This guide applies to the following signal generator models:

E8257D PSG Analog Signal Generator
E8267D PSG Vector Signal Generator

Because of our continuing efforts to improve our products through firmware and hardware revisions, signal generator design and operation may vary from descriptions in this guide. We recommend that you use the latest revision of this guide to ensure that you have up-to-date product information. Compare the print date of this guide (see bottom of page) with the latest revision, which can be downloaded from the following website:

http://www.agilent.com/find/psg
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- Getting Started
- Operation Verification
- Regulatory Information

User's Guide

- Signal Generator Overview
- Basic Operation
- Basic Digital Operation
- Optimizing Performance
- Analog Modulation
- Custom Arb Waveform Generator
- Custom Real Time I/Q Baseband
- Multitone Waveform Generator
- Two-Tone Waveform Generator
- AWGN Waveform Generator
- Peripheral Devices
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Programming Guide

- Getting Started with Remote Operation
- Using IO Interfaces
- Programming Examples
- Programming the Status Register System
- Creating and Downloading Waveform Files
- Creating and Downloading User-Data Files

SCPI Reference

- Using this Guide
- System Commands
- Basic Function Commands
- Analog Commands
- Digital Modulation Commands
- Digital Signal Interface Module Commands
- SCPI Command Compatibility
**Service Guide**

- Troubleshooting
- Replaceable Parts
- Assembly Replacement
- Post-Repair Procedures
- Safety and Regulatory Information

**Key Reference**

- Key function description
1 Using this Guide

In the following sections, this chapter describes how SCPI information is organized and presented in this guide. An overview of the SCPI language is also provided:

- “How the SCPI Information is Organized” on page 1
- “SCPI Basics” on page 2

How the SCPI Information is Organized

SCPI Listings

The table of contents lists the Standard Commands for Programmable Instruments (SCPI) without the parameters. The SCPI subsystem name will generally have the first part of the command in parenthesis that is repeated in all commands within the subsystem. The title(s) beneath the subsystem name is the remaining command syntax. The following example demonstrates this listing:

Communication Subsystem (:SYSTem:COMMunicate)

:PMETer:CHANnel
:SERial:ECHO

The following examples show the complete commands from the above Table of Contents listing:

:SYSTem:COMMunicate:PMETer:CHANnel
:SYSTem:COMMunicate:SERial:ECHO

Subsystem Groupings by Chapter

A subsystem is a group of commands used to configure and operate a certain function or feature. Like individual commands, subsystems that share a similar scope or role can also be categorized and grouped together. This guide uses chapters to divide subsystems into the following groups:

- System Commands
- Basic Function Commands
- Analog Modulation Commands
- Digital Modulation Commands

Front Panel Operation Cross Reference

The last section in this book provides an index of hardkeys, softkeys, and data fields used in front panel operation, cross-referenced to their corresponding SCPI command. Key and data field names are sorted in two ways:

- individual softkey, hardkey, or data field name
- SCPI subsystem name with associated key and data field names nested underneath
Supported Models and Options per Command

Within each command section, the Supported heading describes the signal generator configurations supported by the SCPI command. “All” means that all models and options are supported. When “All with Option xxx” is shown next to this heading, only the stated option(s) is supported.

SCPI Basics

This section describes the general use of the SCPI language for the PSG. It is not intended to teach you everything about the SCPI language; the SCPI Consortium or IEEE can provide that level of detailed information. For a list of the specific commands available for the signal generator, refer to the table of contents.

For additional information, refer to the following publications:

Common Terms

The following terms are used throughout the remainder of this section:

Command A command is an instruction in SCPI consisting of mnemonics (keywords), parameters (arguments), and punctuation. You combine commands to form messages that control instruments.

Controller A controller is any device used to control the signal generator, for example a computer or another instrument.

Event Command Some commands are events and cannot be queried. An event has no corresponding setting; it initiates an action at a particular time.

Program Message A program message is a combination of one or more properly formatted commands. Program messages are sent by the controller to the signal generator.

Query A query is a special type of command used to instruct the signal generator to make response data available to the controller. A query ends with a question mark. Generally you can query any command value that you set.

Response Message A response message is a collection of data in specific SCPI formats sent from the signal generator to the controller. Response messages tell the controller about the internal state of the signal generator.

Command Syntax

A typical command is made up of keywords prefixed with colons (:). The keywords are followed by parameters. The following is an example syntax statement:

[:SOURce]:POWer[:LEVel] MAXimum|MINimum

In the example above, the [:LEVel] portion of the command immediately follows the :POWer portion with no separating space. The portion following the [:LEVel], MINimum|MAXimum, are the parameters (argument for the command statement). There is a separating space (white space) between the command and its parameter.
Additional conventions in syntax statements are shown in Table 1-1 and Table 1-2.

**Table 1-1  Special Characters in Command Syntax**

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<th>Meaning</th>
<th>Example</th>
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<td>[ ]</td>
<td>A vertical stroke between keywords or parameters indicates alternative choices. For parameters, the effect of the command varies depending on the choice.</td>
<td>[:SOURce]:AM:MOD DEEP</td>
</tr>
<tr>
<td></td>
<td>DEEP or NORMAL are the choices.</td>
<td></td>
</tr>
<tr>
<td>[ ]</td>
<td>Square brackets indicate that the enclosed keywords or parameters are optional when composing the command. These implied keywords or parameters will be executed even if they are omitted.</td>
<td>[:SOURce]:FREQuency[:CW]?</td>
</tr>
<tr>
<td></td>
<td>SOURce and CW are optional items.</td>
<td></td>
</tr>
<tr>
<td>&lt; &gt;</td>
<td>Angle brackets around a word (or words) indicate they are not to be used literally in the command. They represent the needed item.</td>
<td>[:SOURce]:FREQuency:STARt &lt;val&gt;&lt;unit&gt;</td>
</tr>
<tr>
<td></td>
<td>In this command, the words &lt;val&gt; and &lt;unit&gt; should be replaced by the actual frequency and unit.</td>
<td></td>
</tr>
<tr>
<td>{ }</td>
<td>Braces indicate that parameters can optionally be used in the command once, several times, or not at all.</td>
<td>[:SOURce]:LIST:POW er &lt;val&gt;{,&lt;val&gt;}</td>
</tr>
<tr>
<td></td>
<td>In this command, the words &lt;val&gt; should be replaced by the actual frequency and unit.</td>
<td></td>
</tr>
</tbody>
</table>

**Table 1-2  Command Syntax**

<table>
<thead>
<tr>
<th>Characters, Keywords, and Syntax</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper-case lettering indicates the minimum set of characters required to execute the command.</td>
<td>[:SOURce]:FREQuency[:CW]?, FREQ is the minimum requirement.</td>
</tr>
<tr>
<td>Lower-case lettering indicates the portion of the command that is optional; it can either be included with the upper-case portion of the command or omitted. This is the flexible format principle called forgiving listening. Refer to “Command Parameters and Responses” on page 5 for more information.</td>
<td>:FREQuency</td>
</tr>
<tr>
<td>When a colon is placed between two command mnemonics, it moves the current path down one level in the command tree. Refer to “Command Tree” on page 4 for more information on command paths.</td>
<td>:TRIGger:OUTPut:POLarity?</td>
</tr>
<tr>
<td>TRIGger is the root level keyword for this command.</td>
<td></td>
</tr>
<tr>
<td>If a command requires more than one parameter, you must separate adjacent parameters using a comma. Parameters are not part of the command path, so commas do not affect the path level.</td>
<td>[:SOURce]:LIST:DWELL &lt;val&gt;{,&lt;val&gt;}</td>
</tr>
<tr>
<td>A semicolon separates two commands in the same program message without changing the current path.</td>
<td>:FREQ 2.5GHZ;:POW er 10DBM</td>
</tr>
<tr>
<td>White space characters, such as &lt;tab&gt; and &lt;space&gt;, are generally ignored as long as they do not occur within or between keywords. However, you must use white space to separate the command from the parameter, but this does not affect the current path.</td>
<td>:FREQ &lt;uncy&gt; or :POW er :LEVel are not allowed.</td>
</tr>
<tr>
<td>A &lt;space&gt; between :LEVel and 6.2 is mandatory.</td>
<td>:POW er :LEVel 6.2</td>
</tr>
</tbody>
</table>
### Command Types

Commands can be separated into two groups: common commands and subsystem commands. Figure 1-1, shows the separation of the two command groups. Common commands are used to manage macros, status registers, synchronization, and data storage and are defined by IEEE 488.2. They are easy to recognize because they all begin with an asterisk. For example *IDN?, *OPC, and *RST are common commands. Common commands are not part of any subsystem and the signal generator interprets them in the same way, regardless of the current path setting.

Subsystem commands are distinguished by the colon (:). The colon is used at the beginning of a command statement and between keywords, as in :FREQuency[:CW?]. Each command subsystem is a set of commands that roughly correspond to a functional block inside the signal generator. For example, the power subsystem (:POWer) contains commands for power generation, while the status subsystem (:STATus) contains commands for controlling status registers.

![Command Tree](image)

### Command Tree

Most programming tasks involve subsystem commands. SCPI uses a structure for subsystem commands similar to the file systems on most computers. In SCPI, this command structure is called a command tree and is shown in Figure 1-2.
The command closest to the top is the root command, or simply “the root.” Notice that you must follow a particular path to reach lower level commands. In the following example, :POWer represents AA, :ALC represents BB, :SOURce represents GG. The complete command path is :POWer:ALC:SOURce? (:AA:BB:GG).

**Paths Through the Command Tree**

To access commands from different paths in the command tree, you must understand how the signal generator interprets commands. The parser, a part of the signal generator firmware, decodes each message sent to the signal generator. The parser breaks up the message into component commands using a set of rules to determine the command tree path used. The parser keeps track of the current path (the level in the command tree) and where it expects to find the next command statement. This is important because the same keyword may appear in different paths. The particular path is determined by the keyword(s) in the command statement.

A message terminator, such as a `<new line>` character, sets the current path to the root. Many programming languages have output statements that automatically send message terminators.

**NOTE** The current path is set to the root after the line-power is cycled or when *RST is sent.

**Command Parameters and Responses**

SCPI defines different data formats for use in program and response messages. It does this to accommodate the principle of forgiving listening and precise talking. For more information on program data types refer to IEEE 488.2. Forgiving listening means the command and parameter formats are flexible.

For example, with the :FREQuency:REFerence:STATe ON|OFF|1|0 command, the signal generator accepts :FREQuency:REFerence:STATe ON, :FREQuency:REFerence:STATe 1, :FREQ:REF:STAT ON, :FREQ:REF:STAT 1 to turn on the frequency reference mode.

Each parameter type has one or more corresponding response data types. A setting that you program using a numeric parameter returns either real or integer response data when queried. Response data (data returned to the controller) is more concise and restricted and is called precise talking.

Precise talking means that the response format for a particular query is always the same.

For example, if you query the power state (:POWer:ALC:STATe?) when it is on, the response is always 1, regardless of whether you previously sent :POWer:ALC:STATe 1 or :POWer:ALC:STATe ON.
**Numeric Parameters**

Numeric parameters are used in both common and subsystem commands. They accept all commonly used decimal representations of numbers including optional signs, decimal points, and scientific notation.

If a signal generator setting is programmed with a numeric parameter which can only assume a finite value, it automatically rounds any entered parameter which is greater or less than the finite value. For example, if a signal generator has a programmable output impedance of 50 or 75 ohms, and you specified 76.1 for the output impedance, the value is rounded to 75. The following are examples of numeric parameters:

- 100  
  - no decimal point required
- 100.  
  - fractional digits optional
- −1.23  
  - leading signs allowed
- 4.56E<space>3  
  - space allowed after the E in exponential
- −7.89E−001  
  - use either E or e in exponential
- +256  
  - leading + allowed
- .5  
  - digits left of decimal point optional

**Extended Numeric Parameters**

Most subsystems use extended numeric parameters to specify physical quantities. Extended numeric parameters accept all numeric parameter values and other special values as well.

The following are examples of extended numeric parameters:

<table>
<thead>
<tr>
<th>Extended Numeric Parameters</th>
<th>Special Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>any simple numeric value</td>
</tr>
<tr>
<td>1.2GHZ</td>
<td>GHZ can be used for exponential (E009)</td>
</tr>
<tr>
<td>200MHZ</td>
<td>MHZ can be used for exponential (E006)</td>
</tr>
<tr>
<td>DEFault</td>
<td>resets parameter to its default value</td>
</tr>
<tr>
<td>UP</td>
<td>increments the parameter</td>
</tr>
<tr>
<td>DOWN</td>
<td>decrements the parameter</td>
</tr>
</tbody>
</table>
Discrete Parameters

Discrete parameters use mnemonics to represent each valid setting. They have a long and a short form, just like command mnemonics. You can mix upper and lower case letters for discrete parameters.

The following examples of discrete parameters are used with the command

:TRIGger[:SEQUence]:SOURce BUS|IMMediate|EXTernal.

- BUS: GPIB, LAN, or RS-232 triggering
- IMMEDIATE: immediate trigger (free run)
- EXTernal: external triggering

Although discrete parameters look like command keywords, do not confuse the two. In particular, be sure to use colons and spaces correctly. Use a colon to separate command mnemonics from each other and a space to separate parameters from command mnemonics.

The following are examples of discrete parameters in commands:

- TRIGger:SOURce BUS
- TRIGger:SOURce IMMEDIATE
- TRIGger:SOURce EXTernal

Boolean Parameters

Boolean parameters represent a single binary condition that is either true or false. The two-state boolean parameter has four arguments. The following list shows the arguments for the two-state boolean parameter:

- ON: boolean true, upper/lower case allowed
- OFF: boolean false, upper/lower case allowed
- 1: boolean true
- 0: boolean false
String Parameters
String parameters allow ASCII strings to be sent as parameters. Single or double quotes are used as delimiters.

The following are examples of string parameters:

'This is valid'  "This is also valid"  'SO IS THIS'

Real Response Data
Real response data represent decimal numbers in either fixed decimal or scientific notation. Most high-level programming languages that support signal generator input/output (I/O) handle either decimal or scientific notation transparently.

The following are examples of real response data:

+4.000000E+010, −9.990000E+002
−9.990000E+002
+4.0000000000000E+010
+1
0

Integer Response Data
Integer response data are decimal representations of integer values including optional signs. Most status register related queries return integer response data. The following are examples of integer response data:

0  signs are optional
+100  leading + allowed
+100  leading + allowed
256  never any decimal point

Discrete Response Data
Discrete response data are similar to discrete parameters. The main difference is that discrete response data only returns the short form of a particular mnemonic, in all upper case letters. The following are examples of discrete response data:

IMM  EXT  INT  NEG

Numeric Boolean Response Data
Boolean response data returns a binary numeric value of one or zero.
String Response Data

String response data are similar to string parameters. The main difference is that string response data returns double quotes, rather than single quotes. Embedded double quotes may be present in string response data. Embedded quotes appear as two adjacent double quotes with no characters between them. The following are examples of string response data:

"This is a string"

"one double quote inside brackets: ["]"

"Hello!"

Program Messages

The following commands will be used to demonstrate the creation of program messages:

[:SOURce]:FREQuency:STARt [:SOURce]:FREQuency:STOP
[:SOURce]:FREQuency[:CW] [:SOURce]:POWer[:LEVel]:OFFSet

Example 1

:FREQuency:STARt 500MHZ;STOP 1000MHZ
This program message is correct and will not cause errors; STARt and STOP are at the same path level. It is equivalent to sending the following message:
FREQuency:STARt 500MHZ;FREQuency:STOP 1000MHZ

Example 2

:POWer 10DBM;:OFFSet 5DB
This program message will result in an error. The message makes use of the default POWer[:LEVel] node (root command). When using a default node, there is no change to the current path position. Since there is no command OFFSet at the root level, an error results.
The following example shows the correct syntax for this program message:
:POWer 10DBM;:POWer:OFFSet 5DB

Example 3

:POWer:OFFSet 5DB;POWer 10DBM
This program message results in a command error. The path is dropped one level at each colon. The first half of the message drops the command path to the lower level command OFFSet; POWer does not exist at this level.
The POWer 10DBM command is missing the leading colon and when sent, it causes confusion because the signal generator cannot find POWer at the POWer:OFFSet level. By adding the leading colon, the current path is reset to the root. The following shows the correct program message:
:POWer:OFFSet 5DB;:POWer 10DBM
Example 4
FREQ 500MHZ;POW 4DBM

In this example, the keyword short form is used. The program message is correct because it utilizes the default nodes of :FREQ[:CW] and :POW[:LEVel]. Since default nodes do not affect the current path, it is not necessary to use a leading colon before FREQ or POW.

File Name Variables

File name variables, such as "<file name>", represent three formats, "<file name>", "<file name@file type>", and "</user/file type/file name>". The following shows the file name syntax for the three formats, but uses "FLATCAL" as the file name in place of the variable "<file name>":

Format 1  "FLATCAL"
Format 2  "FLATCAL@USERFLAT"
Format 3  "/USER/USERFLAT/FLATCAL"

Format 2 uses the file type extension (@USERFLAT) as part of the file name syntax. Format 3 uses the directory path which includes the file name and file type. Use Formats 2 and 3 when the command does not specify the file type. This generally occurs in the Memory (:MEMORY) or Mass Memory (:MMEMory) subsystems. The following examples demonstrate a command where Format 1 applies:

Command Syntax with the file name variable  :MEMORY:STORe:LIST "<file name>"
Command Syntax with the file name  :MEMORY:STORe:LIST "SWEEP_1"

This command has :LIST in the command syntax. This denotes that "SWEEP_1" will be saved in the :List file type location as a list type file.

The following examples demonstrate a command where Format 2 applies:

Command Syntax with the file name variable  :MMEMory:COPY "<filenames">,<"filenames">
Command Syntax with the file name  :MMEMory:COPY "FLATCAL@USERFLAT","FLAT_2CAL@USERFLAT"

This command cannot distinguish which file type "FLATCAL" belongs to without the file type extension (@USERFLAT). If this command were executed without the extension, the command would assume the file type was Binary.
The following examples demonstrate a command where format 3 applies:

Command Syntax with the file name variable

:MMEMory:DATA "/USER/BBG1/WAVEFORM/<file name>",#ABC

Command Syntax with the file name

:MMEMory:DATA "/USER/BBG1/WAVEFORM/FLATCAL",#ABC

This command gives the directory path name where the file "FLATCAL" is stored.

A
the number of decimal digits to follow in B.

B
a decimal number specifying the number of data bytes in C.

C
the binary waveform data.

Refer to Table 2-1 on page 57 for a listing of the file systems and types. The entries under file type are used in the directory path.

ARB Waveform File Directories

ARB waveform files can be saved to the following directories:

- **WFM1**: volatile ARB waveform storage. Files located here can be played by the signal generator’s arb player, but are volatile and will be lost on a power cycle. The directory can also be specified as /USER/BBG1/WAVEFORM.
- **NVWFM**: non-volatile ARB waveform storage. Files must be moved to the WFM1: directory before they can be played by the signal generator’s Dual ARB player. The directory can also be specified as /USER/WAVEFORM.
- **SEQ**: sequence files are stored here and are non-volatile. The directory can also be specified as /USER/SEQ.

MSUS (Mass Storage Unit Specifier) Variable

The variable "<msus>" enables a command to be file type specific when working with user files. Some commands use it as the only command parameter, while others can use it in conjunction with a file name when a command is not file type specific. When used with a file name, it is similar to Format 2 in the **File Name Variables** section on page 10. The difference is the file type specifier (msus) occupies its own variable and is not part of the file name syntax.
The following examples illustrate the usage of the variable "<msus>" when it is the only command parameter:

**Command Syntax with the msus variable**

:MMEMory:CATalog? "<msus>"

**Command Syntax with the file system**

:MMEMory:CATalog? "LIST:"

The variable "<msus>" is replaced with "LIST:". When the command is executed, the output displays only the files from the List file system.

The following examples illustrate the usage of the variable "<file name>" with the variable "<msus>":

**Command Syntax with the file name and msus variables**

:MMEMory:DELete[:NAME] "<file name>",["<msus>"

**Command Syntax with the file name and file system**

:MMEMory:DELete:NAME "LIST_1","LIST:"

The command from the above example cannot discern which file system LIST_1 belongs to without a file system specifier and will not work without it. When the command is properly executed, LIST_1 is deleted from the List file system.

The following example shows the same command, but using Format 2 from the File Name Variables section on page 10:

:MMEMory:DELete:NAME "LIST_1@LIST"

When a file name is a parameter for a command that is not file system specific, either format (<file name>"<msus>" or "<file name@file system">) will work.

Refer to Table 1-1 on page 3 for a listing of special syntax characters.

**Quote Usage with SCPI Commands**

As a general rule, programming languages require that SCPI commands be enclosed in double quotes as shown in the following example:

":FM:EXTernal:IMPedance 600"

However, when a string is the parameter for a SCPI command, additional quotes or other delimiters may be required to identify the string. Your programming language may use two sets of double quotes, one set of single quotes, or backslashes with quotes to signify the string parameter. The following examples illustrate these different formats:

"MEMory:LOAD:LIST "myfile"" used in BASIC programming languages

"MEMory:LOAD:LIST \"myfile\"" used in C, C++, Java, and PERL

"MEMory:LOAD:LIST 'myfile'" accepted by most programming languages

Consult your programming language reference manual to determine the correct format.
Binary, Decimal, Hexadecimal, and Octal Formats

Command values may be entered using a binary, decimal, hexadecimal, or octal format. When the binary, hexadecimal, or octal format is used, their values must be preceded with the proper identifier. The decimal format (default format) requires no identifier and the signal generator assumes this format when a numeric value is entered without one. The following list shows the identifiers for the formats that require them:

- #B identifies the number as a binary numeric value (base-2).
- #H identifies the number as a hexadecimal alphanumeric value (base-16).
- #Q identifies the number as a octal alphanumeric value (base-8).

The following are examples of SCPI command values and identifiers for the decimal value 45:

#B101101 binary equivalent
#H2D hexadecimal equivalent
#Q55 octal equivalent

The following example sets the RF output power to 10 dBm (or the equivalent value for the currently selected power unit, such as DBUV or DBUVEMF) using the hexadecimal value 000A:

:POW #H000A

A unit of measure, such as DBM or mV, will not work with the values when using a format other than decimal.

The following example sets the bluetooth board address to FFBF7 (hexadecimal):

:RAdio:BLUetooth:ARB:BDADdr #HFFBF7
2 System Commands

In the following sections, this chapter provides SCPI descriptions for subsystems dedicated to peripheral signal generator operations common to all PSG models:

- "Calibration Subsystem (:CALibration)" on page 16
- "Communication Subsystem (:SYSTem:COMMunicate)" on page 21
- "Diagnostic Subsystem (:DIAGnostic[:CPU]:INFOrmation)" on page 27
- "Display Subsystem (:DISPlay)" on page 29
- "IEEE 488.2 Common Commands" on page 33
- "Low-Band Filter Subsystem" on page 38
- "Memory Subsystem (:MEMory)" on page 38
- "Mass Memory Subsystem (:MMEMory)" on page 57
- "Output Subsystem (:OUTPut)" on page 62
- "Route Subsystem (:ROUTE:HARDware:DGENerator)" on page 64
- "Status Subsystem (:STATus)" on page 71
- "System Subsystem (:SYSTem)" on page 84
- "Trigger Subsystem" on page 98
- "Unit Subsystem (:UNIT)" on page 101
Calibration Subsystem (:CALibration)

:DCFM

**Supported** All with Option UNT

:CALibration:DCFM

This command initiates a DCFM or DCΦM calibration depending on the currently active modulation. This calibration eliminates any dc or modulation offset of the carrier signal.

Use this calibration for externally applied signals. While the calibration can also be performed for internally generated signals, dc offset is not a normal characteristic for them.

**NOTE** If the calibration is performed with a dc signal applied, any deviation provided by the dc signal will be removed and the new zero reference point will be at the applied dc level. The calibration will have to be performed again when the dc signal is removed in order to reset the carrier signal to the correct zero reference.

**Key Entry** DCFM/DCΦM Cal

:IQ

**Supported** E8267D

:CALibration:IQ

This command initiates an I/Q calibration for a range of frequencies and is equivalent to selecting User from the front panel Calibration Type DC User Full softkey in the I/Q Calibration menu. For setting range frequencies, refer to ":IQ:STARt" on page 18, and ":IQ:STOP" on page 18.

**Key Entry** Execute Cal Calibration Type DC User Full

:IQ:DC

**Supported** E8267D

:CALibration:IQ:DC

This command starts and performs a one- to two-second adjustment that is not traceable to a standard. However, it will minimize errors associated with signal generator internal voltage offsets. This adjustment minimizes errors for the current signal generator setting and at a single frequency. The DC adjustment is volatile and must be repeated with each signal generator setting change. This command can be sent while the RF On/Off is set to Off and the adjustment will still be valid when the RF is enabled.

The I/Q DC adjustment is dependent upon a number of instrument settings. If any of the instrument settings change, the adjustment will become invalid. The dependent instrument settings are:

- RF frequency
- I/Q attenuation level
- Baseband generator settings
• I/Q polarity settings
• Baseband filter settings
• Path settings (Internal I/Q Mux Path 1 or Path 2)
• I/Q calibration (the I/Q DC calibration will be invalidated if any other I/Q calibration is execute)
• Temperature (±5 degrees)
The following instrument states will not invalidate the I/Q DC calibration:
• Power level changes
• I/Q Impairments
  *RST
  N/A
Key Entry
Execute Cal    Calibration Type DC User Full

:IQ:DEFault

Supported
E8267D

:CALibration:IQ:DEFault

This command will restore the original factory calibration data for the internal I/Q modulator.

Key Entry
Revert to Default Cal Settings

:IQ:FULL

Supported
E8267D

:CALibration:IQ:FULL

This command sets and performs a full-frequency range (regardless of the start and stop frequency settings) I/Q calibration and stores the results in the signal generator’s memory.

Start and stop frequencies default to the full frequency range of the signal generator.
Range
Depends on the signal generator’s frequency option
Refer to “:FREQuency:CENTer” on page 105

Key Entry
Execute Cal (Calibration Type DC User Full set to Full)
System Commands
Calibration Subsystem (:CALibration)

:IQ:STARt

Supported    E8267D

:CALibration:IQ:STARt <val><units>
:CALibration:IQ:STARt?

This command sets the start frequency and automatically sets the calibration type to User for an I/Q calibration.

The setting enabled by this command is not affected by a signal generator power-on, preset, or *RST command.

Example

:CAL:IQ:STAR 1GHZ

The preceding example sets the signal generator’s start frequency for an IQ calibration to 1 GHz.

Range    Depends on the signal generator’s frequency option
   Refer to “:FREQuency:CENTer” on page 105

Key Entry    Start Frequency

:IQ:STOP

Supported    E8267D

:CALibration:IQ:STOP <val><units>
:CALibration:IQ:STOP?

This command sets the stop frequency and automatically sets the calibration type to User for an I/Q calibration. The setting enabled by this command is not affected by a signal generator power-on, preset, or *RST command.

Example

:CAL:IQ:STOP 2GHZ

The preceding example sets the signal generator’s stop frequency for an IQ calibration to 2 GHz.

Range    Depends on the signal generator’s frequency option
   Refer to “:FREQuency:CENTer” on page 105

Key Entry    Stop Frequency

:WBIQ

Supported    E8267D with Option 015

:CALibration:WBIQ

This command initiates a wideband I/Q calibration for a range of frequencies and is equivalent to selecting User from the front panel Calibration Type DC User Full softkey. For setting range frequencies, refer to “:WBIQ:STARt” on page 20, and “:WBIQ:STOP” on page 20 command descriptions.

Key Entry    Execute Cal
System Commands
Calibration Subsystem (:CALibration)

**:WBIQ:DC

Supported E8267D with Option 015

This command performs a one to two second adjustment that is not traceable to a standard. However, it will minimize errors associated with offset voltages. This adjustment minimizes errors for the current signal generator setting and at a single frequency. The DC adjustment is volatile and must be repeated with each signal generator setting change. This command can be sent while the RF On/Off is set to Off and the adjustment will be valid when RF is enabled.

The wideband I/Q DC adjustment is dependent upon a number of instrument settings. If any of the PSG settings change, the adjustment will become invalid. The dependent instrument settings are:

- RF frequency
- I/Q attenuation level
- Baseband generator settings
- I/Q polarity settings
- Baseband filter settings
- Path settings (Internal I/Q Mux Path 1 or Path 2)
- I/Q calibration (the I/Q DC calibration will be invalidated if any other I/Q calibration is executed)
- Temperature (±5 degrees)

The following instrument states will not invalidate the I/Q DC calibration:

- Power level changes
- I/Q Impairments

*RST N/A

Key Entry Execute Cal Calibration Type DC User Full

**:WBIQ:DEFAULT

Supported E8267D with Option 015

This command will restore the original factory calibration data for the internal I/Q modulator.

Key Entry Revert to Default Cal Settings
System Commands
Calibration Subsystem (:CALibration)

:WBIQ:FULL

Supported E8267D with Option 015

This command sets and performs a full-frequency range (regardless of the start and stop frequency settings) wideband I/Q calibration and stores the results in the signal generator's firmware.

Start and stop frequencies will default to the full frequency range of the signal generator.

Range Depends on the signal generator's frequency option

Refer to “:FREQuency:CENTer” on page 105

Key Entry
Execute Cal Calibration Type DC User Full

:WBIQ:START

Supported E8267D with Option 015

This command sets the start frequency and automatically sets the calibration type to User for a wideband I/Q calibration. The setting enabled by this command is not affected by a signal generator power-on, preset, or *RST command.

Example

:CAL:WBIQ:STAR 1GHZ

The preceding example sets the signal generator's start frequency to 1 GHz for a wideband IQ calibration.

Range Depends on the signal generator's frequency option

Refer to “:FREQuency:CENTer” on page 105

Key Entry Start Frequency

:WBIQ:STOP

Supported E8267D with Option 015

This command sets the stop frequency and automatically sets the calibration type to User for a wideband I/Q calibration.

The setting enabled by this command is not affected by a signal generator power-on, preset, or *RST command.
Example
:CAL:WBIQ:STOP 2GHZ

The preceding example sets the signal generator’s stop frequency to 2 GHz for a wideband IQ calibration.

Key Entry
Stop Frequency

Communication Subsystem (:SYSTem:COMMunicate)

:GPIB:ADDRess

Supported All Models

:SYSTem:COMMunicate:GPIB:ADDRess <number>
:SYSTem:COMMunicate:GPIB:ADDRess?

This command sets the signal generator’s general purpose instrument bus (GPIB) address.

The variable <number> is a numeric value between 0 and 30. The signal generator typically uses 19 as the instrument address. The address must be different from other GPIB devices in your system.

The setting enabled by this command is not affected by a signal generator power-on, preset, or *RST command.

Example
:SYST:COMM:GPIB:ADDR 19

The preceding example sets the signal generator’s GPIB address to 19.

Range 0–30

Key Entry GPIB Address

:GTLocal

Supported All

:SYSTem:COMMunicate:GTLocal

This command sets the signal generator to local mode, enabling front panel operation.

Range N/A

Key Entry Local
System Commands
Communication Subsystem (:SYSTem:COMMunicate)

**:LAN:CONFig**

**Supported** All Models

`:SYSTem:COMMunicate:LAN:CONFig DHCP|MANual`

`:SYSTem:COMMunicate:LAN:CONFig?`

This command selects the signal generator’s internet protocol (IP) address. The dynamic host communication protocol (DHCP) selection allows the network to assign an IP address. The manual selection allows the user to enter an IP address.

**Example**

`:SYST:COMM:LAN:CONF DHCP`

The preceding example sets up the signal generator LAN configuration to use a DHCP IP address.

**Key Entry** LAN Config

**:LAN:GATEway**

**Supported** All Models

`:SYSTem:COMMunicate:LAN:GATEway "<ipstring>"`

`:SYSTem:COMMunicate:LAN:GATEway?`

This command sets the gateway for local area network (LAN) access to the signal generator from outside the current sub-network.

The "<ipstring>" string variable is the LAN gateway address, formatted as xxx.xxx.xxx.xxx. Refer to “Quote Usage with SCPI Commands” on page 12 for information on using quotes for different programming languages.

Using an empty string restricts access to the signal generator to local hosts on the LAN.

**Example**

`:SYST:COMM:LAN:GATE "203.149.781.101"

The preceding example sets the signal generator’s LAN gateway address.

**Key Entry** Default Gateway

**:LAN:HOSTname**

**Supported** All Models

`:SYSTem:COMMunicate:LAN:HOSTname "<string>"`

`:SYSTem:COMMunicate:LAN:HOSTname?`

This command sets the signal generator’s local area network (LAN) connection hostname.

The "<string>" variable is the hostname for the signal generator. Refer to “Quote Usage with SCPI Commands” on page 12 for information on using quotes for different programming languages.

The setting enabled by this command is not affected by a signal generator power-on, preset, or *RST command.
Example

:SYST:COMM:LAN:HOSTname "siginst3"

The preceding example sets “siginst3” as the signal generator's LAN hostname.

Key Entry  Hostname

:LAN:IP

Supported  All Models

:SYSTem:COMMunicate:LAN:IP "<ipstring>"

:SYSTem:COMMunicate:LAN:IP?

This command sets the signal generator's local area network (LAN) internet protocol (IP) address for your IP network connection.

The "<ipstring>" variable is the signal generator's IP address, formatted as xxx.xxx.xxx.xxx. Refer to “Quote Usage with SCPI Commands” on page 12 for information on using quotes for different programming languages.

The setting enabled by this command is not affected by a signal generator power-on, preset, or *RST command.

Example


The preceding example sets the signal generator's LAN IP address.

Key Entry  IP Address

:LAN:SUBNet

Supported  All Models

:SYSTem:COMMunicate:LAN:SUBNet "<ipstring>"

:SYSTem:COMMunicate:LAN:SUBNet?

This command sets the signal generator's local area network (LAN) subnet mask address for your internet protocol (IP) network connection.

The "<ipstring>" variable is the subnet mask for the IP address, formatted as xxx.xxx.xxx.xxx. Refer to “Quote Usage with SCPI Commands” on page 12 for information on using quotes for different programming languages.

The setting enabled by this command is not affected by a signal generator power-on, preset, or *RST command.

Example

:SYST:COMM:LAN:SUBN "203.194.101.111"

The preceding example sets the signal generator's LAN subnet mask.

Key Entry  Subnet Mask
System Commands
Communication Subsystem (SYSTem:COMMunicate)

:**PMETer:ADDRess**

**Supported** All Models

:SYSTem:COMMunicate:PMETer:ADDRess <val>
:SYSTem:COMMunicate:PMETer:ADDRess?

This command sets the instrument address for a power meter that is controlled by the signal generator. The power meter is controlled only through a general purpose instrument bus (GPIB) cable.

The variable <number> is an integer numeric value between 0 and 30. The power meter address must be different from the GPIB address of the signal generator and any other GPIB instrument addresses in your system.

The setting enabled by this command is not affected by a signal generator power-on, preset, or *RST command.

**Example**

:SYST:COMM:PMET:ADDR 14

The preceding example sets the address to 14 for the power meter that is connected to and controlled by the signal generator.

**Range** 0–30

**Key Entry** Meter Address

:**PMETer:CHANnel**

**Supported** All Models

:SYSTem:COMMunicate:PMETer:CHANnel A|B
:SYSTem:COMMunicate:PMETer:CHANnel?

This command sets the measurement channel on a dual channel power meter that is controlled by the signal generator. A single-channel power meter uses channel A and selecting channel B will have no effect.

The setting enabled by this command is not affected by a signal generator power-on, preset, or *RST command. The power meter is controlled only through a general purpose instrument bus (GPIB) cable.

**Example**

:SYST:COMM:PMET:CHAN B

The preceding example sets the B measurement channel for the power meter that is connected to and controlled by the signal generator.

**Key Entry** Meter Channel A B
System Commands
Communication Subsystem (:SYSTem:COMMunicate)

:PMETer:IDN

Supported All Models

:SYSTem:COMMunicate:PMETer:IDN E4418B|E4419B|E4416A|E4417A

This command sets the model number of the power meter that is controlled by the signal generator. The setting enabled by this command is not affected by a signal generator power-on, preset, or *RST command. The power meter is controlled only through a general purpose instrument bus (GPIB) cable.

Example

:SYST:COMM:PMET:IDN E4417A

The preceding example sets the model number for the power meter that is connected to and controlled by the signal generator.

Key Entry Power Meter

:PMETer:TIMEout

Supported All Models

:SYSTem:COMMunicate:PMETer:TIMEout <num>[<time_suffix>]

This command sets the period of time that the signal generator will wait for a valid reading from the power meter. The variable <num> has a resolution of 0.001.

The variable <num> is the time expressed as a number. The variable <time_suffix> are the units of time, for example mS (milliseconds) or S (seconds).

The setting enabled by this command is not affected by a signal generator power-on, preset, or *RST command. The power meter is controlled only through a general purpose instrument bus (GPIB) cable. If a timeout occurs, the signal generator reports an error message.

Example

:SYST:COMM:PMET:TIME .1SEC

The preceding example sets the timeout to 100 milliseconds for the power meter that is connected to and controlled by the signal generator.

Range 1mS–100S

Key Entry Meter Timeout
**:SERial:BAUD**

**Supported** All Models

`:SYSTem:COMMunicate:SERial:BAUD <number>`

`:SYSTem:COMMunicate:SERial:BAUD?`

This command sets the baud rate for the rear panel RS-232 interface labeled RS-232. The setting enabled by this command is not affected by a signal generator power-on, preset, or \*RST command.

The variable `<number>` is an integer value corresponding to baud rates: 300, 2400, 4800, 9600, 19200, 38400, and 57600.

**Example**

`:SYST:COMM:SER:BAUD 9600`

The preceding example sets the baud rate for serial communication to 9600.

**Key Entry** RS-232 Baud Rate

**:SERial:ECHO**

**Supported** All Models

`:SYSTem:COMMunicate:SERial:ECHO ON|OFF`

`:SYSTem:COMMunicate:SERial:ECHO?`

This command enables or disables the RS-232 echo, and is not affected by a power-on, preset, or \*RST command. Characters sent to the signal generator are displayed or echoed to the controller display.

**Example**

`:SYST:COMM:SER:ECHO ON`

The preceding example enables RS-232 echoing.

**Key Entry** RS-232 ECHO Off On

**:SERial:RESet**

**Supported** All Models

`:SYSTem:COMMunicate:SERial:RESet`

This event command resets the RS-232 buffer and discards unprocessed SCPI input received at the RS-232 port.

**Key Entry** Reset RS-232
System Commands
Diagnostic Subsystem (:DIAGnostic[:CPU]:INFORMATION)

:SERial:TOUT

Supported All Models

:SYSTem:COMMunicate:SERial:TOUT <val>
:SYSTem:COMMunicate:SERial:TOUT?

This command sets the RS-232 serial port timeout value. If further input is not received within the timeout period specified while a SCPI command is processed, the command aborts and clears the input buffer. The variable <val> is entered in seconds. The setting is not affected by a signal generator power-on, preset, or *RST command.

Example

:SYST:COMM:SER:TOUT 2SEC

The preceding example sets the RS-232 timeout for 2 seconds.

Range 1–25

Key Entry RS-232 Timeout

Diagnostic Subsystem (:DIAGnostic[:CPU]:INFORMATION)

:BOARds

Supported All Models

:DIAGnostic[:CPU]:INFORMATION:BOARds?

This query returns a list of the boards installed in the signal generator. The information is returned in the following format:

"<board_name,part_number,serial_number,version_number,status>"

This information format will repeat for each of the signal generator's detected boards.

Key Entry Installed Board Info

:CCOunt:ATTenuator

Supported E8267D and E8257D with Option 1E1

:DIAGnostic[:CPU]:INFORMATION:CCOunt:ATTenuator?

This query returns the cumulative number of times that the attenuator has switched levels.

Key Entry Diagnostic Info

:CCOunt:PON

Supported All Models

:DIAGnostic[:CPU]:INFORMATION:CCOunt:PON?

This query returns the cumulative number of times the signal generator has been powered-on.

Key Entry Diagnostic Info
System Commands
Diagnostic Subsystem (:DIAGnostic[:CPU]:INFormation)

:DISPlay:O TIMe

Supported All Models

:DIAgnostic[:CPU]:INFormation:DISPlay:OTIMe?

This query returns the cumulative number of hours the display has been on.

Key Entry Diagnostic Info

:LICENse:AUXiliary

Supported All Models

:DIAgnostic[:CPU]:INFormation:LIcense:AUXiliary?

This query returns a listing of current external software application license numbers for an auxiliary instrument.

Key Entry Auxiliary Software Options

:OPTions

Supported All Models

:DIAgnostic[:CPU]:INFormation:OPTions?

This query returns a list of options installed in the signal generator.

Key Entry Options Info

:OPTions:DETail

Supported All Models

:DIAgnostic[:CPU]:INFormation:OPTions:DETail?

This query returns the options installed, option revision, and digital signal processing (DSP) version if applicable.

Key Entry Options Info

:OTIMe

Supported All Models

:DIAgnostic[:CPU]:INFormation:OTIMe?

This query returns the cumulative number of hours that the signal generator has been on.

Key Entry Diagnostic Info
System Commands
Display Subsystem (:DISPlay)

:REVision

Supported       All Models

:DIAGnostic[:CPU]:INFormation:REVision?

This query returns the CPU bootstrap read only memory (boot ROM) revision date. In addition, the
query returns the revision, creation date, and creation time for the firmware.

Key Entry       Diagnostic Info

:SDATE

Supported       All Models

:DIAGnostic[:CPU]:INFormation:SDATE?

This query returns the date and time stamp for the signal generator's firmware.

Key Entry       Diagnostic Info

Display Subsystem (:DISPlay)

:ANNotation:AMPLitude:UNIT

Supported       All Models

:DISPlay:ANNotation:AMPLitude:UNIT DBM|DBUV|DBUVEMF|V|VEMF|DB

:DISPlay:ANNotation:AMPLitude:UNIT?

This command sets the displayed front panel amplitude units.
If the amplitude reference state is set to on, the query returns units expressed in dB. Setting any
other unit will cause a setting conflict error stating that the amplitude reference state must be set to
off. Refer to “:REFerence:STATe” on page 140 for more information.

Example

:DISP:ANN:AMPL:UNIT DB

The preceding example sets DB as the amplitude units shown on the signal generator's front panel
display.

*RST       dBm

:ANNotation:CLOCk:DATE:FORMat

Supported       All Models

:DISPlay:ANNotation:CLOCk:DATE:FORMat MDY|DMY

:DISPlay:ANNotation:CLOCk:DATE:FORMat?

This command selects the date format. The choices are month-day-year (MDY) or day-month-year
(DMY) format. The date is shown on the signal generator's front panel display.
The setting enabled by this command is not affected by a signal generator power-on, preset, or *RST command.

**Example**

`:DISP:ANN:CLOC:DATA:FORM DMY

The preceding example sets the date format shown on the signal generator’s front panel display to DMY.

**ANNotation:CLOCk[:STAte]**

**Supported** All Models

`:DISP:ANN:CLOC[:STAte] ON|OFF|1|0
`:DISP:ANN:CLOC[:STAte]?

This command enables or disables the digital clock shown at the lower right side of the front panel display.

The setting enabled by this command is not affected by a signal generator power-on, preset, or *RST command.

**Example**

`:DISP:ANN:CLOC OFF

The preceding example disables the digital clock on the signal generator’s front panel display.

**BRIGHtness**

**Supported** All Models

`:DISP:BRIGH <val>
`:DISP:BRIGH?

This command sets the display brightness (intensity). The brightness can be set to the minimum level (0.02), maximum level (1), or in between by using fractional numeric values (0.03–0.99).

The setting enabled by this command is not affected by a signal generator power-on, preset, or *RST command.

**Example**

`:DISP:BRIG .45

The preceding example sets display intensity to .45.

**Range** 0.02–1

**Key Entry** Brightness
:CAPTure

Supported All Models

:DISPLAY:CAPTURE

This command allows the user to capture the current display and store it in the signal generator's memory.

The display capture is stored as DISPLAY.BMP in the Binary file system. This file is overwritten with each subsequent display capture. The file can be downloaded in the following manner:

1. Log on to the signal generator using file transfer protocol (FTP).
2. Change to the BIN directory using the FTP `cd` command.
3. Retrieve the file by using the FTP `get` command.

:CONTrast

Supported All Models

:DISPLAY:CONTRast <val>
:DISPLAY:CONTRast?

This command sets the contrast for the signal generator's display. The variable `<val>` is expressed as a fractional number between 0 and 1. The contrast can be set to the maximum level (1), minimum level (0), or in between by using fractional numeric values (0.001–0.999).

The setting enabled by this command is not affected by a signal generator power-on, preset, or *RST command.

Example

:DISP:CONTR .45

The preceding example sets the display contrast to .45.

Range 0–1

Key Entry Display contrast hardkeys are located below the display.

:INVerse

Supported All Models

:DISPLAY:INVerse ON|OFF|1|0
:DISPLAY:INVerse?

This command sets the display of the source to inverse video mode. The setting enabled by this command is not affected by a signal generator power-on, preset, or *RST command.
System Commands
Display Subsystem (:DISPlay)

Example
:DISP:INV OFF
The preceding example sets the display video to normal (not inverse).

Key Entry
Inverse Video Off On

:REMeote
Supported
All Models

:DISPlay:REMeote ON|OFF|1|0
:DISPlay:REMeote?
This command enables or disables display updating when the signal generator is remotely controlled.

ON (1) This choice updates the signal generator display so that you can see the settings change as the commands are executed, however, this will decrease the signal generator’s response time.

OFF (0) This choice turns off display updating which will optimizing the signal generator’s response time.

The setting enabled by this command is not affected by signal generator preset or *RST command. However, cycling the signal generator power will reset it to zero.

Example
:DISP:REM 0
The preceding example turns off display updating.

Key Entry
Update in Remote Off On

Display Off On
Supported
All Models

:DISPlay[:WINDow][:STATe] ON|OFF|1|0
:DISPlay[:WINDow][:STATe]?
This command is used to either blank out (OFF or 0) the display screen or turn it on (ON or 1). A signal generator preset, *RST command, or cycling the power will turn the display on.

Example
:DISP OFF
The preceding example blanks out the signal generator's display.
IEEE 488.2 Common Commands

*CLS
Supported All Models

*CLS
The Clear Status (CLS) command clears the Status Byte register, the Data Questionable Event register, the Standard Event Status register, and the Standard Operation Status register. Refer to the Programming Guide for more information on programming the status registers.

*ESE
Supported All Models

*ESE <val>
This command enables bits in the Standard Event Enable register. Bits enabled and set in this register will set the Standard Event Status Summary bit (bit 5) in the Status Byte register. When bit 5 (decimal 32) in the Status Byte register is set, you can read the Standard Event register using the *ESR command and determine the cause.

The Standard Event Enable register state (bits enabled with this command) is not affected by signal generator preset or *RST. The register will be cleared when the signal generator is turned off unless the command *PSC is used before turning it off.

Refer to the Programming Guide for more information on programming the status registers.

Example

*ESE 129
This command enables bit 0 (decimal 1, Operation Complete) and bit 7 (decimal 128, Power On) in the Standard Event Status Enable register.

Range 0–255

*ESE?
Supported All Models

*ESE?
This query returns the decimal sum of the enabled bits in the Standard Event Enable register. Refer to the Programming Guide for more information on programming the status registers.
System Commands
IEEE 488.2 Common Commands

*ESR?

**Supported** All Models

**NOTE** This is a destructive read. The data in the register is latched until it is queried. Once queried, the data is cleared. Refer to the *Programming Guide* for more information.

This query returns the decimal sum of the bits set in the Standard Event register.

*IDN?

**Supported** All Models

*IDN?

This query requests an identification string from the signal generator. The IDN string consists of the following information:

<company_name>, <model_number>, <serial_number>, <firmware_revision>

The identification information can be modified. Refer to “:IDN” on page 86 for more information.

**Key Entry** Diagnostic Info

*OPC?

**Supported** All Models

*OPC?

The Operation Complete (OPC) command sets bit 0 in the Standard Event register.

Refer to the *Programming Guide* for more information on programming the status registers.

*OPC?

**Supported** All Models

*OPC?

The Operation Complete (OPC) query returns the ASCII character 1 in the Standard Event register indicating completion of all pending operations.

Refer to the *Programming Guide* for more information on programming the status registers.
**PSC**

**Supported** All Models

*PSC ON|OFF|1|0

The power-on Status Clear (PSC) command controls the automatic power-on clearing of the Service Request Enable register, the Standard Event Status Enable register, and the device-specific event enable registers.

Refer to the *Programming Guide* for more information on programming the status registers.

The setting enabled by this command is not affected by a signal generator power-on, preset, or *RST command.

ON (1) This choice enables the power-on clearing of the listed registers.

OFF (0) This choice disables the clearing of the listed registers and they retain their status when a power-on condition occurs.

**Example**

*PSC ON

This command clears all listed registers at power-on.

**PSC?**

**Supported** All Models

*PSC?

The power-on Status Clear (PSC) query returns the flag (1 or 0) setting as enabled by the *PSC command.

**RCL**

**Supported** All Models

*RCL <reg>,<seq>

The Recall (RCL) command recalls the state from the specified memory register <reg> in the specified sequence <seq>.

**Range**

* registers: 0–99  Sequences: 0–9

**Key Entry**

RECALL Reg  Select Seq:

**RST**

**Supported** All Models

*RST

The Reset (RST) command resets most signal generator functions to a factory-defined state.

Each command description in this reference shows the *RST value if the signal generator’s setting is affected.
IEEE 488.2 Common Commands

*SAV

Supported All Models

*SAV <reg>,<seq>

The Save (SAV) command saves the state of the signal generator to the specified memory register <reg> of the specified sequence <seq>. Settings such as frequency, attenuation, power, and settings that do not survive a power cycle or an instrument reset can be saved. Data formats, arb setups, list sweep values, table entries, and so forth are not stored. Only a reference to the data file name is saved. Refer to the E8257D/67D PSG Signal Generators User’s Guide and Programming Guide for more information on saving and recalling instrument states.

Range registers: 0–99  Sequences: 0–9

Key Entry  Save Reg  Save Seq[n] Reg[nn]

*SRE

Supported All Models

*SRE <val>

The Service Request Enable (SRE) command enables bits in the Service Request Enable register. Bits enabled and set in this register will set bits in the Status Byte register.

The variable <val> is the decimal sum of the bits that are enabled. Bit 6 (value 64) is not available in this register and therefore cannot be enabled by this command. Because bit 6 is not available, entering values from 64 to 127 is equivalent to entering values from 0 to 63.

Refer to the Programming Guide for more information on programming the status registers.

The setting enabled by this command is not affected by signal generator preset or *RST. However, cycling the signal generator power will reset this register to zero.

Range 0–63, 128–191

*SRE?

Supported All Models

*SRE?

The Service Request Enable (SRE) query returns the decimal sum of bits enabled in the Service Request Enable register. Bit 6 (decimal 64) is not available in this register.

Refer to the Programming Guide for more information on programming the status registers.

Range 0–63, 128–191
**STB?**

*Supported* All Models

*STB?

This command reads the decimal sum of the bits set in the Status Byte register.

Refer to the *Programming Guide* for more information on programming the status registers.

**Range** 0–255

**TRG**

*Supported* All Models

*TRG

The Trigger (TRG) command triggers the device if BUS is the selected trigger source, otherwise, "TRG is ignored. Refer to ":TRIGger[:SEQUence]:SOURce" on page 100 for more information on triggers.

**TST?**

*Supported* All Models

*TST?

The Self-Test (TST) query initiates the internal self-test and returns one of the following results:

0 This shows that all tests passed.
1 This shows that one or more tests failed.

**Key Entry** Run Complete Self Test

**WAI**

*Supported* All Models

*WAI

The Wait-to-Continue (WAI) command causes the signal generator to wait until all pending commands are completed, before executing any other commands.
Low-Band Filter Subsystem

[:SOURce]:LBFilter

Supported All Models with Option 1EH

[:SOURce]:LBFilter ON|OFF|1|0
[:SOURce]:LBFilter?

This command enables or disables the low-band filter located in the RF path. Use this filter to reduce harmonics below 2 GHz.

*RST 0

Key Entry Low Pass Filter below 2 GHz Off On

Memory Subsystem (:MEMory)

:CATalog:BINary

Supported All Models

:CATalog:BINary?

This command outputs a list of binary files. The return data will be in the following form:

<mem_used>,<mem_free>{,"<file_listing>"

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory. Each file listing parameter will be in the following form:

"<file_name,file_type,file_size>"

Refer to “File Name Variables” on page 10 for information on the file name syntax.

Key Entry Binary

:CATalog:BIT

Supported E8267D with Option 601or 602

:CATalog:BIT?

This command outputs a list of bit files. The return data will be in the following form:

<mem_used>,<mem_free>{,"<file_listing>"

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory. Each file listing parameter will be in the following form:

"<file_name,file_type,file_size>"

Refer to “File Name Variables” on page 10 for information on the file name syntax.

Key Entry Bit
:CATalog:DMOD

**Supported** E8267D with Option 601 or 602

:MEMory:CATalog:DMOD?

This command outputs a list of arbitrary waveform digital modulation files. The return data will be in the following form: `<mem_used>,<mem_free>{,"<file_listing>"}

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory. Each file listing parameter will be in the following form:
"<file_name,file_type,file_size>"

Refer to "File Name Variables" on page 10 for information on the file name syntax.

**Key Entry** DMOD

:CATalog:FIR

**Supported** E8267D with Option 601 or 602

:MEMory:CATalog:FIR?

This command outputs a list of finite impulse response (FIR) filter files. The return data will be in the following form: `<mem_used>,<mem_free>{,"<file_listing>"}

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory. Each file listing parameter will be in the following form:
"<file_name,file_type,file_size>"

Refer to "File Name Variables" on page 10 for information on the file name syntax.

**Key Entry** FIR

:CATalog:FSK

**Supported** E8267D with Option 601 or 602

:MEMory:CATalog:FSK?

This command outputs a list of frequency shift keying (FSK) files. The return data will be in the following form:
`<mem_used>,<mem_free>{,"<file_listing>"}`

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory. Each file listing parameter will be in the following form:
"<file_name,file_type,file_size>"

Refer to "File Name Variables" on page 10 for information on the file name syntax.

**Key Entry** FSK
System Commands
Memory Subsystem (:MEMory)

:CATalog:IQ

**Supported**
E8267D with Option 601 or 602

:MEMory:CATalog:IQ?

This command outputs a list of IQ files. The return data will be in the following form:

\(<\text{mem\_used}>,\text{mem\_free}>\{,\"\text{<file\_listing>}\}\}\)

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory. Each file listing parameter will be in the following form:

\("\text{<file\_name},\text{file\_type},\text{file\_size}>\"

Refer to “File Name Variables” on page 10 for information on the file name syntax.

**Key Entry**
I/Q

:CATalog:LIST

**Supported**
All Models

:MEMory:CATalog:LIST?

This command outputs a list of List Sweep files. The return data will be in the following form:

\(<\text{mem\_used}>,\text{mem\_free}>\{,\"\text{<file\_listing>}\}\}\)

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory. Each file listing parameter will be in the following form:

\("\text{<file\_name},\text{file\_type},\text{file\_size}>\"

Refer to “File Name Variables” on page 10 for information on the file name syntax.

**Key Entry**
List

:CATalog:MDMod

**Supported**
E8267D with Option 601 or 602

:MEMory:CATalog:MDMod?

This command outputs a list of arbitrary waveform multicarrier digital modulation (MDMod) files. The return data will be in the following form: \(<\text{mem\_used}>,\text{mem\_free}>\{,\"\text{<file\_listing>}\}\}\)

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory. Each file listing parameter will be in the following form:

\("\text{<file\_name},\text{file\_type},\text{file\_size}>\"

Refer to “File Name Variables” on page 10 for information on the file name syntax.

**Key Entry**
MDMOD
:CATalog:MT0Ne

Supported    E8267D with Option 601 or 602

This command outputs a list of arbitrary waveform multitone files. The return data will be in the following form:

<mem_used>,<mem_free>{,"<file_listing>"}

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory. Each file listing parameter will be in the following form:

"<file_name,file_type,file_size>"

Refer to “File Name Variables” on page 10 for information on the file name syntax.

Key Entry    MT0NE

:CATalog:SEQ

Supported    E8267D with Option 601 or 602

This command outputs a list of arbitrary waveform sequence files. The return data will be in the following form:

<mem_used>,<mem_free>{,"<file_listing>"}

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory. Each file listing parameter will be in the following form:

"<file_name,file_type,file_size>"

Refer to “File Name Variables” on page 10 for information on the file name syntax.

Key Entry    Seq

:CATalog:SHAPE

Supported    E8267D with Option 601 or 602

This command outputs a list of burst shape files. The return data will be in the following form:

<mem_used>,<mem_free>{,"<file_listing>"}

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory. Each file listing parameter will be in the following form:

"<file_name,file_type,file_size>"

Refer to “File Name Variables” on page 10 for information on the file name syntax.

Key Entry    SHAPE
**System Commands**

**Memory Subsystem (:MEMory)**

### :CATalog:STATE

**Supported**  All Models

:MEMory:CATalog:STATE?

This command outputs a list of state files. The return data will be in the following form:

\[
\text{<mem\_used>,<mem\_free>,"<file\_listing>"}
\]

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory. Each file listing parameter will be in the following form:

"<file\_name,\ file\_type,\ file\_size>"

Refer to “File Name Variables” on page 10 for information on the file name syntax.

**Key Entry**  State

### :CATalog:UFLT

**Supported**  All Models

:MEMory:CATalog:UFLT?

This command outputs a list of user-flatness correction files. The return data will be in the following form:

\[
\text{<mem\_used>,<mem\_free>,"<file\_listing>"}
\]

The signal generator will return the two memory usage parameters and as many file listings as there are files in the directory. Each file listing parameter will be in the following form:

"<file\_name,\ file\_type,\ file\_size>"

Refer to “File Name Variables” on page 10 for information on the file name syntax.

**Key Entry**  User Flatness

### :CATalog[:ALL]

**Supported**  All Models

:MEMory:CATalog[:ALL]?

This command outputs a list of all files in the memory subsystem, but does not include files stored in the Option 601 or 602 baseband generator memory. The return data is in the following form:

\[
\text{<mem\_used>,<mem\_free>,"<file\_listing>"}
\]

The signal generator returns the two memory usage parameters and as many file listings as there are files in the memory subsystem. Each file listing parameter is in the following form:

"<file\_name,\ file\_type,\ file\_size>"

See Table 2-1 on page 57 for file types, and “File Name Variables” on page 10 for syntax.

**Key Entry**  All
**:COPY[:NAME]**

**Supported**  All Models

:MEMory:COPY[:NAME] "<src_name>"","<dest_name>">

This command copies the data from one file into another file. The file can use the same name if the specified directory is different. For example, if the file resides in non-volatile waveform memory (NVWFM) it can be copied, using the same name, to the signal generator's volatile memory (WFM1).

"<src_name>"  This variable names a file residing in memory that will be copied. For information on the file name syntax, see “File Name Variables” on page 10.

"<dest_name>"  This variable names the file that is a copy of the "<src_name>" file.

**Example**

:MEM:COPY "/USER/IQ/4QAM","/USER/IQ/test_QAM"

The preceding example copies the 4QAM file in the signal generator’s /USER/IQ directory to a file named test_QAM and saves it in the same directory.

**Key Entry**  Copy File

**:DATA**

**Supported**  All Models

:MEMory:DATA "<file_name>,<data_block>

:MEMory:DATA? "<file_name>"

This command loads waveform data into signal generator memory using the <data_block> parameter and saves the data to a file designated by the "<file_name>" variable. The query returns the file contents of the file as a datablock.

The waveform file must be located in volatile waveform memory (WFM1) before it can be played by the signal generator’s Dual ARB player. For downloads directly into volatile waveform memory use the path "WFM1:<file_name>". For downloads to non-volatile waveform memory, use the path "NVWFM:<file_name>".

Refer to “File Name Variables” on page 10 for information on the file name syntax.

"<file_name>"  This variable names the destination file, including the directory path. Refer to “ARB Waveform File Directories” on page 11 for information on directory paths and the file name syntax.

<data_block>  This parameter represents the data and file length parameters. The data in the file is represented by the <data_block> variable.

Refer to the Programming Guide for more information on programming the status registers.

**NOTE**  ARB waveform files created using the :DATA command cannot be retrieved or uploaded. Attempting to do so will cause the signal generator to display the message: ERROR:221, Access denied. To download ARB data to files for later retrieval, use the :DATA:UNPROtected command on page 51.
Example

:MEM:DATA "NVWFM:IQ_Data",#210Qaz37pY9oL

The preceding example downloads 10 bytes of data to a file, IQ_Data, in the signal generator’s non-volatile memory. The table shown below describes the command parameters.

- "NVWFM:IQ_Data"  
  IQ_Data is the data filename. The directory path is specified along with the filename.

- #210Qaz37pY9oL  
  Data block
  
  #  
  This character indicates the beginning of the data block
  
  10  
  10 bytes of data

:DATA:APPend

Supported All

:MEMory:DATA:APPend "<file_name>";<data_block>

This command appends data to an existing file stored in signal generator memory.

"<file_name>"  
This variable names the destination file and directory path. Refer to “File Name Variables” on page 10 for information on the file name syntax.

<data_block>  
This parameter represents the data and file length parameters. The data in the file is represented by the <data_block> variable. The file length parameters are used by the signal generator for allocating memory.

Refer to the Programming Guide for more information on downloading and using files.

Example

:MEM:DATA:APPend "NVWFM:IQ_Data",#14Y9oL

The preceding example downloads and appends the data, Y9oL, to an existing file named IQ_Data stored in the signal generator’s non-volatile memory (NVWFM).

- "NVWFM:IQ_Data"  
  IQ_Data is the filename to append data to. The directory path is specified along with the filename.

- #14Y9oL  
  Data block
  
  #  
  This character indicates the beginning of the data block
  
  4  
  4 bytes of data
:DATA:BIT

Supported E8267D with Option 601 or 602

:MEMORY:DATA:BIT "<file_name>",<bit_count>,<data_block>

:MEMORY:DATA:BIT? "<file_name>"

This command loads bit data into signal generator memory using the <bit_count> and <data_block> parameters and saves the data to a file designated by the "<file_name>" variable. The query returns the bit count, file length information, and the data.

"<file_name>" This variable names the destination file and the directory path. Refer to “File Name Variables” on page 10 for information on the file name syntax.

<bit_count> This number represents the number of bits in the data block.

<data_block> This parameter represents the data and file length parameters. The data in the file is represented by the <data_block> variable. The file length parameters are used by the signal generator for allocating memory.

Refer to the Programming Guide for more information on downloading and using files.

Example

:MEM:DATA:BIT "/USER/BIT/Test_Data",16,#12Qz

The preceding example downloads bit data to the file, Test_Data. The table below describes the command parameters.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>/&quot;USER/BIT/Test_Data&quot;</td>
<td>Test_Data is the bit data filename. The directory path is specified along with the filename</td>
</tr>
<tr>
<td>16</td>
<td>Number of bits in the data block</td>
</tr>
<tr>
<td>#12Qz</td>
<td>Data block</td>
</tr>
<tr>
<td>#</td>
<td>This character indicates the beginning of the data block</td>
</tr>
<tr>
<td>1</td>
<td>Number of digits in the byte count</td>
</tr>
<tr>
<td>2</td>
<td>Byte count</td>
</tr>
<tr>
<td>Qz</td>
<td>16 bits of data (ASCII representation of bit data)</td>
</tr>
</tbody>
</table>

:DATA:FIR

Supported E8267D with Option 601 or 602

:MEMORY:DATA:FIR "<file_name>",osr,coefficient{,coefficient}

:MEMORY:DATA:FIR? "<file_name>"

This command loads oversample ratio (OSR) and user-defined finite impulse response (FIR) coefficient data into a file in the signal generator's non–volatile memory (NVWFM). The query returns the oversample ratio and coefficient data.

"<file_name>" This variable is the directory path and file name of the destination file. Refer to “File Name Variables” on page 10 for information on the file name syntax.
System Commands
Memory Subsystem (:MEMory)

osr The OSR is the number of filter taps per symbol.
coefficient This variable is the FIR coefficient. The maximum number of coefficients is 1024.
{,coefficient} This optional variable is used when you enter additional coefficients.
Refer to the Programming Guide for more information on downloading and using files.

Example

:MEM:DATA:FIR "USER/FIR/FIR_1",4,0,0,0,0,0.000001,0.000012,0.000132,0.001101,0.006743,0.030588,0.103676,0.265790,0.523849,0.809508,1,1,0.809508,0.523849,0.265790,0.103676,0.030588,0.006743,0.001101,0.000132,0.000012,0.000001,0,0,0,0,0

The preceding example downloads FIR coefficient and oversampling ratio data to the signal generator's non-volatile memory in a file named FIR_1.

Range
osr: 1–32
coefficient: -1000 to 1000

Key Entry
Oversample Ratio

:DATA:FSK

Supported E8267D with Option 601 or 602

:MEM:DATA:FSK "<file_name>,<num_states>,<f0>,<f1>,...<f(n)>
[,<diff_state>,<num_diff_states>,<diff1>,...<diff(n)>]
:MEM:DATA:FSK? "<file_name>

This command loads custom frequency shift keying (FSK) data into a file in the signal generator's non-volatile memory (NVWFM).
The query returns data in the following form:

"<file_name>" This variable string identifies the name of the FSK file. The filename must be enclosed with quotation marks. Refer to “File Name Variables” on page 10 for information on the file name syntax.
<num_states> This variable identifies the number of frequency states.
<f0> This variable identifies the value of the first frequency state.
<f1>,...<f(n)> This variable identifies the value of the second and subsequent frequency states with a frequency resolution of 0.1Hz.
<diff_state> This variable enables or disables differential encoding.
<num_diff_states> This variable identifies the number of differential states.
<diff0> This variable identifies the value of the first differential state.
<diff1>,...<diff(n)> This variable identifies the value of the second and subsequent differential states.

Refer to the Programming Guide for more information on downloading and using files.
Example

:MEM:DATA:FSK "*/USER/FSK/4FSK",4,-2kHz,-1kHz,2kHz,1kHz,ON,2,1,0

The preceding example downloads a four–level FSK data to a file named 4FSK that has four states (frequencies): -2kHz, -1kHz, 2kHz, 1kHz; differential encoding is toggled ON, and there are two differential states 1 and 0. The table shown below describes the command parameters.

- "*/USER/FSK/4FSK" 4FSK is the FSK data filename. The directory path is specified along with the filename
- 4 Number of states
- -2kHz First frequency state
- -1kHz Second frequency state
- 2kHz Third frequency state
- 1kHz Fourth frequency state
- ON Differential encoding is on
- 2 Number of differential states
- 1 Value of the first differential state
- 0 Value of the second differential state

Range

\begin{align*}
\text{num\_diff\_states:} & \quad 0–256 \\
\text{num\_states:} & \quad 2–16 \\
\text{f0–f(n):} & \quad -20\text{MHz to 20MHz} \\
\text{diff0–diff(n):} & \quad -128 to 127
\end{align*}

:DATA:IQ

Supported

E8267D with Option 601 or 602

:MEM:DATA:IQ "<file\_name>",<offsetQ>,<num\_states>,<i0>,<q0>,<i1>,<q1>,...<i(n)>,<q(n)>,[,<diff\_state>,<num\_diff\_states>,<diff0>,<diff1>,...<diff(n)>]

This command loads custom I/Q data into a file in the signal generator’s non–volatile waveform memory (NVWFIM).

The query returns data in the following form:

\begin{align*}
\text{<offsetQ>,<num\_states>,<i0>,<q0>,<i1>,<q1>,...<i(n)>,<q(n)>,<diff\_state>,<num\_diff\_states>,<diff0>,<diff1>,...<diff(n)>}
\end{align*}

"<file\_name>" This variable string identifies the name of the I/Q file. The filename must be enclosed with quotation marks. Refer to “File Name Variables" on page 10 for information on the file name syntax.

<offsetQ> This variable enables (1) or disables (0) the Q output delay by 1/2 symbol from the I output.
<num_states> This is the number of symbols.
<i0>...<i(n)> This is the I value of the first and subsequent I symbols.
<q0>...<q(n)> This is the Q value of the first and subsequent Q symbols.
<diff_state> This variable enables and disables differential encoding.
<num_diff_states> This variable identifies the number of differential states.
<diff0> This variable identifies the value of the first differential state.
<diff1,...diff(n)> This variable identifies the value of the second and subsequent differential states.

Refer to the Programming Guide for more information on downloading and using files.

Example

:MEM:DATA:IQ "USER/IQ/Test_BPSK", 1, 2, 1, 0, 0, 0

The preceding example loads and stores a two-symbol I/Q file named Test_BPSK that has a Q offset. The table shown below describes the command parameters.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test_BPSK</td>
<td>Test_Data is the bit data filename. The directory path is specified along with the filename</td>
</tr>
<tr>
<td>Q Offset</td>
<td>Q Offset. The Q output delay is enabled.</td>
</tr>
<tr>
<td>Number of symbols</td>
<td>Number of symbols</td>
</tr>
<tr>
<td>Value of the first I symbol</td>
<td>Value of the first I symbol</td>
</tr>
<tr>
<td>Value of the second I symbol</td>
<td>Value of the second I symbol</td>
</tr>
<tr>
<td>Value of the second Q symbol</td>
<td>Value of the second Q symbol</td>
</tr>
</tbody>
</table>

Range

- num_states: 2–256
- i0–i(n): −1 to 1
- q0–q(n): −1 to 1
- num_diff_states: 0–256
- diff0–diff(n): -128 to 127

:DATA:PRAM:FILE:BLOCk

Supported E8267D with Option 601 or 602

This command loads block-formatted data directly into pattern RAM volatile memory (WFM1). Pattern RAM memory describes how memory (WFM1) is used and is not a distinct piece of memory. A PRAM file is specified as an array of bytes. No directory path name is needed.

"<file_name>" This variable names the destination file. Refer to “File Name Variables” on page 10 for information on the file name syntax.
<data_block> This parameter represents the data and file length parameters. The data in the file is represented by the <data_block> variable. The file length parameters are used by the signal generator for allocating memory.

Pattern Ram files are binary files downloaded directly into waveform memory as an array of bytes. Each byte specifies a data bit (LSB 0), a burst bit (BIT 2), and an Event 1 output bit (BIT 6). Refer to the Programming Guide for more information on downloading and using files.

**Example**

:MEM:DATA:PRAM:FILE:BLOC "PRAM_Data",#14Yq8L

The preceding example downloads PRAM data to a file named PRAM_Data into the signal generator's volatile memory.

- 'PRAM_Data' PRAM_Data is the data filename. PRAM files are saved to the signal generator's non-volatile memory (WFM1).
- #14Yq8L Data block
  # This character indicates the beginning of the data block
  1 Number of digits in the byte count
  4 Byte count
  Yq8L 4 bytes of data

**:DATA:PRAM:FILE:LIST**

**Supported** E8267D with Option 601 or 602

:MEMORY:DATA:PRAM:FILE:LIST "<file_name>" [,<uint8>,<...>]

This command loads list-formatted data directly into pattern RAM volatile memory (WFM1). Pattern RAM memory describes how memory (WFM1) is used and is not a distinct piece of memory. A PRAM file is specified as an array of bytes.

**NOTE** This command should be preceded by a *WAI (Wait-to-Continue) command to ensure that all pending operations are completed, before loading the list.

"<file_name>" This variable names the destination file. Refer to "File Name Variables" on page 10 for information on the file name syntax.

<uint8> This variable is any of the valid 8-bit, unsigned integer values between 0 and 255.

[,<uint8>,<...>] This variable identifies the value of the second and subsequent 8-bit unsigned integer variables.

Pattern Ram files are binary files downloaded directly into waveform memory as an array of bytes. Each byte specifies a data bit (LSB 0), a burst bit (BIT 2), and an Event 1 output bit (BIT 6). Refer to the Programming Guide for more information on downloading and using files.
Example

:MEM:DATA:PRAM:LIST "Pram_Data", 85,21,21,20,20,100

The preceding example downloads PRAM data, in list format, to a file named Pram_Data in the signal generator's volatile memory (WFM1).

- 'Pram_Data'  
  Pram_Data is the data filename. PRAM files are saved to the signal generator's non-volatile memory (WFM1).
- 85  
  The first 8-bit integer value
- 21,21,20,20,100  
  Subsequent 8-bit integer values.

Range  
0–255

:DATA:PRAM?

NOTE  
This query is no longer supported; however, it is still valid for backward compatibility. Refer to “:DATA:PRAM?” on page 320 for information on this command.

:DATA:PRAM:BLOCk

NOTE  
This command has been replaced by “:DATA:PRAM:FILE:BLOCk” on page 48. This command is no longer supported; however, it is still valid for backward compatibility. Refer to “:DATA:PRAM:BLOCk” on page 320 for information.

:DATA:PRAM:LIST

NOTE  
This command has been replaced by “:DATA:PRAM:FILE:LIST” on page 49. This command is no longer supported; however, it is still valid for backward compatibility. Refer to “:DATA:PRAM:LIST” on page 320 for information.

:DATA:SHAPE

Supported  
E8267D with Option 601 or 602

:MEMORY:DATA:SHAPE "<file_name>";<rise_pnts>;<rp0>,<rp1>,...;<fall_points>;<fp0>,<fp1>,...;<fp(n)}

This command loads a burst shape file into the signal generator's non-volatile memory (NVWFM).

"<file_name>"  
This variable names the destination file and directory path. Refer to “File Name Variables” on page 10 for information on the file name syntax.

rise_pnts  
This variable indicates the number of rise points used to describe the burst shape rising slope.
rp0,...rp(n) This variable defines each successive rise point, where 0 is no power and 1 is full power.

fall_points This variable indicates the number of fall points used to describe the burst shape falling slope.

fp0,...fp(n) This variable defines each successive fall point, where 1 is full power and 0 is no power.

Refer the *Programming Guide* for more information on downloading and using files.

**Example**

```
:MEM:DATA:SHAP "\USER/SHAPE/Shape_File",6,0,0.2,0.4,0.6,0.8,1.0,2,0.5,0
```

The preceding example loads shape data to a file named Shape_File in the signal generator’s non-volatile memory.

- `/USER/SHAPE/Shape_File` Shape_File is the data filename. The directory path is specified along with the file name.
- 6 Number of rise points describing the burst shape.
- 0.0,0.2,0.4,0.6,0.8,1.0 Rise point values.
- 2 Number of fall points describing the burst shape.
- 0.5,0 Fall point values.

**Range**

- `num_rise_points`: 2–256
- `num_fall_points`: 2–256
- `rp0–rp(n)`: 0.0–1.0
- `fp0–fp(n)`: 0.0–1.0

**:DATA:UNPRotected**

**Supported** E8267D with Option 601 or 602

`:MEMory:DATA:UNPRotected "<file_name>",<data_block>`

This command allows you to download data and store it in a file on the signal generator with the ability to retrieve it. This command is intended for downloading waveform data; however, you can use it to download all types of data.

**NOTE** If you do not use the UNPRotected command when downloading a waveform file, you will not be able to retrieve or upload the file. Attempting to do so will cause the signal generator to display the message: ERROR:221, Access denied.

The UNPRotected command does not require the directory path in the `<file_name>` parameter if the destination directory is BINARY.

Waveform files created with Agilent’s Signal Studio are encrypted. These files can be used in other signal generators (provided the other signal generator has the same options and licenses required by
the file) only if the SECUREWAVE directory path is specified in both the download and upload command parameters. The securewave directory path is SNVWFM: for non-volatile waveform memory and SWFM1: for volatile waveform memory.

"<file_name>"  This variable names the destination file and directory path. Refer to “File Name Variables” on page 10 for information on the file name syntax.

<data_block>  This parameter represents the data and file length parameters. The data in the file is represented by the <data_block> variable.

Refer to the Programming Guide for more information on downloading and using files.

