EXT. LEVEL

Select source 1 external leveling.

Programming Code

SOU1EXTE

Main Menu

SYSTEM

Program Sequence

SOU1EXTE;

Manual Sequence

SYSTEM
MORE
POWER LEVELING
SOURCE 1: EXT. LEVEL

Description

Preset	not changed	Range	N/A
Initialized	internal	Recalled	no
Coupled	always coupled		

The primary source (source 1) levels its power using external leveling. This leveling is used with 8349 series amplifiers. There are two kinds of external leveling on the 834XA and B, XTAL and [SHIFT] XTAL. This selection on the 8510 is the same as XTAL. For more information on these two modes refer to the Operating Section, under the subheading Leveling Functions, of the 834XA and B manuals. This selection is not affected by preset or power-up or instrument state recall. It is part of the Hardware State.

SOURCE 2: EXT. LEVEL

Select source 2 external leveling

Programming Code

SOU2EXTE

Main Menu

SYSTEM

Program Sequence

SOU2EXTE;

Manual Sequence

[SYSTEM]
  MORE
    POWER LEVELING
      SOURCE 2: EXT. LEVELING

Description

Preset	not changed	Range	N/A
Initialized	internal	Recalled	no
Coupled	always		

The secondary source (source 2) levels its power using its external leveling method. This leveling is used with 8349 series amplifiers. It is *not* the same as the shift external leveling on the 8340B or 8341B Synthesized Sweepers. This selection is part of the Hardware State definition. It is not affected by preset, power-up, or instrument state recall.

The second source must be connected to the 8510 system and specified in the Multiple Source Menu in order to change its power leveling type.

SOURCE 2: INTERNAL

Select source 2 internal leveling.

Programming Code

SOU2INTE

Main Menu

SYSTEM

Program Sequence

SOU2INTE;

Manual Sequence

SYSTEM
  MORE
    POWER LEVELING
      SOURCE 2: INTERNAL

Description

Preset	not changed	Range	N/A
Initialized	internal	Recalled	no
Coupled	always		

The secondary source (source 2) levels its power using the internal leveling method. This selection is part of the Hardware State and is not changed by preset, power-up, or instrument state recall. The second source must be connected to the 8510 system and specified in the Multiple Source Menu in order to change its leveling type.

`SPACE`

Next character in title is a space.

Programming Code

None

Main Menu

TITLE

Description

Preset	N/A	**Range**	N/A
Initialized	N/A	**Recalled**	N/A
Coupled	N/A		

(SPAN)

Select center/span stimulus mode; active function is current (SPAN) value.

Programming Code

SPAN

Program Sequence

SPAN [value [suffix]];

Manual Sequence

SPAN, [entry] ((x1)=Hz, seconds, or volts)

Description

Preset	see below	**Range**	depends on source
Initialized	see below	**Recalled**	yes
Coupled	may be coupled		

In the Frequency Domain, center/span sets the frequency sweep; in the Time Domain, sets the display upper and lower x-axis limits; in the Aux. Volt Output Domain, sets the upper and lower limits of the AUX VOLT OUTPUT ANALOG ±10V output.

FACTORY PRESET selects Frequency Domain, start/stop stimulus mode, and appropriate frequency range according to test set.

Refer to SEGMENT when using the GPIB mnemonic SPAN with the frequency list.

SPECIFY: ADAPTER

Specify from one to seven calibration standards in each class.

Programming Code

SPECADAP

Main Menu

CAL

Program Sequence

See MODIFY 1 xx and MODIFY 2 xx .

Manual Sequence

CAL
  MORE
    MODIFY 1 xx (where xx=cal kit 1 label) or
    MODIFY 2 xx (where xx=cal kit 2 label)
      SPECIFY CLASS
        SPECIFY: xx stanAno (x1) [stanBno (x1)] ... [stanGno (x1)]
            (where xx=class)
            (stanA to stanGno = the standard number = 1 to 21)
            (terminate each standard number with (x1))
              CLASS DONE (SPECIFIED)
              [other changes]
                KIT DONE (MODIFIED)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Assign the appropriate standards to each class by entering the number of each of from one to seven standards to be used in the class.

If only one standard is assigned to a class, then the standard label is displayed on the calibration menu.

If more than two standards are assigned to a class, then pressing the class label key presents the Standard Selection Menu. It lists the labels of the standards assigned to the class.

After selecting the class to be specified, the title area displays the present definition as a series of standard numbers.

SPECIFY CLASS

Present specify class menu.

Main Menu

CAL

Program Sequence

See `MODIFY 1 xx` and `MODIFY 2 xx` .

Manual Sequence

> `CAL`
> `MORE`
> `MODIFY 1 xx` (where xx = cal kit label) or
> `MODIFY 2 xx` (where xx = cal kit 2 label)
> `SPECIFY CLASS`
> `SPECIFY:  S`$_{11}$`A` or
> `SPECIFY:  S`$_{11}$`B` or
> `SPECIFY:  S`$_{11}$`C` or
> `SPECIFY:  S`$_{22}$`A` or
> `SPECIFY:  S`$_{22}$`B` or
> `SPECIFY:  S`$_{22}$`C` or
> `MORE`
> `SPECIFY:  FWD. TRANS.` or
> `SPECIFY:  REV. TRANS.` or
> `SPECIFY:  FWD. MATCH` or
> `SPECIFY:  REV. MATCH` or
> `SPECIFY:  RESPONSE`
> `CLASS DONE (SPEC'D)`
> [other changes]
> `KIT DONE` (MODIFIED)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

At least one and up to seven standards are assigned to each standard class.

See Also

SPECIFY: (class)

SPECIFY: FWD. ISOL'N

Specify from one to seven calibration standards in each class.

Programming Code

SPECFWDI

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

SPECIFY: ADAPTER for full description.

SPECIFY: FWD. MATCH

Specify from one to seven calibration standards in each class.

Programming Code

SPECFWDM

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

SPECIFY: ADAPTER for full description.

SPECIFY: FWD. TRANS.

Specify from one to seven calibration standards in each class.

Programming Code

SPECFWDT

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

SPECIFY: ADAPTER for full description.

SPECIFY GATE

Present specify gate menu.

Programming Code

None

Note   Applies to Time Domain Option 010 only.

Main Menu

DOMAIN

Program Sequence

See GATE ON .

Manual Sequence

> [DOMAIN]
>> SPECIFY GATE
>>> GATE ON or
>>> GATE OFF or
>>> GATE START or
>>> GATE STOP or
>>> GATE CENTER or
>>> GATE SPAN or
>>> GATE SHAPE

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

`SPECIFY GATE`

See Also

`GATE ON`

SPECIFY OFFSET

Present specify offset menu.

Programming Code

None

Main Menu

CAL

Program Sequence

See `MODIFY 1 xx` and `MODIFY 2 xx`.

Manual Sequence

> (CAL)
> `MORE`
>   `MODIFY 1 xx` (where xx=cal kit 1 label) or
>   `MODIFY 2 xx` (where xx=cal kit 2 label)
>   `DEFINE STANDARD` (entry) (x1)
>   `STD TYPE : (std type)`
>   `SPECIFY OFFSET`
>   (menu depends upon STD TYPE selection)
>   (specify standard characteristics)
>   `STD OFFSET DONE`
>   [other changes]
>   `STD DONE (DEFINED)`
>   `KIT DONE (MODIFIED)`

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Used when the current calibration standard termination is offset from the reference plane.

See Also

MODIFY 1 xx , MODIFY 2 xx

SPECIFY: RESPONSE

Specify from one to seven calibration standards in each class.

Programming Code

SPECRESP

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

SPECIFY: ADAPTER for full description.

SPECIFY: REV. ISOL'N

Specify from one to seven calibration standards in each class.

Programming Code

SPECREVI

Main Menu

CAL

`SPECIFY: REV. ISOL'N`

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

`SPECIFY: ADAPTER` for full description.

`SPECIFY: REV. MATCH`

Specify from one to seven calibration standards in each class.

Programming Code

SPECREVM

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

`SPECIFY: ADAPTER` for full description.

SPECIFY: REV. TRANS

Specify from one to seven calibration standards in each class.

Programming Code

SPECREVT

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

SPECIFY: ADAPTER for full description.

SPECIFY: S$_{11}$A

Specify from one to seven calibration standards in each class.

Programming Code

SPECS11A

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

SPECIFY: ADAPTER for full description.

SPECIFY: S$_{11}$B

Specify from one to seven calibration standards in each class.

Programming Code

SPECS11B

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

SPECIFY: ADAPTER for full description.

SPECIFY: S$_{11}$C

Specify from one to seven calibration standards in each class.

Programming Code

SPECS11C

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

SPECIFY: ADAPTER for full description.

SPECIFY: S$_{22}$A

Specify from one to seven calibration standards in each class.

Programming Code

SPECS22A

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

SPECIFY: ADAPTER for full description.

SPECIFY: S$_{22}$B

Specify from one to seven calibration standards in each class.

Programming Code

SPECS22B

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

SPECIFY: ADAPTER for full description.

SPECIFY: $S_{22}C$

Specify from one to seven calibration standards in each class.

Programming Code

SPECS22C

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

SPECIFY: ADAPTER for full description.

SPECIFY TIME

Present specify time menu.

Programming Code

None

Note	Applies to Time Domain Option 010 only.

Main Menu

DOMAIN

Program Sequence

See LOW PASS : STEP or LOW PASS : IMPULSE and WINDOW: (type).

Manual Sequence

DOMAIN
  SPECIFY TIME
    LOW PASS: STEP or
    LOW PASS: IMPULSE
      WINDOW: MAXIMUM or
      WINDOW: NORMAL or
      WINDOW: MINIMUM

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

SPECIFY: TRL LINE

Specify from one to seven calibration standards in each class.

Programming Code

SPECTRLL

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

SPECIFY: ADAPTER for full description.

SPECIFY: TRL REFLECT

Specify from one to seven calibration standards in each class.

Programming Code

SPECTRLR

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

SPECIFY: ADAPTER for full description.

SPECIFY: TRL THRU

Specify from one to seven calibration standards in each class.

Programming Code

SPECTRLT

Main Menu

CAL

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

`SPECIFY: ADAPTER` for full description.

SRQM

Set SRQ mask.

Main Menu

None (GPIB ONLY)

Program Sequence

`SRQM <bytea>,<byteb>;` *(bytea, byteb = ASCII Integers)*

Description

Preset	Status byes = 0.0 not changed unless a problem is detected	Range	0 to 255, each byte
Initialized	same as Preset	Recalled	no
Coupled	always coupled		

Send two ASCII integers from 0 to 255 to mask selected bits of the Status bytes and thus enable 8510 SRQ generation if the masked bits are set during operation. Mask does not affect `OUTPSTAT`.

Cleared on power up, addressed device clear.

bytea = primary status byte, 0–255

byteb = secondary status byte, 0–255.

