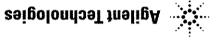
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Programmer's Guide

Agilent Technologies 8712ET/ES and 8714ET/ES RF Network Analyzers



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| Programmer's G. |
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| |
| |
| This manual documents analyzers with firmware revisions E.06.00 a above. |
| Firmware Revision |
| |
| Soffice: This indicates a "softkey" a key whose label is determine by the instrument's firmware, and is displayed on the right side of the instrument's screen next to the eight unlabeled keys. |
| ERONT PANEL KEY): This represents a key physically located on the analyzer (a "hardkey"). |
| This manual uses the following conventions: |
| Key Conventions |
| |
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GPIB Programming

This document is an introduction to programming your analyzer over the general purpose interface bus (GPIB). Its purpose is to provide concise information about the operation of the instrument under GPIB control. It provides some background information on the GPIB and some short programming examples to demonstrate the remote operation of the analyzer.

Example programs can be run on the analyzer's internal controller or on an external controller. These programs can be found in the following

- Example Programs Disk (included with the analyzer)— DOS Format: part number 08714-10003.
- A LIF version of the Example Programs Disk is available, but is not shipped with your analyzer:
- ExamplePrograms Disk LIF Format part number 08714-10004.
- Contact the nearest Agilent Technologies sales office for ordering information. A list of Agilent Technologies sales and service offices can be found in the "Specifications" chapter of the User's Guide.
- Example Programs Guide (included with the analyzer): part number 08714-90016. (This document may not include all of the example programs found on the disk or on the Web site.)
- Web site http://www.agilent.com. Use the search function to find Web pages related to 8712 example programs.
- You should become familiar with the operation of your network analyzer before controlling it over GPIB. This document is not intended to teach programming or to discuss GPIB theory except at an introductory level. Related information can be found in the following references:
- Information on making measurements with the analyzer is available in the analyzer's User's Guide.
- Information on HP Instrument BASIC is available in the HP Instrument BASIC User's Handbook.

| Contact the nearest Agilent Technologies sales office for ordering information. A list of sales and service offices can be found in the 'Specifications' chapter of the $User$'s $Guide$. | ŗ |
|---|---|
| • Information on using the analyzer with a Local Area Network (LAN) is available in The LAN Interface User's Guide. | • |
| Information on using the analyzer to make automated measurements is available in Automated Measurements User's Guide Supplement. | , |
| Information on using the GPIB is available in the Tutorial Description of the Hewlett-Packard Interface Bus (HP literature no. 5021-1927). | • |
| • Example programs are described in Example Programs Guide. | , |
| • Information on HP BASIC programming is available in the manual set for the BASIC revision being used. For example: BASIC 7.0 Programming Techniques and BASIC 7.0 Language Reference. | • |
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Agilent Technologies 8712ET/ES and 8714ET/ES Network Analyzer Documentation Map



The **CDROM** provides the contents of all of the documents listed below.

The User's Guide shows how to make measurements, explains commonly-used features, and tells you how to get

the most performance from the analyzer.



The LAN interface User's Guide Supplement shows how to use a local area network (LAN) for programming and remote operation of the analyzer.



The Automating Measurements User's Guide Supplement provides information on how to configure and control test systems for automation of test processes.



The **Programmer's Guide** provides programming information including GPIB and SCPI command references, as well as short programming examples.



Programmer's Guide analyzers.) cellular antenna systems. (Shipped only with Option 100 abbreviated instructions for verifying the performance of The Cellular Antenna Quick Start Guide provides (Shipped only with Option 100 analyzers.) instructions for testing the quality of coaxial cables. The CATV Quick Start Guide provides abbreviated analyzers.) and SRL measurements. (Shipped only with Option 100 theory and measurement examples for making fault location Loss Measurements User's Guide Supplement provides The Option 100 Fault Location and Structural Return program the analyzer. Supplement shows how to use HP Instrument BASIC to The HP Instrument BASIC User's Handbook HP Instrument BASIC, and includes a language reference. programming and interfacing techniques using The HP Instrument BASIC User's Handbook describes conformance to published specifications. adjust, troubleshoot, repair, and verify analyzer The Service Guide provides the information needed to demonstrate the remote operation of the analyzer. introduction using BASIC programming examples to The Example Programs Guide provides a tutorial

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Introduction to GPIB Programming

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| | |
| 16. The factory default address for the factory default address for the | zer is |
| PIB address on the analyzer, use the softkeys located in the | |
| key sequence or a rear-panel switch. | |
| ge. Device addresses are set on each device using either a | |
| specify which device talks and which device listens during a | |
| aust have a unique address. The active controller uses GPIB | u snq e |
| sees provide a way to identify devices on the bus. Each device | addre |
| ve controller or system controller at different times. | ы, асы |
| e active controller. The network analyzer can act as a talker, | |
| ntroller, the one device that can take control of the bus even | _ |
| the of the controller-capable devices can be designated as the | |
| ntrol data exchanges at any given time. The device ntrolling data exchanges is called the Active Controller. | |
| rice with controller capabilities, only one of the devices is | |
| in a data exchange. When a GPIB system contains more | |
| s are devices that use these control lines to specify the talker | toller |
| e data lines and to control other interface operations. | |
| so five control lines on each cable that are used to manage | |
| steners are devices that receive data over the same lines. | |
| ta lines on each cable that are used to send data from one other. Devices that send data over these lines are called | |
| provide the physical link between devices on the bus. There | |
| The difference of the second s | |
| nt system, including some frequently used commands. | кешен |
| nterface capabilities of instruments and controllers in a | i ədt s |
| by the IEEE 488.1 standard. The IEEE 488.2 standard | |
| est systems. The bus and its associated interface operations | |
| general purpopse interface bus—is a high-performance bus individual instruments and computers together to make | |
| - sud sangin intisat-iisin g gigna sangingni asnon ina iisina sa | ₹ ₩1111 |

JEON

• Square brackets ([]) are used to enclose a keyword that is optional or implied when programming the command; that is, the instrument will process the command to have the same effect whether the option node is omitted or not.

Throughout this manual, the following conventions are used:

- Parameter types (< >) are distinguished by enclosing the type name in angle brackets.
- A vertical bar (|) can be read as "or" and is used to separate alternative parameter options.
- A HARDKEY is a labeled button on the instrument front panel.
- A Softkey is one of the eight unlabeled buttons along the right side of the instrument display. The function of each Softkey is indicated next to the Softkey on the instrument display.

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| No of specific feetings (| г ре ртоgrammer. |
| | speed of the slowest device, and ensures data integrity in multiple listener transfers. With most computing controllers and instruments, the handshake is performed automatically, which makes it transparent to |
| | A three-line handshake scheme coordinates the transfer of data between talkers and listeners. This technique forces data transfers to occur at the |
| | Handshake Lines |
| | every byte transferred over GPIB undergoes a handshake to ensure valid data. |
| · · · · · · · · · · · · · · · · · · · | lines are typically encoded in the ASCII format, although binary encoding is often used to speed up the transfer of large arrays. Both ASCII and binary data formats are available to the analyzer. In addition, |
| | The data bus consists of eight lines that are used to transfer data from one device to another. Programming commands and data sent on these |
| | Data Bus |
| | Bus Structure |

Control Lines

The data bus also has five control lines that the controller uses both to send bus commands and to address devices:

| 1) T 16 18 18 | End or Identify. This line is used by a talker to indicate the last data byte in a multiple byte transmission, or by an active controller to initiate a parallel poll sequence. The analyzer recognizes the EOI line as a terminator and it sets the EOI line true (low) with the last byte of a message output (data, markers, plots, prints, error messages). The analyzer does not respond to parallel messages). |
|----------------------------|--|
| or os sa ir ir | remote mode and devices are addressed either to listen or talk. When the bus is in remote mode and a device is addressed, the device receives instructions from GPIB rather than from its front panel (pressing the Beturn to Local office) returns the device to front panel operation). When this line is set false (high), the bus and all devices return to local operation. |
| | Remote Enable. Only the system controller uses this line. When this line is set true (low), the bus is in the |
| 4 3 | device requests service: the active controller services the requesting device. The analyzer can set the SRQ line true (low) for a variety of reasons. |
| | Service Request. This line is set true (low) when a |
| oo od od ori | command or is data. When this line is true (low), the bus is in the command mode and the data lines carry bus commands. When this line is false (high), the bus is in the data mode and the data lines carry device-dependent instructions or data. |
| | Attention. The active controller uses this line to define whether the information on the data bus is a |
| | or not) are deselected, and go to an idle state. |
| | line. When this line is true (low), all devices (addressed |
| ILC I | Interface Clear. Only the system controller uses this |
| | |

.lloq

| [| 9-i Guide |
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| and the second | |
|) () () () () () () () () () (| |
| (*****) | frace. |
| | device at address 716. If the device is an analyzer, the command instructs the analyzer to set a marker to the maximum point on the data |
| , | This sends the command CALCULATE: MARKER: MAXIMUM to the GPIB |
| \ | OUTPUT 716; "CALCULATE: MARKER: MAXIMUM" |
| * **** | The following example shows how to send a typical device command: |
| | Language systems usually deal differently with these two kinds of GPIB commands. For example, HP BASIC uses a unique keyword output to but always uses the keyword OUTPUT to send device commands. |
| | Device commands, which control analyzer functions. |
| i | Bus management commands, which control the GPIB interface. |
| | send GPIB commands vary among systems. When determining the correct keywords to use, keep in mind that there are two different kinds of GPIB commands: |
| | Commands are sent over the GPIB via a controller's language system, such as IBASIC, QuickBASIC or C. The keywords used by a controller to |
| | Sending Commands |

GPIB Requirements

GPIB Requirements

Number of Interconnected Devices: 15 maximum

Interconnection Path/Maximum Cable Length:
20 meters maximum or 2 meters per device, whichever is less.

Message Transfer Scheme:

Byte serial/bit parallel asynchronous data transfer using a 3-line handshake system.

Data Rate:

Maximum of 1 megabyte per second over limited distances
with tri-state drivers. The actual data rate is the transfer rate
of the slowest device involved.

Address Capability:
Primary addresses: 31 talk, 31 listen. A maximum of 1 talker and 14 listeners at one time.

In systems with more than one controller (like the analyzer system), only one can be active at a time. The active controller can pass control to another controller, but only one system controller can assume unconditional controller is allowed. The system controller is allowed. The system assume bus control after a power failure.

Interface Capabilities

The analyzer has the following interface capabilities, defined by the IEEE 488.1 standard:

Analyzer Interface Capabilities (IEEE 488.1)

I-1 əldsT

| ьь0 | no parallel poll capability |
|-----------------|---|
| DLI | full device trigger capability |
| E2 | tri-state drivers |
| CIS 5 | send IF messages, receive control, pass control |
| G8 _T | send IFC, receive control, pass control, pass control to self |
| C₹Ţ | PAS of bnoqser |
| C3 | send REN Controller capability |
| CS | send IFC and take charge Controller capability |
| CI | System Controller capability |
| DGI | full Device Clear capability |
| RL1 | full Remote/Local capability |
| SEI | full Service Request capability |
| ГEO | no Extended Listener capability |
| ÞΊ | basic Listener, no Listen Only, unaddress if MTA |
| LEO | no Extended Talker capability |
| 9J. | basic Talker, Serial Poll, no Talk Only, unaddress if MLA |
| ΙΗΑ | full Acceptor handshake capability |
| THS | full Source handshake capability |
| | |

I. only when an HP Instrument BASIC program is running 2. only when an HP Instrument BASIC program is not running

Programming Fundamentals

Programming Fundamentals

This section includes specific information for programming your network analyzer. It includes how the analyzer interacts with a controller, how data is transferred between the analyzer and a controller, and how to use the analyzer's status register structure to generate service requests.

Controller Capabilities

The analyzer can be configured as a GPIB system controller or as a talker/listener on the bus. To configure the analyzer, select either the System Controller or the Talker Listener softkey in the CYSTEM OPTIONS (CPIB menu.

The analyzer is not usually configured as the system controller unless it is the only controller on the bus. This setup would be used if the analyzer only needed to control printers or plotters. It would also be used if HP

When the analyzer is used with another controller on the bus, it is usually configured as a talker/listener. In this configuration, when the analyzer is given control it can function as the active controller.

Instrument BASIC was being used to control other test equipment.

| | 1-10 Programmer's Guide |
|--|---|
| | |
| | |
| | This command returns the analyzer to local (front-panel) control. All keys on the analyzer's front-panel are enabled. |
| | Go To Local (GTL) |
| | any instrument settings or registers (although clearing the output queue may indirectly affect the status byte's Message Available (MAV) bit) |
| | mentioned) |
| The state of the s | front panel operation any analyzer operations in progress (other than those already |
| | The command does not affect the following: |
|] | • cancels any pending *OPC command or query |
| The second secon | resets its command parser (so it is ready to receive a new program |
| | clears its input and output queues |
| | When the analyzer receives this command, it does the following: |
| | language system to determine how to send these commands. Device Clear (DCL) |
| | This section describes how the analyzer responds to the GPIB management commands. The commands themselves are defined by the IEEE 488.1 standard. Refer to the documentation for your controller's |
| | devices on the interface can talk (send data) and which can listen (receive data). They also instruct devices on the bus, either individually or collectively, to perform a particular interface operation. |
| | interface is in command mode or data mode. When the interface is in command mode (ATN TRUE), a controller can send bus management commands over the bus. Bus management commands specify which |
| | The GPIB contains an attention (ATM) line that determines whether the |
| | Response to Bus Management Commands |

Interface Clear (IFC)

This command causes the analyzer to halt all bus activity. It discontinues any input or output, although the input and output queues are not cleared. If the analyzer is designated as the active controller when this command is received, it relinquishes control of the bus to the system controller. If the analyzer is enabled to respond to a Serial Poll, it becomes Serial Poll disabled.

Local Lockout (LLO)

This command causes the analyzer to enter the local lockout mode, regardless of whether it is in the local or remote mode. The analyzer only leaves the local lockout mode when the GPIB Remote Enable (REN) line is set FALSE.

Local Lockout ensures that the analyzer's remote softkey menu (including the **Return to Local** softkey) is disabled when the analyzer is in the remote mode. When the key is enabled, it allows a front-panel operator to return the analyzer to local mode, enabling all other front-panel keys. When the key is disabled, it does not allow the front-panel operator to return the analyzer to local mode.

Parallel Poll

The analyzer ignores all of the following parallel poll commands:

- Parallel Poll Configure (PPC)
- Parallel Poll Unconfigure (PPU)
- Parallel Poll Enable (PPE)
- Parallel Poll Disable (PPD)

| (} | |
|--|--|
| | |
| | The analyzer responds to both of the serial poll commands. The Serial Poll Enable (SPE) command causes the analyzer to enter the serial poll mode. While the analyzer is in this mode, it sends the contents of its status byte register to the controller when addressed to talk. |
| | Serial Poll |
| | any analyzer settings or registers (although clearing the output queue may indirectly affect the status byte's MAV bit) passed |
| | any analyzer operations in progress (other than those already mentioned) |
| | • front-panel operation |
| | The command does not affect the following: |
| | • cancels any pending *OPC command or query |
| (Company of the Comp | resets its command parser (so it is ready to receive a new program message) |
| (100 | clears its input and output queues |
| L.,) | When the analyzer receives this command it does the following: |
| Commercial 1 | The analyzer responds to this command in the same way that it responds to the Device Clear (DCL) command. |
| | Selected Device Clear (SDC) |
| (<u>.</u> | suslyzer to local mode, enabling all other front-panel keys. |
| (Arappinian) | softkeys. The remote softkey menu includes seven keys that are available for use by a program. The eighth softkey is the Return to Local key which allows a front-panel operator to return the |
| and the state of t | When the analyzer is in remote mode and local lockout mode, all front panel keys are disabled. When the analyzer is in remote mode but not in local lockout mode, all front panel keys are disabled except for the |
| an-Landyma | mode until it receives the Go to Local (GTL) command or until the REN line is set FALSE. |
| | REM is a single line on the GPIB. When it is set TRUE, the analyzer will enter the remote mode when addressed to listen. It will remain in remote |
| i | Remote Enable (REN) |
| (") | |

1-15

When the status byte is returned in response to a serial poll, bit 6 acts as the Request Service (RQS) bit. If the bit is set, it will be cleared after the status byte is returned.

The Serial Poll Disable (SPD) command causes the analyzer to leave the serial poll mode.

Take Control Talker (TCT)

If the analyzer is addressed to talk, this command causes it to take control of the GPIB. It becomes the active controller on the bus. The analyzer automatically passes control back when it completes the operation that required it to take control. Control is passed back to the address specified by the *PCB command (which should be sent prior to passing control).

If the analyzer does not require control when this command is received, it immediately passes control back.

Message Exchange

The analyzer communicates with the controller and other devices on the GPIB using program messages and response messages. Program messages are used to send commands, queries, and data to the analyzer.

Response messages are used to return data from the analyzer. The syntax for both kinds of messages is discussed in Chapter 9, "Introduction to SCPI."

exchanges between the analyzer and other devices on the bus:

- The analyzer only talks after it receives a terminated query (see "Query Response Generation" on page 1-16).
- Once it receives a terminated query, the analyzer expects to talk before it is told to do something else.

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| CPIB Queues |
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|-----|----------|-------|----------|---------|---------|----------------|-------|-------|--------|-------|-------|
| gug | analyzer | әұұ і | цээмдэр | səges | səw jo | agase usuge | эхә ә | әұт ғ | рэпсе | uə sə | nənə |

- e an input queue
- sn error queue
- ənənb ındıno uv 🔸

Input Queue

the analyzer's command parser: The input queue temporarily stores the following until they are read by

- device commands and queries
- the GPIB END message (EOI asserted while the last data byte is on

bytes. It is cleared when the following actions occur: required to parse and execute those messages. The queue holds up to 128 program messages to the analyzer without regard to the amount of time The input queue also makes it possible for a controller to send multiple

- the analyzer is turned on
- the Device Clear (DCL) or Selected Device Clear (SDC) command is

received

Error Queue

are delivered to the output queue in the order they were received. to the output queue so it can be read by the controller. Error messages send the SYST: ERR? query, one message is moved from the error queue the analyzer detects an error, it places a message in the queue. When you The error queue temporarily stores up to 20 error messages. Each time

The error queue is cleared when the following actions occur:

- all the error messages are read using the SYST: ERR? query
- the analyzer is turned on
- the *CLS command is received

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|--------------|-----------|-----|
|--------------|-----------|-----|

Sueue Queue

The output queue temporarily stores a single response message until it is read by a controller. It is cleared when the following actions occur:

- the message is read by a controller
- the analyzer is turned on
- the Device Clear (DCL) or Selected Device Clear (SDC) command is received

Command Parser

The command parser reads program messages from the input queue in the order they were received from the bus. It analyzes the messages to determine what actions the analyzer should take.

One of the parser's most important functions is to determine the position of a program message in the analyzer's command tree (described in Chapter 9). When the command parser is reset, the next command it receives is expected to arise from the base of the analyzer's command tree.

The parser is reset when the following actions occur:

- the analyzer is turned on
- The Device Clear (DCL) or Selected Device Clear (SDC) command is received.
- a colon immediately follows a semicolon in a program message. (For more information see "Sending Multiple Commands" on page 9-7.)
- A program message terminator is received. A program message terminator can be an ASCII carriage return $^{(C)}_{\rm R}$) or newline character or the GPIB EMD message (EOI set true).

| | Buffer deadlock—a program message is sent that exceeds the length of the input queue or that generates more response data than fits in the output queue. |
|-----------------|--|
| | Interrupted condition—a second program message is sent before the response to the first is read. |
| () | • Unterminated condition—the query is not properly terminated with an ASCII carriage return character or the GPIB END message (EOI set true) before the response is read. |
| | after the query is sent. This ensures that the response is not cleared before it is read. The response is cleared when one of the following message exchange conditions occurs: |
| See a second of | When the analyzer parses a query, the response to that query is placed in the analyzer's output queue. The response should be read immediately |
| en no e | Query Response Generation |

91-1

1-2 Synchronizing the Analyzer and a Controller Download from Www.Somanuals.com. All Manuals Search And Download.

| | Some commands do not hold off the processing of subsequent commands; they are called overlapped commands. |
|------------|---|
| | Most of the analyzer's commands are processed sequentially. A sequential command holds off the processing of subsequent commands until it has been completely processed. |
| | Overlapped commands Alost of the opening opening of the o |
| Normania I | • Sequential commands |
| | Device commands can be divided into two broad classes: |
| | the analyzer and a controller. Proper use of these tools ensures that the analyzer is in a known state when you send a particular command or query. |
| | The IEEE 488.2 standard provides tools that can be used to synchronize |
| Noneman of | Synchronizing the Analyzer and a |

2-2

Overlapped Commands

with a narrow or fine system bandwidth or when averaging is enabled. processed until the measurement is complete. This can take a long time measurement. The command is not considered to have been completely commands. For example, the INITIATE: IMMEDIATE command restarts a Typically, overlapped commands take longer to process than sequential

The analyzer has the following overlapped commands:

CALibration:SELF: ALL

Cylibration:SELF: <ON|OFF|ONCE>

CALibration:SELF:METHod:<ONEPort | TWOPort>

CALibration: SERO: AUTO

CONE; dare[][5]

OAOJ: adrasta CCONstants: LOAD

DIAGnostic: CCONstants: STORe: DISK

DIAGnostic: CCONstants: STORe: EEPRom

DIAGnostic:DITHer

DIAGnostic:SPUR:AVOid

HCOPy[:IMMediate]

INITiate[1|2]:CONTinuous

INITiate[1|2][:IMMediate]

MMEMory: LOAD: STATe

[9TAT2:] tuqTUO

DOMGE[]|S]:WODE

PROGram[:SELected]:EXECute

KOUTe[1|2]:PATH:DEFine:PORT?

KOUTe[1|2]:PATH:DEFine:PORT <numl>, <numl>

ROUTe[1|2]:REFLection:DEFine:PORT <num>

| <umu></umu> | ROUTe[1 2]:TRANsmission:DEFine:PORT |
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| | Towns Section 1 | Programmer's Guide | 5-4 |
|--|--|--|----------|
| TO THE PARTY OF TH | | SENSe[1 2]:FREQuency:STARt | ; |
| · · · | | SENZe[1 2]:FREQuency:SPAN:MAXimum | 1 |
| and the second s | (·········) | SEMS⊖[1 5]: ŁKEŎnGucλ: SŁYM | * |
| | | SENZe[] S]: LKEĞneuck: WODE (Obtion 100 oujk) | * > |
| a constant | (~~) | SENZ6[[S]:EKEĞn6ucλ:CENL6x | * |
| and the state of t | | SENSe[1 5]:DISLance:STOP (Option 100 only) | ; |
| | (~~) | SENSe[1 2]:DISTance:STARt (Option 100 only) | ; |
| | | SENSe[1 2]:DETector[:FUNCtion] | ; |
| AEGAALII AA | (****) | SENS6:CONFle | \$ |
| | | SENSe[1 2]:CORRection:TWOPort[:IMMediate] | ; |
| | | SENSe[1 2]:CORRection:ONEPort:TRANSmission [:IMMediate] | |
| | pr 7 | SENSe[1 2]:CORRection:ONEPort:REFLection[:IMMediate] | 3 |
| | | SENSe[1 2]:CORRection[:STATe] | ; |
| | grownery - | SENSe[1 2]:CORRection:CSET[:SELect] | ; |
| | | SENSe[1 2]:CORRection:COLLect:SAVE | ÷ |
| | J | SENSe[1 2]:CORRection:COLLect:METHod TWOPort | *) |
| | | SENSe[1 2]:CORRection:COLLect:METHod | ; |
| | gramming | SENSe[] STatel::ACARAction:COLLect:ISTate | ; |
| | in an article | [:SETECT] SENZe[1 S]:COKKGCtion:COTTGCt:CKIT:PORT[1 1S] | |
| | | SENSe[1 2]:CORRection:COLLect[:ACQuire] STANdard1-7 | 5 |
| | ************************************** | SENSe[1 2]:CORRection:COLLect[:ACQuire] | 3 |
| | | SENSe[1 2]:CORRection:CLASs[:SELect]? | 3 |
| | and the second second | SENS6[1 2]:BMIDFP[:KESOJAFion] | ; |
| | | SENSe[1 2]:AVERage[:STATe] | 3 |
| | Provintaged | SENSe[1 2]:AVERage:COUNt | 3 |
| | | SENSe[1 2]:AVERage:CLEar | 3 |
| | TO THE STATE OF TH | <pre><mun> TAOT:Por:DEFine:PORT <num></num></mun></pre> | I |

```
TRIGGer[:SEQuence]:SOURce
<...|InoissimzMAAT>?-TVAE: SIMulate: CORRection: SIMulate: SATE
                                          [ATAG:] DATA]
                                         SISIem: PRESet
  SOURce[1|2]:POWer[:LEVel][:IMMediate][:AMPLitude]
                           ZENZG: ZMEGD: LKICGGI: ZONKCG
                           SENSe[1|2]:SWEep:TIME:AUTO
                                SENSe[1|2]:SMEep:TIME
                              ZENZG[[|5]:SMEGD:BOINFZ
                                     SENSe[]|S]:STATe
                             SENSe: ROSCillator: SOURce
SENSe[1|2]:FUNCtion:SRL:SCAN[:IMMediate] (Option 100
                    SENSe[1|2]:FUNCtion 'XFR:S . . .
                SENSe[1|2]:FUNCtion 'XFR:POW:RAT . .
                  SENSe[1|2]:FUNCtion 'XFR:POW . . .
             SENSe[1|2]:FUNCtion 'XFR:GDEL:RAT . . .
                       SENSe[1|2]:FUNCtion 'SRL . . .
                       SENSe[1|2]:FUNCtion 'FLOC . .
                                  SENSe[1|5]: ENNCFiou
                            ZENZ∈[]|S]: EKEĞηθυςλ: 2LOb
```

Programmer's Guide

5-2

Overlapped Commands

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| | |
| analyzer. | |
| but also leaves the controller free to perform other tasks while the command is executing within the | |
| controller to the completion of an overlapped command, | |
| used to generate a service request when all overlapped commands are completed. This synchronizes the | |
| execution. The analyzer's status registers can then be | |
| Sets bit 0 of the Standard Event Status event register to 1 when all preceding commands have completed | *Obc |
| REFLCAL example programs. | ンせいキ |
| chapter and is demonstrated in the TRANCAL and | |
| Use of the $\star \mathtt{OPC?}$ command is explained later in this | |
| execution. | |
| overlapped commands are completed. This command is generally preferred to *WAI for control of command | |
| program reads the output queue before it continues, this effectively pauses the controller until all executing | |
| preceding commands have completed execution. If the | |
| Places a 1 in the analyzer's output queue when all | *OEC3 |
| section and is demonstrated in the SETUP example program. | |
| Use of the *WAI command is explained later in this | |
| input queue complete initiation in the order received. | |
| finished. If used after each overlapped command, this command ensures that commands in the analyzer's | |
| the initiation stage of all preceding commands is | |
| Holds off the processing of subsequent commands until | IAW⋆ |
| | |
| When both stages are complete for a given command, the as "completed execution." | |
| pped command is executed in two stages: initiation and | |
| ing Execution of Overlapped Commands | Controlli |
| | ,- |

| | Refer to "Taking Sweeps" in the Example Programs Guide for more information. |
|---------|--|
| | or another form of the INITiate[1 2][:IMMediate] command combined with the *OPC? query. |
| | ENTER GHP8711; Opc_done OUTPUT GHp8711; Abor; :INIT: Cont Off; :INIT; *Opc?" |
| | The command to use (in an IBASIC OUTPUT statement) is: |
| | reply) before reading data over the bus or executing a marker function. The analyzer has the ability to process the commands it receives faster than it can make a measurement. If the measurement is not complete when the data is read or a marker search function is executed, the results are invalid. |
| ИОІТПОИ | ALWAYS trigger an individual sweep (using *OPC? and waiting for the |
| NOTE | Use *WAI, *OPC? or *OPC whenever overlapped commands are used. A recommended technique is to send *OPC? at the end of each group of commands. |
| TON | • From the company forms from the model of the COGO. I first call |
| | The *CLS and *RST commands cancel any preceding *OPC? or *OPC. Executing overlapped commands are still completed, but their completion is not reported in either the status register or the output queue. Two GPIB bus management commands — Device Clear (DCL) and Selected Device Clear (SDC) — also cancel any preceding *OPC? or and Selected Device Clear (SDC) — also cancel any preceding *OPC? or and Selected Device Clear (SDC) — also cancel any preceding *OPC? or any preceding *OPC? |
| иоте | *OPC only informs you when all currently executing commands have completed execution. It does not hold off the processing of subsequent commands. No command and receiving the service request. Any sending the *OPC command and receiving the service request. Any commands sent will be executed and may affect how the instrument responds to the previously sent *OPC. |

| Parameter (1971) | | |
|--|---|------|
| Common A Annual A | | |
| The state of the s | overlapping commands is required. | |
| age and the state of the state | Because *WAI only controls the order of the initiation stage of commands, rather than the order of completion, it is strongly recommended that *OPC? be used whenever sequential operation of | NOTE |
| and the second second | If all four commands are overlapped types, the order in which they complete execution is unknown. | |
| g******** | Command 3 will begin execution before command 4. | |
| and the form the | • Commands 3 and 4 will not be started until both commands 1 and 2 have finished initiation. | |
| | completion is unknown. | |
| | If both commands I and 2 are overlapped types, the order in which they finish initiation depends on the commands. The order of | |
| l) | Command 1 begins execution first. | |
| diam'n | Commands 1 through 4 are sent to the analyzer as fast as the GPIB bus traffic will allow. The program sending the commands may very well end before any command has been completed. | |
| | order: | |
| i | In the example above, commands are sent and completed in the following | |
| We want | PO END OUTPUT GRIns; "commands". OUTPUT GRIns; "commands;" OUTPUT GRIns; "commands;" OUTPUT GRIns; "commands". OUTPUT GRIns; "commands". | |
| | | |
| Variation of the Control of the Cont | processing of subsequent commands until it has been completely processed. An overlapped command does not. | |
| | discussion, remember that a sequential command holds off the | |
| j | The following example describes the use of the *WAI command. For this | |
| 1117 | I₩A* | |
| The state of the s | Using *WAI and *OPC? | |
| - Very little of the | ODGOT Last rate satisfi | |

8-2

***Ob**C

The following example describes the use of the *OPC? command. For this discussion, remember that a sequential command holds off the processing of subsequent commands until it has been completely processed. An overlapped command does not.

```
70 END
10 OUTPUT GREIRS, "command1,"
20 OUTPUT GREIRS, "command3;"
30 ENTER GREIRS, "command4, *OPC?"
50 OUTPUT GREIRS, "command4, *OPC?"
60 ENTER GREIRS, "command4, *OPC?"
70 END
70 E
```

In the example above, commands are sent and completed in the following

- Commands I and 2 are sent to the analyzer as fast as the GPIB bus traffic will allow.
- Command 1 will begin execution before command 2.
- If both commands 1 and 2 are overlapped commands, the order of command completion is unknown.
- When both commands I and 2 have completed execution, commands 3 and 4 will be sent to the analyzer as fast as the GPIB bus traffic will allow
- Command 3 will begin execution before command 4.
- If both commands 3 and 4 are overlapped commands, the order of command completion is unknown.
- This program will not end until the Opc_done, located in line 60, is returned indicating that both commands have completed execution.

Use *OPC? to ensure commands complete before proceeding. This can be done by calling a subroutine that issues the *OPC? command, and reads the analyzer response with ENTER:

```
130 KELNEW
170 COLDENT @RFDS,"*OPC done
170 COTPUT @RFDS,"*OPC?"
```

Call the Command_done subroutine after each overlapped command to ensure the desired order of command execution.

| | ······································ | |
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| | Programmer's Guide | 2-10 |
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Passing Control

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| | 3-2 Programmer's Guide |
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| | раск. |
| | control back. • The controller must be informed when the analyzer passes control |
| | For smooth passing of control, take steps that ensure the following The analyzer must know the controller's address so it can pass |
| NOTE | Pass Control is not needed to control peripherals connected to the serial, parallel, or LAN ports. For smooth passing of control, take stops that ensure the following |
| 11011 | An example program, PASSCTRL, demonstrates passing control to the analyzer can control a printer for hardcopy output. See the Example Programs Guide. |
| | analyzer completes the operation, it automatically passes control of the bus back to the external controller. |
| | cable, passing control may be needed to control devices such as printers and plotters that are also connected on the GPIB. For some operations the active controller must pass control to the analyzer. When the |
| | When an external controller is connected to the analyzer with a GPIB |
| | Passing Control |

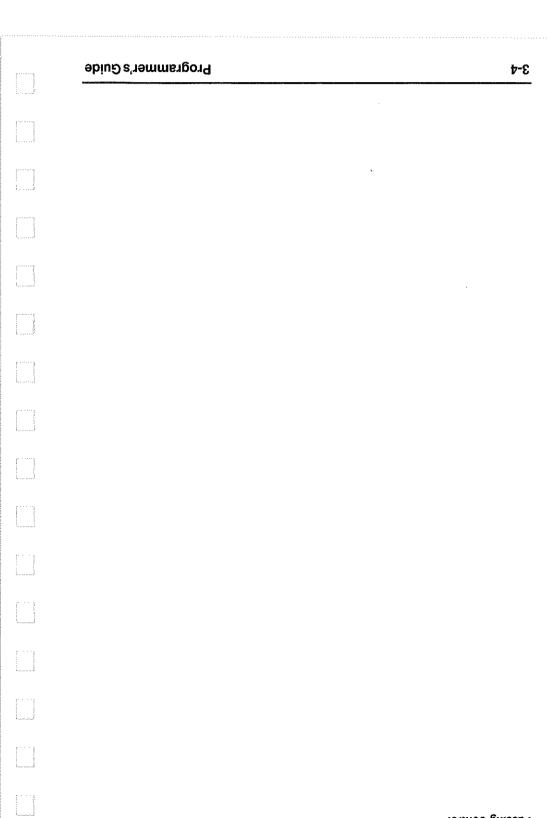
The following is a procedure for passing control:

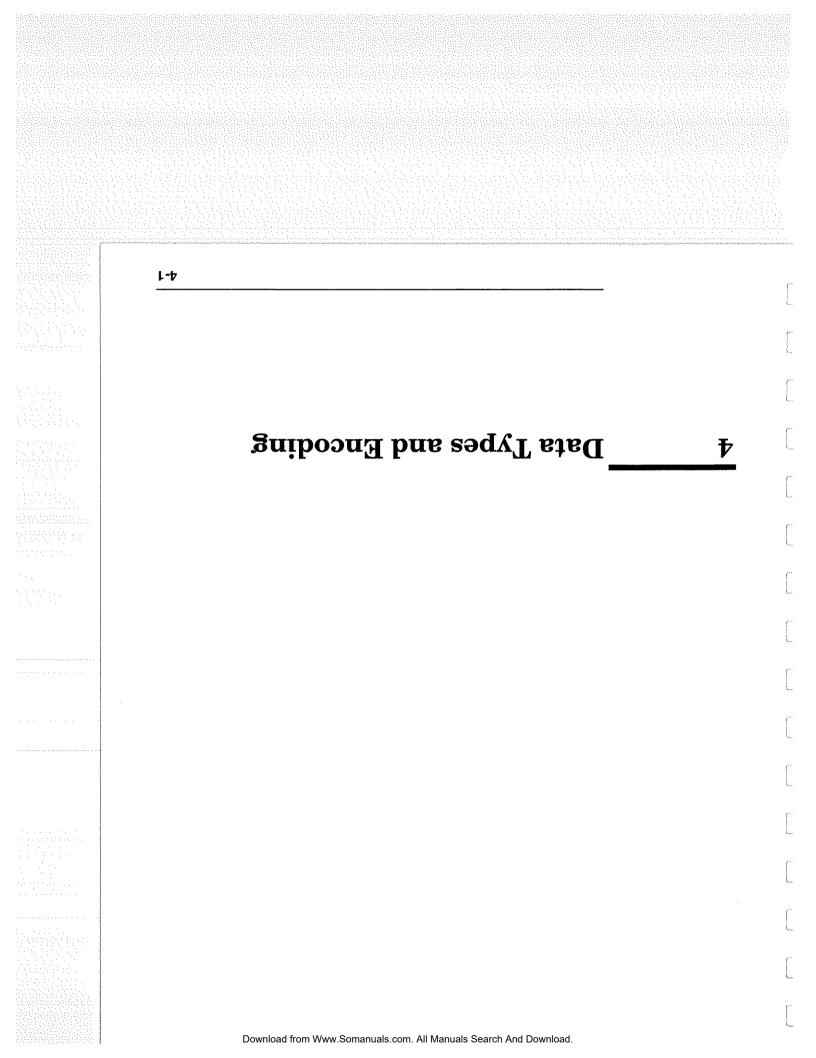
- I. Send the controller's GPIB address to the analyzer with the $^{\star_{\rm PCB}}$ command.
- 2. Clear the analyzer's status registers with the *CLS command.
- 3. Enable the analyzer's status registers to generate a service request when the Operation Complete bit is set. (Send *ESE with a value of 1 and *SRE with a value of 32.)
- 4. Enable the controller to respond to the service request.
- 5. Send the command that requires control of the bus followed by the $\star \texttt{OPC}$ command.
- 6. Pass control to the analyzer and wait for the service request. The service request indicates that the command has been completed and control has been passed back to the controller.

For this procedure to work properly, only the command that requires control of the bus should be pending. Other overlapped commands, see Chapter 2, not. For more information on overlapped commands, see Chapter 2, "Synchronizing the Analyzer and a Controller."

HOTE

Programmer's Guide





| Encoding | pue | Lypes | Data |
|----------|-----|-------|------|
|----------|-----|-------|------|

Data is transferred between the analyzer and a controller via the GPIB data lines, DIO1 through DIO8. Such transfers occur in a byte-serial (one byte at a time), bit-parallel (8 bits at a time) manner. This section discusses the following sapects of data transfer:

- the different data types used during data transfers
- data encoding used during transfers of numeric block data

Data Types

The analyzer uses a number of different data types during data transfers. Data transfer occurs in response to a query. The data type used is determined by the parameter being queried. Data types described in this section are:

- Numeric Data
- Character Data
- String Data
- Expression Data
- Block Data

Numeric Data

The analyzer returns three types of numeric data in response to queries:

| NR3 data | Floating point numbers in scientific notation (such as |
|----------|--|
| NR2 data | Floating point numbers with an explicit decimal point (such as I2.3, +1.234, -0.12345). |
| NRI data | Integers (such as $+1$, 0, -1 , 123, -12345). This is the response type for boolean parameters as well as some numeric parameters. |

Character Data

Character data consists of ASCII characters grouped together in mnemonics that represent specific instrument settings (such as MAXimum, MINimum or MLOGarithmic). The analyzer always returns the short form of the mnemonic in upper-case alpha characters.

| | <num_bytes>. The decimal number <num_bytes> specifies how many data bytes will follow in <data_bytes>. An example IBASIC (or HP BASIC) statement to send ABC+XYZ as a definite block length parameter is shown; note that the data block contains seven bytes (7) and only one</data_bytes></num_bytes></num_bytes> |
|--|--|
| | # <pre>#<pre>#<pre>#<pre>#<pre>#<pre>#<pre>#</pre><pre>#</pre><pre>and definite length block, two numbers must be specified. The single decimal digit <pre>cnum_digit</pre><pre>decimal digit <pre>cnum_digit</pre><pre>specifies how many digits are contained in</pre></pre></pre></pre></pre></pre></pre></pre></pre> |
| | The general form for a definite block length transfer is: |
| The state of the s | Definite Block Length |
| | form. The analyzer always returns definite length block data in response to queries. |
| | The block data mode is typically used to transfer large quantities of related data (like a data trace). Blocks can be sent as definite length blocks — the instrument will accept either |
| and the same of th | Block Data |
| | Expression data consists of mathematical expressions that use character parameters. When expression data is sent to the analyzer, it is always enclosed in parentheses (such as (IMPL/CHISMEM) or (IMPL)). The analyzer returns expression data enclosed in double quotes. |
| | Expression Data |
| | between. The analyzer always uses double quotes when it returns string data. |
| | a delimiter, either single quotes ('This is string data.') or double quotes ("This is also string data."). To include the delimiter as a quotes ("This is also string the typed twice without any characters in character in the string, it must be typed twice without any characters in |
| | String data consists of ASCII characters. The string must be enclosed by |
| | String Data |
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Programmer's Guide

OOLEOL LIE' "#IJYEC+XXZ"

digit is needed to describe the block length \mathbb{T}_{\cdot}

MOTE This analyzer will send an additional $<^C_R>$ with EOI asserted for definite block length transfers. The definite length block form for your analyzer is: #< num_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_bytes><asta_book length block must be terminated by sending a carriage return or newline with EOI asserted. This forces the termination of the program message. An example IBASIC or HP BASIC) statement to send ABC+XYZ as an indefinite block length length block length block length be send ABC+XYZ as an indefinite block length length block length block length block length block length block length block length length block length block length length length block length length block lengt

parameter is shown; note that END is used to properly terminate the

Files are transferred as indefinite length blocks.

OUTPUT 716;"#OABC+XYZ", END

message.

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| | 9-1⁄2 | Programmer's Guide |
|--------|--------------------------------|---|
| СА∪ТЮИ | si stasmurtsai | Agilent 8711/12/13/14/ A-, B-, and C-series ted by sets of three 16-bit integers. The 8714ET/ES instruments use sets of four 16-bit |
| | IS: WƏLSIS | |
| | PROGram[| d:DEFine |
| | e ither definite signore the s | ed data — both numbers and ASCII characters FORMat: DATA. These blocks always transfer as indefinite length block data. The following ke of mixed data: |
| | iiOsA | es the numeric data type (NRI, NR2 or NR3 t). The data is transferred as a series of thed data transfers are demonstrated in the tred data transfers are demonstrated in the TA example program. |
| | INTeger | es the block data type. Either the definite or nite length syntax can be used. The block is erred as an array of binary-encoded data with soint represented by a set of four 16-bit integers. It is instrument's internal format — it should e used for data that will be returned to the ment for later use. Data transfers of the ment for later use. Data transfers of the rectured in the constraints of the set of the later than the later has and LOADCALS example programs. |
| | ТЕАГ | es the block data type. Either the definite or nite length syntax can be used. The block is erred as a series of binary-encoded floating-point ers. Data transfers of the REAL, 64 data type are nstrated in the REALDATA example program. |
| | encoding that | |
| | | g for Large Data Transfers |

ASCII Encoding

The ANSI X3.4-1977 standard defines the ASCII 7-bit code. When an ASCII-encoded byte is sent over the GPIB, bits 0 through 6 of the byte (bit 0 being the least significant bit) correspond to the GPIB data lines DIO1 through DIO7. DIO8 is ignored.

When ASCII encoding is used for large blocks of data, the number of significant digits to be returned for each number in the block can be specified. For example, the following command returns all numbers as NR3 data with 7 significant digits.

FORMat: DATA ASCii, 7

Binary Encoding

When binary encoding is used for large blocks of data, all numbers in the block are transferred as 32-bit or 64-bit binary floating point numbers or as an array of 16-bit integers. The binary floating-point formats are defined in the IEEE 754-1985 standard.

FORMat: DATA REAL, 32 selects the IEEE 32-bit format (not supported by IBASIC or HP BASIC)

FORMat: DATA REAL, 64 selects the IEEE 64-bit format.

FORMat: DATA INTeger, 16 selects the 16-bit integer format.

Byte Swapping

PC compatibles frequently use a modification of the IEEE floating point formats with the byte order reversed. To reverse the byte order for data transfer into a PC, the FORMat:BORDer command should be used.

selects the byte-swapped format

FORMat:BORDer SWAPped FORMat:

selects the standard format

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L-G Using Status Registers Download from Www.Somanuals.com. All Manuals Search And Download.

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| ta ta tees was elemented in the | | | |
| | (minimum) | | |
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| | | | |
| : | ₹J | Limit Fail condition register. | |
| | | which use service request interrupt routines, PASSCTRL which uses the status byte to request control of the GPIB, and LIMITEST which uses the | |
| | ···········) | Example programs using the status registers are included in the Example Programs Guide. These programs include SRQ and GRAPHICS | |
| | () | the registers and their use in GPIB programming. | |
| | | The analyzer's status registers contain information about the condition of the network analyzer and its measurements. This section describes | |
| | () | Using Status Registers | |
| | (mesora) | | |
| | لسيينا | Using Status Registers | |
| | | avalainasi airteta nerial | |

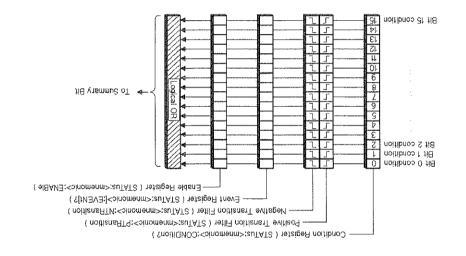
General Status Register Model

The analyzer's status system is based on the general status register model shown in Figure 5-1. Most of the analyzer's register sets include all of the registers shown in the model, although commands are not always available for reading or writing a particular register. The information flow within a register set starts at the condition register and ends at the register summary bit (see Figure 5-2 on page 5-5 for actual connections between the registers). This flow is controlled by setting bits in the transition and enable registers.

Two register sets — the Status Byte and the Standard Event Status Register — are 8-bits wide. All others are 16-bits wide, but the most significant bit (bit 15) in the larger registers is always set to 0.

General Status Register Model

Figure 5-1



Tondition Register

Condition registers continuously monitor the instrument's hardware and firmware status. Bits in a condition register are not latched or buffered, they are updated in real time. When the condition monitored by a specific bit becomes true, the bit is set to 1. When the condition becomes false, the bit is reset to 0. Condition registers are read-only.

Transition Registers

Transition registers control what type of change in a condition register will set the corresponding bit in the event register. Positive state transitions (0 to 1) are only reported to the event register if the corresponding positive transition bit is set to 1. Negative state transition bit is set to 1. Setting both transition bits to 1 causes both positive and negative changes to be reported. Transition registers are read-write, and are unaffected by *CLS (clear status) or queries. They are reset to instrument default conditions at power up and after *RST and SYSTEM: PRESET commands.

Event Register

Event registers latch any reported condition changes. When a transition bit allows a condition change to be reported, the corresponding event bit is set to I. Once set, an event bit is no longer affected by condition changes. It remains set until the event register is cleared. Event registers are read-only.

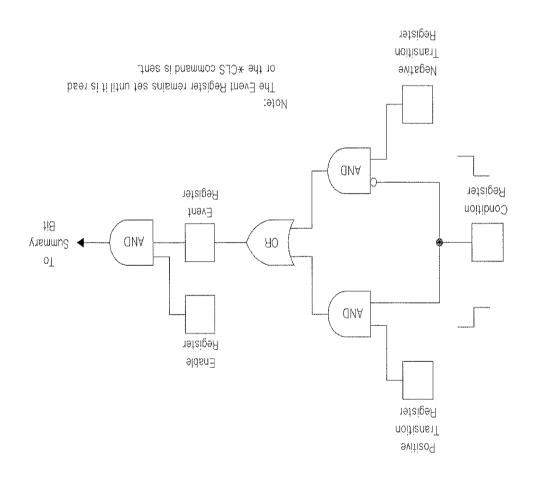
An event register is cleared when you read it. All event registers are cleared when you send the $^{\star}\text{CLS}$ (clear status) command.

Enable Register

Enable registers control the reporting of events (latched conditions) to the register summary bit. If an enable bit is set to 1, the corresponding event is included in the logical ORing process that determines the state of the summary bit. (The summary bit is only set to 1 if one or more enabled event bits are set to 1.) Summary bits are recorded in the instrument's status byte. Enable registers are read-write and are cleared by *CLS (clear status).