Example

:MEM:DATA:UNPR "NVWFM:Data_File",#18Qz37pY9o

The preceding example downloads waveform data to a file named Data_File in the signal generator's non-volatile memory. The table shown below describes the command parameters.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;NVWFM:Data_File&quot;</td>
<td>Data_File is the data filename. The directory path is implied along with the filename.</td>
</tr>
<tr>
<td>#18Qz37pY9o</td>
<td>Data block</td>
</tr>
<tr>
<td>#</td>
<td>This character indicates the beginning of the data block</td>
</tr>
<tr>
<td>1</td>
<td>Number of digits in the byte count</td>
</tr>
<tr>
<td>8</td>
<td>Byte count</td>
</tr>
<tr>
<td>Qz37pY9o</td>
<td>8 bytes of data</td>
</tr>
</tbody>
</table>

:DELETE:ALL

Supported All Models

CAUTION Using this command deletes all user files including binary, list, state, and flatness correction files, and any saved setups that use the front panel table editor. However, this does not include files stored in the Option 601 or 602 baseband generator memory. You cannot recover the files after executing this command.

:MEMORY:DELETE:ALL

This command clears the file system of all user files.

Key Entry Delete All Files

:DELETE:BINary

Supported All Models

:MEMORY:DELETE:BINary

This command deletes all binary files.

Key Entry Delete All Binary Files
System Commands
Memory Subsystem (:MEMory)

:DELe:BIT

Supported  E8267D with Option 601 or 602

This command deletes all bit files.

Key Entry  Delete All Bit Files

:DELe:DMOD

Supported  E8267D with Option 601 or 602

This command deletes all arbitrary waveform digital modulation (DMOD) files.

Key Entry  Delete All ARB DMOD Files

:DELe:FIR

Supported  E8267D with Option 601 or 602

This command deletes all finite impulse response (FIR) filter files.

Key Entry  Delete All FIR Files

:DELe:FSK

Supported  E8267D with Option 601 or 602

This command deletes all frequency shift keying (FSK) files.

Key Entry  Delete All FSK Files

:DELe:IQ

Supported  E8267D with Option 601 or 602

This command deletes all I/Q files.

Key Entry  Delete All I/Q Files
System Commands
Memory Subsystem (:MEMory)

:DELeTe:LIST

Supported: All Models

This command deletes all List files.

Key Entry: Delete All List Files

:DELeTe:MDMod

Supported: E8267D with Option 601 or 602

This command deletes all arbitrary waveform multicarrier digital modulation (MDMod) files.

Key Entry: Delete All ARB MDMOD Files

:DELeTe:MTONE

Supported: E8267D with Option 601 or 602

This command deletes all arbitrary waveform multitone files.

Key Entry: Delete All ARB MTONE Files

:DELeTe:SEQ

Supported: E8267D with Option 601 or 602

This command deletes all sequence files.

Key Entry: Delete All Sequence Files

:DELeTe:SHAPe

Supported: E8267D with Option 601 or 602

This command deletes all burst shape files.

Key Entry: Delete All Shape Files
**:DELete:STATe**

Supported  All Models

**:MEMory:DELete:STATe**

This command deletes all state files.

Key Entry  Delete All State Files

**:DELete:UFLT**

Supported  All Models

**:MEMory:DELete:UFLT**

This command deletes all user-flatness correction files.

Key Entry  Delete All UFLT Files

**:DELete[:NAME]**

Supported  All Models

**:MEMory:DELete[:NAME] "<file_name>"**

This clears the user file system of "<file_name>". When deleting an ARB waveform file, the associated marker and header files are also deleted.

Refer to "File Name Variables" on page 10 for information on the file name syntax.

Example

**:MEM:DEL "/USER/WAVEFORM/Test_Data"**

The preceding example deletes the file named Test_Data from the signal generator's non-volatile memory.

Key Entry  Delete File

**:FREE[:ALL]**

Supported  All Models

**:MEMory:FREE[:ALL] ?**

This command returns the number of bytes left in the user file system.

Key Entry  All
System Commands
Memory Subsystem (:MEMory)

:LOAD:LIST

Supported All Models

:MEMory:LOAD:LIST "<file_name>"

This command loads a List Sweep file.

Example

:MEM:LOAD:LIST "List_Data"

The preceding example loads the file "List_Data" into volatile waveform memory.

Key Entry Load From Selected File

:MOVE

Supported All Models

:MEMory:MOVE "<src_file>"","<dest_file>"

This command renames the src_file to dest_file in the signal generator's memory catalog.

Refer to “File Name Variables” on page 10 for information on the file name syntax.

Example

:MEM:MOV "NVWFM:Test_Data","NVWFM:New_Data"

The preceding example renames the file Test_Data to New_Data in the signal generator's non-volatile memory directory.

Key Entry Rename File

:STATE:COMMent

Supported All Models

:MEMory:STATE:COMMent <reg_num>,<seq_num>,"<comment>"

:MEMory:STATE:COMMent? <reg_num>,<seq_num>

This command lets you to add a descriptive comment to the saved instrument in the state register, <reg_num>,<seq_num>. Comments can be up to 55 characters long.

Example

:MEM:STAT:COMM 00,1, "ARB file using external reference"

The preceding example writes a descriptive comment to the state file saved in register 00, sequence 1.

Key Entry Add Comment To Seq[n] Reg[nn]
**:STOR:e:LIST**

**Supported** All Models

```
:MEM:ORY:STOR:LIST "<file_name>"
```

This command stores the current list sweep data to a file.

Refer to "File Name Variables" on page 10 for information on the file name syntax.

**Example**

```
:MEM:ORY:STOR:LIST "Test_Data"
```

The preceding example writes list sweep data to a file named Test_Data and stores the file in the signal generator’s non–volatile memory, List directory.

**Key Entry** Store To File

---

**Mass Memory Subsystem (:MMEMory)**

**:CATalog**

**Supported** All Models

```
:MMEM:ORY:CATalog? "<msus>"
```

This command outputs a list of the files from the specified file system. The variable "<msus>" (mass storage unit specifier) represents a file system. The file systems and types are shown in Table 2-1.

**Table 2-1**

<table>
<thead>
<tr>
<th>File System</th>
<th>File Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIN - Binary file</td>
<td>BIN</td>
</tr>
<tr>
<td>BIT</td>
<td>BIT</td>
</tr>
<tr>
<td>DMOD - ARB digital modulation file</td>
<td>DMOD</td>
</tr>
<tr>
<td>FIR - finite impulse response filter file</td>
<td>FIR</td>
</tr>
<tr>
<td>FSK - frequency shift keying modulation file</td>
<td>FSK</td>
</tr>
<tr>
<td>I/Q - modulation file</td>
<td>IQ</td>
</tr>
<tr>
<td>LIST - sweep list file</td>
<td>LIST</td>
</tr>
<tr>
<td>MDMOD - ARB multicarrier digital modulation file</td>
<td>MDM</td>
</tr>
<tr>
<td>MTON - ARB multitone file</td>
<td>MTON</td>
</tr>
<tr>
<td>NVMKR - non–volatile arbitrary waveform marker file</td>
<td>NVMKR</td>
</tr>
<tr>
<td>NVWFM - non–volatile arbitrary waveform file</td>
<td>NVWFM</td>
</tr>
<tr>
<td>SEQ - ARB sequence file</td>
<td>SEQ</td>
</tr>
<tr>
<td>SHAPE - burst shape file</td>
<td>SHAP</td>
</tr>
<tr>
<td>STATE</td>
<td>STAT</td>
</tr>
</tbody>
</table>

---
System Commands
Mass Memory Subsystem (:MMEMory)

Table 2-1

<table>
<thead>
<tr>
<th>File System</th>
<th>File Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>USERFLAT - user-flatness file</td>
<td>UFLT</td>
</tr>
<tr>
<td>WFM1 - waveform file</td>
<td>WFM1</td>
</tr>
</tbody>
</table>

The return data will be in the following form: \(<\text{mem\_used}>,<\text{mem\_free}>\{,"<\text{file\_listings}>\}

The signal generator will return the two memory usage parameters and as many file listings as there are files in the specified file system. Each file listing will be in the following format: "<file\_name,file\_type,\text{file\_size}>"

Refer to “MSUS (Mass Storage Unit Specifier) Variable” on page 11 for information on the use of the "<msus>" variable.

Key Entry

<table>
<thead>
<tr>
<th>Binary</th>
<th>List</th>
<th>State</th>
<th>User Flatness</th>
<th>Fir</th>
<th>Shape</th>
<th>Bit</th>
<th>FSK</th>
</tr>
</thead>
<tbody>
<tr>
<td>I/Q</td>
<td>Seq</td>
<td>DMOD</td>
<td>MTONE</td>
<td>MDMOD</td>
<td>WFM1</td>
<td>NVMKR</td>
<td>NVMFM</td>
</tr>
</tbody>
</table>

:COPY

Supported
All Models

:MMEMory:COPY[:NAME] "<\text{src\_name}>","<\text{dest\_name}>"

This command copies the data from one file into another file. The file can use the same name if the specified directory is different. For example, if the file resides in non-volatile waveform memory (NVWFM) it can be copied, using the same name, to the signal generator's volatile memory (WFM1)

"<\text{src\_name}>"  This variable names a file residing in memory that will be copied. For information on the file name syntax, see “File Name Variables” on page 10

"<\text{dest\_name}>"  This variable names the file that is a copy of the "<\text{src\_name}>" file.

Example

:MMEM:COPY "/USER/IQ/4QAM","/USER/IQ/test_QAM"

The preceding example copies the 4QAM file in the signal generator's /USER/IQ directory to a file named test_QAM and saves it in the same directory.

Key Entry
Copy File

:DATA

Supported
All Models

:MMEMory:DATA "<file\_name>",<data\_block>

:MMEMory:DATA? "<file\_name>"

This command loads waveform data into signal generator memory using the <data\_block> parameter and saves the data to a file designated by the "<file\_name>" variable. The query returns the file contents of the file as a datablock.

The waveform file must be located in volatile waveform memory (WFM1) before it can be played by
the signal generator’s Dual ARB player. For downloads directly into volatile waveform memory use the path "WFM1:<file_name>". For downloads to non-volatile waveform memory, use the path "NVWFM:<file_name>".

Refer to "File Name Variables" on page 10 for information on the file name syntax.

"<file_name>" This variable names the destination file, including the directory path. Refer to “ARB Waveform File Directories” on page 11 for information on directory paths and the file name syntax.

<data_block> This parameter represents the data and file length parameters. The data in the file is represented by the <data_block> variable. The file length parameters are used by the signal generator for allocating memory.

Refer to the Programming Guide for more information on downloading and using files.

**NOTE** Files created using the :DATA command cannot be retrieved or uploaded. Attempting to do so will cause the signal generator to display the message: ERROR:221, Access denied. To download data to files for later retrieval, use the :DATA:UNPRotected command on page 51.

**Example**

:MMEM:DATA "NVWFM:IQ_Data",#210Qaz37pY9oL

The preceding example downloads 10 bytes of data to a file, IQ_Data, in the signal generator’s non-volatile memory. The table shown below describes the command parameters.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;NVWFM:IQ_Data&quot;</td>
<td>IQ_Data is the data filename. The directory path is specified along with the filename</td>
</tr>
<tr>
<td>#210Qaz37pY9oL</td>
<td>Data block</td>
</tr>
<tr>
<td>#</td>
<td>This character indicates the beginning of the data block</td>
</tr>
<tr>
<td>2</td>
<td>Number of digits in the byte count</td>
</tr>
<tr>
<td>10</td>
<td>Byte count</td>
</tr>
<tr>
<td>Qaz37pY9oL</td>
<td>10 bytes of data</td>
</tr>
</tbody>
</table>

**:DELete:NVWFm**

**Supported** E8267D with Option 601 or 602

**:MMEMory:DELete:NVWFm**

This command clears the memory file system of all non-volatile arbitrary waveform (NVWFm) files.

**Key Entry** Delete All NVWFm Files
System Commands
Mass Memory Subsystem (:MMEMory)

:DELeTe:WFM
Supported E8267D with Option 601 or 602

This command clears the memory file system of all volatile arbitrary waveform (WFM1) files. It
performs the same function as DELeTe:WFM1 command.

Key Entry Delete All WFM1 Files

:DELeTe[:NAME]

Supported All Models

:MMEMory:DELeTe[:NAME] "<file_name>" [, "<msus>"]

This command clears the memory file system of "<file_name>" with the option of specifying the file
system ["<msus>"] separately.

The variable "<msus>" (mass storage unit specifier) represents the file system. For a list of the file
systems refer to Table 2-1 on page 57. Refer to “MSUS (Mass Storage Unit Specifier) Variable” on
page 11 for information on the mass storage unit specifier.

If the optional variable "<msus>" is omitted, the file name needs to include the file system extension.
Refer to “File Name Variables” on page 10 for information on the file name syntax.

Example

:MMEM:DEL "USER/BIN/Test_Data"
:MMEM:DEL "Test_Data ",":BIN"

The preceding examples delete the file named Test_Data from the signal generator’s USER/BIN
directory. The first example uses the full file name path while the second example uses the "<msus>"
specifier.

Key Entry Delete File

:HEADer:CLEar

Supported E8267D

:MMEMory:HEADer:CLEar "<file_name>"

This command deletes header file information for the waveform file "<file_name>". This command
does not require a personality modulation to be on. The header file contains signal generator settings
and marker routings associated with the waveform file. Refer to “File Name Variables” on page 10 for
information on the file name syntax.

Example

:MMEM:HEAD "USER/WAVEFORM/Test_Data"

The preceding example deletes header file information for the Test_Data waveform file.

*RST N/A

Key Entry Clear Header
**:HEADer:DESCription**

**Supported**

E8267D

`:MMEMory:HEADer:DESCription "<file_name>"","<description>"`

`:MMEMory:HEADer:DESCription? "<file_name>"`

This command inserts a description for the header file named. The header description is limited to 32 characters.

Refer to “File Name Variables” on page 10 for information on the file name syntax.

**Example**

`:MMEM:HEAD:DESC */USER/WAVEFORM/Test_Data","This is new header data"

The preceding example inserts a description into the Test_Data header file. In this example, the file is located in the signal generator's non-volatile waveform memory.

**RST**

N/A

**Key Entry**

Edit Description

---

**:LOAD:LIST**

**Supported**

All Models

`:MMEMory:LOAD:LIST "<file_name>"`

This command loads list data from the List file "<file_name>".

Refer to “File Name Variables” on page 10 for information on the file name syntax.

**Example**

`:MMEM:LOAD:LIST "Sweep_Data"

The preceding example loads sweep configuration data from the Sweep_Data List file.

**Key Entry**

Load From Selected File

---

**:MOVE**

**Supported**

All Models

`:MMEMory:MOVE "<src_file>"","<src_file_1>"

This command renames the src_file to src_file_1 in the signal generator's memory catalog.

Refer to “File Name Variables” on page 10 for information on the file name syntax and using quotes for different programming languages.

**Example**

`:MMEM:MOV "NVWFM:Test_Data","NVWFM:New_Data"

The preceding example renames the file Test_Data to New_Data located in non-volatile memory (NVWFM).
System Commands
Output Subsystem (:OUTPut)

Key Entry Rename File

:STOR:e:LIST

Supported All Models

:MMEMory:STOR:e:LIST "<file name>"

This command copies the current list sweep data to the "<file name>" and saves it in the catalog of List files.

Refer to “File Name Variables” on page 10 for information on the file name syntax.

Example

:MMEM:STOR:LIST "Sweep_Data"

The preceding example stores the current list sweep data to the file Sweep_Data in the signal generator’s catalog of List files.

Key Entry Store To File

Output Subsystem (:OUTPut)

:BLAN:king:AUTO

Supported All Models

[:SOURce]:OUTPut:BLAN:king:AUTO ON|OFF|1|0

[:SOURce]:OUTPut:BLAN:king:AUTO?

This command sets the state for automatic RF Output blanking. Blanking occurs when the RF output is momentarily turned off as the sweep transitions from one frequency segment (band) to another, allowing the signal to settle. Blanking also occurs during the retrace, so the signal can settle before the next sweep. In CW mode, blanking occurs whenever you change the frequency.

ON (1) This choice activates the automatic blanking function. The signal generator determines the blanking occurrences for optimum performance.

OFF (0) This choice turns off the automatic blanking function, which also sets the blanking state to off.

Example

:OUTP:BLAN:AUTO 0

The preceding example disables RF output blanking.

*RST 1

Key Entry Output Blanking Off On Auto
:BLANking[:STATe]

**Supported**  All Models

[:SOURce]:OUTPut:BLANking[:STATe] ON|OFF|1|0
[:SOURce]:OUTPut:BLANking[:STATe]?

This command sets the state for RF Output blanking. Blanking occurs when the RF output is momentarily turned off as the sweep transitions from one frequency segment (band) to another, allowing the signal to settle. Blanking also occurs during the retrace, so the signal can settle before the next sweep. In CW mode, blanking occurs whenever you change the frequency.

**ON** (1)  This choice activates the blanking function. Blanking occurs on all frequency changes, including segment transitions and retrace

**OFF** (0)  This choice turns off the blanking function.

**Example**

:OUTP:BLAN:ON

The preceding example enables RF output blanking.

**Key Entry**  Output Blanking Off On Auto

:MODulation[:STATe]

**Supported**  E8267D and E8257D with Option UNT

:OUTPut:MODulation[:STATe] ON|OFF|1|0
:OUTPut:MODulation[:STATe]?

This command enables or disables the modulation of the RF output with the currently active modulation type(s). Most modulation types can be simultaneously enabled except FM with ΦM.

An annunciator on the signal generator always displays to indicate whether modulation is on or off.

**Example**

:OUTP:MOD  0

The preceding example disables RF modulation.

*RST  1

**Key Entry**  Mod On/Off

[:STATe]

**Supported**  All Models

:OUTPut[:STATe] ON|OFF|1|0
:OUTPut[:STATe]?

This command enables or disables the RF output. Although you can configure and engage various modulations, no signal is available at the RF OUTPUT connector until this command is executed.

An annunciator always displays on the signal generator to indicate whether the RF output is on or off.
System Commands
Route Subsystem (:ROUTe:HARDware:DGENerator)

Example
:OUTP ON
The preceding example turns on the signal generator’s RF output.

*RST 0
Key Entry RF On/Off

Route Subsystem (:ROUTe:HARDware:DGENerator)

:INPut:BPOLarity

Supported E8267D with Option 601 or 602
:ROUTe:HARDware:DGENerator:INPut:BPOLarity POSitive|NEGative
:ROUTe:HARDware:DGENerator:INPut:BPOLarity?

This command sets the signal generator up to respond to either a high (+5 vdc) or low (0 vdc) level TTL input signal at the BURST GATE IN connector. This command performs the same function as ":IPOLarity:BGATe" on page 65.

Example
:ROUT:HARD:DGEN:INP:BPOL NEG
The preceding example sets up the signal generator to respond to a LOW level TTL signal at the BURST GATE IN connector.

*RST POS
Key Entry Burst Gate In Polarity Neg Pos

:INPut:CPOLarity

Supported E8267D with Option 601 or 602
:ROUTe:HARDware:DGENerator:INPut:CPOLarity POSitive|NEGative
:ROUTe:HARDware:DGENerator:INPut:CPOLarity?

This command sets the signal generator up to respond to either a high (+5 vdc) or low (0 vdc) level TTL input signal at the DATA CLOCK input connector. This command performs the same function as ":IPOLarity:CLOCk" on page 66.

Example
:ROUT:HARD:DGEN:INP:CPOL POS
The preceding example sets up the signal generator to respond to a high level TTL signal at the DATA CLOCK input connector.

*RST POS
Key Entry Data Clock Polarity Neg Pos
:INPut:DPOLarity

**Supported** E8267D with Option 601 or 602

:ROUTe:HARDware:DGENerator:INPut:DPOLarity POSitive|NEGative
:ROUTe:HARDware:DGENerator:INPut:DPOLarity?

This command sets the signal generator up to respond to either a high (+5 vdc) or low (0 vdc) level TTL input signal at the DATA connector. This command performs the same function as “:IPOLarity:DATA” on page 66.

**Example**

:ROUT:HARD:DGEN:INP:DPOL POS

The preceding example sets up the signal generator to respond to a high level TTL signal at the DATA input connector.

*RST POS

**Key Entry** Data Polarity Neg Pos

:INPut:SPOLarity

**Supported** E8267D with Option 601 or 602

:ROUTe:HARDware:DGENerator:INPut:SPOLarity POSitive|NEGative
:ROUTe:HARDware:DGENerator:INPut:SPOLarity?

This command sets the signal generator up to respond to either a high (+5 vdc) or low (0 vdc) level TTL input signal at the SYMBOL SYNC input connector.

This command performs the same function as “:IPOLarity:SSYNc” on page 67.

**Example**

:ROUT:HARD:DGEN:INP:SPOL POS

The preceding example sets up the signal generator to respond to a high level TTL signal at the SYMBOL SYNC input connector.

*RST POS

**Key Entry** Symbol Sync Polarity Neg Pos

:INPut:BPOLaTe

**Supported** E8267D with Option 601 or 602

:ROUTe:HARDware:DGENerator:IPOLarity:BGATe POSitive|NEGative
:ROUTe:HARDware:DGENerator:IPOLarity:BGATe?

This command sets the signal generator up to respond to either a high (+5 vdc) or low (0 vdc) level TTL signal at the BURST GATE IN connector. This command performs the same function as “:INPut:BPOLarity” on page 64.
System Commands
Route Subsystem (:ROUte:HArdware:DGEnerator)

Example
:ROUT:HARD:DGEN:IPOL:BGAT POS
The preceding example sets up the signal generator to respond to a high level TTL signal at the rear-panel BURST GATE IN connector.

*RST POS

Key Entry Burst Gate In Polarity Neg Pos

:IPOLarity:CLOCK

Supported E8267D with Option 601 or 602

:ROUTe:HArdware:DGENerator:IPOLarity:CLOCK POSitive|NEGative

This command sets the signal generator up to respond to either a high (+5 vdc) or low (0 vdc) level TTL input signal at the DATA CLOCK connector.

This command performs the same function as ":INPut:CPOLarity" on page 64.

Example
:ROUT:HARD:DGEN:IPOL:CLOC POS
The preceding example sets up the signal generator to respond to a high level TTL signal at the DATA CLOCK input connector.

*RST POS

Key Entry Data Clock Polarity Neg Pos

:IPOLarity:DATA

Supported E8267D with Option 601 or 602

:ROUTe:HArdware:DGENerator:IPOLarity:DATA POSitive|NEGative

This command sets the signal generator up to respond to either a high (+5 vdc) or low (0 vdc) level TTL input signal at the DATA connector. This command performs the same function as ":INPut:DPOLarity" on page 65.

Example
:ROUT:HARD:DGEN:IPOL:DATA POS
The preceding example sets up the signal generator to respond to a high level TTL signal at the DATA input connector.

*RST POS

Key Entry Data Polarity Neg Pos
System Commands
Route Subsystem (:ROUTE:HW:DGEn)

:IPOLarity:SSYNc

**Supported**
E8267D with Option 601 or 602

:ROUTE:HW:DGEn:IPOL:SSYNc POSitive|NEGative
:ROUTE:HW:DGEn:IPOL:SSYNc?

This command sets the signal generator up to respond to either a high (+5 vdc) or low (0 vdc) level TTL input signal at the SYMBOL SYNC connector.

This command performs the same function as "INPut:SPOLarity" on page 65.

**Example**

:ROUTE:HW:DGEn:IPOL:SSYN POS

The preceding example sets up the signal generator to respond to a high level TTL signal at the SYMBOL SYNC input connector.

*RST

**Key Entry**
Symbol Sync Polarity Neg Pos

:OPOLarity:CLOCk

**Supported**
E8267D with Option 601 or 602

:ROUTE:HW:DGEn:OPOL:CLOCk POSitive|NEGative
:ROUTE:HW:DGEn:OPOL:CLOCk?

This command sets the signal generator up to output either a high (+5 vdc) or low (0 vdc) level TTL signal at the DATA CLK OUT pin on the rear panel AUXILIARY I/O connector.

This command performs the same function as "OUTPut:CPOLarity" on page 69.

**Example**

:ROUTE:HW:DGEn:OPOL:CLOC POS

The preceding example sets up the signal generator to output a high level TTL signal at the DATA CLK OUT pin on the rear panel AUXILIARY I/O connector.

*RST

**Key Entry**
Data Clock Out Neg Pos

:OPOLarity:DATA

**Supported**
E8267D with Option 601 or 602

:ROUTE:HW:DGEn:OPOL:DATA POSitive|NEGative
:ROUTE:HW:DGEn:OPOL:DATA?

This command sets the signal generator up to output either a high (+5 vdc) or low (0 vdc) level TTL signal at the DATA OUT pin on the rear panel AUXILIARY I/O connector.

This command performs the same function as "OUTPut:DPOLarity" on page 69.
Example

:ROUTe:HARD:DENeR:DATA NEG

The preceding example sets up the signal generator to output a low level TTL signal at the DATA OUT pin on the rear panel AUXILIARY I/O connector.

*RST POS

Key Entry Data Out Polarity Neg Pos

:OPOLarity:EVENT[1]|2|3|4

Supported E8267D with Option 601 or 602


This command sets the signal generator up to output either a high (+5 vdc) or low (0 vdc) level TTL signal at the EVENT 1 or EVENT 2 connector.

This command performs the same function as “OUTPut:EPOL[1]|2|3|4” on page 70.

Example

:ROUTe:HARD:DENeR:DATA NEG

The preceding example sets up the signal generator to output a low level TTL signal at the DATA OUT pin on the rear panel AUXILIARY I/O connector.

:OPOLarity:SSYNc

Supported E8267D with Option 601 or 602

:ROUTe:HARD:DENeR:OPOLarity:SSYNc POSitive|NEGative

This command sets the signal generator up to output either a high (+5 vdc) or low (0 vdc) level signal at the SYM SYNC OUT pin on the rear panel AUXILIARY I/O connector.

This command performs the same function as “OUTPut:SPOLarity” on page 70.

Example

:ROUTe:HARD:DENeR:SSYN POS

The preceding example sets up the signal generator to output a high level TTL signal at the SYM SYNC OUT pin on the rear panel AUXILIARY I/O connector.

*RST POS

Key Entry Symbol Sync Out Polarity Neg Pos
System Commands
Route Subsystem (:ROUTe:HARDware:DGENerator)

**:OUTPut:CPOLarity**

**Supported** E8267D with Option 601 or 602

**:ROUTe:HARDware:DGENerator:OUTPut:CPOLarity** POSitive|NEGative

**:ROUTe:HARDware:DGENerator:OUTPut:CPOLarity?**

This command sets the signal generator up to output either a high (+5 vdc) or low (0 vdc) level TTL signal at the DATA CLK OUT pin on the rear panel AUXILIARY I/O connector.

This command performs the same function as “:OPOLarity:CLOCk” on page 67.

**Example**

**:ROUTe:HARD:DGEN:OUTP:CPOL POS**

The preceding example sets up the signal generator to output a high level TTL signal at the DATA CLOCK OUT pin on the rear panel AUXILIARY I/O connector.

*RST* POS

**Key Entry** Data Clock Polarity Neg Pos

**:OUTPut:DCS[:STATE]**

**Supported** E8267D with Option 601 or 602

**:ROUTe:HARDware:DGENerator:OUTPut:DCS[:STATe]** ON|OFF|1|0

**:ROUTe:HARDware:DGENerator:OUTPut:DCS[:STATe]?**

This command is used to enable or disable the DATA OUT, DATA CLK OUT, and SYM SYNC OUT signals from the rear panel AUXILIARY I/O connector. Normally, these output signals should be enabled (On). However, disabling these outputs will decrease the spurs that are sometimes present when operating at high symbol rates.

**Example**

**:ROUTe:HARD:DGEN:OUTP:DCS 1**

The preceding example sets up or enables the DATA OUT, DATA CLK OUT, and SYM SYNC OUT output signals from the rear panel AUXILIARY I/O connector.

*RST* 1

**Key Entry** DATA/CLK/SYNC Rear Outputs Off On

**:OUTPut:DPOLarity**

**Supported** E8267D with Option 601 or 602

**:ROUTe:HARDware:DGENerator:OUTPut:DPOLarity** POSitive|NEGative

**:ROUTe:HARDware:DGENerator:OUTPut:DPOLarity?**

This command sets the signal generator up to output either a high (+5 vdc) or low (0 vdc) level TTL signal at the DATA OUT connector.

This command performs the same function as “:OPOLarity:DATA” on page 67.
Example

:ROUT:HARD:DGEn:OUTP:DPOL POS

The preceding example sets up the signal generator to output a high level TTL signal at the DATA OUT connector.

*RST POS

Key Entry Data Out Polarity Neg Pos

:OUTPut:EPOL[1]|2|3|4

Supported E8267D with Option 601 or 602


This command sets the signal generator up to output either a high (+5 vdc) or low (0 vdc) level TTL signal at the EVENT1 or EVENT 2 connector.

This command performs the same function as “OPOLarity:EVENT[1]|2|3|4” on page 68.

Example

:ROUT:HARD:DGEn:OUTP:EPOL1 POS

This command sets the signal generator up to output either a high (+5 vdc) or low (0 vdc) level TTL signal at the EVENT1 or EVENT 2 connector.

:OUTPut:SPOLarity

Supported E8267D with Option 601 or 602

:ROUTe:HARDware:DGENeratOr:OUTPut:SPOLarity POSitive|NEGative

:ROUTe:HARDware:DGENeratOr:OUTPut:SPOLarity?

This command sets the signal generator up to output either a high (+5 vdc) or low (0 vdc) level TTL signal at the SYMBOL SYNC connector.

Example

:ROUT:HARD:DGEn:OUTP:SPOL POS

This command sets the signal generator up to output either a high (+5 vdc) or low (0 vdc) level TTL signal at the EVENT1 or EVENT 2 connector.

*RST POS

Key Entry Symbol Sync Out Polarity Neg Pos
**Status Subsystem (:STATus)**

**:OPERation:BASeband:CONDition**

**Supported**

E8267D with Option 601 or 602

{:STATus:OPERation:BASEband:CONDition?

This query returns the decimal sum of the bits in the Baseband Operation Condition register. For example, if the baseband is busy (bit 0), the value 1 is returned. The data in this register is continuously updated and reflects current signal generator conditions. Refer to the *Programming Guide* for more information on programming the status registers.

**Range**

0–32767

**:OPERation:BASeband:ENABle**

**Supported**

E8267D with Option 601 or 602

{:STATus:OPERation:BASEband <val>

{:STATus:OPERation:BASEband:ENABle?

This command enables bits in the Baseband Operation Event Enable register. Bits enabled and set in this register will set bit 10 in the Standard Operation Condition register.

The variable `<val>` is the sum of the decimal values of the bits you want to enable. Refer to the *Programming Guide* for more information on programming the status registers.

**Example**

{:STAT:OPER:BAS:ENAB 3

This command enables bit 0 (decimal 1, Baseband is Busy) and bit 1 (decimal 2, Baseband 1 Communicating) in the Baseband Operation Event Enable register.

**Range**

0–32767

**:OPERation:BASeband:NTRansition**

**Supported**

E8267D with Option 601 or 602

{:STATus:OPERation:BASEband:NTRansition <val>

{:STATus:OPERation:BASEband:NTRansition?

This command enables bits in the Baseband Operation Negative Transition Filter register. A negative transition (1 to 0) of corresponding bits in the Baseband Operation Condition register will pass through and be read by the Baseband Operation Event register.

Refer to the *Programming Guide* for more information on programming the status registers.

**Example**

{:STAT:OPER:BAS:NTR 3
This command enables bit 0 (decimal 1, Baseband 1 Busy) and bit 1 (decimal 2, Baseband 1 Communicating) in the Baseband Operation Negative Transition Filter register.

**Range**

0–32767

ubeRation:BSasband:PTRansition

**Supported**

E8267D with Option 601 or 602

:STATus:OPERation:BASeband:PTRansition <val>

:STATus:OPERation:BASeband:PTRansition?

This command enables bits in the Baseband Operation Positive Transition Filter register. A positive transition (0 to 1) of corresponding bits in the Baseband Operation Condition register will pass through and be read by the Baseband Operation Event register.

The variable <val> is the sum of the decimal values of the bits that you want to enable.

Refer to the *Programming Guide* for more information on programming the status registers.

**Example**

:STAT:OPER:BAS:PTR 3

This command enables bit 0 (decimal 1, Baseband 1 Busy) and bit 1 (decimal 2, Baseband 1 Communicating) in the Baseband Operation Positive Transition Filter register.

**Range**

0–32767

ubeRation:BSasband:[EVENt]

**Supported**

E8267D with Option 601 or 602

:STATus:OPERation:BASeband:[EVENt]?

**NOTE**

This is a destructive read. The data in the Baseband Operation Event register is latched until it is queried. Once queried, the data is cleared.

This query returns the decimal sum of the bits in the Baseband Operation Event register.

Refer to the *Programming Guide* for more information on programming the status registers.

**Range**

0–32767

ubeRation:CONDition

**Supported**

All Models

:STATus:OPERation:CONDition?

This query returns the decimal sum of the bits in the Standard Operation Condition register. This register monitors signal generator functions such as I/Q calibrating, sweeping, and measuring. For example, if a sweep is in progress (bit 3), a decimal 8 is returned with this query.

The data in this register is continuously updated and reflects current conditions.
Refer to the *Programming Guide* for more information on programming the status registers.

**Range** 0–32767

### :OPERation:ENABle

**Supported** All Models

```plaintext
:STATus:OPERation:ENABle <val>
:STATus:OPERation:ENABle?
```

This command enables bits in the Standard Operation Event Enable register. Bits enabled and set in this register will set the Operation Status Summary bit (bit 7) in the Status Byte register. When bit 7 in the Status Byte register is set, you can read the Standard Operation Event register to determine the cause.

The variable `<val>` is the sum of the decimal values of the bits that you want to enable.

Refer to the *Programming Guide* for more information on programming the status registers.

**Example**

```plaintext
:STAT:OPER:ENAB 43
```

This command enables bit 0 (decimal 1, I/Q calibrating), bit 1 (decimal 2, Settling), bit 3 (decimal 8, Sweeping), and bit 5 (decimal 32, Waiting for Trigger) of the Standard Operation Event Enable register.

**Range** 0–32767

### :OPERation:NTRansition

**Supported** All Models

```plaintext
:STATus:OPERation:NTRansition <val>
:STATus:OPERation:NTRansition?
```

This command enables bits in the Standard Operation Negative Transition Filter register. A negative transition (1 to 0) of corresponding bits in the Standard Operation Condition register will pass through and be read by the Standard Operation Event register.

The variable `<val>` is the sum of the decimal values of the bits that you want to enable.

Refer to the *Programming Guide* for more information on programming the status registers.

**Example**

```plaintext
:STAT:OPER:NTR 3
```

This command enables bit 0 (decimal 1, I/Q Calibrating) and bit 1 (decimal 2, Settling) in the Standard Operation Negative Transition Filter register.

**Range** 0–32767
**:OPERation:PTRansition**

**Supported**  All Models

`:STATus:OPERation:PTRansition <val>`

`:STATus:OPERation:PTRansition?`

This command enables bits in the Standard Operation Positive Transition Filter register. A positive transition (0 to 1) of corresponding bits in the Standard Operation Condition register will pass through and be read by the Standard Operation Event register.

The variable `<val>` is the sum of the decimal values of the bits that you want to enable.

Refer to the *Programming Guide* for more information on programming the status registers.

**Example**

`:STAT:OPER:PTR 3`

This command enables bit 0 (decimal 1, I/Q Calibrating) and bit 1 (decimal 2, Settling) in the Standard Operation Positive Transition Filter register.

**Range**  0–32767

**:OPERation[:EVENt]**

**Supported**  All Models

**NOTE**  This is a destructive read. The data in the register is latched until it is queried. Once queried, the data is cleared.

`:STATus:OPERation[:EVENt]?`

This query returns the decimal sum of the bits in the Standard Operation Event register.

Refer to the *Programming Guide* for more information on programming the status registers.

**Range**  0–32767

**:PRESet**

**Supported**  All Models

`:STATus:PRESet`

This command presets all positive and negative transition filters, enable registers, and error/event queue enable registers.

Refer to the *Programming Guide* for more information on programming the status registers.

**:QUEStionable:CALibration:CONDition**

**Supported**  All Models

`:STATus:QUEStionable:CALibration:CONDition?`

This query returns the decimal sum of the bits in the Data Questionable Calibration Condition register. For example, if the DCFM or DCΦM zero calibration fails (bit 0), a value of 1 is returned.
The data in this register is continuously updated and reflects the current conditions. Refer to the Programming Guide for more information on programming the status registers.

**Range**

0–32767

**:QUESTionable:CALibration:ENABle**

**Supported** All Models

:STATus:QUESTionable:CALibration:ENABle <val>
:STATus:QUESTionable:CALibration:ENABle?

This command enables bits in the Data Questionable Calibration Event Enable register. Bits enabled and set in this register will set the Calibration Summary bit (bit 8) in the Data Questionable Condition register.

The variable <val> is the sum of the decimal values of the bits that you want to enable. Refer to the Programming Guide for more information on programming the status registers.

**Example**

:STAT:QUES:CAL:ENAB 1

This command enables bit 0 (decimal 1, DCFM/DCΦM Zero Failure) in the Data Questionable Calibration Event Enable register.

**Range**

0–32767

**:QUESTionable:CALibration:NTRansition**

**Supported** All Models

:STATus:QUESTionable:CALibration:NTRansition <val>
:STATus:QUESTionable:CALibration:NTRansition?

This command enables bits in the Data Questionable Calibration Negative Transition Filter register. A negative transition (1 to 0) of corresponding bits in the Data Questionable Calibration Condition register will pass through and be read by the Data Questionable Calibration Event register.

The variable <val> is the sum of the decimal values of the bits that you want to enable. Refer to the Programming Guide for more information on programming the status registers.

**Example**

:STAT:OPER:NTR 3

This command enables bit 0 (decimal 1, DCFM/DCΦM Zero Failure) and bit 1 (decimal 2, I/Q Calibration Failure) in the Data Questionable Calibration Negative Transition Filter register.

**Range**

0–32767
System Commands
Status Subsystem (:STATus)

:QUEStionable:CALibration:PTRansition

Supported All Models

:STATus:QUEStionable:CALibration:PTRansition <val>
:STATus:QUEStionable:CALibration:PTRansition?

This command enables bits in the Data Questionable Calibration Positive Transition Filter register. A positive transition (0 to 1) of corresponding bits in the Data Questionable Calibration Condition register will pass through and be read by the Data Questionable Calibration Event register.

The variable <val> is the sum of the decimal values of the bits that you want to enable.

Refer to the Programming Guide for more information on programming the status registers.

Example

:STAT:OPER:PTR 3

This command enables bit 0 (decimal 1, DCFM/DCΦM Zero Failure) and bit 1 (decimal 2, I/Q Calibration Failure) in the Data Questionable Calibration Positive Transition Filter register.

Range 0–32767

:QUEStionable:CALibration[:EVENt]

Supported All Models

NOTE This is a destructive read. The data in the register is latched until it is queried. Once queried, the data is cleared.

:STATus:QUEStionable:CALibration[:EVENt]?

This command returns the decimal sum of the bits in the Data Questionable Calibration Event register.

Refer to the Programming Guide for more information on programming the status registers.

Range 0–32767

:QUEStionable:CONDition

Supported All Models

:STATus:QUEStionable:CONDition?

This query returns the decimal sum of the bits in the Data Questionable Condition register. For example, if the internal reference oscillator oven is cold (bit 4), a value of 16 is returned.

The data in this register is continuously updated and reflects current conditions.

Refer to the Programming Guide for more information on programming the status registers.

Range 0–32767
System Commands
Status Subsystem (:STAT)

[:QUESTionable:ENABLE]

Supported All Models
:STATus:QUESTionable:ENABLE <val>
:STATus:QUESTionable:ENABLE?

This command enables bits in the Data Questionable Event Enable register. Bits enabled and set in this register will set the Data Questionable Summary bit (bit 3) in the Status Byte register. When bit 3 in the Status Byte register is set, you can read the Data Questionable Event register to determine the cause.

The variable <val> is the sum of the decimal values of the bits that you want to enable.

Refer to the Programming Guide for more information on programming the status registers.

Example
:STAT:QUES:ENAB 8

This command enables bit 3 (decimal 8, the Power Summary bit), in the Data Questionable Event Enable register.

Range 0–32767

[:QUESTionable:FREQuency:CONDition]

Supported All Models
:STATus:QUESTionable:FREQuency:CONDition?

This query returns the decimal sum of the bits in the Data Questionable Frequency Condition register. For example, if the 1 GHz internal reference clock is unlocked (bit 2), a value of 4 is returned.

The data in this register is continuously updated and reflects current conditions.

Refer to the Programming Guide for more information on programming the status registers.

Range 0–32767

[:QUESTionable:FREQuency:ENABle]

Supported All Models
:STATus:QUESTionable:FREQuency:ENABle <val>
:STATus:QUESTionable:FREQuency:ENABle?

This command enables bits in the Data Questionable Frequency Event Enable register. Bits enabled and set in this register will set the Data Questionable Condition register bit 5.

The variable <val> is the sum of the decimal values of the bits that you want to enable.

Refer to the Programming Guide for more information on programming the status registers.

Example
:STAT:QUES:FREQ:ENAB 7

This command enables bit 0 (decimal 1, Synthesizer Unlocked), bit 1 (decimal 2, 10 MHz Reference
Unlocked), and bit 2 (decimal 4, 1 GHz reference Unlocked) in the Data Questionable Frequency Event Enable register.

Range 0–32767

:**QUESTIONable:****FREQuency:**NTRansition

Supported All Models

:STATus:**QUESTIONable:**FREQuency:**NTRansition <val>
:STATus:**QUESTIONable:**FREQuency:**NTRansition?

This command enables bits in the Data Questionable Frequency Negative Transition Filter register. A negative transition (1 to 0) of corresponding bits in the Data Questionable Frequency Condition register will pass through and be read by the Data Questionable Frequency Event register.

The variable <val> is the sum of the decimal values of the bits that you want to enable.

Refer to the *Programming Guide* for more information on programming the status registers.

Example

:STAT:QUES:FREQ:NTR 96

This command enables bit 5 (decimal 32, Sampler Loop Unlocked) and bit 6 (decimal 64, YO Loop Unlocked) in the Data Questionable Frequency Negative Transition Filter register.

Range 0–32767

:**QUESTIONable:****FREQuency:**PTRansition

Supported All Models

:STATus:**QUESTIONable:**FREQuency:**PTRansition <val>
:STATus:**QUESTIONable:**FREQuency:**PTRansition?

This command enables bits in the Data Questionable Frequency Positive Transition Filter register. A positive transition (0 to 1) of corresponding bits in the Data Questionable Frequency Condition register will pass through and be read by the Data Questionable Frequency Event register.

The variable <val> is the sum of the decimal values of the bits that you want to enable.

Refer to the *Programming Guide* for more information on programming the status registers.

Example

:STAT:QUES:FREQ:PTR 8

This command enables bit 3 (decimal 8, Baseband 1 Unlocked) in the Data Questionable Frequency Positive Transition Filter register.

Range 0–32767
:QUESTIONable:FREQuency[:EVENt]

**Supported**  All Models

**CAUTION**  This is a destructive read. The data in the register is latched until it is queried. Once queried, the data is cleared.

:STATus:QUESTIONable:FREQuency[:EVENt]?

This query returns the decimal sum of the bits in the Data Questionable Frequency Event register. Refer to the *Programming Guide* for more information on programming the status registers.

**Range**  0–32767

:QUESTIONable:MODulation:CONDition

**Supported**  All Models

:STATus:QUESTIONable:MODulation:CONDition?

This command returns the decimal sum of the bits in the Data Questionable Modulation Condition register. For example, if the modulation is uncalibrated (bit 4), a value of 16 is returned. The data in this register is continuously updated and reflects current conditions. Refer to the *Programming Guide* for more information on programming the status registers.

**Range**  0–32767

:QUESTIONable:MODulation:ENABle

**Supported**  All Models

:STATus:QUESTIONable:MODulation:ENABle <val>

:STATus:QUESTIONable:MODulation:ENABle?

This command enables bits in the Data Questionable Modulation Event Enable register. Bits enabled and set in this register will set bit 7 in the Data Questionable Condition register. The variable `<val>` is the sum of the decimal values of the bits that you want to enable. Refer to the *Programming Guide* for more information on programming the status registers.

**Example**

:STAT:QUES:MOD:ENAB 20

This command enables bit 2 (decimal 4, Modulation 1 Overmod) and bit 4 (decimal 16, Modulation Uncalibrated) in the Data Questionable Modulation Event Enable register.

**Range**  0–32767
System Commands
Status Subsystem (:STATus)

:QUESTIONable:MODulation:NTRansition

Supported All Models

:STATus:QUESTIONable:MODulation:NTRansition <val>
:STATus:QUESTIONable:MODulation:NTRansition?

This command enables bits in the Modulation Questionable Negative Transition Filter register. A negative transition (1 to 0) of corresponding bits in the Modulation Questionable Condition register will pass through and be read by the Modulation Questionable Event register.

The variable <val> is the sum of the decimal values of the bits that you want to enable.

Refer to the Programming Guide for more information on programming the status registers.

Example

:STAT:QUES:MOD:NTR 3

This command enables bit 0 (decimal 1, Modulation 1 Undermod) and bit 1 (decimal 2, Modulation 1 Overmod) in the Data Questionable Modulation Negative Transition Filter register.

Range 0–32767

:QUESTIONable:MODulation:PTRansition

Supported All Models

:STATus:QUESTIONable:MODulation:PTRansition <val>
:STATus:QUESTIONable:MODulation:PTRansition?

This command enables bits in the Data Questionable Modulation Positive Transition Filter register. A positive transition (0 to 1) of corresponding bits in the Data Questionable Modulation Condition register will pass through and be read by the Data Questionable Modulation Event register.

The variable <val> is the sum of the decimal values of the bits that you want to enable.

Refer to the Programming Guide for more information on programming the status registers.

Example

:STAT:QUES:MOD:PTR 3

This command enables bit 0 (decimal 1, Modulation 1 Undermod) and bit 1 (decimal 2, Modulation 1 Overmod) in the Data Questionable Modulation Positive Transition Filter register.

Range 0–32767

:QUESTIONable:MODulation[:EVENt]

Supported All Models

CAUTION This is a destructive read. The data in the register is latched until it is queried. Once queried, the data is cleared.

:STATus:QUESTIONable:MODulation[:EVENt]?

This query returns the decimal sum of the bits in the Data Questionable Modulation Event register.
Refer to the *Programming Guide* for more information on programming the status registers.

**Range**

0–32767

`:QUESTionable:NTRansition`

**Supported**

All Models

`:STATus:QUESTionable:NTRansition <val>
`:STATus:QUESTionable:NTRansition?`

This command enables bits in the Data Questionable Negative Transition Filter register. A negative transition (1 to 0) of corresponding bits in the Data Questionable Condition register will pass through and be read by the Data Questionable Event register.

The variable `<val>` is the sum of the decimal values of the bits that you want to enable.

Refer to the *Programming Guide* for more information on programming the status registers.

**Example**

`:STAT:QUEST:MOD:NTR 3072`

This command enables bit 10 (decimal 1024, Baseband is busy) and bit 11 (decimal 2048, Sweep Calculating) in the Data Questionable Negative Transition Filter register.

**Range**

0–32767

`:QUESTionable:POWer:CONDition`

**Supported**

All Models

`:STATus:QUESTionable:POWer:CONDition?`

This query returns the decimal sum of the bits in the Data Questionable Power Condition register. For example, if the RF output signal is unveled (bit 1), a value of 2 is returned.

The data in this register is continuously updated and reflects current conditions.

Refer to the *Programming Guide* for more information on programming the status registers.

**Range**

0–32767

`:QUESTionable:POWer:ENABle`

**Supported**

All Models

`:STATus:QUESTionable:POWer:ENABle <val>
`:STATus:QUESTionable:POWer:ENABle?`

This command enables bits in the Data Questionable Power Event Enable register. Bits enabled and set in this register will set bit 3 in the Data Questionable Condition register.

The variable `<val>` is the sum of the decimal values of the bits that you want to enable.

Refer to the *Programming Guide* for more information on programming the status registers.
System Commands
Status Subsystem (:STATus)

Example
:STAT:QUES:POW:ENAB 1
This command enables bit 0 (Decimal 1, Reverse Power Protection Tripped) in the Data Questionable Power Event Enable register.

Range 0–32767

:QUESTionable:POWER:NTRansition

Supported All Models
:STATus:QUESTionable:POWER:NTRansition <val>
:STATus:QUESTionable:POWER:NTRansition?
This command enables bits in the Data Questionable Power Negative Transition Filter register. A negative transition (1 to 0) of corresponding bits in the Data Questionable Power Condition register will pass through and be read by the Data Questionable Power Event register.
The variable <val> is the sum of the decimal values of the bits that you want to enable.
See the Programming Guide for more information on programming the status register system.

Example
:STAT:QUES:POW:NTR 1
This command enables bit 0 (Reverse Power Protection Tripped) in the Data Questionable Power Negative Transition Filter register.

Range 0–32767

:QUESTionable:POWER:PTRansition

Supported All Models
:STATus:QUESTionable:POWER:PTRansition <val>
:STATus:QUESTionable:POWER:PTRansition?
This command enables bits in the Data Questionable Power Positive Transition Filter register. A positive transition (0 to 1) of corresponding bits in the Data Questionable Power Condition register will pass through and be read by the Data Questionable Power Event register.
The variable <val> is the sum of the decimal values of the bits that you want to enable.
See the Programming Guide for more information on programming the status register system.

Example
:STAT:QUES:POW:PTR 1
This command enables bit 0 (Decimal 1, Reverse Power Protection Tripped) in the Data Questionable Power Positive Transition Filter register.

Range 0–32767
**:QUEStionable:POWer[:EVENt]**

**Supported**  
All Models

**CAUTION**  
This is a destructive read. The data in the register is latched until it is queried. Once queried, the data is cleared.

```plaintext
:STATus:QUEStionable:POWer[:EVENt]?
```

This query returns the decimal sum of the bits in the Data Questionable Power Event register.  
See the *Programming Guide* for more information on programming the status register system.  
**Range**  
0–32767

---

**:QUEStionable:PTRansition**

**Supported**  
All Models

:STATus:QUEStionable:PTRansition <val>
:STATus:QUEStionable:PTRansition?

This command enables bits in the Data Questionable Positive Transition Filter register. A positive transition (0 to 1) of corresponding bits in the Data Questionable Condition register will pass through and be read by the Data Questionable Event register.  
See the *Programming Guide* for more information on programming the status register system.

**Example**

:STAT:QUES:PTR 8

This command enables bit 3 (decimal 8, Power Summary) in the Data Questionable Positive Transition Filter register.

**Range**  
0–32767

---

**:QUEStionable[:EVENt]**

**Supported**  
All Models

**CAUTION**  
This is a destructive read. The data in the register is latched until it is queried. Once queried, the data is cleared.

```plaintext
:STATus:QUEStionable[:EVENt]?
```

This query returns the decimal sum of the bits in the Standard Operation Event register.  
See the *Programming Guide* for more information on programming the status register system.  
**Range**  
0–32767
System Subsystem (:SYSTem)

:ALTernate

**Supported** All Models with Option 007

:SYSTem:ALTernate <reg_num>

:SYSTem:ALTernate? [MAXimum|MINimum]

This command sets up the signal generator to use a sweep state stored in a state register to alternate with the current sweep. The alternate sweep state must be stored in state registers 1 through 9 in sequence 0. Alternate sweep must be selected and both sweeps must be ramp sweeps.

**Example**

:SYST:ALT 3

The preceding example alternates the current sweep with the sweep settings saved in state register number three.

**Key Entry** Alternate Sweep Seq 0, Register 1–9

:ALTernate:STAte

**Supported** All Models with Option 007

:SYSTem:ALTernate:STAte ON|OFF|1|0

:SYSTem:STAte?

This command enables or disables the alternate sweep state for the signal generator. With alternate state on, the signal generator uses the current sweep setup and alternates with a sweep saved in on of the state registers. Both sweeps must be ramp sweeps.

**Example**

:SYST:ALT:STAT OFF

The preceding example disables the alternate sweep mode.

**Key Entry** Alternate Sweep Off On

:CAPability

**Supported** All Models

:SYSTem:CAPability?

This query returns the signal generator’s capabilities and outputs the appropriate specifiers:

(RFSOURCE WITH((AM|FM|PULM|PM|LFO)&(FSSWEEP|FLIST)&(PSSWEEP|PLIST)&TRIGGER&REFERENCE))

This is a list of the SCPI-defined basic functionality of the signal generator and the additional capabilities it has in parallel (a&b) and singularly (a|b).
:DATE

Supported All Models
:SYSTem:DATE <year>,<month>,<day>
:SYSTem:DATE?

This command sets the date as shown in the lower right area of the signal generator display.

<year> This variable requires a four digit integer.
The query returns the date in the following format: <+year>, <+month>, <+day>

Example
:SYST:DATE 2004,12,15

The preceding example sets the date.

Range <month>: 1–12 <day>: 1–31

Key Entry Time/Date

:ERRor[:NEXT]

Supported All Models
:SYSTem:ERRor[:NEXT]?

This query returns the most recent error message from the signal generator error queue. If there are
no error messages, the query returns the following output:
+0,"No error"

When there is more than one error message, the query will need to be sent for each message.
The error messages are erased after being queried.

Key Entry Error Info View Next Error Message

:ERRor:SCPI[:SYNTax]

Supported All
:SYSTem:ERRor:SCPI[:SYNTax] ON|OFF|1|0
:SYSTem:ERRor:SCPI[:SYNTax]?

This command allows you to turn on verbose error messages that point out where the SCPI parser
generated an error. Use the ERReq[:NEXT] command to read any reported errors.

Example
:SYST:ERR:SCPI ON

The preceding example enables the SCPI command error report function.

*RST 0
**:FILEsystem:SAFEmode**

Supported All

:SYSTem:FILEsystem:SAFEmode ON|OFF|1|0

:SYSTem:FILEsystem:SAFEmode?

This command selects the safe mode for file handling. When safe mode is set to OFF, volatile waveform files can be edited and saved while the signal generator plays the file without signal interruption. However, it is possible with complex waveforms, for corruption of memory to occur which will be reported as an error on the front-panel display and require a reboot of the signal generator to resolve.

**Example**

:SYST:FILE:SAVE ON

The preceding example enables the safe mode setting and waveform files cannot be edited without signal disruption while the signal generator plays them.

*RST On

**:HELP:MODE**

Supported All Models

:SYSTem:HELP:MODE SINGle|CONTinuous

:SYSTem:HELP:MODE?

This command sets the help function mode of the signal generator.

SINGle Help is provided only for the next key that you press.

CONTinuous Help is provided for each key you press. In addition, the function of the key is executed.

The setting enabled by this command is not affected by a signal generator power-on, preset, or *RST command.

**Example**

:SYST:HELP:MODE CONT

The preceding example enables the Help system continuos mode.

**Key Entry** Help Mode Single Cont

**:IDN**

Supported All Models

:SYSTem:IDN "string"

This command modifies the identification string that the *IDN? query returns. Sending an empty string returns the query output of *IDN? to its factory-shipped setting. The maximum string length is 72 characters.

Modification of the *IDN? query output enables the signal generator to identify itself as another
The display diagnostic information, shown by pressing the **Diagnostic Info** softkey, is not affected by this command.

### :LANGuage

**Supported**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>:SYSTem:LANGuage</td>
<td>This command sets the remote language for the signal generator.</td>
</tr>
<tr>
<td></td>
<td>This choice provides compatibility for SCPI commands.</td>
</tr>
<tr>
<td></td>
<td>This choice provides compatibility for a system, comprising a PSG signal generator and a 8757D scalar network analyzer. It is supported only through a GPIB interface.</td>
</tr>
<tr>
<td></td>
<td>This choice provides compatibility for 8340B and 8341B microwave sources, which are supported by using the GPIB interface.</td>
</tr>
<tr>
<td></td>
<td>This choice provides compatibility for 8360 series swept signal generators, which are supported only through a GPIB interface.</td>
</tr>
<tr>
<td></td>
<td>This choice provides compatibility for 83711B and 83712B synthesized CW generators, which are supported only through a GPIB interface.</td>
</tr>
<tr>
<td></td>
<td>This choice provides compatibility for 83731B and 83732B synthesized signal generators, which are supported only through a GPIB interface.</td>
</tr>
<tr>
<td></td>
<td>This choice provides compatibility for 83751B and 83752B synthesized sweepers, which are supported only through a GPIB interface.</td>
</tr>
<tr>
<td></td>
<td>This choice provides compatibility for a system, comprising a PSG signal generator and a 8757D scalar network analyzer. It is supported only through a GPIB interface.</td>
</tr>
<tr>
<td></td>
<td>This choice provides compatibility for the Agilent 8662A Synthesized Signal Generator. The 8662A is controlled only through a GPIB interface.</td>
</tr>
<tr>
<td></td>
<td>This choice provides compatibility for the Agilent 8663A Synthesized Signal Generator. The 8663A is controlled only through a GPIB interface.</td>
</tr>
</tbody>
</table>

The setting enabled by this command is not affected by a power-on, preset, or **RST** command.

For more information on supported SCPI commands and programming codes, refer to Chapter 7, "SCPI Command Compatibility," on page 319.

### Example

```plaintext
:SYST:LANG "8757"
```

The preceding example enables the 8757 Network Analyzer language as the language used to control the signal generator.
System Commands
System Subsystem (:SYSTem)

Key Entry  SCPI  8360 Series  8371B/83712B  8757 System  83731B,83732B  8340B,8341B  83751B,83752B  8662A,8663A

:OEMHead:FREQuency:STARt

Supported  All

:SYSTem:OEMHead:FREQuency:STARt <val>
:SYSTem:OEMHead:FREQuency:STARt?

This command sets the start frequency or minimum band frequency for an external source module. The pre-defined start or minimum band frequency for the selected WR (waveguide rectangular) is overwritten with this command. For more information on pre-defined frequency bands, refer to “:OEMHead:FREQuency:BAND WR15|WR12|WR10|WR8|WR6|WR5|WR3” on page 89.

Example
:SYST:OEMH:FREQ:STAR 90GHZ

The preceding example sets the start frequency for the OEM module to 90 GHz.

*RST  5.0000000000000E+10

Key Entry  Min Band Freq

:OEMHead:FREQuency:STOP

Supported  All

:SYSTem:OEMHead:FREQuency:STOP <val>
:SYSTem:OEMHead:FREQuency:STOP?

This command sets the stop frequency or maximum band frequency for an external source module. The pre-defined stop or maximum band frequency for the selected WR (waveguide rectangular) is overwritten with this command. For more information on pre-defined frequency bands, refer to “:OEMHead:FREQuency:BAND WR15|WR12|WR10|WR8|WR6|WR5|WR3” on page 89.

Example
:SYST:OEMH:FREQ:STOP 70GHZ

The preceding example sets the stop frequency for the OEM module to 70 GHz.

*RST  7.0000000000000E+10

Key Entry  Max Band Freq

:OEMHead:SELect

Supported  All

:SYSTem:OEMHead:SELect ON|OFF|NONE|REAR|FRONT
:SYSTem:OEMHead:SELect?

This command selects an external millimeter-wave source module. The ON, REAR, and FRONT parameters select the OEM source module while the OFF and NONE parameters deselect the OEM source module. The MMOD and MULT annunciators, in the signal generator’s frequency display will
appear when a OEM millimeter-wave source module is selected.

Example

:SYST:OEMH:SEL ON

The preceding example turns on the OEM source module.

*RST

Key Entry

OEM Source Module Off On

:OEMHead:FREQuency:BAND WR15 | WR12 | WR10 | WR8 | WR6 | WR5 | WR3

Supported

All

:SYSTem:OEMHead:FREQuency:BAND WR3
:SYSTem:OEMHead:FREQuency:BAND?

This command allows you to select a pre-defined waveguide rectangular (WR) frequency band. The WR selection is determined by the external millimeter-wave source module frequency range. Selection of a WR frequency band sets the minimum and maximum frequency bands, for the external mm-wave source module, to pre-defined values shown in the table below. These pre-defined frequency bands are common to commercially available mixers and multipliers. Different start, stop, and multiplier values can be selected from the menu displayed under the OEM Source Module Config softkey.

<table>
<thead>
<tr>
<th>Waveguide Band</th>
<th>PSG Start Frequency</th>
<th>PSG Stop Frequency</th>
<th>Multiplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>WR15 50–75GHz</td>
<td>12.5000000000 GHz</td>
<td>18.7500000000 GHz</td>
<td>4.000 x</td>
</tr>
<tr>
<td>WR12 60–90GHz</td>
<td>10.0000000000 GHz</td>
<td>15.0000000000 GHz</td>
<td>6.000 x</td>
</tr>
<tr>
<td>WR10 75–110GHz</td>
<td>12.5000000000 GHz</td>
<td>18.4000000000 GHz</td>
<td>6.000 x</td>
</tr>
<tr>
<td>WR8 90–140GHz</td>
<td>11.2200000000 GHz</td>
<td>17.5000000000 GHz</td>
<td>8.000 x</td>
</tr>
<tr>
<td>WR6 110–170GHz</td>
<td>9.1000000000 GHz</td>
<td>14.2000000000 GHz</td>
<td>12.000 x</td>
</tr>
<tr>
<td>WR5 140–220GHz</td>
<td>11.6000000000 GHz</td>
<td>18.4000000000 GHz</td>
<td>12.000 x</td>
</tr>
<tr>
<td>WR3 220–325GHz</td>
<td>12.2000000000 GHz</td>
<td>18.1000000000 GHz</td>
<td>18.000 x</td>
</tr>
</tbody>
</table>

Example

:SYST:OEMH:FREQ:BAND WR12

The preceding example selects the 60-90 GHz WR frequency band.

*RST WR15

Key Entry

WR15 50-75GHz
System Commands
System Subsystem (:SYSTem)

**:OEMHead:FREQuency:MULTiplier**

**Supported** All Models

**:SYSTem:OEMHead:FREQuency:MULTiplier **<val>
**:SYSTem:OEMHead:FREQuency:MULTiplier?**

This command selects a multiplier for an external millimeter-wave source module.

The multiplier factor allows the signal generator’s frequency display to show the source module’s frequency. The selection is valid only when the OEM source module is selected. The signal generator’s actual RF frequency is not changed by the multiplier. For example, if the signal generator’s RF frequency is 20 GHz and a 4.000 x multiplier is selected, the signal generator will display 80 GHz.

The displayed frequency on the signal generator is affected if the frequency reference and frequency offset settings. The relationship is described as follows: Displayed Frequency = (Actual Freq – Freq Reference) x Frequency Multiplier + Freq Offset. Refer to the “:FREQuency:OFFSet” on page 112 and “:FREQuency:REFerence” on page 113 command descriptions for more information.

**Example**

**:SYST:OEMH:FREQ:MULT 4**

The preceding example selects a 4x multiplier so that the signal generator display shows the frequency at the output of the mm-wave source module.

**RST** 4.00000000E+000

**Key Entry** Freq Multiplier

**:PON:TYPE**

**Supported** All Models

**:SYSTem:PON:TYPE** PRESet|LAST
**:SYSTem:PON:TYPE?**

This command sets the defined conditions for the signal generator at power on.

**PRESet** This choice sets the conditions to factory- or user-defined as determined by the choice for the preset type. Refer to “:PRESet:TYPE” on page 93 for selecting the type of preset.

**LAST** This choice retains the settings at the time the signal generator was last powered down.

The selection is not affected by a signal generator power-on, preset, or the *RST command.

**NOTE** When LAST is selected, no signal generator interaction can occur for at least 3 seconds prior to cycling the power for the current settings to be saved.

**Example**

**:SYST:PON:TYPE** PRES

The preceding example sets the preset state for the signal generator to factory settings.

**Key Entry** Power On Last Preset
:PRESet

Supported All Models

SYSTem:PRESet

This command returns the signal generator to a set of defined conditions. It is equivalent to pressing the front panel Preset hardkey.

The defined conditions are either factory- or user-defined. Refer to “:PRESet:TYPE” on page 93 for selecting the type of defined conditions.

Key Entry Preset

:PRESet:ALL

Supported All Models

:SYSTem:PRESet:ALL

This command sets all states of the signal generator back to their factory default settings, including states that are not normally affected by a signal generator power-on, preset, or *RST command.

:PRESet:LANguage

Supported All Models

:SYSTem:PRESet:LANguage "SCPI"|"8340"|"8360"|"83712"|"83732"|"83752"|
"8757"

:SYSTem:PRESet:LANguage?

This command sets the remote language that is available when the signal generator is preset.

SCPI This choice provides compatibility for SCPI commands.

8340 This choice provides compatibility for 8340B and 8341B microwave sources, which are supported by using the GPIB interface.

8360 This choice provides compatibility for 8360 series swept signal generators, which are supported only through a GPIB interface.

83712 This choice provides compatibility for 83711B and 83712B synthesized CW generators, which are supported only through a GPIB interface.

83732 This choice provides compatibility for 83731B and 83732B synthesized signal generators, which are supported only through a GPIB interface.

83752 This choice provides compatibility for 83751B and 83752B synthesized sweepers, which are supported only through a GPIB interface.

8757 This choice provides compatibility for a system, comprising a PSG signal generator and a 8757D scalar network analyzer. It is supported only through a GPIB interface.

8662 This choice provides compatibility for 8662A series synthesized waveform generators, which are supported only through a GPIB interface.
This choice provides compatibility for 8663A series synthesized waveform generators, which are supported only through a GPIB interface.

Example

:SYST:PRES:LANG "8340"

The preceding example selects 8340 signal generator language as the language used by the signal generator following an instrument preset.

*RST "SCPI"

Key Entry  SCPI  8360 Series  83711B,83712B  8757D System  83731B,83732B 8340B,8341B  83751B,83752B

:PRESet:PERSistent

Supported  All Models

:SYSTem:PRESet:PERSistent

This command sets the states that are not affected by a signal generator power-on, preset, or *RST command to their factory default settings.

Key Entry  Restore Sys Defaults

:PRESet:PN9

Supported  All Models

:SYSTem:PRESet:PN9  NORMAL|QUICK

This command sets the preset length of the PN9 sequence for personalities that require software PRBS generation.

NORMAL  This choice produces a maximal length PN9 sequence.

QUICK  This choice produces a truncated (216 bits) PN9 sequence.

Example

:SYST:PRES:PN9 NORMAL

The preceding example selects a maximum length PN9 sequence.

*RST  NORM

Key Entry  PN9 Mode Preset Normal Quick
**:PRESet:TYPE**

**Supported**  All Models

`:SYSTem:PRESet:TYPE NORMal|USER
`:SYSTem:PRESet:TYPE?`

This command toggles the preset state between factory- and user-defined conditions. Refer to :PRESet[:USER]:SAVE for saving the USER choice preset settings. The setting enabled by this command is not affected by a signal generator power-on, preset, or *RST command.

**Example**

`:SYST:PRES:TYPE USER`

The preceding example selects a user defined conditions for the signal generator preset state.

**Key Entry**  

Preset Normal User

---

### :PRESet[:USER]:SAVE

**Supported**  All Models

`:SYSTem:PRESet[:USER]:SAVE`

This command saves your user-defined preset conditions to a state file.

Only one user-defined preset file can be saved. Subsequent saved user–defined preset files will overwrite the previously saved file.

**Key Entry**  

Save User Preset

---

### :SECurity:DISPLAY

**Supported**  All Models

`:SYSTem:SECurity:DISPLAY ON|OFF|1|0
`:SYSTem:SECurity:DISPLAY?`

This command enables or disables the secure display mode.

**On(1)**  

This selection turns the signal generator display back on, showing the current settings. Cycling the signal generator power also restores the display, however the current settings may change depending on the power-on configuration choice. See “:PON:TYPE” on page 90 for information on the power-on choices available.

**OFF(0)**  

This selection blanks the signal generator’s display, hiding the settings and disabling the front panel keys. While in this mode, the display shows *** SECURE DISPLAY ACTIVATED ***.

For more information about security functions, refer to the *E8257D/67D PSG Signal Generators User’s Guide*. 
System Commands
System Subsystem (:SYSTem)

Example

:SYST:SEC:DISP OFF

The preceding example enables the secure display mode.

*RST

Range

N/A

Key Entry

Activate Security Display

:SECurity:ERASall

Supported

All Models

:SYSTem:SECurity:ERASall

This command removes all user files, flatness correction files, and baseband generator files. In addition, all table editor files are returned to their original factory values.

This command differs from the :DELe:ALL command, which does not reset table editors to factory values. For more information about security functions, refer to the E8257D/67D PSG Signal Generators User's Guide.

Key Entry

Erase All

:SECurity:LEVeI

Supported

All Models

:SYSTem:SECurity:LEVeI NONE|ERASe|OVERwrite|SANitize

:SYSTem:SECurity:LEVeI?

This command selects the security level operation for the signal generator.

NONE

This selection causes the signal generator to reset to factory default settings.

ERASe

This selection removes all user files, table editor files, flatness correction files, and baseband generator files.

OVERwrite

This selection removes all user files, table editor files, flatness correction files, and baseband generator files. The memory is then overwritten with random data.

SRAM

All addressable locations will be overwritten with random characters.

Hard Disk

All addressable locations will be overwritten with random characters.

Flash Memory

The flash blocks will be erased.

SANitize

This selection removes all user files, table editor files, flatness correction files, and baseband generator files using the same techniques as the OVERwrite selection for SRAM and flash memory. For the hard disk, the signal generator overwrites all addressable locations with a single character, its complement, and then with a random character.
Once you select the security level, you must execute the command from \texttt{:SECurity:LEVel:STATe} to arm the security level.

\textbf{NOTE} \hspace{1cm} Once you select a security level and arm it, you cannot change the level.

For other cleaning and security operation descriptions, see \texttt{":SECurity:ERASeall" on page 94}, \texttt{":SECurity:OVERwrite" on page 96}, and \texttt{":SECurity:SANitize" on page 96}. For more information about security functions, refer to the \textit{E8257D/67D PSG Signal Generators User's Guide}.

\textbf{Example}

\texttt{:SYST:SEC:LEV NONE}

The preceding example sets the secure mode so it resets the signal generator to factory settings after completing the security operation.

\textbf{Key Entry} \hspace{1cm} None \hspace{0.5cm} Erase \hspace{0.5cm} Overwrite \hspace{0.5cm} Sanitize

\textbf{:SECurity:LEVel:STATe}

\textbf{Supported} \hspace{1cm} All Models

\textbf{CAUTION} \hspace{1cm} Ensure that you select the security level prior to executing this command with the \texttt{ON (1)} selection. Once you enable the state, you cannot reduce the security level.

\texttt{:SYSTem:SECurity:LEVel:STATe ON|OFF|1|0}

This command arms and executes the current security level parameter.

\texttt{:SYSTem:SECurity:LEVel:STATe?}

\texttt{On (1)} \hspace{0.5cm} This selection arms and prevents any changes to the current security level. Refer to \texttt{":SECurity:LEVel" on page 94} for setting the security level.

\texttt{OFF (0)} \hspace{0.5cm} This selection performs the actions required for the current security level setting. Cycling the signal generator power also performs the same function.

For more information about security functions, refer to the \textit{E8257D/67D PSG Signal Generators User's Guide}.

\textbf{Example}

\texttt{:SYST:SEC:LEV:STAT ON}

The preceding example arms the secure mode selected with the \texttt{SYSTem:SECurity:LEVel} command.

\textbf{Key Entry} \hspace{1cm} Enter Secure Mode
System Commands
System Subsystem (:SYSTem)

**:SECurity:OVERwrite**

**Supported**  All Models

**:SYSTem:SECurity:OVERwrite**

This command removes all user files, table editor files values, flatness correction files, and baseband generator files. The memory is then overwritten with random data as described below. For more information about security functions, refer to the *E8257D/67D PSG Signal Generators User's Guide*.

**SRAM**  All addressable locations will be overwritten with random characters.

**HARD DISK**  All addressable locations will be overwritten with random characters.

**FLASH MEMORY**  The flash blocks will be erased.

**Key Entry**  **Erase and Overwrite All**

**:SECurity:SANitize**

**Supported**  All Models

**:SYSTem:SECurity:SANitize**

This command removes all user files, table editor files values, flatness correction files, and baseband generator files. The memory is then overwritten with a sequence of data as described below. For more information about security functions, refer to the *E8257D/67D PSG Signal Generators User's Guide*.

**SRAM**  All addressable locations will be overwritten with random characters.

**HARD DISK**  All addressable locations will be overwritten with a single character and then a random character.

**FLASH MEMORY**  The flash blocks will be erased.

**Key Entry**  **Erase and Sanitize All**

**:SSAVer:DELay**

**Supported**  All Models

**:SYSTem:SSAVer:DELay <val>**

**:SYSTem:SSAVer:DELay?**

This command sets the amount of time before the display light or display light and text is switched off. The time delay represents the time during which there is no signal generator front panel input. The variable <val> is a positive integer number, in hours. The setting enabled by this command is not affected by power-on, preset, or *RST. See **":SSAVer:MODE" on page 97** for selecting the screen saver mode.
Example

:SYST:SSAV:DEL 2

The preceding example sets two hours delay time for the screen saver mode.

Range

1–12

Key Entry

Screen Saver Delay:

:SSAVer:MODE

Supported

All Models

:SYST:SSAVer:MODE LIGHT|TEXT

This command toggles the screen saver mode between light only or light and text.

LIGHT

Enables only the light to turn off during the screen saver operation while leaving the text visible on the darkened screen.

TEXT

Enables both the display light and text to turn off during screen saver operation.

The setting is not affected by a signal generator power-on, preset, or *RST command.

Example

:SYST:SSAV:MODE TEXT

The preceding example sets the screen saver mode.

Key Entry

Screen Saver Mode

:SSAVer:STATe

Supported

All Models

:SYST:SSAVer:STATe ON|OFF|1|0

This command enables or disables the display screen saver. The setting enabled by this command is not affected by a signal generator power-on, preset, or *RST command.

Example

:SYST:SSAV:STAT 1

The preceding example enables the screen saver mode.

Key Entry

Screen Saver Off On
System Commands
Trigger Subsystem

**:TIME**

**Supported**  All Models

:SYSTem:TIME <hour>,<minute>,<second>

This command sets the time displayed in the lower right area of the signal generator's display.

**Range**

- **<hour>**: 0–23
- **<minute>**: 0–59
- **<second>**: 0–59

**Example**

:SYST:TIME 9,30,45

The preceding example sets the signal generator time to 09:30:45.

**Key Entry**  Time/Date

**:VERSion**

**Supported**  All Models

:SYSTem:VERSion?

This command returns the SCPI version number with which the signal generator complies.

**Trigger Subsystem**

**:ABORt**

**Supported**  All Models

:ABORt

This command causes the List or Step sweep in progress to abort. If INIT:CONT[:ALL] is set to ON, the sweep will immediately re-initiate. The pending operation flag affecting *OPC, *OPC?, and *WAI will undergo a transition once the sweep has been reset.

**:INITiate:CONTinuous[:ALL]**

**Supported**  All Models

:INITiate:CONTinuous[:ALL] ON|OFF|1|0

:INITiate:CONTinuous[:ALL]?

This command selects either a continuous or single List or Step sweep. Execution of this command does not affect a sweep in progress.

ON (1)  Selects continuous sweep where, after the completion of the previous sweep, the sweep restarts automatically, or waits for a trigger.

OFF (0)  This choice selects a single sweep. Refer to “:INITiate[:IMMediate][:ALL]” on page 99 for single sweep triggering information.
Example

:INIT:CONT ON

The preceding example enables the continual mode for the sweep type.