Table S-6. 8510 Status Bytes

Primary Status Byte (#1)				
BIT #	7	6	5	4
Decimal Value	128	64	32	16
Function	Reason in extended byte	RQS (SRQ) issued)	Syntax error	SING, NUMG, cal std measurement complete
BIT #	3	2	1	0
Decimal Value	8	4	2	1
Function	One-Path 2-port measurement. Wait for GET after REVERSE DEVICE.	TRIG mode, waiting for GET (next point or sweep) or SIMS; also FASC; ready for GET menu hardware trigger, CALF; complete	Data entry complete	CAUTION message displayed
Extended Status Byte (#2)				
BIT #	7	6	5	4
Decimal Value	128	64	32	16
Function	not used	not used	not used	not used
BIT #	3	2	1	0
Decimal Value	8	4	2	1
Function	not used	Power ON sequence complete	Key pressed	not used

STANx

Select calibration standard in class; measure standard. Where x = A, B, C, D, E, F, or G.

Programming Code

STANA

Main Menu

None (GPIB ONLY)

Program Sequence

Open, Fixed Load, Arbitrary Impedance, Short, and Delay/thru Type Standards

>   CAL1; or CAL2;
>   *(select calibration type)*
>   *(select class)*
>   STANx;   *x = A, B, C, D, E, F, or G*
>   SAVEn; *n = 1 or 2* or DONE;
>   CALSn;   *n = 1 to 8*

Sliding Load Type Standards (STANC of 7 mm LOADS)

```
STANC;
  SLIS;     (5 slides minimum, 8 recommended)
    SLID;
```


Figure S-2. STANA through STANG Program Sequence

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

When two or more standards are assigned to a Class, selecting the Class presents the Standard Selection Menu. Since the labels for the calibration standards are user-definable, these mnemonics are used to specify the current standard for measurement.

Causes *measurement restart*, then the standard is measured.

If in the RAMP mode and averaging is on, n+1 groups are taken where n is the averaging factor.

The sliding load sequence is also initiated by standard class selection if the sliding load is the only standard in the class.

Table S-7. Select Calibration Standards in Class

Programming Code	7 mm and 3.5 mm Standard Labels	
	S_{11} and S_{22} Loads	Response
STANA (1st Std)	BROADBAND	OPEN
STANB (2nd Std)	SLIDING	SHORT
STANC (3rd Std)	LOWBAND	THRU
STAND (4th Std)	Offset Load	(not used)
STANE (5th Std)	(not used)	(not used)
STANF (6th Std)	(not used)	(not used)
STANG (7th Std)	(not used)	(not used)

Figure S-3. LOADS Frequency Ranges

See Also

CALIBRATE: (calibration type)

[START]

Select start/stop stimulus mode; active function is current [START] value.

Programming Code

STAR

Program Sequence

STAR [value [suffix]];

Manual Sequence

[START] [entry] ([x1] = Hz, seconds, or volts)

Description

Preset	see below	**Range**	depends upon source
Initialized	see below	**Recalled**	yes
Coupled	may be uncoupled		

In the Frequency Domain, start/stop sets the frequency sweep.

In the Time Domain, start/stop sets the display upper and lower x-axis limits. In the Time domain mode, start/stop also sets the upper and lower limits of the AUX VOLT OUTPUT ANALOG ±10V output.

Preset selects Frequency Domain start/stop stimulus mode, and sets the start and stop frequencies at the limits of the frequency range of the test set being used. Unless changed by the user, Instrument State 8 (Power Up) sets the start and stop frequencies, regardless of test set, at 2 GHz and 18 GHz.

Minimum selectable start frequency is 45 MHz.

Refer to SEGMENT when using the GPIB mnemonic STAR with frequency list.

STD DONE (DEFINED)

All characteristics of the current calibration standard are defined.

Programming Code

STDD

Main Menu

CAL

Program Sequence

See MODIFY 1 xx or MODIFY 2 xx

Manual Sequence

See DEFINE STANDARD.

`STD DONE (DEFINED)`

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

`STD DONE (DEFINED)` automatically changes the last character of the calibration kit label to an asterisk (*) to indicate that the standard calibration kit has been modified.

See Also

`DEFINE STANDARD`, `MODIFY 1 xx`, `MODIFY 2 xx`

STD OFFSET DONE

Offset characteristics of the current standard are specified. Return to next higher menu.

Main Menu

CAL

Program Sequence

See `MODI1` and `MODI2`.

Manual Sequence

See `SPECIFY OFFSET`.

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

`SPECIFY OFFSET`, `MODIFY 1 xx`, `MODIFY 2 xx`

STD TYPE: ARBITRARY IMPEDANCE

Specify current standard as an arbitrary (other than Z_0) terminating impedance.

Programming Code

STDTARBI

Main Menu

CAL

Program Sequence

See MODIFY 1 xx and MODIFY 2 xx .

Manual Sequence

(CAL)
  MORE
    MODIFY 1 xx (where xx=cal kit 1 label) or
    MODIFY 2 xx (where xx=cal kit 2 label)
      DEFINE STANDARD [entry] ((x1) = stdno = 1 to 22)
        STD TYPE: ARBITRARY IMPEDANCE
          TERMINAL IMPEDANCE [entry] ((x1) = Ω)
            FIXED or SLIDING
              SPECIFY OFFSET
                OFFSET DELAY [entry] ((x1) = ps)
                  OFFSET LOSS [entry] ((x1) = $G\Omega$/second)
                    OFFSET Z$_0$ [entry] ((x1) = Ω)
                      MAXIMUM FREQUENCY [entry] ((x1) = Hz)
                        MINIMUM FREQUENCY [entry] ((x1) = Hz)
                          COAX or WAVEGUIDE
                            STD OFFSET DONE
                              LABEL STD
                                (enter std label, see TITLE)
                                  STD DONE (DEFINED)
                                    [other changes]
                                      KIT DONE (DEFINED)

`STD TYPE: ARBITRARY IMPEDANCE`

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Figure S-4. Arbitrary Impedance Standard

See Also

`MODIFY 1 xx`, `MODIFY 2 xx`

`STD TYPE: DELAY/THRU`

Specify current standard as a thru or arbitrary delay.

Programming Code

STDTDELA

Main Menu

CAL

Program Sequence

See `MODIFY 1 xx` and `MODIFY 2 xx`.

Used to define a two-port standard.

Manual Sequence

CAL
 MORE
  MODIFY 1 xx (where xx=cal kit 1 label) or
  MODIFY 2 xx (where xx=cal kit 2 label)
   DEFINE STANDARD entry x1 (entry = stdno = 1 to 22)
    STD TYPE: DELAY/THRU
     SPECIFY OFFSET
      OFFSET DELAY [entry]   (x1 $= \rho$seconds)
       OFFSET LOSS [entry]   (x1 $= \text{G}\Omega/\text{second}$)
        OFFSET Z$_0$ [entry]   (x1 $= \Omega$)
         MINIMUM FREQUENCY [entry]   (x1 $= \text{Hz}$)
          MAXIMUM FREQUENCY [entry]   (x1 $= \text{Hz}$)
           COAX or WAVEGUIDE
          STD OFFSET DONE
           LABEL STD
            (enter std label, see TITLE)
             STD DONE (DEFINED)
              [other changes]
               KIT DONE (DEFINED)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Only offset delay needs to be specified for devices used in adapter standard class.

Figure S-5. Delay/Thru Standard

See Also

MODIFY 1 xx , MODIFY 2 xx

STD TYPE: LOAD

Specify current standard as a Z_0 termination.

Programming Code

STDTLOAD

Main Menu

CAL

Program Sequence

See `MODIFY 1 xx` and `MODIFY 2 xx`.

Manual Sequence

`CAL`
  `MORE`
   `MODIFY 1 xx` (where xx=cal kit 1 label) or
   `MODIFY 2 xx` (where xx=cal kit 2 label)
    `DEFINE STANDARD` entry (entry = stdno = 1 to 21)
     `STD TYPE : LOAD`
      `FIXED or SLIDING`
       `SPECIFY OFFSET`
        `OFFSET DELAY` entry (`x1` = ρseconds)
         `OFFSET LOSS` entry (`x1` = GΩ/second)
          `OFFSET Z₀` entry (`x1` = Ω)
           `MINIMUM FREQUENCY` entry (`x1` = Hz)
            `MAXIMUM FREQUENCY` entry (`x1` = Hz)
             `COAX or WAVEGUIDE`
              `STD OFFSET DONE`
               `LABEL STD`
                (enter std label, see TITLE)
                 `STD DONE (DEFINED)`
                  [other changes]
                   `KIT DONE (DEFINED)`

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Figure S-6. Load Standard

See Also

SET Z_0, MODIFY 1 xx, MODIFY 2 xx

STD TYPE: OPEN

Specify current standard as an open circuit termination.

Programming Code

STDTOPEN

Main Menu

CAL

Program Sequence

See MODIFY 1 xx and MODIFY 2 xx.

Manual Sequence

`CAL`
  `MORE`
    `MODIFY 1 xx` (where xx=cal kit 1 label) or
    `MODIFY 2 xx` (where xx=cal kit 2 label)
      `DEFINE STANDARD` entry   ($x1$ = stdno = 1 to 21)
        `STD TYPE: OPEN`
          `C0` entry   ($x1$=x10^{-15} F)
          `C1` entry   ($x1$=x10^{-27} F/Hz)
          `C2` entry   ($x1$=x10^{-36} F/Hz^2)
          `C3` entry   ($x1$=x10^{-45} F/Hz^3)
            `SPECIFY OFFSET`
              `OFFSET DELAY` entry   ($x1$=ρseconds)
                `OFFSET LOSS` entry   ($x1$=GΩ/second)
                  `OFFSET Z`$_0$ entry   ($x1$=Ω)
                    `MINIMUM FREQUENCY` entry   ($x1$=Hz)
                      `MAXIMUM FREQUENCY` entry ($x1$ = Hz)
                      `COAX` or `WAVEGUIDE`
                        `STD OFFSET DONE`
                          `LABEL STD`
                            (enter std label, see TITLE)
                              `STD DONE (DEFINED)`
                              [other changes]
                                `KIT DONE (MODIFIED)`

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Specify the magnitude and phase response of the Open Circuit Calibration Standard using a combination of fringing capacitive reactance (see C_0, C_1, C_2, and C_3) to model the non-linear phase shift, an offset delay to model the characteristic phase shift (linear coaxial or standard rectangular waveguide), and offset loss to model its loss.

Open circuit standards are usually only applicable in coax.

PORT 1

```
          TERI =∞Ω

          c_0 , c_1 , c_2 , c_3

          OFFD

          OFFL

          OFFZ
```

Figure S-7. Open Standard

See Also

MODIFY 1 xx , MODIFY 2 xx

STD TYPE: SHORT

Specify current standard as a short circuit termination.

Programming Code

STDTSHOR

Main Menu

CAL

Program Sequence

See MODIFY 1 xx and MODIFY 2 xx .

Manual Sequence

CAL
  MORE
    MODIFY 1 xx (where xx=cal kit 1 label) or
    MODIFY 2 xx (where xx=cal kit 2 label)
      DEFINE STANDARD entry x1 (entry = stdno = 1 to 22)
        STD TYPE: SHORT
          SPECIFY OFFSET
            OFFSET DELAY entry (x1 = ρseconds)
              OFFSET LOSS entry (x1 = GΩ/second)
                OFFSET ZO entry (x1 = Ω)
                  MINIMUM FREQUENCY entry (x1 = Hz)
                    MAXIMUM FREQUENCY entry (x1 = Hz)
                  COAX or WAVEGUIDE
                STD OFFSET DONE
              LABEL STD
              (enter std label, see TITLE)
              STD DONE (DEFINED)
            [other changes]
              KIT DONE (MODIFIED)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Figure S-8. Short Standard

See Also

MODIFY 1 xx , MODIFY 2 xx

STEP

Select step sweep mode in which the source is phaselocked at each frequency point.