Flow of Information Within a Register Set

Figure 5-2



| A Commonweal of the Commonweal | |
|--|---|
| | |
| The state of the s | |
| | the registers at very short intervals. The SRQ method is better suited for that type of need. |
| | about changes the moment they occur. It does not work well if immediate knowledge of the condition change is needed. A program that used this method to detect a change in a condition would need to continuously read |
| | Examine the bit to see if the condition has changed. The direct-read method works well when it is not necessary to know |
| W. T. A. A. | 2. Send the unique GPIB query that reads that register. |
| | Determine which register contains the bit that monitors the condition. |
| | The following steps are used to monitor a condition with the direct read method: |
| | the controller when there has been a condition change without the controller asking. Either method allows you to monitor one or more conditions. |
| } | In the direct-read method, the analyzer is passive. It only tells the controller that conditions have changed when the controller asks the right question. In the SRQ method, the analyzer is more active. It tells the controller when the controller was a sective. |
| | • the service request (SRQ) method |
| | • the direct-read method |
| | There are two methods of accessing the information in status registers: |
| | How to Use Registers |

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The Service Request Process

The following steps are used to monitor a condition with the SRQ method:

- I. Determine which bit monitors the condition.
- 2. Determine how that bit reports to the request service (RQS) bit of the Status Byte.
- 3. Send GPIB commands to enable the bit that monitors the condition and to enable the summary bits that report the condition to the RQS
- 4. Enable the controller to respond to service requests.

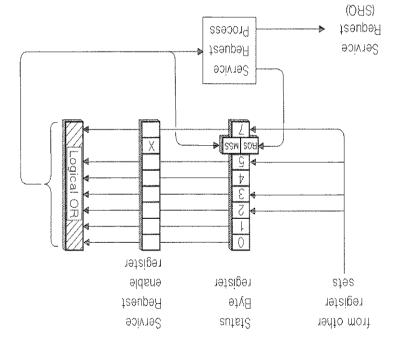
When the condition changes, the analyzer sets its RQS bit and the GPIB's SRQ line. The controller is informed of the change as soon as it occurs. The time the controller would otherwise have used to monitor the condition can now be used to perform other tasks. The controller's response to the SRQ is determined by the program being run.

Generating a Service Request

A service request is generated using the Status Byte. As shown in Figure 5-3, the analyzer's other register sets report indirectly through other register sets.

Generating a Service Request

Figure 5-3



The process of preparing the analyzer to generate a service request, and the handling of that interrupt when it is received by a program, are demonstrated in the SRQ example program.

When a register set causes its summary bit in the Status Byte to change from 0 to 1, the analyzer can initiate the service request (SRQ) process. If both the following conditions are true, the process is initiated:

- The corresponding bit of the Service Request enable register is also set to 1.
- The analyzer does not have a service request pending. (A service request is considered to be pending between the time the analyzer's SRQ process is initiated and the time the controller reads the Status Byte register with a serial poll.)

The SRQ process sets the GPIB's SRQ line true and sets the Status Byte's request service (RQS) bit to 1. Both actions are necessary to inform the controller that the analyzer requires service. Setting the SRQ line informs the controller that some device on the bus requires service. Setting the RQS bit allows the controller to determine that the analyzer was the device that initiated the request.

When a program enables a controller to detect and respond to service requests, it should instruct the controller to perform a serial poll when the GPIB's SRQ line is set true. Each device on the bus returns the contents of its Status Byte register in response to this poll. The device whose RQS bit is set to 1 is the device that requested service.

When the analyzer's Status Byte is read with a serial poll, the RQS bit is reset to 0. Other bits in the register are not affected.

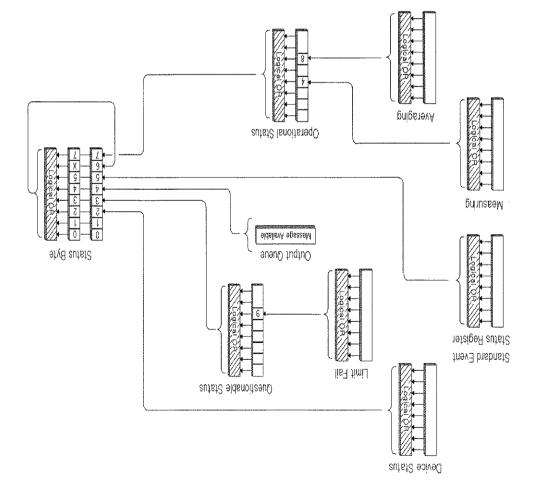
As implied in Figure 5-3, bit 6 of the Status Byte register serves two functions: the request service function (RQS) and the master summary status function (MSS). Two different methods for reading the register allow you to access the two functions. Reading the register with a serial poll allows you to access the bit's RQS function. Reading the register poll allows you to access the bit's RQS function. Reading the register

with *STB allows you to access the bit's MSS function.

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| | Programmer's Guide | 9-10 | |
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| | | | Account Account to the Contract of the Contrac |
| | explicitly presented in the following sections are not yzer. A query to one of these bits returns a value of 0. | | NOTE |
| | tructure is summarized in Figure 5-4. They are ter detail in the following section. | | |
| e silven | STATus: OPERation | Operational Status | |
| | STATus: OPERation: AVERaging | Averaging Status | |
| | STATus: OPERation: MEASuring | Measuring Status | |
| | ESE* bas ↑ESE* | Standard Event Status | |
| | eLdsnoitSEUQ:auTAT2 | Questionable Status | |
| et e ca | STATUS:QUEStionable:LIMit | LisA Jimid | |
| | STATus: DEVice | Device Status | |
| general) | *STB? and *SRE | Status Byte | |
| | s eight register sets to keep track of instrument status: | The analyzer use | |
| | yzer's Status Register Sets | The Analy | |



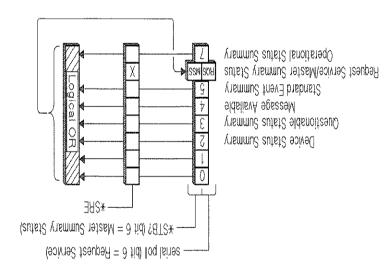
Programmer's Guide

Status Byte

The Status Byte register set summarizes the states of the other register sets and monitors the analyzer's output queue. It is also responsible for generating service requests see "Generating a Service Request" on page 5-8. See Figure 5-5.

The Status Byte Register Set

Figure 5-5



Bit Weights

The Status Byte register set does not conform to the general status register model described at the beginning of this chapter. It contains only two registers: the Status Byte register and the Service Request enable register. The Status Byte register behaves like a condition register for all bits except bit 6. The Service Request enable register behaves like a standard enable register except that bit 6 is always set to 0.

Bits in the Status Byte register are set to 1 under the following conditions:

Device Status Summary

(bit 2) is set to 1 when one or more enabled bits in the Device Status event register are set to 1.

Questionable Status Summary

(bit 3) is set to I when one or more enabled bits in the Questionable Status event register are set to I.

Message Available

(bit 4) is set to 1 when the output queue contains a response message.

Standard Event Status Summary

(bit 5) is set to I when one or more enabled bits in the Standard Event Status event register are set to 1.

Master Summary Status

(bit 6, when read by *STB) is set to 1 when one or more enabled bits in the Status Byte register are set to 1.

Request Service

(bit 6, when read by serial poll) is set to 1 by the service request process (see "Generating a Service Request" on page 5-8).

Operational Status Summary

(bit 7) is set to I when one or more enabled bits in the Operational Status event register are set to I.

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| | | |
| g war | register. | |
| (*****) ₁ | reads the current state of the Service Request Enable | *2KE; |
| | sets bits in the Service Request Enable register. The current setting of the Service Request Enable register is stored in non-volatile memory. If *PSC has been set, it will be saved at power on. | <mun> 442*</mun> |
| | reads the value of the instrument's status byte. This is a non-destructive read—the Status Byte is cleared by the $^\star\text{CLS}$ command. | *STB3 |
| | an IBASIC (or HP BASIC) command used in the service request process to determine which device on the bus is requesting service. | SPOLL |
| | used to read and write to the Status Byte registers are | The commands listed below: |

Device Status Register Set

The Device Status register set monitors the state of device-specific parameters.

Bits in the Device Status condition register are set to 1 under the following conditions:

Key Pressed

(bit 0) is set to 1 when one of the analyzer's front panel keys has been pressed.

Any Softkey Pressed

(bit 1) is set to 1 when one of the analyzer's softkeys has been

pressed.

Any External Keyboard Key Pressed

(bit 2) is set to I when a key has been pressed on an external keyboard connected to the DIN KEYBOARD connector on the rear panel of the analyzer.

Front Panel Knob Turned

(bit 3) is set to I when the analyzer's front panel knob is turned.

| Measurement Channel 1 Limit Failed (bit 0) is set to 1 when limit testing is enabled and any point on measurement channel 1 fails the limit test, or when any enabled marker limit on measurement channel 1 has failed. |
|---|
| The following conditions determine the state for each of the bits when the corresponding Limit Test is ON. |
| The inputs for the bits in the Limit Fail condition register are latched (See Figure 5-6.) The two bits for measurement channel I are latched two bits for measurement channel 2 are latched when Limit Test is OFF. The two bits for measurement channel 2 are latched when Limit Test is OFF for channel 2 or when MEAS 2 is OFF. |
| The Limit Fail regiater set monitors limit test results for both measurement channels. |
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Measurement Channel 2 Limit Failed

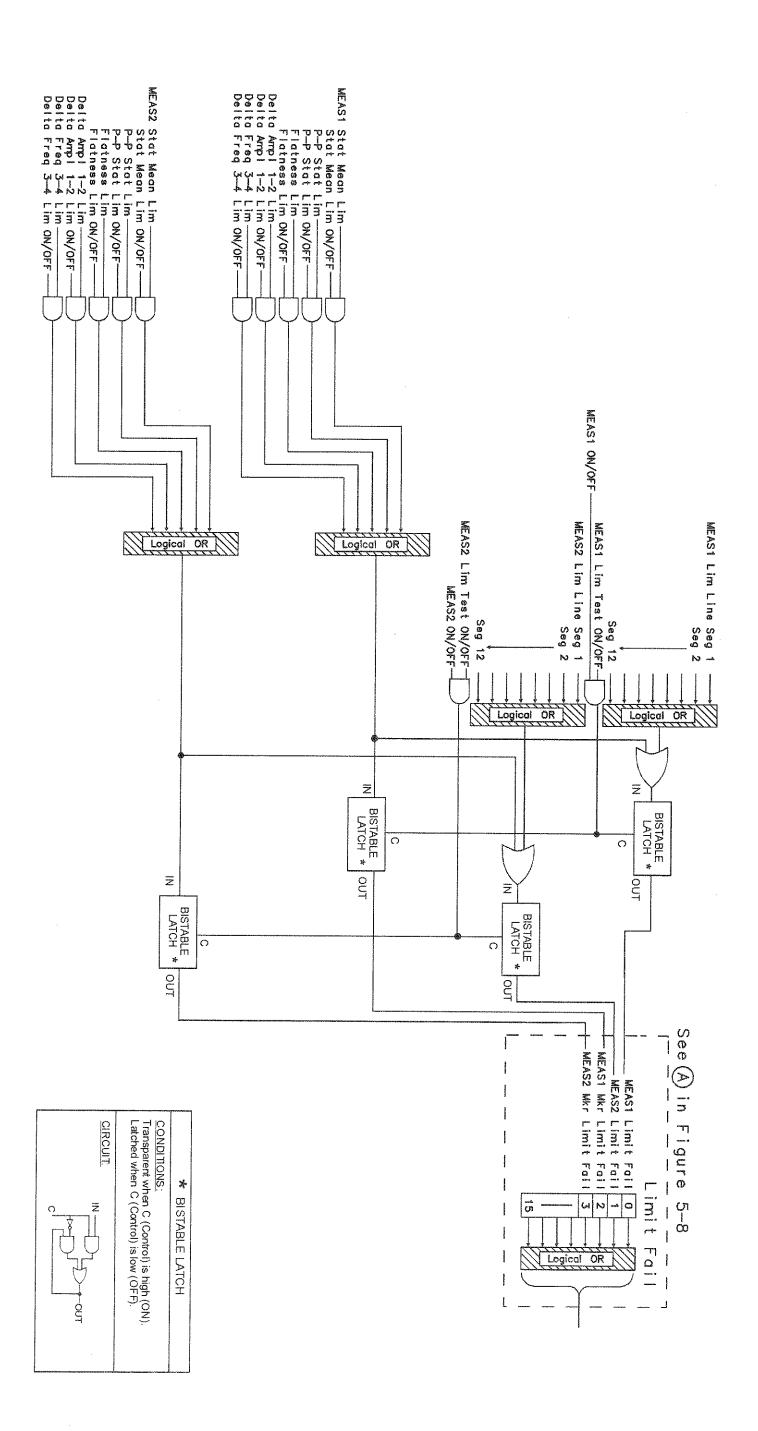
2 has failed. when any enabled marker limit on measurement channel point on measurement channel 2 fails the limit test, or (bit 1) is set to I when limit testing is enabled and any

Measurement Channel 1 Marker Limit Failed

measurement channel 1 has failed. (bit 2) is set to 1 when any enabled marker limit on

Measurement Channel 2 Marker Limit Failed

measurement channel 2 has failed. (bit 3) is set to 1 when any enabled marker limit on



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Questionable Status Register Set

The Questionable Status register set monitors conditions that affect the quality of measurement data.

Bits in the Questionable Status condition register are set to 1 under the following conditions:

Limit Fail

(bit 9) is set to 1 when one or more enabled bits in the Limit Fail event register are set to 1.

Data Questionable

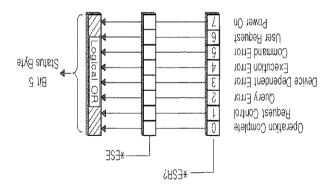
(bit 10) is set to 1 when a change in the analyzer's configuration requires that new measurement data be taken.

Standard Event Status Register Set

The Standard Event Status register set monitors GPIB errors and synchronization conditions. See Figure 5-7.

The Standard Event Status Register Set

Figure 5-7



The Standard Event Status register set does not conform to the general status register model described at the beginning of this section. It contains only two registers: the Standard Event Status event registers and the Standard Event Status enable register. The Standard Event Status event register is similar to other event registers, but behaves like a register set that has a positive transition register with all bits set to I. The Standard Event Status enable register is the same as other enable registers.

Operation Complete

(bit 0) is set to one when the following two events occur (in the order listed):

I. The *OPC command is sent to the analyzer.

2. The analyzer completes all pending overlapped commands.

Request Control

(bit 1) is set to 1 when both of the following conditions are

:an.rı

- The analyzer is configured as a talker/listener for GPIB operation.
- The analyzer is instructed to do something (such as plotting or printing) that requires it to take control of the bus.

Query Error

(bit 2) is set when the command parser detects a query error. A query error indicates that one or both of the following actions occurred:

- an attempt to read data from the Output Queue when no data was present.
- that data in the Output Queue was lost. An example of this would be queue overflow.

Device Dependent Error

(bit 3) is set to I when the command parser detects a device-dependent error. A device-dependent error is any analyzer operation that did not execute properly due to some internal condition such as overrange. This bit indicates that the error was not a command, query, or an execution error.

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|--|--|
| | |
| *ESE? | reads the current state of the standard event status enable register. |
| <wnu> ∃S∃*</wnu> | sets bits in the standard event status enable register. The current setting of the standard event statue enable register is stored in non-volatile memory. If *PSC has been set, it will be saved at power on. |
| *ESR? | reads the value of the standard event status register. |
| The commands Status registers | used to read and write the Standard Event are listed below: |
| nO newor I of the si (7 tid) | when you turn on the analyzer. |
| | lemented. For keypress related functions, see egister Set" on page 5-15. |
| sns nA oer | smantic error occurred. For example, the lyzer received an incorrectly spelled command. ther example would be that the analyzer ived an optional 488.2 command that it does not lement. |
| tha | [EEE 488.2 syntax error occurred. This means the analyzer received a message that did not we the syntax defined by the 488.2 standard. |
| == | when the command parser detects a command |
| | analyzer could not execute a valid command due ome analyzer condition. |
| rew. | PROGRAM DATA> element received in a command outside the legal range for the analyzer, or naistent with the operation of the analyzer. |
| I of the si (4 tid) | when the command parser detects an execution errors occur when the following conditions |
| Execution Error | |

Measuring Status Register Set

measurement process. The Measuring Status register set monitors conditions in the analyzer's

following conditions: Bits in the Measuring Status condition register are set to 1 under the

Measuring Channel 1

measurement data on channel 1. (bit 0) is set to 1 while the analyzer is collecting Channel 2

(bit 1) is set to 1 while the analyzer is collecting

Measuring

measurement data on channel 2.

Averaging Status Register Set

measurement process when the trace averaging function is in use. The Averaging Status register set monitors conditions in the analyzer's

following conditions: Bits in the Averaging Status condition register are set to 1 under the

Averaging Channel 1 Measurement

averaging factor. completed (since "average restart") is less than the measurement channel 1 and the number of sweeps no gniqoowa ai razylaan oh oh is seet to 1 while the analyzer is sweeping on

Averaging Channel 2 Measurement

averaging factor. completed (since "average restart") is less than the measurement channel 2 and the number of sweeps (bit 1) is set to 1 while the analyzer is sweeping on

Operational Status Register Set

The Operational Status register set monitors conditions in the analyzer's measurement process, disk operations, and printing/plotting operations. It also monitors the state of the current HP Instrument BASIC program.

Bits in the Operational Status condition register are set to 1 under the following conditions:

Calibrating (bit 0) is set to 1 while the instrument is zeroing the broadband diode detectors.

Settling (bit 1) is set to 1 while the measurement hardware is settling.

 $\begin{tabular}{ll} \textbf{Measuring} & (bit 4) is set to 1 when one or more enabled bits in the Measuring Status event register are set to 1. \\ \end{tabular}$

Correcting (bit 7) is set to 1 while the analyzer is performing a calibration function.

Averaging (bit 8) is set to I when one or more enabled bits in the Averaging Status event register are set to I.

Hardcopy
(bit 9) is set to 1 while the analyzer is performing a hardcopy (print or plot) function.

Test Running (bit 10) is set to 1 when one of the analyzer's internal service tests is being run.

Program

Chit 14) is set to 1 while an HP Instrument BASIC

Running

program is running on the analyzer's internal controller.

Settings for STATus:PRESet

Executing the STATUS: PRESET command changes the settings in the enable (ENAB), positive transition (PTR), and negative transition (NTR) registers. The table below shows the settings after the command is executed.

Status Register States After PRESet Command

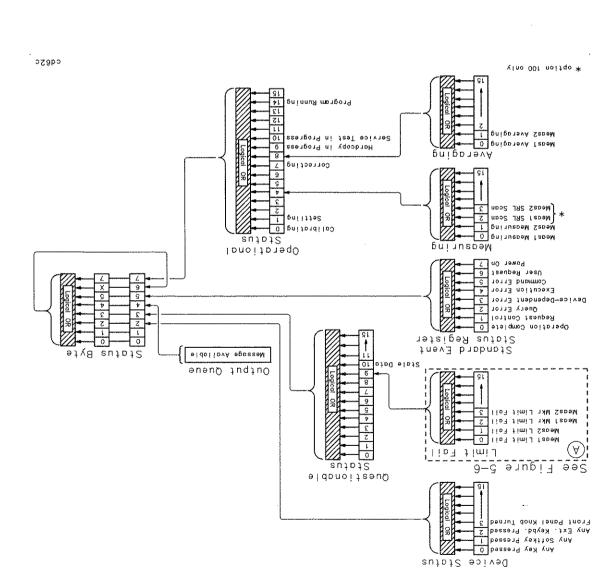
Table 5-1

| a0 lls | ai lis | aO Ila | STATus:OPERation |
|-------------|-------------|--------|----------------------------|
| al lla | a0 Ils | al lla | STATus:OPERation:AVERaging |
| al lls | a0 Ils | sl lls | STATus:OPERation:MEASuring |
| a0 IIs | at IIs | a0 Ils | STATus:QUEStionable |
| a0 fls | ai lla | al lla | STATus:QUEStionable:LIMit |
| a0 IIs | ai Ils | aO Ils | STATus:DEVice |
| MTRansition | PTRansition | ENABle | Register Set |

Analyzer Register Set Summary

Register Set Summary

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Trace Data Transfers

9

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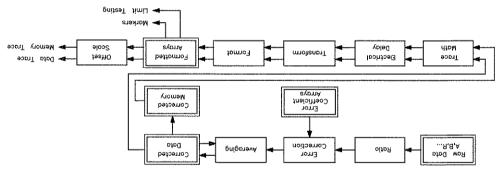
Trace Data Transfers

This chapter explains how to read (query) the measurement data trace from the analyzer into your program. It also describes how to send data from your program to the analyzer's measurement arrays. Accessing the measurement arrays is done using SCPI commands. If you are using IBASIC, you can also access the measurement arrays using high-speed subroutines. Refer to the HP Instrument BASIC User's Handbook for more details.

Figure 6-1 is a data processing flow diagram that represents the flow of numerical data. The data passes through several math operations, denoted in the figure by single-line boxes. Most of these operations can menus. The data is stored in arrays along the way, denoted by double-line boxes. These arrays are places in the flow path where data is accessible via GPIB. While only a single flow path is shown, two identical paths are available, corresponding to measurement channels I and 2.

Numeric Data Flow Through the Network Analyzer

Figure 6-1



. pggsp

Querying the Measurement Trace Using BASIC

After making a measurement, you can read the resultant measurement trace out of the analyzer using the SCPI query:

```
"TRACE: DATA? CHIFDATA"
```

The BASIC program segment below shows how to read the trace from the analyzer into an array in your program.

```
10 REAL Trace(1:201)
20 ASSIGN @Hp8711 TO 716
30 '1 Take sweep here
40 OUTPUT @Hp8711; "FORM:DATA ASCII,5"
60 ENTER @Hp8711; Trace(*)
70 DISP Trace(1), Trace(3), Trace(3), ". . . "
```

In this program, the TRACE:DATA? query returns all of the measurement points as a single block. The analyzer computes the value for each point using the measurement format selected by the [FORMAT] menu (CALC:FORM SCPI command), and returns a block of data called the formatted data array. The values of each point correspond to the values displayed on the screen, or those shown in the marker readouts. The frequency stimulus value (X-axis) of each point is not returned by The TRACE:DATA? query; only the measurement response (Y-axis) values are returned.

When transferring the block of trace data, you may select either binary or ASCII data encoding. This is explained in Chapter 4, "Data Types and Encoding," in the section titled "Data Encoding for Large Data Transfers" on page 4-6. Notice that the terms "encoding format" and "measurement format" are not the same. The encoding format determines how the numbers are represented as bytes, while the measurement format corresponds to the meaning of the value of the

The easiest way to transfer a measurement data trace is to use ASCII data encoding.

In the previous BASIC program segment, the array Trace(1:201) contains 201 real (floating point) numbers. The SCPI command "FORM:DATA ASCII, 5" specifies ASCII data encoding, with 5 significant digits. The command "TRACE:DATA? CHIFDATA" instructs the analyzer to send the measurement trace. The ENTER statement reads the measurement data sent by the analyzer into the Trace(1:201) array. It is important to make sure that the Trace array declared in your program is the same size as the measurement trace on the analyzer, or an error will occur. The ENTER statement attempts to read data from the analyzer until it completely fills the Trace array, at which point it expects to receive an end-of-data terminator from the analyzer. To be expects to receive an end-of-data terminator from the analyzer. To be safe, your program should use the "SENS:SWE:POIN" SCPI command to safe, your program should use the "SENS:SWE:POIN" SCPI command to set the number of measurement data points to the desired value.

Smith Chart and Polar Formats

Guide for a complete example.

Each measurement point is represented by a single floating point number. This is the case for all of the analyzer's measurement formats except Smith Chart and Polar. When Smith Chart or Polar format is selected, each point is represented by two numbers, the first one being the real portion and the second being the imaginary portion of the complex measurement value.

Refer to the example program ASCDATA in the Example Programs

Below is a modified example program that will work when using Smith Chart or Polar formats.

```
10 REAL Trace(1:201,1:2)
20 ASSIGN @Hp8711 TO 716
30 'Take sweep bere
40 OUTPUT @Hp8711; "FORM:DATA ASCII,5"
50 OUTPUT @Hp8711; "TRACE:DATA? CHIFDATA"
50 ENTER @Hp8711; Trace(*)
70 DISP Trace(*)
71 DISP Trace(1,1), Trace(1,2), ". . . ", Trace(201,1), Tra
```

Querying the Measurement Trace Using

This section includes a complete SICL C program that shows how to read the measurement trace from the analyzer.

```
in uznaez
                                                              iclose (analyzer);
                                                /* Close analyzer and exit. */
                               %d/m", pt, data_buf[pt]);
                                                                printf("%4d
                   Tor (pt = 0; pt < num_trace_bytes/sizeof(float); pt++) {
                                                /* Print the trace values. */
               /* Query the trace, read into data_buf[], */
iscanf(analyzer, "Y#b%*c", &num_trace_bytes, &data_buf[0]);
                                    tprintf(analyzer, "FORM:DATA REAL, 32\n");
                                       iprintf(analyzer, "FORM:BORD NORM/n");
              ^* Request the trace data in 32-bit floating point format ^*
                                        /* Take one sweep, wait until done */
iprintf(analyzer, "*OpC?\n");
iprintf(analyzer, "*opC?\n");
                                        iprintf(analyzer, "ABORT/n");
iprintf(analyzer, "INIT:COUT OFF/n");
                   /* Abort current sweep and put analyzer sweep in hold */
                                                               ;cjegi(gugj\sei);
                                                            /* Clear the bus */
                                                  analyzer = iopen("hpib,16");
                               /* Open the network analyzer at address 16 */
   num trace_bytes = sizeof(data_buf); /* Set to max allowable bytes */
                                                           jut num_trace_bytes;
                                                          float data_buf[1601];
      /* measurement trace. 32-bit floats */
                                                                 INST analyzer;
        /* Handle used to talk to analyzer */
                                                                   fur main (void) (
                                   /* For printf() */
                                                                *include <stdio.h>
/* ... ,Teni ,() iscant(), iscant(), INST, ... */
                                                                  #include <sicl.h>
   cc -Aa -o query_trace query_trace.c -lsicl
                                                      * On HP-UX, compile using:
                                                    * to the analyzer over HP-IB.
                 * It uses SICL (Standard Instrument Control Library) to talk
                 * This program takes a sweep, reads the trace, and prints it.
```

Using Binary Data Encoding

The previous section describes how to query the measurement trace, and transfer it into your program using ASCII encoding. Binary encoding can be used for faster data transfers, as shown in the table below:

Trace Transfer Times (typical)

1-9 oldsf

| (sm) səmi] | Number | |
|-------------------|--------------------------------|-----------------|
| ASCII Transfer | esarT lo estatio estatio | |
| L₹ | 21 | T9 |
| 7 91 | 23 | 201 |
| ₽ 18 | 30 | T0 7 |
| 1200 | 28 | 1091 |

When using binary data transfers, the entire trace is sent from the analyzer to your program in a block called a definite length block. The details of block data are described in detail in Chapter 4, "Data Types and Encoding." The definite length block contains a header and a data section. The header indicates how many bytes are in the data section.

In order to read the definite length block, your program must first read the header, and then read the data section. Refer to the example program REALDATA in the Example Programs Guide for an example of how to do this.

In the REALDATA program, you will notice the following lines which read the definite block header:

180 ENTER @Hp8711 USING "%, kVD"; AŞ, Digits 190. 190 ENTER @Hp8711 USING "%, kVALŞ (Digits) &"D"; Bytes

and these lines which read the data section:

200 ASSIGN @Hp8711; FORMAT OFF 210 ENTER @Hp8711; Datal(*)

Each measurement point in the data section is represented as 4 or 8 bytes (32 or 64 bits), depending on whether single precision or double precision numbers are requested. When using HP BASIC or IBASIC, you must select double precision numbers to match BASIC's "REAL" data stre using another language that supports single precision data types, you can select single precision using the SCPI command "FORM:DATA REAL, 32". Languages such as QuickBASIC and C have support for both single and double precision floating point numbers.

When transferring data using binary encoding, you may need to reverse the order of the bytes in each measurement point, since PCs frequently store IEEE floating point numbers with the byte order reversed. To instruct the analyzer to reverse the byte order of the data, send the command "FORMAT:BORDER SWAPPEG" before querying the trace data.

Trace Data Transfer Sizes

The following table shows how many bytes are transmitted during trace data transfers. The left column shows the format of the data, which you can specify using the SCPI command Format: DATA. As you can see, the size of the measurement point data and trace data varies as you change format.

Trace Data Transfer Size Using TRACE:DATA Command

| Size of 201 Point Trace (bytes) | | elgnig l anod tuen set) | Measuren | Type of sta | Format Type (ATAG: 52MRO4) |
|---------------------------------------|--------------|-------------------------------|----------|----------------------------------|----------------------------|
| Complex | Real | Complex | Real | | |
| † 191 | 608 | 8 | ₽ | IEEE 32-bit Floating Point | REAL,32 |
| 3222 | † 191 | 91 | 8 | IEEE 64-bit Floating Point | BEAL,64 |
| 2226 | 8197 | 97 | 13 | unmpets V2CII | 9'IIOSV |
| 77 7 7 | 2211 | 22 | T.T. | unupers VSCII | ASCII,3 |
| ₹191 | _ | 8 | ******** | Internal Sinary | 91,TVI |

When transmitting data in "REAL" or "INT" format, a header is sent before the data block. The header indicates the size of the data block. The header size varies in length from 3 to 11 bytes. Refer to Chapter 4, "Data Types and Encoding," for details on the header.

Transmitting ASCII data requires no header. The ASCII values are separated by commas, and a linefeed is sent after the last value. The sizes shown in the table include the size of the comma(s) and terminating linefeed. Typical data in ASCII,5 format:

-J'SS24E+000'+2'0032E-00J'+4'2SS6E-00J''

Table 6-2

The analyzer stores its internal data with approximately 5 significant digits of resolution. Using REAL, 32 or ASCII, 5 format provides sufficient precision for data transfers. However, REAL, 64 may be necessary when using a programming language which does not support IEEE 32-bit floating point.

| P IBVSIC | Diw 1 | Data | sterring | Tran |
|----------|-------|------|----------|------|
|----------|-------|------|----------|------|

If you are using IBASIC, your IBASIC program can avoid the overhead of using OUTPUT and ENTER to transfer trace data, and instead use the analyzer's built-in high-speed subprograms. These built-in subroutines let you quickly move data between the analyzer's measurement arrays and your program's data arrays. For example, to read the analyzer's formatted data array, use the following:

SO INTEGER Chan 10 DIM Fmc (1:201)

30 LOADSUB Read fdata FROM "XFER: MEM 0,0"

40 Chan=1 50 Read_fdata(Chan,Fmt(*))

Refer to the HP Instrument BASIC User's Handbook for more details.

The table below compares the speed of IBASIC using high-speed transfer subroutines with that of a fast external controller using the SCPI TRACE: DATE? CHIFDATA query.

High-Speed Trace Transfer Times

Table 6-3

| gnisU OISASI stsb1_bss9 (ms) | Controller Using Binary TRACE: DATA? (ms) | Number of Trace Points |
|------------------------------------|---|------------------------|
| L | 12 | 21 |
| 10 | 23 | 201 |
| 13 | 30 | T0† |
| 38 | 78 | 1091 |

Taking Sweeps

When making measurements and querying traces, your program should perform the following steps:

- Place the analyzer's sweep in hold.
- 2. Initiate a single sweep.
- Wait for the sweep to complete.
 Query the measurement trace.

Use the following program lines to perform these steps:

```
10 OUTPUT @Hp8711; "AEORT; :INIT1:COUT OFF"
30 OUTPUT @Hp8711; "*OPC?"
35 ENTER @Hp8711; "*OPC?"
46 OUTPUT @Hp8711; "*OPC?"
47 ENTER @Hp8711; "*OPC?"
```

If you query the measurement trace while the analyzer is in continuous sweep, the query will still work, but the data may not be correct. Using TNIT and *OPC? ensures that a complete sweep has finished before you query the measurement data. In many cases, you can also use the command "*WAI" in place of the "*OPC?" query, replacing lines 30 and 35 above with:

```
"IAW*"; LIT8qH9 TU9TU0 08
```

However, there are cases where "*WAI" will produce incorrect results. One case is when using IBASIC's high-speed subprograms to query the trace data. "*WAI" only ensures that the SCPI commands following the "*WAI" are not executed until the commands before the "*WAI" are complete. Since IBASIC subprograms don't use SCPI commands to access the trace data, "*WAI" is ineffective, and "*OPC?" should be used.

When using "*OPC?", the ENTER statement following the "*OPC?" will program from executing beyond the ENTER statement. When using "*WAI", your program can continue to run and send SCPI commands, and the analyzer will buffer them and act upon them in order.

Chapter 2, "Synchronizing the Analyzer and a Controller," provides additional details.

| 3 | |
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| | |
| | arrays. |
| | interchangeably for trace queries of the formatted measurement data. The "TRACE:DATA" command is more flexible, allowing you to query other measurement arrays and to download data to measurement |
| | The SCPI command "CALCT:DATA?" is functionally equivalent to the command "TRACE:DATA? CHIFDATA". The two can be used |
| · entrans | CALC:DATA? versus TRACE:DATA? |

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Programmer's Guide

Markers Querying Single Data Points Using

this using the SCPI command CALC: MARK. instead of a trace query. The program segment below shows how to do If you only need to query a single data point, you can use a marker query

```
DISE Warker Y
                                    ENTER @Hp8711; Marker_y
                                                              09
                  ONLEGATION GHD8111, "CALCI: MARKI: X 177 MHz"
  : read marker
                                                              9
; ser trequency
       OUTPUT @Hp8711; "CALC1:MARK ON" ! turn on marker
                                                              30
                                         : Take sweep here
                                                              20
                                     ASSIGN @Hp AILT TO 716
```

:sasks: of a bandwidth search. The following program steps accomplish these Xon can also use the CALC: MARK: Func: Rest query to return the results

```
ENTER @Hp8711; Bwidth, Center_freq, Q, Loss
     OUTPUT @Hp8711; "CALC:MARK:BWID -3"
! Get result of bandwidth search
OUTPUT @Hp8711; "CALC:MARK:FUNC:RES?"
                                                                       05
                                                                       30
                                                                       20
                         : Select -3 dB bandwidth
                                                                       OI
```

For more information on using markers, refer to the Example Programs

capine)

Accessing Other Measurement Arrays

The preceding sections describe how to query the formatted data array using the TRACE: DATA? query with the argument CHIFDATA. The formatted array is the last array in the analyzer's data processing chain, and is generally of most interest.

The analyzer also allows you to query other measurement arrays which are earlier in its data processing chain. Figure 6-2 shows the data processing chain.

Numeric Data Flow Through the Network Analyzer

Row Data A.B.R... A.B.R... Error Corrected Memory Trace Markin Markin Delay Transform Formatted Arroys Arroys Arroys Limit Testing

The first array is the Raw Data Array, which contains each of the separate input components (A, B, R, B*, R*, X, Y, AUX) immediately after they are measured. These arrays can be queried and set, but doing so is of limited use, since the data values contained in the arrays are uncorrected, and are not directly correlated to any meaningful reference, such as 0 dBm.

Programmer's Guide

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Ligure 6-2

Accessing Other Measurement Arrays

The Error Coefficient arrays contain default correction values or values created during a measurement calibration. These arrays can be queried and set, but care should be exercised in setting them since incorrect measurements may result. If you wish to apply your own corrections in addition to the analyzer's current correction, the best technique is to use the Corrected Memory array and the Data/Memory feature, explained below.

The Corrected Data array contains the results of the currently selected measurement (Transmission, Reflection, etc.) after error correction and averaging have been applied. The measurement data in these arrays is represented as complex number pairs. When measuring the transmission response of a through cable, the magnitude of the complex numbers will be very close to 1.0. When measuring an open circuit, the magnitude of the complex numbers will be very close to 0.0. When measuring an amplifier, the magnitude of the complex numbers will be greater than 1.0.

The Corrected Memory stray is filled with a copy of the Corrected Data array when the Data -> Memory operation is performed. It can be used to apply a gain correction to the measured data. This is described in the following section.

The Formatted Data array contains the measurement data after it has been formatted using the format selected by the [FORMAT] menu. Querying the Formatted Data array is described in detail at the beginning of this chapter. You can also download data to this array, and the analyzer will display the data using the current Scale and Reference

| (U | nosed to logged data. When displaying the traces using Lin Mag mat, the result of the Data divided by Memory operation (Data/Mem to divide each point of the data trace by each point of the memor will be equivalent to subtracting the Log Mag value of the mory trace from that of the Data trace. |
|----------|--|
| <u>K</u> | sus frequency. Or you may wish to apply an absolute offset to nulate the effect of adding or removing a pad from the measurement ese simulations are easily accomplished using the Corrected Memory and the Data/Memory feature. B. Corrected Data and Memory arrays contain complex linear data, a |
| | general, you should use the analyzer's calibration feature to correct errors in your system. However, there may be cases where you wish t sulate the effect of adding a cable in series with your DUT, and serve how this imaginary cable will attenuate the measured respons |
| e | e Corrected Memory array is filled with a copy of the Corrected Data ay when the Data —> Memory operation is performed. By setting the alyzer to perform Data/Memory trace math, you can apply your own rection factor to the measurement data trace by filling the Corrected mory array with the appropriate complex numbers. |
| | pplying Gain Correction Using the emory Trace |
| • | adt variett aoitservoll ais la paivlas |

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Programmer's Guide

The following example BASIC code segment shows how to download a complex array from your program to the analyzer's Memory trace. The program's "Mem" array is initialized with the proper values such that when the analyzer computes Data divided by Memory, the desired increasing gain will be applied.

```
OUTPUT @Hp8711; "CALC1:MATH (IMPL/CH1SMEM)" ! Data/Mem
                                                                                                                                                                                                                                             350
                                                                          ! Send linefeed
                                                                                                                                                        OUTPUT @Hp8711;""
                                                                                                                                                                                                                                             310
                                                                                                                                                                                           NEXL I
                                                                                                                                                                                                                                             067
    : Nore rue "!"
                                                                            OUTPUT @Hp8711;",";Mem(Pt,I);
                                                                                                                                                                                                                                             087
                                                                                                                                                                  FOR I=1 TO 2
                                                                                                                                                                                                                                             072
                                                                                                                                                                   EOR BE=1 TO 201
                                                                           OUTPUT @Hp8711; "TRACE: DATA CHISMEM";
                                                                                                                                                                                                                                             520
                                                                                           OUTPUT @Hp8711; "FORM:DATA ASCII"
                                                                                                                                                                                                                                             042
                                                                                                   ! Download to the memory trace
                                                                                                                                                                                                                                             230
                                                                                                                                                                                                   NEXT Pt
                                                                                                                                                                                                                                             220
          Gain factor db=3.0*(Pt - 1)/200 ! 0..3 dB Power
Gain factor db=3.0*(Pt - 1)/200 ! 0..3 dB Power
Gain factor lin=10^(Gain factor in real
Mem(Pt,1)=1.0/Gain factor in read
Mem(Pt,2)=0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 0.0 = 
                                                                                                                                                                                                                                             5I0
                                                                                                                                                                                                                                             200
                                                                                                                                                                                                                                             06T
                                                                                                                                                                                                                                             081
                                                                                                                                                                  FOR Pt=1 TO 201
                                                                                                                                                                                                                                             OLI
       Adds 0 dB of gain at start freq; 3 dB at stop freq
                                                                                                                                                                                                                                             09 T
                   Used to compensate for cable loss vs. frequency
                                                                                                                                                                                                                                             OST
                                              upward sloping gain factor vs. frequency.
                                                                                                                                                                                                                                             OFT
                                                                         with values that will result in an
                                                                                                                                                                                                                                             130
                                     ! Fill memory array (denominator in Data/Mem)
                                                                                                                                                                                                                                             150
                                                                                                                                         REAL Mem(1:201,1:2)
ASSIGN @Hp8711 TO 716
                                                                                                                                                                                                                                             OTT
                                                                                                                                                                                                                                             OOT
```

The example above downloads data to the corrected memory array. The data is sent by the program to the analyzer using ASCII encoding. The data is sent as ASCII characters, separated by commas. The analyzer accepts the comma separated list of numbers until it receives a linefeed to terminate the command. The program uses semicolons at the end of some OUTPUT statements to avoid sending a linefeed until all of the data has been sent. After the last number is sent, the program sends a linefeed, and the analyzer accepts the data.

ASCII.
ASCII.

| Programmer's Guide |
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| |
| You may want to instruct the analyzer to display only the memory trace and not the data trace, so that only your post-processed data is seen. |
| Write (download) the post-processed data to the analyzer's memory trace. |
| 4. Perform your post-processing on the measurement data. |
| 3. Read the measurement data into an array in your program. |
| 2. Wait for the sweep to finish. |
| I. Initiate a sweep. |
| After the analyzer has made a measurement, you can read the measurement trace and perform your own post-processing on it, and display the result on the screen. This is done using these steps: |
| Performing Your Own Data Processing |

The program below demonstrates how to perform data post-processing. It takes the measurement data and reverses it, such that the low frequency data is displayed on the right end of the trace, and the high frequency data is displayed on the left.

```
067
                                                          END POOD
                   ! Send linefeed
                                         "", IIT8qH9 TU9TUO
                                                                      280
                    OUTPUT 6Hp8711;",";Fmt(202-Pt);
                                                                      760
; Nofe the ";"
                                           FOR Pt=1 TO 201
                                                                      097
                   OUTPUT @Hp8711; "TRACE:DATA CHIFMEM";
";" ent etot!;
                                                                      5₫0
                         to the formatted memory array
                                                                      235
                        ! Download the trace, backwards,
                                                                      530
                                      ENTER @Hp8711; Fmt(*)
                                                                      220
        ! Resd the trace from the formatted data array OUTPUT GHP8711; "TRACE:DATA? CHIFDATA"
                                                                      OIZ
                                                                      200
                              "IAW*; LTINI"; LIT8qH9 TU9TUO
                                                 | Take sweep
                                                                      180
                                                                      07.T
               OUTPUT @Hp8711; "DISP:WIND:TRAC1 OFF; TRAC2 ON"
                                                                      09 T
                    OUTPUT @Hp8711;"ABOR; INIT: CONT OFF; *WAI"
                                                                      120
                              OUTPUT @HP8711; "FORM: DATA ASCII"
                                                                      T30
                                           REAL Fmt (1:201)
ASSIGN @Hp8711 TO 716
                                                                      150
                                                                      OTI
                    ! Display the measurement data backwards
```

This example program uses ASCII trace data transfers. Higher speed can be achieved using binary data transfers. If using IBASIC, high-speed subroutines can be used for even greater performance. Refer to the IBASIC Handbook for details.

| 20 Programmer's Guide |
|--|
| |
| |
| |
| LDAL GHD811; END |
| arement: |
| seives an EOI. To send an EOI using BASIC, you can use the |
| EOI. The analyzer will read the data segment bytes, stopping when it |
| ta segment, your program must terminate the data block by sending |
| send trace data using an indefinite length block, your program sends block header of "#0", followed by the data segment. After sending the |
| ecified in the block header. |
| ad the data segment bytes, stopping when it receives the number |
| nen you send a definite length block to the analyzer, the analyzer will |
| 508", meaning that the block contains 1608 bytes. |
| specify the size. In this case, 4 digits follow, and those digits are |
| bytes/point). The header characters for a 1608 byte block are: "#41608". e first digit after the "#", "4" tells how many following digits are used |
| AL, 64), the block's data segment will contain 1608 bytes (201 points st |
| -bit floating point numbers for each data point (FORM: DATA |
| r example, if you are sending a trace with 201 data points and using |
| ta segment. |
| culate the number of bytes in the data segment of the block, and sate a block header which tells the analyzer how many bytes are in the |
| send trace data using a definite length block, your program must |
| finite length block, and an indefinite length block. |
| ta section. There are two different types of blocks that can be used: a |
| coded trace is transferred as a block; the block contains a header and a |
| ing binary encoding is faster than using ASCII encoding. As entioned in "Using Binary Data Encoding" on page 6-6, the binary |
| ta traces can be downloaded to the analyzer using binary encoding. |
| 2 |
| gaiboon |

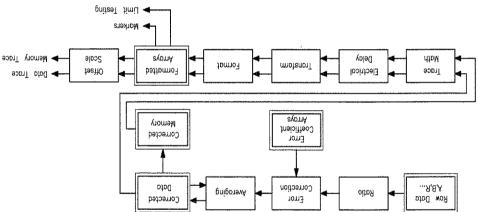
Internal Measurement Arrays

The following sections describe the sequence of math operations and the resulting data arrays as the measurement information flows from the raw data arrays to the display. This information explains the measurement arrays accessible via GPIB.

Figure 6-3 is a data processing flow diagram that represents the flow of numerical data. The data passes through several math operations, denoted in the figure by single-line boxes. Most of these operations can menus. The data is stored in arrays along the way, denoted by double-line boxes. These arrays are places in the flow path where data is accessible via GPIB. While only a single flow path is shown, two identical paths are available, corresponding to measurement channels I and 2.

Numeric Data Flow Through the Network Analyzer

Figure 6-3



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Raw Data Arrays

These arrays are linear measurements of the inputs used in the selected measurement. Note that these are pairs of complex numbers. The arrays are directly accessible via GPIB and are referenced as CH[1|2]AFWD,

CH[1|2] BFWD and CH[1|2] RFWD. Raw data for AUX INPUT is not

CH[1|2]BFWD and CH[1|2]RFWD. Raw data for AUX INPUT is not available via GPIB. Use the corrected data array to access AUX INPUT data.

Raw Data Arrays

Table 6-4

| Raw Arrays | Selected Measurement |
|--|---|
| $\mathbf{B} = \text{CH}[\text{IIS}] \text{BEMD}, \mathbf{B} = \text{CH}[\text{IIS}] \text{KEMD}$ | (A/A) moissimanerT |
| $\mathbf{Y} = \text{CH[I]S]}$ We ch[IIS] REMD | Reflection (A/R) |
| $\mathbf{A} = \mathtt{CH} [\mathtt{I} \mathtt{S}] \mathtt{AFWD}$ | A |
| $\mathbf{B} = \text{CH}[\text{IIS}]$ BEMD | В |
| $oldsymbol{B} = 	exttt{CH[I]SEMD}$ | В |
| \mathbf{B}_* = CH[J S]BEMD | $\mathbf{Power}\left(\mathbf{B}^{*}\right)$ |
| \mathbf{B}_* = CH[] S]BEMD' \mathbf{K}_* = CH[] SBMD | Conversion Loss (B*/R*) |
| \mathbf{K}_* = CH[J S]KEMD | \mathbf{K}_* |
| $\mathbf{X} = \text{CH}[\text{IIS}]$ BEMD, $\mathbf{X} = \text{CH}[\text{IIS}]$ BEMD | AM Delay (Y/X) |
| $\mathbf{X} = \text{CH[T S]}\text{BEMD}$ | X |
| $\mathbf{X} = \text{CH}[\text{IIS}] \text{BEMD}$ | X |
| $\mathbf{A}=$ CH[T S]BEMD, $\mathbf{B}_{*}=$ CH[T S]BEMD | X\F |
| X = CH[IIS]BEMD, X = CH[IIS]BEMD | \(\lambda/\text{X}\'\text{X}\'\text{\text{A}}\) |

Ratio Calculations

These are performed if the selected measurement is a ratio (e.g. A/R or B/R). This is simply a complex divide operation. If the selected measurement is absolute (e.g. A or B), no operation is performed.

Error Correction

Error correction is performed next if correction is turned on. Error correction removes repeatable systematic errors (stored in the error coefficient arrays) from the raw arrays. The operations performed depend on the selected measurement type.

Internal Measurement Arrays

Error Coefficient Arrays

The error coefficient arrays are either default values or are created during a measurement calibration. These are used whenever correction is on. They contain complex number pairs, are accessible via GPIB, and are referenced as CH[1|2]SCORR1, CH[1|2]SCORR3 and CH[1|2]SCORR4.