*RST

Key Entry Sweep Repeat Single Cont

:INITiate[:IMMediate][:ALL]

Supported All Models

This command either sets or sets and starts a single List or Step sweep, depending on the trigger type. The command performs the following:

- arms a single sweep when BUS, EXTERNAL, or KEY is the trigger source selection
- arms and starts a single sweep when IMMEDIATE is the trigger source selection

This command is ignored if a sweep is in progress. See ":INITiate:CONTinuous[:ALL]" on page 98 for setting continuous or single sweep. See ":TRIGger[:SEQuence]:SOURce" on page 100 to select the trigger source.

In some atypical cases, the :INIT command could be ignored if it immediately follows an *OPC? command. If the :INIT command is ignored, then use a 10ms sleep function before sending the command.

Key Entry Single Sweep

:TRIGger:OUTPut:POLarity

Supported All Models

:TRIGger:OUTPut:POLarity POSitive|NEGative

Sets the TTL signal level present at the TRIGGER OUT connector to either high (5 vdc) or low (0 vdc). The trigger out is asserted after the frequency and/or power is set while the sweep is waiting for its step trigger. In addition, the swept-sine sends a pulse to the TRIGGER OUT at the beginning of each sweep.

Example

:TRIG:OUTP:POL NEG

The preceding example enables the continual mode as the sweep type.

*RST

Key Entry Trigger Out Polarity Neg Pos
System Commands
Trigger Subsystem

:TRIGger[:SEQUence]:SLOPe
Supported            All Models
:TRIGger[:SEQUence]:SLOPe POSitive|NEGative
:TRIGger[:SEQUence]:SLOPe?
This command sets the polarity of the ramp or sawtooth waveform slope present at the TRIGGER IN connector that will trigger a List or Step sweep.
Example
:TRIG:SLOP POS
The preceding example sets a positive ramp slope.
*RST            POS
Key Entry            Trigger In Polarity Neg Pos

:TRIGger[:SEQUence]:SOURce
Supported            All Models
:TRIGger[:SEQUence]:SOURce BUS|IMMediate|EXTernal|KEY
:TRIGger[:SEQUence]:SOURce?
This command sets the sweep trigger source for a List or Step sweep.
BUS            This choice enables GPIB triggering using the *TRG or GET command or LAN and RS-232 triggering using the *TRG command.
IMMediate      This choice enables immediate triggering of the sweep event.
EXTernal       This choice enables the triggering of a sweep event by an externally applied signal at the TRIGGER IN connector.
KEY            This choice enables front-panel triggering by pressing the Trigger hardkey.
The wait for the BUS, EXTernal, or KEY trigger can be bypassed by sending the :TRIGger[:SEQUence][[:IMMediate] command.
Example
:TRIG:SOUR BUS
The preceding example sets the sweep trigger source to BUS.
*RST            IMM
Key Entry           Bus    Free Run    Ext    Trigger Key
:TRIGger[:SEQUence][:IMMediate]

Supported All Models

:TRIGger[:SEQUence][:IMMediate]

This event command causes an armed List or Step sweep to immediately start without the selected trigger occurring.

In some atypical cases, the :TRIG command could be ignored if it immediately follows an *OPC? command. If the :TRIG command is ignored, then use a 10ms sleep function before sending the command.

Unit Subsystem (:UNIT)

:POWer

Supported All Models

:UNIT:POWer DBM|DBUV|DBUVEMF|V|VEMF|DB

:UNIT:POWer?

This command terminates an amplitude value in the selected unit of measure.

If the amplitude reference state is set to on, the query returns units expressed in dB. Setting any other unit will cause a setting conflict error stating that the amplitude reference state must be set to off. Refer to, "*REFerence:STATe" on page 140 for more information.

All power values in this chapter are shown with DBM as the unit of measure. If a different unit of measure is selected, replace DBM with the newly selected unit whenever it is indicated for the value.

Example

:UNIT:POW DBM

The preceding example selects dBm as the unit of amplitude measurement.

*RST DBM

Key Entry dBm dBuV dBuVemf mV uV mVemf uVemf
System Commands
Unit Subsystem (UNIT)
3 Basic Function Commands

In the following sections, this chapter provides SCPI descriptions for subsystems dedicated to signal generator operations common to all PSG models:

- “Correction Subsystem ([SOURce]:CORRection)” on page 103
- “Frequency Subsystem ([SOURce])” on page 105
- “List/Sweep Subsystem ([SOURce])” on page 119
- “Marker Subsystem–Option 007 ([SOURce])” on page 130
- “Power Subsystem ([SOURce]:POWer)” on page 133
- “Trigger Sweep Subsystem ([SOURce])” on page 142

### Correction Subsystem ([SOURce]:CORRection)

`:FLATness:LOAD

**Supported** All Models

`:SOURce]:CORRection:FLATness:LOAD "<file_name>"

This command loads a user-flatness correction file designated by the file name "<file_name>" variable. The file will be loaded from the signal generator’s USERFLAT directory. The directory path does not need to be specified in the command. Refer to the E8257D/67D PSG Programming Guide for more information on flatness corrections.

For information on file name syntax, refer to “File Name Variables” on page 10.

**Example**

`:CORR:FLAT:LOAD "Flatness_Data"

The preceding example loads a user flatness file named Flatness_Data from the signal generator’s user flatness directory.

**Key Entry** Load From Selected File
Basic Function Commands
Correction Subsystem [:SOURce]:CORRection

:FLATness:PAIR
Supported All Models
[:SOURce]:CORRection:FLATness:PAIR <freq>,<corr>
This command adds or edits a frequency and amplitude correction pair. The maximum number of pairs or points that can be entered is 1601. Refer to the E8257D/67D PSG Programming Guide for more information on flatness corrections.

The <corr> variable is the power correction in dB.

Power and frequency ranges for different signal generator models and options are listed on page 142.

Example
:CORR:FLAT:PAIR 10MHZ,.1
The preceding example enters a frequency of 10 megahertz and a power of 0.1dB into the user flatness table.

*RST
  Option 520: +2.0000000000000E+10
  Option 532: +3.2000000000000E+10
  Option 540: +4.0000000000000E+10
  Option 544: +4.4000000000000E+10
  Option 550: +5.0000000000000E+10
  Option 567: +6.7000000000000E+10

Range
  Option 520: 250kHz–20GHz
  Option 532: 250kHz–32GHz
  Option 540: 250kHz–40GHz
  Option 544: 250kHz–44GHz
  Option 550: 250kHz–50GHz
  Option 567: 250kHz–70GHz

a.67-70 GHz performance not specified

Key Entry Configure Cal Array

:FLATness:POINts
Supported All Models
[:SOURce]:CORRection:FLATness:POINts?
This query returns the number of points in the user-flatness correction file.

:FLATness:PRESet
Supported All Models

CAUTION Once this command is executed, correction data is overwritten; If needed, save the current correction data (see “:FLATness:STORe” on page 105).

[:SOURce]:CORRection:FLATness:PRESet
This command presets the user-flatness correction to a factory-defined setting that consists of one frequency point and one amplitude point with no corrections.

Key Entry Preset List
**:FLATness:STORE**

**Supported**  All Models

`:SOURce`:CORRection:FLATness:STORe "<file_name>"

This command stores the current user-flatness correction data to a file named by the "<file_name>" variable. All user-flatness files are stored in the signal generator's USERFLAT directory. The directory path does not need to be specified in the command.

For information on file name syntax, refer to “File Name Variables” on page 10.

**Example**

`:CORR:FLAT:STOR "New_Flat_data"

The preceding example stores the current user-flatness table entries in a file named "New_Flat_data".

**Key Entry**  Store To File

**[:STATe]**

**Supported**  All Models

`:SOURce`:CORRection[:STATe] ON|OFF|1|0

`:SOURce`:CORRection[:STATe]?

This command toggles the application of user-flatness corrections to the current signal generator power output.

**Example**

`:CORR OFF

The preceding example turns off correction data.

**:*RST**

0

**Key Entry**  Flatness Off On

**Frequency Subsystem ([SOURce])**

**:FREQuency:CENTer**

**Supported**  All Models with Option 007

`:SOURce`:FREQuency:CENTer <val>[<unit>] |UP|DOWN

`:SOURce`:FREQuency:CENTer? [MAXimum|MINimum]

This command sets the center frequency for a ramp sweep. The center frequency symmetrically divides the selected frequency span and is coupled to the start and stop frequency settings. The frequency range and reset values are dependent on the signal generator model and option number.
Basic Function Commands
Frequency Subsystem ([SDURe])

The query returns the start and stop ramp frequencies if the optional MAXimum or MINimum are used.

*RST

Option 520: +2.0000000000000E+10
Option 532: +3.2000000000000E+10
Option 540: +4.0000000000000E+10
Option 544: +4.4000000000000E+10
Option 550: +5.0000000000000E+10
Option 567: +7.0000000000000E+10

Range

Option 520: 250kHZ–20GHZ
Option 532: 250kHZ–32GHZ
Option 540: 250kHZ–40GHZ
Option 544: 250kHZ–44GHZ
Option 550: 250kHZ–50GHZ
Option 567: 250kHZ–70GHZ

a.67-70 GHz performance not specified

Example
:FREQ:CENT 15GHZ

The preceding example sets the center frequency for a ramp sweep to 15 GHz.

Key Entry
Freq Center

:FREQuency:CHANnels:BAND

Supported
All Models

[:SOURce]:FREQuency:CHANnels:BAND

NBASe|NMOBile|BPGSm|MPGSm|BEGSm|MEGSm|BRGSm|MRGSm|BDCS|MDCS|BPCS|MPCS|B450|GM450|
B480|M480|B850|M850|B8|M8|B15|M15|B390|B420|B460|B915|M380|M410|M450|M870|PHS|DECT

[:SOURce]:FREQuency:CHANnels:BAND?

This command sets the frequency of the signal generator by specifying a frequency channel band. The frequency channel state must be enabled for this command to work. See "[:FREQuency:CHANnels:STATe]" on page 109.

NBASe This choice selects Standard Base as the frequency band for NADC.
NMOBile This choice selects Standard Mobile as the frequency band for NADC.
BPGSm This choice selects P-Gsm 900 Base as the frequency band for GSM.
MPGSm This choice selects P-Gsm 900 Mobile as the frequency band for GSM.
BEGSm This choice selects E-Gsm 900 Base as the frequency band for GSM.
MEGSm This choice selects E-Gsm 900 Mobile as the frequency band for GSM.
BRGSm This choice selects R-Gsm 900 Base as the frequency band for GSM.
MRGSm This choice selects R-Gsm 900 Mobile as the frequency band for GSM.
BDCS This choice selects DCS 1800 Base as the frequency band for GSM.
MDCS This choice selects DCS 1800 Mobile as the frequency band for GSM.
BPCS This choice selects PCS 1900 Base as the frequency band for GSM.
MPCS This choice selects PCS 1900 Mobile as the frequency band for GSM.
B450 This choice selects Gsm 450 Base as the frequency band for GSM.
GM450 This choice selects Gsm 450 Mobile as the frequency band for GSM.
Basic Function Commands
Frequency Subsystem [:SOURce]

Chapter 3

Example

:FREQ:CHAN:BAND DECT

The preceding example sets the frequency band to standard DECT.

*RST

BPGS

<table>
<thead>
<tr>
<th>Key Entry</th>
<th>P-GSM Base</th>
<th>E-GSM Base</th>
<th>R-GSM Base</th>
<th>DCS Base</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCS Base</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NADC Base</td>
<td>800MHZ Base</td>
<td>1500MHZ Base</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tetra Base390/400</td>
<td>Tetra Base 420/430</td>
<td>Tetra Base 460/470</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tetra Base 915/921</td>
<td>PHS Standard</td>
<td>DECT Standard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-GSM Mobile</td>
<td>E-GSM Mobile</td>
<td>R-GSM Mobile</td>
<td>DCS Mobile</td>
<td></td>
</tr>
<tr>
<td>PCS Mobile</td>
<td>GSM 450 Mobile</td>
<td>GSM 480 Mobile</td>
<td>GSM 850 Mobile</td>
<td></td>
</tr>
<tr>
<td>NADC Mobile</td>
<td>800MHZ Mobile</td>
<td>1500MHZ Mobile</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tetra Mobile 380/390</td>
<td>Tetra Mobile 410/420</td>
<td>Tetra Mobile 450/460</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tetra Mobile 870/876</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

B480 This choice selects Gsm 480 Base as the frequency band for GSM.
M480 This choice selects Gsm 480 Mobile as the frequency band for GSM.
B850 This choice selects Gsm 850 Base as the frequency band for GSM.
M850 This choice selects Gsm 850 Mobile as the frequency band for GSM.
B8 This choice selects 800MHz Base as the frequency band for PDC.
M8 This choice selects 800MHz Mobile as the frequency band for PDC.
B15 This choice selects 1500MHz Base as the frequency band for PDC.
M15 This choice selects 1500MHz Mobile as the frequency band for PDC.
B390 This choice selects Base 390-400 as the frequency band for TETRA.
B420 This choice selects Base 420-430 as the frequency band for TETRA.
B460 This choice selects Base 460-470 as the frequency band for TETRA.
B915 This choice selects Base 915-921 as the frequency band for TETRA.
M380 This choice selects Mobile 380-390 as the frequency band for TETRA.
M410 This choice selects Mobile 410-420 as the frequency band for TETRA.
M450 This choice selects Mobile 450-460 as the frequency band for TETRA.
M870 This choice selects Mobile 870-876 as the frequency band for TETRA.
PHS This choice selects Standard PHS as the frequency band.
DECT This choice selects Standard DECT as the frequency band.
**Basic Function Commands**

**Frequency Subsystem ([:SOURce])**

### :FREQuency:CHANnels:NUMBer

**Supported** All Models

 universally

[[:SOURce]:FREQuency:CHANnels:NUMBer <number>]

[[:SOURce]:FREQuency:CHANnels:NUMBer?]

This command sets the frequency of the signal generator by specifying a channel number of a given frequency band.

The channel band and channel state must be enabled for this command to work. Refer to “:FREQuency:CHANnels[:STATe]” on page 109.

**Example**

:FREQ:CHAN:NUMB 24

The preceding example sets the channel number to 24 for the current band.

**RST**

+1

**Range**

- **P-GSM Base/Mobile:** 1–24
- **E-GSM and R-GSM Base/Mobile:** 1–1023
- **DCS Base/Mobile:** 512–885
- **PCS Base/Mobile:** 512–900
- **GSM-450 Base/Mobile:** 259–293
- **GSM-480 Base/Mobile:** 306–340
- **GSM-850 Base/Mobile:** 128–251
- **NADC Base/Mobile:** 1–1023
- **800MHZ Base/Mobile:** 0–640
- **1500MHZ Base/Mobile:** 0–960
- **TETRA 380/390 Mobile:** 3600–4000
- **TETRA 390/4000 Base:** 3600–4000
- **TETRA 410/420 Mobile:** 800–1200
- **TETRA 420/430 Base:** 800–1200
- **TETRA 460/470: 2400 through 2800** 2400–2800
- **TETRA 870/876 Mobile:** 600–640
- **TETRA 915/921 Base:** 600–940
- **PHS Standard:** 1–255
- **DECT Standard:** 0–9

**Key Entry**

**Channel Number**
Basic Function Commands
Frequency Subsystem ([SOURce])

:FREQuency:CHANnels[:STATe]

Supported All Models

[:SOURce]:FREQuency:CHANnels[:STATe] ON|OFF|1|0
[:SOURce]:FREQuency:CHANnels[:STATe]?

This command enables or disables the frequency channel and band selection. The signal generator frequency will be set to the channel frequency when the state is on. To set frequency channel bands refer to “:FREQuency:CHANnels:BAND” on page 106.

Example
:FREQ:CHAN ON

The preceding example turns on the frequency channel.

*RST

Key Entry Freq Channels Off On

:FREQuency:FIXed

Supported All Models

[:SOURce]:FREQuency:FIXed <val><unit>|UP|DOWN
[:SOURce]:FREQuency:FIXed?

This command sets the signal generator output frequency, or increments or decrements the current RF frequency setting.

<val> A frequency value.

UP Increases the current frequency setting by the value set with the :FREQuency[:CW]:STEP[:INCRement] command found on page 116. The front-panel up arrow key performs the same function.

DOWN Decreases the current frequency setting by the value set with the :FREQuency[:CW]:STEP[:INCRement] command found on page 116. The front-panel down arrow key performs the same function.

To set the frequency mode, see “:FREQuency:MODE” on page 111. For a listing of signal generator frequency and power specifications, refer to “[:LEVe{l}][:IMMediate][:AMPLitude]” on page 142.

Example
:FREQ:FIX 10GHZ

The preceding example sets the signal generator frequency to 10 GHz.

*RST

Option 520: +2.0000000000000E+10
Option 532: +3.20000000000000E+10
Option 540: +4.00000000000000E+10
Option 544: +4.4000000000000E+10
Option 550: +5.0000000000000E+10
Option 567: +6.70000000000000E+10

Range Option 520: 250kHZ–20GHz
Basic Function Commands
Frequency Subsystem (:SOURce)

:FREQency:MANual

Supported  All Models with Option 007
[:SOURce]:FREQency:MANual <val><unit>
[:SOURce]:FREQency:MANual?

This command sets the RF output frequency when performing a ramp sweep in manual mode. The frequency value selected must fall within the range of the current start and stop frequency settings. Entering a value with this command has no effect unless manual sweep mode is on. Refer to ":SWEep:MODE" on page 128 for setting the mode.

The variable <val> is a numeric value. The <units> variable can be expressed in HZ, KHZ, MHZ, or GHZ.

Example :

:FREQ:MAN 10GHz

The preceding example sets the signal generator manual ramp sweep frequency to 10 GHz.

Key Entry  Freq CW

Manual Freq

Option 532: 250kHz–32GHz
Option 540: 250kHz–40GHz
Option 544: 250kHz–44GHz
Option 550: 250kHz–50GHz
Option 567: 250kHz–70GHz

a. 67-70 GHz performance not specified

Option 532: 250kHz–32GHz
Option 540: 250kHz–40GHz
Option 544: 250kHz–44GHz
Option 550: 250kHz–50GHz
Option 567: 250kHz–70GHz

Option 520: +2.0000000000000E+10
Option 532: +3.20000000000000E+10
Option 540: +4.00000000000000E+10
Option 544: +4.40000000000000E+10
Option 550: +5.00000000000000E+10
Option 567: +6.70000000000000E+10

Range  Option 520: 250kHz–20GHz
Option 532: 250kHz–32GHz
Option 540: 250kHz–40GHz
Option 544: 250kHz–44GHz
Option 550: 250kHz–50GHz
Option 567: 250kHz–70GHz

a. 67-70 GHz performance not specified

Key Entry  Manual Freq
**Basic Function Commands**

**Frequency Subsystem ([:SOURce])**

---

### :FREQ:MODE

**Supported**
All Models

[:SOURce]:FREQ:MODE FIXed|CW|SWEep|LIST

This command sets the frequency mode of the signal generator.

**FIXed and CW**
These choices are synonymous. Any currently running frequency sweeps are turned off, and the current CW frequency settings are used to control the output frequency.

- To set the frequency in the CW frequency mode, see ":FREQ[:CW]" on page 116.
- To set the frequency in the fixed frequency mode, see ":FREQ:FIXed" on page 109.

**SWEep**
The effects of this choice are determined by the sweep generation type selected (refer to ":SWEep:GENeration" on page 127). In analog sweep generation, the ramp sweep frequency settings (start, stop, center, and span) control the output frequency. In step sweep generation, the current step sweep frequency settings control the output frequency. In both cases, this selection also activates the sweep. This choice is available with Option 007 only.

**LIST**
This choice selects the swept frequency mode. If sweep triggering is set to immediate along with continuous sweep mode, executing the command starts the LIST or STEP frequency sweep.

**NOTE**
To perform a frequency and amplitude sweep, you must also select LIST or SWEep as the power mode (see ":MODE" on page 138).

#### Example

:FREQ:MODE LIST

The preceding example selects a list frequency sweep.

**RST**

---

### :FREQ:MULTiplier

**Supported**
All Models

[:SOURce]:FREQ:MULTiplier <val>

[:SOURce]:FREQ:MULTiplier?

This command sets the multiplier for the signal generator carrier frequency. For any multiplier other than one, the MULT indicator is shown in the frequency area of the display. The multiplier value is used to multiply the signal generator’s displayed frequency. The true frequency remains constant. For example, if the signal generator frequency is 20 GHz and a multiplier of 3 is selected, the displayed frequency will be 60 GHz. This feature is useful when working with mixers and multipliers.
Example

`:FREQ:MULT 2`

The preceding example sets the carrier multiplier to 2.

*RST*  
+1.00000000E+000

**Key Entry**  
Freq Multiplier

**:FREQuency:OFFSet**

**Supported**  
All Models

[:SOURce]:FREQuency:OFFSet <val><units>
[:SOURce]:FREQuency:OFFSet?

This command sets the frequency offset. When an offset has been entered, the OFFS indicator appears in the frequency area of the signal generator’s front-panel display and the frequency reading will include the offset value.

When any non-zero value is entered, the frequency offset state turns on; entering zero turns it off. To set the offset state independent of entering offset values see :FREQuency:OFFSet:STATe.

Example

`:FREQ:OFFS 10GHZ`

The preceding example sets the frequency offset to 10 GHz.

*RST*  
+0.00000000000000E+00

**Range**  
-200GHZ to 200GHZ

**Key Entry**  
Freq Offset

**:FREQuency:OFFSet:STATe**

**Supported**  
All Models

[:SOURce]:FREQuency:OFFSet:STATe ON|OFF|1|0
[:SOURce]:FREQuency:OFFSet:STATe?

This command enables or disables the offset frequency. Entering OFF (0) will set the frequency offset to 0 Hz.

Example

`:FREQ:OFFS:STAT 0`

The preceding example disables the frequency offset and sets the offset to 0 hertz.

*RST*  
0

**Key Entry**  
Freq Offset
Basic Function Commands
Frequency Subsystem ([SOURce])

**[:FREQuency:REFerence]**

**Supported** All Models

[ :SOURce ] :FREQuency:REFerence <val><units>

This command sets the output reference frequency for the signal generator. Once the reference frequency is set, any change to the signal generator’s CW frequency will be displayed referenced to 0 hertz. For example, if the signal generator’s CW frequency is set to 100 megahertz and the frequency reference is set (the frequency reference state will automatically turn on). The frequency display will read 0 Hz. If you change the signal generator’s CW frequency to 1 megahertz, the frequency display will read 1 megahertz. However, the true frequency is 101 megahertz. This can be verified by turning the frequency reference state off. The signal generator frequency display will read 101 megahertz. Refer to :FREquency:REFerence:STATe for more information.

**Example**

:`FREQ:REF 100MHZ`

The preceding example sets the output reference frequency to 100 megahertz.

**RST**

+0.0000000000000E00

**Key Entry** Freq Ref Set

**[:FREQuency:REFerence:SET]**

**Supported** All Models

[ :SOURce ] :FREQuency:REFerence:Set

This command sets the current CW output frequency, along with any offset, as a 0 hertz reference value.

**RST**

+0.0000000000000E00

**Key Entry** Freq Ref Set

**[:FREQuency:REFerence:STATe]**

**Supported** All Models

[ :SOURce ] :FREQuency:REFerence:STATe ON|OFF|1|0

[ :SOURce ] :FREQuency:REFerence:STATe?

This command enables or disables the frequency reference mode. When the frequency reference mode is on, changes in the signal generator’s CW frequency are displayed relative to the 0 hertz frequency reference. When the state is off, the front-panel display indicates the true signal generator frequency.

**Example**

:`FREQ:REF:STAT OFF`

The preceding example turns off the reference frequency mode.

**RST**

0

**Key Entry** Freq Ref Off On
Basic Function Commands
Frequency Subsystem ([:SOURce])

:FREQuency:SPAN

Supported All Models with Option 007

[:SOURce]:FREQuency:SPAN <num>[<freq_suffix>] | UP | DOWN
[:SOURce]:FREQuency:SPAN? [MAXimum|MINimum]

This command sets the length of the frequency range for a ramp sweep. Span setting is symmetrically divided by the selected center frequency and is coupled to the start and stop frequency settings. The span range is dependent on the signal generator model and option number.

Example

:FREQ:SPAN 100MHZ

The preceding example sets the frequency span to 100 megahertz.

*RST

+0.0000000000000E+00

Key Entry

Freq Span

:FREQuency:STARt

Supported All Models

[:SOURce]:FREQuency:STARt <val><units>
[:SOURce]:FREQuency:STARt?

This command sets the frequency start point for a step sweep or ramp sweep (Option 007). In a ramp sweep setup, the selected value must be less than or equal to the value selected for the frequency stop point. In ramp sweep, this setting is coupled with the span and center frequency settings.

Refer to "[:LEVel][:IMMediate][:AMPLitude]" on page 142 for frequency and power specifications for different signal generator options and model numbers.

Example

:FREQ:STAR 1GHZ

The preceding example sets the start frequency for a sweep to 1 GHz.

*RST

Option 520: +2.0000000000000E+10
Option 532: +3.2000000000000E+10
Option 540: +4.0000000000000E+10
Option 544: +4.4000000000000E+10
Option 550: +5.0000000000000E+10
Option 567: +6.7000000000000E+10
Basic Function Commands
Frequency Subsystem ([SOURce])

Range

*Option 520: 250kHz–20GHz
Option 532: 250kHz–32GHz
Option 540: 250kHz–40GHz
Option 544: 250kHz–44GHz
Option 550: 250kHz–50GHz
Option 567: 250kHz–70GHz

a.67–70 GHz performance not specified

Key Entry
Freq Stop

:FREQuency:STOP

Supported
All Models

[:SOURce]:FREQuency:STOP <val><units>
[:SOURce]:FREQuency:STOP?

This command sets the stop frequency for a step sweep or ramp sweep (Option 007). In a ramp sweep setup, the selected value must be greater than or equal to the value selected for the frequency start point. In ramp sweep, this setting is coupled with the span and center frequency settings.

Refer to "[:LEVel][:IMMediate][:AMPLitude]" on page 142 for frequency and power specifications for different signal generator options and model numbers.

Example

:FREQ:STOP 10GHz

The preceding example sets the stop frequency for a sweep to 10 GHz.

*RST

*Option 520: +2.0000000000000E+10
Option 532: +3.20000000000000E+10
Option 540: +4.00000000000000E+10
Option 544: +4.40000000000000E+10
Option 550: +5.00000000000000E+10
Option 567: +6.70000000000000E+10

Range

*Option 520: 250kHz–20GHz
Option 532: 250kHz–32GHz
Option 540: 250kHz–40GHz
Option 544: 250kHz–44GHz
Option 550: 250kHz–50GHz
Option 567: 250kHz–70GHz

a.67–70 GHz performance not specified

Key Entry
Freq Stop
Basic Function Commands
Frequency Subsystem ([:SOURce])

:FREQuency[:CW]

Supported All Models
[:SOURce]:FREQuency[:CW] <val>|<unit>|UP|DOWN
[:SOURce]:FREQuency[:CW]?  
This command sets the signal generator output frequency for the CW frequency mode, or increments or decrements the current RF frequency setting.

<val> A frequency value.

UP Increases the current frequency setting by the value set with the
:FREQuency[:CW]:STEP[:INCRement] command found on page 116. The front-panel up arrow key performs the same function.

DOWN Decreases the current frequency setting by the value set with the
:FREQuency[:CW]:STEP[:INCRement] command found on page 116. The front-panel down arrow key performs the same function.

To set the frequency mode to CW, refer to “:FREQuency:MODE” on page 111.

Example
:FREQ 12GHZ
The preceding example sets signal generator's output frequency to 12 GHz.

*RST  
Option 520: +2.0000000000000E+10
Option 532: +3.20000000000000E+10
Option 540: +4.00000000000000E+10
Option 544: +4.40000000000000E+10
Option 550: +5.00000000000000E+10
Option 567: +6.70000000000000E+10

Range  
Option 520: 250kHZ–20GHz
Option 532: 250kHZ–32GHz
Option 540: 250kHZ–40GHz
Option 544: 250kHZ–44GHz
Option 550: 250kHZ–50GHz
Option 567: 250kHZ–70GHz

a.67-70 GHz performance not specified

Key Entry Frequency

:FREQuency[:CW]:STEP[:INCRement]

Supported All Models
[:SOURce]:FREQuency[:CW]:STEP[:INCRement] <val>|<unit>
[:SOURce]:FREQuency[:CW]:STEP[:INCRement]?  
This command sets the incremental step value for the frequency parameter. The value set with this
command is not affected by *RST or a power cycle.

**Range**

0.01 Hz–99 GHz

**Key Entry**

Incr Set

**:PHASe:REFerence**

**Supported**

All Models

[:SOURce]:PHASe:REFerence

This command sets the output phase reference to zero. Subsequent phase adjustments are set relative to the new reference.

**Key Entry**

Phase Ref Set

**:PHASe[:ADJJust]**

**Supported**

All Models

[:SOURce]:PHASe[:ADJJust] <val><unit>

[:SOURce]:PHASe[:ADJJust]?

This command adjusts the phase of the modulating signal. The query returns values in radians.

**Example**

:PHAS 30DEG

The preceding example sets the phase of the modulating signal to 30 degrees relative to the previous phase setting.

**:ROSCillator:BANDwidth:DEFaults**

**Supported**

All Models with Option UNR/UNX

[:SOURce]:ROSCillator:BANDwidth:DEFaults

This command resets the bandwidth of the reference oscillator to the factory-defined default state. The default value for the internal reference bandwidth is 125 Hz. The default value for the external reference bandwidth is 25 Hz.

**Key Entry**

Restore Factory Defaults

**:ROSCillator:BANDwidth:EXTernal**

**Supported**

All Models with Option UNR/UNX

[:SOURce]:ROSCillator:BANDwidth:EXTernal 25HZ|55HZ|125HZ|300HZ|650HZ

[:SOURce]:ROSCillator:BANDwidth:EXTernal?

This command sets the bandwidth of the internal reference oscillator, when an external reference is applied.
Basic Function Commands
Frequency Subsystem ([SOURce])

**Example**

```plaintext
:ROSC:BAND:EXT 300HZ
```

The preceding example sets the bandwidth of the internal oscillator to 300 hertz.

**Key Entry**  
External Ref Bandwidth

**:ROSCillator:BANDwidth:INTernal**

**Supported**  
All Models with Option UNR/UNX

```
[:SOURce]:ROSCillator:BANDwidth:INTernal 25HZ|55HZ|125HZ|300HZ|650HZ
[:SOURce]:ROSCillator:BANDwidth:INTernal?
```

This command sets the bandwidth of the internal reference oscillator.

**Example**

```plaintext
:ROSC:BAND:INT 125HZ
```

The preceding example sets the bandwidth of the internal oscillator to 125 hertz.

**Key Entry**  
Internal Ref Bandwidth

**:ROSCillator:SOURce**

**Supported**  
All Models

```
[:SOURce]:ROSCillator:SOURce?
```

This command queries the reference oscillator source: INT (internal) or EXT (external).

**:ROSCillator:SOURce:AUTO**

**Supported**  
All Models without Option UNR/UNX

```
[:SOURce]:ROSCillator:SOURce:AUTO ON|OFF|1|0
[:SOURce]:ROSCillator:SOURce:AUTO?
```

This command enables or disables the ability of the signal generator to automatically select between the internal and an external reference oscillator.

**ON (1)**  
This choice enables the signal generator to detect when a valid reference signal is present at the 10 MHz IN connector and automatically switches from internal to external frequency reference.

**OFF (0)**  
This choice selects the internal reference oscillator and disables the switching capability between the internal and an external frequency reference.
Example
:ROSC:SOUR:_AUTO 0
The preceding example turns off the automatic selection of internal or external reference oscillators.

*RST 1

Key Entry Ref Oscillator Source Auto Off On

List/Sweep Subsystem ([SOURce])
A complete sweep setup requires commands from other subsystems. Table 3-1 shows the function and location of these commands.

Table 3-1 Location of Commands from the other Subsystems

<table>
<thead>
<tr>
<th>Sweep Type</th>
<th>Function</th>
<th>Command Location</th>
<th>Key Entry under Sweep/List key</th>
</tr>
</thead>
<tbody>
<tr>
<td>List and Step</td>
<td>Start/stop frequency sweep</td>
<td>:FREQuency:MODE (page 111)</td>
<td>Freq Off</td>
</tr>
<tr>
<td></td>
<td>Start/stop amplitude sweep</td>
<td>:MODE (page 138)</td>
<td>Ampl Off</td>
</tr>
<tr>
<td></td>
<td>Start/stop frequency and amplitude sweep</td>
<td>:MODE (page 138)</td>
<td>Freq &amp; Ampl Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>:FREQuency:MODE (page 111)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Set up &amp; control sweep triggeringb</td>
<td>&quot;Trigger Sweep Subsystem ([SOURce])&quot; (page 142)</td>
<td>See the Trigger Sweep Subsystem ([SOURce])</td>
</tr>
<tr>
<td>Step</td>
<td>Start frequency sweep</td>
<td>:FREQuency:STARt (page 114)</td>
<td>Freq Start</td>
</tr>
<tr>
<td></td>
<td>Stop frequency sweep</td>
<td>:FREQuency:STOP (page 115)</td>
<td>Freq Stop</td>
</tr>
<tr>
<td></td>
<td>Start amplitude sweep</td>
<td>:STARt (page 140)</td>
<td>Ampl Start</td>
</tr>
<tr>
<td></td>
<td>Stop amplitude sweep</td>
<td>:STOP (page 141)</td>
<td>Ampl Stop</td>
</tr>
</tbody>
</table>

a. Execute both commands to start or stop a frequency and amplitude sweep.
b. For point to point triggering, see "LIST:TRIGger:SOURce" on page 124.

:LIST:DIRection
Supported All Models

[:SOURce]:LIST:DIRection UP|DOWN
[:SOURce]:LIST:DIRection?

This command sets the direction of a list or step sweep.

UP This choice enables a sweep in an ascending order:
• first to last point for a list sweep
• start to stop for a step sweep

DOWN This choice reverses the direction of the sweep.
Basic Function Commands  
List/Sweep Subsystem [:SOURce]

Example

:LIST:DIR UP  
The preceding example selects an ascending sweep direction.

*RST UP  
Key Entry Sweep Direction Down Up

:LIST:DWEL

Supported All Models

[:SOURce]:LIST:DWEL1 <val>{,<val>}
[:SOURce]:LIST:DWEL1?

This command sets the dwell time for points in the current list sweep. The variable <val> is expressed in units of seconds with a 0.001 resolution. If only one point is specified, that value is used for all points in the list. Otherwise, there must be a dwell point for each frequency and amplitude point in the list.

NOTE The dwell time <val> does not begin until the signal generator frequency and/or amplitude change has settled.

Dwell time is used when IMMEDIATE is the trigger source. Refer to "LIST:TRIGGER:SOURce" on page 124 for the trigger setting.

The dwell time is the amount of time the sweep pauses after setting the frequency and/or power for the current point.

The setting enabled by this command is not affected by a signal generator power cycle, preset, or *RST command.

Example

:LIST:DWEL 1,2,1,2,3

The preceding example sets the dwell time for a list of five points.

Range 0.001–60

:LIST:DWEL:POINts

Supported All Models

[:SOURce]:LIST:DWEL:POINts?

This command queries the signal generator for the number of dwell points in the list sweep file.
:LIST:DWELL:TYPE

Supported All Models

[:SOURce]:LIST:DWELL:TYPE LIST|STEP
[:SOURce]:LIST:DWELL:TYPE?

This command toggles the dwell time for the list sweep points between the values defined in the list sweep and the value for the step sweep.

LIST This choice selects the dwell times from the list sweep. Refer to “:LIST:DWELL” on page 120 for setting the list dwell points.

STEP This choice selects the dwell time from the step sweep. Refer to “:SWEep:DWELL” on page 127 for setting the step dwell.

Example

[:LIST:DWELL:TYPE STEP]

The preceding example selects the dwell time from step sweep values.

*RST LIST

Key Entry

Dwell Type List Step

:LIST:FREQuency

Supported All Models

[:SOURce]:LIST:FREQuency <val>{,<val>}
[:SOURce]:LIST:FREQuency?

This command sets the frequency values for the current list sweep points. The maximum number of points is 1601. The setting enabled by this command is not affected by a signal generator power-on, preset, or *RST command.

The variable <val> is expressed in hertz.

For signal generator frequency and power specifications, refer to “[:LEVEL][:IMMediate][:AMPLitude]” on page 142.

Example

[:LIST:FREQ 10GHz,12GHz,14GHz,16GHz]

The preceding example sets the frequency value for a four point sweep.

*RST

Option 520: +2.0000000000000E+10
Option 532: +3.2000000000000E+10
Option 540: +4.0000000000000E+10
Option 544: +4.4000000000000E+10
Option 550: +5.0000000000000E+10
Option 567: +6.7000000000000E+10
Basic Function Commands
List/Sweep Subsystem ([:SOURce])

**Range**

- **Option 520**: 250kHZ–200GHZ
- **Option 532**: 250kHZ–320GHZ
- **Option 540**: 250kHZ–400GHZ
- **Option 544**: 250kHZ–440GHZ
- **Option 550**: 250kHZ–500GHZ
- **Option 567**: 250kHZ–700GHZ\(^a\)

\(^a\)67–70 GHz performance not specified

**:LIST:FREQuency:POINts**

**Supported** All Models

[[:SOURce]:LIST:FREQuency:POINts?]

This command queries the current list sweep file for the number of frequency points.

**:LIST:MANual**

**Supported** All Models

[[:SOURce]:LIST:MANual <val> |UP|DOWN]

[[:SOURce]:LIST:MANual?]

This command selects a list point or step sweep point as the current sweep point controlling the frequency and power output. If list or step mode is controlling frequency or power, or both, the indexed point in the respective list(s) is used.

The MANual mode must be selected and sweep enabled for this command to have an effect.

For information on setting the proper mode, see :LIST:MODE.

If the point selected is beyond the length of the longest enabled list, the point sets to the maximum possible point, and an error is generated.

**Example**

:LIST:MAN UP

The preceding example selects the next positive-direction, sequential point in the list.

**Range**

- List Sweep: 1– 1601
- Step Sweep: 1– 65535

**Key Entry** Manual Point
Basic Function Commands
List/Sweep Subsystem ([:SOURce])

:LIST:MODE

Supported All Models

[:SOURce]:LIST:MODE AUTO|MANual

This command sets the operating mode for the current list or step sweep.

AUTO This choice enables the selected sweep type to perform a sweep of all points.

MANual This choice enables you to select an individual sweep point to control the RF output parameters. For more about selecting a sweep point, see “:LIST:MANual” on page 122.

Example

:LIST:MODE AUTO

The preceding example sets the mode to automatic.

*RST AUTO

Key Entry Manual Mode Off On

:LIST:POWer

Supported All Models

[:SOURce]:LIST:POWer <val>{,<val>}

[:SOURce]:LIST:POWer?

This command sets the amplitude for the current list sweep points.

The setting enabled by this command is not affected by signal generator power-on, preset, or *RST.

During an amplitude sweep operation, signal generators with Option 1E1 protect the step attenuator by automatically switching to attenuator hold mode (OFF). The attenuator locks at its current setting and the amplitude sweep range is limited to 40 dB. The maximum number of points is 1601.

Example

:LIST:POW .1,.2,.1,.3,.1,-.1

The preceding example sets the power level for a six point sweep list.

Range See “[[:LEVel][:IMMediate][:AMPLitude]]” on page 142.

:LIST:POWer:POINts

Supported All Models

[:SOURce]:LIST:POWer:POINts?

This command queries the number of power points in the current list sweep file.
Basic Function Commands
List/Sweep Subsystem [:SOURce]

**:LIST:RETRace**

Supported All Models

[:SOURce]:LIST:RETRace ON|OFF|1|0

[:SOURce]:LIST:RETRace?

Upon completion of a single sweep operation, this command either resets the sweep to the first sweep point, or leaves it at the last sweep point. The command is valid for the list, step, or ramp (Option 007) single-sweep modes.

ON (1) The sweep resets to the first sweep point.
OFF (0) The sweep stays at the last sweep point.

**Example**

:LIST:RETR 1

The preceding example sets the retrace on. The sweep will reset to the first point after completing a sweep.

*RST 1

**Key Entry** Sweep Retrace Off On

**:LIST:TRIGger:SOURce**

Supported All Models

[:SOURce]:LIST:TRIGger:SOURce BUS|IMMediate|EXTernal|KEY

[:SOURce]:LIST:TRIGger:SOURce?

This command sets the trigger source for a list or step sweep event.

To set the sweep trigger, see “:TRIGger[:SEQUence]:SOURce” on page 100.

BUS This choice enables GPIB triggering using the *TRG or GET command, or LAN and RS-232 triggering using the *TRG command.
IMMediate This choice enables immediate triggering of the sweep event.
EXTernal This choice enables the triggering of a sweep event by an externally applied signal at the TRIGGER IN connector.
KEY This choice enables triggering by pressing the front-panel Trigger hardkey.

**Example**

:LIST:TRIG:SOUR BUS

The preceding example sets the trigger source to the instrument BUS.

*RST IMM

**Key Entry** Bus Free Run Ext Trigger Key
Basic Function Commands
List/Sweep Subsystem [:SOURce]

:LIST:TYPE

Supported
All Models

[:SOURce]:LIST:TYPE LIST|STEP
[:SOURce]:LIST:TYPE?

This command selects the sweep type.

LIST  This type of sweep has arbitrary frequencies and amplitudes.
STEP  This type of sweep has equally spaced frequencies and amplitudes.

Example
:LIST:TYPE LIST
The preceding example selects list as the sweep type.

*RST
STEP

Key Entry
Sweep Type List Step

:LIST:TYPE:LIST:INITialize:FSTep

Supported
All Models

CAUTION
When you execute this command, the current list sweep data is overwritten. If needed, save the current data. For information on storing list sweep files, see “:STORe:LIST” on page 57.

[:SOURce]:LIST:TYPE:LIST:INITialize:FSTep

This command replaces the loaded list sweep data with the settings from the current step sweep data points. You can have only one sweep list at a time.

The maximum number of list sweep points is 1,601. When copying the step sweep settings over to a list sweep, ensure that the number of points in the step sweep do not exceed the maximum list sweep points.

Key Entry
Load List From Step Sweep

:LIST:TYPE:LIST:INITialize:PRESet

Supported
All Models

CAUTION
When you execute this command, the current list sweep data is overwritten. If needed, save the current data. For information on storing list sweep files, see “:STORe:LIST” on page 57.

[:SOURce]:LIST:TYPE:LIST:INITialize:PRESet

This command replaces the current list sweep data with a factory-defined file consisting of one point at a frequency, amplitude, and dwell time.

Key Entry
Preset List
Basic Function Commands
List/Sweep Subsystem ([SOURce])

[:SOURce]:SWEep:CONTrol:STATe

Supported 
All Models with Option 007

[:SOURce]:SWEep:CONTrol:STATe ON|OFF|1|0
[:SOURce]:SWEep:CONTrol:STATe?

This command sets the sweep control state for a PSG in a dual-PSG ramp sweep setup. When the sweep control is on, you can designate whether the PSG is operating as the master or the slave. For information on setting master and slave designations, see “:SWEep:CONTrol:TYPE” on page 126.

The dual-PSG ramp sweep setup uses a serial cable to connect the two signal generators. This connection enables one PSG to function as the master so that sweep, bandcross, and retrace times are synchronized between the two. Each PSG can have a different sweep range, but they must have identical sweep time settings.

Example
:SWE:CONT:STAT 1

The preceding example sets the sweep control state to on.

*RST 0

Key Entry Sweep Control

[:SOURce]:SWEep:CONTrol:TYPE

Supported 
All Models with Option 007

[:SOURce]:SWEep:CONTrol:TYPE MASTer|SLAVe
[:SOURce]:SWEep:CONTrol:TYPE?

In a dual-PSG ramp sweep setup, this command designates whether the PSG is performing as the master or the slave. The master/slave setup requires two signal generators from the same instrument family. Refer to the E8257D/67D PSG Signal Generators User’s Guide for more information.

MASTer 
This choice enables the PSG to provide the triggering.

SLAVe 
This choice causes the PSG to submit to the triggering parameters provided by the master PSG. You must set the slave PSG triggering to continuous “:INITiate:CONTinuous[:ALL]” on page 98.

Example
:SWE:CONT:TYPE MAST

The preceding example sets the PSG as the master sweep control instrument.

*RST 0

Key Entry Master or Slave
Basic Function Commands
List/Sweep Subsystem [:SOURce]

[:SOURce]:SWEep:DWELl

Supported          All Models
[:SOURce]:SWEep:DWELl <val>
[:SOURce]:SWEep:DWELl?

This command enables you to set the dwell time for a step sweep.
The variable <val> is expressed in seconds with a 0.001 resolution.

**NOTE** The dwell time <val> does not begin until the signal generator has settled for the current
frequency and/or amplitude change.

Dwell time is used when the trigger source is set to IMMEDIATE. For the trigger setting, refer to "[:LIST:TRIGger:SOURce]" on page 124.
The dwell time is the amount of time the sweep pauses after setting the frequency or power, or both, for the current point.

**Example**
:SWE:DWEL .1
The preceding example sets the dwell time for a step sweep to 100 milliseconds.

*RST +2.00000000E−003
Range 0.001–60S
Key Entry Step Dwell

[:SOURce]:SWEep:GENeration

Supported          All Models with Option 007
[:SOURce]:SWEep:GENeration ANALog|STEPped
[:SOURce]:SWEep:GENeration?

This command sets the sweep type to analog or stepped.
ANALog This choice selects a ramp sweep.
STEPped This choice selects a step sweep.

**Example**
:SWE:GEN STEP
The preceding example selects a step sweep.

*RST STEP
Key Entry Sweep Type
Basic Function Commands
List/Sweep Subsystem [:SOURce]

:SWEep:MODE

Supported All Models with Option 007

[:SOURce]:SWEep:MODE AUTO|MANual
[:SOURce]:SWEep:MODE?

This command sets the current ramp sweep operating mode.
AUTO This choice enables the signal generator to automatically sweep through the selected frequency range.
MANual This choice enables you to select a single frequency value within the current sweep range to control the RF output. For information on selecting the frequency value, see ":FREQuency:MANual" on page 110.

Example
:SWE:MODE AUTO
The preceding example sets the signal generator to automatically complete a sweep.

*RST AUTO

Key Entry Manual Mode Off On

:SWEep:POINts

Supported All Models

[:SOURce]:SWEep:POINts <val>
[:SOURce]:SWEep:POINts?

This command enables you to define the number of points in a step sweep.

Example
:SWE:POIN 2001
The preceding example sets the number of step sweep points to 2001.

*RST 2
Range 2–65535
Key Entry # Points
Basic Function Commands
List/Sweep Subsystem [:SOURce]

:SWEep:TIME

Supported All Models with Option 007

[:SOURce]:SWEep:TIME <val><units>
[:SOURce]:SWEep:TIME?

This command enables you to set the sweep time for a ramp sweep in seconds. If this command is executed while the signal generator is in automatic sweep time mode, the manual sweep time mode is activated and the new sweep time value is applied. The sweep time cannot be set to a value faster than what the automatic mode provides.

The sweep time is the duration of the sweep from the start frequency to the stop frequency. It does not include the bandcross time that occurs during a sweep or the retrace time that occurs between sweep repetitions.

Example
:SWEep:TIME .250

The preceding example sets the ramp sweep time to 250 milliseconds.

*RST 1.00000000E-002

Range 10mS–99S

Key Entry Sweep Time

:SWEep:TIME:AUTO

Supported All Models with Option 007

[:SOURce]:SWEep:TIME:AUTO ON|OFF|0|1
[:SOURce]:SWEep:TIME:AUTO?

This command enables you to set the sweep time mode for a ramp sweep.

The sweep time is the duration of the sweep from the start frequency to the stop frequency. It does not include the bandcross time that occurs during a sweep or the retrace time that occurs between sweep repetitions.

ON (1) This choice enables the signal generator to automatically calculate and set the fastest allowable sweep time.

OFF (0) This choice enables you to select the sweep time. The sweep time cannot be set to a value faster than what the automatic mode provides. To set the sweep time refer to ":SWEep:TIME" on page 129.

Example
:SWEep:TIME:AUTO 0

The preceding example sets the ramp sweep time to manual allowing you to select a sweep time.

*RST 1

Key Entry Sweep Time Manual Auto
Basic Function Commands
Marker Subsystem–Option 007 ([SOURce])

Marker Subsystem–Option 007 ([SOURce])

[:MARKer:AMPLitude[:STATE]]

Supported All Models with Option 007

[:SOURce]:MARKer:AMPLitude[:STATE] ON|OFF|1|0
[:SOURce]:MARKer:AMPLitude[:STATE]?

This command sets the amplitude marker state for the currently activated markers. When the state is switched on, the RF output signal exhibits a spike with a magnitude relative to the power level at each marker’s set frequency. (To set the magnitude of the spike, refer to “:MARKer:AMPLitude:VALue” on page 130.) The width of the amplitude spike is a nominal eight buckets, based on 1601 buckets per sweep.

Example

:MARK:AMPL ON

The preceding example enables amplitude markers.

*RST 0

Key Entry Amplitude Markers Off On

[:MARKer:AMPLitude:VALue]

Supported All Models with Option 007

[:SOURce]:MARKer:AMPLitude:VALue <num>[DB]
[:SOURce]:MARKer:AMPLitude:VALue?

This command sets the relative power for the amplitude spikes at each marker’s set frequency when the amplitude marker mode is activated. (To activate the amplitude markers, refer to “:MARKer:AMPLitude[:STATE]” on page 130.)

Example

:MARK:AMPL:VAL 4DB

The preceding example sets the relative marker power to 4 dB for all markers.

*RST 2DB

Range −10DB to +10DB

Key Entry Marker Value

[:MARKer:AOFF]

Supported All Models with Option 007

[:SOURce]:MARKer:AOFF

This command turns off all active markers.

Key Entry Turn Off Markers
Chapter 3

Basic Function Commands

Marker Subsystem–Option 007 ([SOURce])

**:MARKer:DELTa?**

**Supported** All Models with Option 007

[:SOURce]:MARKer:DELTa? <num>,<num>

This query returns the frequency difference between two amplitude markers. The variables <num> are used to designate the marker numbers.

**Example**

:MARK:DEL? 1,2

The preceding example returns the frequency difference between amplitude markers 1 and 2.

**Range** 0–9

**:MARKer[0,1,2,3,4,5,6,7,8,9]:FREQuency**

**Supported** All Models with Option 007

[:SOURce]:MARKer[0,1,2,3,4,5,6,7,8,9]:FREQuency <val><unit>

[:SOURce]:MARKer[0,1,2,3,4,5,6,7,8,9]:FREQuency? MAXimum|MINimum

This command sets the frequency for a specific marker. If the marker designator [n] is not specified, marker 0 is the default. The frequency value must be within the current start, stop, frequency sweep range. Using the MAXimum or MINimum parameters in the query will return the frequency boundary values for the markers.

If the marker frequency mode is set to delta when the query is sent, the returned value is not absolute, but is relative to the reference marker. (See “:MARKer:MODe” on page 131 for more information.)

**Example**

:MARK2:FREQ 10GHZ

The preceding example places amplitude marker 2 at 10 GHz.

**RST** +5.25000000E+008

**Range** Equivalent to current sweep range

**Key Entry** Marker Freq

**:MARKer:MODe**

**Supported** All Models with Option 007

[:SOURce]:MARKer:MODe FREQuency|DELTa

[:SOURce]:MARKer:MODe?

This command sets the frequency mode for all markers.

**FREQuency** The frequency values for the markers are absolute.

**DELTa** The frequency values for the markers are relative to the designated reference marker. The reference marker must be designated before this mode is selected. (See :MARKer:REFerence to select a reference marker.)
**Basic Function Commands**
*Marker Subsystem–Option 007 ([SOURce])*

**Example**

:MARKer:MODE DELT
The preceding example sets the marker mode to delta.

*RST FREQuency
Key Entry Marker Delta Off On

**:MARKer:REFeRe**

**Supported**
All Models with Option 007

[:SOURce]:MARKer:REFeRe <marker>
[:SOURce]:MARKer:REFeRe?
This command designates the reference marker when using markers in delta mode. The variable <marker> designates the marker number.

**Example**

:MARKer:REF 6
The preceding example sets marker 6 as the reference marker.

*RST 0
Range 0–9
Key Entry Delta Ref Set

**:MARKer[0,1,2,3,4,5,6,7,8,9]:STATe**

**Supported**
All Models with Option 007

[:SOURce]:MARKer[0,1,2,3,4,5,6,7,8,9]:STATe ON|OFF|1|0
[:SOURce]:MARKer[0,1,2,3,4,5,6,7,8,9]?[:STATe]
This command turns a marker on or off. Marker 0 is the default if the marker designator [n] is not specified.

**Example**

:MARKer6 ON
The preceding example turns marker 6 on.

*RST 0
Key Entry Marker On Off
Basic Function Commands

Power Subsystem ([SOURce]:POWer)

:ALC:BANDwidth|BWIDth

Supported All Models

[:SOURce]:POWer:ALC:BANDwidth|BWIDth <num>[<freq_suffix>]
[:SOURce]:POWer:ALC:BANDwidth|BWIDth?

This command sets the bandwidth of the automatic leveling control (ALC) loop. You can select bandwidths of 100 Hz, 1 kHz, 10 kHz, or 100kHz. If you do not specify one of these exact bandwidths, your entry rounds to the nearest acceptable value. The bandwidth choices for this command are not effective if an internal I/Q source is being used. Refer to the E8257D/67D PSG Signal Generators User’s Guide for information on ALC and bandwidth considerations.

Example

:POW:ALC:BWID 1KHZ

The preceding example sets the ALC bandwidth to 1 kHz.

*RST 100.0

Key Entry ALC BW

:ALC:BANDwidth|BWIDth:AUTO

Supported All Models

[:SOURce]:POWer:ALC:BANDwidth|BWIDth:AUTO ON|OFF|1|0
[:SOURce]:POWer:ALC:BANDwidth|BWIDth:AUTO?

This command sets the state of the automatic leveling control (ALC) automatic bandwidth function. When this state is turned on, the signal generator automatically selects the optimum bandwidth for the ALC.

Example

:POW:ALC:BWID:AUTO 0

The preceding example disables the automatic bandwidth optimizing function.

*RST 1

Key Entry ALC BW
Basic Function Commands
Power Subsystem [:SOURce]:POWer

:ALC:LEV

Supported E8257D with Option 1E1 and E8267D

[:SOURce]:POWer:ALC:LEV <value>DB
[:SOURce]:POWer:ALC:LEV?

This command sets the automatic leveling control (ALC) level when the attenuator hold is active.

Use this command when the automatic attenuation mode is set to OFF (0). Refer to "ATTenuation:AUTO" on page 138 for choosing the attenuator mode.

Example
:POW:ALC:LEV 10DB

The preceding example sets the ALC to 10 dB.

*RST +1.00000000E+000

Range -20 to 25

Key Entry Set ALC Level

:ALC:SEAR

Supported All Models

[:SOURce]:POWer:ALC:SEARch ON|OFF|1|0|ONCE
[:SOURce]:POWer:ALC:SEARch?

This command enables or disables the internal power search calibration. A power search is recommended for pulse-modulated signals with pulse widths less than one microsecond. Refer to the E8257D/67D PSG Signal Generators User’s Guide for more information on ALC and the power search function.

ON (1) This choice executes the power search automatically with each change in RF frequency or power.

OFF (0) This choice disables the automatic power search routine.

ONCE This choice executes a single power search of the current RF output signal.

Use this command when the automatic leveling control (ALC) state is set to OFF (0). Refer to ":ALC[:STATe]" on page 137 for setting the ALC state.

If ON was previously selected, executing ONCE will cause OFF to be the current selection after the power search is completed.

Example
:POW:ALC:SEAR ONCE

The preceding example starts a single power search of the RF output signal.

*RST 0

Key Entry Power Search Manual Auto Do Power Search
Basic Function Commands
Power Subsystem [:SOURce]:POWer

:ALC:SEARch:REFerence

Supported  All Models
[:SOURce]:POWer:ALC:SEARch:REFerence FIXed|MODulated
[:SOURce]:POWer:ALC:SEARch:REFerence?

This command sets either fixed or modulated modes for power search.

FIXed  This choice uses a 0.5 volt reference.

MODulated  This choice uses the RMS value of the current I/Q modulation as measured during the power search.

Example
:POW:ALC:SEAR:REF FIX

The preceding example selects a fixed voltage as the reference for a power search.

*RST

Key Entry  Power Search Reference Fixed Mod

:ALC:SEARch:SPAN:START

Supported  All Models
[:SOURce]:POWer:ALC:SEARch:SPAN:START <val><units>
[:SOURce]:POWer:ALC:SEARch:SPAN:START?

This command sets the start frequency for a power search over a user-defined range. The start frequency has no default value. The start frequency value will be set before powering off the instrument.

Example
:POW:ALC:SEAR:SPAN:START 12GHZ

The preceding example selects 12 GHz as the start frequency for a power search.

Key Entry  Start Frequency

:ALC:SEARch:SPAN:STOP

Supported  All Models
[:SOURce]:POWer:ALC:SEARch:SPAN:STOP <val><units>
[:SOURce]:POWer:ALC:SEARch:SPAN:STOP?

This command sets the stop frequency for a power search over a user-defined range. The stop frequency has no default value. The stop frequency value will be set before powering off the instrument.

Example
:POW:ALC:SEAR:SPAN:STOP 20GHZ

The preceding example selects 20 GHz as the stop frequency for a power search.

Key Entry  Stop Frequency
Basic Function Commands
Power Subsystem ([SOURce]:POWer)

[:SOURce]:POWer:ALC:SEARch:SPAN:TYPE FULL|USER

Supported All Models

[:SOURce]:POWer:ALC:SEARch:SPAN:TYPE FULL|USER

This command enables you to select the frequency range for a power search. You can specify the range (USER) or you can select the full range (FULL) of the signal generator.

Example
:POW:ALC:SEAR:SPAN:TYPE USER

The preceding example selects a user-defined frequency range for the power search.

Key Entry Span Type User Full

[:SOURce]:POWer:ALC:SEARch:SPAN[:STATe] ON|OFF|1|0

Supported All Models

[:SOURce]:POWer:ALC:SEARch:SPAN[:STATe] ON|OFF|1|0

This command enables (1) or disables (0) the span mode, allowing you to perform power searches over a selected range of frequencies. The power search corrections are then stored and used whenever the signal generator is tuned within the selected range.

Example
:POW:ALC:SEAR:SPAN ON

The preceding example enables the span mode.

[:SOURce]:POWer:ALC:SOURce INTernal|DIODe|MMHead

Supported All Models

[:SOURce]:POWer:ALC:SOURce INTernal|DIODe|MMHead

This command enables you to select an automatic level control (ALC) source. You can select the internal ALC source, an external detector source, or a millimeter-wave source module. Refer to the E8257D/67D PSG Signal Generators User’s Guide for more information on ALC leveling, bandwidth, and the power search function.

Example
:POW:ALC:SOUR MMH

The preceding example selects an Agilent 8355x series external millimeter head as the source (the unit must be connected to the signal generator).

*RST INT

Key Entry Leveling Mode
Basic Function Commands
Power Subsystem [:SOURce]:POWER

:ALC:SOURce:EXTernal:COUPling

Supported All Models

[:SOURce]:POWer:ALC:SOURce:EXTernal:COUPling <value>DB
[:SOURce]:POWer:ALC:SOURce:EXTernal:COUPling?

This command sets the external detector coupling factor. Use this command when DIODe is the selected ALC source (“:ALC:SOURce” on page 136). (0 to 32 coupling value).

Example
:POW:ALC:SOUR:EXT:COUP 20DB

The preceding example sets the external coupling factor to 20 dB.

*RST +1.60000000E+001

Range −200DB to 200DB.

Key Entry Ext Detector Coupling Factor

:ALC[:STATe]

Supported All Models

[:SOURce]:POWer:ALC[:STATe] ON|OFF|1|0
[:SOURce]:POWer:ALC[:STATe]?

This command enables or disables the automatic leveling control (ALC) circuit. The purpose of the ALC circuit is to hold output power at a desired level by adjusting the signal generator power circuits for power drift. Power will drift over time and with changes in temperature. Refer to the E8257D/67D PSG Signal Generators User’s Guide for more information on the ALC.

Example
:POW:ALC ON

The preceding example sets the ALC on.

*RST 1

Key Entry ALC Off On

:ATTenuation

Supported E8257D with Option 1E1 and E8267D

[:SOURce]:POWer:ATTenuation <val><unit>
[:SOURce]:POWer:ATTenuation?

This command sets the attenuation level when the attenuator hold is active. For the E8267D, the attenuation is set in increments of 5 dB. For the E8257D with Option 1E1, the progression is 0, 5, 15, 25 and continues in 5 dB increments.

The output power is the ALC level minus the attenuator setting.

Use this command when the automatic attenuation mode is set to OFF (0). Refer to “:ATTenuation:AUTO” on page 138 for choosing the attenuator mode.
Example

:POW:ATT 10DB
The preceding example sets the attenuator to 10 dB.

*RST +115
Range 0 to 115 dB
Key Entry Set Atten

:ATTenuation:AUTO

Supported E8257D with Option 1E1 and E8267D
[:SOURce]:POWer:ATTenuation:AUTO ON|OFF|1|0
[:SOURce]:POWer:ATTenuation:AUTO?
This command sets the state of the attenuator hold function.

ON (1) This choice enables the attenuator to operate normally.

OFF (0) This choice holds the attenuator at its current setting or at a selected value that will not change during power adjustments.

OFF (0) eliminates the power discontinuity normally associated with the attenuator switching during power adjustments. During an amplitude sweep operation, signal generators with Option 1E1 protect the step attenuator by automatically switching to attenuator hold mode (ON). The attenuator is locked at its current setting and the amplitude sweep range is limited to 40 dB.

Example

:POW:ATT:AUTO OFF
The preceding example turns off the attenuator hold function.

*RST 1
Key Entry Atten Hold Off On

:MODE

Supported All Models
[:SOURce]:POWer:MODE FIXed|SWEep|LIST
[:SOURce]:POWer:MODE?
This command starts or stops an amplitude sweep and sets the power mode of the signal generator.

FIXed This choice stops a power sweep and allows the signal generator to operate at a fixed power level. Refer to "[:LEVel][:IMMediate][:AMPLitude]" on page 142 for more information on running power sweeps and setting CW amplitude settings that control the output power.
Basic Function Commands
Power Subsystem [:SOURce]:POWer

SWEep
The effects of this choice are determined by the sweep generation type selected (refer to "SWEep:GENeration" on page 127). If you are using analog sweep generation, the current ramp sweep amplitude settings (start and stop) control the output power. If you are using step sweep generation, the current step sweep amplitude settings control the output power. In both cases, this selection also activates the sweep. This choice is available with Option 007 only.

LIST
This choice selects the swept power mode. If sweep triggering is set to immediate along with continuous sweep mode, executing the command starts the LIST or STEP frequency sweep.

NOTE To perform a frequency and amplitude sweep, you must also select LIST or SWEep as the frequency mode (see "FREQuency:MODE" on page 111).

Example
:POW:MODE LIST
The preceding example sets list as the amplitude sweep mode.

*RST

Key Entry
Sweep Type Ampl Off Freq & Ampl

:PROTection:STATe

Supported E8257D with Option 1E1 and E8267D

[:SOURce]:POWer:PROTection[:STATe] ON|OFF|1|0
[:SOURce]:POWer:PROTection[:STATe]?

This command enables or disables the power search protection function. The power search protection function sets the attenuator to its maximum level whenever a power search is initiated. This can be used to protect devices that are sensitive to high average power or high power changes. The trade off on using the power protection function is decreased attenuator life, as the attenuator will switch to its maximum setting during a power search.

NOTE Continual or excessive use of the power search protection function can decrease attenuator life.

ON (1) Causes the attenuator to switch to and hold its maximum level setting during a power search.
OFF (0) Sets the attenuator normal mode. The attenuator is not used during power search.

Example
:POW:PROT ON
The preceding example enables the power inhibit function.

*RST

Key Entry RF During Power Search Normal Minimum
Basic Function Commands
Power Subsystem ([:SOURce]:POWer)

:REference

Supported All Models
[:SOURce]:POWer:REference <val><unit>
[:SOURce]:POWer:REference?

This command sets the power level for the signal generator RF output reference. The RF output power is referenced to the value entered in this command.

Example
:POW:REF 50DBM
The preceding example sets the RF output power reference to 50 dBm.

*RST +0.00000000E+000
Range -400 to 300 dBm
Key Entry Ampl Ref Set

:REference:STATe

Supported All Models
[:SOURce]:POWer:REference:STATe ON|OFF|1|0
[:SOURce]:POWer:REference:STATe?

This command enables or disables the RF output reference.

ON (1) Sets the power reference state ON. dB is the unit displayed for commands ("ANNotation:AMPLitude:UNIT" on page 29 and "POWer" on page 101).

OFF (0) Sets the power reference state OFF.

Once the reference state is ON, all subsequent output power settings are set relative to the reference value. Amplitude offsets can be used with the amplitude reference mode.

Example
:POW:REF:STAT 1
The preceding example sets the reference state on.

*RST 0
Key Entry Ampl Ref Off On

:STARt

Supported All Models
[:SOURce]:POWer:STARt <val><unit>
[:SOURce]:POWer:STARt?

This command sets the amplitude of the first point in a step or ramp sweep (Option 007).

During an amplitude sweep operation, signal generators with Option 1E1 protect the step attenuator by automatically switching to attenuator hold (ON) mode. The attenuator is locked at its current setting and the amplitude sweep range is limited to 40 dB.

Range -400 to 300 dBm
Key Entry Ampl Ref Set
Basic Function Commands

Power Subsystem [:SOURce]:POWer

### Example

:POW:STAR -30DBM

The preceding example sets the amplitude of the first point in the sweep to –30 dBm.

*RST Depends on model and option number

**Range**

Refer to "[:LEVel][:IMMediate][:AMPLitude]" on page 142 for the output power ranges.

**Key Entry**

Ampl Start

---

### :STOP

**Supported**

All Models

[:SOURce]:POWer:STOP <val><unit>  
[:SOURce]:POWer:STOP?

This command sets the amplitude of the last point in a step or ramp sweep (Option 007).

During an amplitude sweep, signal generators with Option 1E1 protect the step attenuator by switching to attenuator hold (ON) mode. The attenuator is locked at its current setting and the amplitude sweep range is limited to 40 dB.

**Example**

:POW:STOP -10DBM

The preceding example sets the amplitude of the last point in the sweep to –10 dBm.

*RST Depends on model and option number.

**Range**

See "[:LEVel][:IMMediate][:AMPLitude]" on page 142 for the available power ranges.

**Key Entry**

Ampl Stop

---

### [:LEVel][:IMMediate]:OFFSet

**Supported**

All Models

[:SOURce]:POW[:LEVel][:IMMediate]:OFFSet <val><unit>  
[:SOURce]:POW[:LEVel][:IMMediate]:OFFSet?

This command sets the power offset value as a dB power offset to the actual RF output. This simulates a power level at a test point beyond the RF OUTPUT connector without changing the actual RF output power. The offset value only affects the displayed amplitude setting.

You can enter an amplitude offset anytime in either normal operation or amplitude reference mode.

**Example**

:POW:OFFS 10DB

The preceding example sets the amplitude offset to 10 dB.

*RST +0.00000000E+000

**Range**

–200dB to 200dB

**Key Entry**

Ampl Offset
Basic Function Commands
Trigger Sweep Subsystem [:SOURce]

[:LEVel][:IMMediate][:AMPLitude]

Supported  All Models

[:SOURce]:POWer[:LEVel][:IMMediate][:AMPLitude] <val><unit>
[:SOURce]:POWer[:LEVel][:IMMediate][:AMPLitude]? 

This command sets the RF output power.
The ranges for this command are specified values from the data sheet.

Example

:POW 0DBM
The preceding example sets the signal generator output power level to 0 dBm.

*RST  Depends on model and option number

Range  See data sheet

Key Entry  Amplitude

Trigger Sweep Subsystem [:SOURce])

:TSWeep

Supported  All Models

[:SOURce]:TSWeep

This command aborts the current sweep, then either arms or arms and starts a single list, step, or ramp sweep (Option 007), depending on the trigger type.
The command performs the following:

• arms a single sweep when BUS, EXTERNAL, or KEY is the trigger source selection
• arms and starts a single sweep when IMMEDIATE is the trigger source selection

Key Entry  Single Sweep
Chapter 4

4 Analog Commands

This chapter provides SCPI descriptions for subsystems dedicated to E8257D PSG Analog and E8267D PSG Vector signal generators. The following is a list of the subsystems:

- “Amplitude Subsystem ([SOURce])” on page 143
- “Frequency Modulation Subsystem ([SOURce])” on page 153
- “Low Frequency Output Subsystem ([SOURce]:LFOutput)” on page 161
- “Phase Modulation Subsystem ([SOURce])” on page 166
- “Pulse Modulation Subsystem ([SOURce])” on page 175

Amplitude Subsystem ([SOURce])

:AM[1]|2...

Supported E8257D and E8267D

[:SOURce]:AM[1]|2...

This prefix enables the selection of the AM path and is part of most SCPI commands associated with this subsystem. The two paths are equivalent to the AM Path 1 2 softkey.

AM1 AM Path 1 2 with 1 selected
AM2 AM Path 1 2 with 2 selected

When just AM is shown in a command, the command defaults to path 1.

Each path is set up separately. When a SCPI command uses AM1, only path one is affected. Consequently, when AM2 is selected, only path two is set up. However, the depth of the signals for the two paths can be coupled.

The two AM paths can be on at the same time provided the following conditions have been met:

- dual–sine or swept–sine is not one of the selections for the waveform type
- Each path uses a different source (Internal 1, Internal 2, Ext1, or Ext2)
Analog Commands
Amplitude Subsystem [:SOURce]

:AM:INTernal:FREQuency:STEP[:INCRement]

**Supported**
E8257D and E8267D


[:SOURce]:AM:INTernal:FREQuency:STEP[:INCRement]<num>|MAXimum|MINimum|DEFault

[:SOURce]:AM:INTernal:FREQuency:STEP[:INCRement]?

This command sets the step value for the AM internal frequency.

The step value set by this command is used with the UP and DOWN choices for the

The step value set with this command is not affected by a signal generator power-on, preset, or *RST
cmdand.

**Example**

:AM:INT:FREQ:STEP 1E3

The preceding example sets the step size to 1000 hertz.

**Range**
0.5–1E6

**Key Entry**
Incr Set

:AM:MODE

**Supported**
All with Option UNT


[:SOURce]:AM:MODE DEEP|NORMal

[:SOURce]:AM:MODE?

This command sets the mode for amplitude modulation.

**DEEP**
This choice enables amplitude modulation depth with a greater dynamic range
than normal mode which utilizes the ALC. DEEP has no specified parameters and
emulates the amplitude modulation NORMal mode with the ALC disabled.

**NORMal**
This choice maintains the amplitude modulation standard behavior and has
specified parameters as outlined in the data sheet.

The ALC is disabled when the carrier amplitude is less than –10 dBm and DEEP is the AM mode.
DEEP is limited to repetitive AM and will not work with a dc modulation signal.

**Example**

:AM:MODE NORM

The preceding example selects the normal mode for amplitude modulation.

*RST

**Key Entry**
AM Mode Normal Deep
Analog Commands
Amplitude Subsystem [:SOURce]

:AM:WIDeband:SENSitivity

**Supported** E8267D and Option UNT

[:SOURce]:AM:WIDeband:SENSitivity <val>

This command sets the sensitivity level of the wideband AM signal in units of dB/volt. Sensitivity is .5V = 100% and is linear with .25V = 50%. Wideband AM uses input from the front panel I INPUT.

**Example**

:AM:WID:SENS 20

The preceding example sets the sensitivity level to 20%.

*RST +2.00000000E+001

**Range** 0 – 40DB

**Key Entry** AM Depth

:AM:WIDeband:STATe

**Supported** E8267D with Option UNT

[:SOURce]:AM:WIDeband:STATe ON|OFF|1|0

This command enables or disables wideband amplitude modulation. The RF carrier is modulated when the signal generator's modulation state is ON, see ":MODulation[:STATe]" on page 63 for more information. The signal generator's I input is used to drive wideband AM modulation.

Whenever wideband amplitude modulation is enabled, the AM annunciator appears on the signal generator's front panel display. Wideband amplitude modulation can be simultaneously enabled with AM paths 1 and 2. Refer to ":AM[1]|2..." on page 143 for more information.

**Example**

:AM:WID:STAT 0

The preceding example turns off wideband amplitude modulation.

*RST 0

**Key Entry** AM Off On
Analog Commands
Amplitude Subsystem ([SOURce])


Supported All


This command sets the coupling type for the selected external input. The command does not change the active source or switch the modulation on or off. The modulating signal may be the sum of several signals, with either internal or external sources.

AC This choice will pass only ac signal components.

DC This choice will pass both ac and dc signal components.

Example
:AM1:EXT1:COUP AC

The preceding example sets the AM path 1, external 1 source coupling to AC.

*RST DC

Key Entry Ext Coupling DC AC


Supported All


This command sets the impedance for the external input.

Example
:AM1:EXT1:IMP 600

The preceding example sets the AM path 1, external 1 source impedance to 600 ohms.

*RST +5.00000000E+001

Key Entry Ext Impedance 50 Ohm 600 Ohm


Supported All with Option UNT


This command sets the internal AM rate using the variable <val><units>. The command, used with the UP|DOWN parameters, will change the frequency rate by a user-defined step value. Refer to the :PULM:INTernal[1]:FREQuency:STEP command on page 146 for setting the value associated with the UP and DOWN choices.
Analog Commands
Amplitude Subsystem ([SOURce])

The command changes:
- the frequency rate of the first tone of a dual–sine waveform
- the start frequency for a swept–sine waveform
- the AM frequency rate for all other waveforms


Example
:AM1:INT2:FREQ UP

The preceding example increases the modulation rate for AM path 1, AM internal source 2 by the step value set with the :AM:INTernal:FREQuency:STEP[:INCRement] command described on page 144.

*RST +4.00000000E+002

Range
Dual–Sine & Sine: 0.5HZ–1MHZ
Swept–Sine: 1HZ–1MHZ

Key Entry
<table>
<thead>
<tr>
<th>AM Tone 1 Rate</th>
<th>AM Start Rate</th>
<th>AM Rate</th>
</tr>
</thead>
</table>


Supported All with Option UNT

[:SOURce]:AM[1]|2:INTernal[1]:FREQuency:ALTernate <val><units>
[:SOURce]:AM[1]|2:INTernal[1]:FREQuency:ALTernate?

This command sets the frequency for the alternate signal. The alternate signal frequency is the second tone of a dual–sine or the stop frequency of a swept–sine waveform.


Example
:AM2:INT1:FREQ:ALT 500KHZ

The preceding example sets the alternate frequency (AM path 2, AM internal source 1) for AM tone 2 to 500 kHz.

*RST +4.00000000E+002

Range
Dual–Sine: 0.5HZ–1MHZ
Swept–Sine: 1HZ–1MHZ

Key Entry
<table>
<thead>
<tr>
<th>AM Tone 2 Rate</th>
<th>AM Stop Rate</th>
</tr>
</thead>
</table>


Supported All with Option UNT

[:SOURce]:AM[1]|2:INTernal[1]:FREQuency:ALTernate:AMPLitude:PERCent <val>
[:SOURce]:AM[1]|2:INTernal[1]:FREQuency:ALTernate:AMPLitude:PERCent?

This command sets the amplitude of the second tone for a dual–sine waveform as a percentage of the total amplitude. For example, if the second tone makes up 30% of the total amplitude, then the first tone is 70% of the total amplitude.

**Analog Commands**

**Amplitude Subsystem [:SOURce]**

**Example**


The preceding example sets the amplitude (AM path 2, AM internal source 1) for AM tone 2 to 50% of the total amplitude.