Programming Code

STEP

Main Menu

STIMULUS

Program Sequence

STEP;

Manual Sequence

STIMULUS (MENU)
STEP

Description

Preset	ramp	Range	N/A
Initialized	ramp	Recalled	yes
Coupled	always coupled		

Step sweep mode is used only with the 8360-series and 8340x-series synthesized sweepers. It is a digital sweep beginning at the start frequency and ending at the stop frequency with the source phaselocked and the data measured at frequency intervals determined by the number of points selection. An up arrow on the trace identifies the data point just measured. This mode provides best frequency accuracy and repeatability.

Dwell time prior to measurement at each frequency point is controlled by the sweep time setting. Measurement time at each point is determined by the averaging factor.

Trim sweep is not used for step sweep.

In TRIG mode, the GPIB GET command causes data acquisition for the next point. Data acquisition process depends upon ADDRESS of SOURCE , ADDRESS of TEST SET , and the "LOCK to" selection.

STEP ⬇

Decrease current active function.

Programming Code

DOWN

Program Sequence

DOWN;

Manual Sequence

STEP ⬇

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

The step size for each function is determined algorithmically by internal logic and is not settable by the user.

STEP ⬆

Increase current active function.

Programming Code

UP

Program Sequence

UP;

Manual Sequence

STEP ⬆

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

The step size for each function is determined algorithmically by internal logic and is not settable by the user.

STEP TYPE: NORMAL

Select the data aquisition cycle of the network analyzer.

Programming Code

NORMSTEP

Main Menu

SYSTEM

Program Sequence

NORMSTEP;

Manual Sequence

(SYSTEM)
MORE
   SYSTEM PHASELOCK
     STEP TYPE: NORMAL

Description

Preset	depends on the source used (see below)	Range	N/A
Initialized	same as Preset	Recalled	yes
Coupled	always coupled		

In normal-step, the network analyzer tunes to a frequency and measures all necessary parameters before breaking phaselock and tuning to the next frequency. The network analyzer goes through a complete phaselock sequence at each step frequency.

`STEP TYPE: NORMAL`

This method of phaselock requires a software handshake only (occurs through the System Bus). No other external connectors between the source and analyzer are required and GPIB extenders can be used.

The Preset State for the 83621, 83631, and 83651 synthesizers is `STEP TYPE: QUICK` . For other types of sources, the Preset State is `STEP TYPE: NORMAL` .

See Also

`STEP TYPE: QUICK`

`STEP TYPE: QUICK`

Select the data aquisition cycle of the network analyzer.

Programming Code

QUICSTEP

| **Note** | Feature is compatible with 8360 series synthesized sweepers only. |

Main Menu

SYSTEM

Program Sequence

    QUICSTEP;

Manual Sequence

(SYSTEM)
`MORE`
   `SYSTEM PHASELOCK`
      `STEP TYPE: QUICK`

Description

Preset	depends on the source used	Range	N/A
Initialized	same as Preset	Recalled	yes
Coupled	always coupled		

The key attributes of the quick-step phaselock method are:

■ Each data acquistion point is fully synthesized.

■ The source is "tuned" from point-to-point, it does not break phaselock.

■ The analyzer remains phaselocked to the source except at the source bandcross points or when the test VTO needs to reset.

■ It measures all the parameters possible without breaking phaselock. For example: in single channel with four parameter display selected (assuming no bandcross points), the quick-step phaselock mode takes data for S_{11} and S_{21} on one sweep, then breaks phaselock, re-acquires phaselock and takes data for S_{12} and S_{22}. Note that two sweeps are required to update a full 2-port measurement.

■ The analyzer and source require a hardware handshake. The TRIGGER OUT and STOP SWEEP IN/OUT (rear-panel source) must be connected to the TRIGGER IN and $\overline{\text{STOP}}$ $\overline{\text{SWEEP}}$ (rear-panel analyzer) respectively.

■ Typically (depends on averaging), increased data acquistion speed (six times improvement) is achieved by this method of phaselock.

The Preset State for the 8360 series synthesizers is `STEP TYPE: QUICK`. For other types of sources, the Preset State is `STEP TYPE: NORMAL`.

See Also

`STEP TYPE: NORMAL`

STIMULUS (MENU)

Present stimulus menu.

Programming Code

MENUSTIM

Program Sequence

MENUSTIM;

Manual Sequence

STIMULUS (MENU)
  `POWER` or
  `SWEEP TIME` or
  `NUMBER OF POINTS` or
  `SINGLE POINT` or
  `RAMP` or
  `STEP` or
  `MORE`

STIMULUS (MENU)

> HOLD or
> SINGLE or
> NUMBER of GROUPS or
> CONTINUAL or
> COUPLED CHANNELS or
> UNCOUPLED CHANNELS

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

STIMULUS

Modify the color of the graticule on the display.

Programming Code

COLRSTIM

Main Menu

DISPLAY

Programming Sequence

```
COLRSTIM;
 TINT [value]; or
 CBRI [value]; or
 COLOR [value]; or
 RSCO;
SVCO;
```

Manual Sequence

(DISPLAY)
 ADJUST DISPLAY
  MODIFY COLORS
   STIMULUS
    TINT or
    BRIGHTNESS or
    COLOR or
    RESET COLORS or
    PREDEFINED COLORS
    (PRIOR MENU)
   (PRIOR MENU)
  SAVE COLORS

Description

Preset	white	**Range**	see MODIFY COLORS
Initialization	white	**Recalled**	yes, using SAVE COLORS RECALL COLORS
Coupled	always coupled		

The color of the stimulus can be changed to any color, tint, and brightness combination.

Cycling power changes all color adjustments to the default defined colors. To recall previously modified colors, use the RECALL COLORS softkey.

FACTORY PRESET does not affect color selection.

See Also

MODIFY COLORS , DEFAULT COLORS , PREDEFINED COLORS , SAVE COLORS , RESET COLOR

STIMULUS: DECIMAL POSITION

Adjust the number of digits after the decimal point of the printed stimulus data in a trace list.

Programming Code

LISSTIMDECP

Main Menu

COPY

Program Sequence

LISSTIMDECP [value];   *value = 1 to 15*

Manual Sequence

[COPY]
  DEFINE LIST
    STIMULUS FORMAT
      STIMULUS DECIMAL POSITION [entry [x1]]   (entry = 1 to 15)

Description

Preset	2	Range	1 to 15
Initialized	2	Recalled	yes
Coupled	always coupled		

The stimulus information is the first column of every data list. The column heading varies with the domain selected.

See Also

STIMULUS WIDTH, STIMULUS UNITS, LIST FORMAT, DEFINE LIST, LIST SKIP FACTOR, LIST TRACE VALUES, LIST ALL S PARAMETERS

STIMULUS PEN: n

Select pen number to plot the stimulus values. Where n = 1 to 10.

Programming Code

PENNSTIM

Main Menu

COPY

Programming Sequence

PENNSTIM [value];   *value = 1 to 10*

Manual Sequence

COPY
  DEFINE PLOT
    SET PEN NUMBERS
      STIMULUS PEN: n [entry (x1)]   (entry = 1 to 10)
        (other selections)
      PRIOR MENU
    PRIOR MENU
  PLOT TO PLOTTER
    (select information to plot)

Description

Preset	pen 1	Range	1 to 10
Initialization	pen 1	Recalled	yes
Coupled	always coupled		

The default pen number is 1.

See Also

SET PEN NUMBERS for a complete description.

STIMULUS: UNITS

Present the stimulus units menu.

Main Menu

COPY

Manual Sequence

(COPY)
    DEFINE LIST
        STIMULUS FORMAT
            STIMULUS UNITS
                (select the desired unit)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

The value for stimulus units change depending on the domain selected. In Table S-8, the default setting are indicated with an asterisk.

Table S-8. Stimulus Units in the Various Domains

Units	Domain		
	Frequency Value	Time Value	Aux. Volt Value
Giga	GHz	not applicable	not applicable
Mega	**MHz**[*]	not applicable	not applicable
kilo	kHz	not applicable	not applicable
x1	Hz	seconds	volt
milli	not applicable	**milliseconds**[*]	**mV**[*]
micro	not applicable	μseconds	not applicable
nano	not applicable	nanoseconds	not applicable
pico	not applicable	picoseconds	not applicable

See Also

STIMULUS DECIMAL POSITION , STIMULUS WIDTH

STIMULUS: WIDTH

Adjust the overall number of characters of the printed stimulus data in a trace list.

Programming Code

LISSTIMWIDT

Main Menu

COPY

Program Sequence

LISSTIMWIDT [value];   *value = 1 to 31*

Manual Sequence

COPY
  DEFINE LIST
    STIMULUS FORMAT
      STIMULUS WIDTH [entry (x1)]   (entry = 1 to 31)

Description

Preset	12	**Range**	1 to 31
Initialized	12	**Recalled**	yes
Coupled	always coupled		

The stimulus information is the first column of every trace value list. Stimulus width is the overall number of characters to be printed. The minus sign and decimal point are counted as characters. The column heading varies with the domain selected.

If the width in not large enough to contain the value, question marks are printed.

See Also

STIMULUS: DECIMAL POSITION , STIMULUS: UNITS , LIST FORMAT , DEFINE LIST ,
LIST TRACE VALUES , LIST ALL S PARAMETERS

$\boxed{\text{STOP}}$

Select start/stop stimulus mode; active function is current stop value.

Programming Code

STOP

Program Sequence

STOP [value [suffix]];

Manual Sequence

$\boxed{\text{STOP}}$ entry ($\boxed{\text{x1}}$ = Hz, seconds, or volts)

Description

Preset	see below	**Range**	depends upon domain
Initialized	see below	**Recalled**	yes
Coupled	may be uncoupled		

In the Frequency Domain, start/stop sets the frequency sweep; in the Time Domain, sets the display upper and lower x-axis limits; in the Aux. Volt Output Domain, sets the upper and lower limits of the AUX VOLT OUTPUT ANALOG ±10V output.

Preset selects Frequency Domain, start/stop stimulus mode, appropriate frequency range according to test set.

Maximum selectable stop frequency is set by limitations of the source.

Refer to SEGMENT when using the GPIB mnemonic STOP with frequency list.

STORAGE IS EXTERNAL

Select disc-type mass storage unit on the analyzer system bus for all disc operations.

Programming Code

STOIEXT

Main Menu

DISC

Program Sequence

STOIEXT;

Manual Sequence

[DISC]
STORAGE IS EXTERNAL

Description

Preset	storage is internal	Range	N/A
Initialized	storage is internal	Recalled	yes
Coupled	always coupled		

External disc operations use the ADDRESS OF DISC value to send the information.

Note	This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

SET UP DISC

STORAGE IS INTERNAL

Select the internal disc drive as the mass storage unit.