Error Coefficient Arrays

Table 6-5

| CH[] S]SCOKK] \mathbf{K}_* Kesbouse | Broadband Internal |
|--|---|
| CH[1 2]SCOKK3 Tracking | |
| CH[1 2]SCOKKS Source Match | |
| CH[1 2]SCOKKI Directivity | Reflection (A/R) |
| CH[1 2]SCORR4 Transmission Tracking | |
| CH[1 2]SCOKK3 Reflection Tracking | |
| CH[I S]SCOKKS Somee Match | |
| CH[1 2]SCORRI Directivity | Transmission (B/R) Enhanced Response |
| CH[1 2]SCORRZ Isolation Term | |
| CH[1 2]SCORRI Tracking | Transmission (B/R) Response & Isolation |
| CH[1 S]SCOKKI Tracking | Transmission (A/A) Response |
| Error Coefficient Arrays | Selected Measurement |

| d External measurements. | apply to Broadban | These arrays do not | NOTE |
|--------------------------|-------------------|---------------------|-------------|
| | | | |
| | | | |

6-24

| able 6-6 2-Port Error Coefficient Arrays | | |
|--|-----------|--|
| Error Coefficient Arrays | Direction | |
| CH[1 2]SCORRI Directivity | Forward | |
| CH[1 S]SCOBBS Sonice match | | |
| CH[1 2]SCORR3 Reflection tracking | | |
| CH[1 2]SCORR4 Transmission tracking | | |
| CH[1 2]SCOKK2 Posq match | | |
| CH[1 2]SCORR6 Isolation | | |
| CH[1 2]SCORR7 Directivity | Reverse | |
| CH[1 2] SCOBB8 Zonke match | | |
| CH[1 2]SCORR9 Reflection tracking | | |
| CH[1 2]SCORRIO Transmission tracking | | |
| СН[115] ЗСОВИЈЈ Гозд шаџср | | |
| CH[1 2]SCORR1 2 Isolation | | |

Programmer's Guide

Averaging

Averaging is a noise reduction technique. This calculation involves taking the complex exponential average of several consecutive sweeps. This averaging calculation is different than the System Bandwidth uses digital filtering, applying noise setting. System Bandwidth uses digital filtering, applying noise reduction to the measured data before it is stored into the Raw Data Arrays.

Corrected Data Arrays

The combined results of the ratio, error correction and averaging operations are stored in the corrected data arrays as complex number pairs. These arrays are accessible via GPIB and referenced as CH[1|2]SDATA.

Corrected Memory Arrays

If the Data->Mem or Normalize operations are performed, the corrected data arrays are copied into the corrected memory arrays. These arrays are accessible via GPIB and referenced as CH[1|2] SMEM.

| Andrews and the | 6-26 Programmer's Guide |
|--|---|
| | |
| an the other | performed on the formatted arrays. These arrays are accessible via GPIB and referenced as $CH[1 2]FDATA$ and $CH[1 2]FMEM$. |
| (American market in) | The results so far are stored in the formatted data and formatted memory arrays. It is important to note that marker values and marker functions are all derived from the formatted arrays. Limit testing is also |
| A manufacture of the state of t | Formatted Arrays |
| r ^{elia} n, man a de frie | complex data. |
| | This converts the complex number pairs into a scalar representation for display, according to the selected format (e.g. Log Mag, SWR, etc). These formats are often easier to interpret than the complex number representation. Note that after formatting, it is impossible to recover the |
| | Formatting |
| | transform employs an inverse fast Fourier transform (FFT) algorithm to accomplish the conversion. |
| | This block converts frequency domain data into distance domain, or into an SRL impedance value when measuring fault location or SRL. The |
| | Transform (Option 100 only) |
| | reference plane. (See your analyzer's $User$ $Guide$ for more details on these features.) |
| | Extension features add or subtract phase in proportion to frequency. This is equivalent to "line stretching" or artificially moving the measurement |
| | This block adds or subtracts phase, based on the settings of Phase Offset, Electrical Delay, and Port Extension. The Electrical Delay and Port |
| | Electrical Delay |
| | through exactly the same data processing flow path as the data from the |
| | addition, the complex ratio of the two (Data/Memory) can also be selected. If memory is displayed, the data from the memory arrays goes |
| | This selects either the corrected data array, or the corrected memory array, or both to continue flowing through the data processing path. In |
| | Trace Math Operation |

Internal Measurement Arrays

Offset and Scale

These operations prepare the formatted arrays for display. This is where the reference position, reference value, and scale calculations are performed, as appropriate for the format.

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Using Graphics

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| | рееп фамп. | eraphics have | *************************************** |
| | rrite to the static graphics plane (the same plane where the sawn). There is no sweep-to-sweep speed penalty once the | | |
| | s commands are used to write directly to a measurement | - | NOTE |
| | graphics can only be output in red on a PCL printer. | | |
| | draws the graphics to an IBASIC display partition. The | WINDOWIO | |
| | draws the graphics to the channel 2 measurement screen. | MINDOWZ | |
| | the mnemonic.) | | |
| | draws the graphics to the channel 1 measurement screen. (This is the default if no window is specified in | MINDOMJ | |
| | tre to be written. | | |
| | pecified in the WINDow part of the command selects where | Lye number s | |
| | <pre>Jow[1 2 10]:GRAPhics:<mnemonic>.</mnemonic></pre> | | |
| | ple setup diagram. These commands, listed below, are of | to draw a sim | |
| | ss and messages on the display. The GRAPHICS example e Example Programs Guide uses some of these commands | - ' | |
| | has a set of user graphics commands that can be used to | | |
| | ction | пролзиј | |
| | | | |

```
Unless otherwise specified, the graphics commands listed below start at the current pen location. All sizes are dimensioned in pixels.
```

DISPlay:WINDow[1|2|10]:GRAPhics:CIRCle <y_radius>

DISPlay: WINDow[1|2|10]:GRAPhics:COLor Color cpen>

color choices are: 0 for erase, 1 for bright, 2 for dim
 DISPLAY:WINDOW[1|2|10]:GRAPhics[:DRAW] < new_x>, < new_y>

DISPlay:WINDow[1|2|10]:GRAPhics:LABel <string>

DISBJ&Y:WINDOw[1|2|10]:GRAPhics:LABel:FONT

• font choices are: SMALL, HSMALL, HORMAL, HUORMAL, BOLD, HBOLd, SLANE, HSLane (H as the first letter of the font name indicates highlighted text — inverse video).

DISBJ&Y:WINDOW[1|2|10]:GRAPhics:RECTangle
DISPAy:WINDOW[1|2|10]:GRAPhics:RECTangle

cwidth>, <hetant</pre>

DISPlay:WINDow[l|2|10]:GRAPhics:SCALe <xmin>,<xmax>,<ymin>,<ymin>

DISPlay:WINDow[1|2|10]:GRAPhics:STATe?

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|---|--------|
| Download from Www.Somanuals.com, All Manuals Search And Download. | |

| | | phggu |
|--------|--|---|
| (| (0,758) | (0,0) |
| | | LOWER display partition |
| | company forders 770 / | (761,753) (761.0) |
| | FULL display partition | (0,0) |
| | | UPPER display partition |
| (6£1 | (654,753) | (661,7Σd) (681,0) |
| I-7 9 | IBASIC lower display: | vailable Display Partitions |
| 1-7 ə: | IBASIC lower display: | vailable Display Partitions |
| I-7 9. | | |
| I-7 9: | IBASIC full screen display: IBASIC upper display: IBASIC lower display: | |
| I-7 92 | Measurement channel I Measurement channel I IBASIC full screen display: IBASIC upper display: IBASIC lower display: | or 2 full screen measurement: or 2 split screen measurement: |
| I-7 9 | shows the display partition Measurement channel 1 IBASIC full screen display: IBASIC upper display: IBASIC upper display: | or 2 full screen measurement: or 2 split screen measurement: |
| I-7 9 | display configuration currents display configurations of the affect the dimensions of the shows the display partition Measurement channel I Measurement channe | ophics windows are listed below. Figure 7-1 or 2 full screen measurement: or 2 split screen measurement: or 2 split screen measurement: |
| I-7 9. | have different sizes and location of the display configuration currents acreen measurements, and affect the dimensions of the sizes of the different grahows the display partition. Measurement channel I Me | graphics window are determined by the tly in use — split screen measurements, full or partial IBASIC display partitions wil graphics window in use. or 2 full screen measurement: or 2 split screen measurement: yy: |

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Programmer's Guide

Window Geometry

There is a set of queries that can be used to determine the size and location of the display window in use.

These queries, listed below, return the width and height of the window or the absolute location of its lower left or upper right corners. All the coordinates and sizes are dimensioned in pixels.

- DISLTSA:MINDOM[]|S|]0]:GEOWGCIA:TTELFS
- DISLIGA: MINDOM[]|S|10]: GEOWGCIA: SIZES
- DISBJ&A:WINDOW[]|S|]0]:GEOW6fxX:URIGPt?

The origin of every graphics window is its lower left corner. The locations returned in response to the LLEFt and URIGht are relative to the absolute origin of the entire display, not to the graphics window.

NOTE

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| | Programmer's Guide | |
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| | | |
| | | |
| | | |
| | | |
| | graphics buffer. | |
| 71.041 | intend to print or plot your graphics, make sure they will fit within the | r1 |
| NOTE | Only graphics that can be refreshed will be printed or plotted. If you | |
| | nser-graphics display. | (34) |
| | Use the following command to clear the graphics buffer and | |
| | • 50 strings (60 characters long) | |
| | • 40 rectangles | LJ |
| | sələriə 0# • | |
| | sənil 00č | ii |
| | The graphics buffer will hold up to: | |
| | DISPlay:WINDow:GRAPhics:BUFFer[:STATe] <0N OFF> | |
| | drawn — but they will not be refreshed. The graphics buffer can be turned on and off using the following command (which is used in the GRAPHICS example program). | \ |
| | The analyzer has a graphics buffer that is used to refresh the graphics display if needed. When the buffer is full, additional graphics can still be drawn — but they will not be refreshed. The graphics buffer can be | |
| | The Graphics Buffer | |

F-8

Front Panel Keycodes

8

| () | 8-2 Programmer's Guide |
|---|--|
| | |
| | |
| | |
| Acres (Transit | |
| | |
| | Status Registers"), and stores the associated information in a key queue. Your program can use the SCPI SYSTem: KEY commands to read the contents of the key queue. |
| | When keys are pressed or when the knob is turned, the analyzer detects this event, sets bit 0 of the Device Status Register (see Chapter 5, "Using |
| () () () () () () () () () () | The front panel can be monitored to determine when a key has been pressed or when the knob (RPG — rotary pulse generator) has been turned. Key presses from an attached PC keyboard can also be captured. |
| | Monitoring the Front Panel |
| To Common A of the | Every hardkey and softkey has a unique key name. Refer to the last table in this chapter for a list of all key names. |
| | function of specific keys. The SCPI command SYSTem:KEY <char> sends a key name to the analyzer which executes the same function as the corresponding front panel key. For example, SYSTem:KEY FREQ will execute the function of the FREQ hardkey.</char> |
| | The front panel can be controlled by sending commands to execute the |
| (''') | Controlling the Front Panel |
| | Your program can control or monitor the analyzer's front panel with the use of the SCPI SYSTem: KEY commands. |
| | Front Panel Keycodes |

Front Panel Keycodes

The SCPI query system: Rey: TYPE? returns a string indicating the type of key press event:

Key Press Return Values

I-8 sldsT

| Meaning | Return Value |
|--|--------------|
| No key has been pressed. | NONE |
| A front panel key has been pressed. | KEA |
| The analyzer's knob has been turned. | ВЪС |
| A key on the ASCII PC DIN keyboard has been pressed. | DSV |

The SCPI query system:KeY:YALue]? returns a number describing the type of key press. The meaning of the number depends on the key type returned by the System:KeY:TYPE? query:

Key Press Types

Table 8-2

| SYST: KEY: VALUE Meaning | SXST:KEX:TXPE |
|--|---------------|
| No meaning. Returns – I. | NONE |
| A number from 0 to 56 representing the "key code" of the front panel key. See following table for list. | KEX |
| The number of knob "ticks." Positive values indicate a clock-wise turn; negative numbers indicate counter-clockwise. Larger numbers indicate the knob has been turned faster or further. | ВЪС |
| The ASCII value of the pressed key. | YZC |

| The first continues of the continues of | |
|--|--|
| | For a complete example of how to read the front panel keys and knob, refer to the KEYCODE example program in the Example Programs Guide. |
| <u>i</u> | Example Program |
| \\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\. | When the queue is turned off, your program must read each key before a following key is pressed, or information will be lost. It is generally best to leave the queue enabled. |
| | |
| | SYSTem:KEY:QUEUE[:STATe] <on off></on off> |
| | You can turn the key queue on or off using this command: |
| 4 | SISIGN : KEX: OBENE: CONNES |
| and the second s | neing this command: |
| , | SYSTem: KEY: QUEue: Clear |
| | You can clear the queue using this command: |
| 1 | SYSTem:KEY:QUEue:MAXimum? |
| | You can query the queue length using this command: |
| ļ | key presses or knob ticks will be ignored when the queue is full. |
| and the state of t | The Key Queue stores up to 32 key press events. After 32 key presses, the queue is full, and no more key press events can be stored without reading from the queue (using SYSTem: KEY [: VALue]?). Subsequent |
| | SYSTem:KEY[:VALue]?. |
| | so that you can read the next key. For this reason, you must perform the SYSTEM: REY: TYPE? query before performing the |
| | The SYSTem: KEY[:VALue]? query removes the key from the key queue, |
| 1, 1 × 1, 111111 | Key Queue |
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Key Codes

| ENTer | 20 | ENTER |
|------------------|----------|-------------------|
| NINE | 61 | 6 |
| EICH | 81 | 8 |
| SEVen | LT | |
| XIS | 91 | 9 |
| FIVE | 15 | 9 |
| FOUR | ₽Ţ | Þ |
| THRee | 13 | 3 |
| OWT | 12 | S |
| OME | ŢŢ | Θ |
| SERO | ОТ | 0 |
| SOFTkey8 | L | Soffikery 8 |
| SOFTkey7 | 9 | Softkey 7 |
| SOFTkey6 | g | Softkey 6 |
| SOFTkey5 | 7 | Softkey 5 |
| SOFTkey₄ | 8 | Зойкеу 4 |
| SOFTKey3 | 2 | Soutkey 3 |
| SOŁŁKGNS | Ţ | Softkey 2 |
| SOFTkey1 | 0 | Softkey 1 |
| Name CPIB Key | Key Code | Кеу Label |

| СРІВ Кеу | Key Code | Кеу Label |
|----------|----------|------------------|
| POINt | IS | |
| auVIM | 22 | |
| qU | 53 | Ѿ |
| DOMN | ₽7 | |
| BEGin | 0⊅ | (BECIN) |
| MEVSI | ΙÞ | (MEAS 1) |
| MEVS | ₹ħ | (MEAS 2) |
| POWer | €₽ | LOWER |
| MEAU | ₽₽ | (MENU) |
| ькеб | 9₹ | (FREQ) |
| SWEep | 9ħ | (SMEEP) |
| CVT | LF | CAD |
| DISPLAY | 8₱ | (YAJ92ID) |
| SCALe | 6₹ | (SCALE) |
| AVG | 09 | (DVA) |
| FORMat | 19 | (TAMROT) |
| MARKer | 29 | (WARKER) |
| SAVE | 23 | (SAVE RECALL) |
| məTSYS | ₽₽ | (SYSTEM OPTIONS) |
| HARDcopy | 99 | (НАЯД СОРУ) |
| PRESet | 99 | (PRESET) |

Introduction to SCPI

L-6

| | SCPI was developed to conform to the IEEE 488.2 standard (replacing IEEE 728-1982). The IEEE 488.2 standard defines the syntax and data formats used to send data between devices, the structure of status registers, and the commands used for common tasks. For more information, refer to the IEEE standard itself. SCPI defines the commands used to control device-specific functions, the parameters accepted by these functions, and the values they return. |
|---------------------------------------|---|
| | Standard Commands for Programmable Instruments (SCPI) is a programming language designed specifically for controlling instruments by Agilent Technologies and other industry leaders. SCPI provides commands that are common from one instrument to another. This elimination of "device specific" commands for common functions allows programs to be used on different instruments with very little modification. |
| | This chapter is a guide to GPIB control of the analyzer. Its purpose is to provide concise information about the operation of the analyzer under GPIB control. The reader should already be familiar with making measurements with the analyzer and with the general operation of GPIB. |
| , , , , , , , , , , , , , , , , , , , | Introduction to SCPI |

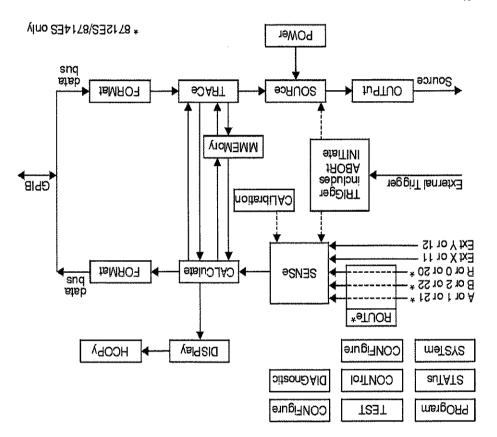
8-5

The Command Tree

The SCPI standard organizes related instrument functions by grouping them together on a common branch of a command tree (see Figure 9-2 on page 9-6 for an example command tree). Each branch is assigned a mnemonic to indicate the nature of the related functions. The analyzer has 16 major SCPI branches or **subsystems**. See Figure 9-1 for a model of how these subsystems are organized to manage the measurement and data flow for the analyzer.

Measurement and Data Flow of the Analyzer

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se Lgdo

| | Programmer's Guide | t -6 |
|---|--|----------------------------|
| A contract of the contract of | Selects transmission and reflection ports. Selects ports on multiport test sets (used with the 87075C multiport test set only). | ЭТИОЯ |
| | Interfaces IBASIC programs and commands with an external controller. For more information on IBASIC programming, refer to HP Instrument BASIC User's Handbook. | PROGram |
| V | Specifies frequency sweeps or power sweeps. | bomer |
| | Turns on/off the source output power (power to the device under test). | Juatuo |
| | Controls mass storage of instrument states and data (disk and internal memory interface functions). | ММЕМОТУ |
| () | Controls the triggering of sweeps. | StaiTINI |
| | Controls hardcopy (printer and plotter) output. | $_{ m HCOb}$ X |
| | Controls the format of data transfers over the GPIB. For more information about GPIB data transfers, refer to Chapter 4, "Data Types and Encoding." | FORMat |
| | Controls the display of measurement data, annotation and user graphics. | YsIqsid |
| | Performs a number of diagnostic and I/O functions. Includes LAM diagnostics, port reads and writes, correction constants utilities, and other miscellaneous functions. | oijsonĐAId |
| | Configures the analyzer for use with a multiport test set. Used with the 87075C multiport test set only. | CONTrol |
| Ameril's | Configures the analyzer to measure a specific device type, including amplifiers, mixers, filters, and cables. | COMEţdnie |
| A company | Controls zeroing the broadband diode detectors. | CALibration |
| | Configures post-measurement processing of the measured data (such as marker and limit testing functions). | CALCulate |
| | Aborts any sweep in progress. | YBOK F |
| Name of the state | rajor SCPI subsystems and their functions are described | The analyzer's m below. |
| | | |

The Command Tree

| When many functions are grouped together on a particular branch, additional branching is used to organize these functions into groups that | |
|---|---------|
| Controls the source of the sweep triggering. | TRIGGET |
| Interfaces with the internal data arrays (functions such as data transfer and trace memory). | TRACe |
| Performs instrument self-test functions. | LESL |
| Contains miscellaneous system configuration commands (such as I/O port, clock and softkey control). | SYSTem |
| Contains the commands for using the SCPI status registers. (For more information about using the status registers, refer to Chapter 5, "Using Status Registers.") | suTAT2 |
| Controls the RF output power level of the source (power to the device under test). | SOURce |
| Configures parameters (such as the frequency and measurement parameters) related to the sweep and the measured signal (from the device under test). This subsystem also controls the narrowband calibration routines. | 2EN26 |
| | |

After many innectors are grouped cogenies on a paractions into groups that additional branching is used to organize these functions into groups that are even more closely related. The branching process continues until function that turns on and off the marker tracking feature is assigned to the TRACKING branch of the FUNCTION branch of the MARKER branch of the CALCULATE subsystem. The command looks like this:

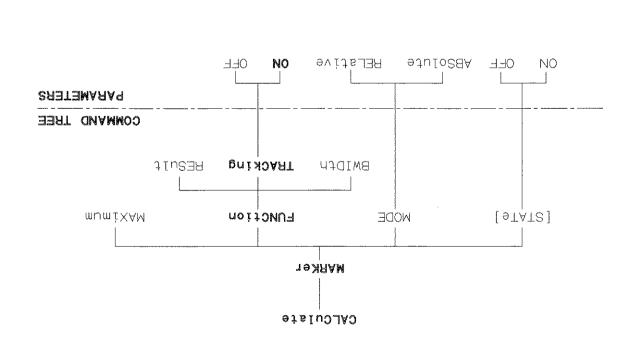
CALCULATE: MARKER: FUNCTION: TRACKING ON

Colons are used to indicate branching points on the command tree. A parameter is separated from the rest of the command by a space.

NOTE

Partial Diagram for the CALCulate Subsystem Command Tree

Figure 9-2



Sending Multiple Commands

Multiple commands can be sent within a single program message by separating the commands with semicolons. For example, the following program message — sent within an HP BASIC OUTPUT statement—turns on the marker reference and moves the main marker to the highest peak on the trace:

BETPLIAE: CVTCATAE: WAKKEK: WODE OALBAL J18'...CVTCATAE: WAKKEK: WODE

One of the analyzer's command parser main functions is to keep track of a program message's position in the command tree. This allows the previous program message to be simplified. Taking advantage of this parser function, the simpler equivalent program message is:

OUTPUT 716; "CALCULATE: MARKER: MODE RELATIVE; MAXIMUM"

In the first version of the program message, the semicolon that separates the two commands is followed by a colon. Whenever this occurs, the command parser is reset to the base of the command tree. As a result, the next command is only valid if it includes the entire mnemonic path from the base of the tree.

In the second version of the program message, the semicolon that separates the two commands is not followed by a colon. Whenever this occurs, the command parser assumes that the mnemonics of the second command arise from the same branch of the tree as the final mnemonic of the first of the preceding command. MODE, the final mnemonic of the first command, arises from the MARKER branch. So MAXIMUM, the first mnemonic of the second command, is also assumed to arise from the markers branch.

The following is a longer series of commands — again sent within HP BASIC ${\tt OUTPUT}$ statements — that can be combined into a single

brogram message:

ONLENT 116; CALCULATE: MARKER: FUNCTION: TRACKING ON"
ONTPUT 116; CALCULATE: MARKER: MODE RELATIVE"
ONTPUT 116; CALCULATE: MARKER: MODE RELATIVE"

The single program message is:

SETVIAE'WYXIWAW'ENNCLION: LEVEKING ON. OALDAL 110', CFTCATVLE: WYKKEK: SLYLE ON'WODE

| | Programmer's Guide |
|-----|--|
| | |
| | |
| | |
| | |
| | OUTPUT 716;"CALC:MARK:STAT ON; MODE REL; MAX; FUNC:TRAC ON" |
| | <pre>pecomes:</pre> |
| | If the rules listed in this section are applied to the last program message in the preceding section, the statement: |
| | SCPI is not case sensitive so any mix of upper and lower-case lettering can be used when sending commands to the analyzer. |
| OTE | The short form of a particular mnemonic is indicated by the use of UPPER-CASE characters in this manual. |
| | If the long form mnemonic has more than four characters and the fourth character is a vowel, the short form consists of the first three characters of the long form. For example, LIMIT becomes LIM. |
| | If the long form mnemonic has more than four characters and the fourth character is a consonant, the short form consists of the first four characters of the long form. For example, CALCULATE becomes CALC. |
| | • If the long form mnemonic has four characters or less, the short form is the same as the long form. For example, DATA remains DATA. |
| | The short form mnemonics are created according to the following rules: |
| | Each command mnemonic has a long form and a short form. The short forms of the mnemonics allow you to send abbreviated commands. Only the exact short form or the exact long form is accepted. |
| | Command Abbreviation |

Implied Mnemonics

NOTE

Some mnemonics can be omitted from GPIB commands without changing the effect of the command. These special mnemonics are called implied mnemonics, and they are used in many subsystems. In addition to entire mnemonics, variable parts of some mnemonics may also be implied. These are usually a number indicating a particular measurement channel, marker, or similar choice.

When a number is not supplied for an implied variable, a default choice is assumed; this choice is always $\mathbb{1}.$

The INITIATE subsystem contains both the implied mnemonic IMMEDIATE at its first branching point and an implied variable for the measurement channel. The command to trigger a new sweep is shown in the "SCPI Command Summary" as:

```
OUTPUT 716; "INITiate[1][:IMMediate]
```

Any of the following forms of the command can be sent to the analyzer (using HP BASIC) to trigger a new sweep on measurement channel 1:

```
OUTPUT 716; "INITIATE1: IMMEDIATE"
OUTPUT 716; "INITIATE1"
OUTPUT 716; "INITIATE1"
```

If the sweep is to be triggered for measurement channel 2, the channel number must be specified:

```
OUTPUT 716; "INITIATES: IMMEDIATE"
OUTPUT 716; "INITIATES"
```

| Parameter Types |
|---|
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| a del promo | |
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| A | |
| La di di | |
| Territories (Ass. Willy | |
| New year of | |
| | |
| | OUTPUT 716; "SENSE1:FREQUENCY:STOP MAX" |
| A second second | OUTPUT 716;"SENSEL:FREQUENCY:STOP 1300 MHZ" |
| s | 8114ET/ES). |
| Andrew Williams | specific value. The second command below sets the stop frequency to its maximum possible value (1300 MHz for 8712ET/ES or 3000 MHz for $\rm 12000~MHz$ |
| emma. | measurement. The first command below sets the stop frequency to a |
| | An example is the command to set the stop frequency for a |
| f17.79 | <num> is used in this document to denote a numeric parameter.</num> |
| Control of the Contro | numeric parameters accept MAXimum and MINimum as values (note that MAXimum and MINimum can be used to set or query values). |
| | automatically rounds the parameter. In addition to numeric values, all |
| | scientific notation. If an instrument setting programmed with a numeric parameter can only assume a finite number of values, the instrument |
| | Simple numeric parameters accept all commonly used decimal representations of numbers, including optional signs, decimal points, and |
| iİ | Most subsystems use numeric parameters to specify physical quantities. |
| | Numeric Parameters |
| Variable 1 | |
| | command by a space. If more than one parameter is sent, they are separated from each other by commas. |
| | types of parameters with different types of commands and queries. When a parameter is sent with a SCPI command, it must be separated from the |
| | Parameters are used in many commands. The analyzer uses several |
| and a | Parameter Types |
| | u , u |

Query Response

When a numeric parameter is queried, the number is returned in one of the three numeric formats.

NR1 Integers (such as +1, 0, -1, 123, -12345)

NR2 Floating point number with an explicit decimal point (such as 12.3, +1.234, -0.12345)

NR3 Floating point number in scientific notation (such as

+1.23E+5, +123.4E-3, -456.789E+6)
An example is the response to a query of the stop frequency after

executing the above commands (this response is of the NR3 type).

returns the value 1.3E+9.

Character Parameters

Character parameters (sometimes referred to as discrete parameters) consist of ASCII characters. They are typically used for program settings that have a finite number of values.

These parameters use mnemonics to represent each valid setting. They have a long and a short form which follow the same rules as command

тиетопісь.

<char> is used in this document to denote a character parameter.

An example of a command using a character parameter is the command that selects the format in which the measurement data is displayed:

OUTPUT 716; "CALCULATE1: FORMAT MLOGARITHMIC"

Grety Response

When a character parameter is queried the response is always the short form of the mnemonic that represents the current setting. An example is the response to a query of the data format after executing the above command.

OUTPUT 716; "CALCULATE1: FORMAT?"

returns the value MLOG.

| returns the value 1. |
|---|
| OUTPUT 716,"INITIATE:CONTINUOUS?" |
| Query Response The response when a boolean parameter is queried is a single NR1 number indicating the state 1 for on or 0 for off. An example is the response to a query on the sweep trigger status after executing the above command. |
| A special group of commands uses boolean parameters to control automatic functions of the instrument, such as automatic functions an the fastest possible sweep speed. With these automatic functions an additional value is available for the parameter. This value ONCE causes the function to execute once before turning off. |
| OUTPUT 716; "INITIATE: CONTINUOUS ON" |
| An example of a command that uses a boolean parameter is the command that makes the analyzer continuously trigger (or stop triggering) measurements. |
| $<\!\!ON\midOFF\!\!>$ is used in this document to denote a boolean parameter. |
| Boolean parameters are used for program settings that can be represented by a single binary condition. Commands that use this type of parameter accept the values ON (or 1) and OFF (or 0). |
| Boolean Parameters |
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9-15

Parameter Types

String Parameters

without any characters in between. For example: included as a character (embedded) inside the string by typing it twice end with the same character (called the delimiter). The delimiter can be bans (") stoup eduote (') or a double quote (") and String parameters can contain virtually any set of ASCII characters. The

OUTPUT 716; "DISP:ANN:TITL:DATA 'DUT''S PHASE'"

<string parameter.</pre>

An example of a command that uses a string parameter is the

CONFIGURE command:

OUTPUT 716; "CONFIGURE 'FILTER: TRANSMISSION'"

'FILTER: TRANSMISSION' in the example above, follow the same rules Some of the string parameters used by the analyzer, like

('FILTER: REFLECTION' is a related command) and abbreviated that apply to mnemonics. They may have branching

versions.

Query Response

the last command). the response to the configuration status of the analyzer (after executing returned in response to a query is in the abbreviated form. An example is data. When the string follows the "SCPI" mnemonic rules, the string delimiters. Embedded double quotes may be present in string response difference is that the response string will only use double quotes as The response when a string parameter is queried is a string. The only

OUTPUT 716; "CONFIGURE?"

returns the value "FILT: TRAN".

Block Parameters

a block parameter. "Data Types and Encoding."

block> is used in this document to denote form. For more information on block data transfers refer to Chapter 4, blocks or indefinite length blocks — the instrument will accept either related data (like a data trace). Blocks can be sent as definite length Block parameters are typically used to transfer large quantities of

Syntax Summary

SCPI mnemonics are being described. The following conventions are used throughout this manual whenever

angle brackets

usually explained in the accompanying text. command or query. The definition of the variable is are used to enclose required parameters within a

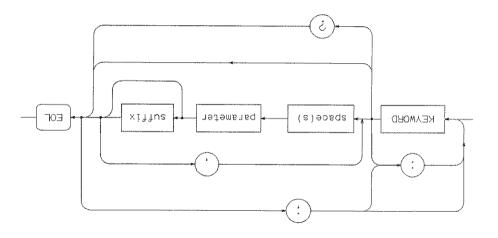
prackets ([]) sdnare

within a command or query. are used to enclose implied or optional parameters

UPPERIOWer

are the rest of the long form mnemonic. given mnemonic. The remaining (lower-case) letters are used to indicate the short form (upper-case) of a csse

SCPI Command Syntax Figure 9-3



Syntax Summary

The following elements have special meanings within a SCPI program message (or combination or mnemonics).

When a command or query contains a series of mnemonics, they are separated by colons. A colon immediately following a mnemonic tells the command parser that the program message is proceeding to the next level of the command tree. A colon immediately following a semicolon tells the command parser that the program message is returning to the base of the command tree.

When a program message contains more than one command or query, a semicolon is used to separate them from each other.

A comma separates the data sent with a command or returned with a response.

One space is required to separate a command or query from its data (or parameters). Spaces are not allowed inside a command or query.

Programmer's Guide

absee ()

comma (,)

semicolon (;)

colon (:)

IEEE 488.2 Common Commands

IEEE 488.2 defines a set of common commands. All instruments are required to implement a subset of these commands, specifically those commands related to status reporting, synchronization and internal operations. The rest of the common commands are optional. The rest of the common commands are implemented in the analyzer and the response of the analyzer when the command is received.

*CLS Clears the instrument Status Byte by emptying the error queue and clearing all event registers, also cancels any preceding *OPC command or query (does not change the enable registers or transition filters).

*ESE <number 5.000.

Sets bits in the Standard Event Status Enable Register or current setting is saved in non-volatile memory.

— current setting is saved in non-volatile memory.

— current setting is saved in non-volatile memory.

| | transfer does not terminate on a carriage return or line |
|------------------|--|
| | similar technique should be used to ensure that the |
| | formatting (ENTER USING "-K" in HP BASIC) or a |
| | instrument state active when *LRN? was sent. Data |
| | when sent back to the analyzer will restore the |
| *PEN5 | This returns a string of device specific characters that, |
| | "HEWLETT-PACKARD,8712, <serial number="">,<software evision="">"</software></serial> |
| | The string is of the form |
| *IDNS | Returns a string that uniquely identifies the analyzer. |
| | Event Status Register. |
| *E2K5 | Reads and clears the current state of the Standard |
| | Enable Register: |
| *ESE3 | Reads the current state of the Standard Event Status |
| | — current setting is saved in non-volatile memory. |
| *ESE <unw></unw> | Sets bits in the Standard Event Status Enable Register |
| | error queue and clearing all event registers, also cancels any preceding $^*\mathrm{OPC}$ command or query (does not change the enable registers or transition filters). |

feed (both $^{\mathrm{C}}_{\mathrm{R}}$ and $^{\mathrm{L}}_{\mathrm{F}}$ are present in the learn string as

part of the data).

IEEE 488.2 Common Commands

| Returns a string identifying the analyzer's option configuration. The string is of the form "IE1, 100". The options are identified by the following: | *ObL3 |
|--|-------|
| Operation complete query. The analyzer will return an ASCII "1" when all pending overlapped operations have been completed. | *ObC3 |
| Operation complete command. The analyzer will generate the OPC message in the Standard Event Status Register when all pending overlapped operations have been completed (e.g. a sweep, or a preset). For more information about overlapped operations, refer to "Overlapped Commands" on page 2-3. | *OPC |

| SRL and Fault Location | 100 |
|------------------------|-----|
| 60 dB step attenuator | IEI |
| Ap opm | IEC |

| controller before a pass control is executed). | | |
|--|-------------|------|
| Sets the pass-control-back address (the address of the | <wnu></wnu> | *bcB |

| powerup. |
|---|
| the Event Status enable register are cleared at |
| whether or not the Service Request enable register and |
| is saved in non-volatile memory. This flag determines |
| Sets the state of the Power-on Status Clear flag — flag |

<

| (************************************** | | 0,0 |
|---|--|-----------------------------------|
| | have been initiated. | |
| | commands until all pending overlapped commands | |
| ll | information. Prohibits the instrument from initiating any new | IAW⊁ |
| | any self-tests. See the Service Guide for further | |
| r | indicates no failures found. Any other character indicates a specific self-test failure. Does not perform | |
| A second | sweep. Returns the result of a complete self-test. An ASCII 0 | *IZL\$ |
| | Triggers a sweep on the active measurement channel when in Trigger Hold mode. Ignored if in continuous | *TRG |
| | Reads the value of the instrument Status Byte. This is a non-destructive read—the Status Byte is cleared by the $*CLS$ command. | :arc |
| en trante | Register. | *STB? |
| | Reads the current state of the Service Request Enable | *2KE5 |
| 7 A | Sets bits in the Service Request Enable Register. Current setting is saved in non-volatile memory. | <pre><bull< pre=""></bull<></pre> |
| the second second | BCG: POWer = MIN | 10S |
| i) | SEE:SWEep:POINts = MAX | NES |
| | <pre>1Se:CORRection[:STATe]</pre> | SEN |
| | ibration: ZERO: AUTO = OFF | CAI |
| THE PARTY NAMED IN COLUMN TO THE PARTY NAMED | = OFF = OFF | ruo |
| | Tiate: CONTinuous = OFF | INI |
| · Commentered | The preset instrument state is described in the $User$'s Guide. | |
| | This command is different from the front panel (and PRESET) function in the state of the commands (and their reset states) listed below. | |
| | Executes a device reset and cancels any pending $\star \text{OPC}$ command or query. The contents of the instrument's nonvolatile memory are not affected by this command. | T2A* |
| | | |

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Menu Map with SCPI Commands

1-01

10

| | 10-2 Programmer's Guide |
|------|---|
| | |
| | |
| OTE | Refer to the Hardkey/Softkey Reference in your instrument's User's Guide for a description of each key. |
| | by reading the program that is created after keystroke recording has been pressed. |
| | SCPI commands that are associated with menu selections can be found |
| | flexibility in measurement configuration, and because many softkey menus and user operations are very similar to each other, not every variation of each softkey menu is shown. |
| | Most softkey choices and associated SCPI commands are shown in the following Menu Map tables. Because the analyzer provides great |
| | Zoukey Menus |
| | "Parameter Types" section. <atring> parameters are enclosed in single quotes: 'the string data'. <value> parameters include <num> and an optional <unit>.</unit></num></value></atring> |
| | Parameter Types <pre></pre> |
| | |
| | both choices: SENS1 2 : (for example). The command is <i>entered</i> with the appropriate channel given: SENS1 : (channel I chosen) or SENS2 : (channel 2 chosen). |
| | Commands requiring a choice of measurement channel are shown with |
| | Command Conventions |
| NOTE | The configuration of the currently active measurement channel mens. |
| | SCPI commands are shown as the short form. |
| | Hardkeys and softkeys are shown as HARDKEY and Soft Key. Each softkey is shown with an associated SCPI command, if one exists. |
| | |
| | This chapter shows all softkey menu choices available. Each hardkey on the instrument front panel has a corresponding table in this chapter showing all softkey choices available after pressing the hardkey. |
| | |

Entering Frequency, Power, and Other Numeric Values

default units. Enter the number then choose the appropriate unit, or press Enter for measurement unit. All entries of this type follow the same sequence: Entry of frequency, power, and other numeric values requires a choice of

Menu Map Tables and Instrument Types

10-1, below. and the channel configuration is shown in the table body. See Figure menu choices that follow, the instrument type is shown in the table title, the active measurement channel configuration. In the tables of softkey The instrument displays menu choices based on the instrument type and

Example Menu Map Table I-01 saugiH

8-01 sldsT

| | — Hardkey | Applicable models |
|--------------|-----------------------|------------------------------|
| | Channel configuration | SCPI command |
| | — Зоцгед | senz[jig]:cokr:czel Deh) +MY |
| | inoff-i feeld | * ;[148 88410:6068:[1 4] |
| | tro4-s riunted | sens(1 s):cobs:cres Dels: 4 |
| | Default 1-Port | SENS[1 2]:CORR:CSET DEF; *WA |
|) <u>1A:</u> | (Reflection) | (увлдкеў висту) |
| | KEKSLIBOKES | SCPI COMMAND |

| əbin ə s | Programmer' | | | | p-01 |
|----------|--|---------------|----------------|------------------------------------|-----------|
| | | | | | |
| | | | | | |
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| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| .FGL | nd how to enter t | ods səgag sho | e. The followi | tor a file name or frequency, t | 'cetate5" |
| | er numeric value aarker location, o | | | | |
| SJƏ | d Charact | ers and | r Numb | to Ente | woH |

ZHW 000 000E I do15

How to Enter Frequency Values

You enter frequency values the same way each time. First select a numeric value ("100") and then select a frequency unit ("MHz"). *RPG knob does not allow unit entry.

Erequency—Enter the Value

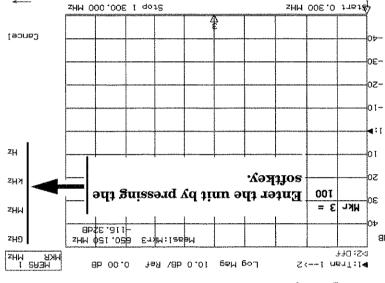
repued knob, or an attached keyboard. the front panel keypad or oε-Enter the frequency using oz-ΖH COT HKL ZHW 8P\$E '911 ¥+0:2< NKB NHZ NEBS I S<---! NETT:14 8P 00:0 Log Mag 10.0 dB/ Ref

Frequency—Enter the Unit

돼서 005.0 가료3환

Figure 10-3

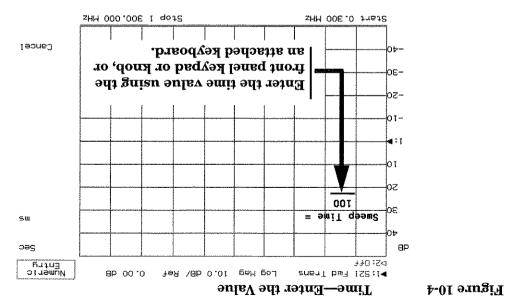
Figure 10-2

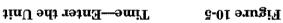


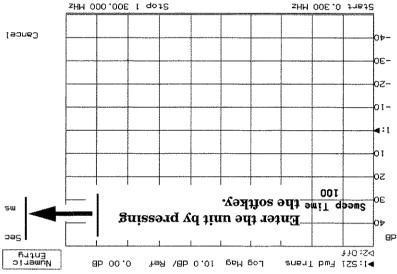
Programmer's Guide

How to Enter Time Values

You enter time values the same way each time. First select a numeric value ("100") and then select a time unit (" Sec ").

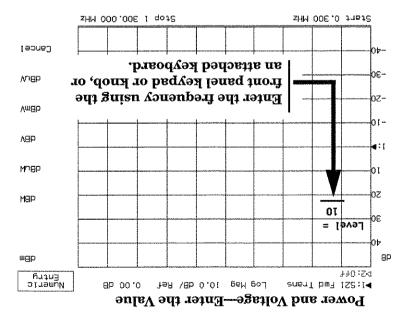


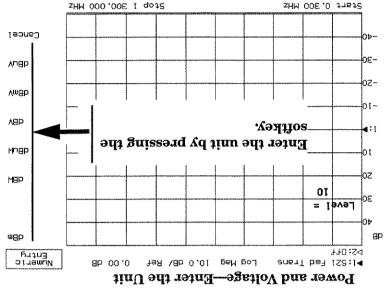




How to Enter Power and Voltage Values

a numeric value ("10") and then select a unit ("W"). You enter power and voltage values the same way each time. First select





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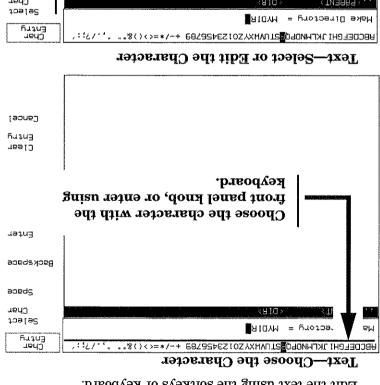
SHM 008.0 Jabas

Figure 10-7

Figure 10-6

How to Enter Text

Choose characters with the front panel knob and press select char, or use the keyboard. The numeric key pad can be used to select numbers. Edit the text using the softkeys or keyboard.



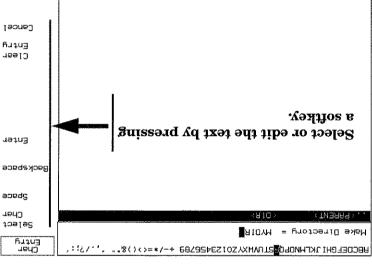


Figure 10-9

8-01 sungiH

Menu Map for 8712ET/ES and 8714ET/ES

AVG Functions, 8712ES and 8714ES

Table 10-1

| Aperture (%)(enter value) CALC[1 2]:GD | CPTC[1 S]:CDYP:APER <%\100>;*MAI |
|---|---|
| Aperture (Hz)(enter value) CALC[1 2]:GD | CYFC[1 S]:CDYB:SBYN 8820000 HZ: *MYI |
| Delay Aperture ³ (menu selection | (menn selection only) |
| Maximum SENS[1 2]:WI | SENS[1 5]:MIND KBES |
| Medium SENS[1 2]:WI | SENS[1 S]:MIND HYWW |
| Minimum SENS[1 2]:WI | SENS[1 S]:MIND BECL |
| Fault Window ² (menu selection | (menu selection only) |
| Fine (15 Hz) SENS[1 2]:BM | SENS[1 S]:BMID 12 HS;*WYI |
| NSLLOM (S20 Hz) SENS[I S]:BM | SENS[1 S]:BMID S20 HS;*WAI |
| Med Narrow (1200 Hz) SENS[1 2]:BW | SENS[1 S]:BMID 1500 HS:*MFI |
| Medium (3700 Hz) SENS[1 2]:BW | SENS[1 S]: BMID 3100 HS: *MFI |
| Med Wide (4000 Hz) SENS[II2]:BW | SENS[1 S]:BMID 4000 HS;*MFI |
| MIG (8200 HZ) SENZ[I S]:BM | SENS[1 S]:BMID 0200 HS:*MFI |
| System Bandwidth (menu selection | (menu selection only) |
| Average Factor SEUS[1 2]:Av | SENS[1 2]: FAEK: CONN <unm>; *WAI</unm> |
| Hestart Average SENS[1 2]:AV | SENS[1 S]: FAEK: CLE; *WAI |
| Average on OFF SEUS[1 2]:AV | PENS[1 S]: FAEK[ON OEE]: *MYI |
| VG (hardkey entry) | (рагдкеу епtry) |
| KEASTROKES ¹ | SCPI COMMAND |

^{2.} Option 100 (SRL and Fault Location) only. content of the softkey menus. 1. The active measurement channel configuration determines the order of appearance and the

3. Use with Delay format only.

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BEGIN Functions, 8712ET and 8714ET (1 of 3)

2-01 sldsT

| Fault Location | CONE[1 S] ,CYBT:EYNTI, '*MYI |
|-------------------------|--------------------------------|
| Reflection | CONE[1 S] ,CYBF: KEEL, ; *MYI |
| nasimansii | CONE[1 S] , CYBF: LKYN, ; *MYI |
| Cable 2 | (menu selection only) |
| Reflection | CONE ,WIX: KEEL, ;*MYI |
| Conversion Loss | COME ,WIX:CFOS, '*MFI |
| Mixer | (menu selection only) |
| noitoelteR | CONE , BBFN: KEEL, ; *WAI |
| nesimens ¹ T | CONE 'BBAN:TRAN'; *WAI |
| Broadband Passive | (menn selection only) |
| Reflection | COME , FILT: REFL', ; *WAI |
| nesimensīT | CONF 'FILT:TRAN'; *WAI |
| Filter | (menu selection only) |
| Power | COME . FMPL: POW', * WAI |
| noitoelleA | CONE 'AMPL: REFL'; *WAI |
| Transmissn | CONE 'AMPL:TRAN'; *WAI |
| Amplifier | (menu selection only) |
| GIN _T | (расдкеу епсту) |

BEGIN Functions, 8712ET and 8714ET (2 of 3)

Table 10-2

| <u> </u> | F |
|---|--|
| Z IsunsM | RENRI: ENNC: RET: IWB < UNum> |
| ño NO S otuA | SENSI:FUNC:SRE:MODE [MANUAL AUTO] |
| Z Cutoff Frequency | SENS:FREQ:ZST <num></num> |
| Connector C | SENS[1 5]:COKB:CYB:CONN < unu> |
| Connector Length | SENS[1 5]:COKK: FENG:CONN <uru></uru> |
| Measure Connector | SENS[1 5]:COKK:WODEF:CONN |
| Connector Model | (menu selection only) |
| (enter value) and units) | SENS[1 2]:FREQ:STOP <num></num> |
| Peri qot& | DISE: YNN: EKEÖ[[] S]: WODE SSLOB |
| enter value) (etinu bns | SENS[1 2]: FREQ:STAR < num> |
| Peril Trate | DISE: PNN: FREQ[1 2]: MODE SSTOP |
| тыз | CONE[1 S] ,CABL:SRL',*WAI |
| Center Frequency | SENS[1 2]:FREQ:CENT <value>;*WAI</value> |
| Band Pass | SENS:FREQ:MODE CENT;*WAI |
| Low Pass | SENS: EKEÖ: WODE TOMD: *MVI |
| s refere | SENS:DIST:UNIT MET |
| <i>}</i> 99∃ | SENS:DIST:UNIT FEET |
| Fault Location, (continued) | |
| BEGIN ¹ , Cable ² , (continued) | |
| KEXSLBOKES | SCPI COMMAND |
| DEATE CHIMANEALA | |

1. The active measurement channel configuration determines the order of appearance and the content of the softkey menus. S. Option 100 (SRL and Fault Location) only.