*RST*  
+5.00000000E+001

**Range**  
0–100PCT

**Key Entry**  
AM Tone 2 Ampl Percent Of Peak


**Supported**  
All with Option UNT


This command selects a gaussian or uniform noise modulation for the selected waveform. Refer to "[:AM[1]|2:INTernal[1]|2:FUNCTION:SHAPE" on page 149 for the waveform selection.

**Example**

`:AM2:INT1:FUNC:NOIS GAUS`

The preceding example selects the gaussian noise waveform for AM modulation on AM path 2, internal source 1.

*RST*  
UNIF

**Key Entry**  
Gaussian Uniform


**Supported**  
All with Option UNT and Option 007


**Example**

`:AM2:INT1:FUNC:RAMP NEG`

The preceding example sets the slope of the ramp modulation for AM path 2, internal source 1, to negative.

*RST*  
POS

**Key Entry**  
Positive Negative
Analog Commands

Amplitude Subsystem ([:SOURce])


**Supported**
All with Option UNT

RAMP|NOISE|DUALsine|SWEPtsine


This command sets the AM waveform type. The INTernal2 source selection does not support the dual–sine or Sweep–Sine waveform choices.

**Example**

:AM1:INT1:FUNC:SHAPE DUAL

The preceding example sets the AM waveform type for AM path 1, internal source 1, to dual sine.

*RST

Key Entry
SINE


**Supported**
All with Option UNT


This command sets the sweep rate for the AM swept–sine waveform.


**Example**

:AM2:INT1:SWE:RATE 1KHZ

The preceding example sets the sweep rate for AM path 1, internal source lto 1 kHz.

*RST

Key Entry
AM Sweep Rate


**Supported**
All with Option UNT


This command sets the trigger source for the AM swept–sine waveform.

**Bus**
This choice enables GPIB triggering using the *TRG or GET command or LAN triggering using the *TRG command.

**IMMediate**
This choice enables immediate triggering of the sweep event.
Analog Commands
Amplitude Subsystem (:SOURce)

EXTernal This choice enables the triggering of a sweep event by an externally applied signal at the TRIGGER IN connector.

KEY This choice enables triggering through front panel interaction by pressing the Trigger hardkey.


Example
:AM1:INT1:SWE:TRIG EXT
The preceding example sets an external trigger source for the swept–sine waveform on AM path 1.

Example
:AM2:SOUR INT1
The preceding example selects internal source 1 as the source for AM path 2.

:AM[1]|2:SOURce
Supported All with Option UNT
This command selects the source for amplitude modulation.

INT This choice selects internal source 1 or 2 to provide an ac–coupled signal.

EXT This choice selects the EXT 1 INPUT or the EXT 2 INPUT connector to provide an externally applied signal that can be ac- or dc-coupled. The externally applied, ac-coupled input signal is tested for a voltage level and an annunciator, on the signal generator's front-panel display, will indicate a high or low condition if that voltage is > ±3% of 1 Vp.

Example
:AM2:SOUR INT1
The preceding example selects internal source 1 as the source for AM path 2.

:AM[1]|2:STATe
Supported All with Option UNT
[:SOURce] :AM[1]|2:STATe ON|OFF|1|0
This command enables or disables amplitude modulation for the selected path.

The RF carrier is modulated when you have set the signal generator's modulation state to ON, see "MODulation[STATe]" on page 63 for more information.

Whenever amplitude modulation is enabled, the AM annunciator appears on the signal generator's front-panel display.
Analog Commands
Amplitude Subsystem ([SOURce])

The two paths for amplitude modulation can be simultaneously enabled. Refer to “:AM[1]|2...” on page 143 for more information.

Example
:AM1:STAT ON
The preceding example turns on AM modulation for AM path 1.
*RST
0
Key Entry AM Off On

:AM[1]|2:TYPE
Supported All with Option UNT
[:SOURce]:AM[1]|2:TYPE LINear|EXPonential
[:SOURce]:AM[1]|2:TYPE?
This command sets the AM type to linear or exponential AM.
LINear This choice selects linear AM type with depth values in units of percent/volt.
EXPonential This choice selects exponential AM type with depth values in units of dB/volt.

Example
:AM2:TYPE EXP
The preceding example selects exponential type depth values for AM path 2.
*RST LIN
Key Entry AM Type LIN EXP

:AM[1]|2[:DEPTH]:EXPonential
Supported All with Option UNT
[:SOURce]:AM[1]|2[:DEPTH]:EXponential <val>
[:SOURce]:AM[1]|2[:DEPTH]:EXponential?
This commands sets the AM depth in dB/volt units. EXponential must be the current AM type for this command to have any affect. Refer to :AM[1]|2:TYPE for setting the AM type.

Example
:AM2:EXP 20
The preceding example sets the exponential depth to 20 dB for AM path 2.
*RST +4.00000000E+001
Range 0.00–40.00DB
Key Entry AM Depth
Analog Commands
Amplitude Subsystem ([SOURce])

**:AM[1]|2:[DEPTh]:[LINear]**

**Supported**  All with Option UNT

[:SOURce]:AM[1]|2:[DEPTh]:[LINear] <val>|UP|DOWN
[:SOURce]:AM[1]|2:[DEPTh]:[LINear]?

This command sets the AM depth in percent/volt units. The command, used with the UP|DOWN parameters, will change the depth by a user-defined step value. Refer to the :AM[:DEPTh]:STEP[:INCRement] command on page 153 for setting the value associated with the UP and DOWN choices.

LINear must be the current AM type for this command to have any affect. Refer to “:AM[1]|2:TYPE” on page 151 for setting the AM measurement type. When the depth values are coupled, a change made to one path is applied to both. For AM depth value coupling, refer to the command “:AM[1]|2:[DEPTh]:[LINear]:TRACk” on page 152.

**Example**

:AM2 20

The preceding example sets the AM path 2 linear depth to 20%.

*RST  +1.00000000E-001

**Range**  0.0–100PCT

**Key Entry**  AM Depth

**:AM[1]|2:[DEPTh]:[LINear]:TRACk**

**Supported**  All with Option UNT

[:SOURce]:AM[1]|2:[DEPTh]:[LINear]:TRACk ON|OFF|1|0
[:SOURce]:AM[1]|2:[DEPTh]:[LINear]:TRACk?

This command enables or disables AM depth value coupling between AM paths 1 and 2. When the depth values are coupled, a change made to one path is applied to both. LINear must be the AM type for this command to have any affect. Refer to “:AM[1]|2:TYPE” on page 151 for setting the AM type.

ON (1) This choice will link the depth value of AM[1] with AM2; AM2 will assume the AM[1] depth value. For example, if AM[1] depth is set to 15% and AM2 is set to 11%, enabling the depth tracking will cause the AM2 depth value to change to 15%. This applies regardless of the path (AM[1] or AM2) selected in this command.

OFF (0) This choice disables coupling and both paths will have independent depth values.

**Example**

:AM1:TRAC ON

The preceding example enables AM depth coupling between AM path 1 and AM path 2.

*RST  0

**Key Entry**  AM Depth Couple Off On
Analog Commands

Frequency Modulation Subsystem ([SOURce])

:AM[:DEPTh]:STEP[:INCRement]

Supported: All with Option UNT
[:SOURce]:AM[:DEPTh]:STEP[:INCRement] <val>|MAXimum|MINimum|DEFault
[:SOURce]:AM[:DEPTh]:STEP[:INCRement]?

This command sets the linear depth step value in percent/volt units.
The step value set by this command is used with the UP and DOWN choices for the
The setting enabled by this command is not affected by a signal generator power-on, preset, or *RST command.

Example
:AM:STEP 10
The preceding example sets the step value for AM depth to 10%.

Range: 0.1–100

Key Entry: Incr Set

Frequency Modulation Subsystem ([SOURce])

:FM[1]|2...

Supported: E8257D and E8267D
[:SOURce]:FM[1]|2...

This prefix enables the selection of the FM path and is associated with all SCPI commands in this subsystem. The two paths are equivalent to the FM Path 1 2 softkey.

FM1: FM Path 1 2 with 1 selected
FM2: FM Path 1 2 with 2 selected

When just FM is shown in a command, this means the command applies to path one only.

Each path is set up separately. When a SCPI command uses FM1, only path one is affected. Consequently, when FM2 is selected, only path two is set up. However, the deviation of the signals for the two paths can be coupled.

Deviation coupling links the deviation value of FM1 to FM2. Changing the deviation value for one path changes it for the other. These two paths can be on at the same time provided the following conditions have been met:

• dual–sine or swept–sine is not the selection for the waveform type
• each path uses a different source (Internal 1, Internal 2, Ext1, or Ext2)
• FM2 must be set to a deviation less than FM1
Analog Commands
Frequency Modulation Subsystem [:SOURce]

**:FM[:INTernal][:FREQuency]:STEP[:INCRement]**

**Supported** All with Option UNT

[:SOURce]:FM[:INTernal][:FREQuency]:STEP[:INCRement]<num>|MAXimum|MINimum|DEFault

[:SOURce]:FM[:INTernal][:FREQuency]:STEP[:INCRement]?

This command sets the step value for the internal frequency modulation.
The step value set by this command is used with the UP and DOWN choices for the command
The setting enabled by this command is not affected by a signal generator power-on, preset, or *RST command.

**Example**

**:FM:INT:FREQ:STEP 1E5**
The preceding example sets the step value to .1 MHz.

**Range** 0.5–1E6


**Supported** All with Option UNT


This command sets the coupling type for the selected external input. The command does not change the active source or switch modulation on or off. The modulating signal may be the sum of several signals, from either internal or external sources.

AC This choice will pass only ac signal components.

DC This choice will pass both ac and dc signal components.

**Example**

**:FM1:EXT1:COUP AC**
The preceding example sets the coupling for FM path 1, external source 1 to AC.

*RST DC

**Key Entry** Ext Coupling DC AC


**Supported** All with Option UNT


This command sets the impedance for the external input.
Example

:FM1:EXT2:IMP 600

The preceding example sets the FM path 1, external 1 source impedance to 600 ohms.

*RST +5.00000000E+001

Key Entry Ext Impedance 50 Ohm 600 Ohm

:FM1|2:INTernal[1]:FREQuency:ALTernate

Supported All with Option UNT

[:SOURce]:FM[1]|2:INTernal[1]:FREQuency:ALTernate <val><units>

[:SOURce]:FM[1]|2:INTernal[1]:FREQuency:ALTernate?

This command sets the internal FM rate of the alternate signal. The alternate signal frequency is the second tone of a dual–sine or the stop frequency of a swept–sine waveform.


Example

:FM1:INT:FREQ:ALT 20KHZ

The preceding example sets the FM tone 2 rate for FM path 1, FM source 1, to 20 kHz.

*RST +4.00000000E+002

Range dual–sine: 0.5HZ–100kHZ swept–sine: 0.5HZ–100kHZ

Key Entry FM Tone 2 Rate FM Stop Rate


Supported All with Option UNT

[:SOURce]:FM[1]|2:INTernal[1]:FREQuency:ALTernate:AMPLitude:PERCent <val><units>

[:SOURce]:FM[1]|2:INTernal[1]:FREQuency:ALTernate:AMPLitude:PERCent?

This command sets the amplitude of the second tone for a dual–sine waveform as a percentage of the total amplitude. For example, if the second tone makes up 30% of the total amplitude, then the first tone is 70% of the total amplitude. Refer to "*:FM[1]|2:INTernal[1]|2:FUNCtion:SHAPe" on page 158 for the waveform selection.

Example


The preceding example sets the amplitude for FM tone 2, FM path 1, FM internal source 1 to 20% of the total amplitude.

*RST +5.00000000E+001

Range 0–100PCT

Key Entry FM Tone 2 Amp1 Percent Of Peak
Analog Commands
Frequency Modulation Subsystem [:SOURce]


**Supported**  All with Option UNT

[:SOURce]:FM[1]|2:INTernal[1]:SWEep:RATE <val><units>

This command sets the sweep rate for the swept-sine waveform. The minimum resolution is 0.5 hertz. Refer to "*FM[1]|2:INTernal[1]|2:FUNCtion:SHAPe" on page 158 for the waveform selection.

**Example**

:FM1:INT:SWE:RATE 20KHZ

The preceding example sets the sweep rate for the swept-sine waveform to 20 kilohertz.

*RST

**Range**  0.5HZ–100kHZ

**Key Entry**  FM Sweep Rate


**Supported**  All with Option UNT

[:SOURce]:FM[1]|2:INTernal[1]:SWEep:TRIGger BUS|IMMEDIATE|EXTERNAL|KEY

[:SOURce]:FM[1]|2:INTernal[1]:SWEep:TRIGger?


**BUS**  This choice enables GPIB triggering using the *TRG or GET command or LAN triggering using the *TRG command.

**IMMEDIATE**  This choice enables immediate triggering of the sweep event. This choice is equivalent to pressing the **Free Run** softkey.

**EXTERNAL**  This choice enables the triggering of a sweep event by an externally applied signal at the TRIGGER IN connector.

**KEY**  Enables triggering through front panel interaction (the **Trigger** hardkey).

*RST  IMM

**Example**

:FM1:INT:SWE:TRIG BUS

The preceding example selects the bus as the trigger source for FM path 1.

**Key Entry**  **Bus**  **Free Run**  **Ext**  **Trigger Key**
Analog Commands

Frequency Modulation Subsystem ([SOURce])


Supported All with Option UNT


This command sets the internal FM rate using the <val><units> variable, or changes the FM rate by a user-defined up/down step value. Refer to the :FM:INTernal:FREQuency:STEP[:INCRement] command on page 154 for setting the value associated with the UP and DOWN choices.

The command changes:
- the FM rate of the first tone of a dual-sine waveform
- the starting FM rate for a swept-sine waveform
- the FM rate for all other waveforms


Example

:FM2:INT:FREQ 40KHZ

The preceding example sets the modulation rate for FM path 2 to 40 kHz.

*RST +4.00000000E+002

Range Dual-Sine & Sine: 0.5HZ–1MHZ
Swept-Sine: 1HZ–1MHZ
All Other Waveforms: 0.5HZ–100kHZ

Key Entry

<table>
<thead>
<tr>
<th>FM Tone 1 Rate</th>
<th>FM Start Rate</th>
<th>FM Rate</th>
</tr>
</thead>
</table>


Supported All with Option UNT


This command selects a gaussian or uniform noise type as the modulation. Refer to "*FM[1]|2:INTernal[1]|2:FUNCTION:SHAPe" on page 158 for the waveform selection.

Example

:FM2:INT2:FUNC:NOIS UNIF

The preceding example selects a uniform noise waveform as the modulation for FM path 2 and FM source 2.

*RST UNIF

Key Entry Gaussian Uniform
Analog Commands
Frequency Modulation Subsystem [:SOURce]


**Supported** All with Option UNT


This command selects a positive or negative ramp as the internal modulating waveform. Refer to **:FM[1]|2:INTernal[1]|2:FUNCtion:SHAPe** for the waveform selection.

**Example**

:FM2:INT2:FUNC:RAMP POS

The preceding example selects a positive sloped ramp as the internal modulating waveform.

*RST* POS

**Key Entry** Positive Negative


**Supported** All with Option UNT


This command selects the FM waveform type. The INTernal2 source selection does not support the dual–sine or Sweep–Sine waveform types.

**Example**

:FM2:INT1:FUNC:SHAP SQU

The preceding example selects a square wave as the internal modulating waveform.

*RST* SINE

**Key Entry** Sine Triangle Square Ramp Noise Dual-Sine Swept-Sine

:**FM[1] | 2:SOURce**

**Supported** All with Option UNT


[:SOURce]:FM[1] | 2:SOURce?

This command selects the FM source.

**INT** This choice selects internal source 1 or 2 to provide an ac-coupled signal.

**EXT** This choice selects the EXT 1 INPUT or the EXT 2 INPUT connector to provide an externally applied signal that can be ac- or dc-coupled. The externally applied, ac-coupled input signal is tested for a voltage level and an annunciator, on the signal generator’s front-panel display, will indicate a high or low condition if that voltage is > ±3% of 1 Vp.
Analog Commands

Frequency Modulation Subsystem (:SOURce)

Example

:FM2:SOUR INT2

The preceding example selects internal source 2 as the FM source for FM path 2.

*RST

Key Entry Internal 1 Internal 2 Ext1 Ext2


Supported All with Option UNT

[:SOURce]:FM[1]|2:STATe ON|OFF|1|0

[:SOURce]:FM[1]|2:STATe?

This command enables or disables the selected FM path.

The RF carrier is modulated when you set the signal generator’s modulation state to ON, see “:MODulation[:STATe]” on page 63 for more information.

Whenever frequency modulation is enabled, the FM annunciator appears on the signal generator’s front-panel display.

The two paths for frequency modulation can be simultaneously enabled. Refer to “:FM[1]|2...” on page 153 for more information.

Example

:FM2:STAT ON

The preceding example enables FM path 2.

*RST

0

Key Entry FM Off On

:FM[1]|2[:DEViation]

Supported All with Option UNT

[:SOURce]:FM[1]|2[:DEViation] <val><units>

[:SOURce]:FM[1]|2[:DEViation]?

This command sets the FM deviation for the selected FM path.

If deviation tracking is ON, a change to the deviation value on one path will apply to both. Refer to “:FM[1]|2[:DEViation]:TRACk” on page 160 for more information on setting the deviation tracking.

Example

:FM2 1MHZ

The preceding example sets the frequency deviation to 1 megahertz.
### Frequency Modulation Subsystem ([SOURce])

#### Analog Commands

#### Key Entry

**FM DEV**

<table>
<thead>
<tr>
<th>Command</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>:FM[1]</td>
<td>2[:DEViation]:TRACk</td>
</tr>
</tbody>
</table>

#### Supported

All with Option UNT

#### [:SOURce]:FM[1]|2[:DEViation]:TRACk

**ON** (1) This choice will link the deviation value of FM1 with FM2; FM2 will assume the FM1 deviation value.

**OFF** (0) This choice disables the coupling and both paths will have independent deviation values.

This command uses exact match tracking, not offset tracking.

#### Example

:FM2:TRAC 0

The preceding example disables deviation coupling.

### Range

*E8267D Only*

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>250KHZ–250MHZ</td>
<td>0–2MHZ</td>
</tr>
<tr>
<td>&gt; 250–500MHZ</td>
<td>0–1MHZ</td>
</tr>
<tr>
<td>&gt; 0.5–1GHz</td>
<td>0–2MHZ</td>
</tr>
<tr>
<td>&gt; 1–2GHz</td>
<td>0–4MHZ</td>
</tr>
<tr>
<td>&gt; 2–3.2GHz</td>
<td>0–8MHZ</td>
</tr>
<tr>
<td>&gt; 3.2–10GHz</td>
<td>0–16MHZ</td>
</tr>
<tr>
<td>&gt; 10–20GHz</td>
<td>0–32MHZ</td>
</tr>
<tr>
<td>&gt; 20–28.5GHz</td>
<td>0–48MHZ</td>
</tr>
<tr>
<td>&gt; 20–40GHz</td>
<td>0–64MHZ</td>
</tr>
<tr>
<td>&gt; 28.5–44GHz</td>
<td>0–80MHZ</td>
</tr>
<tr>
<td>&gt; 40–67GHz</td>
<td>0–128MHZ</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 67–100GHz</td>
<td>0–250MHZ</td>
</tr>
<tr>
<td>&gt; 100–200GHz</td>
<td>0–500MHZ</td>
</tr>
<tr>
<td>&gt; 200–400GHz</td>
<td>0–1GHz</td>
</tr>
<tr>
<td>&gt; 400–800GHz</td>
<td>0–2GHz</td>
</tr>
<tr>
<td>&gt; 800–1600GHz</td>
<td>0–4GHz</td>
</tr>
<tr>
<td>&gt; 1600–3200GHz</td>
<td>0–8GHz</td>
</tr>
<tr>
<td>&gt; 3200–6400GHz</td>
<td>0–16GHz</td>
</tr>
<tr>
<td>&gt; 6400–12800GHz</td>
<td>0–32GHz</td>
</tr>
<tr>
<td>&gt; 12800–25600GHz</td>
<td>0–64GHz</td>
</tr>
<tr>
<td>&gt; 25600–51200GHz</td>
<td>0–128GHz</td>
</tr>
<tr>
<td>&gt; 51200–102400GHz</td>
<td>0–256GHz</td>
</tr>
<tr>
<td>&gt; 102400–204800GHz</td>
<td>0–512GHz</td>
</tr>
<tr>
<td>&gt; 204800–409600GHz</td>
<td>0–1024GHz</td>
</tr>
<tr>
<td>&gt; 409600–819200GHz</td>
<td>0–2048GHz</td>
</tr>
<tr>
<td>&gt; 819200–1638400GHz</td>
<td>0–4096GHz</td>
</tr>
<tr>
<td>&gt; 1638400–3276800GHz</td>
<td>0–8192GHz</td>
</tr>
<tr>
<td>&gt; 3276800–6553600GHz</td>
<td>0–16384GHz</td>
</tr>
<tr>
<td>&gt; 6553600–13107200GHz</td>
<td>0–32768GHz</td>
</tr>
<tr>
<td>&gt; 13107200–26214400GHz</td>
<td>0–65536GHz</td>
</tr>
<tr>
<td>&gt; 26214400–52428800GHz</td>
<td>0–131072GHz</td>
</tr>
<tr>
<td>&gt; 52428800–104857600GHz</td>
<td>0–262144GHz</td>
</tr>
<tr>
<td>&gt; 104857600–209715200GHz</td>
<td>0–524288GHz</td>
</tr>
<tr>
<td>&gt; 209715200–419430400GHz</td>
<td>0–1048576GHz</td>
</tr>
<tr>
<td>&gt; 419430400–838860800GHz</td>
<td>0–2097152GHz</td>
</tr>
<tr>
<td>&gt; 838860800–1677721600GHz</td>
<td>0–4194304GHz</td>
</tr>
<tr>
<td>&gt; 1677721600–3355443200GHz</td>
<td>0–8388608GHz</td>
</tr>
<tr>
<td>&gt; 3355443200–6710886400GHz</td>
<td>0–16777216GHz</td>
</tr>
<tr>
<td>&gt; 6710886400–13421772800GHz</td>
<td>0–33554432GHz</td>
</tr>
<tr>
<td>&gt; 13421772800–26843545600GHz</td>
<td>0–67108864GHz</td>
</tr>
<tr>
<td>&gt; 26843545600–53687091200GHz</td>
<td>0–134217728GHz</td>
</tr>
<tr>
<td>&gt; 53687091200–107374182400GHz</td>
<td>0–268435456GHz</td>
</tr>
<tr>
<td>&gt; 107374182400–214748364800GHz</td>
<td>0–536870912GHz</td>
</tr>
<tr>
<td>&gt; 214748364800–429496729600GHz</td>
<td>0–1073741824GHz</td>
</tr>
</tbody>
</table>

This command uses exact match tracking, not offset tracking.

#### Example

**:FM2:TRAC 0**

The preceding example disables deviation coupling.

**RST**

0

#### Key Entry

**FM Dev Couple Off On**

0
Low Frequency Output Subsystem ([:SOURce]:LFOutput)

`:LOutput:AMPLitude`

Supported All with Option UNT

[:SOURce]:LFOutput:AMPLitude <val><units>

[:SOURce]:LFOutput:AMPLitude?

This command sets the amplitude of the signal at the LF OUTPUT connector.

Example

`:LFO:AMPL 2.1VP`

The preceding example sets the peak amplitude to 2.1 volts.

*RST 0.00

Range 0.000VP–3.5VP

Key Entry LF Out Amplitude


Supported All with Option UNT

[:SOURce]:LFOutput:FUNCTION[1]|2:FREQuency <val><units>

[:SOURce]:LFOutput:FUNCTION[1]|2:FREQuency?

This command sets the frequency of function generator 1 or 2. The command sets:

- the frequency of the first tone of a dual–sine waveform
- the start frequency for a swept–sine waveform
- the frequency for all other waveform types

Refer to “:LFOutput:FUNCTION[1]|2:SHApe” on page 162 for selecting the waveform type.

Example

`:LFO:FUNC1:FREQ .1MHZ`

The preceding example sets the frequency for function generator 1 to 100 kHz.

*RST +4.00000000E+002

Range *Sine and Dual–Sine: 0.5Hz–1MHZ

Range *Swept–Sine: 1Hz–1MHZ

Range *All Other Waveforms: 0.5Hz–100KHZ

Key Entry LF Out Tone 1 Freq LF Out Start Freq LF Out Freq
Analog Commands
Low Frequency Output Subsystem [:SOURce]:LFOutput

[:SOURce]:LFOutput:FUNCTION[1]:FREQuency:ALTernate

Supported All with Option UNT

[:SOURce]:LFOutput:FUNCTION[1]:FREQuency:ALTernate <val><units>
[:SOURce]:LFOutput:FUNCTION[1]:FREQuency:ALTernate?

This command sets the frequency for the alternate LF output signal. The alternate frequency is the second tone of a dual-sine or the stop frequency of a swept-sine waveform.

Refer to "[:SOURce]:LFOutput:FUNCTION[1]|2:SHAPe" on page 162 for more information on selecting the waveform type.

Example
:LFO:FUNC1:FREQ:ALT 20KHZ

The preceding example sets the alternate frequency to 20 kHz.

*RST +4.00000000E+002

Range Dual-Sine: 0.1Hz–100kHz Swept-Sine: 0.1Hz–100kHz

Key Entry LF Out Tone 2 Freq LF Out Stop Freq

[:SOURce]:LFOutput:FUNCTION[1]:FREQuency:ALTernate:AMPLitude:PERCent

Supported All with Option UNT

[:SOURce]:LFOutput:FUNCTION[1]:FREQuency:ALTernate:AMPLitude:PERCent <val><units>
[:SOURce]:LFOutput:FUNCTION[1]:FREQuency:ALTernate:AMPLitude:PERCent?

This command sets the amplitude of the second tone for a dual-sine waveform as a percentage of the total LF output amplitude. For example, if the second tone makes up 30% of the total amplitude, then the first tone is 70% of the total amplitude. Refer to "[:SOURce]:LFOutput:FUNCTION[1]|2:SHAPe" on page 162 for selecting the waveform type.

Example
:LFO:FUNC1:FREQ:ALT:AMPL:PERC 50

The preceding example sets the alternate frequency to 50% of the total output amplitude.

*RST +5.00000000E+001

Range 0–100PCT

Key Entry LF Out Tone 2 Ampl % of Peak

[:SOURce]:LFOutput:FUNCTION[1]|2:SHAPe

Supported All with Option UNT

[:SOURce]:LFOutput:FUNCTION[1]|2:SHAPe SINE|DUALsine|SWEPtsine|TRIangle|SQUare|RAMP|PULSe|NOISe|DC
[:SOURce]:LFOutput:FUNCTION[1]|2:SHAPe?
Analog Commands

Low Frequency Output Subsystem (:SOURce:LFOutput)

This command selects the waveform type. Function Generator 1 must be the source for the dual–sine or the swept–sine waveform. Refer to “:LFOutput:SOURce” on page 165.

**Example**

:LFO:FUNC2:SHAP TRI

The preceding example selects a triangle wave for the Function Generator 2 LF output.

*SRT SINE

<table>
<thead>
<tr>
<th>Key Entry</th>
<th>Sine</th>
<th>Dual-Sine</th>
<th>Swept-Sine</th>
<th>Triangle</th>
<th>Square</th>
<th>Ramp</th>
<th>Pulse</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Noise</td>
<td></td>
<td>DC</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**:LFOutput:FUNCTION[:1]|2:SHAPE:NOISE**

**Supported** All with Option UNT

[:SOURce]:LFOutput:FUNCTION[:1]|2:SHAPE:NOISE UNIFORM|GAUSSIAN

[:SOURce]:LFOutput:FUNCTION[:1]|2:SHAPE:NOISE?

This command selects a gaussian or uniform noise modulation for the LF output. Refer to “:LFOutput:FUNCTION[:1]|2:SHAPE” on page 162 for selecting the waveform type.

**Example**

:LFO:FUNC1:SHAP:NOIS GAUS

The preceding example selects a gaussian noise modulation for the Function Generator 1 LF output.

*RST UNIF

<table>
<thead>
<tr>
<th>Key Entry</th>
<th>Uniform</th>
<th>Gaussian</th>
</tr>
</thead>
</table>

**:LFOutput:FUNCTION[:1]|2:SHAPE:RAMP**

**Supported** All with Option UNT

[:SOURce]:LFOutput:FUNCTION[:1]|2SHAPE:RAMP POSITIVE|NEGATIVE

[:SOURce]:LFOutput:FUNCTION[:1]|2:SHAPE:RAMP?

This command selects a positive or negative slope for the ramp modulation on the LF output. Refer to “:LFOutput:FUNCTION[:1]|2:SHAPE” on page 162 for selecting the waveform type.

**Example**

:LFO:FUNC1:SHAP:RAMP POS

The preceding example selects a positive ramp slope modulation for the Function Generator 1 LF output.

*RST POS

<table>
<thead>
<tr>
<th>Key Entry</th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
</table>
Analog Commands
Low Frequency Output Subsystem [:SOURce]:LFOutput

[:SOURce]:LFOutput:FUNCtion[1]:SWEep:RATE

**Supported**  All with Option UNT

[:SOURce]:LFOutput:FUNCtion[1]:SWEep:RATE <val><units>
[:SOURce]:LFOutput:FUNCtion[1]:SWEep:RATE?

This command sets the sweep rate for an internally generated swept–sine signal.

**Example**

:LFO:FUNC1:SWE:RATE 1E5

The preceding example sets the sweep rate for the swept–sine waveform to 100 kHz.

*RST  +4.00000000E+002
Range  0.5HZ–100kHZ
Key Entry  LF Out Sweep Rate

[:SOURce]:LFOutput:FUNCtion[1]:SWEep:TRIGger

**Supported**  All with Option UNT

[:SOURce]:LFOutput:FUNCtion[1]:SWEep:TRIGger BUS|IMMediate|EXTernal|KEY
[:SOURce]:LFOutput:FUNCtion[1]:SWEep:TRIGger?

This command sets the trigger source for the internally generated swept–sine signal at the LF output.

BUS  This choice enables GPIB triggering using the *TRG or GET command or LAN and RS-232 triggering using the *TRG command.
IMMediate  This choice enables immediate triggering of the sweep event.
EXTernal  This choice enables the triggering of a sweep event by an externally applied signal at the TRIGGER IN connector.
KEY  This choice enables triggering through front panel interaction by pressing the Trigger hardkey.

Refer to "[:SOURce]:LFOutput:FUNCtion[1]|2:SHAPe" on page 162 for selecting the waveform type.

**Example**

:LFO:FUNC1:SWE:TRIG EXT

The preceding example sets an external trigger as the trigger for the swept–sine signal.

*RST  Free Run
Key Entry  Bus  Free Run  Ext  Trigger Key
:LFOutput:SOURce

**Supported**
All with Option UNT


[:SOURce]:LFOutput:SOURce?

This command selects the source for the LF output.

**INT**
This choice enables you to output a signal where the frequency and shape of the signal is set by internal source 1 or 2. For example, if the internal source is currently assigned to an AM path configuration and AM is turned on, the signal output at the LF OUTPUT connector will have the frequency and shape of the amplitude modulating signal.

**FUNCTION**
This choice enables the selection of an internal function generator.

**Example**
:LFO:SOUR FUNC1
The preceding example selects Function Generator 1 as the active LF source.

*RST INT

**Key Entry**
LF Out Off On

Internal 1 Monitor Function Generator 1
Internal 2 Monitor Function Generator 2

:LFOutput:STATe

**Supported**
All with Option UNT

[:SOURce]:LFOutput:STATe ON|OFF|1|0

[:SOURce]:LFOutput:STATe?

This command enables or disables the low frequency output.

**Example**
:LFO:STAT ON
The preceding example enables the source.

*RST 0

**Key Entry**
LF Out Off On
Phase Modulation Subsystem ([SOURce])

:PM[1]|2...

**Supported**

E8257D and E8267D

This prefix enables the selection of the ΦM path and associated with all SCPI commands in this subsystem. The two paths are equivalent to the ΦM Path 1 2 softkey.

**PM1** ΦM Path 12 with 1 selected

**PM2** ΦM Path 12 with 2 selected

When just PM is shown in a command, this means the command applies to path 1 only.

Each path is set up separately. When a SCPI command uses PM1, only path one is affected. Consequently, when PM2 is selected, only path two is set up. However, the deviation of the signals for the two paths can be coupled.

Deviation coupling links the deviation value of PM1 to PM2. Changing the deviation value for one path will change it for the other path. These two paths can be on at the same time provided the following conditions have been met:

- dual–sine or Sweep–Sine is not the selection for the waveform type
- each path uses a different source (Internal 1, Internal 2, Ext1, or Ext2)
- PM2 must be set to a deviation less than or equal to PM1

**:PM:INTernal:FREQuency:STEP[:INCRement]**

**Supported**

All with Option UNT

This command sets the step value of the phase modulation internal frequency.

The step value set by this command is used with the UP and DOWN choices for the :PM[1]|2:INTernal[1]:FREQuency command on page 168.

The setting enabled by this command is not affected by a signal generator power-on, preset, or \*RST command.

**Example**

:PM:INT:FREQ:STEP 1E5

The preceding example sets the step value to 100 kHz.

**Range**

0.5–1E6

**Key Entry**

Incr Set
Analog Commands

Phase Modulation Subsystem ([SOURce])

:PM[1]|2:BANDwidth|BWIDth

Supported All with Option UNT

[[:SOURce]:PM[1]|2:BANDwidth|BWIDth NORMal|HIGH
[[:SOURce]:PM[1]|2:BANDwidth|BWIDth?

This command selects normal phase modulation or high bandwidth phase modulation. The command can use either the BANDwidth or BWIDth paths.

Example

:PM1:BAND NORM

The preceding example selects normal phase modulation for ΦM path 1.

*RST NORM

Key Entry FM ΦM Normal High BW


Supported All with Option UNT


This command sets the coupling for the phase modulation source at the selected external input connector.

AC This choice will only pass ac signal components.

DC This choice will pass both ac and dc signal components.

This command does not change the active source or switch modulation on or off. The modulating signal may be the sum of several signals, from either internal or external sources.

Example

:PM1:EXT:COUP AC

The preceding example selects AC coupling at the external input for ΦM path 1.

*RST DC

Key Entry Ext Coupling DC AC
Analog Commands
Phase Modulation Subsystem ([SOURce])


Supported All with Option UNT

[:SOURce]:PM[1]|2:EXTernal[1]|2:IMPedance <50|600>

This command selects 50 ohms or 600 ohms as the input impedance for the external input signal.

Example
:PM1:EXT2:IMP 600
The preceding example sets the \( \Phi M \) path 1, external 2 source impedance to 600 ohms.

*RST +5.00000000E+001

Key Entry Ext Impedance 50 Ohm 600 Ohm

:PM[1]|2:INTernal[1]:FREQuency

Supported All with Option UNT


This command sets the internal modulation frequency rate. The command sets:

- the frequency of the first tone of a dual–sine waveform
- the start frequency for a swept–sine waveform
- the frequency rate for all other waveforms

Refer to ":*LFOutput:FUNCtion[1]|2:SHAPe" on page 162 for selecting the waveform type.

Example
:PM1:INT1:FREQ 20KHZ
The preceding example sets the \( \Phi M \) path 1, internal source 1 frequency to 20 kHz.

*RST +4.00000000E+002

Range Dual–Sine: 0.1HZ–100KHZ Swept–Sine: 0.1HZ–100KHZ
All Other Waveforms: 0.1HZ–20KHZ

Key Entry \( \Phi M \)Tone 1 Rate \( \Phi M \) Start Rate \( \Phi M \) Rate


Supported All with Option UNT


This command sets the frequency rate for the alternate signal. The alternate frequency is the second tone of a dual–sine or the stop frequency of a swept–sine waveform.

Refer to ":*PM[1]|2:INTernal[1]:FUNCtion:SHAPe" on page 170 for the waveform selection.
Example
:PM1:INT1:FREQ:ALT 50KHZ

The preceding example sets the alternate frequency rate for the ΦM tone 2, ΦM path 1, source 1 to 50 kHz.

*RST +4.00000000E+002

Range Dual-Sine: 0.1HZ–100KHZ Swept-Sine: 0.1HZ–100KHZ
Key Entry ΦM Stop Rate ΦM Tone 2 Rate


Supported All with Option UNT


This command selects a gaussian or uniform noise modulation for the selected path(s).

Example
:PM1:INT1:FUNC:NOIS GAUS

The preceding example selects a gaussian noise modulation for ΦM path 1, source 1.

*RST UNIF
Key Entry Gaussian Uniform


Supported All with Option UNT


This command selects a positive or negative slope for the ramp modulating waveform.

Example
:PM1:INT2:FUNC:RAMP POS

The preceding example selects a positive ramp slope for modulating the signal on ΦM path 1, internal source 2.

*RST POS
Key Entry Positive Negative
Analog Commands
Phase Modulation Subsystem [:SOURce]

[:SOURce]:PM[1]|2:INTernal[1]:FREQuency:ALTernate:AMPLitude:PERCent

**Supported** All with Option UNT

[:SOURce]:PM[1]|2:INTernal[1]:FREQuency:ALTernate:AMPLitude:PERCent <val>

This command sets the amplitude of the second tone for the dual-sine waveform as a percentage of the total amplitude. For example, if the second tone makes up 30% of the total amplitude, then the first tone is 70% of the total amplitude. Refer to “:PM[1]|2:INTernal[1]:FUNCTION:SHAPe” on page 170 for the waveform selection.

**Example**


The preceding example sets the alternate tone amplitude to 40% of the total amplitude.

*RST +5.00000000E+001

**Range** 0–100PCT

**Key Entry** ΦM Tone 2 Ampl Percent of Peak

[:SOURce]:PM[1]|2:INTernal[1]:FUNCTION:SHAPe

**Supported** All with Option UNT

[:SOURce]:PM[1]|2:INTernal[1]:FUNCTION:SHAPe SINE|TRIangle|SQUare|RAMP|NOISE|DUALsine|SWEPtsine

This command sets the phase modulation waveform type for internal source 1.

**Example**

:PM1:INT:FUNC:SHAPE RAMP

The preceding example selects a ramp modulation for ΦM path 1, source 1.

*RST SINE

**Key Entry** Sine Triangle Square Ramp Noise Dual-Sine Swept-Sine
Phase Modulation Subsystem ([SOURce])


Supported All with Option UNT

[:SOURce]:PM[1]|2:INTernal2:FUNCTION:SHAPe SINE|TRIangle|SQUare|RAMP|NOISe

This command sets the phase modulation waveform type for internal source 2.

**Example**

:PM1:INT2:FUNC:SHAPE RAMP

The preceding example selects a ramp modulation for \( \Phi \)M path 1, source 2.

*RST

Key Entry Sine Triangle Square Ramp Noise

:PM[1]|2:INTernal[1]:SWEep:RATE

Supported All with Option UNT

[:SOURce]:PM[1]|2:INTernal[1]:SWEep:RATE <val><units>

This command sets the sweep rate for a phase-modulated, swept-sine waveform. Refer to “PM[1]|2:INTernal[1]:FUNCTION:SHAPe” on page 170 for the waveform selection.

**Example**

:PM1:INT:SWE:RATE 30KHZ

The preceding example sets the sweep rate to 30 kHz.

*RST

Range 0.5HZ–100kHz

Key Entry \( \Phi \)M Sweep Rate

:PM[1]|2:INTernal[1]:SWEep:TRIGger

Supported All with Option UNT

[:SOURce]:PM[1]|2:INTernal[1]:SWEep:TRIGger BUS|IMMediate|EXTernal|KEY

This command sets the trigger source for the phase-modulated, swept-sine waveform.

**BUS** This choice enables GPIB triggering using the *TRG or GET command or LAN and RS-232 triggering using the *TRG command.

**IMMediate** This choice enables immediate triggering of the sweep event. This choice is equivalent to pressing the **Free Run** softkey.

**EXTernal** This choice enables the triggering of a sweep event by an externally applied signal at the TRIGGER IN connector.

**KEY** This choice enables triggering through front panel interaction by pressing the
Analog Commands
Phase Modulation Subsystem [:SOURce]

Trigger hardkey.

Refer to "PM[1]|2:INTernal[1]:FUNCtion:SHApe" on page 170 for the waveform selection.

Example
:PM2:INT:SWE:TRIG BUS

The preceding example selects a BUS trigger as the triggering for the internal source 1 swept-sine waveform on ΦM path 2.

*RST IMM

Key Entry Bus Free Run Ext Trigger Key

:PM[1]|2:SOURce

Supported All with Option UNT

[:SOURce]:PM[1] 2:SOURce?

This command selects the source used to generate the phase modulation.

INT This choice selects internal source 1 or internal source 2 to provide an ac-coupled signal.

EXT This choice selects the EXT 1 INPUT or the EXT 2 INPUT connector to provide an externally applied signal that can be ac- or dc- coupled.

The externally applied, ac-coupled input signal is tested for a voltage level and an annunciator, on the signal generator’s front-panel display, will indicate a high or low condition if that voltage is > ±3% of 1 Vp.

Example
:PM2:SOUR EXT1

The preceding example selects an external signal on the EXT 1 INPUT connector as the source for ΦM path 2 modulation.

*RST INT

Key Entry Internal 1 Internal 2 Ext1 Ext2

:PM[1]|2:STATe

Supported All with Option UNT

[:SOURce]:PM[1] 2:STATe ON|OFF|1|0
[:SOURce]:PM[1] 2:STATe?

This command enables or disables the phase modulation for the selected path. The RF carrier is modulated when you set the signal generator’s modulation state to ON, see "MODulation[:STATE]" on page 63 for more information.

The ΦM annunciator appears on the signal generator’s front-panel display whenever phase modulation is enabled. The two paths for phase modulation can be simultaneously enabled. Refer to "PM[1]|2..." on page 166 for more information.
Analog Commands

Phase Modulation Subsystem [:SOURce]

Example

:PM2:STAT 1

The preceding example turns on ΦM path 2 phase modulation.

*RST

Key Entry ΦM Off On

:PM[1]|2[:DEViation]

Supported All with Option UNT

[:SOURce]:PM[1]|2[:DEViation] <val><units>|UP|DOWN

[:SOURce]:PM[1]|2[:DEViation]?

This command sets the deviation of the phase modulation. The variable <units> will accept RAD (radians), PIRAD (pi-radians), and DEG (degrees); however, the query will only return values in radians. If deviation tracking is active, a change to the deviation value on one path will apply to both.

The command, used with the UP|DOWN parameters, will change the deviation by a user-defined step value. Refer to the :PM[:DEViation]:STEP[:INCRement] command on page 174 for setting the value associated with the UP and DOWN choices.

Example

:PM1 135DEG

The preceding example sets the phase modulation to 135 degrees.

*RST +0.00000000E+000

Range

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Normal Bandwidth</th>
<th>High Bandwidth</th>
</tr>
</thead>
<tbody>
<tr>
<td>250KHZ–250MHZ</td>
<td>0–20rad</td>
<td>0–2rad</td>
</tr>
<tr>
<td>&gt; 250–500MHZ</td>
<td>0–10rad</td>
<td>0–1rad</td>
</tr>
<tr>
<td>&gt; 0.5–1GHZ</td>
<td>0–20rad</td>
<td>0–2rad</td>
</tr>
<tr>
<td>&gt; 1–2GHZ</td>
<td>0–40rad</td>
<td>0–4rad</td>
</tr>
<tr>
<td>&gt; 2–3.2GHZ</td>
<td>0–80rad</td>
<td>0–8rad</td>
</tr>
<tr>
<td>&gt; 3.2–10GHZ</td>
<td>0–160rad</td>
<td>0–16rad</td>
</tr>
<tr>
<td>&gt; 10.0–20GHZ</td>
<td>0–320rad</td>
<td>0–32rad</td>
</tr>
<tr>
<td>&gt; 20.0–28.5GHZ</td>
<td>0–480rad</td>
<td>0–48rad</td>
</tr>
<tr>
<td>&gt; 20.0–40.0GHZ</td>
<td>0–640rad</td>
<td>0–64rad</td>
</tr>
<tr>
<td>&gt; 28.5–44.0GHZ</td>
<td>0–800rad</td>
<td>0–80rad</td>
</tr>
<tr>
<td>&gt;40–67.0GHZb</td>
<td>0–1280rad</td>
<td>0–128rad</td>
</tr>
</tbody>
</table>

Key Entry ΦM Dev

a.E8267D Only

b.Performance is not specified above 50 GHz
Analog Commands
Phase Modulation Subsystem ([SOURce])

:PM[1]|2[:DEViation]:TRACk

Supported All with Option UNT

[:SOURce]:PM[1]|2[:DEViation]:TRACk ON|OFF|1|0

This command enables or disables the deviation coupling between the PM paths 1 and 2.

ON (1) This choice will link the deviation value of PM1 with PM2; PM2 will assume the
PM[1] deviation value. For example, if PM1 deviation is set to 500 Hz and PM2 is
set to 2 kHZ, enabling the deviation tracking will cause the PM2 deviation value to
change to 500 Hz. This applies regardless of the path (PM1 or PM2) selected in
this command.

OFF (0) This choice disables the coupling and both paths will have independent deviation
values.

This command uses exact match tracking, not offset tracking.

Example
:PM1:TRAC OFF
The preceding example disables deviation coupling.

*RST 0

Key Entry ΦM Dev Couple Off On

:PM[:DEViation]:STEP[:INCRement]

Supported All with Option UNT

[:SOURce]:PM[:DEViation]:STEP[:INCRement]<val><units>|MAXimum|MINimum|DEFault
[:SOURce]:PM[:DEViation]:STEP[:INCRement]?

This command sets the phase modulation deviation step value.

The value set by this command is used with the UP and DOWN choices for the FM deviation
command. Refer to “:PM[1]|2[:DEViation]” on page 173 for more information.

The setting is not affected by a signal generator power-on, preset, or *RST command.

Example
:PM:STEP 20RAD
The preceding example sets the step value to 20 radians.

Range 0.001–1E3RAD
Pulse Modulation Subsystem ([SOURce])

[:PULM:EXTernal:POLarity NORMal:INVerted]

Supported All with Option UNU or UNW

[:SOURce]:PULM:EXTernal:POLarity NORMal|INVerted

This command selects the polarity of the TTL input signal at the GATE/PULSE/TRIGGER INPUT front panel connector. The signal generator can respond to either a normal (a TTL high) or an inverted (TTL low) signal.

Example

:PULM:EXT:POL NORM

The preceding example selects normal (TTL high) polarity.

*RST Normal

Key Entry Ext Polarity Normal Inverted

[:PULM:INTternal[1]:DELay]

Supported All with Option UNU or UNW

[:SOURce]:PULM:INTernal[1]:DELay <num><time_suffix>|UP|DOWN

[:SOURce]:PULM:INTernal[1]:DELay?

This command sets the pulse delay for the internally-generated pulse modulation using the variable <num>[<time_suffix>]. The command, used with the UP|DOWN parameters, will change the delay by a user-defined step value. Refer to the :PULM:INTernal[1]:DELay:STEP command on page 176 for setting the value associated with the UP and DOWN choices.

The optional variable <time_suffix> accepts nS (nanoseconds) to S (seconds).

The range value is dependent on the pulse period. Refer to “:PULM:INTernal[1]:PERiod” on page 177 for pulse period settings.

Example

:PULM:INT:DEL 200E-9

The preceding example sets the internal pulse delay to 200 nanoseconds.

*RST +0.00000000E+000

Range Internal Free Run: depends on pulse period and pulse width settings

Internal Triggered & Doublet: 70nS to (42 S - 20 nS - pulse width)

Key Entry Pulse Delay
Analog Commands
Pulse Modulation Subsystem [:SOURce]

**:PULM:INTernal[1]:DELay:STEP**

**Supported**
All with Option UNU or UNW

[:SOURce]:PULM:INTernal[1]:DELay:STEP <num><time_suffix>
[:SOURce]:PULM:INTernal[1]:DELay:STEP?

This command sets the step increment for the pulse delay.

The step value, set by this command, is used with the UP and DOWN choices in the
".:PULM:INTernal[1]:DELay" on page 175 command.

The step value set with this command is not affected by a signal generator power-on, preset, or *RST command.

**Example**
:PULM:INT:DEL:STEP 10NS
The preceding example sets the pulse delay step value to 10 nanoseconds.

**Range**
10nS to (pulse period – 20 nS)

**:PULM:INTernal[1]:FREQuency**

**Supported**
All with Option UNU or UNW

[:SOURce]:PULM:INTernal[1]:FREQuency <val><units>|UP|DOWN
[:SOURce]:PULM:INTernal[1]:FREQuency?

This command sets the pulse rate for the internally-generated square wave using the variable
<val><units>. The command, used with the UP|DOWN parameters, will change the frequency by a
user-defined step value. Refer to the :PULM:INTernal[1]:FREQuency:STEP command for setting the
value associated with the UP and DOWN choices.

This command is used when SQUare is the pulse modulation type. Refer to ".:PULM:SOURce" on
page 180 for the pulse modulation type selection.

**Example**
:PULM:INT:FREQ 1MHZ
The preceding example sets the square wave pulse rate to 1 megahertz.

**RST**
+4.00000000E+002

**Range**
0.1HZ–10MHZ

**Key Entry**
Pulse Rate
Analog Commands
Pulse Modulation Subsystem ([SOURce])

[:SOURce]:PULM:INTernal[1]:FREQuency:STEP

**Supported**
All with Option UNU or UNW

[:SOURce]:PULM:INTernal[1]:FREQuency:STEP[:INCRement] <frequency>
[:SOURce]:PULM:INTernal[1]:FREQuency:STEP[INCRement]?

This command sets the step value for the internally-generated square wave pulse rate.

This command is used when SQUare is the pulse modulation type. Refer to "[:SOURce]:PULM:SOURce" on page 180 for the pulse modulation type selection. The step value, set with this command, is used with the UP and DOWN choices in the :PULM:INTernal[1]:FREQuency command.

The step value set with this command is not affected by a power-on, preset, or *RST command.

**Example**

[:PULM:INT:FREQ:STEP MIN

The preceding example sets the step value for the square wave pulse rate to 0.1 Hz, the minimum rate.

**Range**
0.1HZ–10MHZ

[:SOURce]:PULM:INTernal[1]:PERiod

**Supported**
All with Option UNU or UNW

[:SOURce]:PULM:INTernal[1]:PERiod <val><units>|UP|DOWN
[:SOURce]:PULM:INTernal[1]:PERiod?

This command sets the pulse period for the internally-generated pulse modulation using the variables <val><units>. The command, used with the UP|DOWN parameters, will change the pulse period by a user-defined step value. Refer to the :PULM:INTernal[1]:PERiod:STEP[:INCRement] command for setting the value associated with the UP and DOWN choices.

If the entered value for the pulse period is equal to or less than the value for the pulse width, the pulse width changes to a value that is less than the pulse period. Refer to "[:PULM:INTernal[1]:PWIDth]" on page 178 for setting the pulse width.

**Example**

[:PULM:INT:PER .5S

The preceding example sets the period of the internally-generated pulse to 500 milliseconds.

*RST
+2.00000000E−006

**Range**
70nS–42S

**Key Entry**
Pulse Period
Analog Commands
Pulse Modulation Subsystem [:SOURce]

:PULM:INTernal[1]:PERiod:STEP[:INCRement]

Supported All with Option UNU or UNW

[:SOURce]:PULM:INTernal[1]:PERiod:STEP[:INCRement]<val><units>|MAXimum|MINimum|DEFault

[:SOURce]:PULM:INTernal[1]:PERiod:STEP[:INCRement]?

This command sets the step value for the internal pulse period using the variable <val><units>. The step value, set with this command, is used with the UP and DOWN choices available in the :PULM:INTernal[1]:PERiod command.

The step value set with this command is not affected by a power-on, preset, or *RST command.

Example

:PULM:INT:PER:STEP .1S

The preceding example sets the square wave pulse rate to 100 milliseconds.

*RST 1.00000000E-006

Range 10nS–42S

:PULM:INTernal[1]:PWIDth

Supported All with Option UNU or UNW

[:SOURce]:PULM:INTernal[1]:PWIDth <num><time_suffix>|UP|DOWN

[:SOURce]:PULM:INTernal[1]:PWIDth?

This command sets the pulse width for the internally generated pulse signal.

This command sets the pulse width for the internally- generated pulse modulation using the variables <num><time_suffix>. The command, used with the UP|DOWN parameters, will change the pulse width by a user-defined step value. Refer to the :PULM:INTernal[1]:PWIDth:STEP command for setting the value associated with the UP and DOWN choices.

If the entered value for the pulse width is equal to or greater than the value for the pulse period, the pulse width changes to a value that is less than the pulse period. For more information, refer to the command ":PULM:INTernal[1]:PWIDth" on page 178.

NOTE A power search is recommended for signals with pulse widths less than one microsecond. Refer to ":ALC:SEARch" on page 134.

Example

:PULM:INT:PWIDth 100MS

The preceding example sets the pulse width to 100 milliseconds.

*RST +1.00000000E-006

Range 10nS to (pulse period - 20 nS)

Key Entry Pulse Width
Analog Commands

Pulse Modulation Subsystem ([SOURce])

[:SOURce]:PULM:INTernal[1]:PWIDth:STEP

**Supported**  
All with Option UNU or UNW

[[:SOURce]:PULM:INTernal[1]:PWIDth:STEP<num><time_suffix>|MAXimum|MINimum|DEFault  
[:SOURce]:PULM:INTernal[1]:PWIDth:STEP?

This command sets the step increment for the pulse width using the variable <num><time_suffix>.  
The step value, set by this command, is used with the UP and DOWN choices available in the  
[:PULM:INTernal[1]:PWIDth]command.

The step value, set with this command, is not affected by a power-on, preset, or *RST command.

**Example**

:PULM:INT:PWID:STEP 100NS  
The preceding example sets the pulse width step to 100 nanoseconds.

*RST  
+1.00000000E−006

**Range**  
10nS to (pulse period - 20 nS)

[:PULM:INTernal]

**Supported**  
All with Option UNU or UNW

[[:SOURce]:PULM:SOURce:INTernal SQUARE|FRUN|TRIGGERed|DOUBLEt|GATED  
[:SOURce]:PULM:SOURce:INTernal?

This command selects one of the five internally generated modulation inputs. There are two external  
sources: Scalar and Ext Pulse which are selected using the :PULM:SOURce command.

**Example**

:PULM:SOUR:INT SQU  
The preceding example selects the internally–generated square wave pulse modulation format.

*RST  
FRUN (Int Free–Run)

**Key Entry**  
Internal Square  
Int Free-Run  
Int Triggered  
Int Doublet  
Int Gated
Analog Commands
Pulse Modulation Subsystem ([SOURce])

[:SOURce]:PULM:SOURce

Supported All with Option UNU or UNW
[:SOURce]:PULM:SOURce INTernal|EXTernal|SCALar
[:SOURce]:PULM:SOURce?

This command sets the source for pulse modulation. The INTernal selection accesses one of the five internally generated modulation inputs while EXTernal selects an external pulse (Ext Pulse) and SCALar selects input from a scalar network analyzer.

Example
:PULM:SOUR INT
The preceding example selects the internal free-run, pulse modulation source.

*RST FRUN (Int Free-Run)

Key Entry Internal Square Int Free-Run Int Triggered Int Doublet Int Gated
Ext Pulse Scalar

[:SOURce]:PULM:STATe

Supported All with Option UNU or UNW
[:SOURce]:PULM:STATe ON|OFF|1|0
[:SOURce]:PULM:STATe?

This command enables or disables pulse modulation for the selected path.

When pulse modulation is enabled, the PULSE annunciator appears on the signal generator's front-panel display.

Example
:PULM:STAT ON
The preceding example enables the pulse modulation.

*RST 0

Key Entry Pulse Off On
5 Digital Modulation Commands

In the following sections, this chapter provides SCPI descriptions for subsystems dedicated to the E8267D PSG Vector signal generator:

- “All Subsystem–Option 601 and 602 ([SOURce])” on page 181
- “AWGN ARB Subsystem–Option 403 ([SOURce]:RADio:AWGN:ARB)” on page 182
- “AWGN Real-Time Subsystem–Option 403 ([SOURce]:RADio:AWGN:RT)” on page 189
- “Custom Subsystem–Option 601 and 602 ([SOURce]:RADio:CUSTom)” on page 190
- “Digital Modulation Subsystem ([SOURce]:DM)” on page 214
- “Dual ARB Subsystem–Option 601 or 602 ([SOURce]:RADio:ARB)” on page 230
- “Dmodulation Subsystem–Option 601 or 602 ([SOURce]:RADio:DMODulation:ARB)” on page 258
- “Multitone Subsystem–Option 601 or 602 ([SOURce]:RADio:MTONe:ARB)” on page 280
- “Two Tone Subsystem ([SOURce]:RADio:TTONe:ARB)” on page 293
- “Wideband Digital Modulation Subsystem ([SOURce]:WDM)” on page 302

All Subsystem–Option 601 and 602 ([SOURce])

:RADio:ALL:OFF

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:ALL:OFF

This command disables all digital modulation personalities on a particular baseband. This command does not affect analog modulation.
Digital Modulation Commands
AWGN ARB Subsystem–Option 403 ([:SOURce]:RADio:AWGN:ARB)

**AWGN ARB Subsystem–Option 403 ([:SOURce]:RADio:AWGN:ARB)**

:`BWIDth`

**Supported**  All with Option 403

[:SOURce]:RADio:AWGN:ARB:BWIDth <val>
[:SOURce]:RADio:AWGN:ARB:BWIDth?

This command adjusts the bandwidth of the AWGN waveform. The variable `<val>` is expressed in units of hertz (Hz–MHz).

*RST  +1.00000000E+006

**Range**  5E4–1.5E7

**Key Entry**  Bandwidth

:`IQ:EXTernal:FILTER`

**Supported**  All with Option 403

[:SOURce]:RADio:AWGN:ARB:IQ:EXTernal:FILTER 40e6|THRough
[:SOURce]:RADio:AWGN:ARB:IQ:EXTernal:FILTER?

This command selects the filter or through path for I/Q signals routed to the rear panel I and Q outputs. Selecting a filter setting with this command will automatically set the "`:IQ:EXTernal:FILTER:AUTO` on page 182" command to Off mode.

40e6  This choice applies a 40 MHz baseband filter.

THRough  This choice bypasses filtering.

*RST  THR

**Key Entry**  40.000 MHz  Through

:`IQ:EXTernal:FILTER:AUTO`

**Supported**  All with Option 403

[:SOURce]:RADio:AWGN:ARB:IQ:EXTernal:FILTER:AUTO ON|OFF|1|0
[:SOURce]:RADio:AWGN:ARB:IQ:EXTernal:FILTER:AUTO?

This command enables or disables the automatic selection of the filters for I/Q signals routed to the rear panel I/Q outputs.

ON(1)  This choice will automatically select a digital modulation filter optimized for the current signal generator settings.

OFF(0)  This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to ":`IQ:EXTernal:FILTER` on page 182" for selecting a filter or through path.

*RST  ON

**Key Entry**  I/Q Output Filter Manual Auto
**:HEADer:CLear**

**Supported**
All with Option 403

[:SOURce]:RADio:AWGN:ARB:HEADer:CLear

This command clears the header information from the header file used by this modulation format. The **AWGN Off On** softkey must be set to On for this command to function.

*RST*  
N/A

**Key Entry**
Clear Header

**:HEADer:SAVE**

**Supported**
All with Option 403

[:SOURce]:RADio:AWGN:ARB:HEADer:SAVE

This command saves the header information to the header file used by this modulation format. The **AWGN Off On** softkey must be set to On for this command to function.

*RST*  
N/A

**Key Entry**
Save Setup To Header

**:IQ:MODulation:ATTen**

**Supported**
All with Option 403

[:SOURce]:RADio:AWGN:ARB:IQ:MODulation:ATTen <val>
[:SOURce]:RADio:AWGN:ARB:IQ:MODulation:ATTen?

This command attenuates the I/Q signals being modulated through the signal generator's RF path. The variable <val> is expressed in units of decibels (dB).

*RST*  
+2.00000000E+000

**Range**
0–40

**Key Entry**
Modulator Attten Manual Auto

**:IQ:MODulation:ATTen:AUTO**

**Supported**
All with Option 403

[:SOURce]:RADio:AWGN:ARB:IQ:MODulation:ATTen:AUTO ON|OFF|1|0
[:SOURce]:RADio:AWGN:ARB:IQ:MODulation:ATTen:AUTO?

This command enables or disables the I/Q attenuation auto mode.

**ON (1)**
This choice enables the attenuation auto mode which optimizes the modulator attenuation for the current conditions.

**OFF (0)**
This choice holds the attenuator at its current setting or at a selected value. Refer to "**:IQ:MODulation:ATTen**" on page 183 for setting the attenuation value.

*RST*  
1
Digital Modulation Commands

AWGN ARB Subsystem–Option 403 [:SOURce]:RADio:AWGN:ARB)

Key Entry

Modulator Atten Manual Auto

:IQ:MODulation:FILTer

Supported

All with Option 403

[:SOURce]:RADio:AWGN:ARB:IQ:MODulation:FILTer 40e6|THRough

[:SOURce]:RADio:AWGN:ARB:IQ:MODulation:FILTer?

This command enables you to select a filter or through path for I/Q signals modulated onto the RF carrier. Selecting a filter with this command will automatically set “:IQ:MODulation:ATTen:AUTO” on page 183 to Off(0) mode.

40E6 This choice applies a 40 MHz baseband filter to the I/Q signals.

THRough This choice bypasses filtering.

*RST THR

Key Entry

40.000 MHz Through

:IQ:MODulation:FILTer:AUTO

Supported

All with Option 403

[:SOURce]:RADio:AWGN:ARB:IQ:MODulation:FILTer:AUTO ON|OFF|1|0

[:SOURce]:RADio:AWGN:ARB:IQ:MODulation:FILTer:AUTO?

This command enables or disables the automatic selection of the filters for I/Q signals modulated onto the RF carrier.

ON(1) This choice will automatically select a digital modulation filter.

OFF(0) This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “:IQ:MODulation:FILTer” on page 236 for selecting a filter or through path.

*RST 1

Key Entry

I/Q Mod Filter Manual Auto

:MDEStination:AAMPlitude

Supported

All with Option 403

[:SOURce]:RADio:AWGN:ARB:MDEStination:AAMPlitude NONE|M1|M2|M3|M4

[:SOURce]:RADio:AWGN:ARB:MDEStination:AAMPlitude?

This command routes the selected marker to the Alternate Amplitude function. The NONE parameter clears the marker for the Alternate Amplitude function.

*RST NONE

Key Entry

None Marker 1 Marker 2 Marker 3 Marker 4
Digital Modulation Commands
AWGN ARB Subsystem–Option 403 ([:SOURce]:RADio:AWGN:ARB)

:MDEstination:ALCHold

Supported  All with Option 403

CAUTION  Incorrect automatic level control (ALC) sampling can create a sudden unleveled condition that may create a spike in the RF output potentially damaging a DUT or connected instrument. Ensure that you set markers to let the ALC sample over an amplitude that accounts for the high power levels within the signal.

[:SOURce]:RADio:AWGN:ARB:MDEStination:ALCHold NONE|M1|M2|M3|M4

[:SOURce]:RADio:AWGN:ARB:MDEStination:ALCHold?

This command enables or disables the marker ALC hold function for the selected marker. For setting markers, see “:MARKer[:SET]” on page 239.

Use the ALC hold function when you have a waveform signal that uses idle periods, or when the increased dynamic range encountered with RF blanking is not desired. The ALC leveling circuitry responds to the marker signal during the marker pulse (marker signal high), averaging the modulated signal level during this period.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points. For setting a marker’s polarity, see “:MPOLarity:MARKer1|2|3|4” on page 243.

NOTE  Do not use the ALC hold for more than 100 ms, because it can affect the waveform’s output amplitude.

The marker signal has a minimum of a two-sample delay in its response relative to the waveform signal response. To compensate for the marker signal delay, offset marker points from the waveform sample point at which you want the ALC sampling to begin.

The ALC hold setting is part of the file header information, so saving the setting to the file header saves the current marker routing for the waveform file.

NOTE  A waveform file that has unspecified settings in the file header uses the previous waveform’s routing settings.

For more information on the marker ALC hold function, see the E8257D/67D PSG Signal Generators User’s Guide. For setting the marker points, see “:MARKer[:SET]” on page 239.

NONE  This terminates the marker ALC hold function.

M1–M4  These are the marker choices. The ALC hold feature uses only one marker at a time.

*RST  NONE
Digital Modulation Commands
AWGN ARB Subsystem–Option 403 [:SOURce]:RADio:AWGN:ARB

Example
:RAD:ARB:MDES:ALCH M1

The preceding example routes marker 1 to the ALC Hold function.

Key Entry

| None | Marker 1 | Marker 2 | Marker 3 | Marker 4 |

Remarks
N/A

:MDES:ATION:PULSe

Supported
All with Option 403

CAUTION
The pulse function incorporates the ALC hold. Incorrect automatic level control (ALC) sampling can create a sudden unleveled condition that may create a spike in the RF output potentially damaging a DUT or connected instrument. Ensure that you set markers to let the ALC sample over an amplitude that accounts for the high power levels within the signal.

[:SOURce]:RADio:AWGN:ARB:MDES:ATION:PULSe NONE|M1|M2|M3|M4

This command enables or disables the marker pulse/RF blanking function for the selected marker.

The function automatically uses the ALC hold function, so there is no need to select both ALC hold and marker pulse/RF blanking functions for the same marker

NOTE
Do not use ALC hold for more than 100 ms, because it can affect the waveform’s output amplitude.

The signal generator blanks the RF output when the marker signal goes low. The marker polarity determines when the marker signal is low. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points. For setting a marker’s polarity, see “:MPOL:ARY:MARKer1|2|3|4” on page 243.

NOTE
Set marker points prior to using this function. Enabling this function without setting marker points may create a continuous low or high marker signal, depending on the marker polarity. This causes either no RF output or a continuous RF output. See “:MARKer[:SET]” on page 239 for setting the marker points.

The marker signal has a minimum of a two-sample delay in its response relative to the waveform signal response. To compensate for the marker signal delay, offset marker points from the waveform sample point at which you want the RF blanking to begin. The RF blanking setting is part of the file header information, so saving the setting to the file header saves the current marker routing for the waveform file.

NOTE
A waveform file that has unspecified settings in the file header uses the previous waveform’s routing settings. This could create the situation where there is no RF output signal, because the previous waveform used RF blanking.

For more information on the marker RF blanking function, see the E8257D/67D PSG Signal Generators User’s Guide.
NONE       This terminates the marker RF blanking/pulse function.
M1–M4      These are the marker choices. The RF blanking/pulse feature uses only one marker at a time.

Example
:RAD:ARB:MDES:PULS M2
The preceding example routes marker 2 to Pulse/RF Blanking.

*RST       NONE

:MPOLarity:MARKer1|2|3|4

Supported   All with Option 403
[:SOURCE]:RAD:AWGN:ARB:MPOLarity:MARKer1|2|3|4 NEGative|POSitive[:SOURCE]:RAD:AWGN:ARB:MPOLarity:MARKer1|2|3|4?

This command sets the polarity for the selected marker. For a positive marker polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

Example
:RAD:ARB:MPOL:MARK3 NEG
The preceding example sets the polarity for marker 3 to negative.

*RST       POS

Key Entry  Marker 1 Polarity Neg Pos   Marker 2 Polarity Neg Pos   Marker 3 Polarity Neg Pos
           Marker 4 Polarity Neg Pos

:LENgth

Supported   All with Option 403

This command specifies the length (number of points) of the AWGN waveform. A longer waveform yields a statistically more correct waveform.

*RST       524288

Key Entry  1048576   524288   262144   131072   65536   32768   16384
Digital Modulation Commands
AWGN ARB Subsystem–Option 403 [:SOURce]:RADio:AWGN:ARB

:REference:EXTernal:FREQuency

Supported All with Option 403

[:SOURce]:RADio:AWGN:ARB:REference:EXTernal:FREQuency <val>
[:SOURce]:RADio:AWGN:ARB:REference:EXTernal:FREQuency?

This command allows you to enter the frequency of the applied external reference. The value specified by this command is effective only when you are using an external ARB reference applied to the BASEBAND GEN REF IN rear panel connector. To specify external as the ARB reference source type, refer to “:REference[:SOURce]” on page 268.

The variable <val> is expressed in units of hertz (Hz–MHz).

*RST +1.00000000E+007
Range 2.5E5–1E8
Key Entry Reference Freq

:REference[:SOURce]

Supported All with Option 403

[:SOURce]:RADio:AWGN:ARB:REference[:SOURce] INTernal|EXTernal
[:SOURce]:RADio:AWGN:ARB:REference[:SOURce]?

This command selects either an internal or external reference for the waveform clock. If the EXTernal choice is selected, the external frequency value must be entered and the signal must be applied to the BASEBAND GEN REF IN rear panel connector. Refer to “:REference:EXTernal:FREQuency” on page 268 to enter the external reference frequency.

*RST INT
Key Entry ARB Reference Ext Int

:SCLock:RATE

Supported All with Option 403

[:SOURce]:RADio:AWGN:ARB:SCLock:RATE <val>
[:SOURce]:RADio:AWGN:ARB:SCLock:RATE?

This command sets the sample clock rate for the AWGN modulation format. The modulation format should be active before executing this command. If this command is executed before the modulation format is active, the entered value will be overridden by a calculated factory default value. Refer to “:BURSt:SHAPe:FALL:DElay” on page 192 to activate the modulation format.

The variable <val> is expressed in units of hertz.

*RST +1.00000000E+008
Range 1–1E8
Key Entry ARB Sample Clock
:SEED

**Supported**  All with Option 403

[:SOURce]:RADio:AWGN:ARB:SEED FIXed|RANDom

This command toggles the AWGN waveform noise seed value type.

FIXed  This choice selects a fixed noise seed value.

RANDom  This choice selects a randomly generated noise seed value.

*RST  FIX

**Key Entry**  Noise Seed Fixed Random

[:STATe]

**Supported**  All with Option 403

[:SOURce]:RADio:AWGN:ARB[:STATe] ON|OFF|1|0

[:SOURce]:RADio:AWGN:ARB[:STATe]?

This command enables or disables the AWGN generator function.

*RST  0

**Key Entry**  Arb AWGN Off On

**AWGN Real-Time Subsystem–Option 403 ([SOURce]:RADio:AWGN:RT)**

:BWIDTH

**Supported**  E8267D with Option 403

[:SOURce]:RADio:AWGN:RT:BWIDTH <val>

[:SOURce]:RADio:AWGN:RT:BWIDTH?

This command adjusts the real-time AWGN bandwidth value.

The variable <val> is expressed in units of hertz (Hz–MHz).

*RST  +1.00000000E+006

**Range**  5E4–8E7

**Key Entry**  Bandwidth

[:STATe]

**Supported**  E8267D with Option 403

[:SOURce]:RADio:AWGN:RT[:STATe] ON|OFF|1|0

[:SOURce]:RADio:AWGN:RT[:STATe]?

This command enables or disables the operating state of real-time AWGN.

*RST  0

**Key Entry**  Real-time AWGN Off On
**Custom Subsystem—Option 601 and 602 ([:SOURce]:RADio:CUSTom)**

### :ALPha

**Supported** E8267D with Option 601 or 602

[:SOURce]:RADio:CUSTom:ALPHa <val>
[:SOURce]:RADio:CUSTom:ALPHa?

This command changes the Nyquist or root Nyquist filter's alpha value. The filter alpha value can be set to a minimum level (0), a maximum level (1), or in between by using fractional numeric values (0.001–0.999). To change the current filter type, refer to “:FILTER” on page 201.

**Example**

:RAD:CUST:ALPH .65

The preceding example sets the filter alpha to .65.

*RST  +3.50000000E-001

**Range**  0.000–1.000

**Key Entry**  Filter Alpha

### :BBCLock

**Supported** E8267D with Option 601 or 602

[:SOURce]:RADio:CUSTom:BBCLock?

This command toggles the data (bit) clock input to the baseband generator board to either internal or external. This command is independent in each mode and works for both non-burst (continuous) and burst modes. This allows for a matrix of selections between burst/non-burst, internal/external data generation, internal/external data clock, and external bit/symbol data clock.

**Example**

:RAD:CUST:BBCL 1

The preceding example selects the signal generator’s internal data clock.

*RST  INT

**Key Entry**  BBG Data Clock Ext Int
:BBT

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:CUSTom:BBT <val>
[:SOURce]:RADio:CUSTom:BBT?

This command changes the bandwidth-multiplied-by-bit-time (BbT) filter parameter. The filter BbT value can be set to the maximum level (1) or in between the minimum level (0.100) and maximum level by using fractional numeric values (0.101–0.999). This command is effective only after choosing a Gaussian filter. It does not effect other types of filters (see “:FILTER” on page 201).

Example

:RAD:CUST:BBT .300

The preceding example selects a 0.300 BbT gaussian filter.

*RST +5.00000000E−001

Range 0.100–1.000

Key Entry Filter BbT

:BRAte

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:CUSTom:BRAte <val>
[:SOURce]:RADio:CUSTom:BRAte?

This command sets the bit rate. The variable <val> is expressed in bits per second (bps–Mbps) and the maximum range value depends on the data source (internal or external), the modulation type, and filter. When user-defined filters are selected (see “:FILTER” on page 201), the upper bit rate is restricted using the following criteria:

- FIR filter length > 32 symbols: upper limit is 12.5 Msp
- FIR filter length > 16 symbols: upper limit is 25 Msp

When internal FIR filters are used, these limit restrictions always apply. For higher symbol rates, the FIR filter length will be truncated and will impact the relative timing of the modulated data, as well as the actual filter response (see “:SRATe” on page 205).

A change in the bit rate value effects the symbol rate value; refer to “:SRATe” on page 205 for a list of the minimum and maximum symbol rate values.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 204.
Example

```plaintext
:RAD:CUST:BRAT 10MBPS
```

The preceding example sets the bit rate to 10 megabits per second.

```
*RST +4.86000000E+004
```

Supported

<table>
<thead>
<tr>
<th>Range</th>
<th>Modulation Type</th>
<th>Bits per Symbol</th>
<th>Internal Data</th>
<th>External Serial Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-bit</td>
<td>BPSK</td>
<td>1</td>
<td>45 bps–50 Mbps</td>
<td>45 bps–50 Mbps</td>
</tr>
<tr>
<td>2-bit</td>
<td>FSK2</td>
<td>2</td>
<td>90 bps–100 Mbps</td>
<td>45 bps–50 Mbps</td>
</tr>
<tr>
<td>3-bit</td>
<td>C4FM</td>
<td>3</td>
<td>135 bps–150 Mbps</td>
<td>45 bps–50 Mbps</td>
</tr>
<tr>
<td>4-bit</td>
<td>PSK4</td>
<td>4</td>
<td>180 bps–200 Mbps</td>
<td>45 bps–50 Mbps</td>
</tr>
<tr>
<td>5-bit</td>
<td>MSK</td>
<td>5</td>
<td>225 bps–250 Mbps</td>
<td>45 bps–50 Mbps</td>
</tr>
<tr>
<td>6-bit</td>
<td>FSK8</td>
<td>6</td>
<td>270 bps–300 Mbps</td>
<td>45 bps–50 Mbps</td>
</tr>
<tr>
<td>7-bit</td>
<td>OQPSK</td>
<td>7</td>
<td>315 bps–350 Mbps</td>
<td>45 bps–50 Mbps</td>
</tr>
<tr>
<td>8-bit</td>
<td>SQPSK</td>
<td>8</td>
<td>360 bps–400 Mbps</td>
<td>45 bps–50 Mbps</td>
</tr>
</tbody>
</table>

:BURSt:SHAPe:FALL:DElay

Supported E8267D with Option 601 or 602

```
[:SOURce]:RADio:CUSTom:BURSt:SHAPe:FALL:DElay <val>
[:SOURce]:RADio:CUSTom:BURSt:SHAPe:FALL:DElay?
```

This command sets the burst shape fall delay. The variable <val> is expressed in bits with 1 bit = 1/(symbol_rate*bits_per_symbol).