Programming Code

STOIINT

`STORAGE IS INTERNAL`

Main Menu

DISC

Program Sequence

    `STOIINT;`

Manual Sequence

[DISC]
    `STORAGE IS INTERNAL`

Description

Preset	storage is internal	Range	N/A
Initialized	storage is internal	Recalled	yes
Coupled	always coupled		

Note   This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

`STORAGE IS EXTERNAL` , `SET UP DISC`

`STORE`

Store specified data type from 8510 memory to specified disc file.

Programming Code

STOR

Main Menu

DISC

Manual Sequence

DISC

STORAGE IS INTERNAL or STORAGE IS EXTERNAL

  STORE

    INST STATE 1-8 or

    INST STATE ALL or

    MEMORY 1-8 or

    MEMORY ALL or

    CAL SET 1-8 or

    CAL SET ALL or   CAL KIT 1-2 or

    MORE

     DATA: RAW or

     DATA: DATA or

     DATA: FORMATTED or

     DELAY TABLE or

     USER DISPLAY or

     HARDWARE STATE or

     MACHINE DUMP

      (enter or select disc file)

       STORE FILE or

       REPLACE MENU

        (select disc filename)

         REPLACE FILE

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Figure S-9. DISC Key Sequence

PROGRAMMING CODE	NOTES
CALSn, CALSALL	CORROFF before loading calibration sets
MEMOn, MEMOALL	DISPDATA or DISPMATH before loading memories eight files/data type.

STORE FILE

Store/replace disc filename with data from data type memory.

Programming Code

DISF

Main Menu

DISC

Program Sequence

See STORE .

```
STOIINT; or STOIEXT;
  STOR;
    (select data type)
      DISF "filename";
```

Manual Sequence

DISC

STORAGE IS INTERNAL or STORAGE IS EXTERNAL
STORE
  (select data type)
    (enter disc file name)
      STORE FILE

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

If no file exists on disc with the same name, a new file is created. If a file exists with the same name, the existing file is replaced.

The 8510 uses discs formatted in the logical interchange format (LIF). See INIT DISC for more information.

Files are stored in either ASCII or Binary file formats, depending on the type of file and the file format has been selected. See SAVE USING ASCII for more information.

A three-letter prefix is added to the beginning of the file name in order to show the type of file that is being stored. Any spaces are replaced by an underscore "__". For example: RAW <space> Data = RAW_DATA.

See Also

DISC UNIT NUMBER , DISC VOLUME , DELETE FILE , LOAD FILE , SAVE USING ASCII ,
SAVE USING BINARY , STORE , STORE FILE , STORAGE IS DISC

SUBSET: CENTER

Set frequency subset range.

Programming Code

SUBSCENT

Main Menu

CAL

Program Sequence

```
FRES;
 SUBSCENT [value [suffix]]; or
 SUBSSPAN [value [suffix]]; or
 SUBSSTAR [value [suffix]]; or
 SUBSSTOP [value [suffix]];
CRES;
CALSn;      n = 1 to 8
```

Manual Sequence

```
CAL
 MORE
  MODIFY CALSET ,
   FREQUENCY SUBSET
     SUBSET: START entry or
     SUBSET: CENTER entry or
      CREATE & SAVE
        CAL SET n   (n = 1 to 8)
```

Description

Preset	current sweep full span	Range	current frequency sweep
Initialized	current sweep full span	Recalled	yes
Coupled	subsets always coupled		

With correction on, define the start/stop or center/span range of the frequency subset using these controls. The resultant calibration set is in frequency list mode.

See Also

CREATE & SAVE , FREQUENCY SUBSET

SUBSET: SPAN

Set frequency subset span value.

Programming Code

SUBSSPAN

Main Menu

CAL

Description

Preset	current sweep full span	Range	current frequency sweep
Initialized	current sweep full span	Recalled	yes
Coupled	subsets always coupled		

See Also

SUBSET: CENTER for full description.

SUBSET: START

Set frequency subset start value.

Programming Code

SUBSSTAR

Main Menu

CAL

Description

^M

Preset	current sweep full span	Range	current frequency sweep
Initialized	current sweep full span	Recalled	yes
Coupled	subsets always coupled		

See Also

SUBSET: CENTER for full description.

SUBSET: STOP

Set frequency subset stop value.

Programming Code

SUBSSTOP

Main Menu

CAL

Description

Preset	current sweep full span	**Range**	current frequency sweep
Initialized	current sweep full span	**Recalled**	yes
Coupled	subsets always coupled		

See Also

SUBSET: CENTER for full description.

SWEEP TIME

Set source sweep time.

Programming Code

SWET

Main Menu

STIMULUS

Program Sequence

SWET [value [time suffix]];

Manual Sequence

STIMULUS (MENU)
   SWEEP TIME entry   ((x1) = seconds)

Description

Preset	166 ms	**Range**	50 ms to 100 seconds
Initialized	166 ms	**Recalled**	yes
Coupled	may be uncoupled		

In ramp sweep mode, sets the elapsed time between the start of the sweep and the end of the sweep.

For Frequency Domain step sweep mode, dwell time (in milliseconds) between time that the network analyzer is tuned at the new data point and initiation of data measurement is:

Sweep Time (ms)/(Number of Points − 1)

to allow the device under test to respond to the new tuned frequency.

In ramp sweep mode, if sweep time is greater than 0.05 seconds, a sweep marker appears above the stimulus values along the bottom of the measurement display area.

SYNC ON GREEN

Set synchronization to sync-on-green to work with an external display device.

Programming Code

GREESYNC

Main Menu

DISPLAY

Program Sequence

    GREESYNC;

Manual Sequence

(DISPLAY)
  ADJUST DISPLAY
    EXTERNAL VIDEO
      SYNC ON GREEN

SYNC ON GREEN

Description

Preset	not changed	**Range**	N/A
Initialized	sync-on-green negative sync	**Recalled**	yes
Coupled	always coupled		

This function does not affect the analyzer internal video display.

Use sync-on-green when an external display device requires sync-on-green capability. This synchronization method superimposes the combined horizontal and vertical sync signals onto the green (analog) video signal. This is done in a manner similar to EIA standard RS-330 (positive video, negative sync). When enabled the synchronization signal is routed to the green BNC cable of the D1191A cable supplied with the 8510C.

Note This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

COMPOSITE SYNC , H, V SYNC , EXTERNAL VIDEO

SYS/OPER
 PARAMETERS

Present the system/operating parameter menu.

Main Menu

COPY

Manual Sequence

(COPY)
 SYS/OPER PARAMETERS
    SYSTEM PARAMETERS or
    OPERATING PARAMETERS

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

SYSTEM PARAMETERS , OPERATING PARAMETERS

SWR

Select SWR format for display of current parameter on selected channel.

Programming Code

SWR

Main Menu

FORMAT

Program Sequence

> *(select channel)*
> > *(select parameter)*
> > > SWR;

Manual Sequence

(select channel)
  (select parameter)
    FORMAT (MENU)
      SWR

Description

Preset	ref value=1 scale=1 ref posn=1	Range	N/A
Initialized	same as Preset	Recalled	yes
Coupled	always uncoupled		

Selects Cartesian display in which the trace value is:

`SWR`

$$SWR = (1 + | S_{ij} |) / (1 - | S_{ij} |)$$

where $| S_{ij} |$ is the linear magnitude of the selected parameter.

[SYSTEM]

Present system menu.

Programming Code

MENUSYST

Program Sequence

MENUSYST;

Manual Sequence

[SYSTEM]
DISPLAY FUNCTIONS or
HP-IB ADDRESSES or
HP-IB CONFIGURE or
BEEPER ON or
BEEPER OFF or
CRT OFF or
FREQUENCY OFF or
MORE
SERVICE FUNCTIONS or
PULSE CONFIG or
EDIT MULT. SRC. or
SYSTEM PHASELOCK or
POWER LEVELING or
ANALOG OUT ON or
ANALOG OUT OFF

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

SYSTEM BUS 'LOCAL'

8510 system bus (LOCAL).

Programming Code

SYSBLOCA

Main Menu

SYSTEM

Program Sequence

SYSBLOCA;

Manual Sequence

(SYSTEM)
MORE
  SERVICE FUNCTIONS
    SYSTEM BUS 'LOCAL'

Description

Preset	system bus remote	Range	N/A
Initialized	system bus remote	Recalled	yes
Coupled	always coupled		

When SYSTEM BUS 'LOCAL' is selected, the 8510 suspends all activity on the 8510 System Bus and enters the *hold* mode. Front panel control of instruments connected to the 8510 System Bus is enabled to allow you to change instrument functions not controllable from the 8510.

Selecting SYSTEM BUS 'LOCAL' also allows an external controller to communicate directly with any "appliance" or instrument on the 8510 System Bus via the 8510 System Bus Address.

Any *pass-thru* command to any "appliance" or instrument on the 8510 System Bus causes an automatic System Bus to 'local'.

SYSTEM BUS 'REMOTE'

8510 system bus remote.

Programming Code

SYSBREMO

Main Menu

SYSTEM

Program Sequence

SYSBREM;

Manual Sequence

SYSTEM
MORE
 SERVICE FUNCTIONS
  SYSTEM BUS "REMOTE"

Description

Preset	system bus remote	Range	N/A
Initialized	system bus remote	Recalled	yes
Coupled	always coupled		

Selecting SYSTEM BUS REMOTE returns control of instruments on the 8510 system bus to the 8510.

Source functions controlled by the 8510 are returned to the state represented by the current 8510 instrument state (for example: ramp/step/single point, frequency range, sweep time, source power, and power slope). Other source functions set locally are not changed.

The test set is interrogated and parameter definitions are established (see REDEFINE PARAMETER).

Raw data arrays are zeroed; the displayed trace are updated by the next group of sweeps.

Addressing the 8510 GPIB after pass-thru to any System Bus Address (except address 31) causes an automatic System Bus 'Remote'.

See Also

REDEFINE PARAMETER

SYSTEM PARAMETERS

Display system parameters.

Programming Code

SYSP

Main Menu

COPY

Program Sequence

```
OPEP;
   RESD; or
   PRIP; or
   PLOP;
```

Manual Sequence

(COPY)
  SYS/OPER PARAMETERS
    SYSTEM PARAMETERS
      RESTORE DISPLAY or
      LIST PARAMETERS or
      PLOT PARAMETERS

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	no
Coupled	N/A		

Refer to Table S-9 for a typical system parameters listing. This listing shows the following:

- the current GPIB address of the 8510.

- the expected interface bus addresses of each standard instrument type which may be used on the 8510 system bus.

- the current value of the 8510 SRQ mask.

Table S-9. Typical Initialized System Parameters Listing

```
                                                     RESTORE
                                                     DISPLAY
hp                                                     PRINT
                                                    PARAMETERS
SYSTEM PARAMETER        Channel 1       Channel 2
                                                       PLOT
                                                    PARAMETERS

8510 GPIB ADDRESS       16              16
SYSTEM BUS ADDRESS      17              17
SOURCE HP-IB ADDRESS    19              19
SOURCE 2 HP-IB ADDRESS  31              31
TEST SET HP-IB ADDRESS  20              20
PLOTTER HP-IB ADDRESS   5               5
PRINTER HP-IB ADDRESS   1               1
DISC HP-IB ADDRESS      0               0

PASS-THRU ADDRESS       31              31
USER DISPLAY ADDRESS    31              31

SRQ MASK (PRIMARY)      0               0
SRQ MASK (SECONDARY)    0               0
```

See Also

LOCAL , HP-IB ADDRESSES

SYSTEM PHASELOCK

Present system phaselock menu.