BEGIN Functions, 8712ET and 8714ET (3 of 3)

2-01 əldkT

| User Begin on OFF | (menu selection only) |
|---|----------------------------------|
| teotuA | (menu selection only) |
| stnio9 to redmuM | SENS[] SME:POIN <num>;*MAI</num> |
| SRL Cable Scan | SENS[1 5]: ENNC: SET: SCEN: *MYI |
| Connector Fault | SEMSJ: ENMC: EVNIT: COMM; *MVI |
| SRL, (continued) | |
| ВЕСІИ ¹ , Cable ² , (continued) | |
| KEASLBOKES | SCHI COMWYND |

 The active measurement channel configuration determines the order of appearance and the content of the softkey menus.
 Option 100 (SRL and Fault Location) only.

BEGIN Functions, 8712ES and 8714ES (1 of 3)

E-01 əldsT

| S11 Refi Porti | CONE ,WIX:REFL', *WAI |
|--------------------|--------------------------------|
| Conversion Loss | CONE ,WIX:CFOS, ' *MYI |
| 19xiM | (menu selection only) |
| S22 Refi Port2 | CONE ,BBFN:KELT:KEA, : *MFI |
| STRIT VAR STR | CONF 'BEAN:TRAN:REV'; *WAI |
| S21 Fwd Trans | CONE 'BBAN:TRAN'; *WAI |
| S11 Rell Port1 | CONE 'BEAN: REFL'; *WAI |
| Broadband Passive | (menu selection only) |
| snsT bw3 f22 | CONF 'FILT:TRAN'; *WAI |
| S11 Rell Port1 | CONE 'FILT: REFL'; *WAI |
| Filter | (menu selection only) |
| Power | CONE 'AMPL: POW'; *WAI |
| Stroq ileg SSS | CONE , WMFI: REFL: REV, ; *WAI |
| S12 Rev Trans | CONF 'AMPL:TRAN:REV'; *WAI |
| Sanst Fwd Trans | CONE , WMFI:TRAN'; *WAI |
| thoq ilag tts | CONE , YMPL: REFL', *WAI |
| heitilgmA | (menu selection only) |
| SEGIN _T | |
| KEASLBOKES | SCPI COMMAND |

I. The active measurement channel configuration determines the order of appearance and the content of the softkey menus.

BEGIN Functions, 8712ES and 8714ES (2 of 3)

Table 10-3

| | · Location) only. |
|-------------------------------|--|
| enter value) (extinn bas | SENS[1 2]:FREQ:STOP <num>[MHZ KHZ HZ];*WAI</num> |
| Stop Freq | DISP:ANN:FREQ[1 2]:MODE SSTOP |
| enter value) and units) | SENS[1 2]:FREQ:STAR <num>[MHZ KHZ HZ];*WAI</num> |
| Start Freq | DISP:ANN:FREQ[1 2]:MODE SSTOP |
| 785 | COME[1 S] ,CPBF:SBF, :*MPI |
| Center Frequency | SENS[1 S]: FREQ: CENT <value>; *WAI</value> |
| Band Pass | SENS: EBEÖ: WODE CENI; *MYI |
| Low Pass | SENS: EKEŎ: WODE TOMB' *MVI |
| sreteM | SENS:DIST:UNIT MET |
| ∱96 ∃ | SENS:DIST:UNIT FEET |
| Stop Distance | SENS[1 S]:DIST:SLOF < unw > [FEET MET]; *WAI |
| Start Distance | SENS[1 S]:DIST:STAR <num>[FEET MET]; *WAI</num> |
| Fault Location | CONE[1 S] ,CPBF:EPNFL, '*MPI |
| Reflection | COME[1 S] ,CPBF:BEEF,:*MYI |
| nseimensiT | CONE[1 S] ,CPBL:TRAN',*WAI |
| Cable ¹ (continue) | |
| GIN,(continue) | |
| KEKSLKOKES | SCPI COMMAND |

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BEGIN Functions, 8712ES and 8714ES (3 of 3)

| User Begin on OFF | (menu selection only) |
|--|--|
| teotuA | (menu selection only) |
| Mumber of Points | SENS[1 S]:SME:BOIN <unu>:*MVI</unu> |
| SRL Cable Scan | SENS[1 5]:LONC:SET:SCEN' *MEI |
| Connector Fault | SENSJ:ENNC:EPNTL:CONN; *MFI |
| S launeM | SENSJ:EANC:SBT:IWb <urm></urm> |
| ito MO S ofuA | SENSI:FUNC:SRL:MODE [MANUAL AUTO] |
| Z Cutoff Frequency | SENS:FREQ:ZST <num></num> |
| O rotoennoO | SENS[1 S]:COKK:CAF:CONN < unm> |
| Connector Length | SENS[I S]:COKK: FENG: CONN <unu< td=""></unu<> |
| Measure Connector | REMR[1 5]:COBB:WODEF:CONN |
| Connector Model | (menu selection only) |
| SRL, (continued) | |
| SEGIN, Cable, ^{1,2} (continued) | |
| KEASTROKES | SCPI COMMAND |

I. The active measurement channel configuration determines the order of appearance and the content of the softkey menus. S. Option 100 (SRL and Fault Location) only.

CAL Functions, 8712ES and 8714ES (1 of 3)

Table 10-4

| More Cal $(see\ Table\ 10-11)$ | (menu selection only) |
|--------------------------------|---|
| Normalize on OFF | TRAC CH[1 2]SMEM, CH[1 2]SDATA; :CALC[1 2]: TRAC[1 2] ON; TRAC[1 2] OFF |
| TAO no noitaloal | REMR:COKE:120F ON: *MFI |
| Measure Standard | SENS[] S]:COKB:COTT SLYN[] S];*MYI |
| hoq-s 192U | *MANI SENS[] SORK:COLL:IST OFF; METH TWOP; |
| Default S-Port | SEMS[] S]:COKK:CIPSS DEES: *MFI |
| User 2-Port | REMR[1 5]:COKK:CTVRR DEES: *MVI |
| Measure Standard ¹ | SENS[] S :COKK:COFF SLYN[] S 3];*MYI |
| troq-r rəsU | *MAI SEUS[1 2]:CORR:COLL:IST OFF; METH REFL3; |
| Default 1-Port | SENS[1 5]:COKK:CSEL DEE; *MYI |
| thoq-t 19sU | REMR[[]:COKK:CTVRR DEE]; *MVI |
| Troq-S IlusheD | REMR[I S]:COKK:CTPRR DEES: *MVI |
| Froq-1 flusted | REMR[1 5]:COKK:CREL DEE: *MVI |
| AL, (Reflection) | (рагдкеу епіту) |
| KEASLBOKES | SCPI COMMAND |

I. Pressing this key begins a guided calibration procedure using three standards. When the calibration is complete, the command *WAI; SENS[1+2]:CORR:COLL: SAVE; *WAI is executed. The order of appearance and the content of the softkey meanus depend on the measurement channel 1 and measurement channel 2 configurations.
2. Pressing this softkey begins a guided 2-port calibration procedure, using seven actions.

2. Pressing this softkey begins a guided 2-port calibration procedure, using seven standards. When the calibration is complete, the command *WAI; :SENS[I|S] :CORR:COLL:SAVE; *WAI is executed. The order of appearance and the content of the softkey menus depend on the measurement channel I and measurement channel 2 configurations.

| Guide | اولأج | ១៣៣ | Progr |
|-------|-------|-----|-------|
|-------|-------|-----|-------|

CAL, Functions, 8712ES and 8714ES (2 of 3)

13ble 10-4

ration.

| andard ³ SENS[1 2]:CORR:COLL STAN[1 2 3];*WAI | Measure Sta |
|--|-------------------------|
| use SENS[1 S:COKB:COFF:121 OFF; METH TRAN3; *WAI | Phanced Responsition |
| ndard ² SENS[1 2]:CORR:COLL STAN[1 2 3];*WAI | st2 erueseM |
| tion SEUS[1 2:CORR:COLL:1ST OFF; METH TRAUZ; *WAI | slosi & esnoqseA |
| ndard ¹ SENS[1 2]:CORR:COLL STAN[1 2 3];*WAI | st2 eruzseM |
| SENS[1 S:COKB:COLL:1ST OFF; METH TRANI; *WAI | esuodsey |
| SENSI:COKK:CSET DEF; *WAI | esnoqseA flusted |
| SENS[J S]:COKK:CIVSS DELJ: *MVI | Naer Response |
| SENS[1 S]:COKE:CLASS DEF2; *WAI | Default 2-Port |
| SENS[1 S]:COKK:CSET DEE, *WAI | Default Response |
| (pənuŋ | CAL, (Transmissn) (cont |
| S SCPI COMMAND | KEKSLBOKE |

- I. Pressing this key begins a guided calibration procedure using one standard. When the calibration is complete, the command *WAI; SENS[1|2]:CORR:COLL:SAVE; *WAI is executed.
- AMAIN SENDE [112] : CORK: COLD: SAVE; AMAINS executed.

 2. Pressing this key begins a guided calibration procedure using two standards. When the calibration is complete, the command
- *WAI; :SENS[1|2]:CORR:COLL:SAVE; *WAI is executed.

 3. Pressing this key begins a guided calibration procedure using four standards.

 When the calibration is complete, the command *WAI; :SENS[1|2]:CORR:COLL:

 SAVE; *WAI is executed. The order of appearance and the content of the softkey
 menus depend on the measurement channel I and measurement channel 2 configu-

| See Table 10-7 on page 10-22 for Fe See Table 10-8 on page 10-23 for SI | |
|--|--|
| See Table 10-11 on page 10-30 for 1 | the supplier of the supplier o |
| More Cal (see Table 10-11 on page 10-26) | (menu selection only) |
| HOrmalize on OFF | TRAC CH[1 2] ON; TRAC[1 2] OFF TRAC[1 2] ON; TRAC[1 2]: |
| For no noitslosi | zenz[]:]:lzor [ON OEE];*MVI |
| Measure Standard | SENS[1 S]:COKK:COFF STAN[1 S 7];*WAI |
| User 2-Port | *MAI SENS[1 2]:CORR:COLL:IST OFF;METH TWOP; |
| Troq-S Musted | SENS[1 5]:COKK:CIPZ DEES: *MFI |
| User 2-Port | SENS[] S]:COKK:CIPSS DEES: *MYI |
| CAL, (Transmissn) (continued) | |
| , , , , , , , , , , , , , , , , , , , | SCPI COMMAND |

nel 2 configurations. rue soirkey menus depend on the measurement change 1 and measurement chan-

CAL Functions, 8712ET and 8714ET (1 of 3)

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| Cal Check (see Table 10-10 on page 10-25) | (menu selection only) |
|--|--|
| 44O no ezilsm1oM | TRAC CH[1 2]SMEM, CH[1 2]SDATA;:CALC[1 2]: TRAC[1 2] ON;TRAC[1 2] OFF |
| Measure Standard — Load | SENS[1 2]:COKK:COFF:SFAE; *MFI; |
| trod2 — bisingsi2 erueseM | SENS[1 5]:COBB:COFF SLENS;*MFI |
| neqO — brandard erusaeM | SENS[] S]:COKE:COFF SLENJ:*MFI |
| ¹ brsbnst8 stuzseM | *MAI *WAI |
| hoq-i | <pre>> sens[] S CORR: COLL: IST OFF; METH REFL3;</pre> |
| Default 1-Port | SENS[1 5]:COBB:CSEL DEE: *MBI |
| CAL, (Reflection) | (расдкеу епіту) |
| KEKSLBOKES | SCPI COMMAND |

1. Pressing this softkey begins a guided 1-port calibration procedure, using three standards. When the calibration is complete, the command *WAI; : SENS[1|2] : CORR:COLL:SAVE; *WAI is executed. The order of appearance and the content of the softkey menus depend on the measurement channel 1 and measurement channel 2.

CAL Functions, 8712ET and 8714ET (2 of 3)

| | various and the second | |
|---|---|----------------------------|
| | (ракдкеу епіту) | AL, (TransimansıT) |
| | SENS[1 5]:COKF:CSEL DEE: *MFI | Default Response |
| ;[NAAT | *MAI SENS[1 2]:CORR:COLL:IST OFF;METH | уesbouse |
| | :SENS[1 S]:COKK:COFF:SYAE: *MYI | bisbnst2 siuessM |
| ;SNAAT | *MYI SENS[1 S]:COBB:COFF:ISL OEE:WELH | Response & Isolation |
| | SENS[1 S]:COKK:COFF STANI,*WAI | Measure Standard - Load |
| | SENS[1 S]:COKK:COFF SIENS;*WAI | Measure Standard - Through |
| ;ENAЯТ | *MAI SEUS[1 2]:CORR:COLL:IST OFF; METH | Enhanced Response |
| | SENS[1 5]:COKF:COFF SIFNI; *MFI | Measure Standard - Open |
| | SENS[1 2]:COKK:COFF SIFNS; *WAI | Measure Standard - Short |
| | :SENS[1 5]:COKK:COFF:SVAE; *WAI; | Measure Standard - Load |
| 111 9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | SENS[1 2]:CORR:COLL STAN4; *WAI :SENS[1 2]:CORR:COLL:SAVE; *WAI | Measure Standard - Through |

Menu Map for 8712ET/ES and 8714ET/ES

CAL Functions, 8712ET and 8714ET (3 of 3)

3-01 sldsT

| See Table 10-9 on page 10-24 for F | ower or Conversion Loss calibration. |
|---|---|
| See Table 10-8 on page 10-23 for S | 3RL calibration. |
| See Table 10-7 on page 10-22 for F | ?ault Location calibration. |
| See Table 10-11 on page 10-30 for | Test Set calibration. |
| More Cal (see Table 10-11 on page 10-26) | (menu selection only) |
| Ся Сheck (see Table 10-10 оп раge 10-25) | (menu selection only) |
| Normalize on OFF | TRAC CH[1 2]SMEM, CH[1 2]SDATA; :CALC[1 2]: TRAC (1 2] ON; TRAC[1 2] OFF |
| CAL, (continued) (Transmissn) | |
| KEXSLBOKES | SCFI COMMAND |

CAL, Functions, 8712ET/ES and 8714ET/ES

Table 10-7

| More Cal se Table 10-11 on page 10-26) | (menu selection only) |
|---|--|
| Connector C | REMRI:COKE:CAP:CONM <value></value> |
| Connector Length | SENS[1 5]:COKK: PENG: CONN < AST n G > |
| Connector Values | (menu selection only) |
| Multi Peak Threshold | REMR[I S]:COKK:THRESHOLD:COAX -10.00 |
| Multi Peak Corr on OFF | REMR[1 5]:COKK: BEPK:COPX ON |
| Multi Peak | (menu selection only) |
| eidsO eruseeM | REMR[1 5]:COKK:KAET' *MVI |
| Specify Length | SENS[1 5]:COKK:TENG:COFX <asjn6>; *MFI</asjn6> |
| Calibrate Cable | (menu selection only) |
| Cable Loss | REMR[[S]:COKK:PORR:COFX <asjme></asjme> |
| Velocity Factor | REMR[[S]:COKB:KAEF:COFX <asjn6></asjn6> |
| ¹ brabnaj2 erueseM | SENS[1 5]:COKK:COFF SLEN[1 5 3];*WAI |
| Full Band Cal | REMR[I S]:COKK:EXL [ON OLE] |
| Default Cal | SEMS[1 5]:COKK:CSEL DEE: *MVI |
| L, (Fault Location) | |
| KEASLBOKES | SCPI COMMAND |

I. Pressing this key begins a guided calibration procedure using three standards.

When the calibration is complete, the command *WAI; SEUS[IIS]:CORR:COLL:

SAVE; *WAI is executed. The order of appearance and the content of the softkey
menus depend on the measurement channel I and measurement channel 2 configuration.

Functions, 8712ET/ES and 8714ET/ES

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| More Cal see Table 10-11 on page 10-26) | (menu selection only) |
|--|--|
| Cal Check see Table 10-10 on page 10-25) | (menu selection only) |
| Connector Fault | (sets instrument to connector fault display) |
| Z lsunsM | ZENZ[J S]:ENNC:ZKT:IWb <ur< td=""></ur<> |
| tto NO S otuA | SENS[1 S]:ENNC:SKF:WODE [WFMNFF FNTO] |
| Z cutoff Frequency | SENS:FREQ:ZST <num></num> |
| O robsennoO | RENR[1 5]:COKE:CVD:CONN < unw> |
| Connector Length | RENR[1 5]:COKK:TENG:CONN <unus< td=""></unus<> |
| Measure | RENR[1 5]:COKK:WODEF:CONN |
| Measure Connector | (menu selection only) |
| Connector Model | (menu selection only) |
| ¹ brabnat2 erueseM | SENS[] S]:COKK:COFF STAN[] S 3];*MAI |
| Full Band Cal | RENR[I S]:COKK:EXT [ON OEE] |
| Default Cal | SENS[1 5]:COKK:CSEL DEE: *MYI |
| CAL, (SRL) | |
| KEXSLHOKES | SCPI COMMAND |

I. Pressing this key begins a guided calibration procedure using three standards. When the calibration is complete, the command *WAI; :SEUS [I|S]: CORR: COLL: SAVE; *WAI is executed.

Wenu Map for 8712E1/ES and 8714E1/ES Download from Mww.Somanuals.com. All Manuals Search And Download.

| | AL, (Power or Conversion Loss) |
|--|---|
| CAL:ZERO:AUTO ON | Auto Zero |
| CAL:ZERO:AUTO ONCE | Manual Zero |
| TRAC CH[1 2]SMEM, CH[1 2]SDATA,:CALC[1 2]: TRAC[1 2] ON,TRAC[1 2] OFF | Mormalize on OFF |
| (menu selection only) | More Cal ee Table 10-11 on page 10-26) |

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CAL, Cal Check Functions, 8712ET/ES and 8714ET/ES

Table 10-10

| KEASLBOKES | SCPI COMMAND |
|-------------------------------|--|
| AL, Cal Check | (menu selection only) |
| ро Сві Сһеск | SENSI:COFE:COLL:IST OFF; METH VERIFY; *WAI |
| ^I brabnat2 sruessM | SENS[1 2 :COFR:COLL:VER:REFL |
| View Cal Check ¹ | (menu selection only) |
| Directivity | DIPG:MDIS[1 3]:CORR C_DIRECT; *WAI |
| Source Match | DIAG:MDIS[1 2]:CORR C_SRCMATCH; *WAI |
| Reflection Tracking | DIPG:MDIS[1 8]:COBE C_RTRACKING; *WAI |
| Load Match | DIAG:MDIS[1 2]:CORR C_LDMATCH; *WAI |
| Transmissn Tracking | DIPG:MDIS[1 8]:COBE C_TTRACKING; *WAI |
| lsolation | DIAG:MDIS[1 2]:CORR C_ISOLATION; *WAI |
| Restore Meas | DIAG:MDIS[1 2]:REST; *WAI |

1. Only those calibration checks valid for the current measurement type are active, other choices are dimmed. For example, Transmission Tracking is not valid for reflection measurements.

CAL, More CAL Functions, 8712ET/ES and 8714ET/ES (1 of 4)

Table 10-11

| Туре-И(т) | COPX' JWW' LXBE-N' J2' WFFE, RENZ:COFK:COFF:CKII:50KI[1 5] |
|--|--|
| Type-N(f) (Default) | SENS:CORR:COLL:CKIT:PORT[1 2] |
| Cal Kit | (menu selection only) |
| ℧ 9 Ł | SENS[] S]:COKK:EXL:KELT:LIME <unm> s</unm> |
| 2. 02 | SENS[] S :COKE:EXT:REFL:TIME <num> s</num> |
| 0Z mətay2 | <pre>SO [20112] SENS[1 5]:COKK:IMB:IND:WFGN:SET</pre> |
| Smith Chart Z0 | SENS[1 5]:COKK:IMD:IND:WFGN <urm> OHW</urm> |
| Velocity Factor | REMRE[1 5]:COKK:KAET:COFX < UTU > |
| Port 2 Extension $^{9, 4}$ | SENS[1 2]:COKK:EXT:TRAN:TIME <num> s</num> |
| Port 1 Extension 3 , 4 | SENS[] S]:COKK:EXI:KEET:LIWE <unum> s</unum> |
| Port Ext's ON off | SENS[1 S]:COKK:EXT [ON OFF] |
| enoienetx∃ froq | (menu selection only) |
| 'F' More Cal ^I , ² | (menu selection only) |
| KEXSLHOKES | SCHI COMWYND |

2. The instrument system impedance determines the set of valid connector choices in this menu. Connectors with a characteristic impedance other than the instrument

system impedance are dimmed on the screen. 3. This Key is active if port extensions are on.

4. For 8712ES and 8714ES analyzers.

5. For 8712ET and 8714ET analyzers.

| 9biui | ırammer's | Proc |
|-------|-----------|------|
|-------|-----------|------|

CAL, More CAL Functions, 8712ET/ES and 8714ET/ES (2 of 4)

| SCPI COMMAND | KEXZLHOKES |
|---|--------------------------------|
| (menu selection only) | CAL, More Cal (continued) |
| (menu selection only) | Cal Kit (continued) |
| COPX, 3.5MM, APC-3.5, 50, IMPLIED' | mm 2. £ |
| COPX'JWW'LXBE-E'J2'IWBFIED, | न-eqγĨ |
| SENS:CORK:COLL:CKIT:PORT1 | T-O4A |
| SENS:COFE:CKIT:PORT1 SENS:COEE:COLE:CKIT:PORT1 | 91-7 |
| SENS:COFK:COTT:CKIT:PORT[1 2] | User Cal Kit A ^l |
| SENS:COFF:CKIT:PORT[1 2] | Nser Cal |
| SENS:CORR:COLL:CKIT:PORT[1 2] | Naer Cal |
| .NSER4, IMPLIED, IMPLIED, IMPLIED, IMPLIED, SENS:CORR:COLL:CKIT:PORT[1 2] | User Cal Kit D ^I |
| . USERS; CORR: COLL: CKIT: PORT[1 2] | User Cal Kit E []] |
| SENS:CORR:COLL:CKIT:PORT[1 2] | User Cal Kit F ¹ |
| 'USER', IMPLIED, IMPLIED, IMPLIED, IMPLIED' | User Cal Kit G ^I |

I. The port number in each command is the port selected from the screen using the $\mbox{\tt up}$ and $\mbox{\tt down}$ keys.

CAL, More CAL Functions, 8712ET/ES and 8714ET/ES (3 of 4)

| SCPI COMMAND | KEASLBOKES |
|--|--------------------------------|
| | , More Cal (continued) |
| | Cal Kit (continued) |
| '. USER8, IMPLIED, IMPLIED, IMPLIED, IMPLIED' SEUS: CORR: COLL: CKIT: PORT[1 2] | User Cal Kit H ¹ |
| '. USER9, IMPLIED, IMPLIED, IMPLIED, IMPLIED' SENS: CORR: COLL: CKIT: PORT[1 2] | User Cal Kit I ¹ |
| '.USER10, IMPLIED, IMPLIED, IMPLIED, IMPLIED' SENS:CORR:COLL:CKIT:PORT[1 2] | User Cal Kit J ¹ |
| SENS[1 2]:CORR:CKIT:MOD[:SEL][TYPenf TYPenm UD1 TYPe35mm TYPeff TYPe716f TYPe716m UD2 TYPeapc7 UD3 4 10] | Modify (Cal Kit Type) |
| (menu selection only) | :uədO |
| SENS[] SOBB:CKIT:OPEN:MOD:CZER <num></num> | 00 |
| SENS[] SOBB:CKIL:OBEN:WOD:COME < UTUM> | 61 |
| <pre>ZENE[]:COKK:CKIL:OBEN:WOD:CLMO < UTUW></pre> | CS |
| SENS[] SOKK:CKIL:OBEN:WOD:CLHK < Unw | C3 |
| SENS[] SOKK:CKIL:OBEN:WOD:DET < Unw> | Delay |
| SENS[] SOKK:CKIT:OPEN:MOD:LOSS <num></num> | Гова |
| SENS[1 5]:COKE:CKIL:OBEN:WOD:ZOEF <num></num> | 0Z |

CAL, More CAL Functions, 8712ET/ES and 8714ET/ES (4 of 4)

| Preset All User Kits | <pre>[{KILT S 10}] ZENZ:COBE:CKIL:DBEZ[:IMM]-3</pre> |
|--------------------------------------|--|
| Preset User Kit | (menu selection only) |
| Add Kit Description | <pre>SENS:COFR:CKIT:NAME <kit1 2 10>,</kit1 2 10></pre> |
| Recall | SENS:COKK:CKIT:WOD < NDJ S 10> |
| Save | <pre>ZENZ:COKK:CKIT:ZYAE-3 <kitt \(\sigma\)'''' 10></kitt \(\sigma\)'''' 10></pre> |
| Mod Kit Save Recall | (menu selection only) |
| 0Z | ZENZ[T S]:COKK:CKIL:LHKN:WOD:SOEE <ur< td=""></ur<> |
| SSOT | ZENZ[J S]:COKK:CKIL:LHKN:WOD:FOZZ <unu></unu> |
| Delay | <pre>ZENZ[J S]:COEK:CKIL:LHEN:WOD:DEF <um></um></pre> |
| undT | (menu selection only) |
| 0Z | <pre>ZEN2[]:COKK:CKIL:POVD:WOD:SOLE <unm></unm></pre> |
| Poss | <pre>ZENE[[S]:COKK:CKIL:TOVD:MOD:FORR < unm></pre> |
| Delay | <pre>ZEN2[1 5]:COKE:CKIL:POVD:MOD:DEF < unm></pre> |
| :реод | (menu selection only) |
| OZ | <pre>ZENZ[1 5]:COEK:CKIL:ODEN:WOD:SOLE <unu></unu></pre> |
| гозг | <pre>ZENZ[[]:COKK:CKIL:ZHOK:WOD:FOZZ <unum></unum></pre> |
| Valed | <pre>ZENE[T S]:COKK:CKIL:ZHOK:WOD:DET <um></um></pre> |
| :hod2 | (menu selection only) |
| Modify (Cal Kit Type) (continued) | |
| Cal kit, (continued) | |
| AL, More Cal, (continued) | |
| KEKSLBOKES | SCHI COMMEND |

CAL, Test Set Cal Functions, 8712ET/ES and 8714ET/ES

Table 10-11

| Measure Shorts | <pre><stau1 stau2 stau12>;*WAI; sEUS[1 2]:CORR:COLL:MP:SHORT <stau1 stau2 stau12>;*WAI;</stau1 stau2 stau12></stau1 stau2 stau12></pre> |
|----------------------------------|---|
| Measure Loads | <pre></pre> |
| Measure Thrus | SENS[1 2]:CORR:COLL:MP:THRU |
| enoG sbi2 IIA | SENS[1 S]:COKK:COFF:SFAE'*MFI' |
| Periodic SelfCal SelfCal Once | CAL: SELF ON |
| SelfCal Timer | CYF: SEFE: LIWEE < UNW> |
| SelfCal All Ports | CAL: SELOF: ALL |
| 2-Port Cal on OFF ³ | CYT:SETE:METHOD [ONEP TWOP]*WAI |
| lsolation on OFF ³ | SENS[1 S]:COKK:ISOF [ON OEE]*MFI |

DISPLAY Functions, 8712ET/ES and 8714ET/ES (1 of 5)

Table 10-12

| Marker CA | CFTC[1 S]:WFBKJ:X <nrm></nrm> |
|-------------------------|--|
| End Limit CA | CFFC[] S :PIM:SEGM[n]:FWBF:SLOB <num></num> |
| Begin Limit CA | CALC[1 2]:LIM:SEGM[n]:AMPL:STAR <num></num> |
| Eud Frequency CA | CFFC[]:FIM:SEGM[n]:FREQ:STOP <numm> HZ</numm> |
| Begin Frequency CA | CFFC[]:FIM:SEGM[]:EFEQ:STFR <number nt<="" th=""></number> |
| ACA Line CA | CALC[1 2]:LIM:SEGM[n]:TYPE LMAX;STAT OW ³ |
| m) hdd Limit | (menu selection only) |
| Limit Menu ² | CFTC[1 5]:FIM:DISB ON |
| • | CALC[1 2]:MATH (IMP[1 2]:TRAC1 ON;TRAC2 ON |
| 1 | CALC[1 2]:MATH (IMPL/CH[1 2]SMEM);: |
| Метогу | DISB:MIND[1 S]:LKYCJ OEE:LKYCS ON |
| • | CALC[1 2]:MATH (IMPL);:DISP: |
| TT meM stsQ | TRAC CH[1 2]SMEM, CH[1 2]SDATA |
| CA | TRAC CH[1 2]SMEM, CH[1 2]SDATA;: CALC[1 2]:MATH (IMPL/CH[1 2]SMEM);: |
| A) TYAJASK | (рагдкеу епіту) |
| KEASLBOKES | SCHI COMWYND |

The active measurement channel configuration determines the order of appearance and the content of the softkey menus.
 I imit Monu obvious are presided besed on the current measurement of separal senter.

3. Limit segments are numbered by the instrument as they are entered. At the same time the Limit menu is displayed, the currently defined limits are displayed.

^{2.} Limit Menu choices are provided based on the current measurements, the limit uration. If the instrument is configured for fault location measurements, the limit values are distances, for example.

DISPLAY Functions, 8712ET/ES and 8714ET/ES (2 of 5)

| Delete all Limits | CFFCJ:FIW:DIZE [ON OEE] |
|--|--|
| ⁸ jimiJ ətələ Q | (menu selection only) |
| Маткег | CFFC[]:WFEK]:X <unu></unu> |
| ЯmіJ | CPFC[] S :FIM:SEGW[n]:PWBF:SLPK <nnm></nnm> |
| Frequency | CFTC[]:TIM:SEGW[n]:EKEÖ:SIFK <nnm> HZ</nnm> |
| Inioq niM bbA | CALC[1 2]:LIM:SEGM[n]:TYPE PMIN;STAT ON ² |
| Ма ккег | CFTC[1 S]:WFEKI:X < Unum> |
| ЯmіJ | CPFC[]:FIM:SEGW[n]:PMPL:STAR <num></num> |
| Frednency | CPFC[] S]:FIM:SECW[N]:EKEÖ:SLYK < UNW > HZ |
| Inio9 xsM bbA | CALC[1 2]:LIM:SEGM[n]:TYPE PMAX;STAT OU2 |
| Магкег | CFTC[IIS]:WFEKI:X <und< td=""></und<> |
| fimil bra | CPFC[] S :FIW:SEGW[n]:PWPL:STOP <num></num> |
| Begin Limit | CPTC[] STIW:SEGW[N]:PMbF:SLPK < Unm> |
| Eud Frequency | CFFC[]:FIW:SEGW[N]:EKEÖ:SLOb < UNW HY |
| Begin Frequency | CPTC[1 S]:TIW:SEGW[N]:EKEÖ:SLFK <nnm> HS</nnm> |
| eniJ niM bbA | CALC[1 2]:LIM:SEGM[n]:TYPE LMIN;STAT ON |
| Add Limit (continued) | |
| SPLAY ¹ , Limit Menu, (continued) | |
| KEASLBOKES | SCPI COMMAND |

- I. The active measurement channel configuration determines the order of appearance and the content of the softkey menus.
 Limit segments are numbered by the instrument as they are entered. At the same
- time the Limit menu is displayed, the currently defined limits are displayed.

 3. Select the limit with the up and down keys or the RPG knob on the Limit Menu displayed the limit with the up and down keys or the RPG knob on the Limit Menu displayed.
- play, and select Delete Limit.

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|--------------------|
|--------------------|

DISPLAY Functions, 8712ET/ES and 8714ET/ES (3 of 5)

Table 10-12

| CFTC[] S:FIM:STFT [ON OFF] | the NO tesT fimi.l |
|---|--|
| CFTC[] S]: FIM: WFK: STFT: WEFN [ON OFF] | Mkr Limit on OFF |
| CFTC[]:DIM:MFK:STFT:MEFN:MIN <value></value> | }imi∆ niM |
| CFTC[]:TIM:MFK:STFT:MEFM:MFX <vslue></vslue> | jimi⊥ xsM |
| (menu selection only) | ⁸ (xeM\niM) timiJ tib3 |
| (menu selection only) | Mkr Limits |
| DIZE:YMM:FIW:ICONJ:bOZ:X <asjne></asjne> | noitieod Y nool fimil |
| DIZE: YNN: TIW: ICONI: bOZ: X < xglne> | noilieo¶ X nool timiJ |
| DIZE:ANN:LIM:ICON2:FLAG [ON OFF] | To NO nool Jimil |
| DIZE: YNN: TIW: ICONS: LEXT [ON OEE] | Tho NO free Limil |
| CFTC[[1 5]:FIW:DIZE [ON OEE] | The MO enfl Linel ON off |
| CFTC[[S]:FIM:SEGM[n]:LABE BWFX;STFT ON _S | enoitqO fimiJ |
| CFTC[] S]:FIM:SEGM[n]:FMbF:STOF <num></num> | Jimi1 bri3 |
| CPTC[] S:PIW:SEGM[n]:PWbF:STPK <nnm></nnm> | timi1 nige8 |
| CFIC[] S]: FIM: SECW[n]: FREQ: STOP < nums HZ | End Frequency (End Distance) |
| CALC[1 2]:LIM:SEGM[n]:FREQ:STAR <num> HZ</num> | Begin Frequency ² (عوونه Distance) |
| (menu selection only) | ^S ţimiJ ţib3 |
| | (bəunitnos) ilmil ətələD |
| | DISPLAY ¹ , Limit Menu, (continued) |
| SCPI COMMAND | KEASLBOKES |

 The active measurement channel configuration determines the order of appearance and the content of the softkey menus.
 For fault location measurements

2. For fault location measurements.

3. After Edit Limit (Min/Max) is pressed, the up key can be used to increase the limit (CALC[1|2]:LIM:MARK:STAT:MEAN:WAX UP) and the down key can be used to decrease the limit (CALC[1|2]:LIM:MARK:STAT:MEAN:MAX DOWN).

DISPLAY Functions, 8712ET/ES and 8714ET/ES (4 of 5)

Table 10-12

| SCPI COMMAND | KEASLBOKES |
|----------------------------------|---|
| | (continued) |
| DISE: FORM [ULOW SING] | Split Disp FULL split |
| DIED: EOKW: EXPAND [ON OFF] | Expand ON off |
| NO ITIT: NNA: 4210 | Title and Clock |
| 'Jx9J' , ATAQ:[S 1].TTT:NNA:9210 | Enter Line 1 (enter text, press Enter) |
| 'Txet' , ATAQ:[S 1].TIT:NNA:9210 | Enter Line 2 (enter text, press Enter) |
| DISB: WNM: CFOC: WODE FINE; | Show Clock on Line 1 |
| DISB: WAN: CFOC: WODE FINES | Show Clock on Line 2 |
| DISB: YNN: CFOC: WODE OLE | Clock Off |
| DISP:ANN:TITL [ON OFF] | Title+Clk ON off |
| (menu selection only) | Color Options |
| DISB:CMPB:SCHEME DEFAULT | Factory default |
| DISB:CMPB:SCHEME DELANITS | Default 2 |
| DISE: CMAP: SCHEME GREY | Grey Scale |
| DISE:CMAE:SCHEME INV | Inverse Video |

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DISPLAY Functions, 8712ET/ES and 8714ET/ES (5 of 5)

| ule ON off DISP:WIND1:TRAC:GRAT:GRID [ON OFF] | oiteriO |
|---|------------------------|
| Y-Axis Lbi rei ABS DISP: ANN: YAX: MODE [REL ABS] | |
| Y-Axis Lbi ON off DISP: ANN: YAX [ON OFF] | |
| MKr Number ON off DISP: ANN: MARK[1 2]: NUMB [ON OFF] | |
| MKr Annot ON off DISP: ANN: MARK[1 2] [ON OFF] | |
| Freq Annot ON off DISP: ANN: FREQ[1 2] [ON OFF] | |
| Meas Annot ON off DISP: ANN: CHAN[1 2] [ON OFF] | |
| ation Options (menu selection only) | ionnA |
| n t Diep Intensity DISP:CMAP:COLI6:GREY [0-1.00] | II. |
| 16]:HSL h,s,l | 7 |
| sturation DISP:CMAP:COL[1 2 16]:HSL h,s,l ³ | 3 |
| INTER DIRECTOR [1 S 1 1 1 2 3 3 3 3 3 3 3 3 3 | + |
| select Item (select item, 1-16) | S |
| m Colors ² (menu selection only) | ioteuO |
| Color Options, (continued) | DISPLAY ¹ , |
| KEASLIBOKES SCHI COMMVAD | |

- 1. The active measurement channel configuration determines the order of appearance and the content of the softkey menus.
- 2. First choose an item (Background=1, User Graphics Pen 1=2 through User Graphics Pen 7=8, Inactive Text=9, Warning Text=10, Graticule=11, Trace 1=12, Mem 2=15, Text=16) with select item, then choose a color item to change, and enter a new value. The softkey menu displays Enter and Cancel. Press Enter to save your changes.
- 3. COL[1|2|...|16] selects one of the 16 items listed in Footnote 2, above. HSL h, s, 1 sets the hue, saturation and luminance values, respectively.

FORMAT Functions, 8712ET/ES and 8714ET/ES

E1-01 əldsT

| SWR Delay | CPTC[] S]:EOKW GDET |
|----------------------------------|-------------------------------|
| ьразе | CPTC[1 S]: LOEW PHAS |
| Smith Chart | CFTC[] SDEW SWIL |
| Polar | CFTC[1 S]: LOBW DOL |
| More Format | (menu selection only) |
| Real | CALC[1 2]:FORM REAL |
| Imaginary Impedance Magnitude | CFTC[1 S]: LOBW WIME |
| ^S ezinU geM | (menu selection only) |
| 9BM | CALC[1 2]:FORM:UNIT:MLOG DBW |
| mab | CPTC[] Sobw:nnll:wrog DBWM |
| qBnM | CFFC[] S]:FORM:UNIT:MLOG DBUW |
| ABP | CFTC[] SDEW: NNIL: WTOG DBA |
| Vmab | CALC[1 2]:FORM:UNIT:MLOG DEMV |
| Anap | CFTC[[S]:FORM:UNIT:MLOG DBUV |

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FREQ Functions, 8712ET/ES and 8714ET/ES

Table 10-14

| KEXSLHOKES | SCPI COMMAND |
|----------------------------------|---|
| EØJ | (ратдкеу епtrу) |
| fist | DISP:ANN:FREQ1:MODE SSTOP SENS[1 2]:FREQ:STAR <value> HZ;*WAI</value> |
| dojs | DISP:ANN:FREQ1:MODE SSTOP |
| Center | DISP:ANN:FREQ1:MODE CSPAN SENS[1 2]:FREQ:CENT <value> HZ;*WAI</value> |
| nsq2 | DISP: ANN: FREQ1: MODE CSPAN SENS[1 2]: FREQ: SPAN < Value> HZ; *WAI |
| СМ | SENS[1 S]: EKEĞ: CENT 300000 HX; *MYI DISB: YNN: EKEĞ: SBYN 0 HZ; *MYI |
| Fault Loc Frequency ² | (menu selection only) |
| Low Pass | ZENZ:ŁKEÖ:WODE TOMЬ; ∗M∀I |
| Band Pass | SENS: EKEÖ: WODE CENL |
| Band Pass Max Span | SENS[1 S]:FREQ:SPAN:MAX <value></value> |
| Displ Fred Resolution | CALC[1 2]:FORM IMAG |
| ZHW | DISB: YNN: ŁKEÖ: KEZ WHZ |
| ZHX | DISE: PNN: ŁKEÖ: KEZ KHZ |
| ZH | DISE: PNN: FREQ: RES HZ |

1. The active measurement channel configuration determines the order of appearance and the content of the softkey menus.2. Available for fault location measurements only.

HARD COPY Functions, 8712ET/ES and 8714ET/ES (1 of 4)

Table 10-15

| Select Copy Port | (menu selection only) |
|---|---|
| 1837-1831 1-1641 | (no SCPI command) |
| Restore Defaults | |
| Select | LOBI CENT SEB GB WWEW TYN> HCOB:DEA:TYNGCECT HEGT IBW EDSON ECX> |
| ubba qi rinirq NA_ | SYST:COMM:LAU:PRIN:HOST <addr></addr> |
| Print/Plot GPIB Addr | SYST:COMM:GPIB:HCOP:ADDR <addr></addr> |
| atsA busB | (no SCPI command) |
| łłoX/uoX | SYST:COMM:SER:TRAU:HAND XON |
| RSO/ATO | SYST:COMM:SER:TRAN:HAND DTR |
| Deline PCL5 | (menu selection only) |
| Restore Defaults | (no SCPI command) |
| Мопосhтоте | HCOB:DEA3:COT [ON OEE] |
| Color | HCOB:DEA3:COF [ON OEE] |
| flo MO beed ofuA | HCOD:ITEM3:FFE:STAT [ON OFF] |
| figurence | HCOD:DEA3:PAGE:ORI PORT |
| Гвидесере | HCOP:DEV3:PAGE:ORI LAND |

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HARD COPY Functions, 8712ET/ES and 8714ET/ES (2 of 4)

| Print Width | HCOD: by CE: MIDT < num> |
|--------------------------|--------------------------------------|
| rignsM NeJ | HCOb: byce: Wyke: reft < num> |
| nigasM qoT | HCOD: FAGE: MARG: TOP < num> |
| Printer Resolution | HCOb:DEA:KE2 <um></um> |
| Restore Defaults | (no SCPI command) |
| More Printer | (menu selection only) |
| The MO beeil of uA | HCOB:ILEM3:ELE:SLFT [ON OFF] |
| гвидасаре | HCOb:DEA3:BYGE:OKI TYND |
| fisrhoq | HCOD:DEA3:DFGE:OKI DOKL |
| Color | HCOD: DEAT: COT ON |
| Monochrome | HCOB:DEAT:COT OEE |
| Stiusied enotseA | (no SCPI command) |
| Define Printer | (menu selection only) |
| rtibiW fring | HCOb:DEA3:byGE:MID1 <unm></unm> |
| Left Margin | HCOb:DEA3:byGe:WykG:FeL1 <umu></umu> |
| nigreM qoT | HCOb:DEA3:byce:Wyke:TOP <num></num> |
| Restore Defaults | (no SCPI command) |
| More PCL5 | (menu selection only) |
| Define PCL5, (continued) | |
| HARD COPY, (continued) | |
| KEASLBOKES | SCPI COMMAND |

HARD COPY Functions, 8712ET/ES and 8714ET/ES (3 of 4)

Table 10-15

| SCPI COMMAND | KEASLBOKES |
|------------------------|-----------------------------|
| | APD COPY, (continued) |
| (menu selection only) | Define Plotter |
| (no SCPI command) | Hestore Defaults |
| HCOb:DEAS:COT OLE | Monochrome |
| HCOD:DEAS:COT ON | Color |
| (menu selection only) | Set Pen Numbers |
| (no SCPI command) | Monochrome Pen ¹ |
| (no SCPI command) | Default Pen Colors |
| (no SCPI command) | naq i aosiī |
| (no SCPI command) | Trace 2 Pen |
| (no SCPI command) | Memory 1 Pen |
| (no SCPI command) | Memory 2 Pent |
| (no SCPI command) | Graticule Pen |
| (no SCPI command) | Graphics Pen |
| HCOP:ITEMS:FFE:STAT ON | tto NO bes∃ otuA |

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HARD COPY Functions, 8712ET/ES and 8714ET/ES (4 of 4)

51-01 9ldsT

| KEKSLKOKES | SCPI COMMAND |
|------------------------|------------------------------|
| RD COPY, (continued) | |
| Define Hardcopy | (menu selection only) |
| Restore Defaults | (no SCPI command) |
| Graph and Mkr Table | HCOB:DEA:WODE GWYE |
| Graph Only | HCOB:DEA:MODE GBAP |
| Wkr Table Only | HCOB:DEA:MODE WFK |
| List Trace Values | HCOD:DEA:MODE TABL |
| Define Graph | (menu selection only) |
| Restore Defaults | (no SCPI command) |
| Trace Data ON off | HCOP:ITEM:TRAC:STAT [ON OFF] |
| Graticule ON off | HCOP:ITEM:GRAT:STAT [ON OFF] |
| ∄o ИO noi₃stonnA | HCOF:ITEM:AUN:STAT [ON OFF] |
| Mkr Symbol ON off | HCOP:ITEM:MARK:STAT [ON OFF] |
| Title + CIK ON off | HCOP:ITEM:TITL:STAT [ON OFF] |

MARKER Functions, 8712ET/ES and 8714ET/ES (1 of 3)

31-01 sldsT

| | KEASLBOKES |
|---|---|
| प) | инкен |
| 45 42 | 1: (enter value and units) |
| 40 | 2: (enter value and units) |
| ₹ Э | |
| 4 2 | 3: (enter value and units) |
| 42 | randari ribidanda ndamatan tana na mammamamamamamamamamamamamama ka halibida halibida ka kidabaha kadan ari bida kamamama |
| 43 43 | 4: (enter value and unts) |
| 42 42 | 5: (enter value and units) |
| 40 | |
| 40 40 | 6: (enter value and units) |
| 45 45 | 7: (enter value and units) |
| AD AD | 8: (enter value and units) |
| 40 40 | Active Marker Off |
| enganganisatista di paganisaten di mangana antang andra paganana an | risminosonimi teoremani teoreman por que |

10-45

MARKER Functions, 8712ET/ES and 8714ET/ES (2 of 3)

91-01 əldsT

| Marker -> Min | CALC[1 2]:MARK:FUNC MIN |
|----------------------|--|
| Min Search | CPTC[1 8]:WPKK:FUNC WIN |
| Next Peak Right | CFTC[]:MFKK:MFX:FIGH |
| Next Peak Left | CFTC[1 5]:MFKK:MFX:TELT |
| Wkt -> Wax | CPTC[1 S]:WPEK:FUNC MPX |
| Max Search | CPTC[1 S]:WPKK:ENNC WPX |
| Магкег Search | (menu selection only) |
| Meth Off | CPTC[1 5]:WFK:ENNC OEE |
| stats retilter Stats | CFIC[1 5]:WFK:FUNC FST |
| Flatness | CFTC[j S]:WFK:FUNC FLAT |
| Statistics | CPTC[1 2]:WPKK:FUNC STAT |
| Marker Wath | (menu selection only) |
| Marker -> Elec Delay | CGPTC[1 S]:MARK[1 S 8]:GDEL?);*WAI |
| Marker -> Reference | DISP:WIND[1 2]:TRAC:Y:RLEV (CALC[1 2]:MARK[1 2 8]:Y?);*WAI |
| Marker -> Center | SENS[1 2]: EKEQ: CENT (CALC[1 2]: FREQ: CENT |
| Delta Mkr on OFF | CPTC[]:WPKK:WODE <ket pbs></ket pbs> |
| Marker Functions | (menu selection only) |
| MARKER, (continued) | |
| KEKSLKOKES | SCPI COMMAND |

MARKER Functions, 8712ES and 8714ES (3 of 3)