To change the modulation type, refer to “MODulation[:TYPE]” on page 204. Refer to “SRATe” on page 205 for a list of the minimum and maximum symbol rate values.

“BURSt:SHAPe:FDElay” on page 193 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the E8257D/67D PSG Signal Generators User’s Guide.
Digital Modulation Commands
Custom Subsystem–Option 601 and 602 [:SOURce]:RADio:CUSTom

**Example**

```plaintext
```

The preceding example sets a 50 bit fall delay.

* RST
  +0.00000000E+000

**Range**

−22.3750 to 99

**Key Entry**

Fall Delay

---

**:BURSt:SHAPe:FALL:TIME**

**Supported**

E8267D with Option 601 or 602601 or 602

```
[:SOURce]:RADio:CUSTom:BURSt:SHAPe:FALL:TIME <val>
[:SOURce]:RADio:CUSTom:BURSt:SHAPe:FALL:TIME?
```

This command sets the burst shape fall time. The variable `<val>` is expressed in bits with
1 bit = 1/(symbol_rate*bits_per_symbol).

To change the modulation type, refer to “*:MODulation[:TYPE]” on page 204. Refer to “*:SRATe” on page 205 for a list of the minimum and maximum symbol rate values.

“*:BURSt:SHAPe:FTIMe” on page 194 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the E8257D/67D PSG Signal Generators User’s Guide.

**Example**

```plaintext
```

The preceding example sets a 100 bit fall delay.

* RST
  +1.00000000E+01

**Range**

0.1250–255.8750

**Key Entry**

Fall Time

---

**:BURSt:SHAPe:FDELay**

**Supported**

E8267D with Option 601 or 602

```
[:SOURce]:RADio:CUSTom:BURSt:SHAPe:FDELay <val>
[:SOURce]:RADio:CUSTom:BURSt:SHAPe:FDELay?
```

This command sets the burst shape fall delay. The variable `<val>` is expressed in bits with
1 bit = 1/(symbol_rate*bits_per_symbol).

To change the modulation type, refer to “*:MODulation[:TYPE]” on page 204. Refer to “*:SRATe” on page 205 for a list of the minimum and maximum symbol rate values.

“*:BURSt:SHAPe:FALL:DELay” on page 192 performs the same function; in compliance with the SCPI standard, both commands are listed.
Digital Modulation Commands
Custom Subsystem–Option 601 and 602 [:SOURce]:RADIO:CUSTOM

For concept information on burst shaping, refer to the *E8257D/67D PSG Signal Generators User's Guide*.

**Example**

:RAD:CUSt:BURS:SHAP:FDEL 45

The preceding example sets a 45 bit fall delay.

*RST*  
+0.00000000E+000

*Range*  
−22.3750 to 99

*Key Entry*  
Fall Delay

**:BURSt:SHApe:FTIMe**

**Supported**  
E8267D with Option 601 or 602

[:SOURce]:RADIO:CUStom:BURSt:SHApe:FTIMe <val>  
[:SOURce]:RADIO:CUStom:BURSt:SHApe:FTIMe?

This command sets the burst shape fall time. The variable <val> is expressed in bits with 1 bit = 1/(symbol_rate*bits_per_symbol).

To change the modulation type, refer to “MODulation[:TYPE]” on page 204. Refer to “SRATe” on page 205 for a list of the minimum and maximum symbol rate values.

“BURSt:SHApe: FALL:TIME” on page 193 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the *E8257D/67D PSG Signal Generators User's Guide*.

**Example**

:RAD:CUSt:BURS:SHAP:FTIM 20

The preceding example sets a 20 bit fall delay.

*RST*  
+0.00000000E+000

*Range*  
0.1250−255.8750

*Key Entry*  
Fall Time

**:BURSt:SHApe:RDELay**

**Supported**  
E8267D with Option 601 or 602

[:SOURce]:RADIO:CUStom:BURSt:SHApe:RDELay <val>  
[:SOURce]:RADIO:CUStom:BURSt:SHApe:RDELay?

This command sets the burst shape rise delay. The variable <val> is expressed in bits with 1 bit = 1/(symbol_rate*bits_per_symbol).

To change the modulation type, refer to “MODulation[:TYPE]” on page 204. Refer to “SRATe” on page 205 for a list of the minimum and maximum symbol rate values.
".BURSt:SHApe:RISE:DELay" on page 195 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the E8257D/67D PSG Signal Generators User’s Guide.

**Example**

`:RAD:CUST:BURS:SHAP:RDEL -10`

The preceding example sets a –10 bit rise delay.

*RST +0.00000000E+000

Range –17.3750 to 99

**Key Entry** Rise Delay

`:BURSt:SHApe:RISE:DELay`

**Supported** E8267D with Option 601 or 602

[:SOURce]:RADio:CUSTom:BURSt:SHApe:RISE:DELay <val>

[:SOURce]:RADio:CUSTom:BURSt:SHApe:RISE:DELay?

This command sets the burst shape rise delay. The variable <val> is expressed in bits with 1 bit = 1/(symbol_rate*bits_per_symbol).

To change the modulation type, refer to ":MODulation[:TYPE]" on page 204. Refer to ":SRATe" on page 205 for a list of the minimum and maximum symbol rate values.

".BURSt:SHApe:RDELay" on page 194 performs the same function; in compliance with the SCPI standard, both commands are listed.

For concept information on burst shaping, refer to the PSG User’s Guide.

**Example**


The preceding example sets a 10 bit rise delay.

*RST +0.00000000E+000

Range –17.3750 to 99

**Key Entry** Rise Delay
Digital Modulation Commands
Custom Subsystem–Option 601 and 602 [:SOURce]:RADio:CUStom

:BURSt:SHApe:RISE:TIME

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:CUStom:BURSt:SHApe:RISE:TIME <val>
[:SOURce]:RADio:CUStom:BURSt:SHApe:RISE:TIME?

This command sets the burst shape rise time. The variable <val> is expressed in bits with
1 bit = 1/(symbol_rate*bits_per_symbol).

To change the modulation type, refer to “:MODulation[:TYPE]” on page 204. Refer to “:SRATe” on
page 205 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHApe:RTIMe” on page 196 performs the same function; in compliance with the SCPI
standard, both commands are listed.

For concept information on burst shaping, refer to the E8257D/67D PSG Signal Generators User’s
Guide.

Example


The preceding example sets a .5 bit rise delay.

*RST +1.00000000E+001

Range 0.1250–121.5000

Key Entry Rise Time

:BURSt:SHApe:RTIMe

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:CUStom:BURSt:SHApe:RTIMe <val>
[:SOURce]:RADio:CUStom:BURSt:SHApe:RTIMe?

This command sets the burst shape rise time. The variable <val> is expressed in bits with
1 bit = 1/(symbol_rate*bits_per_symbol).

To change the modulation type, refer to “:MODulation[:TYPE]” on page 204. Refer to “:SRATe” on
page 205 for a list of the minimum and maximum symbol rate values.

“:BURSt:SHApe:RISE:TIME” on page 196 performs the same function; in compliance with the SCPI
standard, both commands are listed.

For concept information on burst shaping, refer to the E8257D/67D PSG Signal Generators User’s
Guide.

Example

:RAD:CUST:BURS:SHAP:RTIM 100

The preceding example sets a 100 bit rise time.

*RST +1.00000000E+001

Range 0.1250–121.5000

Key Entry Rise Time
:BURSt:SHAPE[:TYPE]

**Supported**  E8267D with Option 601 or 602

[:SOURce]:RADio:CUSTom:BURSt:SHAPE[:TYPE] SINE|"<file_name>"

This command selects a user-defined or a pre-defined burst shape file.

SINE  This choice selects the pre-defined Sine burst shape as the burst shape type.

"<file_name>"  This variable names the user burst shape file to use. Refer to "File Name Variables" on page 10 for information on the file name syntax.

**Example**

:RAD:CUST:BURS:SHAPE "Test_File"

The preceding example selects a file named Test_File from the signal generator's SHAPE directory. The directory path is implied in the command and does not need to be specified.

*RST  SINE

**Key Entry**  Sine  User File

:CHANnel

**Supported**  E8267D with Option 601 or 602

[:SOURce]:RADio:CUSTom:CHANnel EVM|ACP

[:SOURce]:RADio:CUSTom:CHANnel?

This command optimizes the Nyquist and root Nyquist filters to minimize error vector magnitude (EVM) or to minimize adjacent channel power (ACP).

EVM  This choice provides the most ideal passband.

ACP  This choice improves stopband rejection.

To change the current filter type, refer to ":FILTER" on page 201.

**Example**

:RAD:CUST:CHAN EVM

The preceding example uses EVM optimizing.

*RST  EVM

**Key Entry**  Optimize FIR for EVM ACP
**:DACS:ALIGn**

**Supported**
E8267D with Option 601 or 602

This command resets the signal generator’s I/Q DAC circuitry. This operation is required any time the external VCO clock signal is lost and re-acquired or when an external VCO clock signal is first applied to the BASEBAND GEN CLK IN connector.

**Example**

`:RAD:CUST:DACS ALIG`

The preceding example resets the I/Q DAC circuitry.

**RST**
N/A

**Range**
N/A

**Key Entry**
Align DACs

---

**:DATA**

**Supported**
E8267D with Option 601 or 602

This command sets the data pattern for unframed transmission. For information on the file name syntax, see "File Name Variables" on page 10.

**Example**

`:RAD:CUST:DATA PN9`

The preceding example selects a PN9 data pattern for unframed transmission.

**RST**
PN23

**Key Entry**

<table>
<thead>
<tr>
<th>PN9</th>
<th>PN11</th>
<th>PN15</th>
<th>PN20</th>
<th>PN23</th>
<th>FIX4</th>
<th>User File</th>
<th>Ext</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 1’s &amp; 4 0’s</td>
<td>8 1’s &amp; 8 0’s</td>
<td>16 1’s &amp; 16 0’s</td>
<td>32 1’s &amp; 32 0’s</td>
<td>PRAM FILE</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**:DATA:FIX4**

**Supported**
E8267D with Option 601 or 602

This command sets the binary, 4-bit repeating sequence data pattern for unframed transmission according to the modulation type, symbol rate, filter, and burst shape selected for the custom modulation format. FIX4 must be selected as the data type.

**<val>**
This variable is an integer value from one to 15 and represents the a four bit pattern.
Digital Modulation Commands
Custom Subsystem—Option 601 and 602 [:SOURce]:RADio:CUSTom

Example
:RAD:CUS T:DATA:FIX4 15

The preceding example selects a FIX4 data pattern consisting of four 1’s.

*RST #B0000

Range #B0000–#B1111 or 0–15

Key Entry FIX4

:DATA:PRAM

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:CUSTom:DATA:PRAM "<file_name>"

[:SOURce]:RADio:CUSTom:DATA:PRAM?

This command selects PRAM data as the data pattern for unframed transmission. Refer to “:DATA:PRAM:FILE:BLOCk” on page 48 for information on PRAM data. For information on the file name syntax, refer “File Name Variables” on page 10.

Example
:RAD:CUS T:DATA:PRAM "Test_Data"

The preceding example selects the PRAM file, Test_Data, as the data pattern for unframed transmission.

Key Entry PRAM File

:DENCCode

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:CUSTom:DENCCode ON|OFF|1|0

[:SOURce]:RADio:CUSTom:DENCCode?

This command enables or disables the differential data encoding function. Executing this command encodes the data bits prior to modulation; each modulated bit is 1 if the data bit is different from the previous one or 0 if the data bit is the same as the previous one.

Example
:RAD:CUS T:DENC 1

The preceding example enables differential data encoding for the selected modulation.

*RST 0

Key Entry Diff Data Encode Off On
**Digital Modulation Commands**

**Custom Subsystem–Option 601 and 602 [:SOURce]:RADio:CUSTom**

### :EDATa:DELAy

**Supported** E8267D with Option 601 or 602

[:SOURce]:RADio:CUSTom:EDATa:DELAy?

This query returns the time delay (in symbols) from the external data input to the beginning of the symbol on the I OUT and Q OUT rear-panel connectors and the front panel RF OUTPUT connector. When the format is turned off, the delay value is unchanged; the query will return the same delay value if the format is on or off.

### :EDCLock

**Supported** E8267D with Option 601 or 602

[:SOURce]:RADio:CUSTom:EDCLock SYMBOL|NORMal

[:SOURce]:RADio:CUSTom:EDCLock?

This command sets the external data clock use. In internal clock mode, neither choice has an effect. Refer to "BBCLock" on page 190 to select EXT as the data clock type.

**SYMBOL** This choice specifies that a continuous symbol clock signal must be provided to the SYMBOL SYNC input connector.

**NORMal** This choice specifies that the DATA CLOCK input connector requires a bit clock. The SYMBOL SYNC input connector requires a (one-shot or continuous) symbol sync signal.

**Example**

:RAD:CUST:EDCL NORM

The preceding example selects normal mode for the external data clock type.

*RST NORM

**Key Entry** Ext Data Clock Normal Symbol

### :EREFerence

**Supported** E8267D with Option 601 or 602

[:SOURce]:RADio:CUSTom:EREFerence INTernal|EXTernal

[:SOURce]:RADio:CUSTom:EREFerence?

This command selects either an internal or external bit-clock reference for the data generator. If the EXTrnal choice is selected, the external frequency value must be applied to the BASEBAND GEN REF IN rear-panel connector. See ":EREFerence:VALUE" on page 201 to enter the external reference frequency.

**Example**

:RAD:CUST:EREF EXT

The preceding example selects an external bit-clock reference for the data generator.

*RST INT

**Key Entry** BBG Ref Ext Int
::EREFerence::VALUE

**Supported**  
E8267D with Option 601 or 602

```plaintext
[:SOURce]:RADio:CUSTom::EREFerence::VALUE <val>
[:SOURce]:RADio:CUSTom::EREFerence::VALUE?
```

This command specifies the reference frequency of the externally applied reference. The variable `<val>` is expressed in hertz (Hz–MHz).

The value specified by this command is valid only when an external reference is applied to the BASEBAND GEN REF IN rear-panel connector. Refer to “::EREFerence” on page 200 to select EXternal as the reference for the bit clock reference of the data generator.

**Example**

```plaintext
:RAD:CUST::EREF::VALUE 10E6
```

The preceding example uses a 10 MHz external reference for the signal generator’s baseband generator.

**RST**  
+1.3000000E+007

**Range**  
2.5E5–1E8

**Key Entry**  
Ext BBG Ref Freq

::FILTER

**Supported**  
E8267D with Option 601 or 602

```plaintext
[:SOURce]:RADio:CUSTom::FILTER RNYQuist|NYQuist|GAUSSian|RECTangle|AC4Fm|UGGaussian|"<User_FIR>"
[:SOURce]:RADio:CUSTom::FILTER?
```

This command selects the pre-modulation filter type.

**RNYQuist**  
This choice selects a root nyquist filter (root raised cosine).

**NYQuist**  
This choice selects a Nyquist filter (raised cosine).

**GAUSSian**  
This choice selects a gaussian filter.

**RECTangle**  
This choice selects a one-symbol–wide rectangular filter.

**AC4Fm**  
This is a pre-defined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.

**UGGaussian**  
This choice selects a GSM Gaussian filter with a fixed Bbt value of 0.300.

"<User_FIR>"  
This variable is any filter file stored in the signal generator’s catalog of FIR files. The directory path is implied in the command and does not need to be specified. For information on the file name syntax, see “File Name Variables” on page 10.

**RST**  
RNYQ
Digital Modulation Commands
Custom Subsystem–Option 601 and 602 (:SOURce:RADio:CUSTom)

Example
:RAD:CUST:FILT GAUS
The preceding example selects a gaussian filter as the pre-modulation filter type.

Key Entry | Root Nyquist | Nyquist | Gaussian | Rectangle | APCO 25 C4FM | UN3/4 GSM Gaussian | User FIR

:IQ:SCALe

Supported | E8267D with Option 601 or 602
[:SOURce]:RADio:CUSTom:IQ:SCALe <val>
[:SOURce]:RADio:CUSTom:IQ:SCALe?
This command sets the amplitude of the I/Q outputs for better adjacent channel power (ACP); lower scaling values equate to better ACP.
The variable <val> is expressed as a percentage.
Example
:RAD:CUST:IQ:SCAL 50
The preceding example sets I/Q scaling to 50%.

*RST
+70
Range | 1–200
Key Entry | I/Q Scaling

:MODulation:FSK[:DEViation]

Supported | E8267D with Option 601 or 602
[:SOURce]:RADio:CUSTom:MODulation:FSK[:DEViation] <val>
[:SOURce]:RADio:CUSTom:MODulation:FSK[:DEViation]?
This command sets the maximum symmetric FSK frequency deviation value.
The variable <val> is a numeric expression in hertz which specifies the spacing of the two outermost FSK tones. Additional tones are evenly spaced between the two outermost tones. The maximum range value equals the current symbol rate value multiplied by four and is limited to 20 MHz.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 204. Refer to “:SRATe” on page 205 for a list of the minimum and maximum symbol rate values. Refer to the E8257D/67D PSG Signal Generators User’s Guide for information on setting an asymmetric FSK deviation value.

Example
:RAD:CUST:MOD:FSK 50KHZ
The preceding example sets the maximum frequency deviation to 50 kHz.

*RST
+4.00000000E+002
Range | 0–2E7
Key Entry | Freq Dev
::MODulation:MSK[:PHASe]

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:CUSTom:MODulation:MSK[:PHASe] <val>
[:SOURce]:RADio:CUSTom:MODulation:MSK[:PHASe]?

This command sets the MSK phase deviation value.
The variable <val> is expressed in degrees.

Example
::RAD:CUST:MOD:MSK 40

The preceding example sets the phase deviation to 40 degrees.

*RST +9.00000000E+001

Range 0–100

Key Entry Phase Dev

::MODulation:UFSK

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:CUSTom:MODulation:UFSK "<file_name>"
[:SOURce]:RADio:CUSTom:MODulation:UFSK?

This command selects a user-defined FSK file from the signal generator's catalog of FSK files. The directory path is implied in the command and does not need to be specified. For information on the file name syntax, see “File Name Variables” on page 10.

The user-defined FSK file is held in signal generator memory until the command that selects user FSK as the modulation type is sent. Refer to “::MODulation[:TYPE]” on page 204 to change the current modulation type.

Example
::RAD:CUST:MOD:UFSK "Test_FSK"

The preceding example selects the file, Test_FSK, from the catalog of FSK files.

Key Entry User FSK

::MODulation:UIQ

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:CUSTom:MODulation:UIQ "<file_name>"
[:SOURce]:RADio:CUSTom:MODulation:UIQ?

This command selects a user-defined I/Q file from the signal generator's catalog of IQ files. The directory path is implied in the command and does not need to be specified. For information on the file name syntax, see “File Name Variables” on page 10.
Digital Modulation Commands
Custom Subsystem—Option 601 and 602 [:SOURce]:RADio:CUSTom

The user-defined I/Q file is held in signal generator memory until the command that selects user I/Q as the modulation type is sent. Refer to “:MODulation[:TYPE]” on page 204 to change the current modulation type.

Refer to “:MODulation[:TYPE]” on page 204 to change the current modulation type.

Example

:RAD:CUST:MOD:UIQ "Test_IQ"

The preceding example selects the file, Test_IQ, from the catalog of IQ files.

Key Entry

:MODulation[:TYPE]

Supported

E8267D with Option 601 or 602

[:SOURce]:RADio:CUSTom:MODulation[:TYPE] BPSK|QPSK|IS95QPSK|GRAYQPSK|OQPSK|IS95QOQPSK|P4DQPSK|PSK8|PSK16|D8PSK|MSK|FSK2|FSK4|FSK8|FSK16|C4FM|QAM4|QAM16|QAM32|QAM64|QAM128|QAM256

[:SOURce]:RADio:CUSTom:MODulation[:TYPE]?

This command sets the modulation type for the Custom personality. For user-defined modulation, UIQ or UFSK, the file must first be specified using the “:MODulation:UFSK” or “:MODulation:UIQ” commands.

Example

:RAD:CUST:MOD BPSK

The preceding example selects binary phase shift keying (BPSK).

*RST

P4DQPSK

Key Entry

BPSK QPSK IS-95 QPSK Gray Coded QPSK OQPSK

IS-95 QOQPSK \(\pi/4\) DQPSK 8PSK 16PSK D8PSK MSK 2-Lvl FSK

4-Lvl FSK 8-Lvl FSK 16-Lvl FSK C4FM 4QAM 16QAM 32QAM

64QAM 128QAM 256QAM User I/Q User FSK

:POLarity[:ALL]

Supported

E8267D with Option 601 or 602

[:SOURce]:RADio:CUSTom:POLarity[:ALL] NORMAL|INVerted

[:SOURce]:RADio:CUSTom:POLarity[:ALL]?

This command sets the signal phase rotation direction.

NORMAL

This choice selects normal clockwise phase rotation for the signal.

INVerted

This choice reverses the phase rotation of the signal by inverting the Q signal.
**Example**

`:RAD:CUR:POL INV`

The preceding example selects reverse phase rotation for the internal Q signal.

*RST*  
**NORM**

**Key Entry**  
*Phase Polarity Normal Invert*

**:SRATe**

**Supported**  
ES267D with Option 601 or 602

`[:SOURce]:RADio:CUSTom:SRATe <val>`  
`[:SOURce]:RADio:CUSTom:SRATe?`

This command sets the transmission symbol rate.

The variable `<val>` is expressed in symbols per second (sps–Msps) and the maximum range value is dependent upon the source of data (internal or external), the modulation type, and filter.

When user-defined filters are selected using the command in section ":`FILTer` on page 201, the upper symbol rate will be restricted using the following criteria:

- FIR filter length > 32 symbols: upper limit is 12.5 Msps
- FIR filter length > 16 symbols: upper limit is 25 Msps

When internal FIR filters are used, these limit restrictions always apply. For higher symbol rates, the FIR filter length will be truncated as follows:

- Above 12.5 Msps, the FIR length will be truncated to 32 symbols
- Above 25 Msps, the FIR length will be truncated to 16 symbols

This will impact the relative timing of the modulated data, as well as the actual filter response.

A change in the symbol rate value effects the bit rate value.

To change the modulation type, refer to ":`MODulation[:TYPE]` on page 204.

**Example**

`:RAD:CUR:SRAT 10KSPS`

The preceding example sets the symbol rate to 10K symbols per second.

*RST*  
+2.43000000E+004

### **Table 1:**

<table>
<thead>
<tr>
<th>Modulation Type</th>
<th>Bits per Symbol</th>
<th>Internal Data</th>
<th>External Serial Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>BPSK</td>
<td>1</td>
<td>1 sps–50 Msps</td>
<td>1 sps–50 Msps</td>
</tr>
<tr>
<td>QPSK2</td>
<td>1</td>
<td>1 sps–50 Msps</td>
<td>1 sps–50 Msps</td>
</tr>
<tr>
<td>MSK</td>
<td>2</td>
<td>1 sps–25 Msps</td>
<td>1 sps–25 Msps</td>
</tr>
<tr>
<td>C4FM</td>
<td>2</td>
<td>1 sps–25 Msps</td>
<td>1 sps–25 Msps</td>
</tr>
</tbody>
</table>
Digital Modulation Commands
Custom Subsystem–Option 601 and 602 [:SOURce]:RADio:CUSTom

### Key Entry

**Symbol Rate**

- **NONE**
- **AC4Fm**
- **ACQPsk**
- **BLUEtooth**
- **CDPD**

### Supported

E8267D with Option 601 or 602

[:SOURce]:RADio:CUSTom:STANdard:SELect NONE|AC4Fm|ACQPsk|BLUEtooth|CDPD

This command selects a pre-defined setup for Custom (with the appropriate defaults) and/or clears the selection.

- **NONE**
  - This choice clears the current pre-defined Custom format.
- **AC4Fm**
  - This choice sets up an Association of Public Safety Communications Officials (APCO) compliant, compatible 4-level frequency modulation (C4FM) format.
- **ACQPsk**
  - This choice sets up an Association of Public Safety Communications Officials (APCO) compliant, compatible quadrature phase shift keying (CQPSK) format.
- **BLUEtooth**
  - This choice sets up a Bluetooth (2-level frequency shift keying) format.
- **CDPD**
  - This choice sets up a minimum shift keying Cellular Digital Packet Data (CDPD) format.

### Example

:RAD:CUST:STAN:SEL AC4FM

The preceding example selects the AC4FM pre-defined operating mode.

*RST

**Key Entry**

- **NONE**
- **APCO 25w/C4FM**
- **APCO 25w/CQPSK**
- **Bluetooth**
- **CDPD**

---

206 Chapter 5
Digital Modulation Commands
Custom Subsystem–Option 601 and 602 [:SOURce]:RADio:CUSTom

:TRIGger:TYPE

Supported  E8267D with Option 601 or 602

[:SOURce]:RADio:CUSTom:TRIGger:TYPE CONTinuous|SINGle|GATE

[:SOURce]:RADio:CUSTom:TRIGger:TYPE?

This command sets the trigger mode (type) that controls the data transmission.

Triggers control the data transmission by telling the PSG when to transmit the modulating signal. Depending on the trigger settings for the PSG, the data transmission can occur once, continuously, or the PSG may start and stop the transmission repeatedly (GATE mode).

A trigger signal comprises both positive and negative signal transitions (states), which are also called high and low periods. You can configure the PSG to trigger on either state of the trigger signal. It is common to have multiple triggers, also referred to as trigger occurrences or events, occur when the signal generator requires only a single trigger. In this situation, the PSG recognizes the first trigger and ignores the rest.

When you select a trigger mode, you may lose the signal (carrier plus modulating) from the RF output until you trigger the modulating signal. This is because the PSG sets the I and Q signals to zero volts prior to the first trigger event, which suppresses the carrier. After the first trigger event, the signal's final I and Q levels determine whether you see the carrier signal or not (zero = no carrier, other values = visible carrier). At the end of most data patterns, the final I and Q points are set to a value other than zero. If you create your own data file, you can set the initial I and Q voltages to values other than zero, and set the last I and Q values to zero. Create your own file using the front-panel UI (see the E8257D/67D PSG Signal Generators User’s Guide), or download a file you create external to the PSG (see the E8257D/67D PSG Programming Guide).

There are four parts to configuring the trigger:

- Choosing the trigger type, which controls the data transmission.
- Setting the data pattern’s response to triggers:
  - CONTinuous, see “:TRIGger:TYPE:CONTinuous[:TYPE]” on page 208
  - SINGle, selecting the mode also sets the response (This differs from using the single mode for the ARB formats.)
  - GATE, selecting the mode also sets the response
- Selecting the trigger source (see “:TRIGger:[SOURce]” on page 210), which determines how the PSG receives its trigger signal, internally or externally. The GATE choice requires an external trigger.
- Setting the trigger polarity when using an external source:
  - CONTinuous and SINGle, see “:TRIGger:[SOURce]:EXTERNAL:SLOPe” on page 212
  - GATE, see “:TRIGger:TYPE:GATE:ACTive” on page 209

For more information on triggering, see the E8257D/67D PSG Signal Generators User’s Guide.

The following list describes the trigger type command choices:

CONTinuous  Upon triggering, the data pattern repeats continuously.
SINGle  Upon triggering, the data pattern plays once.
Digital Modulation Commands  
Custom Subsystem–Option 601 and 602 [:SOURce]:RADio:CUSTom

GATE

An external trigger signal controls the data transmission. The modulating signal waits for the first active trigger signal state to begin. After the initial trigger, the behavior is dependent on whether the signal incorporates framed or unframed data. Because the PSG provides only unframed data for real-time custom, to transmit a framed data signal you must create an external file that incorporates the framing and download it to the PSG. The following list describes the behavior differences between the two types of data transmissions:

- For unframed data, an external trigger signal repeatedly starts and stops the data transmission. The length of each transmission depends on the duty period of the trigger signal and the gate polarity selection (see "::TRIGger::TYPE::GATE::ACTive" on page 209). Data transmits during the active polarity selection state and stops during the inactive state. The active state can be set high or low.

**NOTE** The real-time custom gating behavior described above is opposite to the ARB gating behavior.

- For framed data, an external trigger signals the PSG to start transmitting at the beginning of a frame during active states, but only stops at the end of a frame when the end occurs during the inactive states. If the end of the frame extends into the next active trigger state, the signal transmits continuously. For information on downloading files, see the E8257D/67D PSG Programming Guide.

Example

::RAD:CUST::TRIG::TYPE SING

The preceding example selects the single trigger mode for data transmission.

*RST

Key Entry | Continuous | Single | Gated
---|---|---|---

::TRIGger::TYPE::CONTinuous::[TYPE]

**Supported**  
E8267D with Option 601 or 602

[::SOURce]:RADio:CUSTom::TRIGger::TYPE::CONTinuous::[TYPE] FREE|TRIGger

[::SOURce]:RADio:CUSTom::TRIGger::TYPE::CONTinuous::[TYPE]?

This command selects the data pattern’s response to a trigger signal while using the continuous trigger mode.

For more information on triggering and to select the continuous trigger mode, see "::TRIGger::TYPE" on page 207.

The following list describes the data pattern’s response to each of the command choices:

FREE  
Turning custom on immediately triggers the modulating signal. The signal repeats the data pattern until you turn the signal off, select another trigger, or choose another data pattern.

TRIGger  
The modulating signal waits for a trigger before transmission begins. When the signal receives the trigger, it transmits the data continuously until you turn the signal off, select another trigger, or choose another data pattern.
Example

:RAD:CURV:TRIG:TYPE:CONT FREE

The preceding example selects the free-run mode for continuous data transmission.

*RST FREE

Key Entry Free Run Trigger & Run

:TRIGger:TYPE:GATE:ACTive

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:CUSTom:TRIGger:TYPE:GATE:ACTive LOW|HIGH

[:SOURce]:RADio:CUSTom:TRIGger:TYPE:GATE:ACTive?

This command selects the active state (gate polarity) of the gate while using the gating trigger mode. The LOW and HIGH selections correspond to the low and high states of an external trigger signal. For example, when you select HIGH, the active state occurs during the high of the trigger signal. The PSG uses the active state to transmit the data pattern. When the inactive state occurs, the transmission stops at the last transmitted symbol, then restarts at the next symbol when the active state occurs. For more information on triggering and to select gating as the trigger mode, see “:TRIGger:TYPE” on page 207.

The following list describes the PSG’s gating behavior for the polarity selections:

LOW The PSG transmits the data pattern while the trigger signal is low (active state) and stops when the trigger signal goes high (inactive state).

HIGH The PSG transmits the data pattern while the trigger signal is high (active state) and stops when the trigger signal goes low (inactive state).

Example

:RAD:CURV:TRIG:TYPE:GATE:ACT HIGH

The preceding example selects a high external signal level as the active state for the gate trigger.

*RST HIGH

Key Entry Gate Active Low High
Digital Modulation Commands
Custom Subsystem–Option 601 and 602 [:SOURce]:RADio:CUSTom

:TRIGger[:SOURce]

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:CUSTom:TRIGger[:SOURce] KEY|EXT|BUS

[:SOURce]:RADio:CUSTom:TRIGger[:SOURce]? This command sets the trigger source.

For more information on triggering, see "*:TRIGger:TYPE" on page 207. The following list describes the command choices:

KEY This choice enables manual triggering by pressing the front-panel Trigger hardkey.

EXT An externally applied signal triggers the modulating signal. This is the only choice that works with gating. The following settings affect an external trigger:

- The input connector for the trigger signal. You have a choice between the rear-panel PATTERN TRIG IN connector or the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector. To make the connector selection, see "*:TRIGger[:SOURce]:EXTernal[:SOURce]" on page 212.

For more information on the connectors and on connecting the cables, see the E8257D/67D PSG Signal Generators User’s Guide.

- The trigger signal polarity:
  - gating mode, see "*:TRIGger:TYPE:GATE:ACTive" on page 209
  - continuous and single modes, see "*:TRIGger[:SOURce]:EXTernal:SLOPe" on page 212

- Any desired delay between when the PSG receives a trigger and when the data pattern responds to the trigger. There are two parts to setting the delay:
  - setting the amount of delay, see "*:TRIGger[:SOURce]:EXTernal:DELay" on page 211
  - turning the delay on, see "*:TRIGger[:SOURce]:EXTernal:DELay:STATe" on page 211

BUS This choice enables triggering over the GPIB using the *TRG or GET command, or the LAN and the AUXILIARY INTERFACE (RS-232) using the *TRG command.

Example

:RAD:CUST:TRIG BUS

The preceding example selects BUS triggering.

*RST EXT

Key Entry Trigger Key Ext Bus
Digital Modulation Commands

Custom Subsystem–Option 601 and 602 [:SOURce]:RADio:CUSTom

:TRIGger[:SOURce]:EXTernal:DELay

Supported   E8267D with Option 601 or 602
[:SOURce]:RADio:CUSTom:TRIGger[:SOURce]:EXTernal:DELay <val>
[:SOURce]:RADio:CUSTom:TRIGger[:SOURce]:EXTernal:DELay?

This command sets the number of bits to delay the PSG’s response to an external trigger. The bit delay is a delay between when the PSG receives the trigger and when it responds to the trigger. The delay uses the clocks of the bit-clock to time the delay. After the PSG receives the trigger and the set number of delay bits (clocks) occurs, the PSG transmits the data pattern. The delay occurs after you enable the state. See :TRIGger[:SOURce]:EXTernal:DELay:STATe. You can set the number of bits either before or after enabling the state.

For more information on configuring an external trigger source and to select external as the trigger source, see "*:TRIGger[:SOURce]" on page 210.

Example
:RAD:CUST:TRIG:EXT:DELay 200000
The preceding example sets the delay for an external trigger for 200K bits.

*RST   +0
Range   0–1048575
Key Entry   Ext Delay Bits

:TRIGger[:SOURce]:EXTernal:DELay:STATe

Supported   E8267D with Option 601 or 602
[:SOURce]:RADio:CUSTom:TRIGger[:SOURce]:EXTernal:DELay:STATe ON|OFF|1|0
[:SOURce]:RADio:CUSTom:TRIGger[:SOURce]:EXTernal:DELay:STATe?

This command turns the trigger delay on or off when using an external trigger source. For setting the delay time, see :TRIGger[:SOURce]:EXTernal:DELay, and for more information on configuring an external source, see "*:TRIGger[:SOURce]" on page 210.

Example
:RAD:CUST:TRIG:EXT:DEL:STAT 0
The preceding example disables the delay state for an external trigger source.

*RST   0
Key Entry   Ext Delay Off On
\textbf{.TRIGGER[:SOURce]:EXTERNAL:SLope}

\textbf{Supported} \quad E8267D with Option 601 or 602

\begin{verbatim}
[:SOURce]:RADio:CUSTom:TRIGGER[:SOURce]:EXTERNAL:SLope POSitive|NEGative
[:SOURce]:RADio:CUSTom:TRIGGER[:SOURce]:EXTERNAL:SLope?
\end{verbatim}

This command sets the polarity for an external trigger signal while using the continuous or single triggering modes. To set the polarity for gating, see \textit{".TRIGGER:TYPE:ACTive"} on page 209.

The POSitive and NEGative selections correspond to the high (positive) and low (negative) states of the external trigger signal. For example, when you select POSitive, the waveform responds (transmits) during the high state of the trigger signal. When the PSG receives multiple trigger occurrences when only one is required, the signal generator uses the first trigger and ignores the rest.

For more information on configuring an external trigger source and to select external as the trigger source, see \textit{".TRIGGER[:SOURce]"} on page 210.

\textbf{Example}

\begin{verbatim}
:RAD:CUST:TRIG:EXT:SLOP NEG
\end{verbatim}

The preceding example selects the negative trigger as the active state for data transmission.

\textbf{*RST}

\begin{verbatim}
NEG
\end{verbatim}

\textbf{Key Entry} \quad Ext Polarity Neg Pos

\textbf{.TRIGger[:SOURce]:EXTERNAL[:SOURce]}

\textbf{Supported} \quad E8267D with Option 601 or 602

\begin{verbatim}
[:SOURce]:RADio:CUSTom:TRIGGER[:SOURce]:EXTERNAL[:SOURce] EPT1|EPT2|EPTRIGGER1|EPTRIGGER2
[:SOURce]:RADio:CUSTom:TRIGGER[:SOURce]:EXTERNAL[:SOURce]?
\end{verbatim}

This command selects which rear-panel connector the PSG uses to accept an externally applied trigger signal when external is the trigger source selection.

For more information on configuring an external trigger source and to select external as the trigger source, see \textit{".TRIGGER[:SOURce]"} on page 210. For more information on the rear-panel connectors, see the \textit{E8257D/67D PSG Signal Generators User’s Guide}.

The following list describes the command choices:

\begin{itemize}
\item \textbf{EPT1} \quad This choice is synonymous with EPTRIGGER1 and selects the PATTERN TRIG IN rear-panel connector.
\item \textbf{EPT2} \quad This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.
\item \textbf{EPTRIGGER1} \quad This choice is synonymous with EPT1 and selects the PATTERN TRIG IN rear-panel connector.
\item \textbf{EPTRIGGER2} \quad This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.
\end{itemize}
Example
:RAD:CUST:TRIG:EXT EPT2
The preceding example selects an external trigger from the PATTERN TRIG IN 2 rear-panel connector.

*RST EPT1

Key Entry Patt Trig In 1 Patt Trig In 2

[:STATE]
Supported E8267D with Option 601 or 602
[:SOURce]:RADio:CUSTom[:STATE] ON|OFF|1|0
[:SOURce]:RADio:CUSTom[:STATE]?

This command enables or disables the Custom modulation format.

Although the Custom modulation is enabled with this command, the RF carrier is not modulated unless you activate the front panel Mod On/Off hardkey.

Example
:RAD:CUST OFF
The preceding example turns off the custom modulation format.

*RST 0

Key Entry Custom Off On

:VCO:CLOCK
Supported E8267D with Option 601 or 602
[:SOURce]:RADio:CUSTom:VCO:CLOCK INTERNAL|EXTERNAL
[:SOURce]:RADio:CUSTom:VCO:CLOCK?

This command enables an internal or external VCO clock. The external VCO clock is connected to the rear-panel BASEBAND GEN CLK IN connector. Use the :DACS:ALIGn command after an external VCO clock is first applied to the BASEBAND GEN CLK IN connector or when the VCO signal is lost and then re-acquired.

Example
:RAD:CUST:VCO:CLOC EXT
The preceding example selects an external VCO clock.

*RST Int

Key Entry VCO Clock Ext Int
Digital Modulation Subsystem ([;SOURce]:DM)

:EXTernal:Filter

Supported E8267D

[:SOURce]:DM:EXTernal:FILTer 40e6|THRough
[:SOURce]:DM:EXTernal:FILTer?

This command selects the filter or through path for I/Q signals routed to the rear-panel I and Q outputs.

40e6   This choice applies a 40 MHz baseband filter.
THRough   This choice bypasses filtering.

Example

:DM:EXT:FILT 40E6

The preceding example selects the 40 MHz baseband filter.

*RST   THR

Key Entry  40.000 MHz   Through

:EXTernal:Filter:AUTO

Supported E8267D

[:SOURce]:DM:EXTernal:FILTer:AUTO ON|OFF|1|0
[:SOURce]:DM:EXTernal:FILTer:AUTO?

This command enables or disables the automatic filter selection for I/Q signals routed to the rear-panel I/Q outputs.

ON(1)   This choice automatically selects the 40 MHz filter optimized for the current signal generator settings.

OFF(0)   This choice disables the auto feature and allows you to select the 40 MHz filter or a through path. Refer to ":IQ:EXTernal:FILTer" on page 258 for selecting a filter or through path.

Example

:DM:EXT:FILT:AUTO 1

The preceding example allows automatic selection of the 40 MHz I/Q filter.

*RST   1 (ON)

Key Entry  I/Q Output Filter Manual Auto
:EXTernal:HCRest

Supported E8267D

[:SOURce]:DM:EXTernal:HCRest [STATe] ON|OFF|1|0
[:SOURce]:DM:EXTernal:HCRest [STATe]? 

This command changes the operating condition to accommodate I/Q inputs with a high crest factor.

ON (1) This choice turns high crest mode on for externally applied signals with high crest factors. High crest mode allows the signal generator to process these signals with less distortion. For crest factors higher than 4 dB, I/Q drive levels should be reduced by 1 dB for each dB above that level. In high crest mode, the maximum output level is reduced and power level accuracy is degraded.

OFF (0) This choice disables the high crest mode.

Example
:DM:EXT:HCR 0

The preceding example disables the high crest mode.

*RST NORM

Key Entry High Crest Mode Off On

:EXTernal:POLarity

Supported E8267D

[:SOURce]:DM:EXTernal:POLarity NORMal|INVert|INVerted
[:SOURce]:DM:EXTernal:POLarity?

This command, for backward compatibility with older ESG E44xxB models, selects normal or inverted I/Q signal routing. In inverted mode, the Q input is routed to the I modulator and the I input is routed to the Q modulator.

Example
:DM:EXT:POL INV

The preceding example inverts I and Q signal routing.

*RST NORM

Key Entry Int Phase Polarity Normal Invert
Digital Modulation Commands
Digital Modulation Subsystem [:SOURce]:DM

[:EXTer nal]:SOURce

Supported E8267D

[:SOURce]:DM:EXTernal:SOURce EXTernal|INTernal|BBG1|EXT600|OFF|SUM
[:SOURce]:DM:EXTernal:SOURce?

This command selects the I/Q signal source that is routed to the rear-panel I and Q output connectors.

EXTernal This choice routes a portion of the externally applied signals at the 50 ohm I and Q input connectors to the rear-panel I and Q output connectors.

INTernal This choice is for backward compatibility and performs the same function as the BBG1 selection.

BBG1 This choice routes a portion of the baseband generator I/Q signals to the rear-panel I and Q connectors and requires Option 602.

EXT600 This choice routes a portion of the externally applied signals at the 600 ohm I and Q input connectors to the rear-panel I and Q output connectors.

OFF This choice disables the output to the rear-panel I and Q output connectors.

The output is the analog component of the I and Q signals.

For selecting the I/Q source, refer to "::SOURce" on page 229.

Example
:DM:EXT:SOUR EXT

The preceding example routes the I/Q signals to the external 50 ohm rear-panel output.

*RST

Key Entry Ext 50 Ohm BBG1 Ext 600 Ohm Off

:IQADjustment:DELay

Supported E8267D

[:SOURce]:DM:IQADjustment:DELay <delay_val>
[:SOURce]:DM:IQADjustment:DELay?

This command sets a delay for both I and Q from the baseband to the I/Q outputs and to the RF output. This will allow you to time shift the I/Q with respect to triggering and markers. The absolute phase of both I and Q will change with respect to triggers and markers. A positive value advances the I and Q phase. The range limits are dependent on the current modulation format.

This feature is not compatible with constant envelope modulations and signals connected to the external I/Q inputs.

The <delay_val> variable is expressed in seconds.
Chapter 5

Digital Modulation Commands
Digital Modulation Subsystem [:SOURce]:DM

Example

:DM:IQAD:DEL .05SEC
The preceding example sets a 50 millisecond delay for the I and Q signals.

*RST +0.00000000E+000

Key Entry I/Q Delay

:IQADjustment:EXTernal:COFFset

Supported E8267D

[:SOURce]:DM:IQADjustment:EXTernal:COFFset <units>
[:SOURce]:DM:IQADjustment:EXTernal:COFFset?

This command sets the common mode offset voltage for both the in-phase (I) and quadrature-phase (Q) signals going to the rear-panel I and Q output connectors.

The <units> variable is expressed in volts (mV–V). This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to ":IQADjustment[:STATe]" on page 224.

Example

:DM:IQAD:EXT:COFF -.1
The preceding example sets a negative .1 volt common mode offset voltage for the I and Q signals.

*RST +0.00000000E+000

Range −3 to 3

Key Entry Common Mode I/Q Offset

:IQADjustment:EXTernal:DIOFfset

Supported E8267D

[:SOURce]:DM:IQADjustment:EXTernal:DIOFfset <val><units>
[:SOURce]:DM:IQADjustment:EXTernal:DIOFfset?

This command sets the differential offset voltage for an in-phase (I) signal routed to the I output connectors.

The variable <val> is a numeric expression. The <units> variable is expressed in volts (mV–V).

This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to ":IQADjustment[:STATe]" on page 224.

Example

:DM:IQAD:EXT:DIOF 1
The preceding example sets a 1 volt differential offset voltage for the I signal at the rear-panel I output connector.

*RST +0.00000000E+000

Range −3 to 3

Key Entry Diff. Mode I Offset
Digital Modulation Commands
Digital Modulation Subsystem [:SOURce]:DM

[:IQADjustment:EXTernal:DQOFfset]

Supported E8267D

[:SOURce]:DM:IQADjustment:EXTernal:DQOFfset <val><units>
[:SOURce]:DM:IQADjustment:EXTernal:DQOFfset?

This command sets the differential offset voltage for a quadrature-phase (Q) signal routed to the Q output connectors.

The variable <val> is a numeric expression. The <units> variable is expressed in volts (mV–V).

This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to “:IQADjustment[:STATe]” on page 224.

Example

:DM:IQAD:EXT:DQOF 1

The preceding example sets a 1 volt differential offset voltage for the Q signal at the rear-panel Q connector.

*RST +0.00000000E+000

Range –3 to 3

Key Entry Diff. Mode Q Offset

[:IQADjustment:EXTernal:GAIN]

Supported E8267D

[:SOURce]:DM:IQADjustment:EXTernal:GAIN[1|2] <val><units>
[:SOURce]:DM:IQADjustment:EXTernal:GAIN?

This command sets the I/Q gain ratio (I/Q balance) for signals routed to the rear-panel I and Q output connectors. The I signal (GAIN 1) is increased for positive values and the Q signal (GAIN 2) level increases with negative values.

This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to “:IQADjustment[:STATe]” on page 224.

Example

:DM:IQAD:EXT:GAIN2 1

The preceding example sets a Q gain ratio of 1 volt.

*RST +0.00000000E+000

Range –4 to 4

Key Entry I/Q Out Gain Balance
Digital Modulation Commands
Digital Modulation Subsystem [:SOURce]:DM

[:IQADjustment:EXTernal:IOFFset]

Supported E8267D

[:SOURce]:DM::IQADjustment::EXTernal:IOFFset <val><units>
[:SOURce]:DM::IQADjustment::EXTernal:IOFFset?

This command sets the offset voltage for a signal applied to the 600 ohm I input connector.

The variable <val> is a numeric expression. The <units> variable is expressed in volts (mV–V).

This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to “::IQADjustment[:STATe]” on page 224.

Example
:DM::IQAD:EXT:IOFF 200MV

The preceding example sets a 200 millivolt offset for the signal applied to the I 600 ohm input connector.

*RST +0.00000000E+000
Range −5 to 5
Key Entry Ext In 600 Ohm I Offset

[:IQADjustment:EXTernal:IQATten]

Supported E8267D

[:SOURce]:DM::IQADjustment::EXTernal:IQATten <val><units>
[:SOURce]:DM::IQADjustment::EXTernal:IQATten?

This command sets the I/Q output attenuation level.

The variable <val> is a numeric expression. The <units> variable is expressed in decibels (dB).

The value set by this command is active even if the I/Q adjustment function is off.

Example
:DM::IQAD:EXT:IQAT 10.1

The preceding example sets the IQ attenuator level to 10.1 dB.

*RST +6.00000000E+000
Range 0–40
Key Entry I/Q Output Atten
:IQADjustment:EXTernal:QOFFset

Supported E8267D

[:SOURce]:DM:IQADjustment:EXTernal:QOFFset <val><units>
[:SOURce]:DM:IQADjustment:EXTernal:QOFFset?

This command sets the offset voltage for a signal applied to the 600 ohm Q input connector. The variable <val> is a numeric expression. The <units> variable is expressed in volts (mV–V).

This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to ":IQADjustment[:STATe]" on page 224.

Example
:DM:IQAD:EXT:QOFF 200MV

The preceding example sets a 200 millivolt offset for the signal applied to the Q 600 ohm input connector.

*RST +0.00000000E+000
Range −5 to 5
Key Entry Ext In 600 Ohm Q Offset

:IQADjustment:GAIN

Supported E8267D

[:SOURce]:DM:IQADjustment:GAIN[1|2] <val>
[:SOURce]:DM:IQADjustment:GAIN?

This command sets the gain for the I signal (GAIN 1) relative to the Q signal, (GAIN 2). The gain ratio is expressed in decibels (dB).

This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to ":IQADjustment[:STATe]" on page 224.

Example
:DM:IQAD:GAIN2 -3

The preceding example sets a gain of −3 dB for the Q signal relative to the I signal.

*RST +0.00000000E+000
Range −4 to 4 dB
Key Entry I/Q Gain Balance Source 1
Digital Modulation Commands
Digital Modulation Subsystem [:SOURce]:DM

:IQADjustment:IOFFset

Supported E8267D

[:SOURce]:DM:IQADjustment:IOFFset <val>
[:SOURce]:DM:IQADjustment:IOFFset?

This command adjusts the I channel offset value.

The <val> variable is expressed as a percent with 100% equivalent to 500 mV DC at the input connector. The minimum resolution is 0.025 percent.

When using this command to minimize the LO feedthrough signal, optimum performance is achieved when the command is sent after all other I/Q path commands are executed, such as those that change the internal phase polarity or adjust the modulator attenuator. If other adjustments are made after minimizing is performed, the LO feedthrough signal may increase.

This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to “:IQADjustment[:STATe]” on page 224.

Example
:DM:IQAD:IOFF -30

The preceding example sets the I channel offset to –30%.

*RST +0.00000000E+000

Range -5E1 to +5E1

Key Entry I Offset

:IQADjustment:QOFFset

Supported E8267D

[:SOURce]:DM:IQADjustment:QOFFset <val>
[:SOURce]:DM:IQADjustment:QOFFset?

This command adjusts the Q channel offset value.

The <val> variable is expressed as a percent with 100% equivalent to 500 mV DC at the input connector. The minimum resolution is 0.025 percent.

When using this command to minimize the LO feedthrough signal, optimum performance is achieved when the command is sent after all other I/Q path commands are executed, such as those that change the internal phase polarity or adjust the modulator attenuator. If other adjustments are made after minimizing is performed, the LO feedthrough signal may increase.

This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to “:IQADjustment[:STATe]” on page 224.
Digital Modulation Commands
Digital Modulation Subsystem [:SOURce]:DM

Example
:DM:IQAD:QOFF -30
The preceding example sets the Q channel offset to −30%.

*RST
+0.00000000E+000
Range
−5E1 to +5E1
Key Entry
Q Offset

[:IQADjustment:QSKew
Supported
E8267D
[:SOURce]:DM:IQADjustment:QSKew <val>
[:SOURce]:DM:IQADjustment:QSKew?
This command adjusts the phase angle (quadrature skew) between the I and Q vectors by increasing or decreasing the Q phase angle.
The <val> variable is expressed in degrees with a minimum resolution of 0.1.
If the signal generator is operating at frequencies greater than 3.3 GHz, quadrature skew settings greater than ±5 degrees will not be within specifications.
Positive skew increases the angle from 90 degrees while negative skew decreases the angle from 90 degrees. When the quadrature skew is zero, the phase angle between the I and Q vectors is 90 degrees.
This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to “:IQADjustment[:STATe]” on page 224.
Example
:DM:IQAD:QSKew 4.5
The preceding example increases the phase angle by 4.5 degrees.

*RST
+0.00000000E+000
Range
−1E1 to +1E1
Key Entry
Quadrature Angle Adjustment

[:IQADjustment:SKEW
Supported
E8267D
[:SOURce]:DM:IQADjustment:SKEW[:DELay] <val>
[:SOURce]:DM:IQADjustment:SKEW?
This command changes the input skew which is a time delay difference between the I and Q signals. Equal and opposite skew is applied to both I and Q and affects the RF Output and I/Q output paths simultaneously. A positive value delays the I signal relative to the Q signal, and a negative value delays the Q signal relative to the I signal.
If the internal I/Q correction path is set to RF or BB the I/Q signals are already optimized and adjusting I/Q skew would add an impairment to the signals. If the internal I/Q correction path is set to Off, then adjusting the I/Q skew could improve the I/Q signals. The I/Q skew adjustment cannot be performed on the MSK, FSK, and C4FM constant envelope modulations.

I/Q skew adjustments are preserved when the instrument state is saved. I/Q skew adjustments are also preserved when instrument settings are changed. If the signal generator is calibrated, the skew adjustments are added to the calibration value used for the given signal generator state. If the signal generator is uncalibrated, the skew adjustments are re-applied directly.

Using I/Q skew while playing a user FIR file greater than 32 symbols will generate an error. The variable <val> is expressed in seconds. Range limits are determined by the modulation configuration but is limited to a maximum of ± 2 seconds.

**Example**

:DM:IQAD:SKEW .5

The preceding example sets the time delay difference between the I and Q signals to 500 milliseconds.

*RST +0.00000000E+000

**Key Entry** I/Q Timing Skew

**:IQADjustment:SKEW:Path**

**Supported** E8267D

[:SOURce]:DM:IQADjustment:SKEW:PATH RF BB

This command selects either the RF or BB (baseband) path as the path to which skew timing corrections will be applied. If there are no factory I/Q timing skew corrections data, then adjusting the I/Q timing skew for the selected path may improve the error vector magnitude (EVM) of the signal. Refer to the “:IQADjustment:SKEW” on page 222 for more information.

If internal I/Q corrections are available for the RF or external I/Q output (BB) path then the I/Q signals are already optimized and adjusting I/Q skew for either path would add an impairment to the signal.

**Example**

:DM:IQAD:SKEW:PATH RF

The preceding example selects the RF path as the path to which skew timing adjustments will be made.

*RST +0.00000000E+000

**Key Entry** I/Q Timing Skew Path
Digital Modulation Commands
Digital Modulation Subsystem [:SOURce:DM]

://IQADjustment[:STATe]
Supported E8267D
[:SOURce]:DM:IQADjustment[:STATe] ON|OFF|1|0
[:SOURce]:DM:IQADjustment[:STATe]?  
This command enables or disables the I/Q adjustments.

Example
:DM:IQAD 1
The preceding example enables I/Q adjustments.

*RST  0 (OFF)

Key Entry  I/Q Adjustments Off On

://MODulation:ATTen
Supported E8267D
[:SOURce]:DM:MODulation:ATTen <val>
[:SOURce]:DM:MODulation:ATTen?  
This command sets the attenuation level for the I/Q signals being modulated through the signal generator RF path. The variable <val> is expressed in decibels (dB).

Example
:DM:MOD:ATT 10
The preceding example sets the modulator attenuator to 10 dB.

*RST  +2.00000000E+000

Range  0–40 dB

Key Entry  Modulator Atten Manual Auto

://MODulation:ATTen:AUTO
Supported E8267D
[:SOURce]:DM:MODulation:ATTen:AUTO ON|OFF|1|0
[:SOURce]:DM:MODulation:ATTen:AUTO?  
This command enables or disables the modulator attenuator auto mode. The auto mode will be switched to manual if the signal generator receives a AUTO OFF or AUTO 0 command.

ON (1)  This choice sets the modulator attenuator to auto mode which optimizes the attenuation setting for the current signal generator settings.

OFF (0)  This choice sets the attenuator to manual mode and holds the attenuator at its current setting. Refer to “://MODulation:ATTen” on page 224 for setting the attenuation value.
Digital Modulation Commands
Digital Modulation Subsystem [:SOURce]:DM

Example
:DM:MOD:ATT:AUTO OFF

The preceding example sets the modulator attenuator to manual mode.

*RST 1

Key Entry        Modulator Atten Manual Auto

:MODulation:ATTen:EXTernal

Supported        E8267D

[:SOURce]:DM:MODulation:ATTen:EXTernal DEFault|MANual|MEASure

This command selects the external measurement used to set the attenuator level. Modulation attenuation “:MODulation:ATTen:AUTO” on page 224 must be in auto mode.

DEFault          Use this choice to set the external I/Q input level to the default value of 500.0 mV.
MANual           Use this choice to manually set the external input level. Refer to “:MODulation:ATTen:LEVel” on page 225 to set the input level.
MEASurement      This choice uses a real-time measurement of the external input level to set the attenuator level. The measurement will be used to set the attenuator level setting. To perform this measurement, refer to “:MODulation:ATTen:LEVel:MEASurement” on page 226.

Example
:DM:MOD:ATT:EXT MAN

The preceding example sets manual as the method for setting the external I/Q input level.

*RST DEFault

Key Entry        Ext Input Level (nnn mV) Default Man Meas

:MODulation:ATTen:EXTernal:LEVel

Supported        E8267D

[:SOURce]:DM:MODulation:ATTen:EXTernal:LEVel <val><volt_units>

This command sets the I/Q signal voltage level at the external I/Q inputs. The voltage level set with this command is used as the input level setting for automatic attenuation.

Example
:DM:MOD:ATT:EXT:LEV 100MV

The preceding example sets the voltage level for the I and Q inputs to 100 millivolts.

*RST +4.0000000E-001

Range .05–1 Volt

Key Entry        I/Q Output Atten
Digital Modulation Commands
Digital Modulation Subsystem [:SOURce]:DM

[:MODulation:ATTen:EXTernal:LEVel:MEASurement]

Supported E8267D

[:SOURce]:DM:MODulation:ATTen:EXTernal:LEVel:MEASurement

This command measures the RMS value of the external I/Q signal. The external input level must be set to Meas.

Key Entry Do External Input Level Measurement

[:MODulation:ATTen:OPTimize:BANDwidth]

Supported E8267D

[:SOURce]:DM:MODulation:ATTen:OPTimize:BANDwidth <val><rate>

[:SOURce]:DM:MODulation:ATTen:OPTimize:BANDwidth?

This command sets the expected bandwidth of the external I/Q signal. The bandwidth set with this command be used by the modulator attenuator for level setting.

The variable <val> is a number within the range limits and the variable <rate> is expressed as samples per second (sps, kbps, or mps).

Example


The preceding example measures the voltage level at the external I/Q inputs.

*RST +1.00000000E+006

Range 1E3–100E6

Key Entry Optimize for (nnn sps) Bandwidth

[:MODulation:FILTer]

Supported E8267

[:SOURce]:DM:MODulation:FILTer 40e6|THrough

[:SOURce]:DM:MODulation:FILTer?

This command enables you to select a filter or through path for I/Q signals modulated onto the RF carrier. Selecting a filter with this command automatically sets :MODulation:FILTer:AUTO to OFF (0).

40E6 This choice applies a 40 MHz baseband filter to the I/Q signals.

THThrough This choice uses through path filtering.

Example

:DM:MOD:FILT 40E6

The preceding example selects the 40 MHz filter for I/Q signals.

*RST THR

Key Entry 40.000 MHz Through
Digital Modulation Commands
Digital Modulation Subsystem [:SOURce]:DM

[:MODulation:FILT:Auto]

Supported E8267D

[:SOURce]:DM::MODulation::FILT:AutO ON|OFF|1|0

[:SOURce]:DM:MODulation:FILTer:AUTO?

This command enables or disables the automatic filter selection for I/Q signals modulated onto the RF carrier.

ON (1) This choice will automatically select the optimal filter.

OFF (0) This choice disables the automatic filter selection and allows you to select a filter or through path. Refer to "::IQ::MODulation::FILT:er" on page 236 for selecting a filter or through path.

Example

:DM:MOD:FILT:AUTO 0

The preceding example disables the automatic filter selection for I/Q signals.

*RST 1

Key Entry I/Q Mod Filter Manual Auto

[:POLarity::ALL]

Supported E8267D

[:SOURce]:DM::POLarity::ALL|NORMal|INVert|INVerted

[:SOURce]:DM::POLarity?

This command selects normal or inverted I/Q signal routing. In inverted mode, the Q input is routed to the I modulator and the I input is routed to the Q modulator, inverting the phase polarity.

NORMal This choice selects normal routing for the I and Q signals.

INVert (ed) This choice inverts the phase polarity by routing the I signal to the Q input of the I/Q modulator and the Q signal to the I input.

Example

:DM:POL INV

The preceding example swaps the I and Q routing paths.

*RST NORM

Key Entry Int Phase Polarity Normal Invert
Digital Modulation Commands
Digital Modulation Subsystem ([:SOURce]:DM)

:SKEW:PATH

Supported E8267D

[:SOURce]:DM:SKEW:PATH RF|BB
[:SOURce]:DM:SKEW:PATH?

This command selects the signal path that will be optimized using I/Q skew corrections. The other path maybe degraded.

- **RF** When RF is selected, the skew is optimized for the I/Q signal applied to the RF Output. The baseband (BB) output will be functional, but the I/Q skew applied will be optimized for the RF path. When using this choice, seven symbols of latency are added to the Arb based waveform. While in real-time mode, the maximum number of user symbols for the FIR is limited to 32.

- **BB** When BB is selected, the skew is optimized for the I/Q signal outputs on the rear-panel. The RF Output will be functional, but the I/Q skew applied will be optimized for the BB path. When using this choice, seven symbols of latency are added to the ARB based waveform. While in real-time mode, the maximum number of user symbols for the FIR is limited to 32.

**NOTE** You must have a skew calibration to use this command. I/Q skew corrections and calibration must be performed at an Agilent factory or service center.

**Example**

:DM:SKEW:PATH BB

The preceding example selects the baseband path for I/Q skew and calibration.

*RST RF

**Key Entry** Int I/Q Skew Corrections RF BB Off

:SKEW[:STATe]

Supported E8267D

[:SOURce]:DM:SKEW[:STATe] ON|OFF|1|0
[:SOURce]:DM:SKEW[:STATe]?

This command enables or disables the I/Q skew correction function.

**Example**

:DM:SKEW:STAT 0

The preceding example disables I/Q skew corrections.

*RST 1

**Key Entry** Int I/Q Skew Corrections RF BB Off
:SOURCE

Supported E8267D

[
[:SOURCE]:DM:SOURce[1] | 2 | EXTernal | INTernal | BBG1 | EXT600 | OFF
[:SOURCE]:DM:SOURce?

This command selects the I/Q modulator source for one of the two possible paths.

EXTernal This choice selects an external 50 ohm source as the I/Q input to I/Q modulator.

INTernal This choice is for backward compatibility with ESG E44xxB models and performs the same function as the BBG1 selection.

BBG1 This choice selects the baseband generator as the source for the I/Q modulator.

EXT600 This choice selects a 600 ohm impedance for the I and Q input connectors and routes the applied signals to the I/Q modulator.

OFF This choice disables the I/Q input.

Example

[:DM:SOURCE1 BBG1

The preceding example selects BBG1, the baseband generator, as the modulation source for path 1.

*RST EXT

Key Entry Ext 50 Ohm BBG1 Ext 600 Ohm Off

:SRATio

Supported All

[:SOURCE]:DM:SRATio <val><units>
[:SOURCE]:DM:SRATio?

This command enables you to set the power level difference (ratio) between the source one and the source two signals when the two signals are summed together. A positive ratio value reduces the amplitude for source two while a negative ratio value reduces the amplitude for source one.

The range for the summing ratio is dependent on the modulator attenuator setting for the signal generator that is summing the signals together. The minimum range is achieved when the modulator attenuator setting is zero and the maximum range is reached when the maximum attenuator value is used. The range can be calculated using the following formula:

± Range = 50 dB + Mod Atten

The variable <val> is expressed as a number. The variable <units> is expressed in decibels (dB).

For setting the modulator attenuator for real-time modulation formats, see “:IQ:MODulation:ATTen” on page 262 and “:IQ:MODulation:ATTen:AUTO” on page 262. For setting the modulator attenuator for Arb modulation formats, refer to the SCPI command subsystem for the Arb format being used and find the commands that contain the command mnemonics IQ:MODulation:ATTen.
Digital Modulation Commands
Dual ARB Subsystem–Option 601 or 602 ([:SOURce]:RADio:ARB)

Example

:DM:STAT 3DB
The preceding example sets the summing ratio for source 1 and source 2 to 3 dB.

*RST +0.00000000E+000

Range
Min: ± 50 dB  Max: ± 90 dB

Key Entry  Summing Ratio (SRC1/SRC2) x.xx dB

:STATe

Supported  E8267D

[:SOURce]:DM:STATe ON|OFF|1|0
[:SOURce]:DM:STATe?
This command enables or disables the internal I/Q modulator. The signal generator I/Q annunciator is displayed when the I/Q modulator is on.
The I/Q modulator is enabled whenever a digital format is turned on.

Example

:DM:STAT OFF
The preceding example turns off the I/Q modulator.

*RST 0

Key Entry  I/Q Off On

Dual ARB Subsystem–Option 601 or 602 ([:SOURce]:RADio:ARB)

:CLIPping

Supported  E8267D with Option 601 or 602

[:SOURce]:RADio:ARB:CLIPping "<file_name>",IJQ|IORQ,<val>[,<val>]

This command sets the clipping level of the selected waveform segment to a percentage of its highest peak. The waveform must be selected before the clipping command is executed. For more information about clipping, refer to the E8257D/67D PSG Signal Generators User’s Guide.
The variable <val> is expressed as a percentage within a 10–100% range.

IJQ  This choice clips the composite I/Q waveform.

IORQ  This choice clips I and Q separately. When this choice is enabled, percentage values for both I and Q must be specified.

A value of 100 percent equates to no clipping.
For information on the file name syntax, see “File Name Variables” on page 10.
Example

```
:RAD:ARB:CLIP "ramp_test_wfm",IJQ,50
:RAD:ARB:CLIP "ramp_test_wfm",IORQ,50,60
```

The preceding examples clip the ramp_test_wfm waveform data file. The second example clips I and Q separately to 50% and 60% respectively.

*RST

<table>
<thead>
<tr>
<th>:DACS:ALIGN</th>
</tr>
</thead>
</table>

**Supported**

E8267D with Option 601 or 602

[:SOURce]:RADio:ARB:DACS:ALIGN

This command resets the signal generator’s I/Q DAC circuitry. This operation is required any time the external VCO clock signal is lost and re-acquired or when an external VCO clock signal is first applied to the BASEBAND GEN CLK IN connector.

<table>
<thead>
<tr>
<th>:DACS:ALIGN</th>
</tr>
</thead>
</table>

**Range**

<val>: 10–100 (0.1% resolution)

<table>
<thead>
<tr>
<th>:DACS:ALIGN</th>
</tr>
</thead>
</table>

**Key Entry**

Clipping Clipping Type |I+jQ| |I|,|Q| Clip |I+jQ| To Clip |I| To Clip |Q| To

:**GENERate:SINE**

**Supported**

E8267D with Option 601 or 602

[:SOURce]:RADio:ARB:GENERate:SINE ["<file_name>"] [,<osr>], [<scale>], [I|Q|IQ]

This command creates a sine wave waveform file and saves it in the signal generator’s volatile waveform memory (WFM1).

<table>
<thead>
<tr>
<th>:GENERate:SINE</th>
</tr>
</thead>
</table>

**"<file_name>"**

This variable names the file used to save the generated sine wave data.

<table>
<thead>
<tr>
<th>:GENERate:SINE</th>
</tr>
</thead>
</table>

**<osr>**

This variable sets the oversample ratio, which must be a value that is ≥ 4. If the specified oversample ratio is < 60 (the minimum number of samples or I/Q points), multiple periods are generated to create a waveform with at least 60 samples. The number of periods that will be created is 60 ÷ <osr> (quotient will round off to a whole number). A waveform with an oversample ratio ≥ 60 has one period.

<table>
<thead>
<tr>
<th>:GENERate:SINE</th>
</tr>
</thead>
</table>

**<scale>**

This variable sets the scale factor for the waveform. The scale factor must be between 0–1.

<table>
<thead>
<tr>
<th>:GENERate:SINE</th>
</tr>
</thead>
</table>

**I|Q|IQ**

The sine wave data can be applied to the I, Q, or IQ paths.

Executing this command without the "<file_name>" variable will generate a factory default SINE_TEST_WFM file. When using the variable "<file_name>" for this command, the “@” or “:” characters are not allowed.
Example


The preceding example generates an IQ sine wave and saves the data to a file named Sine_Wave. The oversampling ratio is 20, the scaling is set for 50%, and the data is applied to both the I and Q paths.

Range 4–32 Msamples (limited to available baseband memory)

:HEADER:CLEar

Supported E8267D with Option 601 or 602

`:SOURce:RADio:ARB:HEADER:CLEar`

This command clears the header information from the header file used by this modulation format. Header information consists of signal generator settings and marker routings associated with the waveform file. Refer to the E8257D/67D PSG Signal Generators User’s Guide for information on header files.

The dual ARB must be on for this command to function. To turn on the dual ARB, see “[:STATE]” on page 258

*RST N/A

Key Entry Clear Header

:HEADER:RMS

Supported E8267D with Option 601 or 602


This command sets the RMS value in the header file for the waveform designated by the "<file_name>" variable. The RMS value is expressed in volts. The filename variable includes the directory path and can designate a file in either the WFM1, NVWFM, or SEQ directories. For information on the file name syntax, refer to “File Name Variables” on page 10 and “ARB Waveform File Directories” on page 11. When a file is created with no header information then a header is automatically generated with all fields set to unspecified.

The <val> variable is the user-measured RMS value for the specified waveform. The UNSPecified parameter means that the signal generator will calculate the RMS value when it is needed. The signal generator calculation includes rise times and does not include consecutive zero level samples. DC offsets and noise are also included in the RMS measurement. Because the RMS calculation, done by the signal generator, is slow and may not be appropriate for your application it is recommended that the user calculate and enter their measured RMS value for the waveform file.

The RMS value is calculated as:
Digital Modulation Commands
Dual ARB Subsystem—Option 601 or 602 [:SOURce]:RADio:ARB

Example

[:SOURce]:RADio:ARB:HEADER:RMS "WFM1:Sine_Wave",.835
:RAD:ARB:HEADER:RMS "WFM1:Sine_Wave",UNSP

The first example sets a user-measured RMS value for the Sine_Wave waveform file in the waveform’s header file. The second example, the signal generator will calculate the RMS value when needed.

*RST N/A

Range 0 – 1.414213562373095

Key Entry N/A

:HEADer:SAVE

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:ARB:HEADer:SAVE

This command saves the header information to the header file used by this modulation format. Header information consists of signal generator settings and marker routings associated with the waveform file. Refer to the E8257D/67D PSG Signal Generators User’s Guide for information on header files.

The dual ARB must be on for this command to function. To turn on the dual ARB, see “[:STATe]” on page 258

*RST N/A

Key Entry Save Setup To Header
### :IQ:EXTernal:FILTER

**Supported**

E8267D with Option 601 or 602

```
[:SOURce]:RADio:ARB:IQ:EXTernal:FILTer 40e6|THrough
[:SOURce]:RADio:ARB:IQ:EXTernal:FILTer?
```

This command selects the filter or through path for I/Q signals routed to the rear-panel I and Q outputs. The filter has no effect on the modulated RF signal. Selecting a filter using this command will automatically set “:IQ:EXTernal:FILTER:AUTO” on page 234 to OFF(0) mode.

- **40e6**
  - This choice applies a 40 MHz baseband filter.

- **THThrough**
  - This choice selects the through path.

**Example**

```
:RAD:ARB:IQ:EXT:FILT 40E6
```

The preceding example selects a 40 MHz filter for the I/Q signals routed to the rear panel.

*RST

**Key Entry**

- `40.000 MHz`
- `Through`

### :IQ:EXTernal:FILTER:AUTO

**Supported**

E8267D with Option 601 or 602

```
[:SOURce]:RADio:ARB:IQ:EXTernal:FILTer:AUto ON|OFF|1|0
[:SOURce]:RADio:ARB:IQ:EXTernal:FILTer:AUto?
```

This command enables or disables the automatic filter selection for I/Q signals routed to the rear-panel I/Q outputs.

- **ON(1)**
  - This choice automatically selects the 40 MHz filter optimized for the current signal generator settings.

- **OFF(0)**
  - This choice disables the auto feature and allows you to select the 40 MHz filter or a through path. Refer to “:IQ:EXTernal:FILTER” on page 258 for selecting a filter or through path.

**Example**

```
:RAD:ARB:IQ:EXT:FILT:AUto OFF
```

The preceding example disables the automatic filter selection.

*RST

**Key Entry**

- `I/Q Output Filter Manual Auto`
:IQ:MODulation:ATTen

**Supported**

ES267D with Option 601 or 602

[:SOURce]:RADio:ARB:IQ:MODulation:ATTen <val><units>

This command sets the attenuation level of the I/Q signals being modulated through the signal generator RF path. The variable <val> is expressed in decibels (dB)

**Example**

:RAD:ARB:IQ:MOD:ATT 20

The preceding example sets the attenuator level to 20 dB.

*RST* +2.00000000E+000

**Range**

0–40

**Key Entry**

Modulator Attenuator Manual Auto

:IQ:MODulation:ATTen:AUTO

**Supported**

ES267D with Option 601 or 602

[:SOURce]:RADio:ARB:IQ:MODulation:ATTen:AUTO ON|OFF|1|0

[:SOURce]:RADio:ARB:IQ:MODulation:ATTen:AUTO?

This command enables or disables the modulator attenuator auto mode. The auto mode will be switched to manual if the signal generator receives an AUTO OFF or AUTO 0 command.

**Example**

:RAD:ARB:IQ:MOD:ATT:AUTO 0

The preceding example selects the modulator attenuator manual mode.

*RST* 1

**Key Entry**

Modulator Attenuator Manual Auto
Digital Modulation Commands
Dual ARB Subsystem—Option 601 or 602 ([:SOURce]:RADio:ARB)

**:IQ:**MODulation:FILTer

**Supported**
E8267D with Option 601 or 602

[[:SOURce]:RADio:ARB:**IQ:**MODulation:FILTer:40e6|THrough
[[:SOURce]:RADio:ARB:**IQ:**MODulation:FILTer?]

This command enables you to select a filter or through path for I/Q signals modulated onto the RF carrier. This filter has no effect on the I/Q signal out the rear-panel. Selecting a filter using this command will automatically set “**:IQ:**MODulation:FILTer:AUTO” on page 236 to OFF(0) mode.

40E6 This choice applies a 40 MHz baseband filter to the I/Q signals.

THThrough This choice selects the through path.

Example

**:RAD:**ARB:**IQ:**MOD:FILT 40E6

The preceding example selects a 40 MHz filter.

*RST THR

**Key Entry**

40.000 MHz Through

**:IQ:**MODulation:FILTer:AUTO

**Supported**
E8267D with Option 601 or 602

[[:SOURce]:RADio:ARB:**IQ:**MODulation:FILTer:AUTO ON|OFF|1|0
[[:SOURce]:RADio:ARB:**IQ:**MODulation:FILTer:AUTO?]

This command enables or disables the automatic filter selection for I/Q signals modulated onto the RF carrier.

ON (1) This choice will automatically select optimized filters for the current signal generator setting.

OFF (0) This choice disables the automatic filter selection and allows you to select a digital modulation filter or through path. Refer to “**:IQ:**MODulation:FILTer” on page 236 for selecting a filter or through path.

Example

**:RAD:**ARB:**IQ:**MOD:FILT:AUTO 1

The preceding example allows for automatic filter selection.

*RST 1

**Key Entry**

I/Q Mod Filter Manual Auto
:MARKer:CLEar

**Supported**

ES8267D with Option 601 or 602

[:SOURce:]RADio:MARKer:CLEar "<file_name>",<marker>,<first_point>,<last_point>

This command clears a single marker point or a range of marker points on a waveform segment for the selected marker (1–4). The Dual ARB mode and all of the ARB modes use this command.

"<file_name>"  This variable specifies the name of the waveform file in volatile waveform memory (WFM1). Use the AUTOGEN_WAVEFORM file when clearing marker points for the currently active ARB format and then save the file using a different file name. The PSG automatically creates a file, using current settings, and names it AUTOGEN_WAVEFORM whenever an ARB format is turned on (except Dual ARB); the same file name is used for all ARB formats. When all ARB formats are off, this file will still be in waveform memory (WFM1) and is available for use by the Dual ARB. For information on the file name syntax, see “File Name Variables” on page 10.

<marker>  This variable selects the marker number; an integer value from one to four.