Programming Code

None

Main Menu

SYSTEM

Manual Sequence

SYSTEM
MORE
  SYSTEM PHASELOCK

Description

Preset	not changed	Range	N/A
Initialized	internal, normal	Recalled	N/A
Coupled	always coupled		

See Also

LOCK SPEED: FAST , LOCK SPEED: NORMAL , LOCK TYPE: EXTERNAL , LOCK TYPE: INTERNAL , LOCK TYPE: NONE , STEP TYPE: NORMAL , STEP TYPE: QUICK

TABLE DELAY

Use the user-defined delay table for electrical delay.

Programming Code

TABD

Main Menu

RESPONSE

Program Sequence

TABD;

Manual Sequence

RESPONSE (MENU)
MORE
  TABLE DELAY

Description

Preset	coaxial delay	Range	N/A
Initialized	coaxial delay	Recalled	yes
Coupled	always uncoupled		

TABLE DELAY uses a user-defined delay table for all electrical delay line stretcher functions. This disables electrical delay, phase offset, magnitude slope, and magnitude offset.

There is one delay table for each channel. Initially, this table must be supplied over GPIB from a controller. Subsequently, the table can be read out over GPIB, and stored or loaded from disc (DELT).

The delay table consists of a complex (real and imaginary) data entry for each point in the data trace. This entry can be thought of as a complex scaling factor, which is multiplied with the measured data just after error correction and before Time Domain.

Because the operation takes place before Time Domain, the delay table can be used to simulate arbitrary time domain stimulus.

`TABLE DELAY`

See Also

`COAXIAL DELAY`, `WAVEGUIDE DELAY`, `DELAY TABLE`

`TARGET VALUE`

Specify the target value for marker to target functions.

Programming Code

TARV

Main Menu

MARKER

Program Sequence

TARV [value];

Manual Sequence

(MARKER)
`MORE`
  `TARGET VALUE` [entry] ((x1) = basic units for selected format)
    `MARKER TO TARGET` or
    `SEARCH: LEFT` or
    `SEARCH: RIGHT`

Description

Preset	specific values for each format	Range	0 ±500 dB
Initialized	same as Preset	Recalled	yes
Coupled	always uncoupled		

A separate target value is stored for each format of each channel. `TARGET VALUE` sets the search value for `MARKER to TARGET` and left or right target searches.

TERMINAL IMPEDANCE

Specify the terminating impedance of the arbitrary impedance calibration standard.

Programming Code

TERI

Main Menu

CAL

Program Sequence

See `MODIFY 1 xx` and `MODIFY 2 xx`.

Manual Sequence

See `STD TYPE: ARBITRARY IMPEDANCE`.

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Terminal impedance allows a definition of the real part of the terminating impedance. For all standards except the Arbitrary Impedance Standard type, the terminal impedance has a default value. See `STD TYPE: (std type)`.

See Also

`STD TYPE: ARBITRARY IMPEDANCE`, `MODIFY 1 xx`, `MODIFY 2 xx`

TEST

Execute network analyzer line power-up test. Leaves 8510 system in the preset state.

Programming Code

None

Main Menu

None, recessed front panel button

Manual Sequence

Use a small diameter plastic tool to press the recessed TEST button.

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

If a certain class of error is detected, the test menu (see TEST MENU) is displayed and error codes in the Display/Processor indicator area show the error number. Refer to the *Agilent 8510 On-Site Service Handbook* for diagnostic information.

If the test menu is displayed when the 8510 is addressed via the analyzer GPIB, it is necessary to press TEST to restore normal operation.

TEST AMP. GAIN

For service only, manually select test IF amplifier gain.

Programming Code

TESA

Main Menu

SYSTEM

Program Sequence

```
TESA;
  GAINn;    n = 1 to 4 or AUTO
```

Manual Sequence

SYSTEM
 IF GAIN
  TEST AMP. GAIN
   GAIN n   (n = 1 to 4 or AUTO)

Description

Preset	gain = auto for TEST AMP. GAIN and REFERENCE AMP. GAIN	Range	N/A
Initialized	same as Preset	Recalled	N/A
Coupled	N/A		

See Also

REFERENCE AMP. GAIN

TEST MENU

Present test menu.

Programming Code

MENUTEST

Main Menu

SYSTEM

Program Sequence

MENUTEST;

Manual Sequence

(SYSTEM) MORE
  SERVICE FUNCTIONS
   TEST MENU

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Selecting TEST MENU disables the GPIB interface. This menu gives access to self-test menu items. To return to normal operation, enter 15 then (= MARKER), or cycle line power, or press TEST. Operation of selections from the test menu are described as part service procedures in the *Agilent 8510 On-Site Service Manual*.

The following is a list of the options avaliable on the test menu:

Table T-1. 8510C Test Menu

```
                     MAIN SERVICE FUNCTIONS MENU
        LOOPING SELF TESTS                     SYSTEM COMMANDS

                                         15 RUN MAIN PROGRAM
      1 A5 PROCESSOR EPROM                16 MEMORY OPERATIONS
      2 A5 PROCESSOR RAM                  17 RERUN SELF TEST
      3 A7 DATA BUS                       18 REPEAT TEST LOOP
      4 A4 DISPLAY PROCESSOR
      5 A14 DISPLAY RAM                      DISC COMMANDS
      6 A7 TIMER/CLOCK/RS-232
      7 A7 PUBLIC HPIB                    19 LOAD PROGRAM DISC
      8 A7 SYSTEM BUS                     20 RECORD PROGRAM DISC
      9 INTERRUPT SYSTEM                  21 INITIALIZE DISC
     10 A5 MULTIPLIER
     11 A7 DISC CONTROLLER                   SERVICE COMMANDS
     12 A6 NON-VOLATILE MEMORY
     13 IF DETECTOR DATA                  22 RUN SERVICE PROGRAM
     14 KEYBOARD                          23 DIAGNOSE A FAILURE


     ENTER SELECTION, THEN PRESS =MARKER
```

THRU xx

Measure TRL Thru standard class. Where xx = the class or standard label.

Programming Code

TRLT

Main Menu

CAL

Program Sequence

```
CAL1; or CAL2;
  CALITRL2;
    TRLT;
      TRLR1;
      TRLR2;
      ISOL;
    (measure isolation standards)
      TRLL;
        SAVT;
          CALSn; n = 1 to 8
```

Manual Sequence

(CAL)
CAL 1 xx (xx = cal kit 1 label) or
CAL 2 xx (xx = cal kit 2 label)
  TRL 2-PORT
    THRU THRU or
    S11 REFLECT SHORT or
    S22 REFLECT SHORT or
    LINE 2-18 LINE
    DONE

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

The second line of the softkey name for these is user definable (standard label), if one standard is assigned to the TRL LINE class, or TRL LINE class label if only one standard is assigned. These keys cause the set of measurements needed to compute the error coefficients.

`THRU xx`

They may be made in any order. TRLT and TRLL cycle through a series of S-parameter measurements, and then leave the system in S11. TRLR1 and TRLR2 measure and automatically select just one S-parameter.

See Also

`CALIBRATE: TRL 2-PORT`

TIME BAND PASS

Select the Time Domain, band pass mode and impulse stimulus for the selected channel.

Programming Code

`TIMB`

Note   Applies to Time Domain Option 010 only.

Main Menu

DOMAIN

Program Sequence

`TIMB;`

Manual Sequence

(select channel)
   (DOMAIN)
      `TIME BAND PASS`

Description

Preset	frequency domain	Range	N/A
Initialized	frequency domain	Recalled	yes
Coupled	always uncoupled		

The Frequency Domain data is transformed to display magnitude of the response versus time (distance) using a simulated band limited impulse stimulus. No frequency range limitations apply in this mode. The frequency sweep continues, but start/stop/center/span controls apply to the x-axis limits of the display. Switching between the Time and Frequency Domains automatically selects `DISPLAY: DATA`.

After FACTORY PRESET , selecting TIME BAND PASS chooses:

Function	Setting
Format	Linear Magnitude
Window	Normal
Gate	Off
Gate Start	−500 ps
Gate Stop	500 ps
Gate Center	0 s
Gate Span	1 ms
Gate Shape	Normal
Start	−1 ns
Stop	4 ns
Center	1.5 ns
Span	5 ns

Selecting TIME BAND PASS , SPECIFY TIME , LOW PASS: STEP or LOW PASS: IMPULSE has no effect on the displayed trace.

TIME LOW PASS

Select Time Domain low pass mode for the selected channel.

Programming Code

TIML

Note   Applies to Time Domain Option 010 only.

Main Menu

DOMAIN

Program Sequence

```
TIML;    TIML includes execution of SETF
  LOWPSTEP; or LOWPIMPU;
```

`TIME LOW PASS`

Manual Sequence

(DOMAIN)
  `TIME LOW PASS`
    `SET FREQ. (LOW PASS)`
      `SPECIFY TIME`
        `LOW PASS: STEP` or
        `LOW PASS: IMPULSE`

Description

Preset	frequency domain	**Range**	N/A
Initialized	frequency domain	**Recalled**	yes
Coupled	always uncoupled		

The Frequency Domain data is transformed to display impedance versus time (distance) using simulated last selected Step or Impulse stimulus. Frequency range limitations apply in this mode: see `SET FREQ (LOW PASS)` . The frequency sweep continues, but start/stop/center/span controls apply to the x-axis limits of the display. Switching between the Time and Frequency Domains automatically selects DISPLAY: DATA.

If the frequency range or number of points is changed, or if correction is turned on, the Frequency Domain is automatically selected. In order to make error-corrected measurements in the Time Domain low pass mode, a correction made with low pass frequencies set must be on before this mode is selected. See `SET FREQ. (LOW PASS)` .

After `FACTORY PRESET` , selecting `TIME LOW PASS` selects:

Function	Setting
Format	Real
Low Pass	Impulse
Window	Normal
Gate	Off
Gate Start	-500 ps
Gate Stop	500 ps
Gate Center	0 s
Gate Span	1 ms
Gate Shape	Normal
Start	-1 ns
Stop	4 ns
Center	1.5 ns
Span	5 ns

RESPONSE REPETITION   RANGE CALCULATION

$$\text{RANGE (sec)} = \frac{1}{\Delta f} = \frac{\text{NUMBER of POINTS}-1}{f_{span}\text{(GHz)}}$$

$$\frac{1}{\Delta f} \quad \text{RANGE (m)} = \left(\frac{1}{\Delta f}\right) \times (2.997925 \times 10^{8} \text{m/s}) \times (\text{vf})$$

$$\Delta f = \text{Hz}$$
$$\Delta f = \text{Velocity Factor}$$

Figure T-1. Response Repetition and Range Calculations

See Also

SET FREQ. (LOW PASS)

TINT

Adjust the tint of the color being modified.

Programming Code

TINT

Main Menu

DISPLAY

Program Sequence

TINT [value];   *value = 0 to 100*

Manual Sequence

(DISPLAY)
  ADJUST DISPLAY
   MODIFY COLORS
     (select display element)
   TINT
     [other changes]
     (PRIOR MENU)

`TINT`

(PRIOR MENU)
(PRIOR MENU)
`SAVE COLORS`

Description

Preset	not changed	Range	0 to 100
Initialized	varies with color selected	Recalled	yes
Coupled	always coupled		

Tint is the continuum of hues on the color wheel, ranging from red, through green and blue, and back to red. The tint default setting varies with the color selected.