Table 10-16

| Search Off | CALC[1 2]:MARK:FUNC OFF |
|--|---|
| MultiNotch | CFFC[1 S]:WFBK:ENNC WNOT |
| Multi Peak | CPFC[1 S]:WPBK:ENNC WBE |
| More | (menu selection only) |
| oster value, (enter value, (enter value) | CFTC[] S]:WFKK:RONC \unm> [DB] |
| enter value, (enter value, (estinu bas | CALC[1 2]:MARK:FUNC BWID |
| Search Right (enter value, and units) | CALC[1 2]:MARK:TARG RIGH, <num> [DB]</num> |
| Search Left (enter value, and units) | CFIC[]:MARK:TARG LEFT, <num> [DB]</num> |
| Target Value (enter value, and units) | [DB] CYFC[] S]:WYKK:LYKG <fell kich>'<uju< td=""></uju<></fell kich> |
| Target Search | CPFC[] S]:WBKK:FUNC TARG |
| thgiR niM txeV | CPFC[] S]:MPBK:MIN:BICH |
| te∆ niM txeV | CPFC[] S :MPBK:MIN:FELT |
| Min Search, (continued) | |
| MARKER, Marker Search, (continued) | |
| KEASLBOKES | SCPI COMMAND |

CPTC[]:MYEK:ENMC:LEYC [ON|OEE]

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Tracking ON off

Meast | Meass Functions, 8712ES and 8714ES (1 of 2)

| T-AT | SIGRE |
|---------|-------|
| 2 E U L | Table |

| ROUT[1 2]:PATH:DEF:PORT [(2,1) (1,2)]; *WAI | > Path FWD rev |
|---|---------------------|
| SENS[1 5]:LONC ,XEE:S S'I, DEL NEFN: *MFI | B/B |
| SENS[1 5]:ENNC ,XEE:S 1'1, DEL NBFN: *MFI | A\A |
| SENS[1 5]: LONC /XEK: BOM 0, DEL NBYN: *MYI | ¥ |
| SENS[1 S]:ENNC ,XEK:BOM S, DEL NBYN; *MYI | 8 |
| SENS[1 5]:EDNC /XEK:BOM 1, DEL NBFN: *MFI | A |
| (menu selection only) | Ismetini brisdwomsM |
| (menu selection only) | Detection Options |
| SENS[1 S]:ENNC ,XEK:BOM:BYL S'0, DET BBAN; *WAI | Conversion Loss |
| SENS[1 S]:ENNC ,XEK:BOM S, DEL BBFN: *MFI | Power |
| SENS[1 S]:EDNC ,SET 1,0', DET UBAN; *WAI | าษร |
| SENS[1 5]:ENNC /EFOC 1'0, DEL NBVN: *MVI | Fault Location |
| SENS[1 5]:ENNC ,XEE:S 5'5, DEL NEWN: *MFI | S22 Refi Port2 |
| SENS[1 S]:ENNC /XEE:S 1'S, DEL NBFN: *MFI | S12 Rev Trans |
| SENS[1 5]:EDNC ,XEE:S S'1, DEL NBFN: *MFI | S21 Fwd Trans |
| SENS[1 5]:EANC .XEE:S 1'1,'DEL NEFN: *MFI | thoq flag fits |
| SEUS[1 2]:STAT ON; *WAI | MEAS1 MEAS2 |
| SCPI COMMAND | KEASLHOKES |

MEAST | MEASZ Functions, 8712ES and 8714ES (2 of 2)

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| B */ B * | <pre>sens[1 2]:FUNC 'XFR:POW:RAT 2,0';DET BEAU; *WAI</pre> |
|--|---|
| Broadband External | (menu selection only) |
| res and a proper and a dead of the second second second and a second and a second a second a dead of the second and a second a se | SENS[[]:ENNC ,XEK: DOM]], DET BBAN; *WAI |
| *** | SENS[] S]:ENNC ,XEK: DOM]S, DET BBAN; *WAI |
| A/X | <pre>BEAU; *WAI BEAU; *WAI</pre> |
| X/A | BBFN; *MAI |
| ⊀ H/, | <pre>*MAI SENS[1 2]:FUNC 'XFR:POW:RAT 12,0';DET BBAN;</pre> |
| fuqui xuA | <pre>ZEUS[1 2]:FUNC 'XFR:VOLT'; *WAI</pre> |
| > Path FWD rev | KOUT[1 2]:PATH:DEF:PORT [(2,1) (1,2)]; *WAI |
| Meas OFF | SENS[1 2]:STAT OFF; *WAI |

91-01

MEAS1 | MEAS2 Functions, 8712ET and 8714ET (1 of 2)

81-01 sldsT

| | <u> </u> |
|----------------------------|---|
| B/B | SENS[1 S]: EDNC ,XEB:S S'I, DET NBBN; *MBI |
| A/A | SENS[1 S]:EDNC ,XEB:S 1'1, DET NEBN; *MAI |
| 8 | SENS[1 S]:LONC ,XLE:LOM 0, DEL NEPN: *MFI |
| 8 | SENS[1 S]: LONC , XEE: BOM S, 'DEL NBFN' *MFI |
| A | SENS[1 S]:ENNC ,XEB:BOM 1,'DEL NBFN' *MFI |
| Ismajni basdworrsM | (menu selection only) |
| Detection Options | (menu selection only) |
| Conversion Loss | SENS1:FUNC 'XFR:POW:RAT 2,0'; DET BBAN; |
| Power | SENSI: FUNC , XEE: FOW 2, DET BEAN; *WAI |
| 28 L | SENST: ENNC . SET 1'0', DET NEEN; *MEI |
| Fault Location | SENSI: ENNC , EFOC I'O, 'DET NBYN' *MYI |
| Reflection | SENSJ: ŁONC , XŁK: S I'I', DET NBŁN; *WAI |
| nasimanaT | SEMET: LOMC , XEE: S S'I, DEL MEFM: *MFI |
| MEAS1 MEAS2, (continued) | |
| KEASLBOKES | SCPI COMMAND |

Meast | Measz Functions, 8712ET and 8714ET (2 of 2)

Table 10-18

81-01

| SCPI COMMAND | KEKSLEOKES |
|---|--|
| (Alao aotholos maan) | AS1 MEAS2, (continued) |
| (menu selection only) | Broadband Internal |
| SENS[] S]:EUNC | ************************************** |
| SENS[1 2]:ENNC ,XEK:BOM 0, DET BBAN; *WAI | # # |
| SENS[1 2]:FUNC 'XFR:POW:RAT 2,0'; DET BBAN; | B*/H* |
| (menu selection only) | Broadband External |
| SENS[] S]:EANC .XEK:BOM]], DET BBAN; *WAI | X |
| SENS[] S]:ENNC ,XEK:BOM]S, DET BBAN; *MAI | k |
| <pre>BEBN; *WAI SENS[1 2]:FUNC 'XFR:POW:RAT 11,12'; DET</pre> | A/X |
| SENS[1 2]:FUNC 'XFR:POW:RAT 12,11'; DET BBAN; *WAI | X/A |
| SENS[1 2]:FUNC 'XFR:POW:RAT 12,0';DET | *Я/Ү |
| SENS[1 2]:FUNC 'XFR: VOLT'; *WAI | tuqni xuA |
| SENS[] S]:SLAT OFF; *WAI | Meas OFF |
| Multiport Test Set. | 3 Table 10-20 on page 10-49 for |

MEAS Multiport Test Set Functions, 8712ES and 8714ES

el-ol sidsT

Table 10-20

| Fort (\$\$\$) | (menu selection only) |
|----------------------------|--|
| hoq (IIS) | (menu selection only) |
| Multiport Selection | (menu selection only) |
| S22 RefiPort | SENST: ENNC , XEE:S 5'5, 'DET NEEN' *MEI |
| S12 Tran | SENSI: LONG , XEB:S 1'S, 'DET NBBN' +MBI |
| S21 Tran | SENSJ: FUNC 'XFR:S 2,1'; DET UBAU; *WAI |
| S11 RellPort | SENSI: FUNC 'XFR:S 1,1'; DET NBAN; *WAI |
| MEAS1 MEAS2, (Multiport) | |
| KEASLBOKES | SCPI COMMAND |

MEAS Multiport Test Set Functions, 8712ET and 8714ET

| SCPI COMMAND | KEASLBOKES |
|---|----------------------------|
| | MEAS1 MEAS2, (Multiport) |
| SENSJ: ENNC , XEK: S 1'1, 'DEL NBFN' *MFI | Reflection |
| SENSJ: FUNC 'XFR:S 2,1'; DET UBAN; *WAI | Transmissn |
| (menu selection only) | Multiport Selection |
| ROUT[1 2]REFL:PATH:DEF:PORT[1 2 10] | Reflection Port Num |
| ROUT[1 2]TRAM:PATH:DEF:PORT[1 2 10] | mul Hod nesimensT |

MENU Functions, 8712ET/ES and 8714ET/ES (1 of 2)

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|--------|
| ıstəiQ |
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|) } |

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MENU Functions, 8712ET/ES and 8714ET/ES (2 of 2)

| SCPI COMMAND | KEASLBOKES |
|----------------------------------|-----------------------------|
| | MENU, (continued) |
| SENZ[[S]:ENNC:SBT:SCFN; *MFI | SRL Cable Scan ¹ |
| SENS: BOSC: SONF [EXT INT]; *WAI | Ext Ref on OFF |
| (menu selection only) | Spur Avoid Options |
| DIAG:SPUR:METH NONE; *WAI | None |
| DIAG:SPUR:METH DITH; *WAI | Dither |
| DIRG:SPUR:METH AVO;*WAI | Spur Avoid |

1. Used with SRL measurements only. This softkey starts an automated SRL cable scan.

POWER Functions, 8712ET/ES and 8714ET/ES (1 of 2)

Table 10-22

| r OMEŁ |
|-------------------------------------|
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POWER Functions, 8712ET/ES and 8714ET/ES (2 of 2)

| (cancels entry) | leoneO |
|---------------------------------|--|
| (units choice) | Vuab |
| (eoiodo stinu) | VmBb |
| (units choice) | ЧВЛ |
| (units choice) | Wu8b |
| (e) choice) | PM |
| (epiodo stiran) | dBm |
| SOUR:POW:PRESET <value></value> | Pwr Level at Preset (enter value, and unit) |
| (cancels entry) | leaneO |
| (95) (e) (95) | ABuv |
| (units choice) | dBmV |
| (spiods etian) | ЧВЛ |
| (soiofo stinu) | ФВПМ |
| (spiods etimn) | Map |
| (soliofo edinu) | m a b |
| IAW* ;<9ulsv> qoT2:W0q:RU02 | Stop Power ¹ (enter value, and unit) |
| | POWER, (continued) |
| SCPI COMMAND | KEASLBOKES |

^{1.} This softkey is valid for power sweeps only.

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| | SCHI COMWYND | KEASLEOKES |
|--|------------------------------|----------------|
| | SYST: Preset (hardkey entry) | PRESET |
| () | (menu selection only) | Factory Preset |
| | (menu selection only) | User Preset |
| | | |
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| A CONTRACTOR OF THE CONTRACTOR | | |
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Programmer's Guide

| (no SCPI command) | File Type bin ASCII |
|---|---|
| (no SCPI command) | швтротЧ эvв2-э Я |
| (no SCPI command) | Save Program |
| (menu selection only) | Programs |
| MMEM:LOAD:STAT 1, MEM:STATE2.STA | Recall State |
| WMEM:STOR:TRAC CH2FDATA, 'MEM:TRACE1.SIP' | seaM ave2 |
| MMEM:STOR:TRAC CHIFDATA, 'MEM:TRACEO.SIP' | t 269M 9v62 |
| MMEM:STOR:TRAC:FORM TOUC | Touchstone Format |
| MMEM:STOR:TRAC:FORM LOT | Lotus 123 Format |
| (menu selection only) | Save ASCII |
| WMEM:STOK:STAT:FORM E8711 | 8712/14E Compatible |
| WMEM:SLOK:SLYL:EOKW C8111 | elditsqmoO O1178 |
| MMEM:STOR:STAT:FORM B8711 | 9lditsqmoO 8\A1178 |
| (menu selection only) | File Format |
| WMEM:STOR:STAT:TSCAL [ON OFF] | TSet Cal on OFF ¹ |
| WMEM:STOR:STAT:TRAC [ON OFF] | FAO no shad |
| MMEM:STOR:STAT:CORR[ON OFF]. | Cal on OFF |
| MMEM:STOR:STAT:IST [ON OFF] | Inst State ON off |
| (menu selection only) | Define Save |
| MMEM:STOR:STAT 1,'MEM:STATE1.STA' | Re-Save State (enter file name, press Enter) |
| MMEM:STOR:STAT 1, MEM:STATE1.STA | Save State |
| (рагдкеу епсту) | SAVE RECALL |
| SCPI COMMAND | KEXSLBOKES |

1. A multi-port test set is required for this softkey choice.

SAVE RECALL Functions, 8712ET/ES and 8714ET/ES (2 of 5)

Table 10-24

| 1. This action valid with key recor | Ho by |
|-------------------------------------|-----------------------|
| Edit ¹ | (no SCPI command) |
| ^L q o t2 | (no SCPI command) |
| Continue ¹ | (no SCPI command) |
| L _{nu} A | (no SCPI command) |
| IBASIC | (menu selection only) |
| TSOTUA 9V&2 | (no SCPI command) |
| Гомег | DISE: PROG LOW |
| Upper | DISP:PROG UPP |
| llua | DISP:PROG FULL |
| euoN | DISP:PROG OFF |
| IBVSIC DISPLAY | (menu selection only) |
| Secure | (no SCPI command) |
| Stack Size | (no SCPI command) |
| Clear Program | (no SCPI command) |
| Utilities | (menu selection only) |
| Key record on OFF | (no SCPI command) |
| Edit | (no SCPI command) |
| dəiS | (no SCPI command) |
| Continue | PROG:STAT:CONT |
| Rufi | NUA:TAT2:DOA4 |
| Recall Program | (no SCPI command) |
| AVE RECALL, Programs, (continued) | |
| KEXSLBOKES | SCPI COMMAND |

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SAVE RECALL Functions, 8712ET/ES and 8714ET/ES (3 of 5)

| WMEM:MOVE ' <loc>:<name>', '<loc>:<name>'</name></loc></name></loc> | Hename File (edit name, press Enter) |
|---|--------------------------------------|
| (menu selection only) | File Utilities |
| (no SCPI command) | Size Current Size |
| (no SCPI command) | əsi2 yilboM |
| (no SCPI command) | silusieG enoteeR |
| (menu selection only) | MAR_JOV srugitnoO |
| (menu selection only) | MFS Device |
| WMEM:WSIS ,INI:, | Internal 3.5" Disk |
| MMEM:MSIS 'RAM:' | Volatile RAM Disk |
| NMEM:WRIS ,MEM:, | Non-vol MAM Disk |
| (menu selection only) | Select Disk |
| DISE: PROG LOW | Гомен |
| DISE:PROG UPP | Npber |
| DISE:PROG FULL | lu-7 |
| DISE:PROG OFF | 9noM . |
| (menu selection only) | YelqeiG DISABI |
| (no SCPI command) | Secure |
| (no SCPI command) | Stack Size |
| (no SCPI command) | Clear Program |
| (menu selection only) | ^I səlilit U |
| (no SCPI command) | Key Record on OFF |
| | SAVE RECALL, programs, (continued) |
| SCPI COMMAND | KEASLBOKES |

SAVE RECALL Functions, 8712ET/ES and 8714ET/ES (4 of 5)

| 1. The name can include directory, | tor example: 'MEM: \DIRNAME \NAME'. |
|---|--|
| Format 3.5" Disk | WWEW:INIL ,INL:,' DOS |
| MAR loV 1sm107 | WWEW:INIL ,KFW:,' DOS |
| MAR lovnoM serrioT | WMEM:INIL ,WEW:,' DOS |
| Format Disk Menu | (menu selection only) |
| Copy to NFS Device | WWEW:CObX ,*.*, ,/ NAME, 1 |
| Copy to 3.5" Disk | WWEW:COPY '*'*', 'INT:NAME' ¹ |
| MAR loV of yqoO | WMEM:COPY '*'*', 'RAM:UAME' ¹ |
| MAR loVnoM of yqoO | WMEM:COPY '*.*', 'MEM:UAME' ¹ |
| Copy All Files | WWEW:COba ,*'*,' , <tog>,</tog> |
| Copy to NFS Device | $MMEM: COPY \ [\ 'MEM: UAME^1 \backslash \ ' : NAME^1 \backslash \], \ \ ' : NAME^1 \backslash \]$ |
| Copy to 3.5" Disk | $\label{eq:mameline} \texttt{MMEM:COPY} \ [\ 'MEM: NAME^1 \ \ 'INT: NAME^1 \ \ 'NAME^1 \ \ 'NAME^1 \ \ 'NAME^1 \ \ 'NAME^2 $ |
| MAR loV of yqoO | $MMEM: COPY \ [\ 'MEM: NAME^1 \backslash \ 'RAM: NAME^1 \backslash \ \ 'RAM: NAME^1 \backslash \ \ 'RAM: NAME^1 \backslash \ \ \ 'RAM: NAME^1 \backslash \ \ \ \ \ \ \ \ \ \$ |
| MAR lovnou of vgoO | $\label{eq:mem:name} \texttt{MMEM:COPY} \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$ |
| Copy File | WMEM:COPY ' <loc>:<name>', '<loc>:<name>'</name></loc></name></loc> |
| Seli Files | WMEM:DEF ,MEM:*,*, |
| elif etelet | WWEW:DET , <toc>:<nsue.< td=""></nsue.<></toc> |
| AVE RECALL, File Utilities, (continued) | |
| KEYSTROKES | SCHI COMMAND |

| Suide | nmer's | Progran |
|--------------|--------|---------|
|--------------|--------|---------|

SAVE RECALL Functions, 8712ET/ES and 8714ET/ES (5 of 5)

| SCPI COMMAND | KEASLBOKES |
|--------------------------------------|--|
| | SAVE RECALL, File Utilities, (continued) |
| (menu selection only) | Directory Utilities |
| WMEM:CDIR , <ngme>,</ngme> | Change Directory |
| WMEM:MDIK , <pre>// Jusme>/</pre> | Make Directory |
| WMEM:RDIR / <name></name> | Hemove Directory |
| DISB:WEND:BECALL:FAST [ON!OFF] | Fast Recall on OFF |

SCALE Functions, 8712ET/ES and 8714ET/ES

7able 10-25

| SCFI COMMAND | KEASLISOKES |
|--|--|
| (рагдкеу епсту) | ∃J A C |
| DISP:WIND[1 2]:TRAC:Y:AUTO ONCE | Autoscale |
| DISP:WIND[1 2]:TRAC:Y:PDIV <num></num> | Scale/Div (enter value, press Enter) |
| DISP:WINDI:TRAC:Y:RLEV <num></num> | Reference Level (enter value, press Enter) |
| DISP:WINDI:TRAC:Y:RPOS <num></num> | Reference Position (enter value, press Enter) |
| (menu selection only) | Reference Tracking |
| DISP:WIND[1 2]:TRAC:Y:TRACK [ON OFF] | 110 |
| DISP:WIND[1 2]:TRAC:Y:TRACK PEAK | Тгаск Реак |
| DISP:WIND[1 2]:TRAC:Y:TRACK FREQ | Track Frednency |
| DISP:WIND[]:TRAC:Y:TRACK:FREQ <num></num> | Set Track Frequency (enter value and unit press Enter) |
| SENS[1 5]:COKK:OLLS:LHWS <unms deg<="" td=""><td>Phase Offset (enter value, press Enter)</td></unms> | Phase Offset (enter value, press Enter) |
| SENS[1 2]:COKK:EDET:LIME <nuit></nuit> | Electrical Delay (enter value and unit, press Enter) |

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Programmer's Guide

SWEEP Functions, 8712ET/ES and 8714ET/ES

| SCLI COMMVAD | KEXSLBOKES |
|---|---------------------------------------|
| (hardkey entry) | 2MEEP |
| SENS[]:SME:TIME <num>[s ms]; *WAI</num> | Sweep Time (enter value, and unit) |
| SENS[] S:SME:TIME:AUTO [ON OFF]; *WAI | nsm OTUA əmiT qəəw2 |
| <pre></pre> | Alt Sweep on OFF |
| SENS[J S]: SME: GEN SLEBBED: *MYI | Step Sweep on OFF |
| FOMEE: WODE FIXED; *WAI | Eredneucy Sweep |
| FOMER: WODE SMEEP; *MYI | Power Sweep |

SASTEM OPTIONS Functions, 8712ET/ES and 8714ET/ES (1 of 9)

72-01 sldsT

| 1. Key record must be off to use this softkey. | | |
|--|--|--|
| Login User Setup | Login User Setup (menu selection only) | |
| NA1 | (menn selection only) | |
| Гомег | DISE:PROG LOW | |
|) Apper | DISE:PROG UPP | |
| Full | DISE: PROG FULL | |
| Aon | DISE: PROG OFF | |
| IBASIC Display | (menu selection only) | |
| Zecnie | (no SCPI command) | |
| Stack Size | (no SCPI command) | |
| Clear Program | (no SCPI command) | |
| ^I səirili v U | (menu selection only) | |
| Key Record on OFF | (no SCPI command) | |
| Edit | (no SCPI command) | |
| ^I q o t2 | (no SCPI command) | |
| Continue ^I | PROG:STAT:CONT | |
| L _{nu} A | PROG: STAT: RUN | |
| IBVSIC | (menu selection only) | |
| SYSTEM OPTIONS | (рагдкеу епіту) | |
| KEKSLBOKES | SCPI COMMAND | |

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SYSTEM OPTIONS Functions, 8712ET/ES and 8714ET/ES (2 of 9)

| Submet Mask SYST:COMM:LAN:FOUT:SMAS CIP address SYST:COMM:LAN:FOUT:SMAS SYST:COMM:LAN:FO | |
|--|--|
| Gateway IP Address (enter address, CIP address> press Enter) | |
| L 8712/14ES IP Address, (enter address, press Enter) | monemous v same life is a life gas for age fine for more as an annual of the life |
| Port Setup (menu selection only) | IAJ |
| Delete All Users (menu selection only) | \$400 (19 \$400) a control of |
| Display User List | |
| Password (menu selection only) | |
| CSLKING> CSEK: DOC: NSEK: FIST: NAME? | |
| Delete Login User SYST: COMM: LAW: DG: USER: DEL-? | 4.1.1 |
| Confirm Password (menu selection only) | , page 1, page |
| Password (menu selection only) | e comment a comment comment and a comment of the service of the se |
| CSTRING> CST | |
| Add Login User SYST:COMM:LAN:LOG:USER:ADD-? CSTRING>, CSTRING> | |
| ONS, Lan, (continued) | SYSTEM OPT |
| EASTROKES SCPI COMMAND | K |

1. The analyzer model number appears here. 8712ES IP Address is shown as an example.

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SYSTEM OPTIONS Functions, 8712ET/ES and 8714ET/ES (3 of 9)

Table 10-27

| SCHI COMMAND | KEASTROKES |
|--|---------------------------------------|
| (menu selection only) | (sontinued) Diagnostic Utilities |
| (MIRIN SELECTION ONLY) CIP Address> | IP Address to Ping (enter address, |
| AATT OTHER T. SAFON ON THE PROPERTY OF THE PRO | press Enter) |
| DIAG:COMM:LAN:PING:IMM | Perform Ping |
| DIPG:COWW:PPM:NETW:STAT | Network stat Capture |
| SKET:COMM: FADD3 | eserbbA temental |
| (menu selection only) | MFS Device Setup |
| SXST:COMM:LAU:NFS:MOUN-? | Mount NFS Device |
| <pre>skst:comm:ran:ufs:mount:rist:remh; </pre> | teoH∖₁bbA qi ətoməA |
| <pre>skst:comm:ban:ufs:modut:bist:remf? <#1-7>, <[string]></pre> | Hemote Path |
| <pre><#1-7>, <[STRING]> SYST:COMM:LAN:UFS:MOUNT:LIST:LOCF?</pre> | Local Path |
| SYST:COMM:LAN:NFS:AUTO:ADD-? | quiewoq fA fruomofuA |
| skst:comm:ryn:nes:nnwonn-3 <string></string> | Unmount NFS Device |
| (menu selection only) | Authentication |
| SYST:COMM:LAN:NFS:AUTH:ID: USER #0~4.74836e+07# | User ID |
| SYST:COMM:LAN:NFS:AUTH:ID: GRO #0~4.74836e+07# | Group ID |

Programmer's Guide

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SYSTEM OPTIONS Functions, 8712ET/ES and 8714ET/ES (4 of 9)

| 72-01 | Table |
|-------|-------|
|-------|-------|

| teoH too8 IsnoitqO | SYST:COMM:LAU:BOOT:HOST <string></string> |
|----------------------------------|---|
| tuoəmiT | SYST:COMM:LAU:BOOT:TIM #1~MAX_AUTO_CAL_TIME[S]# |
| FTP Password | <pre>clat:comm:lan:boot:tran:ftp:pass-?</pre> |
| FTP User Name | <pre>SXST:COMM:LAN:BOOT:TRAN:FTP:USER</pre> |
| 417 | SAST:COMM:LAU:BOOT:TRAU:METH <ftp></ftp> |
| वाना | SAST:COMM:LAU:BOOT:TRAU:METH <tftp></tftp> |
| HHO GOTP OR PER | <pre>ZXET:COMM:PAN:BOOT:STAT <off 0="" 1="" on="" =""></off></pre> |
| dutes 9T008 | (menu selection only) |
| MFS Device Table | SKET:COMM: PFM: NEE: WOON: FIET: CONNS |
| eidsT ved innomotuA | SAET:COMM: PAN: NES: BOT: FIST: CONNS |
| friuomotuA evomeR | SYST:COMM:LAU:NFS:AUTO:REM-? <string></string> |
| qurewoq ts truomotuA | SYST:COMM:LAN:NFS:AUTO:ADD-? <string>,<string></string></string> |
| Local Path | <pre>SXST:COMM:LAU:NFS:MOUNT:LIST:LOCF? <#1-7>, [,STRING]></pre> |
| tis9 elomeA | <pre>c#1-7>, [, sTRING]> </pre> |
| teoH∖ıbbA ql ətoməЯ | SYST:COMM:LAN:NFS:AUTO:LIST: REMH? <#1-7>, [,STRING]> |
| qufe2 truomotuA | (menu selection only) |
| SYSTEM OPTIONS, Lan, (continued) | |
| KEAZLHOKEZ | SCPI COMMAND |

SASTEM OPTIONS Functions, 8712ET/ES and 8714ET/ES (5 of 9)

Table 10-27

| SCHI COMMVAD | KEXZLKOKEZ |
|---|---|
| | SYSTEM OPTIONS, Lan (continued) |
| SYST:COMM:LAN:BOOT:TRAN:FILE: | dtsq əli국 IsnoitqO |
| (menu selection only) | Parameters Received |
| (menu selection only) | SICL LAN Setup |
| (no SCPI command) | Restore Defaults |
| NFWE <slking></slking> | GPIB Name |
| rn #0~1054# skal:comm:rpn:sicr:gbib: | GPIB Log. Unit |
| VDDE #0~50, \22~23# | GPIB Dev Address |
| (menu selection only) | SCPI Sock. Setup |
| (no SCPI command) | Restore Defaults |
| SYST:COMM:LAN:SCPI:SOCK:DATA:PORT: NUM #0~4.74836e+07# | Socket Port No. |
| (menn selection only) | СРІВ |
| SYST:COMM:GPIB:ADDR <address></address> | 8712 ES Address (enter address, press Ente t) |
| SAST:COMM:GPIB:CONT OFF | Talker Listener |
| SAST:COMM:GPIB:CONT ON | System Controller |
| SARI:COWW:GBIB:ECHO [ON OEE] | GPIB Echo ON off |
| SYST:COMM:GPIB:ADDR <address></address> | 8712ES Address (enter address, press Enler) |

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Programmer's Guide

SYSTEM OPTIONS Functions, 8712ET/ES and 8714ET/ES (6 of 9)

82-01 əldsT

| DISP:ANN:CLOC:DATE:MODE NUM | Mumeric |
|---|---|
| DISE: PNN:CLOC: DATE: FORM DMY | HH:WM DD-WW-AAAA |
| DISP:ANN:CLOC:DATE:FORM MDY | MM-DD-YYYY |
| DI2F:PUN:CLOC:DATE:FORM YMD | MM:HH |
| (menu selection only) | Clock Format |
| (no SCPI command) | Round Seconds |
| SYST:TIME <h>,<m>,<a></m></h> | Set Minute (enter minute, press Enter) |
| SXST:TIME <h>,<m>,<m>,</m></m></h> | Set Hour (enter hour, press Enter) |
| ,<m>,<yyyy> TIAG:T2Y2</yyyy></m> | Set Day (enter day, press Enter) |
| SYST:DATE <yyyy>,<m>,<m> ,TAG:TSYS</m></m></yyyy> | Set Month (enter month, press Enter) |
| SYST:DATE <yyyy>,<m>,<m></m></m></yyyy> | Set Year (enter year, press Enter) |
| (menu selection only) | Set Clock |
| (menu selection only) | System Config |
| ZAZI:COMW:GBIB:ECHO [ON OEE] | GPIB Echo ON off |
| SAST:COMM:GPIB:CONT ON | System Controller |
| SAST:COMM:GPIB:CONT OFF | Talker Listener |
| | SYSTEM OPTIONS, GPIB, (continued) |
| SCPI COMMAND | KEASLBOKES |

system options Functions, 8712ET/ES and 8714ET/ES $(7\ of\ 9)$

| $\Omega \nabla = \Omega T$ | Table |
|----------------------------|-------|
| | |

| SCPI COMMAND | KEASLBOKES |
|---------------------------------|--|
| | SYSTEM OPTIONS, Sys Config, (continued) |
| DISP:ANN:CLOC:DATE:MODE ALPH | shqlA |
| DIEB: WNN: CFOC: REC [ON OEE] | tho MO sbroose2 |
| SASI:BEED:AOF <unw></unw> | Beeper Volume (enter value, press Enter) |
| (menu selection only) | su(bA TAO |
| (no SCPI command) | Restore Defaults |
| (no SCPI command) | Vertical Position |
| (no SCPI command) | noitieoq IstnozhoH |
| (no SCPI command) | Sync Green on OFF |
| (no SCPI command) | Remove Pattern |
| (no SCPI command) | Restore Defaults |
| (no SCPI command) | Vertical Back Porch |
| (no SCPI command) | Vertical Frnt Porch |
| (no SCPI command) | Horizontal Back Porch |
| (no SCPI command) | Horizontal Frnt Porch |
| (menn selection only) | qufə8 anoifq0 |
| (no SCPI command) | In stall Option (enter keyword, press Enter) |
| (no SCPI command) | Special Option (enter key, press Enter) |

SYSTEM OPTIONS Functions, 8712ET/ES and 8714ET/ES (8 of 9)

Table 10-28

| (no SCPI command) | ofnl tnemunteni |
|---------------------------------|--|
| (no SCPI command) | te9T qo1& |
| (no SCPI command) | Execute Test |
| (no SCPI command) | Select Adjustment |
| (no SCPI command) | Select Self-Test |
| (menu selection only) | stnemteu[bA bns steeT |
| (menu selection only) | Service |
| (screen selection only) | Previous Screen |
| (screen selection only) | Next Screen |
| HCOF: ABOR | hodA |
| (no SCPI command) | Hardcopy All |
| (no SCPI command) | Нагасору Ѕсгеел |
| (menu selection only) | Operating Parameters (seven pages of parameters) |
| (special test set use) | Special Test Set |
| CÒNT]:MULT:STATE [ON OFF] | ^I fto NO froqisluM |
| (menu selection only) | Switching Test Set |
| SXSL:COWW:LLF:NSEB: LEED RMEED | 5wG geewS |
| SXSI:COWW:TIT:USER:FEED KEY | ∂оцкеу Аυtо-Step |
| SXST:COMM:TTL:USER:FEED DEFAULT | Default |
| (menu selection only) | User TTL Config |
| | SYSTEM OPTIONS, Sys Config, (continued) |
| SCPI COMMAND | KEASLIGOKES |

1. For use with multiport test sets only.

SASTEM OPTIONS Functions, 8712ET/ES and 8714ET/ES (9 of 9)

| SCPI COMMAND | KEXZLBOKEZ | |
|-----------------------|-------------------------------------|--|
| | YSTEM OPTIONS, Service, (continued) | |
| (menu selection only) | Update Corr Const | |
| (no SCPI command) | Install CC from Disk | |
| (no SCPI command) | Help Message | |
| (no SCPI command) | Load CC from Disk | |
| (no SCPI command) | Store CC to EPROM | |
| (no SCPI command) | Store CC to Disk | |
| (menu selection only) | Update Corr Const | |
| (no SCPI command) | lnstall CC from Disk | |
| (no SCPI command) | Store CC to Disk | |

11 SCPI Command Summary

Chapter 9, "Introduction to SCPI."

This chapter describes all device commands recognized by the analyzer. Example programs using these commands are given in the Example Programs Guide. IEEE 488.2 common commands are described in

1-11

| And the second s | Programmer's Guide |
|--|--|
| The section of the | |
| | |
| AAA | |
| Vanj. 1881 1 - 188 | |
| | |
| Assessed transfer | |
| Para de la composição d | |
| | <pre><num>, <char>, <string> and <blook> refer to the parameter type expected by the instrument as part of the command.</blook></string></char></num></pre> |
| | The analyzer returns the short form of the mnemonic for the active state or value. In this example, the string MLOG (the short-form of MLOGarithmic) is returned to the device that sent the query. |
| | CALCulate[1 2]:FORMat? |
| | To find which format is active, use the corresponding query command: |
| | CALCulate[1 2]:FORMat:MLOGarithmic |
| | specified as command only or query only. To create the query form of a command, replace the command parameter with a "?". For example, the following command and parameter selects the log magnitude format following command and parameter selects the log magnitude format |
| 2 2 3 3 3 3 3 4 4 4 4 4 4 4 4 4 4 4 4 4 | All device commands have both command and query forms unless |
| | Queries, Forms, and Parameter Types |

Queries, Forms, and Parameter Types

Parameter Types

In the following tables, the **FORM** column gives the **parameter type** returned by the instrument in response to a query, URI, UR2 and UR3 refer to the different types of numeric data. CHAR (character data), STRING (string data) and BLOCK (block data) are also used to describe response types. The parameter types expected by the instrument as part of a command are summarized below:

| BLOCK | Block parameters are typically used to transfer large quantities of related data (like a data trace). |
|--------|---|
| SLEING | String parameters can contain virtually any set of ASCII characters. The string must begin with a single quote (') or a double quote ('') and end with the same character. |
| СНАЯ | Character parameters (sometimes referred to as discrete parameters) consisting of ASCII characters. They are typically used for program settings that have a finite number of values. |
| NE3 | Floating point numbers in scientific notation (such as +1.23E+5, +123.4E-3, -456.789E+6) |
| NES | Floating point numbers with an explicit decimal point (such as 12.3, +1.234, -0.12345) |
| NEI | Integers (such as +1, 0, -1, 123, -12345) |

frequency will accept HZ, KHZ, MHZ and GHZ. Commands that set a time will accept S, MS, US, RS, FS and AS. Note that case is ignored. The multiplier "M" is interpreted as either milli- (10^{-5}) or mega- (10^6) , depending on context. If no suffix is included, the default units for the

Some numeric parameters may be followed by an appropriate suffix. Commands that accept a suffix also allow standard metric multipliers to

be combined with the suffix. For example, commands that set a

Programmer's Guide

parameter are used.

| Aborts and resets the sweep in progress. | command only | | SORE |
|--|--|--|-----------|
| DESCRIBLION | EOEM | I COMMVADS | SOBSKELEN |
| | | ABORŧ | [-]] ə[c |
| nons. nd in the command MODify, for example) nort form of a given mnemonic. The ers are the rest of the long form mnemonic. | e letters (as four de shorte the sh | UPPER-case are used to | |
| nd in the command MoDify, for example) nort form of a given mnemonic. The | l bar (†) can be 9 parameter opt 9 letters (as fow 9 indicate the sh | A vertical Alternative UPER-case are used to | |
| ions. nd in the command MODify, for example) nort form of a given mnemonic. The | ngle brackets. l bar (†) can be parameter opt e letters (as fou pindicate the sh | ns ni əmsn • A vertical sliternative oxes-aagu • ased to | |
| read as "or" and is used to separate ions. In the command MoDiffy, for example) for the form of a given mnemonic. The | implied when I twill process the option node is at types (< >) suggested by the prackets. I bar () can be a parameter option of the parameter option of the prackets of the short of the | optional or optional or instrument whether the sameter and in same in an expectation of the same in alternative saccosed and saccosed or other options of the saccose | |
| programming the command; that is, the se command to have the same effect somitted or not. The distinguished by enclosing the type ions. The distinguished by enclosing the type ions. The nor sparate in the command Modify, for example) nor form of a given mnemonic. The | rackets ([]) are implied when I twill process the will process the rappes (< >) are types (| • Square bi optional or instrument instrument whether the name in an ame in an alternative alternative or opper-case are used to see used to | Ε. |
| are used to enclose a keyword that is programming the command; that is, the se command to have the same effect so omitted or not. The distinguished by enclosing the type ions. The distinguished by enclosing the type ions. The man is used to separate ions. | the network, and interface User's mis chapter, the rackets ([]) and in the option node is nell process the option node is nell bar () can be a parameter option of the short | The The LAN in the The LAN in the The LAN in the Intronghout the optional or instrument in the instrum | Ε. |

7-11

Programmer's Guide

SCPI Device Command Summary

(7 to 1) staluOJAO

2-11 sldsT

| Specifies the group delay aperture in Hertz. | ивз | CALCulate[1 2] :GDAPerture:SPAW <num></num> |
|---|--|---|
| Sets the group delay aperture as a ratio of desired aperture / measured frequency span. | NE3 | CALCulate[1 2] :GDAPerture:APERture <num></num> |
| Selects log magnitude units for Y-axis display. Choose from DEW DEM DEW DEW | CHAR | CALCulate[[] 2]:FORMat: :UNIT:MLOG <char></char> |
| Selects linear magnitude units for Y-axis display. Choose from W MW UW V MV UV. | CHAR | CALCulate[1 2]:FORMat: :UNIT:MLIW <char></char> |
| Selects the display format for measurement data — choose from MLOGarithmic MLINear SWR or PHASe SMITh POLar GDELay REAL IMAGinary MIMPedance. | CHVB | CALCulate[1 2]:FORMat <char></char> |
| Queries the formatted data trace — functionally equivalent to the command TRAC? CH<1 2>FDATA. | or NE3 ₅ BFOCK dneth oujh | <pre>L?ATAG:[S []=js[u]dAD</pre> |
| DESCRIPTION | FORM | COMMVADS SABSASLEM |

I. Refer to Chapter 6, "Trace Data Transfers," and to the ASCDATA and REALDATA example programs in the Example Programs Guide for more information on this command. S. The parameter type of the data is determined by the format selected — FORMat S. The parameter type of the data is determined by the format selected — FORMat

 $\mathtt{REAL}\ \textbf{usee}\ \mathbf{BLOCK}\ \mathbf{data}, \ \mathtt{FORMat}\ \mathtt{ASCii}\ \mathtt{usees}\ \mathbf{NR3}\ \mathbf{data}\ \mathtt{separated}\ \mathbf{by}\ \mathbf{commas}.$

CALCulate (2 of 7)

2-11 sldsT

| 1. Binary parameters accept the values of 1 (on) and 0 (off) in addition to ON and OFF. | | | |
|---|------|---|--|
| Sets the minimum value for a statistic peak-to-peak limit test. | NE3 | CALCulate[1 2]:LIMit:MARKer :STATistic:PEAK:MINimum <num></num> | |
| Sets the maximum value for a statistic peak-to-peak limit test. | NE3 | CALCulate[1 2]:LIMit:MARKer :STATistic:PEAK:MAXimum <num></num> | |
| Turn statistic mean marker limit test flo\no | NET | CALCulate[1 2]:LIMit:MARKer :STATistic:MEAU:STATe <ou off>¹</ou off> | |
| Sets the minimum value for a statistic mean limit test. | NE3 | CALCulate[1 2]:LIMit:MARKer :STATistic:MEAN:MINimum <num></num> | |
| Sets the maximum value for a statistic mean limit test. | NE3 | CALCulate[1 2]:LIMit:MARKer :STATistic:MEAM:MAXimum <num></num> | |
| Turns delta frequency marker limit testing on or off. | IAN | CALCulate[1 2]:LIMit:MARKer :FREQuency [:STATe] <on off>¹</on off> | |
| Sets the minimum value for delta frequency marker limit test. | NE3 | CALCulate[1 2]:LIMit:MARKer :FREQuency:MINimum <num>²</num> | |
| Sets the maximum value for delta frequency marker limit test. | NE3 | CALCulate[1 2]:LIMit:MARKer :FREQuency:MAXimum <num>²</num> | |
| Turns flatness marker limit test flo\no | NEI | CALCulate[1 2]:LIMit:MARKer :FLATness:STATe <0N 0FF> ¹ | |
| Sets the minimum value for a flatness marker limit test. | NE3 | CALCulate[1 2]:LIMit:MARKer :FLATness:MIWimum <num></num> | |
| Sets the maximum value for a flatness limit test. | NE3 | CALCulate[1 2]:LIMit:MARKer :FLATness:MAXimum <num></num> | |
| Tho/no sanil timit of glaph arrur | IHN | CALCulate[1 2]:LIMit:DISPlay <on 0ff>¹</on 0ff> | |
| DESCRIPTION | EOEW | SUBSYSTEM COMMANDS | |

^{1.} Sinkly parameters accept the values of 1 (on) and 0 (off) in addition to ON and OFF. S. Numeric parameters may include an appropriate suffix; if no suffix is included, the default (HZ for frequency or S for time) is assumed.

CALCulate (3 of 7)

Table 11-2

| | | <u> </u> |
|---|---------|---|
| Sets the Begin Frequency for the specified limit segment. | NR3 | CALCulate[1 2]:LIMit:SEGMent [1 2 12]:FREQuency:STARt <num>²</num> |
| Sets the End Distance for the specified limit segment. (Option 100 only) | NE3 | CALCulate[1 2]:LIMit:SEGMent [1 2 12]:DISTance:STOP < num>2 |
| Sets the Begin Distance for the specified limit segment. (Option 100 only) | ивз | CALCulate[1 2]:LIMit:SEGMent [1 2 12]:DISTance:STARt <mun></mun> |
| Turns off all limit segments for a given channel — deletes all segments in the channel's limit table. | command | CALCulate[1 2]:LIMit:SEGMent :AOFF |
| Sets the End Limit for the specified limit segment. | SAN | CALCulate[1 2]:LIMit:SEGMent [1 2 12]:AMPLitude:STOP \$ <mun></mun> |
| Sets the Begin Limit for the specified limit segment. | NE3 | CALCulate[1 2]:LIMit:SEGMent [1 2 12]:AMPLitude:STARt ^S <mun></mun> |
| Turns delta amplitude marker limit testing on or off. | NBI | CALCulate[1 2]:LIMit:MARKer TILT [:STATe] <0N 0FF> ¹ |
| Sets the minimum value for delta amplitude marker limit test. | NK3 | CALCulate[1 2]:LIMit:MARKer :TILT:MIWimum <num>²</num> |
| Sets the maximum value for delta amplitude marker limit test. | NE3 | CALCulate[1 2]:LIMit:MARKer :TILT:MAXimum <num>²</num> |
| Turns statistic peak-to-peak marker limit test on/off. | NEI | CALCulate[1 2]:LIMit:MARKer :STATistic:PEAK:STATe <ow off>¹</ow off> |
| DESCRIBLION | EOEW | SUBSYSTEM COMMANDS |

^{1.} Binary parameters accept the values of 1 (on) and 0 (off) in addition to OM and OFF. S. Numeric parameters may include an appropriate suffix; if no suffix is included, the default (HZ for frequency or S for time) is assumed.

CALCulate (4 of 7)

2-11 oldsT

| 1. Binary parameters accept the values of 1 (on) and 0 (off) in addition to ON and OFF. | | | |
|---|---------|---|--|
| Calculates the bandwidth of a bandpass filter — num is the target bandwidth (-3 for the 3 dB bandwidth). | NE3 | CALCulate[] 2]:MARKer:BWIDth <num></num> | |
| Turns off all markers for a given channel — this has the effect of turning off marker functions and tracking as well. | command | CALCulate[] S]:MARKer:AOFF | |
| Turns the limit test on/off. | NEI | CALCulate[1 2]:LIMit:STATe con oFF>1 | |
| Sets the limit type for the specified segment, choose from LMAX LMIN PMAX PMIN (Max Line, Min Line, Max Point, Min Point) — sets all of the segment's limit parameters to their default values. | ЯАНЭ | CALCulate[[12]:LIMit:SEGMent <char></char> | |
| Turns the specified limit segment on/off — adds or deletes the segment. | NBI | CALCulate[1 2]:LIMit:SEGMent [1 2 12]:STATe <on off>¹</on off> | |
| Sets the End Power for the specified limit segment. | NR3 | CALCulate[1 2]:LIMit:SEGMent [1 2 12]:POWer:STOP <num>2</num> | |
| Sets the Begin Power for the specified limit segment. | NE3 | CALCulate[1 2]:LIMit:SEGMent [1 2 12]:POWer:STARt <mun></mun> | |
| Sets the End Frequency for the specified limit segment. | ИВЗ | CALCulate[1 2]:LIMit:SEGMent 2 12]:FREQuency:STOP < mum>2 | |
| DESCRIBLION | EOEW | SUBSYSTEM COMMANDS | |
| | | 70 T) 0000000000000000000000000000000000 | |

L. Binary parameters accept the values of 1 (on) and 0 (off) in addition to ON and OFF. S. Numeric parameters may include an appropriate suffix; if no suffix is included, the default (HZ for frequency or S for time) is assumed.

CALCulate (5 of 7)

Table 11-2

| Moves the specified marker to the next local maximum to the left. | command | CALCulate[1 2]:MARKer [1 2 8]:MAXimum:LEFT |
|---|---------------------------------------|---|
| Sets the specified marker to the maximum value on the trace. | command | CALCulate[1 2]:MARKer [1 2 8]:MAXimum |
| Returns the group delay value, in seconds, at the specified marker. | only duery | [] S 8]:GDEFGY? CFFCnJate[] S]:WARKer |
| Turn marker function tracking on/off. | NBI | CALCulate[1 2]:MARKer :FUNCtion:TRACking <on off>1</on off> |
| Selects the active marker function— choose from OFF MAXimum MINimum TARGet BWIDth NOTCh MPEak MNOTch STATistics FLATness FSTATistics. | СНАЯ | CALCulate[1 2]:MARKer :FUNCtion[:SELect] <char></char> |
| Queries the results of the active marker function — MAX and MIN return the amplitude; TARG returns the frequency; BWID returns bandwidth, center frequency of and loss; STAT returns the frequency span, the mean and standard deviation of the amplitude response, and the peak-to-peak ripple; FLAT returns the frequency span, gain, slope and flatness; and FSTAT returns the insertion loss and peak-to-peak ripple of the passband of a filter, as well as the maximum signal amplitude in the example program in the Example | query NR3, NR3, NR3, NR3, | CALCulate[1 2]:MARKer: FUNCtion:RESult? |
| DESCRIPTION | ŁOKW | SUBSYSTEM COMMANDS |

^{1.} Binary parameters accept the values of 1 (on) and 0 (off) in addition to OM and OFF .