<first_point>  This variable defines the first point in a range of points. The number must be greater than or equal to one, and less than or equal to the total number of waveform points.

If you enter a value for either the first marker point or the last marker point that would make the first marker point occur after the last, the last marker point automatically adjusts to match the first marker point.

<last_point>  This variable defines the last point in a range of points. The number must be greater than or equal to the first point, and less than or equal to the total number of waveform points.

To clear a single marker point, use the same marker point for the first and last point variables. For more information on markers and ARB files, refer to the *E8257D/67D PSG Signal Generators User’s Guide*.

**Example**

:RAD:ARB:MARK:CLE "Test_Data",1,1,300

The preceding example clears marker 1 from the first point through the 300th point in the Test_Data file.

**Range**

<marker>: 1–4

<first_point>: 1–number of waveform points

<last_point>: <first_point>–number of waveform points

**Key Entry**

<table>
<thead>
<tr>
<th>Set Marker Off</th>
<th>Range Of Points</th>
<th>Marker 1 2 3 4</th>
<th>First Mkr Point</th>
<th>Last Mkr Point</th>
</tr>
</thead>
</table>

Chapter 5 237
Digital Modulation Commands

Dual ARB Subsystem—Option 601 or 602 ([:SOURce]:RADio:ARB)

:MARKer:CLEar:ALL

Supported  E8267D with Option 601 or 602

[:SOURce]:RADio:ARB:MARKer:CLEar:ALL "<file_name>",<marker>

This command clears all marker points on a waveform segment for the selected marker (1–4). The Dual ARB player and all of the ARB formats use this command. With all marker points cleared, the event output signal level is set low.

"<file_name>"  This variable specifies the name of the waveform file in volatile waveform memory (WFM1). Use the AUTOGEN_WAVEFORM file when clearing all marker points for the currently active ARB format and then save the file using a different file name. The PSG automatically creates a file, using current settings, and names it AUTOGEN_WAVEFORM whenever an ARB format is turned on (except Dual ARB); the same file name is used for all ARB formats. When all ARB formats are off, this file will still be in waveform memory (WFM1) and is available for use by the Dual ARB. For information on the file name syntax, see “File Name Variables” on page 10

<marker>  This variable selects the marker number; an integer value from one to four.

Example

:RAD:ARB:MARK:CLE:ALL "Test_Data",1

The preceding example clears marker 1 from the all waveform points in the Test_Data file.

Range  1–4

Key Entry  Marker 1 2 3 4  Set Marker Off All Points

:MARKer:ROTate

Supported  E8267D with Option 601 or 602

[:SOURce]:RADio:ARB:MARKer:ROTate "<file_name>",<rotate_count>

This command shifts the marker points for all markers in a waveform earlier or later by the value of the <rotate_count> variable. The Dual ARB player and all of the ARB formats use this command.

You can use a positive or negative value. When a marker point is close to the end of the waveform and the <rotate_count> value is greater than the number of remaining marker points, but less than the total number of marker points, the marker points that would move beyond the end of the waveform wrap to the beginning of the waveform. For example, if a marker point resides at sample point 195 out of 200, and the <rotate_count> value is twenty-five, the marker point wraps to the beginning of the waveform and continues out to the twentieth waveform point.

To set the marker points in a waveform, refer to “:MARKer:[SET]” on page 239.

"<file_name>"  This variable specifies the name of the waveform file in volatile waveform memory (WFM1). Use the AUTOGEN_WAVEFORM file when rotating marker points for the currently active ARB format and then save the file using a different file name. The PSG automatically creates a file, using current settings, and names it AUTOGEN_WAVEFORM whenever an ARB format is turned on (except Dual ARB); the same file name is used for all ARB formats. When all ARB formats are off, this file will still be in waveform memory (WFM1) and is available for use by the Dual ARB. For information on the file name syntax, see “File Name Variables” on page 10.
Example

:RAD:ARB:MARK:ROT "Test_Data",100

The preceding example shifts all markers set in the Test_Data file 100 points later. If the first set point in the file is at 50, then after sending this command, the first set point will be 150 (assuming the Test_Data file has at least 150 points) and no later set points wrapped around to the beginning of the file.

Range

- (n – 1) to (n – 1)

n = number of points in the waveform

:MARKer:[SET]

Supported

E8267D with Option 601 or 602

[:SOURce]:RADio:ARB:MARKer:[SET] "<file_name>"",<marker>,<first_point>,<last_point>,<skip_count>

This command sets a single marker point or a range of marker points on a waveform segment for the selected marker (1–4). The Dual ARB player and all of the ARB formats use this command.

The PSG provides four independent markers. Each marker routes an output signal to the rear-panel event connector number (BNC—EVENT 1 and EVENT 2 or AUXILIARY I/O—EVENT 3 and EVENT 4) that corresponds to the marker number. A marker consists of marker points placed at defined sample points in a waveform segment. This means that a marker point cannot be less than one or greater than the last sample point in the waveform. Marker points are cumulative, so multiple command executions with different range values, without first clearing the existing points, places additional marker points on the waveform. Because of this cumulative behavior, it is a good practice to clear existing marker points prior to setting new points. This will eliminate unexpected marker pulses. Refer to “:MARKer:CLEAR” on page 237 and “:MARKer:CLEAR:ALL” on page 238 for information on clearing marker points.

For waveforms generated on the signal generator (baseband generator), the PSG automatically places a marker point at the first waveform sample for markers one and two.

NOTE You can set markers for either positive or negative polarity. The following discussions for this command assume positive marker polarity. When using negative marker polarity, the marker pulses occur during the periods of no marker points.

There are three ways to place marker points using this command:

• consecutive marker points over a range that collectively create a single marker pulse that spans the range

• equally spaced marker points over a range, so that a marker pulse occurs at each sample point that coincides with a marker point (Using this method, you can configure a clock signal by setting the <skip_count> variable to one.)

• a single marker point placed at a specific sample point in the waveform, which outputs a single pulse relative to the marker point location (To configure a single marker point, set the first and last points to the same number.)

For more information on markers, refer to the E8257D/67D PSG Signal Generators User’s Guide.
Digital Modulation Commands
Dual ARB Subsystem–Option 601 or 602 ([:SDURe]:RADio:ARB)

The following list describes the command variables:

"<file_name>" This variable specifies the name of the waveform file in volatile waveform memory (WFM1). Use the AUTOGEN_WAVEFORM file when setting marker points for the currently active ARB format and then save the file using a different file name. The PSG automatically creates a file, using current settings, and names it AUTOGEN_WAVEFORM whenever an ARB format is turned on (except Dual ARB); the same file name is used for all ARB formats. When all ARB formats are off, this file will still be in waveform memory (WFM1) and is available for use by the Dual ARB. For information on the file name syntax, see “File Name Variables” on page 10

<marker> This variable selects the marker number; an integer value from one to four.

<first_point> This variable defines the first point in the range over which the marker is placed. This number must be greater than or equal to one, and less than or equal to the total number of waveform points.

If you enter a value for either the first marker point or the last marker point that would make the first marker point occur after the last, the last marker point is automatically adjusted to match the first marker point.

<last_point> This variable defines the last point in the range over which the marker will be placed. This value must be greater than or equal to the first point, and less than or equal to the total number of waveform points.

<skip_count> This variable defines the marker point pattern across the range. A zero value means the marker points occur consecutively across the range. A value greater than zero creates a repeating marker point pattern across the range, where the gap between the marker points is equal to the <skip_count> value. The gaps begin after the first marker point. Each marker point in the pattern, which is only one point wide, produces a marker pulse.

Example
:RAD:ARB:MARK "Test_Data",1,40,100,2

The preceding example sets marker 1 on the first point, 40, the last point, 100, and every third point (skip 2) between 40 and 100 (assuming the Test_Data file has at least 100 points).

Range
<marker>: 1–4
<first_point>: 1–number of waveform points
<last_point>: <first_point>–number of waveform points
<skip_count>: 0–number of points in the range

Key Entry
Set Marker on Range Of Points Marker 1 2 3 4 First Mkr Point Last Mkr Point
# Skipped Points Apply to Waveform
Digital Modulation Commands
Dual ARB Subsystem–Option 601 or 602
[:SOURce]:RADio:ARB

:MDEStination:AAMPlitude

**Supported**
E4438C with Option 601 or 602

[:SOURce]:RADio:ARB:MDEStination:AAMPlitude NONE|M1|M2|M3|M4

[:SOURce]:RADio:ARB:MDEStination:AAMPlitude?

This command routes the selected marker to the Alternate Amplitude function. The `NONE` parameter clears the marker for the Alternate Amplitude function.

*RST

<table>
<thead>
<tr>
<th>Key Entry</th>
<th>Marker 1</th>
<th>Marker 2</th>
<th>Marker 3</th>
<th>Marker 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>Marker 1</td>
<td>Marker 2</td>
<td>Marker 3</td>
<td>Marker 4</td>
</tr>
</tbody>
</table>

:MDEStination:ALCHold

**Supported**
E8267D with Option 601 or 602

**CAUTION**
Incorrect ALC sampling can create a sudden unleveled condition that may create a spike in the RF output potentially damaging a DUT or connected instrument. Ensure that you set markers to let the ALC sample over an amplitude that accounts for the high power levels within the signal.

[:SOURce]:RADio:ARB:MDEStination:ALCHold NONE|M1|M2|M3|M4

[:SOURce]:RADio:ARB:MDEStination:ALCHold?

This command disables the marker ALC hold function, or it enables the marker hold function for the selected marker. For setting markers, see “:MARKer:[SET]” on page 239.

Use the ALC hold function when you have a waveform signal that incorporates idle periods, or when the increased dynamic range encountered with RF blanking is not desired. The ALC leveling circuitry responds to the marker signal during the marker pulse (marker signal high), averaging the modulated signal level during this period.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points. For setting a marker’s polarity, see “:MPOLarity:MARKer1|2|3|4” on page 243.

**NOTE**
Do not use the ALC hold for more than 100 ms, because it can affect the waveform’s output amplitude.

The marker signal has a minimum of a two-sample delay in its response relative to the waveform signal response. To compensate for the marker signal delay, offset marker points from the waveform sample point at which you want the ALC sampling to begin.

The ALC hold setting is part of the file header information, so saving the setting to the file header saves the current marker routing for the waveform file.

**NOTE**
A waveform file that has unspecified settings in the file header uses the previous waveform’s routing settings.

For more information on the marker ALC hold function, see the E8257D/67D PSG Signal Generators User’s Guide. For setting the marker points, see “:MARKer:[SET]” on page 239.
**Digital Modulation Commands**

**Dual ARB Subsystem—Option 601 or 602 ([SOURce]:RADio:ARB)**

<table>
<thead>
<tr>
<th>NONE</th>
<th>This terminates the marker ALC hold function.</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1–M4</td>
<td>These are the marker choices. The ALC hold feature uses only one marker at a time.</td>
</tr>
<tr>
<td><em>RST</em></td>
<td>NONE</td>
</tr>
</tbody>
</table>

**Example**

`:RAD:ARB:MDEST:ALCH M1`

The preceding example routes marker 1 to the ALC Hold function.

**Remarks**

N/A

**:MDESTination:PULSe**

**Supported**

ES8267D with Option 601 or 602

### CAUTION

The pulse function incorporates ALC hold. Incorrect ALC sampling can create a sudden unlevelled condition that may create a spike in the RF output potentially damaging a DUT or connected instrument. Ensure that you set markers to let the ALC sample over an amplitude that accounts for the high power levels within the signal.

```
[:SOURce]:RADio:ARB:MDESTination:PULSe NONE|M1|M2|M3|M4
```

This command enables or disables the marker pulse/RF blanking function for the selected marker. The function automatically uses the ALC hold function, so there is no need to select both ALC hold and marker pulse/RF blanking functions for the same marker.

### NOTE

Do not use ALC hold for more than 100 ms, because it can affect the waveform’s output amplitude.

The signal generator blanks the RF output when the marker signal goes low. The marker polarity determines when the marker signal is low. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points. For setting a marker’s polarity, see “:MPOLarity:MARKer1|2|3|4” on page 243.

### NOTE

Set marker points prior to using this function. Enabling this function without setting marker points may create a continuous low or high marker signal, depending on the marker polarity. This causes either no RF output or a continuous RF output. See “:MARKer:[SET]” on page 239 for setting the marker points.

The marker signal has a minimum of a two-sample delay in its response relative to the waveform signal response. To compensate for the marker signal delay, offset marker points from the waveform sample point at which you want the RF blanking to begin. The RF blanking setting is part of the file header information, so saving the setting to the file header saves the current marker routing for the waveform file.
NOTE  A waveform file that has unspecified settings in the file header uses the previous waveform's routing settings. This could create the situation where there is no RF output signal, because the previous waveform used RF blanking.

For more information on the marker RF blanking function, see the E8257D/67D PSG Signal Generators User’s Guide.

NONE  This terminates the marker RF blanking/pulse function.

M1–M4  These are the marker choices. The RF blanking/pulse feature uses only one marker at a time.

Example

:RAD:ARB:MDES:PULS M2

The preceding example routes marker 2 to Pulse/RF Blanking.

*RST  NONE

Key Entry  None  Marker 1  Marker 2  Marker 3  Marker 4

:MPOLarity:MARKer1|2|3|4

Supported  E8267D with Option 601 or 602

[:SOURce]:RADio:ARPOLarity:MARKer1|2|3|4 NEGative|POSitive

[:SOURce]:RADio:ARPOLarity:MARKer1|2|3|4?

This command sets the polarity for the selected marker. For a positive marker polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points.

Example

:RAD:ARB:MPOL:MARK3 NEG

The preceding example sets the polarity for marker 3 to negative.

*RST  POS

Key Entry  Marker 1 Polarity Neg Pos  Marker 2 Polarity Neg Pos  Marker 3 Polarity Neg Pos  Marker 4 Polarity Neg Pos
Digital Modulation Commands
Dual ARB Subsystem–Option 601 or 602 ([SOURce]:RADio:ARB)

[:NOISe]

Supported E8267D with Option 601 or 602 and Option 403

[:SOURce]:RADio:ARB:NOISe[:STATe] ON|OFF|1|0
[:SOURce]:RADio:ARB:NOISe[:STATe]?

This command enables or disables adding real-time, non-repeating additive white gaussian noise (AWGN) to the carrier modulated by the waveform being played by the Dual ARB waveform player. The noise bandwidth will be at least 0.8 times the sample rate, or 1.6 times the sample rate depending on the bandwidth factor. For information on the bandwidth factor, refer to “:NOISe:BFACtor”.

When the bandwidth factor is 2, and the sample rate is greater than 50 Msamples/sec, noise cannot be enabled. Maximum bandwidth cannot exceed 80 MHz. Any oversampling in the waveform increases the noise bandwidth by a factor equal to the oversampling.

Example

[:RAD:ARB:NOIS ON

The preceding example applies real-time AWGN to the carrier.

*RST 0

Key Entry Real-time Noise Off On

[:NOISe:BFACtor]

Supported E8267D with Option 601 or 602 and Option 403

[:SOURce]:RADio:ARB:NOISe:BFACtor <1 - 2>
[:SOURce]:RADio:ARB:NOISe:BFACtor?

This command sets the flat noise bandwidth for applied real time noise. The bandwidth factor will set the noise bandwidth to at least 0.8 times the sample rate when the bandwidth factor is 1 or to 1.6 times the sample rate if the bandwidth factor is 2. Maximum bandwidth cannot exceed 80 MHz.

When the bandwidth factor is 2, and the sample rate is greater than 50 megasamples/sec, noise cannot be enabled. Any oversampling in the waveform increases the noise bandwidth by a factor equal to the oversampling.

Example

[:RAD:ARB:NOIS:BFAC 2

The preceding example sets the bandwidth factor to 2 and increases the flat noise bandwidth by at least 1.6 times the ARB sample clock rate.

*RST +1

Key Entry Noise Bandwidth Factor
Digital Modulation Commands
Dual ARB Subsystem—Option 601 or 602 ([SORce]:RAdio:ARB)

:NOISe:CBWidth

Supported  E8267D with Option 601 or 602 and Option 403

[:SORce]:RAdio:ARB:NOISe:CBWidth <1Hz-80MHz>
[:SORce]:RAdio:ARB:NOISe:CBWidth?

This command selects the carrier bandwidth over which the AWGN (additive white gaussian noise) is applied. The noise power will be integrated over the selected bandwidth for the purposes of calculating C/N (carrier to noise ratio). The carrier bandwidth is limited to the ARB sample rate but cannot exceed 80 MHz. For more information refer to “:NOISe” and “:NOISe:BFACtor” on page 244.

*RST  +1.00000000E+000

Range  1.0 Hz

Key Entry  Carrier Bandwidth

:NOISe:CN

Supported  E8267D with Option 601 or 602 and Option 403

[:SORce]:RAdio:ARB:NOISe:CN <-100dB - 100dB>
[:SORce]:RAdio:ARB:NOISe:CN?

This command sets the carrier to noise ratio in dB. The carrier power is defined as the total modulated signal power without noise power added. The noise power is applied over the specified bandwidth of the carrier signal. For more information, refer to “:NOISe:CBWidth”.

Example

:RAD:ARB:NOIS:CN 50DB

The preceding example sets the carrier to noise ratio to 50 dB.

*RST  +0.00000000E+000

Key Entry  Carrier to Noise Ratio

:REFe rence:EXTer nal:FREQuency

Supported  E8267D with Option 601 or 602

[:SORce]:RAdio:ARB:REFe rence:EXTer nal:FREQuency <val>
[:SORce]:RAdio:ARB:REFe rence:EXTer nal:FREQuency?

This command allows you to enter the frequency of the external reference.

The variable <val> is expressed in hertz (Hz–MHz).

The value specified by this command is effective only when you are using an external ARB reference applied to the BASEBAND GEN REF IN rear-panel connector.

To specify external as the ARB reference frequency you must set the ARB reference to external. Refer to “:REFe rence:[SORce]” on page 246 for more information.
Digital Modulation Commands
Dual ARB Subsystem—Option 601 or 602 ([:SOURce]:RADio:ARB)

Example

:RAD:ARB:REF:EXT:FREQ 500KHZ

The preceding example sets the external clock frequency reference to 500 kHz.

*RST

+1.00000000E+007

Range

2.5E5–1E8

Key Entry

Reference Freq

:REFerence[:SOURce]

Supported

E8267D with Option 601 or 602

[[:SOURce]:RADio:ARB:REFerence[:SOURce] INTernal|EXTernal
[[:SOURce]:RADio:ARB:REFerence[:SOURce]?]

This command selects either an internal or external reference for the waveform clock.

If the EXTernal choice is selected, the external frequency value must be entered and the signal must be applied to the BASEBAND GEN REF IN rear-panel connector.

Refer to “:REFerence:EXTernal:FREQuency” on page 245 to enter the external reference frequency.

Example

:RAD:ARB:REF EXT

The preceding example sets the ARB reference to external.

*RST

INT

Key Entry

ARB Reference Ext Int

:RETrigger

Supported

E8267D with Option 601 or 602

[[:SOURce]:RADio:ARB:RETrigger ON|OFF|IMMediate
[[:SOURce]:RADio:ARB:RETrigger?]

This command selects the signal generator’s response to a trigger signal while using the single trigger mode.

When the PSG receives multiple trigger occurrences, when only one is required, it uses the first trigger and ignores the rest. For more information on triggering and to select the single trigger mode, see “:TRIGger:TYPE” on page 250.

The following list describes the waveform’s response to each of the command choices:

 ON The waveform waits for a trigger before play begins and accepts a subsequent trigger during playback. If there is a subsequent trigger during playback, the waveform completes its current playback and then plays one more time. If there is no subsequent trigger, the waveform plays once and stops until it receives another trigger.
OFF  The waveform waits for a trigger before play begins and ignores triggers during playback. To restart the waveform, you must send a trigger after the playback completes.

IMMediate  The waveform waits for a trigger before play begins and accepts a subsequent trigger during playback. Upon receipt of the subsequent trigger, the waveform immediately resets and begins playing from the beginning of the file. For a waveform sequence, this means to the beginning of the first segment in the sequence.

Example
:RAD:ARB:RETR IMM
The preceding example selects the immediate mode for the single mode trigger.

*RST  ON
Key Entry  On  Off  Immediate

`:RSCAling`

Supported  E8267D with Option 601 or 602
[:SOURce]:RADio:ARB:RSCaling <val>
[:SOURce]:RADio:ARB:RSCaling?

This command adjusts the scaling value that is applied to a waveform while it is playing. The variable <val> is expressed as a percentage. Runtime scaling does not alter the waveform data file. For more information about runtime scaling, refer to the E8257D/67D PSG Signal Generators User’s Guide.

Example
:RAD:ARB:RSC 50
The preceding example applies a 50% scaling factor to the selected waveform.

*RST  +7.00000000E+001
Range  1–100
Key Entry  Waveform Runtime Scaling

`:SCALing`

Supported  E8267D with Option 601 or 602
[:SOURce]:RADio:ARB:SCALing "<file_name>",<val>

This command scales the designated "<file_name>" waveform file while it is being played by the Dual ARB player. The variable <val> is expressed as a percentage, 1–100%. For information on file name syntax, see “File Name Variables” on page 10.

Scaling is additive and permanent. You cannot scale up. If you scale a waveform file by 60% and then scale it again to 80% you will scale down the 60% waveform file. For more information about waveform file scaling, refer to the E8257D/67D PSG Signal Generators User’s Guide.
Digital Modulation Commands
Dual ARB Subsystem–Option 601 or 602 [:SOURce]:RADio:ARB

Example

:SOURce:RADio:ARB:SCAL "Test_Data", 50

The preceding example applies a 50% scaling factor to the Test_Data waveform file.

Range 1–100

Key Entry Scaling Scale Waveform Data

:SOURce:RADio:ARB:SCLock:RATE

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:ARB:SCLock:RATE <sample_clock_rate>

This command sets the ARB sample clock rate. The sample_clock_rate variable can be set from 1 hertz to 100 megahertz.

Example

:SOURce:RADio:ARB:SCLock:RATE 1E6

The preceding example sets the ARB sample clock for 1 MHz.

*RST +1.00000000E+008

Range 1–1.0E8 Hz

Key Entry ARB Sample Clock

:SOURce:RADio:ARB:SEQuence

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:ARB:SEQuence 
"<file_name>"", "<waveform1>"", <reps>, NONE|M1|M2|M3|M4|M1M2|M1M3|M1M4|M1M2M3|M1M2M4|M1M3M4|M1M2M3M4|M2M3|M2M4|M3M4|M1M2M3M4|M1M2M3M5|M1M2M4M5|M2M3M4M5|ALLgebung{"<waveform2>"", <reps>, NONE|M1|M2|M3|M4|M1M2|M1M3|M1M4|M2M3|M2M4|M3M4|M1M2M3|M1M2M4|M1M3M4|M2M3M4|ALL}

[:SOURce]:RADio:ARB:SEQuence? "<file_names>"

This command creates a waveform sequence. A waveform sequence is made up of segments and other sequences. Any number of segments, up to a segment count limit of 32768, can be used to create a sequence. The count limit is determined by the number of segments in the waveform sequence. Repeated segments are included in the count limit.

For example, using the figure below, suppose a waveform is created using two sequences: Sequence_A and Sequence_B. Sequence_A consists of Sequence_B and Segment_Q with Sequence_B repeated four times. The total segment count for this waveform sequence would be eleven.
The query returns the contents and segment settings of the waveform sequence file.

The segments and sequences play in the same order as placed into the waveform sequence by the command. Once you create the file, you cannot edit the segment settings or add further waveform segments unless you use the signal generator’s front panel. Using the same waveform sequence name overwrites the existing file with that name. To use a segment’s marker settings, you must enable the segment’s markers within the segment or within the waveform sequence. A sequence is stored in the catalog of SEQ files USER/SEQ or SEQ: directory.

When you create a waveform sequence, the PSG also creates a file header for the sequence. This file header takes priority over segment or nested sequence file headers. Refer to the *E8257D/67D PSG Signal Generators User’s Guide* for more information on file headers. To save the file header, see ":HEADer:SAVE" on page 233.

"<file_name>" This variable names the waveform sequence file. For information on the file name syntax, see “File Name Variables” on page 10.

"<waveform1>" This variable specifies the name of an existing waveform segment or sequence file. A waveform segment or the waveform segments in a specified sequence must reside in volatile memory, WFM1, before it can be played by the Dual ARB player. For information on the file name syntax, see “File Name Variables” on page 10, and for more information on waveform segments, see the *E8257D/67D PSG Signal Generators User’s Guide*.

"<waveform2>" This variable specifies the name of a second existing waveform segment or sequence file. The same conditions required for waveform1 apply for this segment or sequence. Additional segments and other sequences can be inserted into the file.

<reps> This variable sets the number of times a segment or sequence plays (repeats) before the next segment or sequence plays.

NONE This choice disables all four markers for the waveform. Disabling markers means that the waveform sequence ignores the segment’s or sequence’s marker settings.

M1, M2, M3, M4 These choices, either individually or a combination of them, enable the markers for the waveform segment or sequence. Markers not specified are ignored for that segment or sequence.
ALL  This choice enables all four markers in the waveform segment or sequence.

**Example**


**NOTE**  A carriage return or line feed is never included in a SCPI command. The example above contains a carriage return so that the text will fit on the page.

The preceding example creates a waveform sequence file named Test_Data. This file consists of the factory-supplied waveform segments, ramp_test_wfm and sine_test_wfm. The waveform is stored in the signal generator's SEQ: directory.

- The first segment, ramp_test_wfm, has 25 repetitions with markers 1 and 4 enabled.
- The second segment, sine_test_wfm, has 100 repetitions with all four markers enabled.

**Range**

- `<reps>`: 1–65535

**:TRIGger:TYPE**

**Supported**  E8267D with Option 601 or 602

Supports E8267D with Option 601 or 602

- `[:SOURce]:RADio:ARB:TRIGger:TYPE CONTinuous|SINGle|GATE|SADVance`
- `[:SOURce]:RADio:ARB:TRIGger:TYPE?`

This command sets the trigger mode (type) that controls how the waveform plays.

Triggers control the playback by telling the PSG when to transmit the modulating signal (waveform). Depending on the trigger settings for the PSG, the waveform transmission can occur once, continuously, or the PSG may start and stop the transmission repeatedly (GATE mode). For waveform sequences, you can even control when each segment plays (SADVance—segment advance mode).

A trigger signal comprises both positive and negative signal transitions (states), which are also called high and low periods. You can configure the PSG to trigger on either state. It is common to have multiple triggers occur when the signal generator requires only a single trigger. In this situation, the PSG recognizes the first trigger and ignores the rest.

When you select a trigger mode, you may lose the signal (carrier plus modulating) from the RF output until you trigger the waveform. This is because the PSG sets the I and Q signals to zero volts prior to the first trigger event, which suppresses the carrier. After the first trigger event, the waveform's final I and Q levels determine whether you will see the carrier signal or not (zero = no carrier, other values = carrier visible). At the end of most files, the final I and Q points are set to a value other than zero. If desired, you can create and download an external file (see the E8257D/67D PSG Programming Guide) with the initial I and Q voltages set to values other than zero. Conversely, you can set the last I and Q points to zero.
Digital Modulation Commands
Dual ARB Subsystem—Option 601 or 602 ([SOURce]:RADio:ARB)

There are four parts to configuring the trigger:

- Choosing the trigger type, which controls the waveform’s transmission.
- Setting the waveform’s response to triggers:
  - CONTinuous, see “:TRIGger:TYPE:CONTinuous[:TYPE]” on page 252
  - SINGle, see “:TRIGger:TYPE:CONTinuous[:TYPE]” on page 208
  - SADVance, see “:TRIGger:TYPE:SADVance[:TYPE]” on page 253
  - GATE, selecting the mode also sets the response.
- Selecting the trigger source (see “:TRIGger:[SOURce]” on page 254), which determines how the PSG receives its trigger signal, internally or externally. The GATE choice requires an external trigger.
- Setting the trigger polarity when using an external source:
  - CONTinuous, SINGle, and SADVance, see “:TRIGger:[SOURce]:EXTernal:SLOPe” on page 256
  - GATE, see “:TRIGger:TYPE:GATE:ACTive” on page 252

For more information on triggering, see the E8257D/67D PSG Signal Generators User’s Guide.

The following list describes the trigger type command choices:

**CONTinuous**
- Upon triggering, the waveform repeats continuously.

**SINGle**
- Upon triggering, the waveform segment or sequence plays once.

**GATE**
- An external trigger signal repeatedly starts and stops the waveform’s playback (transmission). The length of each transmission depends on the duty period of the trigger signal and the gate polarity selection (see “:TRIGger:TYPE:GATE:ACTive” on page 252). The waveform plays during the inactive state and stops during the active polarity selection state. The active state can be set high or low. The gate mode works only with an external trigger source.

**SADVance**
- The trigger controls the segment advance within a waveform sequence. To use this choice, a waveform sequence must be the active waveform. Ensure that all segments in the sequence reside in volatile memory.

**NOTE** The ARB gating behavior described above is opposite to the gating behavior for real-time custom.

**Example**
:RAD:ARB:TRIG:TYPE GATE

The preceding example selects the gated trigger mode.

<table>
<thead>
<tr>
<th>Key Entry</th>
<th>Continuous</th>
<th>Single</th>
<th>Gated</th>
<th>Segment Advance</th>
</tr>
</thead>
</table>

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Digital Modulation Commands
Dual ARB Subsystem—Option 601 or 602 [:SOURce:RADio:ARB]

**:TRIgger:TYPE:CONTinuous[:TYPE]**

**Supported**
E8267D with Option 601 or 602

[[:SOURce]:RADio:ARB:TRIgger:TYPE:CONTinuous[:TYPE] FREE|TRIgger|RESet
[[:SOURce]:RADio:ARB:TRIgger:TYPE:CONTinuous[:TYPE]?

This command selects the waveform's response to a trigger signal while using the continuous trigger mode.

For more information on triggering and to select the continuous trigger mode, see "*:TRIgger:TYPE" on page 250.

The following list describes the waveform's response to each of the command choices:

- **FREE**
  Turning the ARB format on immediately triggers the waveform. The waveform repeats until you turn the format off, select another trigger, or choose another waveform file.

- **TRIGGER**
  The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously until you turn the format off, select another trigger, or choose another waveform file.

- **RESET**
  The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously. Subsequent triggers reset the waveform to the beginning. For a waveform sequence, this means to the beginning of the first segment in the sequence.

**Example**

*RST*:RAD:ARB:TRI:TYPE:CONT TRIG

The preceding example selects the trigger continuous mode.

**Key Entry**

Free Run  Trigger & Run  Reset & Run

**:TRIgger:TYPE:GATE:ACTive**

**Supported**
E8267D with Option 601 or 602

[[:SOURce]:RADio:ARB:TRIgger:TYPE:GATE:ACTive LOW|HIGH
[[:SOURce]:RADio:ARB:TRIgger:TYPE:GATE:ACTive?

This command selects the active state (gate polarity) of the gate while using the gating trigger mode.

The LOW and HIGH selections correspond to the low and high states of an external trigger signal. For example, when you select HIGH, the active state occurs during the high of the trigger signal. When the active state occurs, the PSG stops the waveform playback at the last played sample point, then restarts the playback at the next sample point when the inactive state occurs. For more information on triggering and to select gating as the trigger mode, see "*:TRIgger:TYPE" on page 250.

The following list describes the PSG's gating behavior for the polarity selections:

- **LOW**
  The waveform playback stops when the trigger signal goes low (active state) and restarts when the trigger signal goes high (inactive state).

- **HIGH**
  The waveform playback stops when the trigger signal goes high (active state) and restarts when the trigger signal goes low (inactive state).
Example


The preceding example sets the active gate state to high.

*RST

Key Entry

Gate Active Low High

:TRIGger:TYPE:SADVance[:TYPE]

Supported

E8267D with Option 601 or 602

[:SOURce]:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] SINGle|CONTinuous

[:SOURce]:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE]?

This commands selects the waveform's response to a trigger signal while using the segment advance (SADVance) trigger mode.

When the PSG receives multiple trigger occurrences when only one is required, the signal generator uses the first trigger and ignores the rest. For more information on triggering and to select segment advance as the trigger mode, see “:TRIGger:TYPE” on page 250.

The following list describes the waveform's response to each of the command choices:

SINGle

Each segment in the sequence requires a trigger to play, and a segment plays only once, ignoring a segment’s repetition value (see “SEQuence” on page 248 for repetition information). The following list describes a sequence’s playback behavior with this choice:

- After receiving the first trigger, the first segment plays to completion.
- When the waveform receives a trigger after a segment completes, the sequence advances to the next segment and plays that segment to completion.
- When the waveform receives a trigger during play, the current segment plays to completion. Then the sequence advances to the next segment, and it plays to completion.
- When the waveform receives a trigger either during or after the last segment in a sequence plays, the sequence resets and the first segment plays to completion.

CONTinuous

Each segment in the sequence requires a trigger to play. After receiving a trigger, a segment plays continuously until the waveform receives another trigger. The following list describes a sequence’s playback behavior with this choice:

- After receiving the first trigger, the first segment plays continuously.
- A trigger during the current segment play causes the segment to play to the end of the segment file, then the sequence advances to the next segment, which plays continuously.
- When last segment in the sequence receives a trigger, the sequence resets and the first segment plays continuously.
Digital Modulation Commands
Dual ARB Subsystem–Option 601 or 602 [:SOURce]:RADio:ARB

Example
:RAD:ARB:TRIG:TYPE:SADV CONT
The preceding example selects the continuous segment advance mode.

*RST CONT

Key Entry Single Continuous

:.TRIGger[:SOURce]

Supported E8267D with Option 601 or 602
[:SOURce]:RADio:ARB:.TRIGger[:SOURce] KEY|EXT|BUS
[:SOURce]:RADio:ARB:.TRIGger[:SOURce]?

This command sets the trigger source.

For more information on triggering, see ":.TRIGger:TYPE" on page 250. The following list describes the command choices:

KEY This choice enables manual triggering by pressing the front-panel Trigger hardkey.

EXT An externally applied signal triggers the waveform. This is the only choice that works with gating. The following settings affect an external trigger:

- The input connector for the trigger signal. You have a choice between the rear-panel PATTERN TRIG IN connector or the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector. To make the connector selection, see ":.TRIGger[:SOURce]:EXTernal[:SOURce]" on page 255.

For more information on the connectors and on connecting the cables, see the E8257D/67D PSG Signal Generators User’s Guide.

- The trigger signal polarity:
  - gating mode, see ":.TRIGger:TYPE:GATE:ACTive" on page 252
  - continuous, single, and segment advance modes, see ":.TRIGger[:SOURce]:EXTernal:SLOPe" on page 256

- The time delay between when the PSG receives a trigger and when the waveform responds to the trigger. There are two parts to setting the delay:
  - setting the amount of delay, see ":.TRIGger[:SOURce]:EXTernal:DELay" on page 255
  - turning the delay on, see ":.TRIGger[:SOURce]:EXTernal:DELay:STATe" on page 256

BUS This choice enables triggering over the GPIB using the *TRG or GET commands, or the LAN and the AUXILIARY INTERFACE (RS-232) using the *TRG command.

Example
:RAD:ARB:TRIG KEY
The preceding example sets the trigger source to manual, front-panel key operation.

*RST EXT

Key Entry Trigger Key Ext Bus
Digital Modulation Commands

Dual ARB Subsystem–Option 601 or 602 (:SOURce:RADio:ARB)

:TRIGger[:SOURce]:EXTernal[:SOURce]

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:ARB::TRIGger[:SOURce]:EXTernal[:SOURce] EPT1|EPT2|
EPTRIGGER1|EPTRIGGER2
[:SOURce]:RADio:ARB:TRIGger[:SOURce]:EXTernal[:SOURce]? T

This command selects which PATTERN TRIG IN connection the PSG uses to accept an externally applied trigger signal when external is the trigger source selection.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURce]” on page 254. For more information on the rear-panel connectors, see the E8257D/67D PSG Signal Generators User’s Guide.

The following list describes the command choices:

EPT1 This choice is synonymous with EPTRIGGER1 and selects the PATTERN TRIG IN rear-panel connector.
EPT2 This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.
EPTRIGGER1 This choice is synonymous with EPT1 and selects the PATTERN TRIG IN rear-panel connector.
EPTRIGGER2 This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.

Example

:RAD:ARB::TRIG:EXT EPT2

The preceding example sets the trigger source to the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.

*RST EPT1

Key Entry Patt Trig In 1 Patt Trig In 2

:TRIGger[:SOURce]:EXTernal:DELay

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:ARB::TRIGger[:SOURce]:EXTernal::DELay <val>
[:SOURce]:RADio:ARB::TRIGger[:SOURce]:EXTernal::DELay?

This command sets the amount of time to delay the PSG’s response to an external trigger.

The delay is a path (time) delay between when the PSG receives the trigger and when it responds to the trigger. For example, configuring a trigger delay of two seconds, causes the PSG to wait two seconds after receipt of the trigger before the PSG responds and transmits the waveform.

The delay does not occur until you enable it (see :TRIGger[:SOURce]:EXTernal::DELay::STATE). You can set the delay value either before or after turning it on.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURce]” on page 254.

The unit of measurement for the variable <val> is in seconds (nsec–sec).
**Digital Modulation Commands**  
Dual ARB Subsystem–Option 601 or 602 ([SOURce]:RADio:ARB)

**Example**

:RAD:ARB:TRIG:EXT:DEL .2  
The preceding example sets the external delay to 200 milliseconds.

*RST  
+1.00000000E−003  
Range  
1E−8 to 4E1  
Key Entry  
Ext Delay Time

**:TRIGger[:SOURce]:EXTernal:DELAY:STATE**

Supported  
E8267D with Option 601 or 602  
[:SOURce]:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELAY:STATE ON|OFF|1|0  
[:SOURce]:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELAY:STATE?

This command turns the trigger delay on or off when using an external trigger source. For setting the delay time, see :TRIGger[SOURce]:EXTernal:DELAY, and for more information on configuring an external source, see “:TRIGger[:SOURce]” on page 254.

**Example**

The preceding example disables the external delay function.

*RST  
0  
Key Entry  
Ext Delay Off On

**:TRIGger[:SOURce]:EXTernal:SLOPe**

Supported  
E8267D with Option 601 or 602  
[:SOURce]:RADio:ARB:TRIGger[:SOURce]:EXTernal:SLOPe POSitive|NEGative  
[:SOURce]:RADio:ARB:TRIGger[:SOURce]:EXTernal:SLOPe?

This command sets the polarity for an external trigger signal while using the continuous, single, or segment advance triggering modes. To set the polarity for gating, see “.TRIGger:TYPE:GATE:ACTIVE” on page 252. The POSitive and NEGative selections correspond to the high (positive) and low (negative) states of the external trigger signal. For example, when you select POSitive, the waveform responds (plays) during the high state of the trigger signal. When the PSG receives multiple trigger occurrences when only one is required, the signal generator uses the first trigger and ignores the rest. For more information on configuring an external trigger source and to select external as the trigger source, see “.TRIGger[:SOURce]” on page 254.

**Example**

:RAD:ARB:TRIG:EXT:SLOP NEG  
The preceding example sets the external trigger slope to negative.

*RST  
NEG  
Key Entry  
Ext Polarity Neg Pos
:VCO:CLOCK

**Supported**
E8267D with Option 601 or 602

[:SOURce]:RADio:ARB:VCO:CLOCK INTernal|EXTernal

[:SOURce]:RADio:ARB:VCO:CLOCk?

This command selects an internal or external VCO clock. The external VCO clock is connected to the rear-panel BASEBAND GEN CLK IN connector. Use the :DACS:ALIGN command after an external VCO clock is first applied to the BASEBAND GEN CLK IN connector or when the VCO signal is lost and then re-acquired.

**Example**

:RAD:ARB:VCO:CLOC EXT

The preceding example selects an external VCO clock.

*RST

**Key Entry**

VCO Clock Ext Int

:WAVEform

**Supported**
E8267D with Option 601 or 602

[:SOURce]:RADio:ARB:WAVEform "WFM1:file_name"|"SEQ:filename"

[:SOURce]:RADio:ARB:WAVEform?

This command, for the Dual ARB mode, selects a waveform file or sequence, for the Dual ARB player to play. The file must be present in volatile memory, WFM1: or in the SEQ directory. If a file is in non-volatile memory (NVWFM), use the command "COPY" on page 58 to copy the file to WFM1.

"WFM1:file_name" This variable names a waveform file residing in volatile memory:WFM1. For information on the file name syntax, see "File Name Variables" on page 10.

"SEQ:filename" This variable names a sequence file residing in the catalog of sequence files. For more information on the file name syntax, see “File Name Variables” on page 10.

**Example**

:RAD:ARB:WAV "WFM1:Test_Data"

The preceding example selects the file Test_Data from the list of files in volatile waveform memory, WFM1 and applies its header settings.

**Key Entry**

Select Waveform
:Waveform:NHEADers

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:ARB:WAVEform:NHEADers "WFM1:file_name"|"SEQ:filename"

This command, for the Dual ARB mode, allows for a fast selection of a waveform file or sequence. No header information or settings are applied to the waveform or sequence when this command is used. This will improve the access or loading speed of the waveform file or sequence to approximately 100 ms for a single segment. The file must be in volatile waveform memory, WFM1; or in the SEQ directory. If a file is in non-volatile memory (NVWFM), use the command “:COPT” on page 58 to copy files to WFM1.

"WFM1:file_name" This variable names a waveform file residing in volatile memory:WFM1. For information on the file name syntax, see “File Name Variables” on page 10.

"SEQ:filename" This variable names a sequence file residing in the catalog of sequence files. For more information on the file name syntax, see “File Name Variables” on page 10.

Example

:RAD:ARB:WAV:NHEA "Test_Data"

The preceding example selects the file Test_Data, without applying header settings.

[:STATe]

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:ARB[:STATe] ON|OFF|1|0

This command enables or disables the operating state of the signal generator's dual arbitrary waveform (ARB) generator.

Example

:RAD:ARB 1

The preceding example turns on the signal generator's ARB generator personality.

*RST 0

Key Entry ARB Off On

Dmodulation Subsystem—Option 601 or 602 ([:SOURce]:RADio:DMODulation:ARB)

:IQ:EXTernal:FILTer

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:DMODulation:ARB:IQ:EXTernal:FILTer 40e6|THRough

This command selects a 40 MHz filter or a through path for I/Q signals routed to the rear-panel I and Q outputs. Selecting a filter using this command will automatically set “:IQ:EXTernal:FILTer:AUTO” on page 259 to OFF(0) mode.
Digital Modulation Commands
Dmmodation Subsystem–Option 601 or 602 ([:SOURce]:RADio:DMODulation:ARB)

40e6  This choice selects the 40 MHz baseband filter.
THRough  This choice selects a through path and bypasses filtering.

Example
The preceding example selects a 40 MHz filter.

*RST  THR

Key Entry  40.000 MHz  Through

:IQ:EXTernal:FILTer:AUTO

Supported  E8267D with Option 601 or 602

[:SOURce]:RADio:DMODulation:ARB:IQ:EXTernal:FILTer:AUTO ON|OFF|1|0
[:SOURce]:RADio:DMODulation:ARB:IQ:EXTernal:FILTer:AUTO?

This command enables or disables the automatic filter selection for I/Q signals routed to the rear-panel I/Q outputs.

ON(1)  This choice automatically selects a filter that is optimized for the current signal generator settings.
OFF(0)  This choice disables the auto feature and allows you to select the 40 MHz filter or a through path. Refer to “:IQ:EXTernal:FILTer” on page 258 for selecting a filter or through path.

Example
The preceding example disables the auto mode filter selection.

*RST  1

Key Entry  I/Q Output Filter Manual Auto

:FILTer

Supported  E8267D with Option 601 or 602

[:SOURce]:RADio:DMODulation:ARB:FILTer RNYQuist|NYQuist|GAUSsian|RECTangle|AC4Fm|UGGaussian|"<user_FIR>"
[:SOURce]:RADio:DMODulation:ARB:FILTer?

This command specifies the pre-modulation filter type.

RNYQuist  This choice selects a Root Nyquist (root raised cosine) filter. This filter is adjusted using Alpha.
NYQuist  This choice selects a Nyquist (raised cosine) filter. This filter is adjusted using Alpha.
GAUSsian  This choice selects a Gaussian Filter which is adjusted using Bbt values.
RECTangle  This choice selects a one symbol wide rectangular filter.
Digital Modulation Commands

**D**igital **M**odulation **S**ubsystem–**O**ption 601 or 602 ([:SOURce]:RADio:DMODulation:ARB)

- **AC4Fm**: This choice selects a pre-defined Association of Public Safety Communications officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.
- **UGGAUSSian**: This choice selects a UN3/4 delay-compatible, GSM, 0.300 Bbt Gaussian filter. The Bbt value is not adjustable.
- **"<User_FIR>"**: This variable is any filter file that you have stored in memory. For information on the file name syntax, see “File Name Variables” on page 10.

**Example**


The preceding example selects a file named FIR_Data, from the catalog of FIR files, as the filter type.

**:*RST**

**Key Entry**

- Root Nyquist
- Nyquist
- Gaussian
- Rectangle
- APCO 25
- C4FM
- UN3/4
- GSM
- Gaussian
- User FIR

`:FILT:ER:ALPH a

**Supported**

E8267D with Option 601 or 602

`:FILT:ER:ALPH <val>
`:FILT:ER:ALPH?

This command changes the Nyquist or root Nyquist filter alpha value.

The filter alpha value can be set to the minimum level (0), the maximum level (1), or in between by using numeric values (0.001–0.999).

To change the current filter type, refer to “:FILT:ER” on page 259.

**Example**

`:RAD:DMOD:ARB:FILT:ALPH .33

The preceding example sets .33 as the filter alpha.

**:*RST**

**Range**

0.000–1.000

**Key Entry**

Filter Alpha

`:FILT:ER:BBT

**Supported**

E8267D with Option 601 or 602

`:FILT:ER:BBT <val>
`:FILT:ER:BBT?

This command changes the bandwidth-multiplied-by-bit-time (Bbt) filter parameter for a Gaussian filter. It has no effect on other types of filters.

The filter Bbt value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

To change the current filter type, refer to “:FILT:ER” on page 259.
**Digital Modulation Commands**

**Dmodulation Subsystem—Option 601 or 602 [:SOURce:RADIO:DMODulation:ARB]**

**Example**

:`RAD:DMOD:ARB:FILT:BBT .52`

The preceding example sets .52 as the filter BbT.

*RST* +5.00000000E−001

Range 0.000–1.000

**Key Entry** Filter BbT

**:FILTer:CHANnel**

**Supported** E8267D with Option 601 or 602

[:SOURce]:RADIO:DMODulation:ARB:FILTer:CHANnel EVM|ACP

This command optimizes the Nyquist and root Nyquist filters to minimize error vector magnitude (EVM) or to minimize adjacent channel power (ACP). To change the current filter type, refer to “:FILTer” on page 259.

**Example**

:`RAD:DMOD:ARB:FILT:CHAN ACP`

The preceding example selects ACP optimization.

EVM This choice provides the most ideal passband.

ACP This choice improves stopband rejection.

*RST* EVM

**Key Entry** Optimize FIR For EVM ACP

**:HEADer:CLEar**

**Supported** E8267D with Option 601 or 602

[:SOURce]:RADIO:DMODulation:ARB:HEADer:CLEar

This command clears the header information from the header file used by this modulation format. Header information consists of signal generator settings and marker routings associated with the waveform file. Refer to the E8257D/67D PSG Signal Generators User’s Guide for information on header files.

For this command to function, the Arb Waveform Generator’s Digital Modulation must be on. To turn Digital Modulation on, see “[STATe]” on page 280.

*RST* N/A

**Key Entry** Clear Header
Digital Modulation Commands
Digital Modulation Subsystem–Option 601 or 602 ([:SOURce]:RADio:DMODulation:ARB)

:HEADER:SAVE

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:DMODulation:ARB:HEADER:SAVE

This command saves the header information to the header file for the active modulation file. Header information consists of signal generator settings and marker routings associated with the waveform file. Refer to the E8257D/67D PSG Signal Generators User's Guide for information on header files.

For this command to function, the Arb Waveform Generator's Digital Modulation must be on. To turn Digital Modulation on, see “[:STATE]” on page 280.

*RST N/A

Key Entry Save Setup To Header

:IQ:MODulation:ATTen

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:DMODulation:ARB:IQ:MODulation:ATTen <val><unit>

[:SOURce]:RADio:DMODulation:ARB:IQ:MODulation:ATTen?

This command sets the attenuation level of the I/Q signals being modulated through the signal generator RF path. The variable <val> is expressed in decibels (dB).

Example


The preceding example sets the modulator attenuator level to 20 dB.

*RST +2.00000000E+000

Range 0–40 dB

Key Entry Modulator Attenu Manual Auto

:IQ:MODulation:ATTen:AUTO

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:DMODulation:ARB:IQ:MODulation:ATTen:AUTO ON|OFF|1|0

[:SOURce]:RADio:DMODulation:ARB:IQ:MODulation:ATTen:AUTO?

This command enables or disables the modulator attenuator auto mode. The auto mode will be switched to manual if the signal generator receives a AUTO OFF or AUTO 0 command.

ON (1) This choice enables the attenuation auto mode which optimizes the modulator attenuation for the current conditions.

OFF (0) This choice holds the attenuator at its current setting or at a selected value. Refer to “:IQ:MODulation:ATTen” on page 262 for setting the attenuation value.
**Example**


The preceding example selects the modulator attenuator auto mode.

*RST 1

**Key Entry**  Modulator Atten Manual Auto

**:IQ:MODulation:FILT**er

**Supported**  E8267D with Option 601 or 602

[:SOURce]:RADio:DMODulation:ARB:IQ:MODulation:FILT|40e6|THRough

[:SOURce]:RADio:DMODulation:ARB:IQ:MODulation:FILT?

This command enables you to select a filter or through path for I/Q signals modulated onto the RF carrier. Selecting a filter using this command will automatically set "**:IQ:MODulation:FILT:AUTO" to OFF (0) mode.

**40E6**  This choice applies a 40 MHz baseband filter to the I/Q signals.

**THRough**  This choice bypasses filtering.

**Example**


The preceding example selects the through path and bypasses filtering.

*RST THR

**Key Entry**  40.000 MHz Through

**:IQ:MODulation:FILT:AUTO**

**Supported**  E8267D with Option 601 or 602

[:SOURce]:RADio:DMODulation:ARB:IQ:MODulation:FILT:AUTO|OFF|1|0

[:SOURce]:RADio:DMODulation:ARB:IQ:MODulation:FILT:AUTO?

This command enables or disables the automatic filter selection for I/Q signals modulated onto the RF carrier.

**ON (1)**  This choice will automatically select a filter that is optimized for the current signal generator setting.

**OFF (0)**  This choice disables the automatic filter selection and allows you to select a digital modulation filter or through path. Refer to "**:IQ:MODulation:FILT" on page 236 for selecting a filter or through path.

**Example**


The preceding example sets the automatic filter selection function.

*RST 1

**Key Entry**  I/Q Mod Filter Manual Auto
:MDestination:ALCHold

Supported E8267D with Option 601 or 602

CAUTION Incorrect ALC sampling can create a sudden un leveled condition that may create a spike in the RF output potentially damaging a DUT or connected instrument. Ensure that you set markers to let the ALC sample over an amplitude that accounts for the high power levels within the signal.

[:SOURce]:RADio:DMODulation:ARB:MDEStination:ALCHold NONE|M1|M2|M3|M4

This command disables the marker ALC hold function, or it enables the marker hold function for the selected marker.

Use the ALC hold function when you have a waveform signal that uses idle periods, or when the increased dynamic range encountered with RF blanking is not desired. The ALC circuitry responds to the marker signal during the marker pulse (marker signal high), averaging the modulated signal level during this period.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points. To set a marker’s polarity, see “:MPOLarity:MARKer1|2|3|4” on page 267. For more information on markers, see “:MARKer:[SET]” on page 239.

NOTE Do not use the ALC hold for more than 100 ms, because it can affect the waveform’s output amplitude.

The marker signal has a minimum of a two-sample delay in its response relative to the waveform signal response. To compensate for the marker signal delay, offset marker points from the waveform sample point at which you want the ALC sampling to begin.

The ALC hold setting is part of the file header information, so saving the setting to the file header saves the current marker routing for the waveform file.

NOTE A waveform file that has unspecified settings in the file header uses the previous waveform’s routing settings.

For more information on the marker ALC hold function, see the E8257D/67D PSG Signal Generators User’s Guide. To configure marker points, refer to the following sections located in the Dual ARB subsystem:

- For clearing a single marker point or a range of marker points, see “:MARKer:CLEar” on page 237.
- For clearing all marker points, see “:MARKer:CLEar:ALL” on page 238.
- For shifting marker points, see “:MARKer:ROTate” on page 238.
- For setting marker points, see “:MARKer:[SET]” on page 239.

NONE This terminates the marker ALC hold function.

M1–M4 These are the marker choices. The ALC hold feature uses only one marker at a time.
Digital Modulation Commands
Dmodulation Subsystem–Option 601 or 602 ([:SOURce]:RADio:DMODulation:ARB)

Example
:RAD:DMOD:ARB:MDES:ALCH M1

The preceding example routes marker 1 to the ALC Hold function.

*RST
NONE

Key Entry
None Marker 1 Marker 2 Marker 3 Marker 4

Remarks
N/A

:MDEStination:PULSe

Supported
E8267D with Option 601 or 602

CAUTION
The pulse function incorporates ALC hold. Incorrect ALC sampling can create a sudden unlevelled condition that may create a spike in the RF output potentially damaging a DUT or connected instrument. Ensure that you set markers to let the ALC sample over an amplitude that accounts for the high power levels within the signal.

[:SOURce]:RADio:DMODulation:ARB:MDEStination:PULSe NONE|M1|M2|M3|M4

[:SOURce]:RADio:DMODulation:ARB:MDEStination:PULSe?

This command disables the marker RF blanking/pulse function, or it enables the marker RF blanking/pulse function for the selected marker.

This function automatically incorporates the ALC hold function, so there is no need to select both functions for the same marker.

NOTE
Do not use ALC hold for more than 100 ms, because it can affect the waveform’s output amplitude.

The signal generator blanks the RF output when the marker signal goes low. The marker polarity determines when the marker signal is low. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points. To set a marker’s polarity, see “:MPOLarity:MARKer1|2|3|4” on page 267. For more information on markers, see “:MARKer:[SET]” on page 239.

NOTE
Set marker points prior to using this function. Enabling this function without setting marker points may create a continuous low or high marker signal, depending on the marker polarity. This creates the condition where there is either no RF output or a continuous RF output.

To configure marker points, refer to the following sections located in the Dual ARB subsystem:
- For clearing a single marker point or a range of marker points, see “:MARKer:CLEar” on page 237.
- For clearing all marker points, see “:MARKer:CLEar:ALL” on page 238.
- For shifting marker points, see “:MARKer:ROTate” on page 238.
- For setting marker points, see “:MARKer:[SET]” on page 239.

The marker signal has a minimum of a two-sample delay in its response relative to the waveform signal response. To compensate for the marker signal delay, offset marker points from the waveform sample point at which you want the RF blanking to begin.
The RF blanking setting is part of the file header information, so saving the setting to the file header saves the current marker routing for the waveform file.

**NOTE** A waveform file that has unspecified settings in the file header uses the previous waveform’s routing settings. This could create the situation where there is no RF output signal, because the previous waveform used RF blanking.

For more information on the marker RF blanking function, see the *E8257D/67D PSG Signal Generators User’s Guide*.

**NONE** This terminates the marker RF blanking/pulse function.

**M1–M4** These are the marker choices. The RF blanking/pulse feature uses only one marker at a time.

**Example**

The preceding example routes marker 2 to the Pulse/RF Blanking function.

**Range**  
0–2E7

**Key Entry**  
Freq Dev

**:MODulation:FSK[:DEViation]**

**Supported**  
E8267D with Option 601 or 602

`[:SOURce]:RADio:DMODulation:ARB:MODulation:FSK[:DEViation] <val><units>`

`[:SOURce]:RADio:DMODulation:ARB:MODulation:FSK[:DEViation]?`

This command sets the symmetric FSK frequency deviation value.

The variable `<val>` is a numeric expression with a maximum range equal to the current symbol rate value multiplied by ten, limited to 20 MHz. The variable `<units>` is expressed in hertz.

To change the modulation type, refer to the command `“:MODulation[:TYPE]”` on page 267. Refer to the command `“:SRATe”` on page 273 for a list of the minimum and maximum symbol rate values.

For more information on setting an asymmetric FSK deviation value, refer to the *E8257D/67D PSG Signal Generators User’s Guide*.

**Example**

`:RAD:DMOD:ARB:MOD:FSK 50KHZ`

The preceding example sets the maximum frequency deviation to 50 kHz.

**Range**  
0–2E7

**Key Entry**  
Freq Dev
**Digital Modulation Commands**

**Dmodulation Subsystem—Option 601 or 602 ([:SOURce]:RADIO:DMODulation:ARB)**

**:MODulation[:TYPE]**

**Supported**

E8267D with Option 601 or 602

[:SOURce]:RADIO:DMODulation:ARB:MODulation[:TYPE] BPSK QPSK IS95QPSK

GRAYQPSK | QPSK | IS95QPSK | P4DQPSK | PSK8 | PSK16 | D8PSK | EDGE | MSK | FSK2 | FSK4

FSK8 | FSK16 | C4FM | QAM4 | QAM16 | QAM32 | QAM64 | QAM128 | QAM256

[:SOURce]:RADIO:DMODulation:ARB:MODulation[:TYPE]?

This command sets the modulation type for the digital modulation personality.

**Example**

:RAD:DMOD:ARB:MOD BPSK

The preceding example selects binary phase shift keying (BPSK) as the modulation type.

**:*RST**

P4DQPSK

**Key Entry**

<table>
<thead>
<tr>
<th>BPSK</th>
<th>QPSK</th>
<th>IS-95 QPSK</th>
<th>Gray Coded QPSK</th>
<th>QPSK</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS-95 QPSK</td>
<td>π/4 DQPSK</td>
<td>8PSK</td>
<td>16PSK</td>
<td>D8PSK</td>
</tr>
<tr>
<td>2-Lvl FSK</td>
<td>4-Lvl FSK</td>
<td>8-Lvl FSK</td>
<td>16-Lvl FSK</td>
<td>C4FM</td>
</tr>
<tr>
<td>320AM</td>
<td>640AM</td>
<td>1280AM</td>
<td>2560AM</td>
<td>User I/Q</td>
</tr>
</tbody>
</table>

**:MPOLarity:MARKer1 | 2 | 3 | 4**

**Supported**

E8267D with Option 601 or 602

[:SOURce]:RADIO:DMODulation:ARB:MPOLarity:MARKer1 | 2 | 3 | 4 NEGative |

POSitive

[:SOURce]:RADIO:DMODulation:ARB:MPOLarity:MARKer1 | 2 | 3 | 4?

This command sets the polarity for the selected marker.

For a positive marker polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points. To configure marker points, refer to the following sections located in the Dual ARB subsystem:

- For clearing a single marker point or a range of marker points, see “:MARKer:CLEar” on page 237.
- For clearing all marker points, see “:MARKer:CLEar:ALL” on page 238.
- For shifting marker points, see “:MARKer:ROTate” on page 238.
- For information on markers and setting marker points, see “:MARKer:[SET]” on page 239.

**Example**

:RAD:DMOD:ARB:MPOL:MARK2 NEG

The preceding example sets the polarity for marker 2 to negative.

**:*RST**

POS

**Key Entry**

<table>
<thead>
<tr>
<th>Marker 1 Polarity Neg Pos</th>
<th>Marker 2 Polarity Neg Pos</th>
<th>Marker 3 Polarity Neg Pos</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marker 4 Polarity Neg Pos</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

Chapter 5 287
Digital Modulation Commands

Dmodulation Subsystem–Option 601 or 602 ([SOURce]:RADio:DMODulation:ARB)

**:REFerence:EXTernal:FREQuency**

**Supported**  E8267D with Option 601 or 602

[:SOURce]:RADio:DMODulation:ARB:REFerence:EXTernal:FREQuency <val>

This command sets or retrieves the reference frequency value of an externally applied reference to the signal generator. The variable <val> is expressed in hertz (Hz–MHz).

The value specified by this command is effective only when you are using an external ARB reference applied to the BASEBAND GEN REF IN rear-panel connector.

To specify external as the ARB reference source type, refer to “:REFerence:[SOURce]” on page 268.

**Example**


The preceding example sets the external reference to 10 MHz.

*RST  +1.00000000E+007

**Range**  2.5E5–1E8

**Key Entry**  Reference Freq

**:REFerence:[SOURce]**

**Supported**  E8267D with Option 601 or 602

[:SOURce]:RADio:DMODulation:ARB:REFerence:[SOURce] INTernal|EXTernal

[:SOURce]:RADio:DMODulation:ARB:REFerence:[SOURce]?  

This command selects either an internal or external reference for the waveform clock.

If the EXTERNAL choice is selected, the external frequency value must be entered and the signal must be applied to the BASEBAND GEN REF IN rear-panel connector.

Refer to “:REFerence:EXTernal:FREQuency” on page 268 to enter the external reference frequency.

**Example**

:RAD:DMOD:ARB:REF INT

The preceding example sets an internal clock reference.

*RST  INT

**Key Entry**  ARB Reference Ext Int
Digital Modulation Commands
Dmodulation Subsystem–Option 601 or 602 ([:SOURce]:RADio:DMODulation:ARB)

**:RETRigger**

**Supported** E8267D with Option 601 or 602

[:SOURce]:RADio:DMODulation:ARB:RETRigger ON|OFF|IMMEDIATE

[:SOURce]:RADio:DMODulation:ARB:RETRigger?

This command selects the waveform’s response to a trigger signal while using the single trigger mode.

When the PSG receives multiple trigger occurrences when only one is required, the signal generator uses the first trigger and ignores the rest. For more information on triggering and to select the single trigger mode, see “:TRIGger:TYPE” on page 274.

The following list describes the waveform’s response to each of the command choices:

- **ON**
  - The waveform waits for a trigger before play begins and accepts a subsequent trigger during playback. If there is a subsequent trigger during playback, the waveform completes its current playback and then plays one more time. If there is no subsequent trigger, the waveform plays once and stops until it receives another trigger.

- **OFF**
  - The waveform waits for a trigger before play begins and ignores triggers during playback. To restart the waveform, you must send a trigger after the playback completes.

- **IMMEDIATE**
  - The waveform waits for a trigger before play begins and accepts a subsequent trigger during playback. Upon receipt of the subsequent trigger, the waveform immediately resets and begins playing from the beginning of the file. For a waveform sequence, this means to the beginning of the first segment in the sequence.

**Example**

:RAD:DMOD:ARB:RETR ON

The preceding example selects the ON mode for the single mode trigger.

**RST**

ON

Key Entry

On    Off    Immediate

**:SCLock:RATE**

**Supported** E8267D with Option 601 or 602

[:SOURce]:RADio:DMODulation:ARB:SCLock:RATE <sample_clock_rate>

[:SOURce]:RADio:DMODulation:ARB:SCLock:RATE?

This command sets the sample clock rate in hertz. The modulation format should be active before executing this command. If this command is executed before the modulation format is active, the entered value will be overridden by a calculated factory default value. Refer to “[:STATe]” on page 280 to activate the modulation format.
Digital Modulation Commands

Dmodulation Subsystem—Option 601 or 602 ([:SOURCE]:RADio:DMODulation:ARB)

Example


The preceding example sets the sample clock rate to 50 MHz.

*RST
+1.00000000E+008

Range 1–1E8

Key Entry ARB Sample Clock

:SETup

Supported E8267D with Option 601 or 602

[ :SOURCE ] :RADio:DMODulation:ARB:SETup GSM|NADC|PDC|PHS|DECT|AC4Fm|ACQPsk|CDPD|PWT|EDGE|TETRA|MCARrier|"<file_name>"


This command selects the digital modulation format type. For information on the file name syntax, see “File Name Variables” on page 10.

Example

:RAD:DMOD:ARB:SET CDPD

The preceding example selects cellular digital packet data (CDPD) as the modulation format.

*RST
NADC

Key Entry

GSM NADC PDC PHS DECT APCO 25 w/C4FM APCO w/CQPSK
CDPD PWT EDGE TETRA Multicarrier Off On Select File

:SETup:MCARrier

Supported

E8267D with Option 601 or 602

"<file_name>"


This command builds a table with the specified number of carriers and frequency spacing or retrieves the setup stored in the specified user file. The query returns the carrier type, number of carriers, and frequency spacing. The output format is as follows:

<carrier_type>,<num_carriers>,<freq_spacing>

If a specific file is loaded and then queried, only the file name is returned. For information on the file name syntax, see “File Name Variables” on page 10. To store a multicarrier setup refer to “:SETup:MCARRier:STORe” on page 271.

The variable <freq_spacing> is expressed in hertz (kHz–MHz).
Example

[:SOURce:] RADIO:DMODulation:ARB:SET:MCAR NADC, 2, 10MHZ

[:SOURce:] RADIO:DMODulation:ARB:SET:MCAR "<file_name>"

The preceding examples show the syntax used to select a North American Digital Cellular (NADC) modulation format with two carriers and 10 MHz frequency spacing and the syntax for selecting an existing multicarrier file.

*RST  Carrier:  NADC
<num carriers>:  2
<freq spacing>:  +1.0000000000000E+06

Range
<num carriers>:  2–100
<freq spacing>:  2 + (<num carriers> − 1) × 80 MHz

Key Entry

<table>
<thead>
<tr>
<th>GSM</th>
<th>NADC</th>
<th>PDC</th>
<th>PHS</th>
<th>DECT</th>
<th>APCO 25 w/C4FM</th>
<th>APCO w/CQPSK</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDPD</td>
<td>PWT</td>
<td>EDGE</td>
<td>TETRA</td>
<td># of Carriers</td>
<td>Freq Spacing</td>
<td></td>
</tr>
</tbody>
</table>

:SETup:MCARrier:PHASe

Supported  E8267D with Option 601 or 602

[:SOURce:] RADIO:DMODulation:ARB:SETup:MCARrier:PHASe FIXed|RANDom

[:SOURce:] RADIO:DMODulation:ARB:SETup:MCARrier:PHASe?

This command sets the phase difference between carriers for multicarrier digital modulation.

FIXed  This choice sets the phase of all carriers to 0.
RANDom  This choice sets random phase values for all of the carriers.

Example

[:SOURce:] RADIO:DMODulation:ARB:SET:MCAR:PHAS RAND

The preceding example sets the phase difference between carriers to a random value.

*RST  FIX

Key Entry  Carrier Phases Fixed Random

:SETup:MCARrier:STORe

Supported  E8267D with Option 601 or 602

[:SOURce:] RADIO:DMODulation:ARB:SETup:MCARrier:STORe "<file_name>"

This command stores the current multicarrier setup information.

The stored file contains information that includes the digital modulation format, number of carriers, frequency spacing, and power settings for the multicarrier setup.

The setting enabled by this command is not affected by signal generator power-on, preset, or *RST. For information on the file name syntax, see “File Name Variables” on page 10.
Digital Modulation Commands

Dmodulation Subsystem—Option 601 or 602 [:SOURce]:RADio:DMODulation:ARB

Example

[:SOURce]:RADio:DMODulation:ARB:SET:MCAR:STOR "NADC_Data"

The preceding example saves the multicarrier setup information to a file called NADC_Data and stores the file in the catalog of MDMOD files.

*RST

N/A

Key Entry

Load/Store

[:SOURce]:RADio:DMODulation:ARB:SETup:MCARrier:TABLe

Supported E8267D with Option 601 or 602

:SETup:MCARrier:TABLe INIT|APPend

INIT This choice clears the current information and creates a new one-row table, allowing for further definition using additional parameters.

APPend This choice adds rows to an existing table.

<carrier_num> This variable specifies the number of the carriers in the multicarrier table that will be modified. The value of the variable <carrier_num> must be specified prior to selecting the digital modulation format.

For information on the file name syntax, see “File Name Variables” on page 10. To store a multicarrier setup refer to “SETup:MCARrier:STORE” on page 271.

When a query is initiated, carrier type, frequency offset, and power level are returned in the following format: <carrier_type>,<freq_offset>,<power>

*RST

carrier type: NADC

<freq_offset>: 5.00000000E+004

<power>: +0.00000000E+000

Range

<freq_offset>: –1E5 to 1E6

<power>: –40 to 0

Key Entry

Initialize Table Insert Row GSM NADC PDC PHS DECT

APCO 25 w/C4FM APCO w/CQPSK CDPD PWT EDGE TETRA

Custom Digital Mod State
Digital Modulation Commands
Dmodulation Subsystem–Option 601 or 602 [:SOURce]:RADio:DMODulation:ARB

:SETup:MCARrier:TABLE:NCARriers

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:DMODulation:ARB:SETup:MCARrier:TABLE:NCARriers?
This query returns the number of carriers in the current multicarrier setup.

*RST 2
Range 1–100
Key Entry # of Carriers

:SETup:STORe

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:DMODulation:ARB:SETup:STORe "<file_name>"
This command stores the current custom digital modulation state using the "<file_name>" file name. The saved file contains information that includes the modulation type, filter and symbol rate for the custom modulation setup.
For information on the file name syntax, see "File Name Variables" on page 10.

Example

:RAD:DMOD:ARB:SET:STOR "Setup_Data"
The preceding example saves the modulation format setup to a file named Setup_Data and stores the file in the catalog of DMOD files.

*RST N/A
Range N/A
Key Entry Store Custom Dig Mod State

:SRAte

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:DMODulation:ARB:SRAte <val>
[:SOURce]:RADio:DMODulation:ARB:SRAte?
This command sets the transmission symbol rate. The variable <val> is expressed in symbols per second (sps–Msp) and the maximum range value is dependent upon the source of data (internal or external), the modulation type, and filter.

When user-defined filters are selected using the command in section ":FILTer" on page 259, the upper bit rate will be restricted using the following criteria:

- FIR filter length > 32 symbols: upper limit is 12.5 Msp
- FIR filter length > 16 symbols: upper limit is 25 Msp
When internal FIR filters are used, these limit restrictions always apply. For higher symbol rates, the FIR filter length will be truncated as follows:

- Above 12.5 Msps, the FIR length is truncated to 32 symbols
- Above 25 Msps, the FIR length is truncated to 16 symbols

This impacts the relative timing of the modulated data, as well as the actual filter response.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 267.

Example

`:RAD:DMOD:ARB:SRAT 10KSPS`

The preceding example sets the symbol rate to 10K symbols per second.

*RST

+2.43000000E+004

Range 1 ksp–50 Msps

Key Entry  Symbol Rate

`:TRIGger:TYPE`

Supported  E8267D with Option 601 or 602

`[:SOURce]:RADio:DMODulation:ARB:TRIGger:TYPE CONTinuous|SINGle|GATE`

This command sets the trigger mode (type) that controls the waveform’s playback.

Triggers control the playback by telling the PSG when to play the modulating signal (waveform). Depending on the trigger settings for the PSG, the waveform playback can occur once, continuously, or the PSG may start and stop playing the waveform repeatedly (GATE mode).

A trigger signal comprises both positive and negative signal transitions (states), which are also called high and low periods. You can configure the PSG to trigger on either state of the trigger signal. It is common to have multiple triggers, also referred to as trigger occurrences or events, occur when the signal generator requires only a single trigger. In this situation, the PSG recognizes the first trigger and ignores the rest.

When you select a trigger mode, you may lose the signal (carrier plus modulating) from the RF output until you trigger the waveform. This is because the PSG sets the I and Q signals to zero volts prior to the first trigger event, which suppresses the carrier. After the first trigger event, the waveform’s final I and Q levels determine whether you will see the carrier signal or not (zero = no carrier, other values = carrier visible). At the end of most files, the final I and Q points are set to a value other than zero.

There are four parts to configuring the trigger:

- Choosing the trigger type, which controls the waveform’s transmission.
- Setting the waveform’s response to triggers:
  - CONTinuous, see “:TRIGger:TYPE:CONTinuous[:TYPE]” on page 275
  - SINGle, see “:RETRigger” on page 269
  - GATE, selecting the mode also sets the response
• Selecting the trigger source (see “:TRIGger[:SOURce]” on page 277), which determines how the PSG receives its trigger signal, internally or externally. The GATE choice requires an external trigger.

• Setting the trigger polarity when using an external source:
  — CONTinuous and SINGle see “:TRIGger[:SOURce]:EXTernal:SLOPe” on page 279
  — GATE, see “:TRIGger:TYPE:GATE:ACTive” on page 276

For more information on triggering, see the E8257D/67D PSG Signal Generators User’s Guide.

The following list describes the trigger type command choices:

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTinuous</td>
<td>Upon triggering, the waveform repeats continuously.</td>
</tr>
<tr>
<td>SINGle</td>
<td>Upon triggering, the waveform segment or sequence plays once.</td>
</tr>
<tr>
<td>GATE</td>
<td>An external trigger signal repeatedly starts and stops the waveform's playback (transmission). The time duration for playback depends on the duty period of the trigger signal and the gate polarity selection (see “:TRIGger:TYPE:GATE:ACTive” on page 276). The waveform plays during the inactive state and stops during the active polarity selection state. The active state can be set high or low. The gate mode works only with an external trigger source.</td>
</tr>
</tbody>
</table>

**NOTE** The ARB gating behavior described above is opposite to the gating behavior for real-time custom mode.

**Example**

:RAD:DMOD:ARB:TRIG:TYPE GATE

The preceding example selects the gate trigger mode.

**Supported**

| [:SOURce]:RADio:DMODulation:ARB:TRIGger:TYPE:CONTinuous[:TYPE]? |

This command selects the waveform's response to a trigger signal while using the continuous trigger mode.

For more information on triggering and to select the continuous trigger mode, see “:TRIGger:TYPE” on page 274.

The following list describes the waveform's response to each of the command choices:

**FREE**

Turning the ARB format on immediately triggers the waveform. The waveform repeats until you turn the format off, select another trigger, or choose another waveform file.
TRIGger

The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously until you turn the format off, select another trigger, or choose another waveform file.

RESet

The waveform waits for a trigger before play begins. When the waveform receives the trigger, it plays continuously. Subsequent triggers reset the waveform to the beginning. For a waveform sequence, this means to the beginning of the first segment in the sequence.

Example


The preceding example selects the continuous trigger free mode.

*RST

FREE

Key Entry Free Run Trigger & Run Reset & Run

:TRIGger:TYPE:GATE:ACTive

Supported

E8267D with Option 601 or 602

[:SOURce]:RADio:DMODulation:ARB:TRIGger:TYPE:GATE:ACTive LOW|HIGH

[:SOURce]:RADio:DMODulation:ARB:TRIGger:TYPE:GATE:ACTive?

This command selects the active state (gate polarity) of the gate while using the gating trigger mode.

The LOW and HIGH selections correspond to the low and high states of an external trigger signal. For example, when you select HIGH, the active state occurs during the high of the trigger signal. When the active state occurs, the PSG stops the waveform playback at the last played sample point, then restarts the playback at the next sample point when the inactive state occurs. For more information on triggering and to select gating as the trigger mode, see “:TRIGger:TYPE” on page 274.

The following list describes the PSG’s gating behavior for the polarity selections:

LOW The waveform playback stops when the trigger signal goes low (active state) and restarts when the trigger signal goes high (inactive state).

HIGH The waveform playback stops when the trigger signal goes high (active state) and restarts when the trigger signal goes low (inactive state).

Example


The preceding example sets the active gate state to high.

*RST

HIGH

Key Entry Gate Active Low High
Digital Modulation Commands
Dmodulation Subsystem–Option 601 or 602 ([:SOURce]:RADio:DMODulation:ARB)

**:TRIGger[:SOURce]**

**Supported**
E8267D with Option 601 or 602

[:SOURce]:RAD:DMOD:ARB::TRIGger[:SOURce] KEY|EXT|BUS

This command sets the trigger source.