The tint setting for the primary colors is as follows:

    yellow = 14.
    blue (cyan) = 53.
    red = 0.

Green is a mixture of yellow and blue, its setting is 38.

Note   This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

`BRIGHTNESS` , `COLOR` , `RESET COLOR` , `DEFAULT COLORS` , `PREDEFINED COLORS`

`TITLE`

Display string in title area of 8510 LCD/CRT. Title sequence is also used to make labels.

Programming Code

TITL

Main Menu

SYSTEM

Program Sequence

TITL "string";

Manual Sequence

(SYSTEM)
 DISPLAY FUNCTIONS
 TITLE
(use knob to select character)
 SELECT LETTER or
 SPACE or
 BACK SPACE or
 ERASE TITLE or
 TITLE DONE
(last menu displayed)

Description

Preset	restores standard title	**Range**	N/A
Initialized	restores standard title	**Recalled**	yes
Coupled	N/A		

Use the knob to point at the desired character, then press SELECT LETTER . Use SPACE ,
BACK SPACE , and ERASE TITLE as required. When complete, select TITLE DONE . The string
replaces the current title. Via GPIB, the old title or label is not erased until replaced with
a new or an empty string. TITL "string"; clears the title. TITL; makes TITLE the active
function for output. See OUTPTITL.

The active function entry is turned off, but it is still active if it is recalled after the last active
function. It is saved/recalled as part of the instrument state. Used with PARAMETER LABEL ,
LABEL: (std class) , LABEL KIT , LABEL STD . 50 characters are available for the title, 10
characters for softkey labels.

TITLE DONE

Current displayed character string is used as the title.

Programming Code

Main Menu

SYSTEM

Manual Sequence

See TITLE .

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

TOP MARGIN

Add a margin to the top of printer plots.

Programming Code

PRINTOPMAR

Main Menu

COPY

Program Sequence

PRINTOPMAR [value];   *value = 0 to 1.0*

Manual Sequence

(COPY)
  DEFINE PRINT
  MORE
    TOP MARGIN [entry (k/m)]   (entry = 0 to 1000, (k/m) = mm)

Description

Preset	portrait: 12.7 mm landscape: 5.08 mm	Range	0 to 1.0m
Initialized	same as Preset	Recalled	yes
Coupled	always coupled		

See Also

PRINT: PORTRAIT , PRINT: LANDSCAPE , PRINTER RESOLUTION , PRINT WIDTH
LEFT MARGIN , RIGHT MARGIN

TRANS. DONE

2-port transmission calibration sequence is complete.

Programming Code

TRAD

Main Menu

CAL

Program Sequence

```
CAL1; or CAL2;
  CALIFUL2; or CALIONE2;
    TRAN;
      FWDT;
        FWDM;
          REVT;
            REVM;
              TRAD;
                (reflection and isolation calibration steps)
                  SAV2;
                    CALSn;   n = 1 to 8
```

`TRANS. DONE`

Manual Sequence

[CAL]
`CAL 1 xx` (xx = cal kit 1 label) or
`CAL 2 xx` (xx = cal kit 2 label)
  `FULL 2-PORT` or
  `ONE-PATH 2-PORT`
    `TRANSMISSION`
      `FWD. TRANS. (class label)`
       `FWD. MATCH (class label)`
        `REV. MATCH (class label)`
         `REV. MATCH (class label)`
          `TRANS. DONE`
           (reflection and isolation calibration steps)
           `SAVE 2-PORT CAL`
            `CAL SET n` (n = 1 to 8)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Error coefficient sets for forward and reverse transmission signal path frequency response and load match are measured.

See Also

`CALIBRATE: FULL 2-PORT` , `CALIBRATE: ONE-PATH 2-PORT`

TRANSMISSION

After selection of 2-port measurement calibration, begin transmission calibration sequence.

Programming Code

TRAN

Main Menu

CAL

Program Sequence

See `TRANS. DONE`.

Manual Sequence

See `TRANS. DONE`.

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

Error coefficient sets for forward and reverse transmission signal path frequency response and load match are measured.

See Also

`CALIBRATE: FULL 2-PORT`, `CALIBRATE: ONE-PATH 2-PORT`

TRIG

Select externally triggered data acquisition mode.

Main Menu

None (GPIB Only)

Program Sequence

(set frequency range)
  (select sweep mode)
    TRIG;
    FRER; *to exit*

TRIG

Description

Preset	normal operation	**Range**	N/A
Initialized	normal operation	**Recalled**	no
Coupled	N/A		

Mode 1. Waiting for GPIB GROUP EXECUTE TRIGGER:

Selecting TRIG allows data acquisition to be controlled by an external controller using the GPIB GET (group execute trigger) command. The exact data acquisition process depends upon the current source address, the current test set address, and whether LOCK to NONE is selected.

If the source and test set addresses are standard (0 to 30) and LOCK to a_1 or a_2 is selected, TRIG sets the system to the beginning of the next group of sweeps, then sets bit 2 (waiting for GET) of the 8510 Primary Status Byte. GET initiates a group of sweeps (ramp), or the next data point (step or list frequency), or a single data point (single point).

When a group execute trigger is received, the "waiting for GET" bit in the Primary Status Byte is cleared. The test set local oscillator is phase-locked to the source if appropriate and the 8510 makes the selected measurement: a group of sweeps if RAMP is selected, the next point if STEP is selected, or a single point if SINGLE POINT is selected. When data acquisition and trace updating is complete, the "waiting for GET" bit is set and the system waits for the next GET.

If the source address is 31, or a test set is not connected to the System Bus, the source tuning part of the data acquisition cycle is skipped and the current selected frequency range is used as the basis for the 1st IF phase lock.

If the test set address is 31, then no test set signal path switching operations are attempted. If LOCK to NONE is selected, the 1st IF phase lock part of the data acquisition sequence is skipped.

MODE 2. Waiting for 8510 SIMS, Simulated Measurement of a Calibration Standard:

Select the desired instrument state (sweep mode, frequency range, etc.), then issue TRIG. Executing TRIG allows the measurement calibration process to proceed normally, except that after the standard is selected, the actual measurement does not take place. Instead, the data to be used to develop the error coeffiecient is input via the GPIB to the Raw Data Array, and the SIMS; instruction causes the raw data to be transferred to the appropriate error coeffiecient array for the current selected standard, then underlines the standard label. When all standards are measured, issue CALSn; to compute and store the error coefficients.

See Also

ADDRESS of SOURCE #1 , ADDRESS of TEST SET , FRER, GET (GPIB command),
HP-IB ADDRESSED COMMAND , LOCK to NONE

TRIGGER DELAY

Set measurement trigger delay for all domains except pulse profile.

Programming Code

TRID

Note	Wideband IF Option 008 only.

Main Menu

STIMULUS

Program Sequence

TRID [value [time suffix]];

Manual Sequence

(STIMULUS)
MORE
  TRIGGER MODE
    TRIGGER DELAY entry (entry = -1 μs minimum to $+40.88$ ms maximum)

Description

Preset	5 μs	Range	-1 μs minimum
			$+40.88$ ms maximum
Initialized	5 μs	Recalled	N/A
Coupled	N/A		

This function is active only in Frequency Domain and is normally used in pulsed-RF applications. It allows you to set the data acquistion point at a spot delayed from the leading edge of the pulse.

Figure T-2. Description of Trigger Delay

When the wideband detectors are selected the trigger delay function sets the time that the measurement will be made with respect to time zero.

For internal triggering, the time equals zero seconds when the signal at PULSE OUT (analyzer rear-panel) is asserted. The trigger delay can be set from a certain negative time (before time = 0 seconds, depends upon the pulse width and the number of points) to 40.88 ms after the pulse output signal is asserted.

For external triggering, time equals zero seconds is set by the falling edge of the TRIGGER IN (analyzer rear-panel) signal. The trigger delay can be set from a certain positive time (after time = 0 seconds, depends upon the number of points and the stop time) to 40.88 ms after the trigger in signal.

Table T-2.

Pulse Width	Minimum Trigger Delay	
	Internal	External
0 to 400 μs	−600 ns	+300 ns
400.2 to 800 μs	−600 ns	+400 ns
801 to 4000 μs	−1000 ns	0 ns
4010 to 40880 μs	0 ns	0 ns

See Also

DETECTOR: WIDE BW , TRIGGER MODE , *Pulsed-RF User's Guide*

TRIGGERING EXTERNAL

Select external measurement trigger. 8510 rear-panel connector TRIGGER IN.

Programming Code

EXTTPOIN

Main Menu

STIMULS

Program Sequence

EXTTPOIN;

Manual Sequence

(STIMULUS)
MORE
  TRIGGER MODE
    TRIGGERING INTERNAL or
    TRIGGERING EXTERNAL

Description

Preset	triggering internal	**Range**	N/A
Initialized	triggering internal	**Recalled**	N/A
Coupled	N/A		

Allows the analyzer data acquistion cycle to be synchronized with an external event other than the source frequency sweep.

For external triggering:

1. The analyzer STOP SWEEP BNC is enabled and goes high to indicate that the network analyzer is ready to accept an external trigger input.
2. The analyzer PULSE OUT BNC is disabled.

   With the wideband detectors selected, the TTL falling edge signal at TRIGGER IN (analyzer rear-panel) sets time = 0 seconds and starts the measurement cycle.

   With the normal detectors selected, the TTL falling edge signal at TRIGGER IN (analyzer rear-panel) initiates the next measurement.

See Also

TRIGGER DELAY, *Pulsed-RF User's Guide*

TRIGGERING INTERNAL

Select internal measurement trigger.

Programming Code

EXTTOFF

Main Menu

STIMULS

Program Sequence

EXTTOFF;

Manual Sequence

See TRIGGER EXTERNAL

Description

Preset	triggering internal	Range	N/A
Initialized	triggering internal	Recalled	N/A
Coupled	N/A		

The analyzer data acquistion cycle is synchronized with the source frequency ramp output (Agilent 8350-series and 8340-series). The data aquisition cycle is controlled by the 8360-series sources using the TRIGGER IN/TRIGGER OUT connection when the system is in quick step.

For internal triggering:

1. The analyzer STOP SWEEP BNC is disabled.
2. The analyzer PULSE OUT BNC is enabled (if DETECTOR: WIDE BW).

   With normal detectors selected, the measurement cycle is initiated automatically.

See Also

TRIGGER DELAY , TRIGGER EXTERNAL

TRIGGER MODE

Present the trigger mode menu.

Programming Code

None

Main Menu

STIMULUS

Manual Sequence

(STIMULUS)
MORE
  TRIGGER MODE
    TRIGGER DELAY or
    TRIGGERING EXTERNAL or
    TRIGGERING INTERNAL

Description

Preset	trigger delay 5μs, triggering internal	**Range**	N/A
Initialized	same as Preset	**Recalled**	N/A
Coupled	N/A		

See Also

TRIGGER DELAY , TRIGGERING EXTERNAL , TRIGGERING INTERNAL

TRIM SWEEP

Start stimulus trim sweep procedure.