CALCulate (6 of 7)

Table 11-2

| 1. Refer to "Displaying Measurement Results" in Chapter 7 of the User's Guide for more information on using this command. S. Binary parameters accept the values of 1 (on) and 0 (off) in addition to 00 and | | | |
|---|-------------------|---|--|
| Performs a marker search for a target value — char is the direction LEFT or RIGHt. | NE3 CHVE' | CALCulate[1 2] :MARKer[1 2 8]:TARGet <char>,<num>3</num></char> | |
| Turns the specified marker on/off. | NBI | CALCulate[1 2] :MARKer[1 2 8][:STATe] <ou 0ff>²</ou 0ff> | |
| Queries the amplitude of the reference marker. | only NR3 | CALCulate[1 2] :MARKer:REFerence:Y? | |
| Queries the frequency of the reference marker. | dnery only NR3 | CALCulate[1 2] :MARKer:REFerence:X? | |
| Sets the specified marker point. | NE3 | CALCulate[1 2] :MARKer[1 2 8]:POINt ¹ | |
| Calculates the notch width of a notch filter — num is the marker search level (-6 for the default 6 dB bandwidth). | NE3 | CALCulate[1 2]:MARKer :WOTCh <num>3</num> | |
| Turns delta marker state on/off — choose Absolute or Relative. | CHAR | CALCulate[1 2]:MARKer :MODE <char></char> | |
| Moves the specified marker to the next local minimum to the right. | command only | CALCulate[1 2]:MARKer [1 2 8]:MINimum:RIGHt | |
| Moves the specified marker to the next local minimum to the left. | command | CALCulate[1 2]:MARKer [1 2 8]:MINimum:LEFT | |
| Sets the specified marker to the minimum value on the trace. | command | CALCulate[1 2]:MARKer [1 2 8]:MINimum | |
| Moves the specified marker to the next local maximum to the right. | only command | CALCulate[1 2]:MARKer [1 2 8]:MAXimum:RIGHt | |
| SUBSYSTEM COMMANDS FORM DESCRIPTION | | | |

 $[\]Omega$. Binary parameters accept the values of 1 (on) and 0 (off) in addition to ΩM and

| ebin e | .smmer's | iporq |
|---------------|----------|-------|
|---------------|----------|-------|

^{3.} Numeric parameters may include an appropriate suffix; if no suffix is included, the default (Hz for frequency or S for time) is assumed.

CALCulate (7 of 7)

2-11 əldsT

| (IMPL/CH<1 2>SMEM) for "data/ memory". | | |
|---|-------------------|--|
| choose measurement trace from (IMPL) for "data only" or | | SXPRession Cexpr |
| Selects a trace math expression — | EXBE | CALCulate[1 2] |
| Queries the specified marker's resistance value when in Smith chart format. | dnery only NR3 | CALCulate[1 2] :MARKer[1 2 8]:Y:RESistance? |
| Queries the specified marker's reactance value when in Smith chart format. | query only NR3 | CALCulate[1 2] :MARKer[1 2 8]:Y:REACtance? |
| Queries the specified marker's phase value when in polar format. | dnery | CALCulate[1 2]:Y:PHASe? |
| Queries the specified marker's magnitude when in polar format. | query only NR3 | CALCulate[1 2] :MARKer[1 2] |
| Queries the specified marker's inductance when in Smith chart format. | only NR3 | CALCulate[1 2] :MARKer[1 2 8]:Y:INDuctance? |
| Queries the specified marker amplitude. | only NR3 | CALCulate[1 2] : Y? |
| Sets a marker to an absolute value (such as frequency or amplitude). The set value is not relative to a reference marker if one is enabled. | ИВЗ | CALCulate[1 2] :MARKer[1 2 8]:X:ABS <num></num> |
| Sets the specified marker frequency (or power if in power sweep). | NE3 | CALCulate[1 2] :X <num></num> |
| DESCRIPTION | FORM | SUBSYSTEM COMMANDS |

1. $<\!\!\exp_T\!\!>$ and EXPR represent expressions, a parameter type that consists of mathematical expressions that use character parameters and are enclosed in parentheses.

CALibration

Table 11-3

| Turns the broadband detector autozeroing function on/off. | NET | CALibration CALibration <000 OFF ONCE>2 |
|--|-----------------|--|
| Sets the time interval for automatic SelfCals. ¹ | NEI | CALibration SELF:TIMER <num></num> |
| Initiates a SelfCal on the currently selected ports and selects Periodic SelfCal (ON) or SelfCal Once (OFF or ONCE). I | CHAR NR1 | CALibration :SELF <on off once> ²</on off once> |
| Selects the method of SelfCal: enhanced response/1-port or 2-port. | CHAR | CALibration :SELF:METHod <oneport twoport></oneport twoport> |
| Initiates a SelfCal on all ports that were calibrated during the Test Set Cal. ¹ | command only | CALibration : SELF: ALL |
| DESCRIBLION | LOEW | SUBSYSTEM COMMANDS |

I. For use with multiport test sets only. 2. Binary parameters accept the values of 1 (on) and 0 (off) in addition to ON and OFF.

| Guide | Programmer's |
|-------|--------------|
|-------|--------------|

SCPI Device Command Summary

CONFigure

Table 11-4

| | * ~= | 10 F DEIO 17: |
|---|--------|-----------------------------|
| | | |
| .CABLe: SRL' | | |
| .TJUAT: STERLE | | |
| 'CABLe: REFLection' | | |
| 'CABLe: TRANsmission' | | |
| .WIXer:REFLection' | | |
| .WIXGK:GDET, | | |
| I'MIXer:CLOSs' | | |
| 1.BBANd:REFLection:REVerse' | | |
| 'BEANd: TRANsmission: REVerse' | | |
| BBANd: REFLection' | | |
| 'noissimaNAAT:bNAAB' | | |
| 'FILTer: REFLection' | | |
| 'FILTer:TRANsmission' | | : |
| ''AMPLifier:POWer' | | |
| 'AMPLifier: REFLection: REVerse' | | |
| 'AMPLifier:TRANsmission:REVerse' | | |
| 'AMPLifier: REFLection' | | |
| 'AMPLifier:TRANsmission' | | |
| | | |
| strings: | | |
| function) — choose from one of the following | | |
| device type and parameter (the BEGIN | | 6 |
| Configures the analyzer to measure a specific | STRING | COMFigure <string></string> |
| DESCRIBLION | EOEM | SUBSYSTEM COMMANDS |

1. For use with 8712ES and 8714ES only.

Table 11-5 CONTrol

| DESCRIBLION | EOEM | SUBSYSTEM COMMANDS |
|---|------|--------------------------|
| When on, configures analyzer for use with a | NEI | CONTrol[1 2]:MULTiport |
| multiport test set. L | | :STATE <on off></on off> |

 $\boldsymbol{1}.$ For use with multiport test sets only.

Table 11-6 DIAGnostic (1 of 4)

| F | · p | |
|--|----------|----------------------------------|
| Strid or cention at our groot | CATTALLO | <pre></pre> |
| Sets the IP address to ping. | SLEING | DIAGnostic:COMMunicate:LAN:PING |
| troubleshooting or verifying a LAN connection. | | |
| IP address. Used in | опју | MMI: |
| Pings" a remote user-specified | command | DIAGnostic:COMMunicate:LAN:PING |
| ping. | | |
| andress to ping and to perform | oujy | :NETWork:STAT |
| Ti splays the menu to set the IP | command | DIAGnostic: COMMunicate: LAN |
| ееьком: | | |
| constants from memory to flash | Уlпо | : EEbkow |
| Stores default factory calibration | command | DIAGnostic: CCOWstants: STORE |
| disk. | _ | |
| constants from memory to floppy | ouJy | |
| Stores default factory calibration | command | DIAGnostic:CCONstants:STORE:DISK |
| тетоку | _ | |
| constants from floppy disk to | Vino | |
| Loads default factory calibration | basmmoo | DIAGnostic: CCONstants: LOAD |
| it true, and a 0 it false. | | |
| are installed in flash. Returns a 1 | only NR1 | |
| Queries if correction constants | guery | Figure : CCONstants: INSTalled? |
| DESCRIBLION | EOEM | SUBSYSTEM COMMANDS |

| Programmer's Guide | ł |
|--------------------|---|
|--------------------|---|

DIAGnostic (2 of 4)

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| Return to messurement mode snd suto scales after viewing calibration uncertainties. | only only | DIAGnostic:MDISplay[1 2] :CORRection <i direct c="" direct i="" direct m="" isolation="" isolation m="" ldmatch="" ldmatch i="" response i="" response m="" rtracking c="" srcmatch="" srcmatch i="" tracking="" tracking m="" ttracking c="" xscalar c="" c="" i="" m=""></i> |
|---|--------------|--|
| DIAGNOSTIC:COMMunicate:LA N:SEND? returns 0 if the last socket connection was successful, and -1 if the last socket connection failed. This may not be the last socket connection made by the IBASIC program. Multiple socket connections are possible, and telnet sessions may be interspersed among programmed socket connections. | | |
| <pre><timeout> is an integer <num> <timeout> is an integer <num> in the range 0-75 specifying the number of seconds allocated for a successful transmission. If 0 is specified, a minimum interval of 0.10 seconds is used. If </num></timeout></num></timeout></pre> ctimeout> is not specified, the default interval of 75 seconds is used. | | |
| Instructs the analyzer to open a socket to the specified IP address and port number, and send the string specified. | NEI' | DIAGnostic:COMMunicate:LAN:SEND <ip_address>,<port_num>,<string>,< timeout></string></port_num></ip_address> |
| DESCRIBLION | FORM | SOBSKELEM COMMANDS |

DIAGnostic (3 of 4)

91-11

3-11 əldeT

| DESCRIPTION | EOEM | SUBSYSTEM COMMANDS |
|---|---------|---|
| Displays corrected measurement uncertainties. Choose from one of the following strings: | command | IAGnostic:MDISplay[1 2] CORRection <string></string> |
| Cal check | | |
| C_DIRECTivity | | |
| C_LDMATCH C_ISOLATION | | |
| C_RTRACKING | | |
| C_SRCMATCH | | |
| C_TTRACKING | | |
| - 14 -framed Language A hotology of | | |
| Interpolated Array (accessed through the service menu.) | | |
| I DIRECTIVICY | | |
| I_RESPONSE | | |
| I_SRCMATCH | | |
| I_TRACKING | | |
| I_LDMATCH | | |
| NOITAJOSI_I | | |
| Master Array (accessed through the | | |
| service menu.) | | |
| M_DIRECT1v1ty | | |
| w_response | | |
| M_SRCMATCH | | |
| W_TRACKING | | |
| M_XSCALAR M_LDMATCH | | |
| NOITAJO2I_I | | |
| *************************************** | | |
| Returns to measurement mode and | pusmmoo | IAGnostic:MDISplay[1 2] |
| autoscales after viewing calibration uncertainties. | Λjuo | RESTore |

Programmer's Guide

SCPI Device Command Summary

DIAGnostic (4 of 4)

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| Selects the spur avoid mode. | NEI | DIAGnostic:SPUR:METHod <none dither avoid></none dither avoid> |
|---|-------------------------|--|
| Queries the instrument's serial semon ramber. | SLEING oujà dnetà | DIAGnostic:SNUMber <string>?</string> |
| Writes to the rear panel I/O ports. | NBI NBI' | DIAGnostic:PORT:WRITE <pre>Port><register> </register></pre> |
| Reads the rear panel I/O ports. | NBI oujy dnety | FABA: TROS: biteonDAIU <reptetper></reptetper> |
| DESCRIBLION | LOEW | SUBSYSTEM COMMANDS |

1. Refer to "Controlling Peripherals" in Chapter 7 of the User's Guide for more information on using this command. See also Table 11-7 on page 11-18 and Table 11-8 on page 11-19.

2. See "Controlling Peripherals" in Chapter 7 of the User's Guide for more information on using this command. See also Table 11-7 on page 11-18 and Table 11-8 on page 11-19.

| LOLIS | Vriteable | A |
|-----------|------------------|---|
| 3-44×-0-7 | Oldonting | |

7-11 sldsT

| Description | Register | Port Number |
|---|-------------|----------------|
| | | |
| Outputs 8-bit data to the Cent_D0 through D7 lines of the | 0 | g |
| Centronics port. Cent_D0 is the least significant bit, | | |
| Cent_D7 is the most significant bit. Checks Centronics status lines for: | | |
| | | |
| • Out of Paper | | |
| • Printer Not on Line | | |
| • BOSK | | |
| VCKNOMFEDGE | | |
| Sets/clears the user bit according to the least significant bit of A. A least significant bit equal to 1 sets the user bit high. A least significant bit of 0 clears the user bit. | τ | g |
| | | <u> </u> |
| Sets/clears the limit pass/fail bit according to the least significant bit equal to I sets the pass/fail bit high. A least significant bit of 0 clears the pass/fail bit. | 7 | |
| | <u> </u> | 3 |
| Outputs 8-bit data to the Cent_D0 through D7 lines of the Cent_Dn is the least significant bit, Cent_D7 is the most significant bit. Does not check Cent_D7 is the most significant bit. Does not check | 8 | ğ. |
| Outputs a byte to the serial port. The byte is output serially | 0 | |
| according to the configuration for the serial port. | | |
| the WRITEIO(15, 0) or WRITEIO(15, 3) command, the ect Line is set high. However, when the instrument is doing | Printer_Sel | 31 <u>.</u> |
| ne Printer_Select Line is set low. The Printer_Select line ma be used by individual printers. Check with your printer | | |
| | .lsuasm | |
| | | |
| | | |
| oius e'iemmergorq | 81-11 | |

Readable Ports

8-11 sldsT

| Description | Register | Port Number |
|---|----------|----------------|
| Reads the serial port. | 0 | 6 |
| Reads the 8-bit data port Cent_D0 through D7. | 0 | ទ្ធរ |
| Reads the user bit. | Ţ | 91 |
| Reads the limit test pass/fail bit. | 2 | 15 |
| Reads the 8-bit status port. | ot | 91 |
| • D0 — Cent_acknowledge | | |
| • D1 — Cent_busy | | |
| • D2 — Cent_out_of_paper | | |
| • D3 — Cent_on_line | | |
| • D4 — Cent_printer_err | | |

DISPlay (1 of 7)

Pable 11-9

| 1. Binary parameters accept the values of 1 (on) and 0 (off) in addition to ON and OFF. 2. Refer to "Displaying Measurement Results" in Chapter 7 of the $User's$ Guide for | | | | |
|---|--------|--|--|--|
| A user-defined X-axis label. | STRING | DISPlay:ANNotation:FREQuency [1 2]:USER:LABel:DATA <string></string> | | |
| Enables/disables frequency | NEI | DISPlay:ANNotation:FREQuency [1 2] [:STATe] <off on></off on> | | |
| Sets the resolution of display from frequency values — choose from MHZ KHZ HZ. | CHAR | DISPlay:ANNotation :FREQuency[1 2]:RESolution <char></char> | | |
| Sets the frequency annotation on the display — choose SSTOP (start/stop), CSPAN (center/span) or CW. | CHAR | DISPlay:ANNotation :FREQuency[l 2]:MODE <char></char> | | |
| Turns on/off display of seconds in the clock display. | NRI | DISPlay:ANNotation:CLOCk :SEConds[:STATe] <on off>¹</on off> | | |
| Selects how the clock will appear in the measurement display title area — choose from Linel Linel Off. | CHAR | DISPlay:ANNotation:CLOCk :MODE <char< th=""></char<> | | |
| Selects the format for the date in the clock display — choose NUMeric or ALPHa. | CHAR | DISPlay:ANNotation:CLOCk :DATE:MODE <char:< th=""></char:<> | | |
| Selects the Year/Month/Day ordering of the date in the clock display — choose from YMD MDY DMY. | CHAR | DISPlay:ANNotation:CLOCk :DATE:FORMat <char></char> | | |
| Enables user-defined measurement channel annotation. | NEI | DISPlay:AUNotation :CHAUnel[1 2]:USER:STATe <off ON>^{1,2}</off | | |
| Specifies the string to be displayed in the measurement channel annotation area (above the graticule). | SLEING | DISPlay:ANNotation :CHANnel[] 2]:USER:LABel:DATA <string>2</string> | | |
| Enables/disables measurement channel annotation. | NEI | DISPlay:AUNotation:CHAUnel[1 2][:STATe] <off on></off on> | | |
| DESCRIBLION | EOEM | SUBSYSTEM COMMANDS | | |

T. Britary parameters accept the values of 1 (on) and 0 (on) in addition to 0N and OFF.

2. Refer to "Displaying Measurement Results" in Chapter 7 of the User's Guide for more information on using this command.

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| Enables/disables the active marker annotation for measurement channels I and 2. | NEI | DISPlay: ANNotation: MARKer[1 2] |
|--|--------|--|
| Enables/disables the display of markers. | NEI | $\label{eq:def:def:con:marker[l S]} \begin{split} \text{DISPlay:AUNotation:Marker[l S]} \\ : \text{NUMBers} & \text{ [:STATe]} \\ \end{split}$ |
| Turns the limit test "PASS/FAIL" text on or off. | NBI | $\begin{array}{ll} \textbf{D} \texttt{ISPlay:ANNotation:LIMit:ICON} \\ \textbf{I} & \texttt{SPlay:ANNotation:LIMit:ICON} \end{array}$ |
| Positions the limit test pass/fail text and icon on the display. Accepts whole number values from 0 (bottom of display). | NBI | DISPlay:ANNotation:LIMit:ICON [1 2] |
| Positions the limit test pass/fail text and icon on the display. Accepts whole number values from 0 (flush left) to 100 (flush right). | ИВІ | DISPlay:AUNotation:LIMit:ICON |
| Enables/disables the display of the limit test fail icon. | IBN | DISPlay: PLAG[:STATe] <0N OFF> ¹ |
| Specifies the suffix for user defined frequency annotation. | STRING | DISPlay:ANNotation:FREQuency [1 2]:USER:SUFFix[:DATA] <string> ²</string> |
| Specifies the stop value for user-defined frequency annotation. | NE3 | DISPlay:ANNotation:FREQuency [1 2]:USER:STOP <num>²</num> |
| Enables user-defined frequency annotation. | IBN | DISPlay: ANNotation: FREQuency |
| Specifies the start value for user-defined frequency annotation. | NE3 | DISPlay:ANNotation:FREQuency |
| DESCRIBLION | EOBM | SUBSYSTEM COMMANDS |

^{1.} Binary parameters accept the values of 1 (on) and 0 (off) in addition to OM and OFF. 2. Refer to "Displaying Measurement Results" in Chapter 7 of the User's Gwide for more information on using this command.

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(7 to 8) yalqsıd

e-11 sldsT

| | | tion on using this command. 2. Binary parameters accept the values o |
|---|-----------------|--|
| Changes the default intensity of the selected item on the analyzer's internal monitor. | NR2 | DISPLAY: CMAP: COLOY[1 2 16] :GREYscale <num> L. Refer to "Operator Interaction" in Cha</num> |
| .alədsl aixs-Y fto\no anuT | IAN | DISPlay:ANNotation:YAXis[:STATe] |
| Sets mode for the Y-axis labels—choose RELative or ABSolute | CHAR | DISPlay:ANNotation:YAXis:MODE <char s<="" th=""></char> |
| Turns on/off display of the title and clock. | NRI | DISPlay:ANNotation:TITLe[:STATe] <on off>¹</on off> |
| Enters a string for the specified title line. | STRING | [2 1]edTIT:notation:YalqZIU |
| Enables/disables the message window — CAUTION: this suppresses display of all messages (even ERROR messages). | NBI | DISPlay:ANNotation:MESSage :STATe <on off>¹</on off> |
| Displays a user-defined message in the pop-up message window. Optional argument specifies the timeout: choose from | STRING | 9ps223M:noitst0MA:Ys19RIU f <pre>cpnints> ATAU:</pre> |
| Removes a user-defined pop-up message window. | command only | DISPlay: ANNotation: MESSage |
| Turns off any currently showing message window, active entry and IBASIC window. | command | DISPlay: ANNotation: MESSage: AOFF |
| DESCRIBLION | ьовм | SUBSYSTEM COMMANDS |
| | | () 10 c) \(RELICIO \text{ FILE 100 \tex |

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|--------------|---------|-------|
|--------------|---------|-------|

(7 to 4) yalqeld

e-11 sldsT

| Turns on/off fast recall mode. | NEI | DISPlay:MENU:RECall:FAST CON OFF>2 |
|--|-----------------|---|
| Specifies the softkey menu labels when using user-defined BEGIN key. | STRING | <pre><string> 1 SPlay:MENU[2]:KEY[1 2 7]</string></pre> |
| Specifies the softkey menu labels from a remote controller or IBASIC | STRING | DISPlay:MENU:KEY[1 2 7] <string> ¹</string> |
| Enables/disables expand measurement mode. | NEI | <on ołe></on ołe> |
| (full or split screen) for displaying trace data — choose SINGle (overlay) or ULOWer (split). | | |
| Selects the format | CHAR | DISbjay:FORMat <char></char> |
| Sets the color scheme for an external monitor. Choose from DEFault DEFault GREY INVerse CUSTom. | CHAR | DISPlay:СМАР:SCHeme <char></char> |
| For use with an external monitor. Sets the color scheme to the factory default. | command only | DIZBJSX:CWYB:DEEsnJt |
| For use with an external monitor. Sets the color map based on the Red/Green/Blue model. Accepted values for each parameter are 0 to 1. | NES | DISPlay:CMAP:COLor[1 2 …16] :RGB <num,num,num></num,num,num> |
| For use with an external VGA compatible monitor. Sets hue, saturation, and luminance for the selected display item. Accepted values for each parameter are 0 to 1. | NK2 | DISPlay:CMAP:COLor[1 2 16] :HSL <num>,<num></num></num> |
| DESCRIBLION | ŁOEW | SUBSYSTEM COMMANDS |

^{1.} Refer to "Operator Interaction" in Chapter 7 of the User's Guide for more information on using this command.

2. Piperur assess the qualitative of 1 (cm) and 0 (cff) in addition to our analysis of the command.

11-23

^{2.} Binary parameters accept the values of ${\bf 1}$ (on) and ${\bf 0}$ (off) in addition to OM and OFF.

DISPlay (5 of 7)

8-11 sldsT

| Queries the absolute pixel coordinates of the upper right corner of the selected | only query | :GEOW6fry:URIGHT? |
|---|-----------------|--|
| display window. Turn on/off buffering of user graphics commands. | NET NET | DISPlay:WINDow:GRAPhics:BUFFer[:STATe] |
| Draws a circle of the specified Y-axis radius centered at the current pen location — num is the radius in pixels. | command only | DISPlay:WINDow[1 2 10] SGRAPhics:CIRCle <num>2</num> |
| Clears the user graphics and graphics buffer for the specified window. | command Vino | :GERAPhics:CLEar ³ |
| Sets the color of the user graphics pen—choose from 0 for erase, 1 for bright, and 2 for dim. | NBI | DISPlay:WINDow[l 2 10] |
| Draws a line from the current pen position to the specified new pen position — numl and num2 are the new absolute X and Y coordinates in pixels. 3 | command | DISPLAY:WINDOw[1 2 10] :GRAPhics [:DRAW] <numl>,<numl></numl></numl> |

^{3.} Refer to Chapter 7, and to the example program titled "GRAPHICS" in the Example Programs Guide for more information.

OISPlay (6 of 7)

Pable 11-9

| Scales the measurement data for a best fit display. | command only | DISPlay:WINDOw[1 2]:TRACe :Y[:SCALe]:AUTO ONCE |
|--|------------------|--|
| Turns the display of trace and memory data from the specified measurement channel on/off. | NBI | DISPlay:WINDow[1 2] TRACe[1 2][:STATe] <on off>²</on off> |
| Turns display graticule on/off. | NBI | DISPlay:WINDOw[1 2]:TRACe :GRATicule:GRID[:ATATe] <on of -2<3</on of |
| Queries whether a window is enabled for user graphics commands. | query onlyNR1 | DISPlay:WINDow[1 2 10] :GRAPhics:STATe? |
| Specifies new coordinates for window. | NEI | DISPlay:WINDow[1 2 10] :GRAPhics:SCALe <xmin>,<xmax>,<ymin,<ymax></ymin,<ymax></xmax></xmin> |
| Draws a rectangle of the specified size with lower left corner at the current pen position — numl and neight in numl are the width and height in limited in the width and height in limited in the control of the contro | command | DISPlay:WINDow[1 2 10] :GRAPhics:RECTangle <numl>,<num2></num2></numl> |
| Moves the pen to the specified new pen position — numl and numl stee the new absolute X and Y coordinates in pixels. | NR1,NR1 | DISPlay:WINDow[l 2 10] :GRAPhics:MOVE <numl>,<num2>¹</num2></numl> |
| Selects the user graphics label font — choose from SMALL HSMall NORMal HNORmal BOLD HBOLd SLANt HSLant. | CHAR | DISPlay:WINDow[l 2 10] :GRAPhics:LABel:FONT <char>^l</char> |
| Draws a label with the lower left corner at the current pen location. | command only | DISPlay:WIMDow[l 2 10] :GRAPhics:LABel <string>¹</string> |
| DESCRIBLION | EOEM | SOBSESTEM COMMANDS |

I. Refer to "Using Graphics" in Chapter 7 and the "GRAPHICS" program in the Example Programs Guide for more information on using this command. S. Binary parameters accept the values of 1 (on) and 0 (off) in addition to ON and OFF.

(7 to 7) yalqsıd

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| NR3 Specifies the height (dB or units per division) of each vertical division of the specified measurement channel. NR3 Specifies the Y-axis reference position for the specified measurement channel. NR3 Specifies the Y-axis reference position for the position for the measurement channel. Selects the method for reference measurement channel. OTHAR Selects the method for reference offset tracking. | DISPLAY:WINDOW[1 2]:TRACE :Y[:SCALE]:PDIVision <num>1 :Y[:SCALE]:RLEVEL :Y[:SCALE]:RLEVEL :Y[:SCALE]:RLEVEL :Y[:SCALE]:RLEVEL :Y[:SCALE]:RLEVEL :Y[:SCALE]:TRACE :Y[:SCALE]:RLEVEL :Y[:SCALE]:RLEVEL<</num> |
|--|--|
| NR3 Specified measurement channel. Specified measurement channel. MR3 Specifies the Y-axis reference position for the specified measurement channel. CHAR Selects the method for reference | :Y[:SCALe]:RLEVel <num>1 DISPlay:WINDow[1 2]:TRACe :Y[:SCALe]:RPOSition <num>1 :Y[:SCALe]:RPOSition <num>1</num></num></num> |
| position for the specified measurement channel. CHAR Selects the method for reference | :Y[:SCALe]:RPOSition <num>¹</num> |
| 1 | |
| | <ole beyk ekeö></ole beyk ekeö> |
| NR3 Selects frequency to track with reference tracking. | DISPlay:WINDow[1 2 10] -:TRACe[1 2]:Y:TRACk:FREQuency - |

I. Numeric parameters may include an appropriate suffix; if no suffix is included, the default (HZ for frequency or S for time) is assumed.

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|---------|--------------|

FORMat

Table 11-10

| Specifies the data format for use during data transfer — choose from REAL, 54 REAL, 52 INTeger, 16 ASCII. | (,WR1) | FORMat[:DATA] <char>[,<num>]</num></char> |
|---|--------|---|
| Specifiesa the byte order used for GPIB data transfer — choose NORMal or SWAPped (for PC-compatible systems). | CHAR | FORMat:BORDer <char></char> |
| DESCRIBLION | FORM | SUBSYSTEM COMMANDS |

HCOPy (1 of 2)

II-II əldsT

| 1. Binary parameters accept the values of 1 (on) and 0 (off) in addition to ON and OFF. S. For DEVice, use 1 for PCL/Epson printers, 2 for plotters, and 3 for PCL5 printers. 3. EPSon and 1EM produce the same results. | | |
|--|-----------------|--|
| from CENTronics SERial GPIB MM EMory LAN. | | |
| Selects the communications port for hardcopy output — choose | CHAR | \mathbb{C}^{2} |
| Sets the print width (for printer output) in millimeters. | NES | HCOPy:DEVice[1 2 3]:PAGE:WIDTh |
| Sets printer output page orientation — choose PORTrait or LANDscape. | CHAR | HCOPy:DEVice[1 2 3]:PAGE :ORlentation <char>²</char> |
| Sets the top margin (for printer output) in millimeters. | NES | HCOPy:DEVice[] 2 3]:PAGE:MARGin :TOP <num>²</num> |
| Sets the left margin (for printer output) in millimeters. | NEZ | HCOPy:DEVice[1 2 3]:PAGE:MARGin :LEFT <num>2</num> |
| Selects the graph and/or table(s) to appear on a hardcopy plot — choose from GMARKer TABLe. | СНАЯ | HCOPy:DEVice[1 2 3]:MODE <char>2</char> |
| PCF23 PGF14PGF EPSon IBM PCX Pardcopy output — choose from Selects the language for | CHAR | HCOPy: DEVice[1 2 3]: LANGuage |
| Selects monochrome OFF or color | NEI | $<$ ON $ $ OkE $>$ $_{1}$, $_{5}$ HCOF $_{4}$:DEV $_{5}$:COLOT |
| Aborts any hardcopy currently in progress. | command only | HCOPy: ABORt |
| DESCEILLION | FORM | SUBSYSTEM COMMANDS |

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SCPI Device Command Summary

HCOPy (2 of 2)

II-II əldsT

| DESCHIBLION | ьовм | SUBSYSTEM COMMANDS |
|--|-----------------|---|
| Sets the printer resolution in dots per inch. | NEI | HCOPy:DEVice[] 2]:RESolution <num>1</num> |
| Initiates a hardcopy output (print or plot). | command only | HCOPy[:IMMedìate] |
| For DEVice, use 1 for PCL/Epson printers, or 2 for plotters. | | |
| Turns on/off channel and frequency annotation as part of hardcopy output. | NEI | HCOPy:ITEM[] 2 3]:AUNotation :STATe <on 0ff>^{1,2}</on 0ff> |
| Turns on/off an automatic form feed at the completion of hardcopy output — use item 1 for printers and 2 for plotters. | NET | HCOPy:ITEM[1 2 3]:FFEed:STATe |
| Turns on/off graticule as part of hardcopy output. | NEI | HCOPy:ITEM[1 2 3]:GRATicule :STATe <on off>^{1,2}</on off> |
| Turns on/off marker symbols as part of hardcopy output. | NEI | $\label{eq:hcopy} \texttt{HCOP}_{Y}: \texttt{ITEM} \texttt{[I S 3]}: \texttt{MARKet}: \texttt{STATe} \\ < \texttt{ON OFF} > ^2, ^3$ |
| Turns on/off title and clock lines as part of hardcopy output. | NBI | <pre><on off>2, 3 <on off< pre=""></on off<></on off></pre> |
| Turns on/off trace data as part of hardcopy output. | NEI | HCOPy:ITEM[1 2 3]:TRACe:STATe |

3. Binary parameters accept the values of 1 (on) and 0 (off) in addition to OM and OFF .

I. For DEVice, use 1 for PCL/Epson printers, or 2 for plotters, and 3 for PCL5 printers. 2. For DEVice, use 1 for PCL/Epson printers, 2 for plotters, and 3 for PCL5 printers.

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Table 11-12 INITiate

| Initiates a new measurement sweep. | command only | [ətsibəMMI:][2 1]ətsiTINI |
|--|-----------------|---|
| Sets the trigger system to continuously sweep or to stop sweeping. | NEI | INITiate[1 2]:CONTinuous <on 0ff>¹</on 0ff> |
| DESCRILLION | EOEW | SOBSASTEM COMMANDS |

1. Binary parameters accept the values of 1 (on) and 0 (off) in addition to ON and OFF.

Table 11-13 INPut

| Sets the R, A, or B IF input | FORM | SUBSYSTEM COMMANDS INPut:GAIN:BUTO <r a b>, <on off></on off></r a b> |
|---|-----------------|--|
| sutomatic gain control on or off. | only command | \(\text{TIO} \) \(\text{VO} \) \(\t |
| Sets the R, A, or B IF input gain to one of four choices: high, medium, or low. | oujy command | INPut:GAIN:SETTing <r a b>,</r a b> |

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|-------|------------|-------|
|-------|------------|-------|

SCPI Device Command Summary

MMEMory (1 of 3)

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| formation) with a contract of the formation of the format | | |
|--|-------------------------|---|
| Makes a new directory on a DOS formatted disk. | oorja command | WMEMory: MDIRectory <string> 2</string> |
| Returns file information such as date/time. (a directory listing, file names and more info.) | SLBING oujà dnetà | WWEWOLX:FILE:IWFO? <string>1</string> |
| Recalls a user cal kit. | command only | WMEMory:LOAD:CKIT:USER[:SELect] |
| Recalls an instrument state from mass storage — string is the filename. | command | <pre>% LOAD:STATE 1, <string>!, 3</string></pre> |
| Formats a disk — string is the mass storage device MEM: (internal memory), or INT: (internal floppy disk). Disk format char is DOS, and the interleave factor num. | command only | MMEMory:INITialize [{string>[, <char>[,<mum>]]]</mum></char> |
| Deletes a file — string is the filensme. | only command | MMEMory:DELete <string>1,2</string> |
| Copies a file — stringl is the source file, stringl is the destination file. | command only | MMEMory:COPY <stringl>, <stringl>^{1,2}</stringl></stringl> |
| Changes the current directory on a DOS formatted disk — new directory must be on the same mass storage device. | STRING | MMEMory:CDIRectory <string></string> |
| Lists the names of the files in memory. (a directory listing, file names only.) | SLEING ouj? dner? | MMEMory:CATalog? <string>¹</string> |
| DESCRIPTION | EOEW | SUBSYSTEM COMMANDS |
| | | (0.70.7) (10.707777777777777777777777777777777777 |

Filenames may include the mass storage device — MEM: (internal non-volatile memory), FAM: (internal volatile memory), INT: (internal 3.5 disk drive) or NFS local path. Wildcards ? and * may be used.
 Be sure to catalog the desired disk using MMEM: MSIS before using this command.

^{3.} Refer to "Automated Measurement Setup and Control" in Chapter 7 of the User's Guide for more infor-

[.]basmmos sing this command.

MMEMory (2 of 3)

Fi-11 sldsT

| I. File names may include the mass storage device name—MEM: (internal non-volatile memory), RAM: (internal volatile memory), INT: (internal 3.5" disk drive), or NFS local path. Wildcards? and * may be used. 2. Be sure to catalog the desired disk using MMEM: MSIS before using this command. | | |
|--|-----------------|--|
| Turns the data trace on/off — part of the definition of a saved file. | ивл | MMEMory: STORe:STATe:TRACe |
| Turns the instrument state on/off — part of the definition of a saved file. | NBI | MMEMory:STORe:STATe:ISTate <0N OFF> ³ |
| Saves instrument state files to be compatible with older "A/B" model analyzers (choose BB711), or with current "C" model analyzers (choose CB711). | СНАЯ | WMEMory:STORe:STATe:FORMat <char></char> |
| Turns the calibration on/off — part of the definition of a saved file. | NBI | MMEMory:STORe:STATe:CORRection |
| Saves an instrument state to mass storage — string is the filename. | command only | MMEMory:STORe:STATe 1, <string>^{1,2,3}</string> |
| Deletes a directory from a DOS formatted disk. | command only | WMEMory: RDIRectory <string>2</string> |
| Selects a mass storage device — choose MEM: (internal memory), INT: (internal floppy disk drive), etc. | SLEING | WMEMory:MSIS <string></string> |
| Moves or renames a file—stringl is the source (or old) filename and stringl is the destination (or new) filename. | command | WMEMory:MOVE <stringl>,<string2>^{1, 2}</string2></stringl> |
| DESCRIBLION | FORM | SUBSYSTEM COMMANDS |

2. Be sure to catalog the desired disk using MMEM:MSIS before using this command.

3. Binary parameters accept the values of 1 (on) and 0 (off) in addition to ON and OFF.

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|---------|------|---------|

MMEMory (3 of 3)

Table 11-14

| Copies a file to or from the analyzer's disk drive. ⁵ | STRING, | MMEMory:TRANsfer[:HFS] <string>²[,<block>]⁴</block></string> |
|--|-----------------|---|
| Copies a file to or from the analyzer's disk drive. ⁵ | BFOCK SLEING | MMEMory:TRANsfer:BDAT <string>²[,<block>]⁴</block></string> |
| Selects the format that the ASCII data will be saved in. Choose from LOTus 123 or TOUChstone. | CHVE | WMEMory:STORe:TRACe:FORMat <char< td=""></char<> |
| Stores an ASCII list of trace and frequency values to a file — char is the formatted data trace CH<1 2>FDATA and string is the filename. | command | MMEMory:STORe:TRACe <char>,<string>^{2,3}</string></char> |
| When on, the saved state will be the test set cal only. | NEI | <pre><on oee="" ="">1 WMEMory: STORe: STATe: TSCAL</on></pre> |
| DESCRIBLION | EOEW | SUBSYSTEM COMMANDS |

I. Binary parameters accept the values of 1 (on) and 0 (off) in addition to ON and OFF. S. File names may include the mass storage device name—MEM: (internal non-volatile memory), RAM: (internal volatile memory), INT: (internal 3.5" disk drive), or NFS local path. Wildcards? and * may be used.

^{3.} Refer to "Automated Measurement and Control" in Chapter 7 of the User's Guide for more information on using this command

^{4.} Refer to the Example Programs Guide for more information on using this command. 5. Refer to the example programs PUTFILE and GETFILE in the Example Programs Guide.

Coli Devilce Command Search and Devilce Common Search and
Table 11-15 OUTPut

| Turns RF power from the source on/off. | NBI | I <910 NO> [9TAT2:] JuqTUO |
|---|------|------------------------------|
| DESCRIBLION | FORM | SUBSYSTEM COMMANDS |

I. Binary parameters accept the values of ${\tt I}$ (on) and ${\tt O}$ (off) in addition to ${\tt OM}$ and ${\tt OFF}.$

Table 11-16 POWer

| DESCRIBLION | FORM | SUBSYSTEM COMMANDS |
|--|------|-------------------------------|
| Specifies either frequency sweep (FIXed) or power sweep (SWEep). | CHAR | FOWer[1 2]:MODE <char></char> |

| Programmer's Guide | 11-34 |
|--------------------|-------|
| | |

PROGram (1 of 2)

Table 11-17

| Allocates memory space for IBASIC programs — choose an integer between 2048 and 4000000 bytes. | NEI | PROGram 1 [:SELected] 2 :MALLocate $^{ m cnum}>$ |
|---|-------------------------|---|
| braceutes an IBASIC command. | only comman | PROGram ¹ [:SELected] ² :EXECute <string></string> |
| Deletes the active IBASIC program — equivalent to an HP BASIC SCRATCH A command. | only comman | PROGram ¹ [:SELected] :DELete[:SELected] |
| bd Deletes all IBASIC programs from the program buffer — equivalent to an HP BASIC schroll A command. | oujA cowwsu | PROGram ¹ [:SELected] ² :DELete:ALL |
| Downloads an IBASIC program from an external controller. | BFOCK | $	ext{PKOGram}_1$ [:SELected] 2 :DEFine |
| Lists the names of the defined is IBASIC programs — response is "PROG" (if a program is present) to the null string (""). | SLBINC onja dreta | PROGram ¹ :CATalog? |
| I DESCRIBLION | EOEW | SUBSYSTEM COMMANDS |

I. IBASIC programs can be generated and controlled in the instrument. S. Commands grouped under the SELected mnemonic in the PROGram subsystem operate on the active program buffer.

PROGram (2 of 2)

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| Waits until the IBASIC program completes. | ИВІ | PROGram [:SELected] ¹ :WAIT |
|---|------------------------------|---|
| Loads a new value for a string variable string in the active IBASIC program — strings is the new value. | SLEING | PROGram [:SELected] ¹ :STRing <stringl>,<strings></strings></stringl> |
| Selects the state of the active IBASIC program — choose from STOP PAUSE RUN CONTinue, | CHAR | PROGram [:SELected] ¹ :STATe <char></char> |
| Loads a new value for a numeric variable string in the active IBASIC program — num is the new value. | ot NK3 ₅ BFOCK | PROGram [:SELected] ¹ :NUMBer <string>,<data></data></string> |
| Selects the IBASIC program in the program buffer to be active. | STRING | PROGram [:SELected] 1:WAME 'PROG' |
| DESCRIBLION | EOEM | SOBSESTEM COMMANDS |

I. Commands grouped under the SELected mnemonic in the PROGram subsystem operate on the active program buffer. S. The parameter type of the data is determined by the format selected — FORMat REAL uses BLOCK data, FORMat ASCii uses NR3 data separated by commas.

ROUTe Table 11-18

| Selects which port of the analyzer is to function as the reflection (RF out) port and which port is to function as the transmission (RF in) port. Choose from $1, 2$ (forward), or $2, 1$ (reverse). | NBI | FOUTe[1 2]:PATH:DEFine : PORT <num>,<mun></mun></num> |
|--|------|--|
| Selects which port of the test set is connected to the TRANSMISSION port of the analyzer. ¹ | NEI | HTA4:noissimsAAT:[]]] |
| Selects which port of the test set is connected to the REFLECTION port of the analyzer. ¹ | NBI | ROUTe[1 2]:REFLection:PATH :DEFine:PORT<1 2 12> |
| DESCRIBLION | EOBW | SOBSKELEM COMMYNDS |

^{1.} For use with multiport test sets only. 2. For use with the 8712ES and 8714ES models only.

SENSe (1 of 16)

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| Returns true (1) if the channel is active, false (0) if the channel is not active. (Only one channel can be "active" at a time.) | ouj?\ | ENS&[1 2]:ACTIVE? |
|---|---------------|---|
| paragraph opert off officers of | | |
| d Re-starts the trace averaging function. | only comma | ENSe[] S]:AVERage:CLEar |
| Specifies a count or weighting factor for the averaged measurement data. | NBI | ENSe[1 2]:AVERage:COUNt |
| Turns the trace averaging function on/off. | NBI | ON OEE> _J ENZe[] S]:YAEK3de[:SLYLe] |
| Specifies the bandwidth of the IF receiver (fine, narrow, medium or wide) to be used in the measurement — choose | NES | ENSe[1 2]:BWIDth |
| (anh) 31 | | |
| (wornen) 052 (wornen muibəm) 0021 | | |
| (muibəm) 0078 | | |
| (əbiw muibəm) 0004 | | |
| (ebiw) 0059 | | |
| Turns measurement calibration function on/off. Uncorrected readings are used when "off." | NRI | OEE\ON] _J ENZe[J S]:COKKection: |
| Returns the current calibration annotation: "C", "C?", "Cx", or "". | only | ENSe[1 2]:CORRection: NNotation? |
| Selects a connector compensating capacitance value. (For use with structural return loss measurements on analyzers with Option 100 only.) | NE3 | ENSe[1 2]:CORRection: APacitance:CONNector <num></num> |

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SENSe (2 of 16)

Table 11-19

| Modifies or queries the cal kit open standard offset delay time. | NE3 | SENSe[1 2]:CORRection:CKIT:OPEN:MODify:DELay? #0~le-06[5]# |
|--|--------|--|
| Sets or queries the cal kit open standard fringe capacitance model C0 (f ⁰ , Farad) value. | икз | SENSe[1 2]:CORRection:CKIT:OPEN::MODifY:CZERo? #-10000~1[FARAD]# |
| Sets or queries the cal kit open standard fringe capacitance C2 (f ² , Farad/Hz ²) value. | NE3 | SENS&[1 2]:CORR&ction:CKIT:OPEN: |
| Sets or queries the cal kit open standard fringe capacitance C3 (f ³ , Farad/Hz ³) value. | NE3 | SENSe[1 2]:CORRection:CKIT:OPEN: |
| Sets or queries the cal kit open standard fringe capacitance C1 (f ¹ , Farad/Hz) value. | NE3 | SENSe[] S]:COKKection:CKIT:OPEN:MODify:CONE? #-10000~1[FARAD]# |
| Sets the description of the user-defined calibration kit. | STRING | SENSe[1 2]:CORRection:CKIT:NAME <kit1 kit2 kit10>,<string></string></kit1 kit2 kit10> |
| Selects or queries the cal kit connector type. Select TYPe716m for modifiable cal kit. | снув | SENSe[1 2]:CORRection:CKIT:MODify [:SELect] <typenf typenm ud1 type35mm TYPeapc7 UD3 UD4 UD10></typenf typenm ud1 type35mm |
| Sets or queries the cal kit load standard offset impedance value. | NEI | SENSe[1 2]:COKKection:CKIT:LOAD |
| Sets or queries the cal kit load standard offset loss value. | NR3 | SENSe[] S]:COKKection:CKIT:LOAD |
| Sets or queries the cal kit load standard offset delay time. | NE3 | SENSe[1 2]:CORRection:CKIT:LOAD::MODify:DELay? #0~1e-06[S]# |
| DESCRIBLION | LOEW | SUBSYSTEM COMMANDS |

| (91 | to | 8) | SENS |
|-----|----|----|------|
|-----|----|----|------|

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| DESCRIBLION | EOEM | SUBSYSTEM COMMANDS |
|---|-----------------|--|
| Modifies or queries the cal kit open standard offset loss value. | NE3 | WODŢ $\{\lambda: 	extsf{FOS2S} +0 	imes 	extsf{FOS1}: 	extsf{COKB} 	extsf{CKII}: 	extsf{Oben}$ |
| Modifies or queries the cal kit open standard offset impedance value. | NE3 | ENSe[1 2]:CORRection:CKIT:OPEN |
| Sets all values of all user-defined cal kits to the default values. | Command Only | ENSe[1 2]:CORRection:CKIT:PRESet :IMMediate]-? <kit1 kit2 kit10>]</kit1 kit2 kit10> |
| Saves the user-defined cal kit or queries whether the selected user-defined cal kit has been saved. | СНАЯ | ENSe[1 2]:CORRection:CKIT:SAVE? KIT1 KIT2 KIT10> |
| Modifies or queries the cal kit short standard offset delay time. | ИКЗ | ENSe[1 2]:CORRection:CKIT:SHORt |
| Modifies or queries the cal kit short standard offset loss value. | ИКЗ | MODify:LOSS? #0~le+12# |
| Modifies or queries the cal kit short standard offset impedance value. | NEŢ | ENS&[] S]:COKK&ction:CKIT:SHOKt |
| Modifies or queries the cal kit thru standard offset delay time. | NE3 | ENSe[1 2]:CORRection:CKIT:THRU |
| Modifies or queries the cal kit thru standard offset loss value. | NR3 | MODify:LOSS? #0~le+12# MODify:LOSS? #0~le+12# |
| Modifies or queries the cal kit thru standard offset impedance value. | ИКЗ | EUSe[1 2]:CORRection:CKIT:THRU |

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| currently in progress. | Уlпо | #AOAA: | | |
|---|--|--|--|--|
| Aborts the calibration that is | command | SENSe[1 2]:CORRection:COLLect | | |
| * The requested user calibration may or may not be stored in memory, and may or may or may not be valid for the current instrument settings. If the requested user calibration is invalid, a valid user calibration will be selected, if found. If no valid user calibration is found, the default factory calibration will be selected. The instrument can be queried with selected. The instrument can be queried with selected. The instrument can be queried with calibration choice. | | | | |
| t calibration Multi-port testset | og-owi 19s∪ | TWOPort* | | |
| staet calibration | Multi-port te | [] jestSIT | | |
| ed response calibration | ∩sеr епhапс | * Enoissims MA AT | | |
| TRAMamission2* User response and isolation calibration | | | | |
| e calibration | TRAMsmissionl* User response calibration | | | |
| t calibration | REFLection3* User one-port calibration | | | |
| ry two-port calibration | Default factory two-port calibration | | | |
| ry one-port calibration | DEFaultl | | | |
| Selects an existing calibration from the following <item> list:</item> | command only | SENSe[1 2]:CORRection:CLASs [:SELect] <item></item> | | |
| Returns the current calibration choice. Returns string from the <item> list (below). (ES models only)</item> | CHAR | SENSe[1 2]:CORRection:CLASs [:SELect]? | | |
| DESCRIBLION | LOEM | SOURCE COMMANDS | | |

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|--|---|---------|---|
| | | | |
| M, TYPE-N, 75, FEMALE' M, TYPE-7-16, 50, FEMALE' M, TYPE-7-16, 50, MALE' M, TYPE-7-16, 50, MALE' | VCOAX, 7N | | |
| IMPLIED, IMPLIED, IM, TYPE-F, 75, IMPLIED, IM, TYPE-F, 75, IMPLIED, | IMPLIED, | | |
| MY TYPE-N, 50, PEMALE' MA, TYPE-N, 50, MALE' | TCOAX, 7N | | |
| Oal Kit— choose from one of ing strings: | | STRING | SENSe[1 2]:CORRection:COLLe ct:CKIT[:SELect] <string></string> |
| M, TYPE-7, 50, IMPLIED' M, TYPE-7-50, IMPLIED' | VCOAX, 7P | | |
| SERI USERZ, IMPLIED, IMPLIED, IMPLIED, IMPLIED, IMPLIED, IMPLIED, IMPLIED, | IMPLIED, | | |
| M, TYPE-U, 50, FEMALE' MM, TYPE-U, 50, MALE' MM, APC-3.5, 50, IMPLIED' | COAX, 7M | | |
| test set will be assigned a Cal selects a Cal Kit— choose of the following strings: | multiport Kit. Also, | DATES C |][:ggrect] <structures< td=""></structures<> |
| The snalyzer or the snalyzer or | STANGSTC | SLEING | SENSe[1 2]:CORRection |
| 91 | orsbNAT2 orsbNAT2 orsbNAT2 | | |
| St | orsbWAT2 brsbWAT2 brsbWAT2 | | |
| a calibration standard — ar> from: | d Measures select <ch< td=""><td>commanc</td><td>SENSe[1 2]:CORRection: COLLect[:ACQuire] <char></char></td></ch<> | commanc | SENSe[1 2]:CORRection: COLLect[:ACQuire] <char></char> |
| DESCRIPTION | | EOEM | SUBSYSTEM COMMANDS |

SENSe (6 of 16)

Table 11-19

| | | odi transco motormora i |
|---|-----------------|---|
| Measures a short on the port selected during a test set calibration. ² | command only | SENSe[1 2]:CORRection:COLL ect:MP:SHORT <stan1 stan2 stan12></stan1 stan2 stan12> |
| Measures an open on the port selected during a test set calibration. ² | command only | SENSe[1 2]:CORRection:COLL ect:MP:OPEN <stan1 stan2 stan12></stan1 stan2 stan12> |
| NOME — No calibration | | |
| TWOPort — Two-port calibration | | |
| VERIEY — Calibration Check | | |
| T(Troft-2) | | |
| TESTset2 — Test Set Calibration | | |
| (Enhanced Response/1-Port) | | |
| TESTSet1 — Test Set Calibration | | |
| TESTset — Test Set Calibration (Enhanced Response/1-Port) ¹ | | |
| KELT3 — Ketlection one bort | | |
| TRAN3 — Transmission enhanced response | | |
| & eanoqeet noissimanetT — TRANT moitsloal | | |
| eanoqser noissimansrT — INAAT | | |
| Selects the type of calibration — choose from: | command only | SENSe[1 2]:CORRection: COLLect:METHod <char></char> |
| Selects the instrument state for calibration — choose Full Band (ON) or User Defined (OFF). | NEI | SENSe[1 2]:CORRection:COLL ect:ISTate[:AUTO] <on off>¹</on off> |
| DESCRIPTION | EOEW | SUBSYSTEM COMMANDS |

I. Binary parameters accept the values of $\mathbb{1}(\text{on})$ and $\mathbb{0}(\text{off})$ in addition to $\mathbb{0}N$ and $\mathbb{0}F$. S. For use with multiport test sets only.