For more information on triggering, see “**:TRIGger:TYPE**” on page 274. The following list describes the command choices:

**KEY**
This choice enables manual triggering by pressing the front-panel Trigger hardkey.

**EXT**
An externally applied signal triggers the waveform. This is the only choice that works with gating. The following conditions affect an external trigger:

- The input connector selected for the trigger signal. You have a choice between the rear-panel PATTERN TRIG IN connector or the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector. To make the connector selection, see “**:TRIGger[:SOURce]:EXTernal[:SOURce]**” on page 278.

  For more information on the connectors and on connecting the cables, see the E8257D/67D PSG Signal Generators User’s Guide.

- The trigger signal polarity:
  - gating mode, see “**:TRIGger:TYPE:GATE:ACTive**” on page 276
  - continuous and single modes, see “**:TRIGger[:SOURce]:EXTERNAL:SLOPe**” on page 279

- The time delay between when the PSG receives a trigger and when the waveform responds to the trigger. There are two parts to setting the delay:
  - setting the amount of delay, see “**:TRIGger[:SOURce]:EXTERNAL:DELay**” on page 278
  - turning the delay on, see “**:TRIGger[:SOURce]:EXTERNAL:DELay:STATe**” on page 279

**BUS**
This choice enables triggering over the GPIB or LAN using the *TRG or GET commands or the AUXILIARY INTERFACE (RS-232) using the *TRG command.

**Example**

:RAD:DMOD:ARB::TRIG EXT

The preceding example sets the trigger source to external triggering mode.

**RST**

**Key Entry**

<table>
<thead>
<tr>
<th>Trigger Key</th>
<th>Ext</th>
<th>Bus</th>
</tr>
</thead>
</table>

---

Chapter 5 277
Digital Modulation Commands
Demodulation Subsystem—Option 601 or 602 ([:SOURCE]:RADIO:DMODulation:ARB)

**:TRIGger[:SOURCE]:EXTernal[:SOURCE]**

**Supported**  
E8267D with Option 601 or 602

[:SOURCE]:RADIO:DMODulation:ARB:TRIGger[:SOURCE]:EXTernal[:SOURCE] EPT1
EPT2|EPTRIGGER1|EPTRIGGER2

This command selects which PATTERN TRIG IN connection the PSG uses to accept an externally applied trigger signal when external is the trigger source selection.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURCE]” on page 277. For more information on the rear-panel connectors, see the **E8257D/67D PSG Signal Generators User’s Guide**.

The following list describes the command choices:

- **EPT1**: This choice is synonymous with EPTRIGGER1 and selects the PATTERN TRIG IN rear-panel connector.
- **EPT2**: This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.
- **EPTRIGGER1**: This choice is synonymous with EPT1 and selects the PATTERN TRIG IN rear-panel connector.
- **EPTRIGGER2**: This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear-panel AUXILIARY I/O connector.

**Example**

**:RAD:DMOD:ARB:TRIG:EXT EPT1**

The preceding example sets the trigger source to the PATTERN TRIG IN rear-panel connector.

**:*RST**

**Key Entry**  
Patt Trig In 1 Patt Trig In 2

**:TRIGger[:SOURCE]:EXTernal:DELay**

**Supported**  
E8267D with Option 601 or 602

[:SOURCE]:RADIO:DMODulation:ARB:TRIGger[:SOURCE]:EXTernal:DELay <val>
[:SOURCE]:RADIO:DMODulation:ARB:TRIGger[:SOURCE]:EXTernal:DELay?

This command sets the amount of time to delay the PSG’s response to an external trigger.

The delay is a path (time) delay between when the PSG receives the trigger and when it responds to the trigger. For example, configuring a trigger delay of two seconds, causes the PSG to wait two seconds after receipt of the trigger before the PSG plays the waveform.

The delay does not occur until you turn it on (see :TRIGger[:SOURCE]:EXTernal:DELay:STATe). You can set the delay value either before or after turning it on.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[:SOURCE]” on page 277.

The unit of measurement for the variable <val> is in seconds (nsec–sec).
Digital Modulation Commands
Dmodulation Subsystem–Option 601 or 602 [:SOURce]:RADio:DMODulation:ARB

Example
:RAD:DMOD:ARB:TRIG:EXT:DEL 200MS

The preceding example sets the delay for an external trigger to .2 seconds.

*RST +1.00000000E−003

Range 1E−8 to 4E1

Key Entry Ext Delay Time

[:TRIGger[:SOURce]:EXTernal:DELay:STATe

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:DMODulation:ARB:TRIGger[:SOURce]:EXTernal:DELay:STATe ON|OFF|1|0

This command turns the trigger delay on or off when using an external trigger source.

For setting the delay time, see :TRIGger[SOURce]:EXTernal:DELay, and for more information on configuring an external source, see “:TRIGger[SOURce]” on page 277.

Example
:RAD:DMOD:ARB:TRIG:EXT:DEL 1

The preceding example sets the delay active for an external trigger.

*RST 0

Key Entry Ext Delay Off On

[:TRIGger[:SOURce]:EXTernal:SLOPe

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:DMODulation:ARB:TRIGger[:SOURce]:EXTernal:SLOPe POSitive|NEGative

[:SOURce]:RADio:DMODulation:ARB:TRIGger[:SOURce]:EXTernal:SLOPe?

This command sets the polarity for an external trigger signal while using the continuous, single triggering mode. To set the polarity for gating, see “:TRIGger:TYPE:GATE:ACTive” on page 276.

The POSitive and NEGative selections correspond to the high (positive) and low (negative) states of the external trigger signal. For example, when you select POSitive, the waveform responds (plays) during the high state of the trigger signal. When the PSG receives multiple trigger occurrences when only one is required, the signal generator uses the first trigger and ignores the rest.

For more information on configuring an external trigger source and to select external as the trigger source, see “:TRIGger[SOURce]” on page 277.
Digital Modulation Commands
Multitone Subsystem–Option 601 or 602 [:SOURce]:RADio:MTONe:ARB

Example
.:RAD:DMOD:ARB:TRIG:EXT:SLOPE POS
The preceding example sets the polarity of the active triggering state to positive.

*RST NEG
Key Entry Ext Polarity Neg Pos

[:STATe]
Supported E8267D with Option 601 or 602
[:SOURce]:RADio:DMODulation:ARB[:STATe] ON|OFF|1|0
[:SOURce]:RADio:DMODulation:ARB[:STATe]?
This command enables or disables the digital modulation.
ON (1) This choice sets up the internal hardware to generate the currently selected digital modulation format. When ON is selected, the I/Q state is activated and the I/Q source is set to internal.
OFF (0) This choice disables the digital modulation capability.

Example
.:RAD:DMOD:ARB ON
The preceding example turns on the arbitrary waveform generator.

*RST 0
Key Entry Digital Modulation Off On

Multitone Subsystem–Option 601 or 602 ([:SOURce]:RADio:MTOnE:ARB)

Creating a Multitone Waveform
Use the following steps to create a multitone waveform:
1. Initialize the phase for the multitone waveform (:SETup:TABLE:PHAs:INITialize on page 291).
2. Assign the frequency spacing between the tones (:SETup:TABLE:FSPacing on page 290).
3. Define the number of tones within the waveform (:SETup:TABLE:NTOnes on page 290).
4. Modify the power level, phase, and state of any individual tones (:ROW on page 292).

:HEADer:CLEar
Supported E8267D with Option 601 or 602
[:SOURce]:RADio:MTOnes:ARB:HEADer:CLEar
This command clears the header information from the header file used by this modulation format. Header information consists of signal generator settings and marker routings associated with the waveform file. Refer to the E8257D/67D PSG Signal Generators User’s Guide for information on header files.
For this command to function, the multitone mode must be on. To turn multitone on, see “[:STATe]” on page 292.

*RST     N/A
Key Entry Clear Header

:HEADer:SAVE

Supported E8267D with Option 601 or 602
[:SOURce]:RADio:MTONe:ARB:HEADer:SAVE

This command saves the header information to the header file used by this modulation format. Header information consists of signal generator settings and marker routings associated with the waveform file. Refer to the E8257D/67D PSG Signal Generators User's Guide for information on header files.

For this command to function, multitone must be on. To turn multitone on, see “[:STATe]” on page 292.

*RST     N/A
Key Entry Save Setup To Header

:IQ:EXTernal:FILTER

Supported E8267D with Option 601 or 602
[:SOURce]:RADio:MTONe:ARB:IQ:EXTERNAL:FILTER 40e6|THRough
[:SOURce]:RADio:MTONe:ARB:IQ:EXTERNAL:FILTER?

This command selects the filter or through path for I/Q signals routed to the rear-panel I and Q outputs. Selecting a filter using this command will automatically set “:IQ:EXTERNAL:FILTER:AUTO” on page 282 to OFF(0) mode.

40e6   This choice applies a 40 MHz baseband filter.
THRough   This choice bypasses filtering.

Example

The preceding example selects a 40 MHz filter for the I/Q rear-panel signal path.

*RST     THR
Key Entry 40.000 MHz Through
Digital Modulation Commands
Multitone Subsystem–Option 601 or 602 [:SOURce]:RADio:MTONe:ARB

:iQ:EXTernal:FILTer:AUTO

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:MTONe:ARB:IQ:EXTernal:FILTer:AUTO ON|OFF|1|0

This command enables or disables the automatic filter selection for I/Q signals routed to the rear-panel I/Q outputs. The AUTO feature allows the signal generator to select the filter or through path for the signal.

ON(1) This choice automatically selects the 40 MHz filter optimized for current signal generator settings.

OFF(0) This choice disables the auto feature and allows you to select the 40 MHz filter or a through path. Refer to “:IQ:EXTernal:FILTer” on page 258 for selecting a filter or through path.

Example


The preceding example sets output I/Q filtering to automatic.

*RST 1

Key Entry I/Q Output Filter Manual Auto

:iQ:MODulation:ATTen

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:MTONe:ARB:IQ:MODulation:ATTen <val>

This command sets the attenuation level of the I/Q signals being modulated through the signal generator RF path. The variable <val> is expressed in decibels (dB).

Example


The preceding example sets the modulator attenuator level to 20dB.

*RST +2.00000000E+000

Range 0–40 (.01dB resolution)

Key Entry Modulator Atten Manual Auto
**:IQ:MODulation:ATTen:AUTO**

**Supported**

E8267D with Option 601 or 602

[[:SOURce]:RADio:MTONe:ARB:IQ:MODulation:ATTen:AUTO ON|OFF|1|0]

This command enables or disables the modulator attenuator auto mode. The AUTO mode allows the signal generator to select the best attenuator level for the current settings. The auto mode will be switched to manual if the signal generator receives an AUTO OFF or AUTO 0 command.

---

**Example**


The preceding example sets the attenuator in manual mode.

---

**:*RST**

1

**Key Entry**

Modulator Attenuator Manual Auto

---

**:IQ:MODulation:FILTer**

**Supported**

E8267D with Option 601 or 602

[[:SOURce]:RADio:MTONe:ARB:IQ:MODulation:FILTer 40e6|THRough

[[:SOURce]:RADio:MTONe:ARB:IQ:MODulation:FILTer?

This command enables you to select a filter or through path for I/Q signals modulated onto the RF carrier. Selecting a filter using this command will automatically set “:IQ:MODulation:FILTer:AUTO” on page 284 to OFF(0) mode.

---

**Example**


The preceding example selects a through path for I/Q signals routed to the rear-panel outputs.

---

**:*RST**

THR

**Key Entry**

40.000 MHz Through
**Digital Modulation Commands**

**Multitone Subsystem—Option 601 or 602 ([SOURce]:RADio:MTONe:ARB)**

**:IQ:MODulation:FILTer:AUTO**

**Supported**
E8267D with Option 601 or 602

```plaintext
[SOURce]:RADio:MTONe:ARB:IQ:MODulation:FILTer:AUTO ON|OFF|1|0
[SOURce]:RADio:MTONe:ARB:IQ:MODulation:FILTer:AUTO?
```

This command enables or disables the automatic filter selection for I/Q signals modulated onto the RF carrier.

**ON (1)**
This choice will automatically select the 40 MHz filter optimized for the current signal generator setting.

**OFF (0)**
This choice disables the automatic filter selection and allows you to select the 40 MHz filter or the through path. Refer to “:IQ:MODulation:FILTer” on page 296 for selecting a filter or through path.

**Example**

```
```

The preceding example sets the automatic filter selection off.

**:MDEStination:ALCHold**

**Supported**
E8267D with Option 601 or 602

**CAUTION**
Incorrect ALC sampling can create a sudden unleveled condition that may create a spike in the RF output potentially damaging a DUT or connected instrument. Ensure that you set markers to let the ALC sample over an amplitude that accounts for the high power levels within the signal.

```plaintext
[SOURce]:RADio:MTONe:ARB:MDEStination:ALCHold NONE|M1|M2|M3|M4
[SOURce]:RADio:MTONe:ARB:MDEStination:ALCHold?
```

This command enables or disables the marker ALC hold function for the selected marker.

Use the ALC hold function when you have a waveform signal that incorporates idle periods, or when the increased dynamic range encountered with RF blanking is not desired. The ALC circuitry responds to the marker signal during the marker pulse (marker signal high), averaging the modulated signal level during this period.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points. To set a marker’s polarity, see “:MPOLarity:MARKer1|2|3|4” on page 286. For more information on markers, see “:MARKer:[SET]” on page 239.

**NOTE**
Do not use the ALC hold for more than 100 ms, because it can affect the waveform’s output amplitude.

The marker signal has a minimum of a two-sample delay in its response relative to the waveform signal response. To compensate for the marker signal delay, offset marker points from the waveform sample point at which you want the ALC sampling to begin.
The ALC hold setting is part of the file header information, so saving the setting to the file header saves the current marker routing for the waveform file.

**NOTE**  A waveform file that has unspecified settings in the file header uses the previous waveform’s routing settings.

For more information on the marker ALC hold function, see the *E8257D/67D PSG Signal Generators User’s Guide*. To configure marker points, refer to the following sections located in the Dual ARB subsystem:

- For clearing a single marker point or a range of marker points, see “:MARKer:CLEar” on page 237.
- For clearing all marker points, see “:MARKer:CLEar:ALL” on page 238.
- For shifting marker points, see “:MARKer:ROTate” on page 238.
- For setting marker points, see “:MARKer:[SET]” on page 239.

**NONE**  This terminates the marker ALC hold function.

**M1–M4**  These are the marker choices. The ALC hold feature uses only one marker at a time.

**Example**

```
:RAD:MTON:ARB:MDES:ALCH M1
```

The preceding example routes marker one to the ALC hold function.

**RST**

```
NONE
```

**Key Entry**

<table>
<thead>
<tr>
<th>None</th>
<th>Marker 1</th>
<th>Marker 2</th>
<th>Marker 3</th>
<th>Marker 4</th>
</tr>
</thead>
</table>

**:MDEStination:PULSe**

**Supported**  E8267D with Option 601 or 602

**CAUTION**  The pulse function incorporates ALC hold. Incorrect ALC sampling can create a sudden unleveled condition that may create a spike in the RF output potentially damaging a DUT or connected instrument. Ensure that you set markers to let the ALC sample over an amplitude that accounts for the high power levels within the signal.

```
[:SOURce]:RADio:MTONe:ARB:MDEStination:PULSe NONE|M1|M2|M3|M4
```

This command disables the marker RF blanking/pulse function, or it enables the marker RF blanking/pulse function for the selected marker.

This function automatically incorporates the ALC hold function, so there is no need to select both functions for the same marker.

**NOTE**  Do not use ALC hold for more than 100 ms, because it can affect the waveform’s output amplitude.

The signal generator blanks the RF output when the marker signal goes low. The marker polarity determines when the marker signal is low. For a positive polarity, this is during the marker points.
Digital Modulation Commands
Multitone Subsystem–Option 601 or 602 ([:SOURce]:RADio:MTONe:ARB)

For a negative polarity, this is when there are no marker points. To set a marker's polarity, see 
“:MPOLarity:MARKer1|2|3|4” on page 286. For more information on setting markers, see
“:MARKer:[SET]” on page 239.

NOTE Set marker points prior to using this function. Enabling this function without setting marker
points may create a continuous low or high marker signal, depending on the marker polarity.
This creates the condition where there is either no RF output or a continuous RF output.

To configure marker points, refer to the following sections located in the Dual ARB subsystem:
• For clearing a single marker point or a range of marker points, see “:MARKer:CLea” on page 237.
• For clearing all marker points, see “:MARKer:CLea:ALL” on page 238.
• For shifting marker points, see “:MARKer:ROTate” on page 238.
• For setting marker points, see “:MARKer:[SET]” on page 239.

The marker signal has a minimum of a two-sample delay in its response relative to the waveform
signal response. To compensate for the marker signal delay, offset marker points from the waveform
sample point at which you want the RF blanking to begin.

The RF blanking setting is part of the file header information, so saving the setting to the file header
saves the current marker routing for the waveform file.

NOTE A waveform file that has unspecified settings in the file header uses the previous waveform’s
routing settings. This could create the situation where there is no RF output signal, because
the previous waveform used RF blanking

For more information on the marker RF blanking function, see the E8257D/67D PSG Signal Generators User’s Guide.

NONE This terminates the marker RF blanking/pulse function.
M1–M4 These are the marker choices. The RF blanking/pulse feature uses only one marker
at a time.

Example
:RAD:MTON:ARB:MDES:PULSE M1
The preceding example routes marker one to the Pulse/RF Blanking function.

*RST

Key Entry

None Marker 1 Marker 2 Marker 3 Marker 4

:MPOLarity:MARKer1|2|3|4

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:MTONe:ARB:MPOLarity:MARKer1|2|3|4 NEGative|POSitive

This command sets the polarity for the selected marker.

For a positive marker polarity, the marker signal is high during the marker points. For a negative
marker polarity, the marker signal is high during the period of no marker points. To configure marker

points, refer to the following sections located in the Dual ARB subsystem:

- For clearing a single marker point or a range of marker points, see “:MARKer:CLEar” on page 237.
- For clearing all marker points, see “:MARKer:CLEar:ALL” on page 238.
- For shifting marker points, see “:MARKer:ROTate” on page 238.
- For information on markers and setting marker points, see “:MARKer:[SET]” on page 239.

**Example**

```
:RAD:MTON:ARB:MPOL:MARK1 NEG
```

The preceding example sets the polarity for marker one to negative.

```
*RST POS
```

**Key Entry**

<table>
<thead>
<tr>
<th>Marker 1 Polarity</th>
<th>Marker 2 Polarity</th>
<th>Marker 3 Polarity</th>
<th>Marker 4 Polarity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neg</td>
<td>Neg</td>
<td>Neg</td>
<td>Neg</td>
</tr>
<tr>
<td>Pos</td>
<td>Pos</td>
<td>Pos</td>
<td>Pos</td>
</tr>
</tbody>
</table>

**:REFerence:EXTernal:FREQuency**

**Supported**

E8267D with Option 601 or 602

```
[:SOURce]:RADio:MTONe:ARB:REFerence:EXTernal:FREQuency <val>
[:SOURce]:RADio:MTONe:ARB:REFerence:EXTernal:FREQuency?
```

This command allows you to enter the frequency of an external reference. The variable `<val>` is expressed in hertz (Hz–MHz). The value specified by this command is effective only when you are using an external ARB reference applied to the BASEBAND GEN REF IN rear-panel connector. To specify external as the ARB reference source type, refer to “:REFerence[:SOURce]” on page 287.

**Example**

```
```

The preceding example sets the external reference to .5 megahertz.

```
*RST +1.00000000E+007
```

**Range**

2.5E5–1E8

**Key Entry**

<table>
<thead>
<tr>
<th>Reference Freq</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

**:REFerence[:SOURce]**

**Supported**

E8267D with Option 601 or 602

```
[:SOURce]:RADio:MTONe:ARB:REFerence[:SOURce] INTernal|EXTernal
[:SOURce]:RADio:MTONe:ARB:REFerence[:SOURce]?
```

This command selects either an internal or external reference for the waveform clock. If EXTernal is selected, the external frequency value must be entered and the clock signal must be applied to the BASEBAND GEN REF IN rear-panel connector. See “:REFerence:EXTernal:FREQuency” on page 287 to enter the external reference frequency.
Digital Modulation Commands
Multitone Subsystem–Option 601 or 602 [:SOURce:RADio:MTONe:ARB]

Example

:RAD:MTON:ARB:REF EXT
The preceding example sets an external reference as the waveform clock.

*RST INT
Key Entry ARB Reference Ext Int

:SCLock:RATE

Supported ES267D with Option 601 or 602
[:SOURce]:RADio:MTONe:ARB:SCLock:RATE <sample_clock_rate>
[:SOURce]:RADio:MTONE:ARB:SCLock:RATE?

This command sets the ARB sample clock rate.

The multitone generator should be on before executing this command. If this command is executed before the multitone generator is active, the entered value will be overridden by a calculated factory default value. Refer to “[:STATe]” on page 280 to activate the modulation format.

Example

:RAD:MTON:ARB:SCL:RATE 1E6
The preceding example sets the sample clock rate to 1 megahertz.

*RST +1.00000000E+006
Range 1–1E8
Key Entry ARB Sample Clock

:SETup

Supported ES267D with Option 601 or 602
[:SOURce]:RADio:MTONe:ARB:SETup "<file_name>"
[:SOURce]:RADio:MTONE:ARB:SETup?

This command retrieves a multitone waveform file from the signal generator's MTONE directory. The directory path is implied in the command and does not need to be specified. After the waveform file is loaded into memory you must send the command to turn on the Multitone generator. For information on the file name syntax, see “File Name Variables” on page 10.

Example

:RAD:MTON:ARB:SET "Multi_Setup"
The preceding example loads the Multi_Setup waveform file into the signal generator's memory.

Key Entry Load From Selected File
Digital Modulation Commands
Multitone Subsystem–Option 601 or 602 ([SOURce]:RADio:MTONE:ARB)

**:SETup:STORe**

**Supported**  
E8267D with Option 601 or 602

[:SOURce]:RADio:MTONE:ARB:SETup:STORe "<file_name>"

This command stores the current multitone waveform setup in the signal generator’s MTONE directory using the "<file_name>" file name. The directory path is implied in the command and does not need to be specified.

**Example**

:RAD:MTON:ARB:SET:STOR "Multi_Setup1"

The preceding example stores the current multitone setup to the Multi_Setup1 file and stores it in the signal generator’s MTONE directory.

**Key Entry**  
Store To File

**:SETup:TABLe**

**Supported**  
E8267D with Option 601 or 602

[:SOURce]:RADio:MTONE:ARB:SETup:TABLe <freq_spacing>,<num_tones>,{<phase>,<state>}

[:SOURce]:RADio:MTONE:ARB:SETup:TABLe?

This command creates and configures a multitone waveform. The frequency offset, power, phase, and state value are returned when a query is initiated. The parameter format is as follows:

- `<freq_spacing>`: Spacing is limited by the 80 MHz bandwidth of the arbitrary waveform generator and the number of tones desired. No units are specified.
- `<num_tones>`: There must be a minimum of two tones and a maximum of 64.
- `<phase>`: 0-359
- `<state>`: An enabled state is +1. A disabled state is 0.

**NOTE**  
Frequency offset is related to frequency spacing. Frequency offset between tones equals the frequency spacing.

To set the frequency spacing, refer to “:SETup:TABLe:FSPacing” on page 290. To set the power level for tones refer to “:ROW” on page 292.

**Example**

:RAD:MTON:ARB:SET:TABL 1000000,3,90,1,60,0,45,1

The preceding example creates a multitone setup consisting of 3 tones with 1 megahertz tone spacing. The first tone phase is 90 degrees and the state is on. The second tone phase is 60 degrees and the state is off. The third tone phase is 45 degrees and the state is on.

<table>
<thead>
<tr>
<th>TONE</th>
<th>&lt;frequency offset&gt;</th>
<th>&lt;power&gt;</th>
<th>&lt;phase&gt;</th>
<th>&lt;state&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tone 1</td>
<td>-35000</td>
<td>+0.00000000E+000</td>
<td>+0</td>
<td>+1</td>
</tr>
<tr>
<td>Tone 2</td>
<td>-25000</td>
<td>+0.00000000E+000</td>
<td>+0</td>
<td>+1</td>
</tr>
<tr>
<td>Tone 3</td>
<td>-15000</td>
<td>+0.00000000E+000</td>
<td>+0</td>
<td>+1</td>
</tr>
<tr>
<td>Tone 4</td>
<td>-5000</td>
<td>+0.00000000E+000</td>
<td>+0</td>
<td>+1</td>
</tr>
<tr>
<td>Tone 5</td>
<td>+5000</td>
<td>+0.00000000E+000</td>
<td>+0</td>
<td>+1</td>
</tr>
</tbody>
</table>
**Chapter 5**

**Digital Modulation Commands**

**Multitone Subsystem–Option 601 or 602 ([SOURce]:RADio:MTONe:ARB)**

---

**[:SOURce]:RADio:MTONe:ARB**

- **[:SOURce]:RADio:MTONe:ARB:SETup:TABLe:FSPacing**

  This command sets the frequency spacing between tones. The variable `<freq_spacing>` is expressed in hertz (Hz–MHz) and is limited to the 80 megahertz bandwidth of the arbitrary waveform generator.

  **Example**
  
  `:RAD:MTON:ARB:SET:TABL:FSP 100KHZ`

  The preceding example sets a 100 kHz frequency spacing between tones.

  **Range**

  - `<freq_spacing>` (2 tones): 1E4–8E7
  - `<freq_spacing>` (>2 tones): 1E4 to (80 MHz ÷ (num_tones – 1))

  **Key Entry**

  Freq Spacing

  **[:SOURce]:RADio:MTONe:ARB:SETup:TABLe:NTONes**

  This command defines the number of tones in the multitone waveform. To specify the number of tones and additional parameters required to create or configure a multitone waveform, refer to “[:SETup:TABLE] on page 289. This command is the third step in creating a multitone waveform. Refer to “Creating a Multitone Waveform” on page 280 for all four steps.

  **Example**
  

  The preceding example sets four tones in the current multitone table.

  **Range**

  2–64

  **Key Entry**

  Number Of Tones

---

<freq_spacing> (2 tones): 1E4–8E7

<freq_spacing> (>2 tones): 1E4 to (80 MHz ÷ (num_tones – 1))

<freq_spacing>: 0–359

**Key Entry**

Freq Spacing

Number Of Tones

Toggle State
**:SETup:TABLE:PHAsE:INITialize**

**Supported**
E8267D with Option 601 or 602

```plaintext
[:SOURce]:RADio:MTONe:ARB:SETup:TABLE:PHAsE:INITialize FIXed|RANDom
[:SOURce]:RADio:MTONe:ARB:SETup:TABLE:PHAsE:INITialize?
```

This command initializes the phase in the multitone waveform table.

- **FIXed**: This choice sets the phase of all tones to the fixed value of 0 degrees.
- **RANDom**: This choice sets the phase of all tones to random values based on the setting on the random seed generator.

To change the random number generator seed value, refer to "*:SETup:TABLE:PHAsE:INITialize:SEED" on page 291.

This command is the first step in creating a multitone waveform. Refer to "Creating a Multitone Waveform" on page 280 for all four steps.

**Example**

```plaintext
```

The preceding example sets the phase for the tones to a random number.

**RST**

**FIX**

**Key Entry**

Initialize Phase Fixed Random

**:SETup:TABLE:PHAsE:INITialize:SEED**

**Supported**
E8267D with Option 601 or 602

```plaintext
[:SOURce]:RADio:MTONe:ARB:SETup:TABLE:PHAsE:INITialize:SEED FIXed|RANDom
[:SOURce]:RADio:MTONe:ARB:SETup:TABLE:PHAsE:INITialize:SEED?
```

This command initializes the random number generator seed that is used to generate phase values for the multitone waveform tones.

- **FIXed**: This choice sets the random number generator seed to a fixed value. This selection will generator random and repeatable phase values: the same phase values will be generated with subsequent execution of the command.
- **RANDom**: This choice sets the random number generator seed to a random value. This changes the phase value after each initialization of the phase.

**Example**

```plaintext
```

The preceding example sets the random number generator seed to a random value.

**RST**

**FIX**

**Key Entry**

Random Seed Fixed Random
Digital Modulation Commands
Multitone Subsystem—Option 601 or 602 [:SOURce]:RADio:MTONe:ARB

**:ROW**

Supported  
ES267D with Option 601 or 602

[:SOURce]:RADio:MTONe:ARB:SETup:TABLE:ROW <row_number>,<power>,<phase>,<state>

This command modifies the indicated tone (row) of the multitone waveform.

- **<row_number>**  
The number of rows for this variable is determined by the :SETup:TABLE command.
- **<power>**  
The power level of the tone defined in the row number. Power levels for all tones must not exceed the power level of the signal generator. The power variable is expressed in decibels (dB)
- **<phase>**  
The phase of the tone relative to the carrier. The phase variable is expressed in degrees.
- **<state>**  
The state of the tone in this row can be enabled or disabled.

Frequency offset, power, phase, and state value are returned when a query is initiated. The output format is as follows:

```
 freq_offset, power, phase, state
```

Refer to “SETup:TABLE” on page 289 for information on how to change the number of rows. This command is the final step in creating a multitone waveform. Refer to “Creating a Multitone Waveform” on page 280 for all four steps.

**Example**

```
:RAD:MTON:ARB:SET:TABLE:ROW 2,-10,40,0
```

The preceding example modifies row number two in the currently selected multitone table. The power is set to –10 dB, the phase is set to 40 degrees, and the state is off.

- **RST**
  ```
  3.50000000E+004 <power>: +0.00000000E+000
  +0.00000000E+000 <phase>: +0.00000000E+000 <state>: 1
  ```

- **Range**
  ```
  -4E7 to 4E7 <power>: −80 to 0 <phase>: 0–359 <state>: 1
  ```

- **Key Entry**
  ```
  Goto Row  Toggle State
  ```

**[:STAte]**

Supported  
ES267D with Option 601 or 602

[:SOURce]:RADio:MTONe:ARB[:STAte] ON|OFF|1|0

This command enables or disables the operating state of the multitone waveform generator.
Example
[:SOURce]:RADio:TTONe:ARB ON

The preceding example turns on the multitone generator.

*RST 0

Key Entry Multitone Off On

Two Tone Subsystem ([SOURce]:RADio:TTONe:ARB)

 ALIGNment

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:TTONe:ARB:ALIGNment LEFT|CENTer|RIGHT

[:SOURce]:RADio:TTONe:ARB:ALIGNment?

This command will align the two tones either left, center or right of the carrier frequency.

Example
:RAD:TTON:ARB:ALIGN CENT

The preceding example aligns each of the two tones equidistant from the carrier frequency.

Key Entry Alignment Left Cent Right

APPLY

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:TTONe:ARB:APPLY

This command will cause the two-tone waveform to be regenerated using the current settings.

This command has no effect unless the two-tone waveform generator is enabled and a change has been made to the frequency spacing setting.

Key Entry Apply Settings

FSPacing

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:TTONe:ARB:FSPacing <freq_spacing>

[:SOURce]:RADio:TTONe:ARB:FSPacing?

This command sets the frequency spacing between the tones.

The variable <freq_spacing> is expressed in hertz (Hz–MHz).
Digital Modulation Commands
Two Tone Subsystem ([SOURce]:RADio:TTONe:ARB)

Example
:[SOURce]:RADio:TTONe:ARB:FSP 10MHZ
The preceding example sets a 10 megahertz frequency spacing for the two tones.

*RST +1.00000000E+004
Range 1E2–8E7
Key Entry Freq Separation

:HEADer:CLEar

Supported E8267D with Option 601 or 602
[[SOURce]:RADio:TTONe:ARB:HEADer:CLEar
This command clears the header information from the header file used for the two-tone waveform format. Header information consists of signal generator settings and marker routings associated with the waveform file. Refer to the E8257D/67D PSG Signal Generators User's Guide for information on header files.

For this command to function, two tone must be on. To turn two tone on, see “:STATe” on page 304.

*RST N/A
Key Entry Clear Header

:HEADer:SAVE

Supported E8267D with Option 601 or 602
[[SOURce]:RADio:TTONe:ARB:HEADer:SAVE
This command saves the header information to the header file used for the two-tone waveform format. Header information consists of signal generator settings and marker routings associated with the waveform file. Refer to the E8257D/67D PSG Signal Generators User's Guide for information on header files.

For this command to function, two tone must be on. To turn two tone on, see “:[STATe]” on page 302.

*RST N/A
Key Entry Save Setup To Header

:IQ:EXTernal:FILTer

Supported E8267D with Option 601 or 602
[[SOURce]:RADio:TTONe:ARB:IQ:EXTernal:FILTer 40e6|THrough
[[SOURce]:RADio:TTONe:ARB:IQ:EXTernal:FILTer?
This command selects the filter or through path for I/Q signals routed to the rear-panel I and Q outputs. Selecting a filter with this command automatically sets “:IQ:EXTernal:FILTer:AUTO” on page 282 to OFF.
Digital Modulation Commands
Two Tone Subsystem [:SOURce]:RADio:TTONe:ARB

40e6 This choice applies a 40 MHz baseband filter.
THROugh This choice bypasses filtering.

Example
The preceding example sets the through path for I/Q signal.

*RST
Key Entry 40.000 MHz Through

:IQ:EXTer nal:FILTer:AUTO

Supported E8267D with Option 601 or 602
[:SOURce]:RADio:TTONe:ARB:IQ:EXTernal:FILTer:AUTO ON|OFF|1|0
[:SOURce]:RADio:TTONe:ARB:IQ:EXTernal:FILTer:AUTO?
This command enables or disables the automatic filter selection for I/Q signals routed to the rear-panel I/Q outputs.
ON(1) This choice automatically selects the 40 MHz filter optimized for the current signal generator settings.
OFF(0) This choice disables the auto feature and allows you to select the 40 MHz filter or a through path. Refer to “:IQ:EXTer nal:FILTer” on page 258 for selecting a filter or through path.

Example
The preceding example enables the automatic filter selection.

*RST 1
Key Entry I/Q Output Filter Manual Auto

:IQ:MODulation:ATTen

Supported E8267D with Option 601 or 602
[:SOURce]:RADio:TTONe:ARB:IQ:MODulation:ATTen <val><unit>
[:SOURce]:RADio:TTONe:ARB:IQ:MODulation:ATTen?
This command sets the attenuation level of the I/Q signals being modulated through the signal generator RF path. The variable <val> is expressed in decibels (dB).

Example
The preceding example sets the modulator attenuator to 20 dB.

*RST +2.00000000E+000
Range 0–40 dB
Key Entry Modulator Atten Manual Auto
Digital Modulation Commands
Two Tone Subsystem [:SOURce]:RADio:TTONe:ARB

[:IQ:MODulation:ATTen:AUTO]

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:TTONe:ARB:IQ:MODulation:ATTen:AUTO ON|OFF|1|0

This command enables or disables the modulator attenuator auto mode. The auto mode will be switched to manual if the signal generator receives an AUTO OFF or AUTO ON command.

ON (1) This choice enables the attenuation auto mode which allows the signal generator to select the attenuation level that optimizes performance based on the current conditions.

OFF (0) This choice holds the attenuator at its current setting or at a selected value. Refer to “:IQ:MODulation:ATTen” on page 282 for setting the attenuation value.

Example


The preceding example enables the attenuator automatic mode.

*RST 1

Key Entry Modulator Atten Manual Auto

[:IQ:MODulation:FILTer]

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:TTONe:ARB:IQ:MODulation:FILTer 40e6|THRough

This command enables you to select a filter or through path for I/Q signals modulated onto the RF carrier. Selecting a filter using this command will automatically set “:IQ:MODulation:FILTer:AUTO” on page 284 to OFF (0) mode.

40E6 This choice applies a 40 MHz baseband filter to the I/Q signals.

THRough This choice bypasses filtering.

Example


The preceding example selects the 40 MHz filter.

*RST THR

Key Entry 40.000 MHz Through
Digital Modulation Commands
Two Tone Subsystem [:SOURce]:RADio:TTONe:ARB

:IQ:MODulation:FILTer:AUTO

Supported E8267D with Option 601 or 602

[:SOURce]:RADio:TTONe:ARB:IQ:MODulation:FILTer:AUTO ON|OFF|1|0
[:SOURce]:RADio:TTONe:ARB:IQ:MODulation:FILTer:AUTO?

This command enables or disables the automatic filter selection for I/Q signals modulated onto the RF carrier.

ON (1) This choice will automatically select the 40 MHz filter optimized for the current signal generator setting.

OFF (0) This choice disables the automatic filter selection and allows you to select a digital modulation filter or through path. Refer to “:IQ:MODulation:FILTer” on page 236 for selecting a filter or through path.

Example

:RAD:TTON:ARB:IQ:MDEStination:ALCHold NONE|M1|M2|M3|M4
[:SOURce]:RADio:TTONe:ARB:MDEStination:ALCHold?

This command disables the marker ALC hold function, or it enables the marker hold function for the selected marker.

Use the ALC hold function when you have a waveform signal that incorporates idle periods, or when the increased dynamic range encountered with RF blanking is not desired. The ALC circuitry responds to the marker signal during the marker pulse (marker signal high), averaging the modulated signal level during this period.

The ALC hold function operates during the low periods of the marker signal. The marker polarity determines when the marker signal is high. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points. To set a marker’s polarity, see “:MPOLarity:MARKer1|2|3|4” on page 300. For more information on markers, see “:MARKer:[SET]” on page 239.

NOTE Do not use the ALC hold for more than 100 ms, because it can affect the waveform’s output amplitude.
The marker signal has a minimum of a two-sample delay in its response relative to the waveform signal response. To compensate for the marker signal delay, offset marker points from the waveform sample point at which you want the ALC sampling to begin.

The ALC hold setting is part of the file header information, so saving the setting to the file header saves the current marker routing for the waveform file.

**NOTE** A waveform file that has unspecified settings in the file header uses the previous waveform’s routing settings.

For more information on the marker ALC hold function, see the E8257D/67D PSG Signal Generators User’s Guide. To configure marker points, refer to the following sections located in the Dual ARB subsystem:
- For clearing a single marker point or a range of marker points, see “:MARKer:CLEar” on page 237.
- For clearing all marker points, see “:MARKer:CLEar:ALL” on page 238.
- For shifting marker points, see “:MARKer:ROTate” on page 238.
- For setting marker points, see “:MARKer:[SET]” on page 239.

**NONE** This terminates the marker ALC hold function.

**M1–M4** These are the marker choices. The ALC hold feature uses only one marker at a time.

**Example**

```
```

The preceding example routes marker two to the ALC hold function.

**CAUTION** The pulse function incorporates ALC hold. Incorrect ALC sampling can create a sudden unleveled condition that may create a spike in the RF output, potentially damaging a DUT or connected instrument. Ensure that you set markers to let the ALC sample over an amplitude that accounts for the high power levels within the signal.

```
[:SOURce]:RADio:TTOn:ARB:MDEStination:PULSe NONE|M1|M2|M3|M4
[:SOURce]:RADio:TTOn:ARB:MDEStination:PULSe?
```

This command disables the marker RF blanking/pulse function, or it enables the marker RF blanking/pulse function for the selected marker.

This function automatically incorporates the ALC hold function, so there is no need to select both functions for the same marker.

**NOTE** Do not use ALC hold for more than 100 ms, because it can affect the waveform’s output amplitude.
The signal generator blanks the RF output when the marker signal goes low. The marker polarity determines when the marker signal is low. For a positive polarity, this is during the marker points. For a negative polarity, this is when there are no marker points. To set a marker’s polarity, see “:MPOLarity:MARKer1|2|3|4” on page 300. For more information on markers, see “:MARKer:[SET]” on page 239.

**NOTE** Set marker points prior to using this function. Enabling this function without setting marker points may create a continuous low or high marker signal, depending on the marker polarity. This creates the condition where there is either no RF output or a continuous RF output.

To configure marker points, refer to the following sections located in the Dual ARB subsystem:
- For clearing a single marker point or a range of marker points, see “:MARKer:CLEar” on page 237.
- For clearing all marker points, see “:MARKer:CLEar:ALL” on page 238.
- For shifting marker points, see “:MARKer:ROTate” on page 238.
- For setting marker points, see “:MARKer:[SET]” on page 239.

The marker signal has a minimum of a two-sample delay in its response relative to the waveform signal response. To compensate for the marker signal delay, offset marker points from the waveform sample point at which you want the RF blanking to begin.

The RF blanking setting is part of the file header information, so saving the setting to the file header saves the current marker routing for the waveform file.

**NOTE** A waveform file that has unspecified settings in the file header uses the previous waveform’s routing settings. This could create the situation where there is no RF output signal, because the previous waveform used RF blanking.

For more information on the marker RF blanking function, see the *E8257D/67D PSG Signal Generators User’s Guide*.

**NONE** This terminates the marker RF blanking/pulse function.

M1–M4 These are the marker choices. The RF blanking/pulse feature uses only one marker at a time.

**Example**


The preceding example routes marker three to the Pulse/RF Blanking function.

**RST** NONE

**Key Entry** None Marker 1 Marker 2 Marker 3 Marker 4
Digital Modulation Commands
Two Tone Subsystem [:SOURce]:RADio:TTONe:ARB

:MPOLarity:MARKer1|2|3|4

Supported
E8267D with Option 601 or 602

[:SOURce]:RADio:TTONe:ARB:MPOLarity:MARKer1|2|3|4 NEGative|POSitive

This command sets the polarity for the selected marker.

For a positive marker polarity, the marker signal is high during the marker points. For a negative marker polarity, the marker signal is high during the period of no marker points. To configure marker points, refer to the following sections located in the Dual ARB subsystem:

- For clearing a single marker point or a range of marker points, see “:MARKer:CLEar” on page 237.
- For clearing all marker points, see “:MARKer:CLEar:ALL” on page 238.
- For shifting marker points, see “:MARKer:ROTate” on page 238.
- For information on markers and setting marker points, see “:MARKer:[SET]” on page 239.

Example

:RAD:TTONe:ARB:MPOL:MARK1 POS

The preceding example sets the polarity for marker one to positive.

*RST

POS

Key Entry | Marker 1 Polarity Neg Pos | Marker 2 Polarity Neg Pos | Marker 3 Polarity Neg Pos | Marker 4 Polarity Neg Pos
---|---|---|---|---

:REFerence:EXTernal:FREQuency

Supported
E8267D with Option 601 or 602

[:SOURce]:RADio:TTONe:ARB:REFerence:EXTernal:FREQuency <val>

This command allows you to enter the frequency of the external reference.

The variable <val> is expressed in hertz (Hz–MHz).

The value specified by this command is effective only when you are using an external ARB reference applied to the BASEBAND GEN REF IN rear-panel connector.

To specify external as the ARB reference source type, refer to “:REFerence:[SOURce]” on page 246.

Example

:RAD:TTONe:ARB:REF:EXT:FREQ 1MHZ

The preceding example sets the external reference to 1 megahertz.

*RST

+1.00000000E+007

Range

2.5E5–1E8

Key Entry | Reference Freq
Digital Modulation Commands
Two Tone Subsystem [:SOURce]:RADio:TTOn:ARB

[:REFerence[:SOURce]]

Supported  

ES267D with Option 601 or 602

[:SOURce]:RADio:TTOn:ARB:REFerence[:SOURce] INTernal|EXTernal

This command selects either an internal or external reference for the waveform clock. If EXTernal is selected, the external frequency value must be entered and the clock signal must be applied to the BASEBAND GEN REF IN rear-panel connector. See “[:REFerence:EXTernal:FREQuency]” on page 287 to enter the external reference frequency.

Example

:RAD:TTON:ARB:REF EXT

The preceding example sets an external reference as the waveform clock.

*RST  

INT

Key Entry  

ARB Reference Ext Int

:SCLock:RATE

Supported  

ES267D with Option 601 or 602

[:SOURce]:RADio:TTOn:ARB:SCLock:RATE <sample_clock_rate>

This command sets the ARB sample clock rate.

The multitone generator should be on before executing this command. If this command is executed before the multitone generator is active, the entered value will be overridden by a calculated factory default value. Refer to “[:STATe]” on page 280 to activate the modulation format.

Example

:RAD:TTON:ARB:SCL:RATE 1MHZ

The preceding example sets the ARB sample clock to 1 MHz.

*RST  

+1.00000000E+008

Range  

1–1E8

Key Entry  

ARB Sample Clock
Digital Modulation Commands
Wideband Digital Modulation Subsystem ([SOURce]:WDM)

[:STATe]

Supported  
ES267D with Option 601 or 602

[:SOURce]:RADio:TTONe:ARB[:STATe] ON|OFF|1|0
[:SOURce]:RADio:TTONe:ARB[:STATe]?

This command enables or disables the on/off operational state of the two-tone waveform generator function.

Example
:RAD:TTON:ARB ON

The preceding example turns on the two-tone generator.

*RST
 0

Key Entry  Two Tone Off On

Wideband Digital Modulation Subsystem ([SOURce]:WDM)

:IQADjustment:IOFFset

Supported  
ES267D with Option 015

[:SOURce]:WDM:IQADjustment:IOFFset <val><unit>
[:SOURce]:WDM:IQADjustment:IOFFset?

This command sets the I channel offset value, as a percent of the full scale. 100% offset is equivalent to 500 mV DC at the input connector.

Example
:WDM:IQAD:IOFF 100MV

The preceding example sets an offset of 100 mV DC for the I signal.

*RST
  +0.00000000E+000

Range  
−5E1 to +5E1

Key Entry  I Offset

:IQADjustment:QOFFset

Supported  
ES267D with Option 015

[:SOURce]:WDM:IQADjustment:QOFFset <val><unit>
[:SOURce]:WDM:IQADjustment:QOFFset?

This command sets the Q channel offset value, as a percent of the full scale. 100% offset is equivalent to 500 mV DC at the input connector.

Example
:WDM:IQAD:QOFF 100MV

The preceding example sets an offset of 100 mV DC for the Q signal.


**Digital Modulation Commands**

**Wideband Digital Modulation Subsystem [:SOURce]:WDM**

---

**:IQADjustment:QSKew**

**Supported**

E8267D with Option 601 or 602 and Option 015

\[
[:\text{SOURce}]:\text{WDM}:\text{IQADjustment}:\text{QSKew} \ <\text{val}>
\]

\[
[:\text{SOURce}]:\text{WDM}:\text{IQADjustment}:\text{QSKew}?
\]

This command adjusts the phase angle between the I and Q vectors.

The variable \(<\text{val}>\) is expressed in degrees with a minimum resolution of 0.1.

Positive skew increases the angle from 90 degrees while negative skew decreases the angle from 90 degrees. When the quadrature skew is zero, the phase angle is 90 degrees. If the signal generator is operating at frequencies greater than 3.3 GHz, quadrature skew settings greater than ±5 degrees will not be within specifications.

This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to ":IQADjustment[:STATe]" on page 303.

**Example**

:WDM:IQAD:QSK 3.1

The preceding example sets the skew value for the Q signal to 3.1 degrees.

**:IQADjustment[:STATe]**

**Supported**

E8267D with Option 015

\[
[:\text{SOURce}]:\text{WDM}:\text{IQADjustment}[:\text{STATe}] \ \text{ON}|\text{OFF}|1|0
\]

\[
[:\text{SOURce}]:\text{WDM}:\text{IQADjustment}[:\text{STATe}]?
\]

This command enables or disables the wideband I/Q adjustments.

**Example**

:WDM:IQAD ON

The preceding example enables I/Q adjustments.
:STATe

**Supported**
E8267D with Option 015

[:SOURce]:WDM:STATe ON|OFF|1|0
[:SOURce]:WDM:STATe?

This command enables or disables the wideband I/Q modulator. The I/Q modulator is automatically enabled whenever a digital modulation form is turned on and when active, the I/Q annunciator appears on the signal generator’s display.

**Example**

:WDM:STAT ON

The preceding example enables the wideband I/Q modulator.

*RST 0

**Key Entry**
I/Q Off On
6 Digital Signal Interface Module Commands


- “Digital Subsystem ([SOURce])” on page 305

Digital Subsystem ([SOURce])

:DIGItal:CLK:CPS

Supported E8267D Option 601 or 602 with Option 003

[:SOURce]:DIGItal:CLK:CPS 1|2|4

[:SOURce]:DIGItal:CLK:CPS?

This command selects the number of clock cycles per sample. The command is used with parallel or parallel interleaved port configurations. If this command is executed with a serial port configuration or an IF signal type, the parameter value is changed, but it is not used by the interface module until the port configuration is changed to parallel or parallel interleaved, and the signal type is changed to IQ.

The query returns the currently set value, regardless of the port configuration, you must query all four states (clocks per sample, port configuration, data direction, and signal type) to know the interface module’s current setup.

Example

:DIG:CLK:CPS 2

The preceding example sets two clock cycles for each sample.

*RST 1

Range 1,2,or 4

Key Entry Clocks Per Sample
Digital Signal Interface Module Commands
Digital Subsystem [:SOURce]

:DIGital:CLOCk:PHASe

Supported E8267D Option 601 or 602 with Option 003 or 004

[:SOURce]:DIGital:CLOCk:PHASe <val>
[:SOURce]:DIGital:CLOCk:PHASe?

This command sets the phase for the clock relative to the leading edge transition of the data. At 0 degrees the clock and leading edge of the data signal are aligned. Any phase value between 0 and 360 degrees can be used in the command, however, the signal generator rounds up or down to get 90, 180, 270 and 0 degree settings. For example 140 degrees will cause the signal generator to use the 180 degree setting.

If this command is executed when the clock rate is less than 10 MHz or greater than 200 MHz, the resolution of this setting changes to 180 degrees, and the maximum phase becomes 180 degrees.

Example

:DIG:CLOC:PHAS 90DEG

The preceding example sets the clock phase to 90 degrees. The clock signal leading edge transition will be delayed by 1/4 of a clock period relative to the leading edge data transition.

*RST +0.00000000E+000

Range 0 – 360 deg

Key Entry Clock Phase

:DIGital:CLOCk:POLarity

Supported E8267D Option 601 or 602 with Option 003 or 004

[:SOURce]:DIGital:CLOCk:POLarity POSitive|NEGative
[:SOURce]:DIGital:CLOCk:POLarity?

This command sets the alignment for the clock signal to positive or negative. Positive selects the leading edge transition of the clock signal to align with the leading edge data transition and negative selects the falling edge transition of the clock signal to align with the leading edge of the data.

Example

:DIG:CLOC:POL NEG

The preceding example sets the clock falling edge transition to align with the leading edge data transition.

*RST POS

Key Entry Clock Polarity


`:DIGital:CLOCk:RATE

Supported E8267D Option 601 or 602 with Option 003 or 004

[[:SOURce]:DIGital:CLOCk:RATE <val>
[[:SOURce]:DIGital:CLOCk:RATE?

This command sets the clock rate. If an external clock is used, the rate set with this command must match the external clock rate. Only clock phase settings of 0 or 180 degrees are valid for a clock rate setting below 10 MHz or above 200 MHz. The variable <val> is a expressed in hertz

Example

:DIG:CLOC:RATE 200MHZ

The preceding example sets the clock rate to 200 megahertz.

*RST +1.000000E+008

Range 1 kHz–400 MHz

Key Entry Clock Rate

`:DIGital:CLOCk:REFerence:FREQuency

Supported E8267D Option 601 or 602 with Option 004

[[:SOURce]:DIGital:CLOCk:REFence:FREQuency <freq>
[[:SOURce]:DIG:CLOC:REF:FREQ?

This command allows you to specify the frequency of the external reference supplied to the Freq Ref connector. This command is valid only when the clock source is set to internal.

If this command is executed when the clock source is not set to internal, the parameter value is changed, but it is not used by the signal generator until the clock source is changed to internal.

Because a query returns the currently set value, regardless of the clock source, you must query both states (reference frequency and clock source) to know the signal generator’s current setup.

Example

:DIG:CLOC:REF:FREQ 50MHZ

The preceding example specifies a 50 megahertz external reference frequency.

*RST +1.000000E+007

Range 1–100 MHz

Key Entry Reference Frequency
:DIGital:CLOCk:SOURCe

Supported E8267D Option 601 or 602 with Option 003 or 004

[:SOURce]:DIGital:CLOCk:SOURCe INternal|EXTernal|DEVice

[:SOURce]:DIG:CLOC:SOURCe?

This command selects one of three possible clock sources.

Example

:DIG:CLOC:SOUR DEV

The preceding example uses the “Device Interface Connector” input clock.

*RST INT

Key Entry Clock Source

:DIGital:CLOCk:SKEW

Supported E8267D Option 601 or 602 with Option 003 or 004

[:SOURce]:DIGital:CLOCk:SKEW <val>

[:SOURce]:DIGital:CLOCk:SKEW?

This command sets the clock signal skew value. The skew is a fine-tune adjustment for the course tune clock phase function and helps to align the clock with valid data states. This is useful at high clock rates and available only for clock frequencies above 10 megahertz. The variable <val> is expressed in nanoseconds.

Example

:DIG:CLOC:SKEW 2NS

The preceding example sets the clock skew to 2 nanoseconds.

*RST +0.00000000E+000 ns

Range -5ns to 5ns

Key Entry Clock Skew

:DIGital:DATA:ALIGnment

Supported E8267D Option 601 or 602 with Option 003 or 004

[:SOURce]:DIGital:DATA:ALIGnment MSB|LSB

[:SOURce]:DIGital:DATA:ALIGment?

This command selects the bit alignment for word less than 16 bits in length. The MSB (most significant bit) selection maintains the MSB of the word on the same data line while the LSB (least significant bit) will move depending on the word size. The opposite effect occurs when the alignment is set to LSB.
**Example**

:DIG:DATA:ALIG MSB

The preceding example sets the MSB word format.

*RST  LSB

**Key Entry**  Word Alignment

**:DIGital:DATA:BORDer**

Supported  E8267D Option 601 or 602 with Option 003 or 004

[:SOURce]:DIGital:DATA:BORDer MSB|LSB

[:SOURce]:DIGital:DATA:BORD?

This command selects the bit order for data transmitted through the N5102A module. Data can be in least significant (LSB) bit first or most significant (MSB) bit first.

**Example**

:DIG:DATA:BORD MSB

The preceding example specifies data in MSB first format.

*RST  LSB

**Key Entry**  Bit Order

**:DIGital:DATA:DIRection**

Supported  E8267D Option 601 or 602 with Option 003 or 004

[:SOURce]:DIGital:DATA:DIRection OUTPut|INPut

[:SOURce]:DIGital:DATA:DIRection?

This command selects an input or output direction for data flow through the N5102A module.

**Example**

:DIG:DATA:DIR INP

The preceding example selects input as the direction of data flow.

*RST  Output (unless only Option 004 is installed)

**Key Entry**  Direction
:DIGital:DATA:IGain

Supported E8267D Option 601 or 602 with Option 003

[:SOURce]:DIGital:DATA:IGain <val>
[:SOURce]:DIGital:DATA:IGain?

This command adjusts the gain of the I data in the N5102A module. The adjustment does not affect the Q data. The variable <val> is expressed as a percentage delta from 100%.

The offset is an adjustment to the analog level that is represented by the digital sample. The analog voltage is limited to a 16-bit data sample. If the amplitude of the signal, after gain is applied, cannot be represented by 16 bits, the signal will be clipped.

Example

:DIG:DATA:IG 10

The preceding example turns off wideband amplitude modulation.

*RST +0.00000000E+000

Range –12.5 through 12.5

Key Entry I Gain

:DIGital:DATA:INEGate

Supported E8267D Option 601 or 602 with Option 003 or 004

[:SOURce]:DIGital:DATA:INEGate OFF|ON|0|1
[:SOURce]:DIGital:DATA:INEGate?

This command enables or disables the negation of the I data sample. Negation changes the sample by expressing it in two's complement form, multiplying by negative one, and converting back to the selected numeric format. This can be done for I samples, Q samples, or both.

The sample or word represents a quantized analog voltage level. For a 16-bit sample, the range is from 0 to 65535 in offset binary or -32768 to +32767 in 2's complement mode.

Example

:DIG:DATA:INEG ON

The preceding example enables negation of the I data.

*RST 0

Key Entry Negate I
**:DIGital:DATA:IOFFset**

**Supported**
E8267D Option 601 or 602 with Option 003

[:SOURce]:DIGital:DATA:IOFFset <val>

[:SOURce]:DIGital:DATA:IOFFset?

This command adjusts the DC offset for I data. The command is available for the N5102A module output mode. The variable `<val>` is expressed as a +/- 100% of the full scale value. Refer to the E8257D/67D PSG Signal Generators Key Reference for more information.

**Example**

:DIG:DATA:IOFF 40

The preceding example sets the I offset to 40% of full scale.

*RST*

+0.00000000E+000

**Range**

-100 to +100

**Key Entry**

I Offset

**:DIGital:DATA:IQSWap**

**Supported**
E8267D Option 601 or 602 with Option 003 or 004

[:SOURce]:DIGital:DATA:IQSWap OFF|ON|0|1

[:SOURce]:DIGital:DATA:IQSWap?

This command enables or disables swapping of the I and Q data. When enabled, the I data is sent to the N5102A's Q bus and the Q data is sent to the I bus.

**Example**

:DIG:DATA:IQSW ON

The preceding example enables swapping of I and Q data.

*RST*

0

**Key Entry**

Swap IQ

**:DIGital:DATA:NFORmat**

**Supported**
E8267D Option 601 or 602 with Option 003 or 004

[:SOURce]:DIGital:DATA:NFORmat OBINary|TCOMplement

[:SOURce]:DIGital:DATA:NFORmat?

This command selects the binary format used to represent the transmitted data values. The selections are offset binary or 2's complement.

**Example**

:DIG:DATA:NFOR OBIN

The preceding example selects the offset binary format to represent data values.

*RST*

TCOM

**Key Entry**

Numeric Format


**Digital Signal Interface Module Commands**  
**Digital Subsystem ([:SOURce])**

---

### :DIGit:DATA:POLarity:FRAME

**Supported**  
E8267D Option 601 or 602 with Option 003 or 004

```
[:SOURce]:DIGit:DATA:POLarity:FRAME POSitive|NEGative
```

This command selects the polarity of the frame marker for serial transmission. The frame marker indicates the beginning of each sample or byte of data. The command is valid for serial transmission only.

- **POS**  
  This choice selects a positive polarity. The frame marker is high for the first data sample.

- **NEG**  
  This choice selects a negative polarity. The frame marker is low for the first data sample.

**Example**

`:DIG:DATA:POL:FRAM NEG`

The preceding example selects a negative polarity for the frame marker.

**RST**  
POS

**Key Entry**  
Frame Polarity

---

### :DIGit:DATA:POLarity:IQ

**Supported**  
E8267D Option 601 or 602 with Option 003 or 004

```
[:SOURce]:DIGit:DATA:POLarity:IQ POSitive|NEGative
```

This command selects the logic level for I and Q data. Positive selects a high logic level at the output as a digital one and negative selects a low logic level at the output as a digital one.

- **POS**  
  This choice selects a logic high level as digital one.

- **NEG**  
  This choice selects a logic low level as a digital one.

**Example**

`:DIG:DATA:POL:IQ NEG`

The preceding example turns off wideband amplitude modulation.

**RST**  
POS

**Key Entry**  
IQ Polarity
Digital Signal Interface Module Commands
Digital Subsystem ([:SOURce])

:DIGital:DATA:QGain

Supported  E8267D Option 601 or 602 with Option 003

[:SOURce]:DIGital:DATA:QGain <val>
[:SOURce]:DIGital:DATA:QGain?

This command adjusts the gain for Q data in the N5102A module. The adjustment does not affect the I data. The variable <val> is expressed as a percentage delta from 100%. The offset is an adjustment to the analog level that is represented by the digital sample. The analog voltage is limited to a 16-bit data sample.

Example
:DIG:DATA:QG 10

The preceding example increases the gain for Q data by 10% above the nominal value.

*RST  +0.00000000E+000

Range  -12.5 through 12.5

Key Entry  Q Gain

:DIGital:DATA:QNEGate

Supported  E8267D Option 601 or 602 with Option 003 or 004

[:SOURce]:DIGital:DATA:QNEGate OFF|ON|0|1
[:SOURce]:DIGital:DATA:QNEGate?

This command enables or disables the negation of the Q data sample. Negation changes the sample by expressing it in two's complement form, multiplying by negative one, and converting back to the selected numeric format.

The sample or word represents a quantized analog voltage level. For a 16-bit sample, the range is from 0 to 65535 in offset binary or -32768 to +32767 in 2's complement mode.

Example
:DIG:DATA:QNEG ON

The preceding example enables negation of the Q data.

*RST  0

Key Entry  Negate Q
Digital Signal Interface Module Commands
Digital Subsystem [:SOURce]

:DIGital:DATA:QOFFset

Supported E8267D Option 601 or 602 with Option 003

[:SOURce]:DIGital:DATA:QOFFset <val>
[:SOURce]:DIGital:DATA:QOFFset?

This command adjusts the DC offset for Q data. The command is available for the N5102A module output mode. The variable <val> is expressed as a +/− 100% of the full scale value.

Example
:DIG:DATA:QOFF 40

The preceding example sets the Q offset to 40% of full scale.

*RST +0.00000000E+000
Range −100 through 100
Key Entry Q Offset

:DIGital:DATA:ROTation

Supported E8267D Option 601 or 602 with Option 003

[:SOURce]:DIGital:DATA:ROTation <val>
[:SOURce]:DIGital:DATA:ROTation?

This command rotates the IQ data in the IQ plane. This command is valid for the N5102A output mode. The variable <val> is expressed in degrees with a range from 0 to 360.

Example
:DIG:DATA:ROT 45

The preceding example rotates the IQ constellation 45 degrees.

*RST +1.00000000E+000
Range 0–360
Key Entry Rotation

:DIGital:DATA:SCALing

Supported E8267D Option 601 or 602 with Option 003

[:SOURce]:DIGital:DATA:SCALing <val>
[:SOURce]:DIGital:DATA:SCALing?

This command enables scaling of the I and Q data to the level indicated by the <val> variable. This command is valid for the N5102A output mode. The variable <val> is expressed as a percentage.
**Example**

:DIG:DATA:SCAL 50

The preceding example scales the I and Q data to amplitude to 50% of the nominal value.

*RST*  +1.00000000E+002

**Range**  -100 through 100

**Key Entry**  Scaling

---

:**DIGital:DATA:SIZE**

**Supported**  E8267D Option 601 or 602 with Option 003 or 004

[:SOURce]:DIGital:DATA:SIZE <val>

[:SOURce]:DIGital:DATA:SIZE?

This command selects the number of bits in each sample. A sample can have a maximum word length of 16 bits.

**Example**

:DIG:DATA:SIZE 8

The preceding example sets the sample word size to eight bits.

*RST*  +1.60000000E+001

**Range**  4–16

**Key Entry**  Word Size

---

:**DIGital:DATA:STYPe**

**Supported**  E8267D Option 601 or 602 with Option 003

[:SOURce]:DIGital:DATA:STYPe IQ|IF

[:SOURce]:DIGital:DATA:STYPe?

This command selects the output format for the IQ data. The IQ selection outputs digital I and Q data. Whereas the IF (intermediate frequency) selection modulates the I and Q data onto the IF frequency. The IF is calculated as 1/4 the clock sample rate. This command is valid only for the N5102A output mode.

**Example**

:DIG:DATA:STYP IF

The preceding example sets the output data to IF.

*RST*  IQ

**Key Entry**  Signal Type
**Digital Signal Interface Module Commands**

**Digital Subsystem [:SOURce]**

### :DIGital:DATA:TYPE

**Supported**

E8267D Option 601 or 602 with Option 003 or 004

[:SOURce]:DIGital:DATA:TYPE  \(\text{SAMPLEs|PPSamples} \)

[:SOURce]:DIGital:DATA:TYPE?

This command selects filtered baseband data or unfiltered baseband data as the transmitted data type.

If this command is executed while an ARB modulation format is active, the parameter choice is changed, but it is not used by the interface module until a real-time modulation format is turned on.

Because a query returns the current choice, regardless of whether or not an ARB format is active, you must query both states (data type and the modulation format) to know the signal generator’s current setup.

**SAMPLEs**

This choice selects DAC samples at the data transmitted.

**PPSamples**

This choice selects pre-filtered samples which are unfiltered I and Q data.

**Example**

: DIG: DATA: TYPE PFS

The preceding example sets the data type to pre-filtered I and Q data.

* RST SAMP

**Key Entry**

Data Type

### :DIGital:DIAgnostic:LOOPback

**Supported**

E8267D Option 601 or 602 with Option 003 or 004

[:SOURce]:DIGital:DIAgnostic:LOOPback  \(\text{DIGBus|CABLe|N5102A|DEVice} \)

[:SOURce]:DIGital:DIAgnostic:LOOPback?

This command selects a loop back test that validates the integrity of digital data. Refer to the E8257D/67D PSG Signal Generators Key Reference for more information.

**DIGBus**

This choice selects a loop back test using the Digital Bus Loop Back Fixture test board.

**CABLe**

This choice selects a loop back test on the PSG Digital Bus connector at the signal generator side.

**N5102A**

This choice selects a loop back test for the N5102A module.

**DEVice**

This choice selects a loop back test using the LOOP BACK TEST SINGLE ENDED IO DUAL 40 PIN board.

**Example**

: DIG: DIAG: LOOP?

The preceding example runs the diagnostic test for device and returns a pass or fail state.

* RST Device Intfc

**Key Entry**

Loop Back Test Type
:DIGITAL:LOGIC[:TYPE]

Supported E8267D Option 601 or 602 with Option 003 or 004

[:SOURce]:DIGITAL:LOGIC[:TYPE] LVDS|LVTT1|CMOS15|CMOS18|CMOS25|CMOS33

[:SOURce]:DIGITAL:LOGIC[:TYPE]?

This command selects the logic data type used by the device being tested.

LVDS This choice selects low voltage differential signaling as the logic data type.
LVTT1 This choice selects a low voltage TTL signal as the logic data type.
CMOS15 This choice selects a 1.5 volt CMOS signal as the logic data type.
CMOS18 This choice selects a 1.8 volt CMOS signal as the logic data type.
CMOS25 This choice selects a 2.5 volt CMOS signal as the logic data type.
CMOS33 This choice selects a 3.3 volt CMOS signal as the logic data type.

Example

:DIG:LOG CMOS15

The preceding example selects 1.5 volt CMOS as the logic data type.

*RST

CMOS33

Key Entry Logic Type

:DIGITAL:PCONFIG

Supported E8267D Option 601 or 602 with Option 003 or 004

[:SOURce]:DIGITAL:PCONFIG PARallel|SERial|PINTIQ|PINTI

[:SOURce]:DIGITAL:PCONFIG?

This command selects the data transmission type used for communication between the N5102A module and the device under test. Refer to the E8257D/67D PSG Signal Generators Key Reference for more information.

PARallel This choice selects parallel data transmission.
SERial This choice selects serial data transmission.
PINTIQ This choice selects parallel interleaving data transmission. The I data is transmitted on the rising clock edge and the Q data on the falling edge.
PINTI This choice selects parallel interleaving data transmission. The Q data is transmitted on the rising clock edge and the I data on the falling edge.

Example

:DIG:PCON PINTI

The preceding example selects parallel interleaving using the QI format

*RST PAR

Key Entry Port Config
Digital Signal Interface Module Commands
Digital Subsystem [:SOURce]

::DIGital::PRESet::PTHRough

**Supported**
E8267D Option 601 or 602 with Option 003 or 004

[:SOURce]:DIGital::PRESet::PTHRough

This command sets up the preset condition for the N5102A module and allows transmission of data through the module with no modifications. The command is valid only when a modulation format is active.

**Example**

::DIG::PRES::PTHR

The preceding example sets the N5102A module to a preset condition and allows data to pass through unmodified.

**Key Entry**
Pass Through Preset

::DIGital[:STATe]

**Supported**
E8267D Option 601 or 602 with Option 003 or 004

[:SOURce]:DIGital[:STATe] 0|1|OFF|ON

[:SOURce]:DIGital[:STATe]?

This command enables or disables the operating state of the N5102A module.

**Example**

::DIG ON

The preceding example turns on the N5102A module.

*RST OFF

**Key Entry**
N5102A Off On
7 SCPI Command Compatibility

This chapter provides a compatibility listing of SCPI commands. Many commands unique to other Agilent signal generator models are also supported by the PSG Signal Generator:

- " :SYSTem:IDN" on page 319
- "E8257D/67D Compatible Commands" on page 320
- "E8241A/44A/51A/54A and the E8247C/57C/67C PSG Compatible SCPI Commands" on page 320
- "8340B/41B and 8757D Compatible Commands" on page 321
- "836xxB/L Compatible SCPI Commands" on page 334
- "8373xB and 8371xB Compatible SCPI Commands" on page 350
- "8375xB Compatible SCPI Commands" on page 358
- "8662A/63A Compatible Commands" on page 370

:SYSTem:IDN

Supported All
:SYSTem:IDN "<string>"

This command modifies the identification string that the *IDN? query returns. Sending an empty string returns the query output to its factory shipped setting. The maximum string length is 72 characters.

Modification of the *IDN? query output enables the PSG to identify itself as another signal generator when it is used as a backward compatible replacement.

The display diagnostic information, shown by pressing the Diagnostic Info softkey, is not affected by this command.

Example

:SYST:IDN "Agilent Technologies, Exxxx, US4000000, c.00.00.1234"

The preceding example changes and sets the identification string for the signal generator.
E8257D/67D Compatible Commands

The following commands are compatible with the E8257D and E8267D signal generators. These commands were documented in earlier versions of firmware but are now deprecated and may be removed from future firmware versions.

**:DATA:PRAM?**

**Supported** E8267D with Option 601 or 602

**:MEMORY:DATA:PRAM?**

This query determines whether there is a user-defined pattern in the pattern RAM (PRAM). This command is not compatible with the “**:DATA:PRAM:FILE:BLOCK” or “**:DATA:PRAM:FILE:LIST” commands.

*:RST 0*

**:DATA:PRAM:BLOCk**

**Supported** E8267D with Option 601 or 602

**:MEMORY:DATA:PRAM:BLOCk <data_block>**

This command downloads the block-formatted data directly into pattern RAM. This command is still valid for backward compatibility; however, it has been replaced by the “**:DATA:PRAM:FILE:BLOCk” command.

**:DATA:PRAM:LIST**

**Supported** E8267D Option 601 or 602

**:MEMORY:DATA:PRAM:LIST <uint8>[,<uint8>,<...>]**

This command downloads the list-formatted data directly into pattern RAM. This command is still valid for backward compatibility; however, it has been replaced by the “**:DATA:PRAM:FILE:LIST” command.

<uint8> This variable is any of the valid 8-bit, unsigned integer values between 0 and 255.

[,<uint8>,<...>] This variable identifies the value of the second and subsequent 8-bit unsigned integer variables.

**Range** 0–255

E8241A/44A/51A/54A and the E8247C/57C/67C PSG Compatible SCPI Commands

All commands are fully supported. To use the commands, select SCPI as the remote language. See “**LANguage**” on page 87 for selecting the language type.
SCPI Command Compatibility
8340B/41B and 8757D Compatible Commands

The tables in this section provide the following:

**Table 7-1 on page 321**: a comprehensive list of 8340B/41B and 8757D programming codes, listed in alphabetical order. The equivalent SCPI command sequence for each supported code is provided; codes that are not supported by the PSG family are indicated as such in the command column.

**Table 7-2 on page 332**: a list of the implemented 8340B/41B and 8757D programming codes that set the active function. This table also indicates which codes are compatible with the RB command (knob), and lists the operation active (OA) query, the operation prior (OP) query, and the increment (up), and the decrement (down) SCPI commands.