Programming Code

TRIS

Main Menu

CAL

Program Sequence

TRIS [value]; $value = -1024$ to $+1024$

Manual Sequence

(CAL)
MORE
   TRIM SWEEP [entry (x1)] (entry = −1024 to +1024)

Description

Preset	0	**Range**	−1024 to +1024
Initialized	0	**Recalled**	yes
Coupled	may be uncoupled		

Performs a different function for Agilent 834x-series and 8350B/835xx-series sources. For 834x-series, used in the ramp sweep mode, TRIM SWEEP adjusts the end frequency at each band switch point to minimize the difference between the end frequency of one band and the start frequency of the next band. For 8350B sources, TRIM SWEEP is adjusted to provide best overall frequency accuracy.

TRIM SWEEP is not used for 834x-series source operated in the step sweep mode.

Refer to the TRIM SWEEP adjustment procedure under "Measurement Calibration" in the *Agilent 8510 Operating and Programming Manual*. For best accuracy, perform the trim sweep operation separately for each different frequency range prior to measurement calibration. The trim sweep value (−1024 to +1024) has no significance except as a scaling factor. Sweep time may affect the trim sweep adjustment.

The trim sweep setting is part of the calibration set limited instrument state, and is recalled with the calibration set. It is also saved/recalled with the Instrument State. Changing the trim sweep setting with correction on does not cause correction turn off, but may result in measurement errors because the actual frequencies measured change.

This function applies to 834x-series and 8350B/835xx-series sources.

TRL OPTION

Specify options for TRL 2-port calibration.

Programming Code

None

Main Menu

CAL

Program Sequence

See TRL OPTION DEFINED .

Manual Sequence

See TRL OPTION DEFINED .

Description

See TRL OPTION DEFINED .

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

CAL Z_0: LINE , CAL Z_0: TRLL , LOWBAND FREQUENCY , MODIFY 1 xx , MODIFY 2 xx , SET REF.: REFLECT , SET REF.: THRU

TRL OPTION DEFINED

TRL options specified.

Programming Code

TRLO

Main Menu

CAL

Program Sequence

```
MODI1; or MODI2;
  CALZLINE; or CALZSYST;
    SETRTHRU; or SETRREFL;
      LOWF [value];   (x1) = Hz
       TRLO;
       [other changes]
         KITD;
```

Manual Sequence

(CAL)
MORE
 MODIFY 1 xx (xx = cal kit 1 label) or
 MODIFY 2 xx (xx = cal kit 2 label)
  TRL OPTION
   CAL Z_0: LINE Z_0 or
   CAL Z_0: SYSTEM Z_0
    SET REF.: THRU or
    SET REF.: REFLECT
     LOWBAND FREQUENCY [value]
      TRL OPTION DONE
       [other changes]
        KIT DONE (MODIFIED)

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

TRL OPTION DEFINED is done after the appropriate TRL options have been selected. This automatically changes the last character of the calibration kit label to indicate that the standard calibration kit has been modified.

See Also

CAL Z_0: LINE, CAL Z_0: TRLL, LOWBAND FREQUENCY, MODIFY 1 xx, MODIFY 2 xx, SET REF.: REFLECT, SET REF.: THRU

2-PORT to: S_{11} 1-PORT

Create an S_{11} 1-port calibration from the currently active 2-port calibration set.

Programming Code

TWOPS11

Main Menu

CAL

Program Sequence

(turn on any 2-port calibration set)
TWOPS11;
  CHAS;
CALSn;   *n = 1 to 8*

Manual Sequence

[CAL]
  MORE
  MODIFY CAL SET
    CHANGE CAL TYPE
      2-PORT to: S_{11} 1-PORT
      CHANGE & SAVE
  CAL SET n

`2-PORT to: S₁₁ 1-PORT`

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

To invoke this function, a 2-port calibration set (full, one-path, or TRL) must be on.

Forward reflection signal path frequency response, source match, and directivity error coefficents from the selected 2-port calibration set are used to create a new 1-port calibration set.

See Also

`CHANGE & SAVE`, `CHANGE CAL TYPE`

2-PORT to: S_{22} 1-PORT

Create an S_{22} 1-port calibration from a 2-port calibration set.

Programming Code

TWOPS22

Main Menu

CAL

Program Sequence

(turn on any 2-port calibration set)
TWOPS22;
CHAS;
CALSn;   n = 1 to 8

Manual Sequence

CAL
  CORRECTION ON
     CAL SET n   (n = 1 to 8)
  MORE
  MODIFY CAL SET
     CHANGE CAL TYPE
        2-PORT to: S_{22} 1-PORT

CHANGE & SAVE
CAL SET n

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

To invoke this function, a 2-port calibration set (full, one-path, or TRL) must be selected on.

Reverse reflection signal path frequency response, source match, and directivity coefficents are used to create the new 1-port calibration set.

See Also

CHANGE & SAVE , CHANGE CAL TYPE

UNCOUPLED CHANNELS

Uncouple channel 1 and channel 2 stimulus and calibration sets.

Programming Code

UNCC

Main Menu

STIMULUS

Program Sequence

UNCC;

Manual Sequence

STIMULUS (MENU)
MORE
  UNCOUPLED CHANNELS

Description

Preset	coupled channels	Range	N/A
Initialized	coupled channels	Recalled	yes
Coupled	N/A		

Selecting UNCOUPLED CHANNELS allows the functions listed in the calibration set limited instrument state and Time Domain gate markers to be different for channel 1 and channel 2, thus allowing a different calibration set to be applied to the same parameter on different channels.

If the instrument state is changed from COUPLED CHANNELS to UNCOUPLED CHANNELS, then correction is turned off for all parameters of the nonactive channel.

These functions can be uncoupled:

- Frequency range.
- Sweep time.
- Correction on, calibration sets.
- Time domain gate markers.

UNCOUPLED CHANNELS

- Source power.
- Power slope.

These functions are always coupled, and cannot be uncoupled:

- Number of points.
- Ramp, step, single point, frequency list.
- Hold, continual.
- Frequency domain markers, if the domain is the same for both channels.
- GPIB addresses
- Attenuator port 1, 2

See Also

COUPLED CHANNELS

UN-DELETE

Recover last deleted disc file.

Programming Code

UNDE

Main Menu

DISC

Program Sequence

UNDE;

Manual Sequence

DISC
   UN-DELETE

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

If the file area has not been used by storing or loading another file, the disc has not been removed, or FACTORY PRESET selected, then the last deleted disc file is recovered.

UNITS: Giga

Specify gigahertz units (10^9) for stimulus values on the data list.

Programming Code

LISSTIUGIGA

Main Menu

COPY

Program Sequence

    LISSTIUGIGA;

Manual Sequence

COPY
    DEFINE LIST
        STIMULUS FORMAT
            STIMULUS UNITS
                UNITS: Giga

Description

Preset	varies with domain see STIMULUS: UNITS	Range	N/A
Initialized	same as Preset	Recalled	yes
Coupled	always coupled		

Gigahertz units are applicable in the Frequency Domain only.

See Also

STIMULUS: UNITS , STIMULUS: DECIMAL POSITION , STIMULUS: WIDTH

UNITS: kilo

Specify kilohertz units (10^3) for stimulus values on data list.

Programming Code

LISSTIUKILO

Main Menu

COPY

Program Sequence

```
LISSTIUKILO;
```

Manual Sequence

```
(COPY)
  DEFINE LIST
    STIMULUS FORMAT
      STIMULUS UNITS
        UNITS: kilo
```

Description

Preset	varies with domain see STIMULUS: UNITS	Range	N/A
Initialized	same as Preset	Recalled	yes
Coupled	always coupled		

Kilohertz units are applicable in the Frequency Domain only.

See Also

STIMULUS: UNITS , STIMULUS: DECIMAL POSITION , STIMULUS: WIDTH

UNITS: Mega

Specify megahertz units (10^6) for stimulus values on data list.

Programming Code

LISSTIUMEGA

Main Menu

COPY

Program Sequence

```
LISSTIUMEGA;
```

Manual Sequence

```
[COPY]
  DEFINE LIST
    STIMULUS FORMAT
      STIMULUS UNITS
        UNITS: Mega
```

Description

Preset	varies with domain see **STIMULUS: UNITS**	Range	N/A
Initialized	same as Preset	Recalled	yes
Coupled	always coupled		

Megahertz units are applicable in the Frequency Domain only.

See Also

STIMULUS: UNITS , STIMULUS: DECIMAL POSITION , STIMULUS: WIDTH

UNITS: micro

Specify microsecond units (10^{-6}) for stimulus values on the data list.

Programming Code

LISSTIUMICR

Main Menu

COPY

Program Sequence

    LISSTIUMICR;

Manual Sequence

COPY
    DEFINE LIST
        STIMULUS FORMAT
            STIMULUS UNITS
                UNITS: micro

Description

Preset	varies with domain	Range	N/A
	see STIMULUS: UNITS		
Initialized	same as Preset	Recalled	yes
Coupled	always coupled		

Microsecond units are applicable in Time Domain only.

See Also

STIMULUS: UNITS , STIMULUS: DECIMAL POSITION , STIMULUS: WIDTH

UNITS: milli

Specify millisecond (Time Domain) or millivolt (Aux Voltage Domain) units (10^{-3}) for stimulus values on the data list.

Programming Code

LISSTIUMILI

Main Menu

COPY

Program Sequence

LISSTIUMILI;

Manual Sequence

COPY
    DEFINE LIST
        STIMULUS FORMAT
            STIMULUS UNITS
                UNITS: milli

Description

Preset	varies with domain see STIMULUS: UNITS	Range	N/A
Initialized	same as Preset	Recalled	yes
Coupled	always coupled		

See Also

STIMULUS: UNITS , STIMULUS: DECIMAL POSITION , STIMULUS: WIDTH

UNITS: nano

Specify nanosecond units (10^{-9}) for stimulus values on the data list.

Programming Code

LISSTIUNANO

Main Menu

COPY

Program Sequence

LISSTIUNANO;

Manual Sequence

COPY
  DEFINE LIST
    STIMULUS FORMAT
      STIMULUS UNITS
        UNITS: nano

Description

Preset	varies with domain see STIMULUS: UNITS	Range	N/A
Initialized	same as Preset	Recalled	yes
Coupled	always coupled		

Nanosecond units are applicable in Time Domain only.

See Also

STIMULUS: UNITS , STIMULUS: DECIMAL POSITION , STIMULUS: WIDTH

UNITS: pico

Specify picosecond units (10^{-12}) for stimulus values on the data list.

Programming Code

LISSTIUPICO

Main Menu

COPY

Program Sequence

LISSTIUPICO;

Manual Sequence

COPY
DEFINE LIST
STIMULUS FORMAT
STIMULUS UNITS
UNITS: pico

Description

Preset	varies with domain see STIMULUS: UNITS	Range	N/A
Initialized	same as Preset	Recalled	yes
Coupled	always coupled		

Picosecond units are applicable in Time Domain only.

See Also

STIMULUS: UNITS , STIMULUS: DECIMAL POSITION , STIMULUS: WIDTH

UNITS: x 1

Specify basic units (hertz, second, volt) for stimulus values on data list.