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| Specifies the port extension at the reflection port, in seconds. | NE3 | SENSe[1 2]:CORRection:EXTensi on:REFLection[:TIME] <num> L. For use with multiport test sets on</num> |
|--|--------------------|---|
| Specifies the electrical delay in seconds. | NE3 | SENSe[1 2]:CORRection:EDELay: |
| Queries the current calibration type — returns DEF (factory default), FULL (full band) or USER (user | CHVE dneth outh | SENSe[1 2]:CORRection:CSET [:SELect]? |
| Restores the "factory" default calibration for the current measurement and channel. | command only | SENSe[1 2]:CORRection:CSET [:SELect] DEFault |
| Measures a calibration standard during a cal check procedure for transmission measurements. | command only | SENSe[1 2]:CORRection:COLLect :VERify:TRANsmission <stan1 stan2 stan12>;</stan1 stan2 stan12> |
| Measures a calibration standard during a cal check procedure for reflection measurements. | command only | SENSe[1 2]:CORRection:COLLect :VERify:REFLection <stan1 stan2 stan12></stan1 stan2 stan12> |
| Completes and saves current calibration. | only command | SENSe[1 2]:CORRection:COLLect |
| Selects the number of ports to perform a test set calibration on. $^{\rm I}$ | NEI | SENSe[] S]:CORRection:COLLect: |
| Measures a thru on the port selected during a test set calibration. ² | command only | SENSe[1 2]:CORRection:COLLect :MP:THRU <stan1 stan2 stan6></stan1 stan2 stan6> |
| Measures a load on the port selected during a test set calibration. ² | command | SENSe[] S]:CORRection:COLLect :MP:LOAD <staats staats taats< td=""></staats staats taats<> |
| DESCRILLION | FORM | SOURCE COMMANDS |

| Guide | ammer's | Progr |
|-------|---------|-------|
|-------|---------|-------|

SCPI Device Command Summary

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Table 11-19

| under test, in dB/100 ft. ³ | · | :COAX <num>²</num> |
|--|--------|---|
| Specifies the loss of a cable | NES | SENSe[1 2]:CORRection:LOSS |
| sədəni | | |
| interface connector, in mm or | | :CONNector <num>2</num> |
| Specifies the length of an | NES | SENSe[1 2]:CORRection:LENGth |
| meters. ³ |] | Allmir AAUU. |
| be calibrated, in feet or | PTOTAT | :COAX <num>2</num> |
| Specifies the length of cable to | NES | SENSe[1 S]:CORRection:LENGth |
| 2-port calibrations are selected. | | [:STATe] {OFF 0 0N 1} |
| Enables or disables use of isolation error correction when | NET | SENSe[1 2]:COKRection:ISOLation |
| | ran | |
| impedance. | | :INPut:MAGNitude:SELect ZO_75 |
| Selects 75 ohms as the system | NEI | SENSe[1 2]:CORRection:IMPedance |
| impedance. | | :INPut:MAGNitude:SELect ZO_50 |
| Selects 50 ohms as the system | NEI | SENSe[1 2]:CORRection:IMPedance |
| analyzer's system impedance. | | |
| display. The default is the | | TIME ACTIONATION AND AND AND AND AND AND AND AND AND AN |
| impedance for the Smith chart | C4717 | : INPut: MAGNitude <num>:</num> |
| Specifies the reference | NE3 | SENSe[1 2]:CORRection:IMPedance |
| seconds. | | |
| the transmission port, in | | TRANsmission[:TIME] <num>2</num> |
| Specifies the port extension at | NE3 | SENSe[1 2]:CORRection:EXTension |
| | | STATe] < ON OFF> |
| Enables port extensions. | NET | SENSe[1 2]:CORRection:EXTension[: |
| DESCRIBLION | ŁOKW | SOBSTEM COMMANDS |

I. Binary parameters accept the values of 1 (on) and 0 (off) in addition to OM and OFF. 2. Numeric parameters may include an appropriate suffix; if no suffix is included, the

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default (HZ for frequency or S for time) is used. S. For use with structural return loss measurements using analyzers with Option 100 $_{\rm ODL}$

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| only command the meternian the optimum values for connector length and connector connector length and connector connector length and connector apparents. Specifies the phase offset. Them to the current measurement. Specifies them to the current measurement. Them to the current measurement. Splies them to the current measurement. Them to the current measurement. Splies them to the current measurement. Them to the correction factors from internal memory and applies them to the correction factors from internal memory and applies them to the correction factors from internal memory and applies them to the correction factors from internal memory and applies them to the correction factors from internal memory and applies them to the correction factors from internal memory and applies them to the correction factors from internal memory and applies them to the correction factors from internal memory and applies them to the correction factors. | ENSe[1 2]:CORRection:1 CONNector[:IMMediate] ENSe[1 2]:CORRection:0 PHASe TRANSmission[:IMMediate] TRANSmission[:IMMediate] TRANSmission[:IMMediate] |
|--|--|
| ONEPOIT Command Retrieves the user one-port reflection error correction factors from internal memory and applies them to the current measurement. SOMEPOIT Command Retrieves the user one-port applies them to the current measurement. Result only Retrieves the user one-port applies them to the current measurement. ROPOIT COMMAND RETRIEVED TO THE TO T | PHASe ENSe[1 2]:CORRection:C ENSe[1 2]:CORRection:C TRANSmission[:IMMediate |
| only reflection error correction factors from internal memory and applies them to the current measurement. THOPORT command hetrieves the user two-port error measurement. THOPORT command correction factors from internal memory and measurement. THOPORT command hetrieves the user two-port error measurement. THOPORT command correction factors from internal memory and applies them to the current measurement. | REFLection[:IMMediate] ENSe[1 2]:CORRection:C |
| tacion error correction factors from internal memory and applies them to the current measurement. TWOPORT command only correction factors from internal memory and applies them to the current measurement. current measurement. | TRANSmission[:IMMediat |
| only correction factors from internal memory and applies them to the current measurement. | |
| | |
| | ENSe[1 2]:CORRection:F |
| Specifies the velocity factor to be used when displaying the distance for electrical length and port extensions. 1.0 the speed of light. | ENSe:CORRection:RVELoc SAX <mun> 3</mun> |
| CVELOCITY command Measures the cable and determine only the optimum values for cable loss and velocity factor. 2 | ENSe[1 2]:CORRection:F :IMMediate] |

default (Hz for frequency or ${\tt S}$ for time) is assumed. o. Munieric parameters may include an appropriate surinx in no surinx is included, the

(91 to 01) 9SNAS

Pable 11-19

| | | autonom moitonal ilinoi diim ann mail I |
|--|-----------------|--|
| Sets the center frequency of the RF source. | икз | SENSe[1 2]:FREQuency:CENTer |
| Sets the stop distance for a fault location measurement, in feet or meters. ¹ | NE3 | SENSe[1 2]:DISTance:STOP <num></num> |
| Specifies distance units. Choose | CHAR | SENSe[1 2]:DISTance:UNITs <char< th=""></char<> |
| Sets the start distance for a fault location measurement, in feet or meters. ¹ | NE3 | SENSe[1 2]:DISTance:STARt <mun></mun> |
| Sets the center distance for a fault location measurement, in feet or meters. ¹ | NE3 | SENSe[1 2]:DISTance:CENTer |
| Specifies which detection mode is used to make the measurement—choose BBANG (broadband) or NBANG (narrowband). | СНАВ | <pre>SENSe[1 S]:DETector[:FUNCtion]</pre> |
| Turns the alternate sweep mode or NONE (alternate sweep). | CHAR | SENSe[] S]:CONbJe <cpgx></cpgx> |
| Selects multi-peak threshold value, in dB. ¹ | NR2 | SENSe[1 2]:CORRection:THReshold:COAX < num> |
| Brings up the Test Set Cal menu. ² | only command | SENSe[1 2]:CORRection:TESTSET |
| DESCRIBLION | FORM | SOBSESTEM COMMANDS |

I. For use with fault location measurements on analyzers with Option 100 only. S. Numeric parameters may include an appropriate suffix; if no suffix is included, the default (Hz for frequency or ${\tt S}$ for time) is assumed.

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| yagament mumixem adt staß | NB3 | MAG2.vagamoaga.[S1[]a2M32 |
|---|----------------------|--|
| Sets the maximum frequency span of the RF source for bandpass fault location measurements. ² | ИКЗ | SENSe[1 2]:FREQuency:SPAN I <mum <num:<="" th=""></mum> |
| Sets the start frequency of the RF source. | ИКЗ | SENSe[] S]:FREQuency:STARt <num>¹</num> |
| Sets the stop frequency of the RF source. | NE3 | SENSe[I 2]:FREQuency:STOP <num>¹</num> |
| Sets the Z cutoff frequency for cable impedance calculations. 2 | NE3 | SENSe[1 2]:FREQuency:ZSTOp |
| See SENSe[1 2]:FUNction ' commands for string definitions. Queries the measurement function — returns a string that defines the current measurement function. | SLEING dnety only | RENR⊖[IIS]:EQNCFŢOUS |

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| 22 (Кечет ве В) | | |
|--|-----------------|---|
| 2 (Forward B) | | |
| 12 (Forward Ext X) | | |
| 11 (Forward Ext X) | | |
| 21 (Reverse A) | | |
| (A byswio A) | | |
| 20 (Reverse R) | | |
| 0 (Forward R) | | |
| from detectors: | | |
| For 8712ET/8714ET models—choose from detectors 0 (R), 1 (A), 2 (B), 11 (Ext X) or 12 (Ext Y). | | |
| Specifies that the receiver will measure the power into a specific detector on the specific detector on the | command | .XFRequency:POWer <num>'</num> |
| For 8712ES/8714ES models—choose 1, 0 (Forward A/R), or 22, 20 (Reverse B/R). (For use with fault location measurement on analyzers with Option 100 only.) | | |
| For 8712ET/8714ET models—choose | | |
| Specifies that the receiver will measure the ratio of the power (fault location) into the specified measurement channel. | only command | <pre><unm>'<unm>, ZENZ@[1 5]:EUNCtion 'FLOC</unm></unm></pre> |
| DESCRIBLION | ьовм | SOBSESTEM COMMANDS |

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| | ROLLINGSER | Mava | SIIBSACHEM COMMANDS |
|--|---|-----------------|--|
| | DESCRIBLION | EOEM | SUBSYSTEM COMMANDS |
| | Specifies that the receiver will measure the ratio of the power (group delay) into the specified measurement channel. For | command | SENSe[1 2]:FUNCtion 'XFRequency:GDELay:RATio <num>,<num>,</num></num> |
| | 2,0 (B/R). | 1 | |
| | For 8712ES/8714ES models—choose from ratios 2, 0 (Forward B/R), or 21, 20 (Reverse A/R). | | |
| | | • | |
| | Specifies that the receiver will measure a ratio of the power into the specified measurement channel. | ouj? commsnd | <pre><ru></ru></pre> <pre></pre> <pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre><pre></pre><pre></pre><pre></pre><pre></pre><pre></pre><pre><pre></pre><pre><pre><pre><pre><pre><pre><pre><pre><pre><pre><pre><pre><pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre> |
| | For 8712ET/8714ET models—choose from ratios 1, 0 (A/R), 2, 0 (B/R), 12, 0 (Ext Y/Rxt Y), or | | |
| | IS, II (Ext Y/Ext X). | | |
| | For 8712ES/8714ES models—choose | | |
| n greening | 1,0 (Forward A/R) | | |
| The state of the s | SI, SO (Reverse A/R) | | |
| | 2, 0 (Forward B/R) | | |
| 72 | SS, 20 (Reverse B/R) | | |
| L) | 12, 0 (Forward Ext Y/R) | | |
|) | 11, 12 (Forward Ext X/Ext Y) | | |
| | | | |
| ¿) | | | |

Programmer's Guide

SENSe (14 of 16)

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| Forces a connector verification measurement on the alternate channel. (For use with SRL measurements on analyzers with Option 100 only.) | command | SENSe[1 2]:FUNCtion:FAULt :CONNector [:IMMediate] |
|--|---------|--|
| Specifies that the receiver will measure an s-parameter into the specified an s-parameter into the specified choices will depend on the number of ports. For example, with a 2-port device, choose from 1, 1 (S ₁₁), 1, 2 (S ₁₂), 2, 2 (S ₂₂), or 2, 1 (S ₂₁). As another example, with a 12-port device using the 87075C multiport test set, some choices would include 1, 8 (S ₁₈), or 12, 1 (S ₁₂₁), or 7, 7 (S ₇₇). This command may be used in place of: set some choices would include 1, 8 and ROUT [1 2 \) : PATH: DEF: PORT. If using the 87075C multiport test set, this command may be used in place of this command may be used in place of the two commands just listed, as well as: the two commands just listed, as well as: and and may be used in place of the two commands just listed, as well as: and command may be used in place of the two commands just listed, as well as: and command may be used in place of the two commands just listed, as well as: and | NBI'NBI | YFRequency:S <num>, <num>'</num></num> |
| DESCRIBLION | EOEM | SUBSYSTEM COMMANDS |

1. For use with the 8712ES and 8714ES models only.

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12ble 11-19

| DESCRIBLION | EOEW | SUBSYSTEM COMMANDS |
|--|-----------------|---|
| Specifies that the receiver will measure the ratio of the power (SRL) into the specified measurement channel?. For 8712ET/8714ET models—choose 1, 0 (Forward A/R). For 8712ES/8714ES models—choose 1, 0 (Forward A/R). | NB1°NB1 | SENSe[1 2]:FUNCtion:SRL |
| Sets the cable impedance. ² | NKS | SENSe[1 2]:FUNCtion:SRL |
| Sets the suto z function to AUTO or Sets the suto z function to AUTO or Sets 2 . | СНАЯ | :WODE <cyst> RENRG[[5]:ENNCf;ou:RKF</cyst> |
| Starts a cable scan. ² | only command | SENSe[1 2]:FUNCtion:SRL |
| Specifies the source of the reference oscillator — select INTernal or EXTernal. | CHAR | SENSe[1 2]:ROSCillator |
| Turns the specified channel on/off. | INN | SENSe[1 2]:STATe <on off>3</on off> |

- L. Numeric parameters may include an appropriate suffix; if no suffix is included, the default (HZ for frequency or S for time) is assumed. For use with structural return loss measurements on analyzers with Option 100 2. For use with structural return loss measurements on analyzers with Option 100
- only. 3. Binary parameters accept the values of 1 (on) and 0 (off) in addition to ${\tt OM}$ and ${\tt OFF}.$

SCPI Device Command Summary

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| Sets the window selection for fault location measurements. Choose from RECTangular (Minimum), HAMMing (Medium), or KBESsel (Maximum). (For use with fault location measurements on analyzers with Option 100 only.) | снув | SENS&[1 2]:WINDOM[:LKbE] <cygr></cygr> |
|---|---------|--|
| Sets the trigger source for each point in a sweep — choose IMMediate or EXTernal (used in conjunction with TRIGGET[:SEQuence]:SOURce). | СНАВ | <pre><cpst></cpst></pre> <pre><cpst></cpst></pre> <pre><pre><cpst></cpst></pre><pre><pre><pre><pre><pre><pre><pre><</pre></pre></pre></pre></pre></pre></pre></pre> |
| Turns the automatic sweep time function on/off. | CHAR or | <pre><on oee once>5 2ENSe[I S]:SMEep:TIME:AUTO</on oee once></pre> |
| Sets the sweep time. | NE3 | <pre>SENSe[] :SMEep:TIME <num> 1</num></pre> |
| Sets the number of data points for the measurement — choose from 3 5 11 21 51 101 201 401 8 | NBI | SENSe[1 2]:SWEep:POINts <num></num> |
| DESCRIPTION | EOEW | SUBSYSTEM COMMANDS |

I. Numeric parameters may include an appropriate suffix; if no suffix is included, the default (Hz for frequency or s for time) is assumed. 2. Binary parameters accept the values of 1 (on) and 0 (off) in addition to ON and OFF

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SOURce

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| edt behulogi si villus og i villus etsiggongge ge ehulogi veg sveteggereg sinemul [| | |
|---|-------|---|
| Sets the power sweep stop power. | NE3 | SOURce[1 2]:POWer:STOP <num></num> |
| Sets the power sweep start power. | N.B.3 | SOURce[[1 2]:POWer:STARK <num></num> |
| Specifies the power sweep range. Choose from ATTen20 ATTen10 ATTen20 ATTen40 ATTen50 ATTen40 ATTen40 | CHAR | SOURce[] 2]:POWer:RANGe <char></char> |
| Sets the power level that the analyzer will always return to after an instrument preset. | NK3 | <pre>SOURce:POWer:PRESet <num></num></pre> |
| Sets the RF power output from the | NR3 | SOURce[1 2]:POWer[:LEVel] Implitude](shum>1 |
| DESCRIBLION | кови | SOBSESTEM COMMANDS |

I. Numeric parameters may include an appropriate suffix; if no suffix is included, the default (HZ for frequency or S for time) is assumed.

(4 to 1) suTATS

| Sets and queries bits in the Averaging status negative transition register. ² | иві | STATus:OPERation:AVERaging :MTRansition <mun></mun> |
|--|-------------------|--|
| Reads and clears the Averaging status event register. ¹ | MEI dnety only | STATus:OPERation:AVERaging |
| Sets and queries bits in the Averaging status enable register. ² | NEI | STATus:OPERation:AVERaging: ENABle <num></num> |
| Reads the Averaging status condition register. ¹ | dnety only | STATus:OPERation:AVERaging :CONDition? |
| Sets and queries bits in the Device Status positive transition register. ² | NEI | <pre><mun> noijiansAT4:95iV3d:auTAT8</mun></pre> |
| Sets and queries bits in the Device Status negative transition register: ² | NEI | STATus:DEVice:NTRansition <num></num> |
| Reads and clears the Device Status event register. ¹ | drety only | STATus:DEVice[:EVEUt]? |
| Sets and queries bits in the Device Status enable register. ² | IAN | STATus:DEVice:EWABle <num></num> |
| Reads the Device Status condition register: ¹ | NEI dneth onjh | STATus:DEVice:CONDition? |
| DESCRIBLION | ьовм | SOBSKELEM COMMVADS |

I. Returns the sum of the decimal weights $(2^n$ where n is the bit number) of all bits currently set. For more information on using the status registers, refer to Chapter 5, "Using Status Registers."

2. <num> is the sum of the decimal weights of all bits to be set.

(4 to 2) suTATS

| I. $<$ num $>$ is the sum of the decimal weights of all bits to be set. | | |
|--|-------------------|--|
| Sets and queries bits in the Measuring status positive transition register. ¹ | ИВТ | STATUS:OPERation:MEASuring <pre>chun> noitisnsATT:</pre> |
| Sets and queries bits in the Measuring status negative transition register. ¹ | NBI | gniruSA3M:noiJsA34O:auTAT2 <mun> noiJisnsATV:</mun> |
| Reads and clears the Measuring status event register. ² | MEI dnety only | STATus:OPERation:MEASuring [:EVEUt]? |
| Sets and queries bits in the Measuring status enable register. ¹ | NEI | STATus:OPERation:MEASuring :ENABle <num></num> |
| Reads the Measuring status condition register. ² | NEI dreth oujh | STATus:OPERation:MEASuring: CONDition? |
| Reads and clears the Operational status event register. ² | dnety only | STATus:OPERation[:EVENt]? |
| Sets and queries bits in the Operational status enable register. 1 | NBI | STATus:OPERation:ENABle <mun></mun> |
| Reads the Operational status condition register. | NKI dnety only | STATus:OPERation:CONDition? |
| Sets and queries bits in the Averaging status positive transition register. ¹ | NEI | STATus:OPERation:AVERaging -PTRansttion <num></num> |
| DESCRIBLION | EOEW | SUBSYSTEM COMMANDS |

L. <num> 1s the sum of the decimal weights of all bits to be set. 2. Returns the sum of the decimal weights (2^n where n is the bit number) of all bits currently set. For more information on using the status registers refer to Chapter 5, "Using Status Registers."

(4 to 8) suTATS

| top ad at stid lie to staniam leminah adt to mus adt si amina. I | | |
|--|--------------------|---|
| Reads the Limit Fail condition register. ² | NBI dneth oujh | STATus:QUEStionable:LIMit |
| Reads and clears the Questionable Status event register. ² | NBI dnety only | STATus:QUEStionable[:EVENt]? |
| Sets and queries bits in the Questionable Status enable register. ¹ | NEI | <pre><mun> 918AME:91dsnoit23UQ:auTAT2</mun></pre> |
| Reads the Questionable Status condition register. ² | drety only | STATus: QUEStionable: COMDition? |
| Sets bits in most enable and transition registers to their default state. | command command | JəSZHT: suTATS |
| Sets and queries bits in the Operational Status positive transition register. ¹ | NBI | noijiensAT4:noijsA340:euTAT2 <mun></mun> |
| Sets and queries bits in the Operational Status negative transition register. ¹ | NBI | noijtansATW:noijtATS:swTATS <mun></mun> |
| DESCRIBLION | ьокм | SOBSKELEW COMMVNDS |

I. <num> is the sum of the decimal weights of all bits to be set.

^{2.} Returns the sum of the decimal weights $(2^n$ where n is the bit number) of all bits currently set. For more information on using the status registers refer to Chapter 5, "Using Status Registers."

(4 to 4) suTATS

Table 11-21

| I. <num> is the sum of the decimal weights of all bits to be set.</num> | | |
|---|-------------------|---|
| Sets and queries bits in the Questionable Status positive transition register. ¹ | NEI | noitiansATT:91dsnoit34VQ:avTAT2 <mun></mun> |
| Sets and queries bits in the Questionable Status negative I.sansition register. | NBI | noitiansATM: 9ldsnoit23UQ:avTAT2 <mun></mun> |
| Sets and queries bits in the Limit Fail positive transition register. ¹ | NEI | JiMIL:9ldsnoiJ23UQ:auTAT2 <mun> noiJiansAT4:</mun> |
| Sets and queries bits in the Limit Fail negative transition register. ¹ | NEI | STATus:QUEStionable:LIMit <mun> :NTRanstien <mun> :NTRanstiens</mun></mun> |
| Reads and clears the Limit Fail event register. ² | NEI dneth oujh | STATus:QUEStionable:LIMit |
| Sets and queries bits in the Limit Fail enable register. ¹ | NET | STATus:QUEStionable:LIMit: ENABle <num></num> |
| DESCRIBLION | ьовм | SUBSYSTEM COMMANDS |

I. Shans is the sum of the decimal weights (\mathbb{R}^n where n is the bit number) of all bits currently set. For more information on using the status registers refer to Chapter 5, "Using Status Registers."

(8 to 1) msTSYS

| Sets a BOOTP request when the analyzer boots up. | NEI | SYSTem:COMMunicate:LAN:BOOTp :STATE <off 0 0n 1></off 0 0n 1> |
|---|------------------|--|
| Sets the host name or host IP address of the remote host that receives the BOOTP requests. | SLEING | GYSTem:COMMunicate:LAN:BOOTp <pre>cpnirja> T20H:</pre> |
| Sets the analyzer's GPIB address — num must be an integer between 0 and 30. | NBI | SYSTem:COMMunicate:GPIB[:SELF] *Amun> ezaAddA: |
| Sets the address of an GPIB printer or plotter for hardcopy output — num must be an integer between 0 and 30. | NEI | SYSTem:COMMunicate:GPIB:HCOPy <mun> sae9AUdA:</mun> |
| OPIS GPIB mnemonic echo. | NEI | <pre>SXSTem:COMMunicate:GPIB:ECHO </pre> |
| controjjer: Wakes the analyzer the system | NEI | SYSTem:COMMunicate:GPIB :CONTroller[:STATe] <on off>^{2,3}</on off> |
| Sets the volume of the beeper — num is a number between 0 for 0%. | NES | <pre><mun> emulOV:194334:meT2Y2</mun></pre> |
| Instructs the analyzer to beep. Arguments are frequency (Hz), duration (seconds), and volume (0 to 1). | NK3 NK3' NK3' | SYSTem:BEEPer[:IMMediate] [<freq>()<dur>()<freq< th=""></freq<></dur></freq> |
| DESCRIBLION | LOEM | SUBSYSTEM COMMANDS |

I. <freq>, <dur>, and <vol> are optional <num> parameters.

² . Binary parameters accept the values of 1 (on) and 0 (off) inaddition to OVF .

^{3.} For use with IBASIC—this command cannot be executed from an external controller.

 $^{4.\} A$ delay of 5 seconds is required before a command is sent to the new address.

(8 to 2) msTSYS

Table 11-23

| Sets the number of seconds the | NBI | SYSTem:COMMunicate:LAN:BOOTp |
|--|----------------------|---|
| analyzer will retry the BOOTP requests at boot time. | | :TIMeout #1~MAX_AUTO_CAL_TIME[S]# |
| Sets the path file name of the boot file you want to receive at boot time. | SLEING | gTSTem:COMMunicate:LAN:BOOTp - TRANsfer:FILE:MAME <string></string> |
| Selects the password of the remote | command only | gTSTem:COMMunicate:LAN:BOOTp :TRANafer:FTP:PASSword-? <pre>cpning></pre> |
| Selects the user name of the remote BOOTP host. | SLEING | SYSTem:COMMunicate:LAN:BOOTp :TRANsfer:FTP:USERname <string></string> |
| Selects TFTP as the file transfer program. | NEI | qTOOH:LAN:CALe:LAN:BOOTp :TRANsfer:METHod <tftp ftp></tftp ftp> |
| Queries the analyzer's ethernet address. | SLEING drety only | SYSTem:COMMunicate:LAN:EADDres |
| Sets the analyzer's Internet Protocol address. | STRING | ss <string></string> |
| Selects the login user/password pairs. | command only | SYSTem:COMMunicate:LAN:LOGin:USER:ADD-? <string></string> |
| Deletes the login user/password psirs. | command | SYSTem:COMMunicate:LAN:LOGin :USER:DELETE-? setring>, <string></string> |
| Queries login user names. | NEI dneth ouly | 3YSTem:COMMunicate:LAN:LOGin :USER:LIST:COUNt? |
| Queries user name. | SLEING drety only | 3YSTem:COMMunicate:LAN:LOGin :USER:LIST:NAME? #1-7 |
| Selects the NFS remote file system for entering a Group ID. | NES | SYSTem:COMMunicate:LAN:NFS SAUTHentiation:ID:GROup SAUTHentiation:ID:GROup |

Programmer's Guide

(8 to 8) msTSYS

| Selects the remote host file system name for an MFS device. | STRING | SYSTem:COMMunicate:LAN:NFS |
|--|----------------------|---|
| Queries the local file system name. | SLEING dneth oujh | SYSTem:COMMunicate:LAN:NFS -7-1# Seyseys: #1-7 |
| Queries the number of currently mounted NFS devices. | NEI dneth ouly | SYSTem:COMMunicate:LAN:NFS :MOUNT:LIST:COUNt? |
| Selects the remote host, file system, and local system name for an NFS device. | command only | SYSTem:COMMunicate:LAN:NFS:MOUNT-? <string>,<string></string></string> |
| Removes device from automount list. | command only | SYSTem:COMMunicate:LAN:NFS :AUTOmount:REMove-? <string></string> |
| Queries the remote host name (or host IP address) for an NFS device. | ZLEING dnety only | SYSTem:COMMunicate:LAN:WFS -7-1# ?TEMHOST:LIST:LINOMOTUA: |
| Queries the automount list. | SLEING dnety only | SYSTem:COMMunicate:LAN:UFS #1-7 |
| Selects the local file system name for an NFS device. | SLEING dnety only | SYSTem:COMMunicate:LAN:NFS :AUTOmount:LIST:LOCFilesys? #1-7 |
| Selects the number of NFS devices in Automount list. | MEI dnety only | SYSTem:COMMunicate:LAN:NFS :AUTOmount:LIST:COUNt? |
| Sets the mounted NFS device to the sutomount device table. | command only | SYSTem:COMMunicate:LAN:NFS :AUTOmount:ADD-? <string>,<string></string></string> |
| Selects the NFS remote file system for entering a User ID. | NES | SYSTem:COMMunicate:LAN:NFS :MTHentiation:ID:USER #0~4.74836e+07# |
| DESCRIBLION | FORM | SOUND COMMANDS |

(8 to 4) msTSYS

| DESCRILLION | EOEW | SOBSKSTEM COMMANDS |
|--|--------|---|
| Selects the remote host name (or host IP address) for an NFS device. | STRING | SYSTem:COMMunicate:LAN:NFS T# %120HM3A:T211:TWUOM: |
| Selects the MFS device table. | NONE | SYSTem:COMMunicate:LAN:NFS <pre>SYSTem:COMMUnicate:LAN:NFS</pre> |
| Specifies the IP address of the LAN printer. | STRING | SYSTem:COMMunicate:LAN:PRINter :Corring> |
| Sets the IP address for a LAN gateway. | STRING | SYSTem:COMMunicate:LAN:ROUTe :GATeway <string></string> |
| Sets the subnet mask. | STRING | SYSTem:COMMunicate:LAN:ROUTe :SMASk <string></string> |
| Selects the port number for a socket connection to the analyzer for SCPI socket programming. | NEI | SYSTem:COMMunicate:LAN:SCPI <mun> TAOq:teMcock</mun> |
| Sets the GPIB address for SICL LAN. | NBI | SYSTem:COMMunicate:LAN:SICL :GPIB:ADDRess #0~20, S2~30# |
| Sets the GPIB logical unit number for SICL LAN. | NEI | SYSTem:COMMunicate:LAN:SICL :GPIB:LU #0~1024# |
| Sets the GPIB name for SICL LAN. | STRING | SYSTem:COMMunicate:LAN:SICL :GPIB:WAME <string></string> |

SCPI Device Command Summary

(8 to 3) msTSYS

| W Fi. CE ICEDON OF | | der groupe as asite another erous roll t |
|--|-------------------------|---|
| Sends key names ² which execute the same functions as front panel | command only | SYSTem: KEY <char></char> |
| Queries the error queue — returns the error number and message. | SLEING ouly dnery | SYSTem:ERRor? ¹ |
| Sets the year (numl), month (numl) and day (numl) of the real time clock. | NRI NRI NRI | SYSTem:DATE <numl>,<num3></num3></numl> |
| Selects the function of the USER TTL IN/OUT port on the rear panel of the analyzer. Choose from DEFault KEY SWEEp. | CHAR | SYSTem:COMMunicate:TTL:USER: FEED <char></char> |
| Sets the handshake for communication to a hardcopy device on the serial port — choose XOM or DTR. | ЯАНЭ | SYSTem:COMMunicate:SERial <transmit:handshake <char=""></transmit:handshake> |
| Sets the band rate for hardcopy output to a device on the serial port — choose from 1200 2400 4800 9600 19200. | NET | SYSTem:COMMunicate:SERial :TRANsmit:BAUD <num></num> |
| DESCRIBLION | EOEM | SOBSASTEM COMMANDS |

I. For more information on errors, refer to Chapter 13, "SCPI Error Messages."
 2. A list analyzer front panel key codes is provided in Chapter 8, "Front Panel Keycodes."

(8 to 8) msTSYS

| TITO ban 1/0 of aniiibbo ai (Mo) o ban (| do) [jo soulen | 1. Binary parameters accept the |
|---|--------------------|---------------------------------|
| Queries the key code value for the last key pressed — RPG type returns the knob count, positive for clockwise rotation, KEY type returns the front panel keycode, and ASC type returns the ASCII code number. | NEI dneth oujh | SYSTem:KEY[:VALue]? |
| Sets the User Request bit of the Standard Event Status Register. | command | SYSTem:KEY:USER |
| Queries the type of key that was pressed — returns none, RPC, KEY (front panel key) or ASC (external keyboard). | CHVE dnetA oujA | SXSTem:KEY:TYPE? |
| Lurns on/off the key queue. | NEI | SYSTem:KEY:QUEue[:STATe] |
| Queries the size of the key queue (the maximum number of key codes it can hold). | NBI dnetA oujA | SYSTem:KEY:QUEue:MAXimum? |
| Queries the number of key codes in the queue. | NEI dneth oujh | SYSTem:KEY:QUEue:COUNt? |
| Clears the key queue. | сошшзид опјх | SYSTem:KEY:QUEue:CLEar |
| Queries the mask (shift, ctrl, alt) associated with a keypress on an external keyboard. | NEI dneth oujh | SYSTem:KEY:MASK? |
| DESCRIBLION | EOEM | SUBSYSTEM COMMANDS |

I. Binary parameters accept the values of 1 (on) and 0 (off) in addition to ON and OFF. 2. A list of the analyzer's front panel keycodes and key names is provided in Chapter 8, "Front Panel Keycodes."

(8 to 7) msTSYS

| Queries the SCPI version of the analyzer. See *IDN? to query the firmware revision. | NBS dnetA oujA | SYSTem:VERSion? |
|---|-------------------|---|
| Sets the hour (num1), minute (num2) and second (num3) of the real time clock. | NRI, NRI, NRI | <pre><emun>,<cmun>,<mun> = MIT:meT2Y2</mun></cmun></emun></pre> |
| Queries or set the instrument state, data, and calibration. Similar to save/recall. | BFOCK | SXSI&m:SET:LRNLong? [<user>] ¹</user> |
| Queries or set the instrument state. | BFOCK | SYSTem:SET:LRN? [<user>] ¹</user> |
| Sends a learn string (obtained using *LRN?) to the analyzer — this command is included in the learn string. | command only | SZSIem:SET |
| Performs a system preset— this is the same as the front panel (PRESET) key. | command only | JəSZA4:məTZYZ |
| DESCRIBLION | ьовм | SOBSKELEM COMMENDS |

Guide for more information on using this command. I. Refer to "Automated Measurement Setup and Control" in Chapter 7 of the User's

(8 to 8) msTSYS

99-11

Table 11-24

| DESCHILLION | EOEM | SUBSYSTEM COMMANDS |
|--|-----------------------|--|
| Queries the result of the selected sdjustment or self-test — the response will be NULL PRSS FAIL. | CHVE oujà dnexà | EST:RESult? |
| Selects the adjustment or self-test to execute. | NBI | EST:SELect <num></num> |
| Selects the state of the active adjustment or self-test — choose from RUM CONTinue STOP for the command. Query returns uull RUM PAUS DONE. | CHAR | <rp><tatc: p="" tz3<=""></tatc:></rp> |
| Sets or queries a value for an adjustment or self-test. | NBI | <pre>cum> <num> <num></num></num></pre> |

Programmer's Guide

(2 to 1) 9DAAT

Table 11-25

| | 11 Reverse load | Q | 5 Forward load matching |
|---|--|---|-------------------------------|
| smission tracking | 10 Reverse trans | gui | 4 Forward transmission tracki |
| ction tracking | 9 Reverse reflec | | 3 Forward reflection tracking |
| gaidətem əc | 8 Reverse sourc | | 2 Forward source matching |
| tivity | 7 Reverse direc | | 1 Forward directivity |
| | uo | strot correcti | Array choices for two-port e |
| Formatted data ² Formatted memory data ² data ³ data ³ Thformatted memory data ³ Fewn Raw data | Queries trace date following array to CH<1 2>FMEM CH<1 2>FMEM CH<1 2>SMEM CH<1 2>SMEM CH<1 2>SMEM CH<1 2>SMEM CH<1 2>SMEM CH<1 2>SMEM CH<1 1 | or NR3 ₁ BFOCK oujà dnery | TRACe[:DATA]? <char></char> |
| SHPTION STATES | | FORM | SUBSTANT COMMANDS |

I. The parameter type of the data is determined by the format selected — FORMat REAL uses BLOCK data, FORMat ASCii uses NR3 data separated by commas. 2. Single magnitude value for each measured point.

3. Corrected data in real/imaginary pairs for each measured point.

 \bullet Example Programs Disk, 8712ET/ES and 8714ET/ES (DOS format); part number Example programs can be found in the following four locations: using the analyzer's simcal command. correction arrays from measurements of the raw (uncorrected) calibration standards when 2. See the example program titled "SIMCAL." This program demonstrates how to create 2-port BLOCK data, FORMat ASCii uses NR3 data separated by commas. 1. The parameter type of the data is determined by the format selected — FORMat REAL uses | NONE> TESTSet1 | TESTSet2 | VERIFY | TWOPOrt arrays. Vino <TRAN1|TRAN2|TRAN3|REFL3|TESTset|</pre> command Computes cal error correction TRACe: CORRection: SIMulate: SAVE analyzer.² remote controller into the calibration standards from a or stored measurements of Λjuo {SIGTS|...|SGTS|IGTS} [ATAG:] standards. Loads pre-computed TRACe: CORRection: SIMulate Reads simulated calibration command channel. from the same measurement source and target arrays must be (CH<1|2>SDATA). Note that the while charz is the source array target array (CH<1 | 2>SMEM) array to another — charl is the ΛŢUO Moves data from one internal command TRACe[:DATA] <charl>, <charl> more information. type. L Note: See Chapter 6 for can be either BLOCK or NR3 the above list of arrays. The data Ajuo Inputs trace data — choose from command TRACe[:DATA] <char>, <data> DESCRIBLION **EOBM** SUBSYSTEM COMMANDS TRACe (2 of 2) Table 11-25

- Example Programs Disk, 8712ET/ES and 8714ET/ES (LIF format): 80001-41780
- part number 08714-10004
- 8712 example programs. • Web site http://www.agilent.com. Use the search function to find Web pages related to
- 91006-1780 redmun traq • Example Programs Guide, 8712ET/ES and 8714ET/ES:

| Guide | Programmer's |
|-------|--------------|
| | |

TRIGger

| Sets the source for the sweep trigger signs! — choose IMMediate or EXTernal (used in conjunction with | СНАВ | TRIGGer[:SEQuence]:SOURce <char></char> |
|---|------|---|
| DESCRIBLION | LOEW | SUBSYSTEM COMMANDS |

| 1 | Programmer's Guide | 11-70 |
|---|--------------------|-------|
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12 SCPI Conformance Information

12-1

| [] | 12-2 Programmer's Guide | |
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| Transcript State Control of State Contro | | |
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| | 1996.0 version of SCPL. | |
| | The 8712ET/ES and 8714ET/ES RF Network Analyzers conform to the | |
| | SCPI Conformance Information | |

SCPI Standard Commands

The analyzer implements the following IEEE 488.2 standard commands:

- *CFR
- *EZE
- *EZES
- *EZKS
- *IPN5*IDN5
- *0bC
- *ObC5
- *OPT?
- *bcB
- T2A* ●
- *ZKE
- *ZKES
- *ZLB5
- *IBG
- ¿ISI* •
- IAW* •

The analyzer implements the following SCPI 1996.0 standard commands:

- → ABORt
- CALCulate[1|2]:DATA?
- CALCulate[1|2]:FORMat
- CALCulate[1|2]:FORMat?
- CALCulate[1|2]:GDAPerture:APERture

| Programmer's Guide | 12-4 | |
|------------------------|---|---|
| | S[9TAT2:][2 1]:TRACe[1 2]? | • |
| | DISPlay:WINDow[1 2]:TRACe[1 2][:STATe] | 4 |
| | DISPlay:WINDow[1 2]:TRACe:GRATicule:GRID[:STATe]? | • |
| | DISPlay:WINDow[1 2]:TRACe:GRATicule:GRID[:STATe] | • |
| | DISPlay:WINDow[1 2 10]:GRAPhics:STATe? | • |
| | DISPlay:WINDow[1 2 10]:GRAPhics:MOVE? | • |
| | DISPlay:WINDow[1 2 10]:GRAPhics:MOVE | • |
| | DISPlay:WINDow[1 2 10]:GRAPhics:LABel | 0 |
| | DISPlay:WINDow[1 2 10]:GRAPhics[:DRAW] | • |
| | DISPlay:WINDow[1 2 10]:GRAPhics:COLor? | • |
| | DISPlay:WINDow[1 2 10]:GRAPhics:COLor | • |
| | DISPlay:WINDow[1 2 10]:GRAPhics:CLEar | • |
| | DISETSY:WINDOw[1 2 10]:GEOWGCIY:URIGHT? | • |
| | DISETSY:WINDOW[1 2 10]:GEOWGfry:SIZE? | • |
| | DISETSY:WINDOW[1 2 10]:GEOWGfry:LLEFT? | • |
| | DISETS λ :WENN[I S]:KEX[I S] β | • |
| | DISETSY: CMAP: DEFault | • |
| | DIZBJ97:CWYB:COFOx[J S "Je]:BGB5 | • |
| | DISBJ97:CWYB:COFOx[J S "Je]:BGB | • |
| | DIZBJSA:CWYB:COFOx[J S Je]:HZL? | • |
| | DISPlay: CMAP: COLOT[1 2 16]: HSL | • |
| | CALibration: ZERO: AUTO? | • |
| | CALibration: ZERO: AUTO | • |
| | CALCulate[1 2]:MATH[:EXPRession]? | • |
| | CALCulate[1 2]:MATH[:EXPRession] | • |
| | CALCulate[1 2]:LIMit:STATe? | • |
| | CALCulate[1 2]:LIMit:STATe | |

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• CALCulate[1|2]:GDAPerture:SPAM

15-5

```
• DISPlay:WINDow[1|2]:TRACe:Y[:SCALe]:PDIVision
     • DISPlay:WINDow[1|2]:TRACe:Y[:SCALe]:AUTO
```

DISPlay:WINDow[1|2]:TRACe:Y[:SCALe]:RLEVel DISPlay:WINDow[1|2]:TRACe:Y[:SCALe]:PDIVision?

DISPlay:WINDow[]|2]:TRACe:Y[:SCALe]:RLEVel?

DISPlay:WINDow[1|2]:TRACe:Y[:SCALe]:RPOSition? DISPlay:WINDow[1|2]:TRACe:Y[:SCALe]:RPOSition

FORMat: BORDer

FORMat[:DATA] FORMat: BORDer?

FORMat[:DATA]?

HCOPY: ABORt

HCOB√:DEAŢCG[]|S|3]:COPOX

HCODX: DEATCG[[|S|3]:COPORS

 $HCOP_{Y}: DEVice[1|2|3]: LANGuage$

HCOFY: DEVice [1|2|3]: LANGuage?

HCOb√:DEA;ce[[]|S|3]:MODE

 $HCOb^{\overline{\Lambda}}:DE\Lambda \mathfrak{T}CG[\mathfrak{I}|\mathfrak{Z}|\mathfrak{Z}]:MODE\mathfrak{S}$

HCOPy:DEVice[1|2|3]:RESolution

HCODA: DEAjce[1|5|3]: RESOINTIONS

• HCOPy[:IMMediate]

 $\mathsf{HCOP}_Y : \mathsf{ITEM} : \mathsf{AUNotation} : \mathsf{STATe}$

• HCOPy: ITEM: ANNotation: STATe?

HCOPy:ITEM[1|2|3]:FFEed:STATe

 $HCOP_Y: ITEM[1|2|3]: FFEed: STATe?$

INITiate[1|2]:CONTinuous

INITiate[1|2]:CONTinuous?

• INITiate[1|2][:IMMediate]

| 2000 p. 2000 p | Programmer's Guide | 15-6 |
|--|--------------------|--------------------------------------|
| | | PROGram[:SELected]:NUMBer |
| i | | PROGram[:SELected]:WAME? |
| | | PROGram[:SELected]:WAME |
| | | PROGram[:SELected]:MALLocate? |
| [] | | PROGram[:SELected]:MALLocate |
| <u>[]</u> | | PROGram[:SELected]:EXECute |
| | | PROGram[:SELected]:DELete[:SELected] |
| | | PROGram[:SELected]:DELete:ALL |
| | | PROGram[:SELected]:DEFine? |
| | | PROGram[:SELected]:DEFine |
| | | PROGram:CATalog? |
|) | | <pre>% [aTAT2:] JuqTUO</pre> |
| | | [9TAT2:] JuqTUO |
| | | MMEMory: TRANsfer[:HFS] |
| | | $\mathtt{MMEMory:TRAUslet:BDAT}$ |
| | | MMEMOTY: STORe: TRACe |
| | | MMEMory: STORe: STATe |
| J | | WWEWORX:WZIZS |
| | | WMEWOIX:WZIS |
| | | WWEWOLY: MOVE |
| | | MMEMory: LOAD: STATe |
| icu t | | MMEMory: INITialize |
| | | WMEMOrX:EITE:INEO3 |
| l | | MMEMory: DELete |
| | | WMEMORY: COPY |
| and the same of | | WMEMory: CDIRectory? |
| | | WMEMory: CDIRectory |
| e sout | | WMEMory: CATalog? |

```
SCPI Standard Commands
```

15-7

```
PROGram[:SELected]:STRing?
 PROGram[:SELected]:STRing
 • PROGram[:SELected]:STATe?
  • PROGram[:SELected]:STATe
• PROGram[:SELected]:NUMBer?
```

Programmer's Guide

■ ZENZ [[] | S] : EKE One uch : ZENZ

ZENZe[]:EKEOneucl:CENLers SENSe[]|S]:FREQuency:CENTer ZENZ6[]:DETector[:FUNCTION] SENSe[1|2]:CORRection[:STATe]? SENSe[1|2]:CORRection[:STATe]

SENSe[]|S]:CORRection:RVELocity:COAX SENSe[1|2]:CORRection:OFFSet:PHASe

ZENZG[]:COKKGcfiou:EDELay:TIME ZENZG[]:COKKGCCTOU:CRET[:RELGCC]? SENSe[1|2]:CORRection:CSET[:SELect] ZENZe[]|S]:COBKection:COFFect:SAVE SENSe[1|2]:COKRection:COLLect:METHod

SENSe[1|2]:CORRection:COLLect[:ACQuire]

SENSG[]:BMIDfp[:RESolution]; SENSe[1|2]:BMIDfh[:RESolution]

> SENSe[]:AVERage[:STATe]? SENSe[]|S]:AVERage[:STATe] SENSe[]|S]:AVERage:COUNt? SENSe[]|S]:AVERage:COUNt • PROGram[:SELected]:WAIT? PROGram[:SELected]:WAIT

SENSe[1|2]:CORRection:IMPedance:INPut:MAGNitude

SENZE[]|S]:EKEÖnGUCX:SLYKF
 SENZE[]|S]:EKEÖnGUCX:SLYKF

COMMISSING

CO

| Programmer's Guide | 15-8 |
|--------------------|---|
| | ?noijiansATq:noijsAAG:auTAT; |
| | TATus:OPERation:PTRansition |
| | TATus:OPERation:MTRansition? |
| | TATus:OPERation:MTRansition |
| | TATus:OPERation[:EVENt]? |
| | TATus:OPERation:ENABle? |
| | TATus: OPERation: ENABle |
| | TATus: OPERation: CONDition? |
| | OURce[1 2]:POWer:STOP |
| | OURce[112]:POWer:STARt |
| | OURCe[1 2]:POWer:RANGe |
| | ONECE[1 2]:POWer[:LEVel][:IMMediate][:AMPLitude]? |
| | :OURce[1 2]:POWer[:LEVel][:IMMediate][:AMPLitude] |
| | ENSe[1 2]:SWEep:TIME:AUTO? |
| | EN26[1 2]:SME6p:TIME:AUTO |
| | EN26[1 5]:2ME6D:LIWE3 |
| | ENZ6[1 2]:SME&p:TIME |
| | ENZ6[1 2]:SME6p:POINts? |
| | EN26[1 2]:SME6p:POINts |
| | ENSe: ROSCillator: SOURce? |
| | ENSe: ROSCillator: SOURce |
| | ENSe[I S]:ENNCF;ous |
| | ENSe[1 2]:FUNCtion |
| | ENSe[I S]:FREQuency:STOP? |
| | ENZ6[J S]: EKEÖneuch: SLOB |
| | ?ENZe[1 2]:EKEĞneucy:STARt? |

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• STATus:QUEStionable:COMDition?
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STATus:QUEStionable:ENABle

STATus:QUEStionable:ENABle?

STATus:QUEStionable[:EVENt]?

STATus:QUEStionable:NTRansition? STATus:QUEStionable:WTRansition

STATus:QUEStionable:PTRansition

STATus:QUEStionable:PTRansition?

ZXZLem:BEEPer[:IMMediate]?

ZXZLGw:BEELGt:AOTnwG

SXSLem: BEEDet: NOrnwes

SXSTem:COMMunicate:GPIB[:SELF]:ADDRess? SXSTem:COMMunicate:GPIB[:SELF]:ADDRess

SXSTem:COMMunicate:SERial:TRANsmit:BAUD

SYSTem:COMMunicate:SERial:TRANsmit:BAUD?

SXSTem:DATE

SXSIGW: DYIES

ZXZLGW:EKKOLS

SXSTem:KEY[:VALue]?

SXSIGm: PRESet

SXSLew:SEL

SXSL&m:SEL: PBN5

SXSL6m:LIME

SXSIGW:LIWES

SXSI@m: NEKSion?

• TRACe [:DAAR] • • TRACe[:DATA]

TRIGGer[:SEQuence]:SOURce

IKIcder[:SEQuence]:SOURce?

| p. 444.543 | CALCulate[1 2]:LIMit:SEGMent[1 2 12]:AMPLitude:STOP |
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| | CALCulate[1 2]:LIMit:SEGMent[1 2 12]:AMPLitude:STARt? |
| r******* | CALCulate[1 2]:LIMit:SEGMent[1 2 12]:AMPLitude:STARt |
| , | CALCulate[1 2]:LIMit:MARKer:TILT[:STATe] |
| p | CALCulate[1 2]:LIMit:MARKer:TILT:MINimum |
| | CALCulate[[1 2]:LIMit:MARKer:TILT:MAXimum |
| <i></i> | CALCulate[1 2]:LIMit:MARKer:STATistic:PEAK[:STATe] |
| | CALCulate[1 2]:LIMit:MARKer:STATistic:PEAK:MINimum |
| | CALCulate[[] S]:LIMit:MARKer:STATistic:PEAK:MAXimum |
| | CALCulate[1 2]:LIMit:MARKer:STATistic:MEAU[:STATe] |
| , | CALCulate[1 2]:LIMit:MARKer:STATistic:MEAN:MINimum |
| | • CALCulate[[1 2]:LIMit:MARKer:STATistic:MEAN:MAXimum |
| ,,,,,,,,, | • CALCulate[1 2]:LIMit:MARKer:FREQuency[:STATe] |
| أسيا | • CALCulate[1 2]:LIMit:MARKer:FREQuency:MINimum |
| , | CALCulate[1 2]:LIMit:MARKer:FREQuency:MAXimum |
| | • CALCulate[] S]:LIMit:MARKer:FLATness[:STATe] |
| , | • CALCulate[[1 2]:LIMit:MARKer:FLATness:MIWimum |
| | • CALCulate[[1 2]:LIMit:MARKer:FLATness:MAXimum |
| , | CALCulate[1 2]:LIMit:DISPlay? |
| | • CALCulate[1 2]:LIMit:DISPlay |
| | • CALCulate[1 2]:FORMat:UNIT:MLOG? |
| | • CALCulate[1 2]:FORMat:UNIT:MLOG |
| | • CALCulate[1 2]:FORMat:UNIT:MLIN? |
| | • CALCulate[1 2]:FORMat:UNIT:MLIN |
| and the second | The following are instrument specific commands implemented by the 8712ET/ES and 8714ET/ES RF Network Analyzers which are not part of the present SCPI 1996.0 definition. |
| 1 1 A 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | Instrument Specific Commands |

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• CPPCnJate[1|2]:LIMit:SEGMent[1|2|...12]:AMPLitude:STOP?
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CALCulate[1|2]:LIMit:SEGMent:AOFF

• CALCulate[1|2]:LIMit:SEGMent[1|2|...12]:FREQuency:STARt

• CALCulate[1|2]:LIMit:SEGMent[1|2|...12]:FREQuency:STARt?

CALCulate[1|2]:LIMit:SEGMent[1|2|...12]:FREQuency:STOP? CYPCnޤfe[1|S]:LIMŢf:SECWeuf[1|S|"ŢS]:FREQuency:STOP

CALCulate[1|2]:LIMit:SEGMent[1|2|...12]:POWer:STOP

• CALCulate[1|2]:LIMit:SEGMent[1|2|...12]:POWer:STOP?

• CALCulate[1|2]:LIMit:SEGMent[1|2|...12]:STATe

CALCulate[1|2]:LIMit:SEGMent[1|2|...12]:STATe?

• CALCulate[1|2]:LIMit:SEGMent[1|2|...12]:TYPE

CALCulate[1|2]:LIMit:SEGMent[1|2|...12]:TYPE?

CALCulate[1|2]:MARKer:BWIDth CALCulate[1|2]:MARKer:AOFF

• CALCulate[1|2]:MARKer:BWIDth?

• CALCulate[1|2]:MARKer:FUNCtion:RESult?

CALCulate[1|2]:MARKer:FUNCtion[:SELect]

• CALCulate[1|2]:MARKer:FUNCtion[:SELect]?

CALCulate[1|2]:MARKer:FUNCtion:TRACking

CALCulate[1|2]:MARKer:FUNCtion:TRACking?

CALCulate[1|2]:MARKer[1|2|...8]:GDELay?

• CALCulate[1|2]:MARKer[1|2|...8]:MAXimum

• CALCulate[1|2]:MARKer[1|2|...8]:MAXimum:LEFT

CALCulate[1|2]:MARKer[1|2|...8]:MAXimum:RIGHt

• CALCulate[1|2]:MARKer[1|2|...8]:MINimum

• CALCulate[1|2]:MARKer[1|2|...8]:MINimum:LEFT

CALCulate[1|2]:MARKer[1|2|...8]:MINimum:RIGHt

• CALCulate[1|2]:MARKer:MODE

| (······) | Programmer's Guide | 15-15 |
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| | | |
| ···· | | • DIAGROStic:CCONstants:STORe:DISK |
| | | • DIAGnostic:CCONstants:LOAD |
| Lucia | | • DIAGnostic:CCONstants:INSTalled? |
| | | CONTrol[1 2]:MULTiport:STATE |
| <u> </u> | | • COME; dure; |
| | | • COME; dance |
| ļ | | CALibration:SELF:ALL |
| | | CALibration:SELF:TIMER |
| | | • CALibration:SELF |
| | | CALCulate[1 2]:MARKer[1 2 8]:Y:RESistance? |
| | | CALCulate[1 2]:MARKer[1 2 8]:Y:REACtance? |
| , | | CALCulate[1 2]:MARKer[1 2 8]:Y:PHASe? |
| f===1 | | CALCulate[1 2]:MARKer[1 2 8]:Y:MAGNitude? |
| l so-so-d | | • CALCulate[1 2]:MARKer[1 2 8]:Y:INDuctance? |
| f****1 | | • CALCulate[1 2]:MARKer[1 2 8]:Y? |
| | | • CALCulate[1 2]:MARKer[1 2 8]:X:ABS |
| (******) | | • CALCulate[1 2]:MARKer[1 2 8]:X? |
| | | • CALCulate[1 2]:MARKer[1 2 8]:X |
| 11117 | | • CALCulate[1 2]:MARKer[1 2 8]:TARGet? |
| | | • CALCulate[1 2]:MARKer[1 2 8]:TARGet |
| [] | | • CALCulate[1 2]:MARKer[1 2 8][:STATe]? |
| | | • CALCulate[1 2]:MARKer[1 2 8][:STATe] |
| () | | CALCulate[1 2]:MARKer:REFerence:Y? |
| | | CALCulate[1 2]:MARKer:REFerence:X? |
| | | • CALCulate[[]:MARKer[] 2 8]:POINt? |
| | | • CALCulate[1 2]:MARKer[1 2 8]:POINt |
| [] | | • CALCulate[1 2]:MARKer:NOTCh |
| Congression | | CALCulate[1 2]:MARKer:MODE? |

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• DIAGnostic:CCONstants:STORe:EEPRom
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DIAGnostic: COMMunicate: LAN: PING: IPADress MMI:DNIG:UAL:estspinuMMOD:piteonDAIG

• DIAGnostic:COMMunicate:LAM:SEND

- DIAGnostic:MDISplay[1|2]:CORRection C_DIRECT
- DIAGnostic:MDISplay[1|2]:CORRection C_ISOLATION
- DIAGnostic:MDISplay[1|2]:CORRection C_LDMATCH
- DIAGnostic:MDISplay[1]2]:CORRection C_RTRACKING
- DIAGnostic:MDISplay[1|2]:CORRection C_SRCMATCH
- DIAGnostic:MDISplay[1|2]:CORRection C_TTRACKING
- DIAGnostic:MDISplay[1|2]:CORRection I_DIRECTivity
- DIAGnostic:MDISplay[1|2]:CORRection I_RESPONSE
- DIAGnostic:MDISplay[1|2]:CORRection I_SRCMATCH
- DIAGnostic:MDISplay[1|2]:CORRection I_TRACKING
- DIAGnostic:MDISplay[1|2]:CORRection M_DIRECTivity
- DIAGnostic: MDISplay[1|2]: CORRection M_RESPONSE
- DIAGnostic:MDISplay[1|2]:CORRection M_SRCMATCH
- DIAGnostic:MDISplay[1|2]:CORRection M_TRACKING
- DIAGnostic:MDISplay[1|2]:CORRection M_XSCALAR
- DIAGnostic:MDISplay[1|2]:REST
- DIAGnostic:DITHer
- DIAGnostic:DITHer?
- DIAGnostic:SNUMber
- DIAGnostic:SNUMber?
- DIAGnostic:SPUR:AVOid
- DIAGnostic:SPUR:AVOid?
- DISPlay: ANNotation: CHANnel[1|2][:STATe]

• DISPlay: ANNotation: CHANnel[1|2]: USER: LABel[:DATA]

DISPlay: ANNotation: MARKer[1|2][:STATe]? DISPlay: ANNotation: MARKer[1|2][:STATe] • DISPlay:ANNotation:MARKer[1|2]:NUMBers[:STATe] • DISPlay: ANNotation: LIMit: ICON[]:STATe DISPlay: ANNotation: LIMit: ICON[1|2]: TEXT DISPlay: ANNotation: LIMit: ICON[1|2]: POS: Y DISPlay: ANNotation: LIMit: ICON[1|2]: POS:X DISPlay: ANNotation: LIMit: ICON[1|2]: FLAG DISFlay: ANNotation: FREQuency[1|2]: USER: SUFFIX • DISPlay: AMMotation: FREQuency[1|2]: USER: STOP • DISPlay: ANNotation: FREQuency[1|2]: USER[:STATe] DISPLAY: ANNotation: FREQuency[1|2]: USER: STARt DISPlay: AMMotation: FREQuency[l|2]:USER: LABel[:DATA] DISPlay: ANNotation: FREQuency[1|2][:STATe] DISEJay: ANNotation: FREQuency: RESolution? DISPlay:ANNotation:FREQuency:RESolution DISPLAY: ANNotation: FREQuency [1 | 2]: MODE? DISPlay: AMMotation: FREQuency [1|2]: MODE PISPlay:AUNotation:CLOCk:SEConds[:STATe]? DISPlay: ANNotation: CLOCk: SEConds[:STATe] ■ DISPlay: ANNotation: CLOCk: MODE? DISPlay: ANNotation: CLOCk: MODE DISPlay: ANNotation: CLOCk: DATE: MODE? DISPlay: ANNotation: CLOCk: DATE: MODE • DISPlay: ANNotation: CLOCk: DATE: FORMat? • DISPlay: ANNotation: CLOCk: DATE: FORMat ■ DISPlay:AMMotation:CHAMnel[1|2]:USER[:STATe]

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DISPlay:ANNotation:MESSage:AOFF

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- DISPlay: ANNotation: MESSage[:DATA]? • DISPlay: ANNotation: MESSage: CLEar
- DISPlay: ANNotation: MESSage: STATe
- DISPlay: ANNotation: MESSage: STATe?
- ATAG: [2|1] adTIT: noitstoNNA: ys1q2IG
- PISPlay: TATAG: [2|1] ⇒JTIT: ποίσετοΝΜΑ: γείq2Id
- [9TAT2:]91TIT:noitstoNNA: \glq SIGIG
- PISPlay: ANNotation: TITLe [9TATE] ?
- DISPlay: ANNotation: YAXis: MODE
- [9TAT2:]sixAY:noitstoWNA:qs[qs]q DISPlay: ANNotation: YAXis: MODE?
- DISPlay: ANNotation: YAXis[:STATe]?

- DISPlay: CMAP: COLor[1|2|...16]: GREYscale
- DISPlay: CMAP: SCHeme
- DISPlay:FORMat
- DISBJSX:EORWSTS
- DISPLAY: FORMat: EXPAND
- DISPlay: MENU: RECall: FAST[:STATe]
- DISETay:PROGram[:MODE]
- DISEJay:PROGram[:MODE]?
- DISPlay:WIMDow:GRAPhics:BUFFer[:STATe]
- DISPlay: WINDow: GRAPhics: BUFFer [:STATe]?
- DISPlay:WINDow[1|2|10]:GRAPhics:CIRCle
- DISELAY:WINDOW[1|2|10]:GRAPhics:LABel:FONT
- DISETay:WINDow[1|2|10]:GRAPhics:LABel:FONT?
- DISETAY:WINDOW[1|2|10]:GRAPhics:RECTangle
- DISPlay:WINDow[1|2|10]:TRACe[1|2]:Y:TRACk
- HCOPy: DEVice: PAGE: MARGin: LEFT

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|--------------------|---|
| | MMEMory:STORe:STATe:ISTate |
| | MMEMory: STORe: STATe: CORRection? |
| | MMEMOry:STORe:STATe:CORRection |
| | WMEMory: RDIRectory |
| | WMEMory: MDIRectory |
| | INPut:GAIN:SETTing |
| | OTUA: MIAD: JuquI |
| | $\mathtt{HCOb}^{ar{\lambda}} : \mathtt{FFGE} : \mathtt{MIDLPS}$ |
| | HCOP⅓: b∀GE: MIDIP |
| | HCOPy:PAGE:ORlentation? |
| | HCOPy:PAGE:ORlentation |
| | HCOPY:PAGE:MARGin:TOP? |
| | $\mathtt{HCOp} \mathtt{A} : \mathtt{FFGE} : \mathtt{MFKGin} : \mathtt{TOp}$ |
| | $HCOp^{\lambda}\colon \mathtt{byce}: \mathtt{Myketn}: \mathtt{rells}$ |
| | $\mathtt{HCOP}_{\mathtt{A}}:\mathtt{FAGE}:\mathtt{MARG}\mathtt{in}:\mathtt{FEFT}$ |
| | $\mathtt{HCOP}_{\mathtt{A}}:\mathtt{ILEM}:\mathtt{LKPCe}:\mathtt{SLYLe}$? |
| | $\mathtt{HCOP}_{\mathtt{Y}}:\mathtt{ITEM}:\mathtt{TRACe}:\mathtt{STATe}$ |
| | $\texttt{HCOP}{\lambda}: \texttt{ILEM}: \texttt{LILFe}: \texttt{SLYLe} \S$ |
| | HCOPy:ITEM:TITLe:STATe |
| | $\texttt{HCOP}{\tt \lambda}: \texttt{ITEM}: \texttt{MARKet}: \texttt{STATe} \texttt{?}$ |
| | $\texttt{HCOP}{\mathtt{Y}}: \mathtt{ITEM}: \mathtt{MARKet}: \mathtt{STATe}$ |
| | HCOPy:ITEM:GRATicule:STATe? |
| | HCOPy:ITEM:GRATicule:STATe |
| | $\text{HCOp}_{X}: \text{DEAtce}: \text{FOKTS}$ |
| | HCOPy:DEVice:PORT |
| | HCOb√:DEAŢC€: byce:MIDTh |
| | HCOPy: DEVice: PAGE: ORlentation |

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MMEMory:STORe:STATe:ISTate?MMEMory:STORe:STATe:TRACe
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• MMEMory:STORe:STATe:TRACe?

● MMEMory:STORe:STATe:TSCAL

■ MMEMory: STORe: TRACe

MMEMory: STORe: TRACe: FORMat

• MMEMory: TRANsfer: BDAT

DOMET/[1|S]:MODEMWEWOTY:TRANSfer[:HFS]

. . .

ROUTe[[]2]:REFLection:PATH:DEFine:PORT
 ROUTe[]2]:REFLection:PATH:DEFine:PORT

• ROUTe[1|2]:TRANsmissins:PATH:DEFine:PORT

• SENSe[1|2]:AVERage:CLEar

• SENSe[1|2]:CORRection:CAPacitance:CONNector(Option 100 only)

• SENSe[1|2]:CORRection:CAPacitance:CONNector?(Option 100 only)

• SENSe[1|2]:CORRection:COLLect:ABORt

• SENSe[1|S]:CORRection:COLLect:CKIT[:SELect]

• SENZe[]|S]:COBBection:COFFect:CKII[:SEFect];

• SENSe[1|2]:CORRection:COLLect:ISTate[:AUTO]

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• SENSe[1|2]:CORRection:COLLect:ISTate[1AUTO]?

• SENSe[1|2]:CORRection:COLLect:PORTS

■ SENSe[1|S]:COKKection:COLLect:MP:OPEN

SENSe[1|2]:CORRection:COLLect:MP:SHORT

• SENSe[1|2]:CORRection:COLLect:MP:LOAD

• SENSe[]|S]:CORRection:COLLect:MP:THRU

• SENSe[1|2]:CORRection:COLLect:VERify:TRANsmission

• SENZe[]|S]:COKKection:COPrect:VERify:ReFlection

• SENSe[1|2]:CORRection:EXTension[:STATe]

SENSe[1|2]:COKKection:EXTension:KEFLection[:TIME]

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| t | |
| | • SENSe: FREQuency: SPAN: MAXimum? (Option 100 only) |
| 1 | SENSe: FREQuency: MODE? (Option 100 only) |
| | • SENSe:FREQuency:MODE (Option 100 only) |
| `` | • SENSe:DISTance:UNITa? (Option 100 only) |
| | • SENSe:DISTance:UNITs (Option 100 only) |
| \J | • SENSe:DISTance:STOP? (Option 100 only) |
| (| • SENSe:DISTance:STOP (Option 100 only) |
| \3 | • SENSe:DISTance:STARt? (Option 100 only) |
| | • SENSe:DISTance:STARt (Option 100 only) |
| i | • SENSe[1 2]:DETector[:FUNCtion]? |
| | • SENSe[1 2]:DETector[:FUNCtion] |
| () | • RENSE:CONFLE? |
| | • REMRG:CONFLE |
| i | • SENSe[1 2]:CORRection:THReshold:COAX? (Option 100 only) |
| | • SEMSe[1 2]:CORRection:THReshold:COAX (Option 100 only) |
| \ | • SENSe[1 2]:CORRection:TESTSET |
| | SENSe[1 2]:CORRection:RVELocity[:IMMediate] (Option 100 only) |
| l | • SEMSe[1 2]:CORRection:PEAK:COAX? (Option 100 only) |
| | • SENSe[1 2]:CORRection:PEAK:COAX (Option 100 only) |
| i | • SENSe[] S]:CORRection:MODel:CONNector[:IMMediate] (Option 100 only) |
| | • SENSe[] S]:CORRection:LOSS:COAX? (Option 100 only) |
| L | • SENSe[1 2]:CORRection:LOSS:COAX (Option 100 only) |
| | • SENSe[1 2]:CORRection:Length:CONNector?(Option 100 only) |
| Complete Co. | • SENSe[1 2]:CORRection:LENGth:CONNector (Option 100 only) |
| | • SENSe[1 2]:CORRection:LENGth:COAX? (Option 100 only) |
| l.,i | • SENSe[1 2]:CORRection:Length:COAX (Option 100 only) |
| | • SENSe[] S]:CORRection:IMPedance:IMPut:MAGNitude:SELect |
| i | • SENSe[1 2]:CORRection:EXTension:TRANsmission[:TIME] |
| | |

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• SENSe: FREQuency: SPAN: MAXimum (Option 100 only)
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- SENSe: FREQuency: ZSTop? (Option 100 only)
- SENSe: FUNCtion: SRL: IMPedance (Option 100 only)
- SENSe: FUNCtion: SRL: IMPedance? (Option 100 only)
- SENSe: FUNCtion: SRI: MODE (Option 100 only)
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- BENSE: ELINGF; OB: SET: WODES (Obtion 100 only)
- SENSe: FUNCtion: SRL: SCAN[:IMMediate] (Option 100 only)
- SENSe[1|2]:STATe
- _ . _
- ZENZ6:ZME6b:LKIGd6x:ZONKC6ZENZ6:ZME6b:LKIGd6x:ZONKC6
- SENSe:WINDOW[:TYPE] (Option 100 only)
- SENSe: MINDOW [: TYPE]? (Option 100 only)
- STATus:DEVice:CONDition?
- STATus:DEVice:ENABle
- STATus:DEVice:ENABle?
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- STATus:DEVice:MTRansition?
- STATus:DEVice:PTRansition? STATus:DEVice:PTRansition?
- STATus:OPERation:AVERaging:CONDition?
- STATus:OPERation:AVERaging:ENABle
- STATus:OPERation:AVERaging:ENABle?
- STATus:OPERation:AVERaging[:EVENt]?
- STATus:OPERation:AVERaging:WTRansition
- STATus:OPERation:AVERaging:WTRansition?

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|--|--------------------|--|
| | | • SYSTem:COMMunicate:GPIB:MMEMory:UNIT |
| ll | | • SYSTem:COMMunicate:GPIB:MMEMory:ADDRess? |
| | | • SYSTem:COMMunicate:GPIB:MMEMory:ADDRess |
| () | | SXSIem:COMMunicate:GFIB:HCOPy:ADDRess? |
| · | | SXSTem:COMMunicate:GPIB:HCOPy:ADDRess |
| łl | | • SXSIem:COMMunicate:GPIB:ECHO? |
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| i | | • SYSTem:COMMunicate:GPIB:CONTroller[:STATe]? |
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| L) | | • STATus:QUEStionable:LIMit:PTRansition? |
| of the state of th | | • STATus:QUEStionable:LIMit:PTRansition |
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| 1 | | • STATus:PRESet |
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| \I | | • STATUs:OPERation:MEASuring:PTRansition |
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| | | STATus:OPERation:AVERaging:PTRansition? |
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• SYSTem:COMMunicate:GPIB:MMEMory:UNIT?
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- SYSTem: COMMunicate: GPIB: MMEMory: VOLume
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- SYSTem:COMMunicate:LAN:ROUTe:GATeway

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- SYSTem: COMMunicate: LAM: ROUTe: SMASk
- SYSTem: COMMunicate: LAN: ROUTe: SMASk?
- SYSTem: COMMunicate: LAN: STATe
- SYSTem:COMMunicate:LAN:STATe?
- SYSTem: COMMunicate: SERial: TRANsmit: HANDshake
- SYSTem:COMMunicate:SERial:TRANsmit:HANDshake?
- SYSTem:COMMunicate:TTL:USER:FEED
- ZXZLem:COMMunicate:TTL:USER:FEED?
- ZXZLGm:KEX:MASK?
- SXSLem:KEX:QUEue:CLEar
- SYSTem:KEY:QUEue:COUNt?
- SYSTem:KEY:QUEue:MAXimum?
- SXSIem:KEY:QUEue[:STATe]
- SXSTem:KEY:QUEue[:STATe]?
- SXSLGW:KEX:LXBES
- SXS16m:KEX:USEK
- ZXZLEW: ZEL: FKNFoud

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| ng a garage | | | • TEST: SELect | |
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13-1

ZCBI Error Messages

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Programmer's Guide

Command Errors

An error/event number in the range -199 to -100 indicates that an IEEE 488.2 syntax error has been detected by the instrument's parser. The occurrence of any error in this class shall cause the command error bit (bit 5) in the event status register (IEEE 488.2, section 11.5.1) to be set. One of the following events has occurred:

- An IEEE 488.2 syntax error has been detected by the parser. That is, a controller-to-device message was received which is in violation of the IEEE 488.2 standard. Possible violations include a data element which violates the device listening formats or whose type is unacceptable to the device.
- An unrecognized header was received. Unrecognized headers include incorrect device-specific headers and incorrect or unimplemented IEEE 488.2 common commands.
- A Group Execute Trigger (GET) was entered into the input buffer inside of an IEEE 488.2 program message.

Events that generate command errors shall not generate execution errors, device-specific errors, or query errors; see the other error

| KLLOLZ | Command | RCFL |
|--------|---------|------|
|--------|---------|------|

| 1.81 | Table |
|------|-------|
| | |

| Error Description | ултрег Китог |
|--|-----------------|
| Command error — This is the generic syntax error for devices that cannot detect more specific errors. This code indicates only that a Command Error has occurred. | 00T- |
| Invalid character — A syntactic element contains a character which is invalid for that type; for example, a header containing an amperaand, SETUP&. This error might be used in place of errors –114, –121, –141, and perhaps some others. | 101- |
| Syntax error — An unrecognized command or data type was encountered; for example, a string was received when the device does not accept strings. | 201- |
| Invalid separator — The parser was expecting a separator and encountered an illegal character; for example, the semicolon was omitted after a program message unit, *EMC 1:CH1:VOLTS 5. | 601- |
| Data type error — The parser recognized a data element different than one allowed; for example, numeric or string data was expected but block data was encountered. | ₽ 01− |
| GET not allowed — A Group Execute Trigger was received within a program message. | 901- |
| Parameter not allowed — More parameters were received than expected for the header; for example, the *EMC common command only accepts one parameter, so receiving *EMC 0 , 1 is not allowed. | 801- |
| Missing parameter — Fewer parameters were received than required for the header; for example, the *EMC common command requires one parameter, so receiving *EMC is not allowed. | 601- |
| Command header error — An error was detected in the header. This error message should be used when the device cannot detect the more specific errors described for errors —111 through —119. | 011- |
| Header separator error — A character which is not a legal header separator was encountered while parsing the header; for example, no white space followed the header, thus *GMC"MACRO" is an error. | 111- |

| Error Description | Krror Number |
|--|-----------------|
| Program mnemonic too long — The header contains more that twelve characters. | 211- |
| Undefined header — The header is syntactically correct, but it is undefined for this specific device; for example, $\star XYX$ is not defined for any device. | 811- |
| Header suffix out of range — The value of a numeric suffix attached to a program mnemonic makes the header invalid. | ₽ []- |
| Numeric data error — This error, as well as errors –121 through –129, are generated when parsing a data element which appears to be numeric, including the nondecimal numeric types. This particular error message should be used if the device cannot detect a more specific error. | 021- |
| Invalid character in number — An invalid character for the data type being parsed was encountered; for example, an alpha in a decimal numeric or a "9" in octal data. | 121- |
| Exponent too large — The magnitude of the exponent was larger than 32000. | -123 |
| Too many digits — The mantissa of a decimal numeric data element contained more than 255 digits excluding leading zeros. | -124 |
| Numeric data not allowed — A legal numeric data element was received, but the device does not accept one in this position for the header. | 821- |
| Suffix error — This error, as well as errors –131 through –139, are generated when parsing a suffix. This particular error message should be used if the device cannot detect a more specific error. | 081- |
| Invalid suffix — The suffix does not follow the correct syntax, or the suffix is inappropriate for this device. | 181- |
| Suffix too long — The suffix contained more than 12 characters. | ₽ 81− |
| Suffix not allowed — A suffix was encountered after a numeric element which does not allow suffixes. | 861- |
| Character data error — This error, as well as errors –141 through –149, are generated when parsing a character data element. This particular error message should be used if the device cannot detect a more specific error | 0∳I− |

message should be used if the device cannot detect a more specific error.

| Error Description | Error Number |
|--|-----------------|
| Invalid character data — Either the character data element contains an invalid character or the particular element received is not valid for the header. | 141- |
| Character data too long — The character data element contains more than twelve characters. | ₽ ₽[− |
| Character data not allowed — A legal character data element was encountered where prohibited by the device. | 841- |
| String data error — This error, as well as errors –151 through –159, are generated when parsing a string data element. This particular error message should be used if the device cannot detect a more specific error. | -120 |
| Invalid string data — A string data element was expected, but was invalid for some reason. For example, an END message was received before the terminal quote character. | -121 |
| String data not allowed — A string data element was encountered but was not allowed by the device at this point in parsing. | -158 |
| Block data error — This error, as well as errors –161 through –169, are generated when parsing a block data element. This particular error message should be used if the device cannot detect a more specific error. | 091- |
| Invalid block data — A block data element was expected, but was invalid for some reason. For example, an END message was received before the length was satisfied. | 191- |
| Block data not allowed — A legal block data element was encountered but was not allowed by the device at this point in parsing. | 891- |
| Expression error — This error, as well as errors —171 through —179, are generated when parsing an expression data element. This particular error message should be used if the device cannot detect a more specific error. | 041- |
| Invalid expression — The expression data element was invalid (for example, unmatched parentheses or an illegal character). | T <i>L</i> T- |
| Expression data not allowed — A legal expression data was encountered but was not allowed by the device at this point in parsing. | 871- |

Command Errors

| Error Description | Ктог Китрег |
|--|----------------|
| Macro error — This error, as well as errors –181 through –189, are generated when defining or executing a macro. This particular error message should be used if the device cannot detect a more specific error. | 081- |
| Invalid outside macro definition — Indicates that a macro parameter placeholder (\$ <number) a="" definition.<="" encountered="" macro="" of="" outside="" td="" was=""><td>181-</td></number)> | 181- |
| Invalid inside macro definition — Indicates that the program message unit sequence, sent with a *DDT or *DMC command, is syntactically invalid. | -183 |
| Macro parameter error — Indicates that a command inside the macro | ₽ 8I− |

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| | | Errors | uopnoex |
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| of the second se | NVOMOOG GIVEN VIV GIVONAVIVION |
| | Events that generate execution errors shall not generate Command Errors, device-specific errors, or Query Errors; see the other error definitions in this section. |
| A contract of the contract of | Execution errors shall be reported by the device after rounding and expression evaluation operations have taken place. Rounding a numeric data element, for example, shall not be reported as an execution error. |
| | A valid program message could not be properly executed due to some device condition. |
| A | A program data element following a header was evaluated by the device as outside of its legal input range or is otherwise inconsistent with the device's capabilities. |
| | (bit 4) in the event status register to be set. One of the following events has occurred: |
| Property of the second | An error/event number in the range -299 to -200 indicates that an error has been detected by the instrument's execution control block. The occurrence of any error in this class shall cause the execution error bit |
| The state of the s | Execution Errors |

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Programmer's Guide

SCPI Execution Errors

Table 13-2

| Error Description | Егтог Number |
|---|-----------------|
| Execution error — This is the generic syntax error for devices that cannot detect more specific errors. This code indicates only that an Execution Error has occurred. | 002- |
| Invalid while in local — Indicates that a command is not executable while the device is in local due to a hard local control; for example, a device with a rotary switch receives a message which would change the switches state, but the device is in local so the message can not be executed. | 102- |
| Settings lost due to rtl — Indicates that a setting associated with a hard local control was lost when the device changed to LOCS from REMS or to LWLS from RWLS. | 202- |
| Command protected — Indicates that a legal password-protected program command or query could not be executed because the command was disabled. | 802- |
| Trigger error | -210 |
| Trigger ignored — Indicates that a GET, *TRG, or triggering signal was received and recognized by the device but was ignored because of device timing considerations; for example, the device was not ready to respond. | 112- |
| Arm ignored — Indicates that an arming signal was received and recognized by the device but was ignored. | 212 |
| Init ignored — Indicates that a request for a measurement initiation was ignored as another measurement was already in progress. | -213 |
| Trigger deadlock — Indicates that the trigger source for the initiation of a measurement is set to GET and subsequent measurement query is received. The measurement cannot be started until a GET is received, but the GET would cause an INTERRUPTED error. | † 12- |
| Arm deadlock — Indicates that the arm source for the initiation of a measurement is set to GET and subsequent measurement query is received. The measurement cannot be started until a GET is received, but the GET would cause an INTERRUPTED error. | s212- |

| Error Description | Error Number | | | |
|---|-----------------|--|--|--|
| Parameter error — Indicates that a program data element related error occurred. This error message should be used when the device cannot detect the more specific errors -221 through -229. | -220 | | | |
| Settings conflict — Indicates that a legal program data element was parsed but could not be executed due to the current device state. | 122- | | | |
| Data out of range — Indicates that a legal program data element was parsed but could not be executed because the interpreted value was outside the legal range as defined by the device. | -222 | | | |
| Too much data — Indicates that a legal program data element of block, expression, or string type was received that contained more data than the device could handle due to memory or related device-specific requirements. | -223 | | | |
| Illegal parameter value — U sed where an exact value, from a list of possible values, was expected. | ₽27- | | | |
| Out of memory — The device has insufficient memory to perform the requested operation. | -225 | | | |
| Lists not same length — Attempted to use LIST structure having individual LIST's of unequal lengths. | 927- | | | |
| Data corrupt or stale — Possibly invalid data; new reading started but not completed since last access. | -230 | | | |
| Data questionable — Indicates that measurement accuracy is suspect. | 162- | | | |
| Invalid format — Indicates that a legal program data element was parsed but could not be executed because the data format or structure is inappropriate, such as when loading memory tables or when sending a SYSTem: SET parameter from an unknown instrument. | | | | |
| Invalid version — Indicates that a legal program data element was parsed but could not be executed because the version of the data is incorrect to the device. This particular error should be used when file or block data formate are recognized by the instrument but cannot be executed for reasons of version incompatibility. For example, an unsupported file version, or an unsupported instrument version. | -233 | | | |

Execution Errors

| Error Description | Zaror Karor |
|--|----------------|
| Hardware error — Indicates that a legal program command or query could not be executed because of a hardware problem in the device-specific. This error message should be used when the device cannot detect the more specific errors described for errors —241 through —249. | 0₱⋜− |
| Hardware missing — Indicates that a legal program command or query could not be executed because of missing device hardware; for example, an option was not installed. Definition of what constitutes missing hardware is completely device-specific. | 142- |
| Mass storage error — Indicates that a mass storage error occurred. This error message should be used when the device cannot detect the more specific errors described for errors —251 through —259. | -520 |
| Missing mass storage — Indicates that a legal program command or query could not be executed because of missing mass storage; for example, an option that was not installed. Definition of what constitutes missing massstorage is device-specific. | -521 |
| Missing media — Indicates that a legal program command or query could not be executed because of a missing media; for example, no disk. The definition of what constitutes missing media is device-specific. | -252 |
| Corrupt media — Indicates that a legal program command or query could not be executed because of corrupt media; for example, bad disk or wrong format. The definition of what constitutes corrupt media is device-specific. | -523 |
| Media full — Indicates that a legal program command or query could not be executed because the media was full; for example, there is no room on the disk. The definition of what constitutes a full media is device-specific. | - 254 |
| Directory full — Indicates that a legal program command or query could not be executed because the media directory was full. The definition of what constitutes a full media directory is device-specific. | -255 |
| File name not found — Indicates that a legal program command or query could not be executed because the file name on the device media was not found; for example, an attempt was made to read or copy a nonexistent file. The definition of what constitutes a file not being found is device-specific. | 927- |

| Errors | Execution |
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| Error Description | Number Error |
|---|-----------------|
| File name error — Indicates that a legal program command or query could not be executed because the file name on the device media was in error; for example, an attempt was made to copy to a duplicate file name. The definition of what constitutes a file name error is device-specific. | 752– |
| Media protected — Indicates that a legal program command or query could not be executed because the media was protected; for example, the write-protect tab on a disk was present. The definition of what constitutes protected media is device-specific. | -528 |
| Expression error — Indicates that an expression program data element related error occurred. This error message should be used when the device cannot detect the more specific errors described for errors –261 through –269. | 097- |
| Math error in expression — Indicates that a syntactically legal expression program data element could not be executed due to a math error; for example, a divide-by-zero was attempted. The definition of math error is device-specific. | 197- |
| Macro error — Indicates that a macro-related execution error occurred. This error message should be used when the device cannot detect the more specific errors -271 through -279. | 072- |
| Macro syntax error — Indicates that a syntactically legal macro program data sequence could not be executed due to a syntax error within the macro definition. | 172- |
| Macro execution error — Indicates that a syntactically legal macro program data sequence could not be executed due to some error in the macro definition. | ZLZ- |
| Illegal macro label — Indicates that the macro label defined in the *DMC command was a legal string syntax, but could not be accepted by the device; for example, the label was too long, the same as a common command header, or contained invalid header syntax. | £72- |
| Macro parameter error — Indicates that the macro definition improperly used a macro parameter placeholder. | ₽ 1 2- |

Execution Errors

| Error Description | Кетог Катор |
|---|----------------|
| Macro definition too long — Indicates that a syntactically legal macro program data sequence could not be executed because the string or block contents were too long for the device to handle. | 272 – |
| Macro recursion error — Indicates that a syntactically legal macro program data sequence could not be executed because the device found it to be recursive. | 912- |
| Macro redefinition not allowed — Indicates that a syntactically legal macro label in the $\star {\tt DMC}$ command could not be executed because the macro label was already defined. | <i>LL</i> 7- |
| Macro header not found — Indicates that a syntactically legal macro label in the \star GMC? query could not be executed because the header was not previously defined. | 872- |
| Program error — Indicates that a downloaded program-related execution error occurred. This error message should be used when the device cannot detect the more specific errors —281 through —289. A downloaded program is used in the program and the mechanism for downloading a program is device-specific. | 087- |
| Cannot create program — Indicates that an attempt to create a program was unsuccessful. One reason for failure might include not enough memory. | 182- |
| Illegal program name — The name used to reference a program was invalid; for example, redefining an existing program, deleting a nonexistent program, or in general, referencing a nonexistent program. | Z8Z- |
| Illegal variable name — An attempt was made to reference a nonexistent variable in a program. | -283 |
| Program currently running — Certain operations dealing with programs may be illegal while the program is running; for example, deleting a running program might not be possible. | ₽8 7− |
| Program syntax error — Indicates that a syntax error appears in a downloaded program. The syntax used when parsing the downloaded program is device-specific. | -285 |
| Program runtime error | 983- |

| I. A DT0 device always ignores GET and treats $*$ TRG as a Command Error. | | |
|---|----------------|--|
| Incompatible type — Indicates that the type or structure of a memory item is inadequate. | ₹6 7 | |
| Referenced name already exists | -293 | |
| Referenced name does not exist | 767 | |
| Опт от те | 167- | |
| Memory use error — Indicates that a user request has directly or indirectly caused an error related to memory or data_handles (this is not the same as "bad" memory). | 067- | |
| Error Description | Zeror Krror | |

Device-Specific Errors

An error/event number in the range -399 to -300 or 1 to 32767 indicates that the instrument has detected an error which is not a command error, a query error, or an execution error. It indicates that some device operations did not properly complete, possibly due to an abnormal hardware or firmware condition. These codes are also used for self-test response errors. The occurrence of any error in this class should cause the device-specific error bit (bit 3) in the event status register to be set.

The meaning of positive error codes is device-dependent and may be enumerated or bit mapped; the error message string for positive error codes is not defined by SCPI and available to the device designer. Note that the string is not optional; if the designer does not wish to implement a string for a particular error, the null string should be sent (for example, 42). The occurrence of any error in this class should cause the device-specific error bit (bit 3) in the event status register to be set. Events that generate device-specific errors bit (bit 3) in the event status register to be set. Events that generate device-specific errors in this section errors, or query errors; see the other error definitions in errors, execution errors, or query errors; see the other error definitions in this section.

| SIGLIST | эшээдс | -aataar | TITO |
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Table 13-3

| Error Description | Zeror Krror |
|---|----------------|
| Device-specific error — This is the generic device-dependent error for devices that a Device-Dependent Error has occurred. | -300 |
| System error — Indicates that some error, termed "system error" by the device, has occurred. This code is device-dependent. | -310 |
| Memory error — Indicates that an error was detected in the device's memory. The scope of this error is device-dependent. | 118- |
| PUD memory lost — Indicates that the protected user data saved by the *PUD command has been lost. | 218- |
| Calibration memory lost — Indicates that nonvolatile calibration data used by the *CAL? command has been lost. | £18- |
| Save/recall memory lost — Indicates that the nonvolatile data saved by the $\star \texttt{SAV}$ command has been lost. | ₽ 18− |
| Configuration memory lost — Indicates that nonvolatile configuration data saved by the device has been lost. The meaning of this error is device-specific. | 315– |
| Self-test failed. | -330 |
| Queue overflow — A specific code entered into the queue in lieu of the code that caused the error. This code indicates that there is no room in the queue and an error occurred but was not recorded. | -320 |
| Communication error — This is the generic communication error for devices that cannot detect the more specific errors –361 through –363. | 098- |
| Parity error in program message — Parity bit not correct when data received, for example, on a serial port. | 198– |
| Framing error in program message — A stop bit was not detected when data was received, for example, on a serial port (for example, a band rate mismatch). | 798- |
| Input buffer overrun — Software or hardware input buffer on serial port overflows with data caused by improper or nonexistent pacing. | 898- |

Query Errors

An error/event number in the range —499 to —400 indicates that the output queue control of the instrument has detected a problem with the message exchange protocol. The occurrence of any error in this class shall cause the query error bit (bit 2) in the event status register to be set. These errors correspond to message exchange protocol errors. One of the following is true:

- An attempt is being made to read data from the output queue when no output is either present or pending;
- Data in the output queue has been lost.

Events that generate query errors shall not generate command errors, execution errors, or device-specific errors; see the other error definitions in this section.

| Errors | Gnery | SCPI |
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|-----|----|---|---|----|---|

| Error Description | Krror Krror |
|---|-------------------|
| Query error — This is the generic query error for devices that cannot detect more specific errors. This code indicates only that a Query Error has occurred. | 004- |
| Query interrupted — Indicates that a condition causing an interrupted Query error occurred; for example, a query followed by DAB or Get defore a response was completely sent. | 014- |
| Query UNTERMINATED — Indicates that a condition causing an UNTERMINATED Query error occurred; for example, the device was addressed to talk and an incomplete program message was received. | 420 |
| Query deror occurred; for example, both input buffer and output buffer are full and the device cannot continue. | 08 1 - |
| Query UNTERMINATED after indefinite response — Indicates that a query was received in the same program message after an query requesting an indefinite response was executed. | 0₩- |

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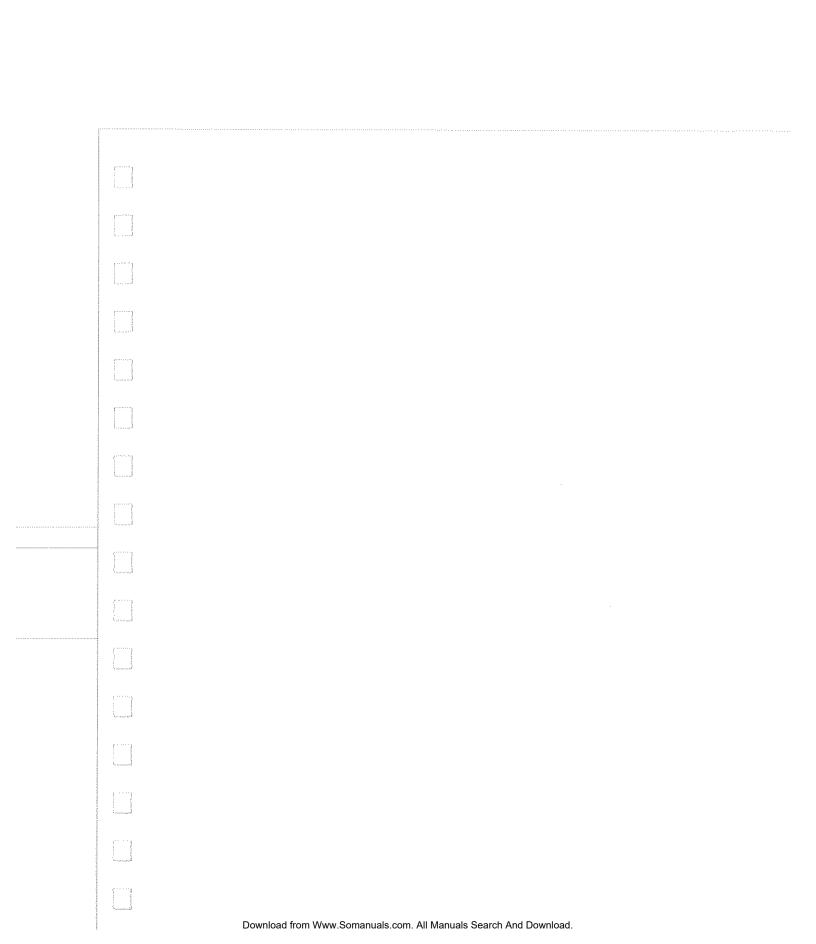
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