Programming Code

LISSTIUUNIT

Main Menu

COPY

Program Sequence

```
LISSTIUUNIT;
```

Manual Sequence

COPY
  DEFINE LIST
    STIMULUS FORMAT
      STIMULUS UNITS
        UNITS: x 1

Description

Preset	varies with domain see STIMULUS: UNITS	Range	N/A
Initialized	same as Preset	Recalled	yes
Coupled	always coupled		

See Also

STIMULUS: UNITS , STIMULUS: DECIMAL POSITION , STIMULUS: WIDTH

USER DISPLAY

Disc data type select user display data memory.

Programming Code

USED

Main Menu

DISC

Program Sequence

```
STOIINT or STOIEXT;
  STOR or LOAD or DELE;
    USED;
      DISF "filename";
```

Manual Sequence

DISC
STORAGE IS INTERNAL or STORAGE IS EXTERNAL
STORE or
LOAD or
DELETE
MORE
  USER DISPLAY
    STORE FILE or LOAD FILE or DELETE FILE

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

USER 1 a_1

Select user parameter.

Programming Code

USER1

Main Menu

PARAMETER

Program Sequence

USER1; or USER2; or USER3; or USER4;

Manual Sequence

PARAMETER (MENU)
  USER 1 a_1 or
  USER 2 b_2 or
  USER 3 a_2 or
  USER 4 b_1

Description

Description

Preset	standard basic and user parameter definitions	Range	N/A
Initialized	same as Preset	Recalled	yes
Coupled	always uncoupled		

The standard user parameter definitions measure the unratioed power level allowing approximation of the test or reference signal level applied to the first frequency conversion stage.

These parameters may be redefined for other measurements, and for use in frequency response measurement calibrations. However, due to automatic parameter selection, these parameters cannot be used in 1-port or 2-port measurement calibration sequences.

Selecting a User parameter recalls the last selected *format* and *response* characteristics for that parameter on the selected channel.

Redefined User parameters can be saved and recalled.

See Also

REDEFINE PARAMETER

USER 2 b_2

Select user parameter.

Programming Code

USER2

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

USER 1 a_1 for complete description.

USER 3 a_2

Select user parameter.

Programming Code

USER3

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

USER 1 a_1 for complete description.

USER 4 b_1

Select user parameter.

Programming Code

USER4

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

See Also

USER 1 a_1 for complete description.

USER PRESET

Set the analyzer to a user defined preset state.

Programming Code

USERPRES

Program Sequence

USERPRES;

Manual Sequence

USER PRESET

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Recalls Instrument State register 8. Instruments on the system bus are not initialized.

The GPIB command `PRES;` can be made to either execute a user preset or a factory preset depending on the setting of the `HP-IB USES USR PRESET` or `HP-IB USES FACTORY PRESET` keys.

See Also

`FACTORY PRESET` , `HP-IB CONFIGURE`

USER PRESET *8

Set the analyzer to a user defined preset state.

Programming Code

USERPRES

Program Sequence

USERPRES;

Manual Sequence

(RECALL)
MORE
  USER PRESET *8

Description

Preset	N/A	Range	N/A
Initialization	N/A	Recalled	N/A
Coupled	N/A		

Recalls Instrument State register 8. This function operates the same as the green hardkey (USER PRESET).

See Also

`FACTORY PRESET` , `HP-IB CONFIGURE`

V

VELOCITY FACTOR

Relative velocity factor of propagation.

Programming Code

VELOFACT

Main Menu

CAL

Program Sequence

VELOFACT [value];

Manual Sequence

CAL
MORE
  PORT EXTENSIONS
    VELOCITY FACTOR [entry] ($\boxed{x1}$ = factor)

Description

Preset	1.0	Range	0.001 to 500
Initialized	1.0	Recalled	as part of instrument state
Coupled	always coupled		

Velocity factor modifies the distance readout that occurs with certain active functions (ELECTRICAL DELAY, PORT EXTENTIONS), and marker readouts in Time Domain.

This allows a calibrated distance readout when the propagation velocity is different than the speed of light in a vacuum (C = 2.997925 x 10^8 meters/sec.). This value is normally related to the relative dielectric constant of the propagation media, as shown in the equation below:

$$V_{rel} = 1/(\varepsilon_r)^{0.5}$$

where ε_r = 1.00064 for standard air.

VELOCITY FACTOR

See Also

ELECTRICAL DELAY

W

WAIT

Hold off processing of next GPIB instruction until currently executing program instruction is complete.

Main Menu

None (GPIB Only)

Program Sequence

`WAIT;`

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

`WAIT` does not allow the next instruction to be processed until any previous instruction is complete and the current instrument state is updated. This is useful when instructions are input via the 8510 GPIB that do not include an automatic holdoff.

One use of `WAIT` is, after a domain change to allow conversion of data before the marker is positioned and the trace value is output:

Example:

```
MARK1  10 GHz;  OUTPMARK;
   .
   .
   .
TIMB;  WAIT;  MARK 1  10 ns; OUTPMARK;
   .
   .
   .
```

WARNING

Modify the color of the warning messages on the display.

Programming Code

COLRWARN

Main Menu

DISPLAY

Programming Sequence

```
COLRWARN;
 TINT [value]; or
 CBRI [value]; or
 COLOR [value]; or
 RSCO;
SVCO;
```

Manual Sequence

DISPLAY
  ADJUST DISPLAY
    MODIFY COLORS
      WARNING
        TINT or
        BRIGHTNESS or
        COLOR or
        RESET COLORS or
        PREDEFINED COLORS
      PRIOR MENU
    PRIOR MENU
  SAVE COLORS

Description

Preset	red	Range	see MODIFY COLORS
Initialization	red	Recalled	yes, using
			SAVE COLORS
			RECALL COLORS
Coupled	always coupled		

The color of the warning messages be changed to any color, tint, and brightness combination.

Cycling power changes all color adjustments to the default defined colors. To recall previously modified colors, use the RECALL COLORS softkey.

FACTORY PRESET does not affect color selection.

See Also

MODIFY COLORS , DEFAULT COLORS , PREDEFINED COLORS , SAVE COLORS , RESET COLOR

WARNING PEN: n

Select pen number to plot the warning messages. Where n = 1 to 10.

Programming Code

PENNWARN

Main Menu

COPY

Programming Sequence

    PENNWARN [value];   *value = 1 to 10*

Manual Sequence

COPY
  DEFINE PLOT
    SET PEN NUMBERS
      WARNING PEN: n [entry x1]   (entry = 1 to 10)
        (other selections)
      PRIOR MENU
    PRIOR MENU
  PLOT TO PLOTTER
    (select information to plot)

Description

Preset	pen 2	Range	1 to 10
Initialization	pen 2	Recalled	yes
Coupled	always coupled		

The default pen number is 2.

`WARNING PEN: n`

See Also

`SET PEN NUMBERS` for a complete description.

WAVEGUIDE

Specify current calibration standard as waveguide type.

Programming Code

WAVE

Main Menu

CAL

Program Sequence

See `MODIFY 1 xx` and `MODIFY 2 xx`.

Manual Sequence

See `MODIFY 1 xx` and `MODIFY 2 xx`.

Description

Preset	N/A	Range	N/A
Initialized	N/A	Recalled	N/A
Coupled	N/A		

`OFFSET LOSS` is not used for waveguide type standards.

`OFFSET Z`$_0$ should be specified as 50 Ω for waveguide type standards.

See Also

`MINIMUM FREQUENCY`

WAVEGUIDE DELAY

Select waveguide phase for electrical delay; make cutoff frequency active function (Standard Rectangular Waveguide Phase).

Programming Code

WAVD

Main Menu

RESPONSE

Program Sequence

WAVD [value];

Manual Sequence

RESPONSE (MENU)
MORE
  WAVEGUIDE DELAY
    (enter waveguide cutoff frequency value)

Description

Preset	coaxial delay	Range	0 to 999 GHz
Initialized	coaxial delay	Recalled	N/A
Coupled	uncoupled		

WAVEGUIDE DELAY sets the mode for electrical delay in dispersive standard rectangular waveguide.

See Also

COAXIAL DELAY , TABLE DELAY

WHITE

Set the specified display element to white.

Main Menu

DISPLAY

Manual Sequence

[DISPLAY]
  ADJUST DISPLAY
    MODIFY COLORS
      (select display element)
        PREDEFINED COLORS
          WHITE
          [other changes]
        [PRIOR MENU]
      [PRIOR MENU]
    [PRIOR MENU]
    SAVE COLORS

Description

Preset	not changed	Range	N/A
Initialized	tint = 0 brightness = 100% color = 0%	Recalled	yes, using SAVE COLORS, RECALL COLORS
Coupled	always coupled		

The softkeys and with various degress of brightness, it is also used for markers and stimulus values.

Note	This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

PREDEFINED COLORS, MODIFY COLOR, DEFAULT COLORS

WINDOW: MAXIMUM

Select Time Domain window type.

Programming Code

WINDMAXI

Note	Applies to Time Domain Option 010 only.

Main Menu

DOMAIN

Program Sequence

WINDMAXI;

Manual Sequence

(DOMAIN)
SPECIFY TIME
  WINDOW: MAXIMUM or
  WIDOW: NORMAL or
  WINDOW: MINIMUM

Description

Preset	window: normal	Range	N/A
Initialized	window: normal	Recalled	yes
Coupled	always uncoupled		

If Time Domain is selected, the specified window is applied to the displayed data.

WINDOW TYPE	IMPULSE SIDELOBE LEVEL	STEP SIDELOBE LEVEL
MINIMUM	−13 dB	−21 dB
NORMAL	−44 dB	−60 dB
MAXIMUM	< −90 dB	< −90 dB

Figure W-1. Window Characteristics

WINDOW: MINIMUM

Select Time Domain window type.

Programming Code

WINDMINI

Note   Applies to Time Domain Option 010 only.

Program Sequence

WINDMINI;

Description

Preset	window: normal	Range	N/A
Initialized	window: normal	Recalled	yes
Coupled	always uncoupled		

See Also

WINDOW: MAXIMUM for complete description.

WINDOW: NORMAL

Select Time Domain window type.

Programming Code

WINDNORM

Note   Applies to Time Domain Option 010 only.

Program Sequence

WINDNORM;

Description

Preset	window: normal	Range	N/A
Initialized	window: normal	**Recalled**	yes
Coupled	always uncoupled		

See Also

WINDOW: MAXIMUM for complete description.

YELLOW

Set the specified display element to yellow.

Main Menu

DISPLAY

Manual Sequence

[DISPLAY]
  ADJUST DISPLAY
   MODIFY COLORS
     (select display element)
       PREDEFINED COLORS
         YELLOW
           [other changes]
         [PRIOR MENU]
       [PRIOR MENU]
     [PRIOR MENU]
     SAVE COLORS

Description

Preset	not changed	**Range**	N/A
Initialized	tint = 14 brightness = 100% color = 100%	**Recalled**	yes, using SAVE COLORS , RECALL COLORS
Coupled	always coupled		

S_{11} data and at a dimmer brightness of 70%, it is used for S_{11} memory.

Note   This function is not implemented on an 8510B with firmware (6.0 or greater) revisions.

See Also

PREDEFINED COLORS , MODIFY COLOR , DEFAULT COLORS

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