**NOTE** Compatibility is provided for GPIB only; RS-232 and LAN are not supported.

When using the programming codes in this section, you can:

- set the PSG system language to 8340 or 8757 for the current session:
  ```
  Utility > GPIB/RS-232 LAN > Remote Language > 8340B (or 8757D)
  ```
  or send the command:
  ```
  :SYST:LANG "8340" (or "8757")
  ```

- set the PSG system language to 8340 or 8757 so that it does not reset with either preset, instrument power cycle or *RST command:
  ```
  Utility > Power On/Preset > Remote Language > 8340B (or 8757D)
  ```
  or send the command:
  ```
  :SYST:PRESET:LANG "8340" (or "8757")
  ```


### Table 7-1 8340B/41B Prog. Codes & Equivalent SCPI Sequences

<table>
<thead>
<tr>
<th>Cmd</th>
<th>Description</th>
<th>8340</th>
<th>8757</th>
<th>Equivalent SCPI Command Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Internal leveling mode</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:POWer:ALC:SOURce INTernal</td>
</tr>
<tr>
<td>A2</td>
<td>External leveling mode with diode detector</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:POWer:ALC:SOURce DIODe [:SOURce]:POWer:ALC:SOURce:EXTernal:COUPling &lt;val&gt; dB</td>
</tr>
<tr>
<td>A3</td>
<td>External leveling mode with power meter</td>
<td>Y</td>
<td>Y</td>
<td>supported, but has no effect on PSG</td>
</tr>
<tr>
<td>AK0</td>
<td>Amplitude markers off</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:MArk:AMPlitude OFF</td>
</tr>
<tr>
<td>AK1</td>
<td>Amplitude markers on</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:MArk:AMPlitude ON</td>
</tr>
<tr>
<td>AL0</td>
<td>Alternate sweep mode off</td>
<td>Y</td>
<td>Y</td>
<td>:SYSTem:ALTernate:STATe OFF</td>
</tr>
<tr>
<td>AL1</td>
<td>Alternate sweep mode on</td>
<td>Y</td>
<td>Y</td>
<td>:SYSTem:ALTernate:STATe ON ; :SYSTem:ALTernate n</td>
</tr>
</tbody>
</table>
### SCPI Command Compatibility

8340B/41B and 8757D Compatible Commands

<table>
<thead>
<tr>
<th>Cmd</th>
<th>Description</th>
<th>8340</th>
<th>8757</th>
<th>Equivalent SCPI Command Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM0</td>
<td>Amplitude modulation off</td>
<td>Y</td>
<td>N</td>
<td>[:SOURce]:AM1:STATe OFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:AM2:STATe OFF</td>
</tr>
<tr>
<td>AM1</td>
<td>Amplitude modulation on</td>
<td>Y</td>
<td>N</td>
<td>[:SOURce]:AM1:STATe OFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:AM2:STATe ED[1]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:AM2:EXTERNAL[1]:COUpling DC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:AM2:DEPTh 100</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:AM2:EXTERNAL[1]:IMPedance 600</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:AM2:STATe ON</td>
</tr>
<tr>
<td>A80</td>
<td>Alternate state selection: select current front panel</td>
<td>Y</td>
<td>Y</td>
<td>supported, but no equivalent SCPI command sequence</td>
</tr>
<tr>
<td>A81</td>
<td>Alternate state selection: select recalled state</td>
<td>Y</td>
<td>Y</td>
<td>supported, but no equivalent SCPI command sequence</td>
</tr>
<tr>
<td>AT</td>
<td>Set attenuator</td>
<td>Y</td>
<td>N</td>
<td>[:SOURce]:POWer:ATTenuation &lt;val&gt;&lt;unit&gt;</td>
</tr>
<tr>
<td>AU</td>
<td>Auto-coupled mode to obtain shortest possible sweep time</td>
<td>Y</td>
<td>N</td>
<td>[:SOURce]:SWEep:TIME:AUTO ON</td>
</tr>
<tr>
<td>BC</td>
<td>Advance to next frequency band crossing</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>C1</td>
<td>1 MHz crystal marker frequency</td>
<td>N</td>
<td>Y</td>
<td>supported, but has no effect on PSG</td>
</tr>
<tr>
<td>C2</td>
<td>10 MHz crystal marker frequency</td>
<td>N</td>
<td>Y</td>
<td>supported, but has no effect on PSG</td>
</tr>
<tr>
<td>C3</td>
<td>50 MHz crystal marker frequency</td>
<td>N</td>
<td>Y</td>
<td>supported, but has no effect on PSG</td>
</tr>
<tr>
<td>C4</td>
<td>External crystal marker frequency</td>
<td>N</td>
<td>Y</td>
<td>supported, but has no effect on PSG</td>
</tr>
<tr>
<td>CA0</td>
<td>Amplitude crystal markers off</td>
<td>N</td>
<td>Y</td>
<td>supported, but has no effect on PSG</td>
</tr>
<tr>
<td>CA1</td>
<td>Amplitude crystal markers on</td>
<td>N</td>
<td>Y</td>
<td>supported, but has no effect on PSG</td>
</tr>
<tr>
<td>CF</td>
<td>Center frequency (step sweep)</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:SWEep:MODE AUTO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:FREQuency:MODE SWEep</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:FREQuency:CENTer &lt;val&gt;&lt;unit&gt;</td>
</tr>
<tr>
<td>CL0</td>
<td>Intensity crystal markers off</td>
<td>N</td>
<td>Y</td>
<td>supported, but has no effect on PSG</td>
</tr>
<tr>
<td>CL1</td>
<td>Intensity crystal markers on</td>
<td>N</td>
<td>Y</td>
<td>supported, but has no effect on PSG</td>
</tr>
<tr>
<td>C8</td>
<td>Clear both status bytes</td>
<td>Y</td>
<td>Y</td>
<td>*CLS</td>
</tr>
<tr>
<td>CW</td>
<td>Set CW frequency</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:SWEep:MODE AUTO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:FREQuency:MODE CW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:FREQuency:CENT&lt;val&gt;&lt;unit&gt;</td>
</tr>
<tr>
<td>DB</td>
<td>dB(m) terminator</td>
<td>Y</td>
<td>Y</td>
<td>dB</td>
</tr>
<tr>
<td>DF</td>
<td>Delta frequency (step sweep)</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:SWEep:MODE AUTO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:FREQuency:MODE SWEep</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:FREQuency:SPAN &lt;val&gt;&lt;unit&gt;</td>
</tr>
<tr>
<td>DN</td>
<td>Step down (decrements active function by step value)</td>
<td>Y</td>
<td>Y</td>
<td>supported, see Table 6.2 on page 230</td>
</tr>
</tbody>
</table>

*Table 7-1 8340B/41B Prog. Codes & Equivalent SCPI Sequences (Continued)*
### Table 7-1  8340B/41B Prog. Codes & Equivalent SCPI Sequences (Continued)

<table>
<thead>
<tr>
<th>Cmd</th>
<th>Description</th>
<th>8340</th>
<th>8757</th>
<th>Equivalent SCPI Command Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>DP0</td>
<td>Display blanking off</td>
<td>N</td>
<td>Y</td>
<td>DISPLAY[:WINDow][:STATe] OFF</td>
</tr>
<tr>
<td>DP1</td>
<td>Display blanking on</td>
<td>N</td>
<td>Y</td>
<td>DISPLAY[:WINDow][:STATe] ON</td>
</tr>
<tr>
<td>DU0</td>
<td>Display update off</td>
<td>N</td>
<td>Y</td>
<td>DISPLAY[:WINDow][:STATe] OFF</td>
</tr>
<tr>
<td>DU1</td>
<td>Display update on</td>
<td>Y</td>
<td>Y</td>
<td>DISPLAY[:WINDow][:STATe] ON</td>
</tr>
<tr>
<td>EF</td>
<td>Entry display off</td>
<td>Y</td>
<td>Y</td>
<td>DISPLAY[:WINDow][:STATe] OFF</td>
</tr>
<tr>
<td>EK</td>
<td>Enable knob</td>
<td>N</td>
<td>Y</td>
<td>not supported</td>
</tr>
<tr>
<td>EM0</td>
<td>Extended marker mode off</td>
<td>N</td>
<td>Y</td>
<td>supported, but no equivalent SCPI command sequence</td>
</tr>
<tr>
<td>EM1</td>
<td>Extended marker mode on</td>
<td>N</td>
<td>Y</td>
<td>supported, but no equivalent SCPI command sequence</td>
</tr>
<tr>
<td>F1</td>
<td>20 MHz/V PM sensitivity</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>F2</td>
<td>6 MHz/V PM sensitivity</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>FA</td>
<td>Start frequency (step sweep)</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:SMBus:MODE AUTO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:PRFerency:MODE SMBus</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:PRFerency:STAR &lt;val&gt;&lt;unit&gt;</td>
</tr>
<tr>
<td>FB</td>
<td>Stop frequency (step sweep)</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:SMBus:MODE AUTO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:PRFerency:MODE SMBus</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:PRFerency:STOP &lt;val&gt;&lt;unit&gt;</td>
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<tr>
<td>FL0</td>
<td>CW filter off</td>
<td>N</td>
<td>Y</td>
<td>supported, but has no effect on PSG</td>
</tr>
<tr>
<td>FL1</td>
<td>CW filter on</td>
<td>N</td>
<td>Y</td>
<td>supported, but has no effect on PSG</td>
</tr>
<tr>
<td>FM0</td>
<td>Frequency modulation off</td>
<td>Y</td>
<td>N</td>
<td>[:SOURce]:FM1:STATe OFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:FM2:STATe OFF</td>
</tr>
<tr>
<td>FM1</td>
<td>Frequency modulation on</td>
<td>Y</td>
<td>N</td>
<td>[:SOURce]:FM1:STATe OFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:FM2:STATe EXT2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:FM2:EXTeRnal2:COUPling DC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:FM2:EXTeRnal2:IMPedance 50</td>
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<td></td>
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<td></td>
<td>[:SOURce]:FM2:STATe ON</td>
</tr>
<tr>
<td>FM1</td>
<td>Frequency modulation sensitivity</td>
<td>Y</td>
<td>N</td>
<td>[:SOURce]:FM2[:DEVIation] &lt;val&gt;&lt;unit&gt;</td>
</tr>
<tr>
<td>FP</td>
<td>Fast phase lock</td>
<td>Y</td>
<td>N</td>
<td>supported, but has no effect on PSG</td>
</tr>
<tr>
<td>GZ</td>
<td>GHz terminator</td>
<td>Y</td>
<td>Y</td>
<td>GZ</td>
</tr>
<tr>
<td>HZ</td>
<td>Hz terminator</td>
<td>Y</td>
<td>Y</td>
<td>HZ</td>
</tr>
<tr>
<td>IF</td>
<td>Increment frequency</td>
<td>Y</td>
<td>N</td>
<td>TRIGger[:SEQUence][:IMMediate]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>or [:SOURce]:PRFerency[:OK] UP</td>
</tr>
<tr>
<td>IL</td>
<td>Input learn string</td>
<td>Y</td>
<td>Y</td>
<td>supported, but no equivalent SCPI command sequence</td>
</tr>
</tbody>
</table>
### Table 7-1 8340B/41B Prog. Codes & Equivalent SCPI Sequences (Continued)

<table>
<thead>
<tr>
<th>Cmd</th>
<th>Description</th>
<th>8340</th>
<th>8757</th>
<th>Equivalent SCPI Command Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP</td>
<td>Instrument preset</td>
<td>Y</td>
<td>N</td>
<td>SYSTem:PRESet</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[[:SOURce]:FREQuency[:CW]:STEP</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:INCHement] 1 GHZ</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[[:SOURce]:FREQuency:MULTiplier</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&lt;saved multiplier&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[[:SOURce]:SHExp:MODE AUTO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[[:SOURce]:FREQuency:MODE SHExp</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[[:SOURce]:FREQuency:START 2 GHz or MIN</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[[:SOURce]:FREQuency:STOP MAX</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[[:SOURce]:POWer[:LEVel]:I:MMediate]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:AMPLitude] 0 dB</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OUTput[[:STATe] ON</td>
</tr>
<tr>
<td>IP</td>
<td>Instrument preset</td>
<td>N</td>
<td>Y</td>
<td>SYSTem:LANGuage &quot;8757&quot;</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>[[:SOURce]:SHExp:MODE AUTO</td>
</tr>
<tr>
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<td></td>
<td>[[:SOURce]:FREQuency:MODE SHExp</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[[:SOURce]:FREQuency:START 2 GHz or MIN</td>
</tr>
<tr>
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<td></td>
<td></td>
<td>[[:SOURce]:FREQuency:STOP MAX</td>
</tr>
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<td></td>
<td></td>
<td>[[:SOURce]:POWer[:LEVel]:I:MMediate]</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td>[:AMPLitude] 0 dB</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OUTput[[:STATe] ON</td>
</tr>
<tr>
<td>IX</td>
<td>Input micro learn string</td>
<td>N</td>
<td>Y</td>
<td>supported, but has no effect on PSG</td>
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<tr>
<td>KE</td>
<td>Key release</td>
<td>Y</td>
<td>Y</td>
<td>supported, but no equivalent SCPI command sequence</td>
</tr>
<tr>
<td>KZ</td>
<td>kHz terminator</td>
<td>Y</td>
<td>Y</td>
<td>KHZ</td>
</tr>
<tr>
<td>MO</td>
<td>Frequency marker off</td>
<td>Y</td>
<td>Y</td>
<td>[[:SOURce]:MARKer[n]:[STATe] OFF</td>
</tr>
<tr>
<td>MO</td>
<td>Frequency marker off</td>
<td>Y</td>
<td>Y</td>
<td>[[:SOURce]:MARKer0:[STATe] ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[[:SOURce]:MARKer0:FREQuency &lt;val&gt;&lt;unit&gt;</td>
</tr>
<tr>
<td>M1</td>
<td>Turn on and set frequency marker 0</td>
<td>Y</td>
<td>Y</td>
<td>[[:SOURce]:MARKer1:[STATe] ON</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td>[[:SOURce]:MARKer1:FREQuency &lt;val&gt;&lt;unit&gt;</td>
</tr>
<tr>
<td>M2</td>
<td>Turn on and set frequency marker 1</td>
<td>Y</td>
<td>Y</td>
<td>[[:SOURce]:MARKer2:[STATe] ON</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td>[[:SOURce]:MARKer2:FREQuency &lt;val&gt;&lt;unit&gt;</td>
</tr>
<tr>
<td>M3</td>
<td>Turn on and set frequency marker 2</td>
<td>Y</td>
<td>Y</td>
<td>[[:SOURce]:MARKer3:[STATe] ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[[:SOURce]:MARKer3:FREQuency &lt;val&gt;&lt;unit&gt;</td>
</tr>
<tr>
<td>M4</td>
<td>Turn on and set frequency marker 3</td>
<td>Y</td>
<td>Y</td>
<td>[[:SOURce]:MARKer4:[STATe] ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[[:SOURce]:MARKer4:FREQuency &lt;val&gt;&lt;unit&gt;</td>
</tr>
<tr>
<td>M5</td>
<td>Turn on and set frequency marker 4</td>
<td>Y</td>
<td>Y</td>
<td>[[:SOURce]:MARKer5:[STATe] ON</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td>[[:SOURce]:MARKer5:FREQuency &lt;val&gt;&lt;unit&gt;</td>
</tr>
<tr>
<td>M6</td>
<td>Turn on and set frequency marker 5</td>
<td>Y</td>
<td>Y</td>
<td>[[:SOURce]:MARKer6:[STATe] ON</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>[[:SOURce]:MARKer6:FREQuency &lt;val&gt;&lt;unit&gt;</td>
</tr>
<tr>
<td>M7</td>
<td>Turn on and set frequency marker 6</td>
<td>Y</td>
<td>Y</td>
<td>[[:SOURce]:MARKer7:[STATe] ON</td>
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<tr>
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<td></td>
<td>[[:SOURce]:MARKer7:FREQuency &lt;val&gt;&lt;unit&gt;</td>
</tr>
</tbody>
</table>
### Table 7-1 8340B/41B Prog. Codes & Equivalent SCPI Sequences (Continued)

<table>
<thead>
<tr>
<th>Cmd</th>
<th>Description</th>
<th>8340</th>
<th>8757</th>
<th>Equivalent SCPI Command Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>M8</td>
<td>Turn on and set frequency marker 8</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:MARKer8[:STATe] ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:MARKer8:FREQuency &lt;val&gt;&lt;unit&gt;</td>
</tr>
<tr>
<td>M9</td>
<td>Turn on and set frequency marker 9</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:MARKer9[:STATe] ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:MARKer9:FREQuency &lt;val&gt;&lt;unit&gt;</td>
</tr>
<tr>
<td>MC</td>
<td>Active marker to center frequency</td>
<td>Y</td>
<td>Y</td>
<td>supported, but no equivalent SCPI command sequence</td>
</tr>
<tr>
<td>MD</td>
<td>Marker delta</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>MP0</td>
<td>Marker 1-2 sweep off</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>MP1</td>
<td>Marker 1-2 sweep on</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>MS</td>
<td>Milliseconds terminator</td>
<td>Y</td>
<td>Y</td>
<td>MS</td>
</tr>
<tr>
<td>MZ</td>
<td>MHz terminator</td>
<td>Y</td>
<td>Y</td>
<td>MZH</td>
</tr>
<tr>
<td>NA</td>
<td>Network analyzer mode</td>
<td>N</td>
<td>Y</td>
<td>supported, but no equivalent SCPI command sequence</td>
</tr>
<tr>
<td>NT</td>
<td>Network analyzer trigger</td>
<td>N</td>
<td>Y</td>
<td>supported, but has no effect on PSG</td>
</tr>
<tr>
<td>OA</td>
<td>Output active parameter</td>
<td>Y</td>
<td>Y</td>
<td>supported, see Table 6-2 on page 234</td>
</tr>
<tr>
<td>OB</td>
<td>Output next bandcross frequency</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>OC</td>
<td>Output coupled parameters (start frequency, center frequency, sweep time)</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:FREQuency:STARt? [:SOURce]:FREQuency:CENTer? [:SOURce]:SWEep:TIME?</td>
</tr>
<tr>
<td>OD</td>
<td>Output diagnostic values</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>OE</td>
<td>Output when executed</td>
<td>N</td>
<td>Y</td>
<td>supported, but no equivalent SCPI command sequence</td>
</tr>
<tr>
<td>OF</td>
<td>Output fault</td>
<td>Y</td>
<td>N</td>
<td>supported, but no equivalent SCPI command sequence</td>
</tr>
<tr>
<td>OI</td>
<td>Output identification</td>
<td>Y</td>
<td>Y</td>
<td>*IDN?</td>
</tr>
<tr>
<td>OK</td>
<td>Output last lock frequency</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>OL</td>
<td>Output learn string</td>
<td>Y</td>
<td>Y</td>
<td>supported, but no equivalent SCPI command sequence</td>
</tr>
<tr>
<td>OM</td>
<td>Output mode string</td>
<td>N</td>
<td>Y</td>
<td>supported, but no equivalent SCPI command sequence</td>
</tr>
<tr>
<td>OP</td>
<td>Output interrogated parameter</td>
<td>Y</td>
<td>Y</td>
<td>supported, see Table 6-2 on page 234</td>
</tr>
<tr>
<td>OPA2</td>
<td>Output external detector coupling factor</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:POWer:ALC:SOURce:EXTernal :COUPling?</td>
</tr>
<tr>
<td>OPAT</td>
<td>Output attenuator</td>
<td>Y</td>
<td>N</td>
<td>[:SOURce]:POWer:ATTenuation?</td>
</tr>
<tr>
<td>OFCF</td>
<td>Output center frequency</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:FREQuency:CENTer?</td>
</tr>
</tbody>
</table>
### Table 7-1 8340B/41B Prog. Codes & Equivalent SCPI Sequences (Continued)

<table>
<thead>
<tr>
<th>Cmd</th>
<th>Description</th>
<th>8340</th>
<th>8757</th>
<th>Equivalent SCPI Command Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPCW</td>
<td>Output CW frequency</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:FREQuency:CW?</td>
</tr>
<tr>
<td>OPDF</td>
<td>Output delta frequency</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:FREQuency:SPAN?</td>
</tr>
<tr>
<td>OPFA</td>
<td>Output start frequency</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:FREQuency:STARt?</td>
</tr>
<tr>
<td>OPFB</td>
<td>Output stop frequency</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:FREQuency:STOP?</td>
</tr>
<tr>
<td>OPFM1</td>
<td>Output FM sensitivity</td>
<td>Y</td>
<td>N</td>
<td>[:SOURce]:FM[:DEViation]?</td>
</tr>
<tr>
<td>OPMA</td>
<td>Output marker 0 frequency</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:MARKer0:FREQuency?</td>
</tr>
<tr>
<td>OPM1</td>
<td>Output marker 1 frequency</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:MARKer1:FREQuency?</td>
</tr>
<tr>
<td>OPM2</td>
<td>Output marker 2 frequency</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:MARKer2:FREQuency?</td>
</tr>
<tr>
<td>OPM3</td>
<td>Output marker 3 frequency</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:MARKer3:FREQuency?</td>
</tr>
<tr>
<td>OPM4</td>
<td>Output marker 4 frequency</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:MARKer4:FREQuency?</td>
</tr>
<tr>
<td>OPM5</td>
<td>Output marker 5 frequency</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:MARKer5:FREQuency?</td>
</tr>
<tr>
<td>OPM6</td>
<td>Output marker 6 frequency</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:MARKer6:FREQuency?</td>
</tr>
<tr>
<td>OPM7</td>
<td>Output marker 7 frequency</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:MARKer7:FREQuency?</td>
</tr>
<tr>
<td>OPM8</td>
<td>Output marker 8 frequency</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:MARKer8:FREQuency?</td>
</tr>
<tr>
<td>OPM9</td>
<td>Output marker 9 frequency</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:MARKer9:FREQuency?</td>
</tr>
</tbody>
</table>
| OPPL   | Output power level               | Y    | Y    | [:SOURce]:POWer[:LEVEL][:IMMediate][:AMPLitude]?
| OPPL   | Output power sweep span          | Y    | Y    | [:SOURce]:POWer:SPAN?           |
| OPBS   | Output # of sweep buckets        | N    | N    | supported, but no equivalent SCPI command sequence |
| OPPL   | Output power level               | Y    | Y    | [:SOURce]:POWer[:LEVEL][:IMMediate][:AMPLitude]?
| OPPL   | Output power level               | N    | N    | [:SOURce]:POWer[:LEVEL][:IMMediate][:AMPLitude]?
| OPPL   | Output ALC level                 | Y    | N    | [:SOURce]:POWer:ALC[:LEVEL]?
| OPPL   | Output ALC level                 | Y    | N    | [:SOURce]:POWer:ALC[:LEVEL]?
| OPPL   | Output ALC level                 | N    | N    | [:SOURce]:POWer:ALC[:LEVEL]?
| OPPL   | Output frequency step size       | Y    | Y    | [:SOURce]:FREQuency[:CM]:STEP [:INCriment]?
| OPPL   | Output frequency step size       | Y    | N    | [:SOURce]:FREQuency[:CM]:STEP [:INCriment]?
| OPPL   | Output frequency step size       | Y    | N    | [:SOURce]:FREQuency[:CM]:STEP [:INCriment]?
| OPPL   | Output frequency step size       | Y    | Y    | [:SOURce]:FREQuency[:CM]:STEP [:INCriment]?
| OPPL   | Output swept CW frequency        | Y    | N    | [:SOURce]:FREQuency[:CM]:STEP [:INCriment]?
| OPPL   | Output frequency multiplier      | Y    | Y    | [:SOURce]:FREQuency[MULTiplier]?
## Table 7-1  8340B/41B Prog. Codes & Equivalent SCPI Sequences (Continued)

<table>
<thead>
<tr>
<th>Cmd</th>
<th>Description</th>
<th>8340</th>
<th>8757</th>
<th>Equivalent SCPI Command Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPSF</td>
<td>Output frequency offset</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:FREQuency:OFFSet?</td>
</tr>
<tr>
<td>OPSE</td>
<td>Output power step size</td>
<td>Y</td>
<td>N</td>
<td>[:SOURce]:POWer[:LEVel][:IMMediate][:AMPLitude]:STEP[:INCRement]?</td>
</tr>
<tr>
<td>OPSP</td>
<td>Output sweep step points</td>
<td>Y</td>
<td>N</td>
<td>[:SOURce]:POWer[:LEVel][:IMMediate][:AMPLitude]?</td>
</tr>
<tr>
<td>OPSM</td>
<td>Output ALC level</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:POWer:ALC:LEVel?</td>
</tr>
<tr>
<td>OPSR</td>
<td>Output power level</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>OPSR</td>
<td>Output attenuator</td>
<td>Y</td>
<td>N</td>
<td>[:SOURce]:POWer:ATTenuation?</td>
</tr>
<tr>
<td>OPSS</td>
<td>Output sweep step points</td>
<td>N</td>
<td>Y</td>
<td>[:SOURce]:SWep:POINts?</td>
</tr>
<tr>
<td>OPSS</td>
<td>Output power slope</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:POWer:SLOpe?</td>
</tr>
<tr>
<td>OPSS</td>
<td>Output manual frequency</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:FREQuency:MANual?</td>
</tr>
<tr>
<td>OPSS</td>
<td>Output sweep step points</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:SWep:POINts?</td>
</tr>
<tr>
<td>OPSP</td>
<td>Output power step size</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:POWer[:LEVel][:IMMediate][:AMPLitude]:STEP[:INCRement]?</td>
</tr>
<tr>
<td>OPST</td>
<td>Output sweep time</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:SWep:TIME?</td>
</tr>
<tr>
<td>OPTL</td>
<td>Output sweep time limit</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:SWep:TIME:LLIMit?</td>
</tr>
<tr>
<td>OR</td>
<td>Output internally measured power level</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>OS</td>
<td>Output status bytes</td>
<td>Y</td>
<td>Y</td>
<td>supported, but no equivalent SCPI command sequence</td>
</tr>
<tr>
<td>OS</td>
<td>Output micro learn string</td>
<td>N</td>
<td>Y</td>
<td>supported, but has no effect on PSG</td>
</tr>
<tr>
<td>PL</td>
<td>Set power level</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:POWer:ATTenuation:AUTO ON</td>
</tr>
<tr>
<td>PM0</td>
<td>Pulse modulation off</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:PULM:STATe OFF</td>
</tr>
<tr>
<td>PM1</td>
<td>Pulse modulation on</td>
<td>Y</td>
<td>N</td>
<td>[:SOURce]:PULM:SOUrce EXTERNAL [:SOURce]:PULM:STATe ON</td>
</tr>
<tr>
<td>PM1</td>
<td>27.8 KHz square wave pulse modulation on</td>
<td>N</td>
<td>Y</td>
<td>[:SOURce]:PULM:SOUrce SCALar [:SOURce]:PULM:STATe GB</td>
</tr>
<tr>
<td>PM1</td>
<td>Power sweep off</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:POWer:MODE FIXed</td>
</tr>
<tr>
<td>PS0</td>
<td>Power sweep on</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:POWer:MODE SWep</td>
</tr>
<tr>
<td>PS0</td>
<td>Power sweep off</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:POWer:SPAN &lt;val&gt; dB</td>
</tr>
<tr>
<td>R2</td>
<td>Extended status byte #2 mask</td>
<td>N</td>
<td>Y</td>
<td>supported, but has no effect on PSG</td>
</tr>
<tr>
<td>R8</td>
<td>Control knob remotely</td>
<td>Y</td>
<td>Y</td>
<td>supported, but no equivalent SCPI command sequence</td>
</tr>
<tr>
<td>RC</td>
<td>Recall state</td>
<td>Y</td>
<td>Y</td>
<td>*RCL &lt;reg_num&gt;[,&lt;seq_num&gt;]</td>
</tr>
</tbody>
</table>

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SCPI Command Compatibility
8340B/41B and 8757D Compatible Commands
SCPI Command Compatibility
8340B/41B and 8757D Compatible Commands

Table 7-1  8340B/41B Prog. Codes & Equivalent SCPI Sequences (Continued)

<table>
<thead>
<tr>
<th>Cmd</th>
<th>Description</th>
<th>8340</th>
<th>8757</th>
<th>Equivalent SCPI Command Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>RE</td>
<td>Extended status byte mask</td>
<td>Y</td>
<td>Y</td>
<td>supported, but no equivalent SCPI command sequence</td>
</tr>
<tr>
<td>RF0</td>
<td>RF output off</td>
<td>Y</td>
<td>Y</td>
<td>OUTPut[:STATe] OFF</td>
</tr>
<tr>
<td>RF1</td>
<td>RF output on</td>
<td>Y</td>
<td>Y</td>
<td>OUTPut[:STATe] ON</td>
</tr>
<tr>
<td>RM</td>
<td>Status byte mask</td>
<td>Y</td>
<td>Y</td>
<td>*SRE &lt;mask&gt;</td>
</tr>
<tr>
<td>RP0</td>
<td>RF peaking off</td>
<td>Y</td>
<td>N</td>
<td>supported, but has no effect on PSG</td>
</tr>
<tr>
<td>RP1</td>
<td>RF blanking off</td>
<td>N</td>
<td>Y</td>
<td>supported, but has no effect on PSG</td>
</tr>
<tr>
<td>RS</td>
<td>Reset sweep</td>
<td>Y</td>
<td>Y</td>
<td>supported, but no equivalent SCPI command sequence</td>
</tr>
<tr>
<td>S1</td>
<td>Continuous sweep mode</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:SWEep:MODE AUTO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:SWEep:GENeration</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ANALog:TRIGger[:SEQUence]:SOURce</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IMMedi ate:INITiate:CONT inuous[:ALL] ON</td>
</tr>
<tr>
<td>S2</td>
<td>Single sweep mode</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:SWEep:MODE AUTO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:SWEep:GENeration</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ANALog:TRIGger[:SEQUence]:SOURce</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IMMedi ate:INITiate:CONT inuous[:ALL] OFF</td>
</tr>
<tr>
<td>S3</td>
<td>Manual frequency sweep mode</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:SWEep:MODE MANual</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:SWEep:GENeration</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ANALog:TRIGger[:SEQUence]:SOURce</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IMMedi ate:INITiate:CONT inuous[:ALL] OFF</td>
</tr>
<tr>
<td>SB</td>
<td>Number of sweep buckets</td>
<td>N</td>
<td>Y</td>
<td>supported, but no equivalent SCPI command sequence</td>
</tr>
<tr>
<td>SC</td>
<td>Seconds terminator</td>
<td>Y</td>
<td>Y</td>
<td>s</td>
</tr>
<tr>
<td>SF</td>
<td>Frequency step size</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:FREQuency[:CW]:STEP[:INCRement] &lt;val&gt;&lt;unit&gt;</td>
</tr>
<tr>
<td>SG</td>
<td>Single sweep mode</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:SWEep:MODE AUTO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:SWEep:GENeration ANALog</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>:TRIGger[:SEQUence]:SOURce IMMedi ate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>:INITiate:CONT inuous[:ALL] OFF</td>
</tr>
<tr>
<td>SH</td>
<td>Shift prefix</td>
<td>Y</td>
<td>Y</td>
<td>supported, but no equivalent SCPI command sequence</td>
</tr>
<tr>
<td>SH01</td>
<td>Blank display</td>
<td>N</td>
<td>Y</td>
<td>DISPLAY[:WINDOW][:STATe] OFF</td>
</tr>
<tr>
<td>SHA1</td>
<td>Disable ALC and set power level</td>
<td>Y</td>
<td>N</td>
<td>[:SOURce]:POWer:ALC[:STATe] OFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:POWer[:LEVEL][:IMMediate]</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:AMPLitude] &lt;val&gt;&lt;unit&gt;</td>
</tr>
<tr>
<td>Cmd</td>
<td>Description</td>
<td>8340</td>
<td>8757</td>
<td>Equivalent SCPI Command Sequence</td>
</tr>
<tr>
<td>-----</td>
<td>-------------</td>
<td>------</td>
<td>------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>SHA2</td>
<td>External leveling mode with millimeter head module</td>
<td>Y</td>
<td>N</td>
<td>[:SOURCE]:POWer:ALC:SOURce MMHead [:SOURCE]:POWer:ALC:LEVel &lt;val&gt;:dB</td>
</tr>
<tr>
<td>SHAK</td>
<td>Immediate YTF peak</td>
<td>Y</td>
<td>N</td>
<td>supported, but has no effect on PSG</td>
</tr>
<tr>
<td>SHAL</td>
<td>Retain multiplication factor on power on/off and preset</td>
<td>Y</td>
<td>Y</td>
<td>supported, but no equivalent SCPI command sequence</td>
</tr>
<tr>
<td>SHAM</td>
<td>Pulse modulation enhancement</td>
<td>Y</td>
<td>N</td>
<td>supported, but has no effect on PSG</td>
</tr>
<tr>
<td>SHAZ</td>
<td>External leveling mode with millimeter head module</td>
<td>Y</td>
<td>N</td>
<td>[:SOURCE]:POWer:ALC:SOURce MMHead [:SOURCE]:POWer:ALC:LEVel &lt;val&gt;:dB</td>
</tr>
<tr>
<td>SHCF</td>
<td>Frequency step size</td>
<td>Y</td>
<td>N</td>
<td>[:SOURCE]:FREQuency[:CW]:STEP[:INCRement] &lt;val&gt;&lt;unit&gt;</td>
</tr>
<tr>
<td>SHCF</td>
<td>Coarse CW resolution</td>
<td>N</td>
<td>Y</td>
<td>supported, but has no effect on PSG</td>
</tr>
<tr>
<td>SHCW</td>
<td>Swept CW</td>
<td>N</td>
<td>Y</td>
<td>[:SOURCE]:SHlep:MODE AUTO [:SOURCE]:FREQuency:MODE SHlep [:SOURCE]:FREQuency:STARt &lt;val&gt;&lt;unit&gt; [:SOURCE]:FREQuency:STOP &lt;val&gt;&lt;unit&gt;</td>
</tr>
<tr>
<td>SHDF</td>
<td>Fine CW resolution</td>
<td>N</td>
<td>Y</td>
<td>supported, but has no effect on PSG</td>
</tr>
<tr>
<td>SHEF</td>
<td>Restore cal. const. access function</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>SHFA</td>
<td>Frequency multiplier</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURCE]:FREQuency:MULTiplier &lt;val&gt;</td>
</tr>
<tr>
<td>SHFH</td>
<td>Frequency offset</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURCE]:FREQuency:OFFSet &lt;val&gt;&lt;unit&gt;</td>
</tr>
<tr>
<td>SHIP</td>
<td>Reset multiplication factor to 1 and preset instrument</td>
<td>Y</td>
<td>Y</td>
<td>supported, but no equivalent SCPI command sequence</td>
</tr>
<tr>
<td>SHMO</td>
<td>All frequency markers off</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURCE]:MARKer:AOFF</td>
</tr>
<tr>
<td>SHM1</td>
<td>Turn on and set marker delta</td>
<td>Y</td>
<td>N</td>
<td>[:SOURCE]:MARKer:MODE DELTa</td>
</tr>
<tr>
<td>SHM2</td>
<td>Enable counter interface</td>
<td>N</td>
<td>Y</td>
<td>supported, but has no effect on PSG</td>
</tr>
<tr>
<td>SHM3</td>
<td>Disable counter interface</td>
<td>N</td>
<td>Y</td>
<td>supported, but has no effect on PSG</td>
</tr>
<tr>
<td>SHM4</td>
<td>Diagnostics: test/display results</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>SHMO</td>
<td>All frequency markers off</td>
<td>N</td>
<td>Y</td>
<td>[:SOURCE]:MARKer:AOFF</td>
</tr>
<tr>
<td>SHMP</td>
<td>Set start frequency to marker 1 and set stop frequency to marker 2</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURCE]:POWer[:LEVel][:IMMediate] [:AMPLitude]:STEP[:INCRement] &lt;val&gt;</td>
</tr>
<tr>
<td>SHPL</td>
<td>Power step size</td>
<td>Y</td>
<td>N</td>
<td>[:SOURCE]:POWer[:LEVel1][:IMMediate] [:AMPLitude]:STEP[:INCRement] &lt;val&gt;</td>
</tr>
<tr>
<td>SHPM</td>
<td>27.8 KHz square wave pulse modulation on</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURCE]:PULM:SOURce SCALar [:SOURCE]:PULM:STATe ON[:Sens] :MODulation[:STATe] ON[:Sens]</td>
</tr>
</tbody>
</table>

Table 7-1 8340B/41B Prog. Codes & Equivalent SCPI Sequences (Continued)
### Table 7-1 8340B/41B Prog. Codes & Equivalent SCPI Sequences (Continued)

<table>
<thead>
<tr>
<th>Cmd</th>
<th>Description</th>
<th>8340</th>
<th>8757</th>
<th>Equivalent SCPI Command Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHPS</td>
<td>Decouple attenuator and ALC (control ALC independently)</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:POWER:ATTenuation:AUTO OFF</td>
</tr>
<tr>
<td>SHRC</td>
<td>Unlock save/recall</td>
<td>Y</td>
<td>Y</td>
<td>supported, but no equivalent SCPI command sequence</td>
</tr>
<tr>
<td>SHRF</td>
<td>Disable ALC and set power level</td>
<td>Y</td>
<td>N</td>
<td>[:SOURce]:POWER[:STATe] OFF</td>
</tr>
<tr>
<td>SHRP</td>
<td>Auto track</td>
<td>Y</td>
<td>N</td>
<td>supported, but has no effect on PSG</td>
</tr>
<tr>
<td>SHS10</td>
<td>Disable display update</td>
<td>Y</td>
<td>N</td>
<td>DISPLAY[:WINDOW][:STATe] OFF</td>
</tr>
<tr>
<td>SHS11</td>
<td>Re-enable display update</td>
<td>Y</td>
<td>N</td>
<td>DISPLAY[:WINDOW][:STATe] ON</td>
</tr>
<tr>
<td>SHS3</td>
<td>Display fault diagnostic</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>SHSL</td>
<td>Set attenuator from front panel</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:POWER:ATTenuation &lt;val&gt;&lt;unit&gt;</td>
</tr>
<tr>
<td>SHSN</td>
<td>Stepped sweep</td>
<td>N</td>
<td>Y</td>
<td>supported, but has no effect on PSG</td>
</tr>
<tr>
<td>SHSS</td>
<td>Reset step sizes to default values</td>
<td>N</td>
<td>Y</td>
<td>supported, but has no effect on PSG</td>
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<tr>
<td>SHST</td>
<td>Zoom function</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
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<tr>
<td>SHSV</td>
<td>Lock save/recall</td>
<td>Y</td>
<td>Y</td>
<td>supported, but no equivalent SCPI command sequence</td>
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<tr>
<td>SHT1</td>
<td>Test displays</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
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<tr>
<td>SHT2</td>
<td>Bandcrossing penlift</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
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<tr>
<td>SHT3</td>
<td>Display unlock indicators</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>SHGZ</td>
<td>IO Channel</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
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<td>SHMZ</td>
<td>IO Subchannel</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
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<tr>
<td>SHKZ</td>
<td>Write to IO</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
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<td>SHHZ</td>
<td>Read from IO</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
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<tr>
<td>SHVR</td>
<td>Frequency offset</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
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<td>SLO</td>
<td>Power slope off</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:POWER:SLOPe:STATe OFF</td>
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<td>SL1</td>
<td>Power slope on</td>
<td>Y</td>
<td>N</td>
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### SCPI Command Compatibility

#### 8340B/41B and 8757D Compatible Commands

<table>
<thead>
<tr>
<th>Cmd</th>
<th>Description</th>
<th>8340</th>
<th>8757</th>
<th>Equivalent SCPI Command Sequence</th>
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<tbody>
<tr>
<td>SL1</td>
<td>Power slope on</td>
<td>N</td>
<td>Y</td>
<td>[:SOURce]:POWer:SLOPe:STATe ON</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:POWer:SLOPe &lt;value&gt; [DB/Hz]</td>
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<tr>
<td>SM</td>
<td>Manual frequency sweep mode</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:SWEp:MODE MANUAL</td>
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<tr>
<td></td>
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<td>[:SOURce]:FREQuency:MANual &lt;val&gt;&lt;unit&gt;</td>
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<tr>
<td>SN</td>
<td>Number of points in a stepped sweep</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:SWEp:MODE AUTO</td>
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<td></td>
<td>[:SOURce]:SWEp:GENERation STEPped</td>
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<td></td>
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<td>[:SOURce]:LIST:TYPE STEP</td>
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<td>[:SOURce]:LIST:TRIGger:SOURCE</td>
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<td>[:SOURce]:SWEp[:SEQuence]:SOURce</td>
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<tr>
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<td></td>
<td>[:SOURce]:SWEp:GENeration STEPped</td>
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<td>[:SOURce]:SWEp:POINts &lt;val&gt;</td>
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<tr>
<td>*</td>
<td>Power step size</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:POWer[:LEVel][:IMMediate]</td>
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<td>[:AMPLitude]:STEP[:INCRement] &lt;val&gt;</td>
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<tr>
<td>ST</td>
<td>Sweep time</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:SWEp:MODE AUTO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:SWEp:TIME &lt;val&gt; &lt;unit&gt;</td>
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<tr>
<td>SV</td>
<td>Save state</td>
<td>Y</td>
<td>Y</td>
<td>*SAV &lt;reg_num&gt;[,.&lt;seq_num&gt;]</td>
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<tr>
<td>SW0</td>
<td>Swap network analyzer channels</td>
<td>Y</td>
<td>Y</td>
<td>supported, but has no equivalent SCPI command sequence</td>
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<tr>
<td>SW1</td>
<td>Swap network analyzer channels</td>
<td>Y</td>
<td>Y</td>
<td>supported, but has no equivalent SCPI command sequence</td>
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<tr>
<td>SX</td>
<td>External sweep type</td>
<td>N</td>
<td>Y</td>
<td>supported, but has no effect on PSG</td>
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<tr>
<td>T1</td>
<td>Free run sweep trigger mode</td>
<td>Y</td>
<td>Y</td>
<td>:TRIGger[:SEQuence]:SOURce IMMEDIATE</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>:INITiate:CONTinuous[:ALL] ON</td>
</tr>
<tr>
<td>T2</td>
<td>Line sweep trigger mode</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>T3</td>
<td>External sweep trigger mode</td>
<td>Y</td>
<td>Y</td>
<td>:TRIGger[:SEQuence]:SOURce EXTERNAL</td>
</tr>
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<td></td>
<td></td>
<td>:INITiate:CONTinuous[:ALL] ON</td>
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<tr>
<td>T4</td>
<td>Single sweep trigger mode</td>
<td>N</td>
<td>Y</td>
<td>:INITiate[:IMMediate][:ALL]</td>
</tr>
<tr>
<td>TL</td>
<td>Sweep time limit</td>
<td>Y</td>
<td>Y</td>
<td>[:SOURce]:SWEp:TIME:LLIMIT &lt;val&gt; &lt;unit&gt;</td>
</tr>
<tr>
<td>TS</td>
<td>Take sweep</td>
<td>Y</td>
<td>Y</td>
<td>:TSWeep</td>
</tr>
<tr>
<td>UP</td>
<td>Step up (increments active function by step value)</td>
<td>Y</td>
<td>Y</td>
<td>supported, see Table 6-2 on page 224</td>
</tr>
<tr>
<td>VR</td>
<td>CW vernier</td>
<td>N</td>
<td>Y</td>
<td>supported, but has no effect on PSG</td>
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</table>
## Table 7-2 8340 and 8757 Code Compatibility

<table>
<thead>
<tr>
<th>Code</th>
<th>Sets Active Function</th>
<th>Comp. with OA/OP</th>
<th>Comp. with UP/DN</th>
<th>Comp. with RB (Knob)</th>
<th>Equivalent SCPI Commands for OA/OP query and UP/DN command</th>
</tr>
</thead>
<tbody>
<tr>
<td>A2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>[:SOURce]:POWer:ALC:SOURce::EXTernal:COUPling?</td>
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<tr>
<td></td>
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<td></td>
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<td>[:SOURce]:POWer:ATTenuation UP</td>
</tr>
<tr>
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<td></td>
<td></td>
<td>[:SOURce]:POWer:ATTenuation DOWN</td>
</tr>
<tr>
<td>AT</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>[:SOURce]:POWer:ATTenuation?</td>
</tr>
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<td>[:SOURce]:POWer:ATTenuation UP</td>
</tr>
<tr>
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<td></td>
<td>[:SOURce]:POWer:ATTenuation DOWN</td>
</tr>
<tr>
<td>CF</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>[:SOURce]:POWer:ATTenuation?</td>
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</tr>
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<td>[:SOURce]:POWer:ATTenuation DOWN</td>
</tr>
<tr>
<td>CW</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>[:SOURce]:FREQuency:[CW]?</td>
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<td>[:SOURce]:FREQuency:[CW] UP</td>
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<td>[:SOURce]:FREQuency:[CW] DOWN</td>
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<td>DF</td>
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<td>✓</td>
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<td>[:SOURce]:FREQuency:SPAN?</td>
</tr>
<tr>
<td>PA</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>[:SOURce]:FREQuency:STARt?</td>
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<td>FH</td>
<td>✓</td>
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<td>✓</td>
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<td>[:SOURce]:FREQuency:STOP?</td>
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<td>FM1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>[:SOURce]:PM2[:DEViation]?</td>
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<tr>
<td>MA</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>[:SOURce]:MARKer0:FREQuency?</td>
</tr>
<tr>
<td>M1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>[:SOURce]:MARKer1:FREQuency?</td>
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<tr>
<td>M2</td>
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<td>M4</td>
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<td>✓</td>
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<td>[:SOURce]:MARKer4:FREQuency?</td>
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<td>✓</td>
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<td>[:SOURce]:MARKer5:FREQuency?</td>
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<tr>
<td>M6</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>[:SOURce]:MARKer6:FREQuency?</td>
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<tr>
<td>M7</td>
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<td>✓</td>
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<td>[:SOURce]:MARKer7:FREQuency?</td>
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<td>M8</td>
<td>✓</td>
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<td>✓</td>
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<td>[:SOURce]:MARKer8:FREQuency?</td>
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<tr>
<td>M9</td>
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<td>✓</td>
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<td>[:SOURce]:POWer[:LEVEL][:IMMediate][:AMPLitude]?</td>
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### Table 7-2 8340 and 8757 Code Compatibility (Continued)

<table>
<thead>
<tr>
<th>Code</th>
<th>Sets Active Function</th>
<th>Comp. with OA/OI</th>
<th>Comp. with UP/DN</th>
<th>Comp. with RB (Knob)</th>
<th>Equivalent SCPI Commands for OA/OI query and UP/DN command</th>
</tr>
</thead>
<tbody>
<tr>
<td>SB</td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td></td>
<td>supported, but no equivalent SCPI command sequence</td>
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<tr>
<td>SF</td>
<td>✓ ✓ ✓</td>
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<td></td>
<td>[:SOURce]:FREQuency[:CW]:STEP[:INCRement]?</td>
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<td>SHA1</td>
<td>✓ ✓ ✓ ✓</td>
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<td>[:SOURce]:POWer[:LEVel]:[IMMediate]:[AMPLitude]?</td>
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<td>[:SOURce]:POWer[:LEVel]:[IMMediate]:[AMPLitude] DOWN</td>
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<td>[:SOURce]:FREQuency:STOP?</td>
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<td>[:SOURce]:POWer[:LEVel]:[IMMediate]:[AMPLitude]:STEP[:INCRement]?</td>
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<tr>
<td>SHRF</td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:POWer[:LEVel]:[IMMediate]:[AMPLitude]?</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:POWer[:LEVel]:[IMMediate]:[AMPLitude] UP</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:POWer[:LEVel]:[IMMediate]:[AMPLitude] DOWN</td>
</tr>
<tr>
<td>SHSL</td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:POWer:ATTenuation?</td>
</tr>
<tr>
<td>SHSN</td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:SWEep:POINts?</td>
</tr>
<tr>
<td>SL</td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:POWer:SLOPe?</td>
</tr>
<tr>
<td>EM</td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:FREQuency:MANual?</td>
</tr>
<tr>
<td>SN</td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:SWEep:POINts?</td>
</tr>
<tr>
<td>SP</td>
<td>✓ ✓</td>
<td></td>
<td></td>
<td></td>
<td>[:SOURce]:POWer[:LEVel]:[IMMediate]:[AMPLitude]:STEP[:INCRement]?</td>
</tr>
</tbody>
</table>
SCPI Command Compatibility
836xxB/L Compatible SCPI Commands

Table 7-2  8340 and 8757 Code Compatibility (Continued)

<table>
<thead>
<tr>
<th>Code</th>
<th>Sets Active Function</th>
<th>Comp. with OA/OP</th>
<th>Comp. with UP/DN</th>
<th>Comp. with RB (Knob)</th>
<th>Equivalent SCPI Commands for OA/OP query and UP/DN command</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>[:SOURce]:SWEep:TIME?</td>
</tr>
<tr>
<td>SV</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td>none</td>
</tr>
<tr>
<td>TL</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>[:SOURce]:SWEep:TIME:LLIMit?</td>
</tr>
</tbody>
</table>

836xxB/L Compatible SCPI Commands

Table 7-3 is a comprehensive list of 836xxB/L SCPI commands arranged by subsystem. Commands that are supported by the PSG are identified, in addition to commands that are unsupported. Use the legend within the table to determine command compatibility.

The preset state of the PSG differs from that of the 836xxB/L. The RF output and sweep are turned off in the PSG, while in the 836xxB/L, these parameters are turned on. To optimize the benefit of using 836xxB/L compatible commands with a PSG, set up a user-defined preset state, emulating the preset state of the 836xxB/L.

To use the commands, select 8360 as the remote language. See ":LANGUAGE" on page 87 for selecting the language type.

When using the programming codes in this section, you can:

- set the PSG system language to 8360 Series for the current session:
  
  Utility > GPIB/RS-232 LAN > Remote Language > 8360 Series
  
  or send the command:
  
  :SYST:LANG "8360"

- set the PSG system language to 8360 so that it does not reset with either preset, instrument power cycle or *RST command:
  
  Utility > Power On/Preset > Preset Language > 8360 Series
  
  or send the command:
  
  :SYST:PRESET:LANG "8360"


**NOTE** Some of the PSG supported commands are a subset of the 836xxB/L commands. When this occurs, the syntax supported by the PSG is shown in addition to the syntax that is not supported.
### Table 7-3  836xxB/L SCPI Commands

<table>
<thead>
<tr>
<th></th>
<th>83620B &amp; 83640B</th>
<th>83620L &amp; 83640L</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IEEE Common Commands</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*CLS</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*ESE &lt;data&gt;</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*ESE?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*ESR?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*IDN?a</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*LRN?</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>*OPC</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*OPC?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*OPT?</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>*RCL &lt;reg_num&gt;</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*RST</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*SAV &lt;reg_num&gt;</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*SRE &lt;data&gt;</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*SRE?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*STB?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*TRG</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*TST?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*WAI</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td><strong>Abort Subsystem</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>:ABORT</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td><strong>Amplitude Modulation Subsystem</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>:AM[:DEPTH] &lt;num&gt; [PCT]</td>
<td>MAXimum</td>
<td>MINimum</td>
</tr>
<tr>
<td>:AM[:DEPTH]? [MAXimum</td>
<td>MINimum]</td>
<td>Y</td>
</tr>
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</table>
### SCPI Command Compatibility

#### 836xxB/L Compatible SCPI Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Supported by PSG</th>
<th>83620B &amp; 83640B</th>
<th>83620L &amp; 83640L</th>
</tr>
</thead>
<tbody>
<tr>
<td>:AM:INTernal:FREQuency <code>&lt;num&gt;</code></td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:AM:INTernal:FREQuency?</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:AM:INTernal:FUNCtion</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:AM:SOURce</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:AM:MODE</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:AM:STATe</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:AM:TYPE</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:CALibration:AM:AUTO</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:CALibration:AM:AUTO?</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:CALibration:AM[:EXECute]</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:CALibration:PEAKing:AUTO</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:CALibration:PEAKing:AUTO?</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:CALibration:PEAKing[:EXECute]</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:CALibration:PMETer:DETector:INITiate?</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:CALibration:PMETer:DETector:NEXT? <code>&lt;num&gt;</code></td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:CALibration:PMETer:FLATness:INITiate?</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:CALibration:PMETer:FLATness:NEXT? <code>&lt;value&gt;</code></td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:CALibration:SPAN:AUTO</td>
<td>N</td>
<td>N</td>
<td>N</td>
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</tbody>
</table>

#### Calibration Subsystem

Table 7-3 836xxB/L SCPI Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Supported by PSG</th>
<th>83620B &amp; 83640B</th>
<th>83620L &amp; 83640L</th>
</tr>
</thead>
<tbody>
<tr>
<td>:CALibration:AM:AUTO</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:CALibration:AM:AUTO?</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:CALibration:AM[:EXECute]</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:CALibration:PEAKing:AUTO</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:CALibration:PEAKing:AUTO?</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:CALibration:PEAKing[:EXECute]</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:CALibration:PMETer:DETector:INITiate?</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:CALibration:PMETer:DETector:NEXT? <code>&lt;num&gt;</code></td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:CALibration:PMETer:FLATness:INITiate?</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:CALibration:PMETer:FLATness:NEXT? <code>&lt;value&gt;</code></td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:CALibration:SPAN:AUTO</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 7-3  836xxB/L SCPI Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Y= Supported by PSG</th>
<th>N= Not supported by PSG</th>
<th>83620B &amp; 83640B</th>
<th>83620L &amp; 83640L</th>
</tr>
</thead>
<tbody>
<tr>
<td>:CALibration:SPAN:AUTO?</td>
<td>N</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:CALibration:SPAN[:EXECute]</td>
<td>N</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:CALibration:TRACk</td>
<td>N</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Correction Subsystem</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>:CORRection:ARRay[i]{&lt;value&gt;[DB]}</td>
<td></td>
<td></td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:CORRection:ARRay[i]?</td>
<td></td>
<td></td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:CORRection:FLATness {&lt;num&gt;[freq suffix],[&lt;num&gt;[DB]]}</td>
<td>N</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:CORRection:FLATness?</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:CORRection:SOURce[i] ARRay</td>
<td>FLATness</td>
<td>N</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>:CORRection:SOURce[i]?</td>
<td></td>
<td></td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:CORRection[:STATE] ON</td>
<td>OFF</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>:CORRection[:STATE]?</td>
<td></td>
<td></td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td><strong>Diagnostics Subsystem</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>:DIAGnostics:ABUS? &lt;value&gt;</td>
<td>N</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:DIAGnostics:ABUS:AVERage &lt;value&gt;</td>
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<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:DIAGnostics:ABUS:AVERage?</td>
<td></td>
<td></td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:DIAGnostics:ABUS:STATus?</td>
<td>N</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:DIAGnostics:INSTrument:PMETer:ADDRess &lt;value&gt;</td>
<td></td>
<td></td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:DIAGnostics:INSTrument:PMETer:ADDRess?</td>
<td></td>
<td></td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:DIAGnostics:INSTrument:PRINter:ADDRess &lt;value&gt;</td>
<td></td>
<td></td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:DIAGnostics:INSTrument:PRINter:ADDRess?</td>
<td></td>
<td></td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:DIAGnostics:IORW &lt;value&gt;,&lt;value&gt;</td>
<td>N</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:DIAGnostics:IORW? &lt;value&gt;</td>
<td>N</td>
<td>N</td>
<td></td>
<td></td>
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<tr>
<td>:DIAGnostics:OUTPut:FAULT?</td>
<td>N</td>
<td>N</td>
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<td></td>
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### 836xxB/L SCPI Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>83620B &amp; 83640B</th>
<th>83620L &amp; 83640L</th>
</tr>
</thead>
<tbody>
<tr>
<td>:DIAGnostic:RESult?</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:DIAGnostic:TEST:CONTinue</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:DIAGnostic:TEST:DATA:DESC?</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:DIAGnostic:TEST:DATA:MAXimum?</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:DIAGnostic:TEST:DATA:MINimum?</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:DIAGnostic:TEST:DATA:VALUE?</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:DIAGnostic:TEST:DISable {&lt;num&gt;}</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:DIAGnostic:TEST:ENABLE {&lt;num&gt;}</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:DIAGnostic:TEST[:EXECute] &lt;value&gt;</td>
<td>N</td>
<td>N</td>
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<tr>
<td>:DIAGnostic:TEST:LOG:SOURce ALL</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:DIAGnostic:TEST:LOG:SOURce?</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:DIAGnostic:TEST:LOG[:STATE]?</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:DIAGnostic:TEST:LOG[:STATE] ON</td>
<td>OFF</td>
<td>1</td>
</tr>
<tr>
<td>:DIAGnostic:TEST:LOOP ON</td>
<td>OFF</td>
<td>1</td>
</tr>
<tr>
<td>:DIAGnostic:TEST:LOOP?</td>
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<td>N</td>
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<td>:DIAGnostic:TEST:NAME? [&lt;value&gt;]</td>
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<td>N</td>
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<tr>
<td>:DIAGnostic:TEST:POINTS?</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:DIAGnostic:TEST:RESULT? [&lt;value&gt;]</td>
<td>N</td>
<td>N</td>
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<tr>
<td>:DIAGnostic:TEST:TINT? &lt;value&gt;</td>
<td>N</td>
<td>N</td>
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</table>

### Display Subsystem

<table>
<thead>
<tr>
<th>Command</th>
<th>83620B &amp; 83640B</th>
<th>83620L &amp; 83640L</th>
</tr>
</thead>
<tbody>
<tr>
<td>:DISPLAY[:STATE] ON</td>
<td>OFF</td>
<td>1</td>
</tr>
<tr>
<td>:DISPLAY[:STATE]?</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

### Frequency Modulation Subsystem

<table>
<thead>
<tr>
<th>Command</th>
<th>83620B &amp; 83640B</th>
<th>83620L &amp; 83640L</th>
</tr>
</thead>
<tbody>
<tr>
<td>:FM:COUpling AC</td>
<td>DC</td>
<td>Y</td>
</tr>
<tr>
<td>:FM:COUpling?</td>
<td>Y</td>
<td></td>
</tr>
</tbody>
</table>
### Table 7-3 836xxB/L SCPI Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>83620B &amp; 83640B</th>
<th>83620L &amp; 83640L</th>
</tr>
</thead>
<tbody>
<tr>
<td>:FM[:DEViation] &lt;val&gt;&lt;unit&gt;</td>
<td>MAXimum</td>
<td>MINimum</td>
</tr>
<tr>
<td>:FM[:DEViation]? [MAXimum</td>
<td>MINimum]</td>
<td>Y</td>
</tr>
<tr>
<td>:FM:FILTer:HPAsS &lt;num&gt;[&lt;freq suffix&gt;]</td>
<td>MAXimum</td>
<td>MINimum</td>
</tr>
<tr>
<td>:FM:FILTer:HPAsS? [MAXimum</td>
<td>MINimum]</td>
<td>N</td>
</tr>
<tr>
<td>:FM:INTernal:FREQuency &lt;num&gt;[&lt;freq suffix&gt;]</td>
<td>MAXimum</td>
<td>MINimum</td>
</tr>
<tr>
<td>:FM:INTernal:FUnCTion SINusoid</td>
<td>SQUare</td>
<td>TRIangle</td>
</tr>
<tr>
<td>:FM:INTernal:FUnCTion?</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:FM:SOURce INTERNAL</td>
<td>EXTernal</td>
<td>Y</td>
</tr>
<tr>
<td>:FM:SOURce?</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:FM:SENSitivity &lt;val&gt;&lt;freq suffix/V&gt;</td>
<td>MAXimum</td>
<td>MINimum</td>
</tr>
<tr>
<td>:FM:STATE ON</td>
<td>OFF</td>
<td>1</td>
</tr>
<tr>
<td>:FM:STATE?</td>
<td>Y</td>
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</table>

**Frequency Subsystem**

<table>
<thead>
<tr>
<th>Command</th>
<th>83620B &amp; 83640B</th>
<th>83620L &amp; 83640L</th>
</tr>
</thead>
<tbody>
<tr>
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<td>MAXimum</td>
<td>MINimum</td>
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<td>MINimum</td>
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<td>N</td>
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<tr>
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<td>1</td>
</tr>
<tr>
<td>:FREQuency[:FIXed]:AUTO?</td>
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<td>N</td>
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### Table 7-3 836xxB/L SCPI Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>83620B &amp; 83640B</th>
<th>83620L &amp; 83640L</th>
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<td>MINimum]</td>
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<td>SWEep</td>
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<td>YY</td>
<td></td>
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<td>:FREQuency:MULTiplier &lt;num&gt;</td>
<td>MAXimum</td>
<td>MINimumb</td>
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<td>MINimum]</td>
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<tr>
<td>:FREQuency:MULTiplier:STATE ON</td>
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<td>N</td>
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<td>:FREQuency:OFFSet &lt;num&gt;</td>
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<td>MINimum</td>
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<td>[MAXimum</td>
<td>MINimum]</td>
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<td>1</td>
</tr>
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<td>:FREQuency:OFFSet:STATE?</td>
<td>Y</td>
<td>Y</td>
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<td>:FREQuency:SPAN &lt;num&gt;[freq suffix]</td>
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<td>MINimum</td>
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<td>MINimum]</td>
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<td>:FREQuency:START &lt;num&gt;[freq suffix]</td>
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<td>MINimum</td>
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<td>[MAXimum</td>
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<td>:FREQuency:STEP:AUTO?</td>
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<td>Y</td>
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<tr>
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<td>MAXimum</td>
<td>MINimum</td>
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<tr>
<td>:FREQuency:STEP[:INCReement]?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:FREQuency:STOP &lt;num&gt;[freq suffix]</td>
<td>MAXimum</td>
<td>MINimum</td>
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<tr>
<td>:FREQuency:STOP?</td>
<td>[MAXimum</td>
<td>MINimum]</td>
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### SCPI Command Compatibility

**836xxB/L Compatible SCPI Commands**

#### Initiate Subsystem

<table>
<thead>
<tr>
<th>Command</th>
<th>83620B &amp; 83640B</th>
<th>83620L &amp; 83640L</th>
</tr>
</thead>
<tbody>
<tr>
<td>:INITiate:CONTinuous ON</td>
<td>OFF</td>
<td>1</td>
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<tr>
<td>:INITiate:CONTinuous?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:INITiate[:IMMediate]</td>
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#### List Subsystem

<table>
<thead>
<tr>
<th>Command</th>
<th>83620B &amp; 83640B</th>
<th>83620L &amp; 83640L</th>
</tr>
</thead>
<tbody>
<tr>
<td>:LIST:DWELL {&lt;num&gt;[&lt;time suffix&gt;]</td>
<td>MAXimum</td>
<td>MINimum}</td>
</tr>
<tr>
<td>:LIST:DWELL? [MAXimum</td>
<td>MINimum]</td>
<td></td>
</tr>
<tr>
<td>:LIST:FREQuency {&lt;value&gt;[&lt;freq suffix&gt;]</td>
<td>MAXimum</td>
<td>MINimum}</td>
</tr>
<tr>
<td>:LIST:FREQuency?</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>:LIST:MANual &lt;num&gt;</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:LIST:MANual?</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>:LIST:MANual</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:LIST:MANual?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:LIST:MODE AUTO</td>
<td>MANual</td>
<td>Y</td>
</tr>
<tr>
<td>:LIST:MODE?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:LIST[:POWer]:CORRection {&lt;value&gt;[DB]</td>
<td>MAXimum</td>
<td>MINimum}</td>
</tr>
<tr>
<td>:LIST[:POWer]:CORRection?</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:LIST[:POWer]:CORRection:POINTS? [MAXimum</td>
<td>MINimum]</td>
<td>N</td>
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<tr>
<td>:LIST:TRIGger:SOURce IMMEDIATE</td>
<td>BUS</td>
<td>EXTERNAL</td>
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<tr>
<td>:LIST:TRIGger:SOURce?</td>
<td>Y</td>
<td>Y</td>
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#### Marker Subsystem

<table>
<thead>
<tr>
<th>Command</th>
<th>83620B &amp; 83640B</th>
<th>83620L &amp; 83640L</th>
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</thead>
<tbody>
<tr>
<td>:MARKer[n]:AMPLitude[:STATe] ON</td>
<td>OFF</td>
<td>1</td>
</tr>
<tr>
<td>:MARKer[n]:AMPLitude[:STATe]?</td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>:MARKer[n]:AMPLitude:VALUE &lt;value&gt;[DB]</td>
<td>MAXimum</td>
<td>MINimum</td>
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<tr>
<td>:MARKer[n]:AMPLitude:VALUE? [MAXimum</td>
<td>MINimum]</td>
<td>N</td>
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</table>

**Table 7-3 836xxB/L SCPI Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Supported by PSG</th>
<th>Not supported by PSG</th>
</tr>
</thead>
<tbody>
<tr>
<td>:INITiate:CONTinuous ON</td>
<td>OFF</td>
<td>1</td>
</tr>
<tr>
<td>:INITiate:CONTinuous?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:INITiate[:IMMediate]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Y= Supported by PSG
N= Not supported by PSG

83620B & 83640B
83620L & 83640L
### SCPI Command Compatibility

**836xxB/L Compatible SCPI Commands**

#### Table 7-3  836xxB/L SCPI Commands

<table>
<thead>
<tr>
<th>Y= Supported by PSG</th>
<th>N= Not supported by PSG</th>
<th>83620B &amp; 83640B</th>
<th>83620L &amp; 83640L</th>
</tr>
</thead>
<tbody>
<tr>
<td>:MARKer[n]:AOFF</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:MARKer[n]:DELTa?</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:MARKer[n]:FREQuency [value][&lt;freq suffix&gt;]</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:MARKer[n]:FREQuency? [MAXimum</td>
<td>MINimum]</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:MARKer[n]:MODE FREQuency</td>
<td>DELTa</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:MARKer[n]:MODE?</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:MARKer[n]:REFerence &lt;n&gt;</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:MARKer[n]:REFerence?</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:MARKer[n][:STATe] ON</td>
<td>OFF</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>:MARKer[n][:STATe]?</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

**Measure Subsystem**

| :MEASure:AM? | N |
| :MEASure:FM? | N |

**Modulation Subsystem**

| :MODulation:OUTPut:SOURce AM|FM | N |
| :MODulation:OUTPut:SOURce? | N |
| :MODulation:OUTPut:STATe ON|OFF|1|0 | Y |
| :MODulation:OUTPut:STATe? | Y |
| :MODulation:STATe? | Y |

**Power Subsystem**

| :POWer:ALC:BANDwidth|:BWIDth [value][<freq suffix>] | Y | Y |
| :POWer:ALC:BANDwidth|:BWIDth:AUTO ON|OFF|1|0 | Y | Y |
| :POWer:ALC:BANDwidth|:BWIDth:AUTO? | Y | Y |
### SCPI Command Compatibility

#### 836xxB/L Compatible SCPI Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>83620B &amp; 83640B</th>
<th>83620L &amp; 83640L</th>
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</thead>
<tbody>
<tr>
<td>:POWer:ALC:CFACtor &lt;value&gt;[DB]</td>
<td>MAXimum</td>
<td>MINimum</td>
</tr>
<tr>
<td>:POWer:ALC:CFACtor? [MINimum</td>
<td>MAXimum]</td>
<td>Y</td>
</tr>
<tr>
<td>:POWer:ALC:SOURce PMETer</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:POWer:ALC:SOURce INTernal</td>
<td>DIODE</td>
<td>MMHead</td>
</tr>
<tr>
<td>:POWer:ALC:SOURce?</td>
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<td>Y</td>
</tr>
<tr>
<td>:POWer:ALC[:STATe] ON</td>
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<tr>
<td>:POWer:ALC[:STATe]?</td>
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<td>Y</td>
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<tr>
<td>:POWer:AMPLifier:STATE ON</td>
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<td>1</td>
</tr>
<tr>
<td>:POWer:AMPLifier:STATE?</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:POWer:AMPLifier:STATE:AUTO ON</td>
<td>OFF</td>
<td>1</td>
</tr>
<tr>
<td>:POWer:AMPLifier:STATE:AUTO?</td>
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<td>N</td>
</tr>
<tr>
<td>:POWer:ATTenuation &lt;num&gt;[DB]</td>
<td>MAXimum</td>
<td>MINimum</td>
</tr>
<tr>
<td>:POWer:ATTenuation? [MAXimum</td>
<td>MINimum]</td>
<td>Y</td>
</tr>
<tr>
<td>:POWer:ATTenuation:AUTO ON</td>
<td>OFF</td>
<td>1</td>
</tr>
<tr>
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<td>Y</td>
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<td>MINimum</td>
</tr>
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<td>MINimum]</td>
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<td>MINimum</td>
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<tr>
<td>:POWer[:LEVel]? [MAXimum</td>
<td>MINimum]</td>
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<tr>
<td>:POWer:MDE</td>
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<td>SWRep</td>
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<td>MINimum</td>
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</tr>
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<tr>
<td>:POWer:OFFSet:STATe OFF</td>
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<table>
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<tr>
<th>Y= Supported by PSG</th>
<th>N= Not supported by PSG</th>
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<td>:POWer:ALC:CFACtor &lt;value&gt;[DB]</td>
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<tr>
<td>:POWer:ALC:CFACtor? [MINimum</td>
<td>MAXimum]</td>
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<td>:POWer:ALC:SOURce PMETer</td>
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<tr>
<td>:POWer:AMPLifier:STATE?</td>
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<td>OFF</td>
</tr>
<tr>
<td>:POWer:AMPLifier:STATE:AUTO?</td>
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</tr>
<tr>
<td>:POWer:ATTenuation &lt;num&gt;[DB]</td>
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<tr>
<td>:POWer:ATTenuation? [MAXimum</td>
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<td>OFF</td>
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<tr>
<td>:POWer:ATTenuation:AUTO?</td>
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</tr>
<tr>
<td>:POWer:CENTer &lt;num&gt;[&lt;lvl suffix&gt;]</td>
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<tr>
<td>:POWer:CENTer? [MAXimum</td>
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<td>:POWer[:LEVel] &lt;num&gt;[&lt;lvl suffix&gt;]</td>
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<tr>
<td>:POWer[:LEVel]? [MAXimum</td>
<td>MINimum]</td>
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<tr>
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<td>MINimum]</td>
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<tr>
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### SCPI Command Compatibility

#### 836xxB/L Compatible SCPI Commands

<table>
<thead>
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<th>83620L &amp; 83640L</th>
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<td>Y</td>
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<td>MINimum</td>
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<td>:POWer:RANGE?</td>
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<tr>
<td>:POWer:SEARch ON</td>
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<td>1</td>
</tr>
<tr>
<td>:POWer:SEARch?</td>
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<td>Y</td>
</tr>
<tr>
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<td>MIN</td>
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<td>Y</td>
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<td>:POWer:SPAN &lt;value&gt;[DB]</td>
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<td>MINimum</td>
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<td>:POWer:STARt &lt;val&gt;&lt;unit&gt;</td>
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<td>MINimum</td>
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</tr>
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<td>:POWer:STATe?</td>
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<td>Y</td>
</tr>
<tr>
<td>:POWer:STEP:AUTO ON</td>
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</tr>
<tr>
<td>:POWer:STEP:AUTO?</td>
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<td>Y</td>
</tr>
<tr>
<td>:POWer:STEP[:INCRement] &lt;num&gt;[DB]</td>
<td>MAXimum</td>
<td>MINimum</td>
</tr>
<tr>
<td>:POWer:STEP[:INCRement]? [MAXimum</td>
<td>MINimum]</td>
<td>Y</td>
</tr>
<tr>
<td>:POWer:STOP &lt;val&gt;&lt;unit&gt;</td>
<td>MAXimum</td>
<td>MINimum</td>
</tr>
<tr>
<td>:POWer:STOP? [MAXimum</td>
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#### Pulse Modulation Subsystem

<table>
<thead>
<tr>
<th>Command</th>
<th>83620B &amp; 83640B</th>
<th>83620L &amp; 83640L</th>
</tr>
</thead>
<tbody>
<tr>
<td>:FULM:EXTernal:DELay &lt;value&gt;[&lt;time suffix&gt;]</td>
<td>MAXimum</td>
<td>MINimum</td>
</tr>
</tbody>
</table>
### SCPI Command Compatibility

**836xxB/L Compatible SCPI Commands**

Table 7-3 836xxB/L SCPI Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Supported by PSG</th>
<th>83620B &amp; 83640B</th>
<th>83620L &amp; 83640B</th>
</tr>
</thead>
<tbody>
<tr>
<td>:PULM:EXTERNAL:POLarity NORMal</td>
<td>INVerted</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:PULM:EXTERNAL:POLarity?</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:PULM:INTERNAL:FREQuency &lt;num&gt;[&lt;freq suffix&gt;]</td>
<td>MAXimum</td>
<td>MINimum</td>
<td>Y</td>
</tr>
<tr>
<td>:PULM:INTERNAL:GATE ON</td>
<td>OFF</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>:PULM:INTERNAL:GATE?</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:PULM:INTERNAL:PERiod &lt;num&gt;[&lt;time suffix&gt;]</td>
<td>MAXimum</td>
<td>MINimum</td>
<td>Y</td>
</tr>
<tr>
<td>:PULM:INTERNAL:TRIGger:SOURce INTernal</td>
<td>EXTERNal</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:PULM:INTERNAL:WIDTH &lt;num&gt;[&lt;time suffix&gt;]</td>
<td>MAXimum</td>
<td>MINimum</td>
<td>Y</td>
</tr>
<tr>
<td>:PULM:SLEW &lt;value&gt;[&lt;time suffix&gt;]</td>
<td>MAXimum</td>
<td>MINimum</td>
<td>N</td>
</tr>
<tr>
<td>:PULM:SLEW?</td>
<td>[MAXimum</td>
<td>MINimum]</td>
<td>N</td>
</tr>
<tr>
<td>:PULM:SLEW:AUTO ON</td>
<td>OFF</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>:PULM:SLEW:AUTO?</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:PULM:SOURce SCALar</td>
<td>N</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:PULM:SOURce INTernal</td>
<td>EXTERNal</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:PULM:SOURce?</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:PULM:STATe ON</td>
<td>OFF</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>:PULM:STATe?</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Pulse Subsystem**

<table>
<thead>
<tr>
<th>Command</th>
<th>Supported by PSG</th>
<th>83620B &amp; 83640B</th>
<th>83620L &amp; 83640B</th>
</tr>
</thead>
<tbody>
<tr>
<td>:PULSe:FREQuency &lt;num&gt;[&lt;freq suffix&gt;]</td>
<td>MAXimum</td>
<td>MINimum</td>
<td>Y</td>
</tr>
<tr>
<td>:PULSe:FREQuency?</td>
<td>[MAXimum</td>
<td>MINimum]</td>
<td>Y</td>
</tr>
<tr>
<td>:PULSe:PERiod &lt;num&gt;[&lt;time suffix&gt;]</td>
<td>MAXimum</td>
<td>MINimum</td>
<td>Y</td>
</tr>
</tbody>
</table>
### SCPI Command Compatibility

#### 836xxB/L Compatible SCPI Commands

| Command | Y | N
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>:PULSe:PERiod? [MAXimum</td>
<td>MINimum]</td>
</tr>
<tr>
<td>:PULSe:WIDTh &lt;num&gt; [&lt;time suffix&gt;]</td>
<td>Y</td>
</tr>
<tr>
<td>:PULSe:WIDTh? [MAXimum</td>
<td>MINimum]</td>
</tr>
</tbody>
</table>

#### Reference Oscillator Subsystem

| Command | Y | N
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>:ROSCillator:SOURce?</td>
<td>Y</td>
</tr>
<tr>
<td>:ROSCillator:SOURce:AUTO ON</td>
<td>OFF</td>
</tr>
<tr>
<td>:ROSCillator:SOURce:AUTO?</td>
<td>Y</td>
</tr>
<tr>
<td>:ROSCillator:SOURce INTernal</td>
<td>EXTernal</td>
</tr>
</tbody>
</table>

#### Status Subsystem

| Command | Y | N
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>:STATus:OPERation:CONDition?</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:OPERation:ENABLE &lt;value&gt;</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:OPERation:ENABLE?</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:OPERation[:EVENT]?</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:OPERation:NTRansition &lt;value&gt;</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:OPERation:NTRansition?</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:OPERation:PTRansition &lt;value&gt;</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:OPERation:PTRansition?</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:PRESet</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:QUEStionable:CONDition?</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:QUEStionable:ENABLE &lt;value&gt;</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:QUEStionable:ENABLE?</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:QUEStionable[:EVENT]?</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:QUEStionable:NTRansition &lt;value&gt;</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:QUEStionable:NTRansition?</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:QUEStionable:PTRansition &lt;value&gt;</td>
<td>Y</td>
</tr>
</tbody>
</table>

---

Table 7-3 836xxB/L SCPI Commands

<table>
<thead>
<tr>
<th>Y= Supported by PSG</th>
<th>N= Not supported by PSG</th>
<th>83620B &amp; 83640B</th>
<th>83620L &amp; 83640L</th>
</tr>
</thead>
<tbody>
<tr>
<td>:PULSe:PERiod? [MAXimum</td>
<td>MINimum]</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:PULSe:WIDTh &lt;num&gt; [&lt;time suffix&gt;]</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:PULSe:WIDTh? [MAXimum</td>
<td>MINimum]</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:ROSCillator:SOURce?</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:ROSCillator:SOURce:AUTO ON</td>
<td>OFF</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>:ROSCillator:SOURce:AUTO?</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:ROSCillator:SOURce INTernal</td>
<td>EXTernal</td>
<td>NONE</td>
<td>Y</td>
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</tbody>
</table>
### Table 7-3 836xB/L SCPI Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>83620B &amp; 83640B</th>
<th>83620L &amp; 83640L</th>
</tr>
</thead>
<tbody>
<tr>
<td>:STATus:QUEStionable:FTRansition?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td><strong>Sweep Subsystem</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>:SWEep:CONTrol:STATe ON</td>
<td>OFF</td>
<td>1</td>
</tr>
<tr>
<td>:SWEep:CONTrol:STATe?</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:SWEep:CONTrol:TYPE MASTer</td>
<td>SLAVe</td>
<td>N</td>
</tr>
<tr>
<td>:SWEep:CONTrol:TYPE?</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:SWEep:DWELl &lt;num&gt;[&lt;time suffix&gt;]</td>
<td>MAXimum</td>
<td>MINimum</td>
</tr>
<tr>
<td>:SWEep:DWELl? [MAXimum</td>
<td>MINimum]</td>
<td>Y</td>
</tr>
<tr>
<td>:SWEep:DWELl:AUTO ON</td>
<td>OFF</td>
<td>1</td>
</tr>
<tr>
<td>:SWEep:DWELl:AUTO?</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:SWEep:GENeration STEPped</td>
<td>ANALog</td>
<td>N</td>
</tr>
<tr>
<td>:SWEep:GENeration?</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:SWEep:MANual:POINT &lt;num&gt;</td>
<td>MAXimum</td>
<td>MINimum</td>
</tr>
<tr>
<td>:SWEep:MANual[:RELative] &lt;value&gt;</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:SWEep:MANual[:RELative]?</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:SWEep:MARKer:STATe ON</td>
<td>OFF</td>
<td>1</td>
</tr>
<tr>
<td>:SWEep:MARKer:STATe?</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:SWEep:MARKer:XFER</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:SWEep:MODE AUTO</td>
<td>MANual</td>
<td>Y</td>
</tr>
<tr>
<td>:SWEep:MODE?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:SWEep:POINts &lt;num&gt;</td>
<td>MAXimum</td>
<td>MINimum</td>
</tr>
<tr>
<td>:SWEep:STEP &lt;value&gt;[&lt;freq suffix&gt;]</td>
<td>MAXimum</td>
<td>MINimum</td>
</tr>
<tr>
<td>:SWEep:STEP? [MAXimum</td>
<td>MINimum]</td>
<td>N</td>
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</tbody>
</table>
### SCPI Command Compatibility

#### 836xxB/L Compatible SCPI Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>83620B</th>
<th>83640B</th>
<th>83620L</th>
<th>83640L</th>
</tr>
</thead>
<tbody>
<tr>
<td>:SWEep:TIME &lt;value&gt;[&lt;time suffix&gt;]</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:SWEep:TIME? [MAXimum</td>
<td>MINimum]</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:SWEep:TIME:AUTO</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:SWEep:TIME:AUTO?</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:SWEep:TIME:LLIMit &lt;value&gt;[&lt;time suffix&gt;]</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:SWEep:TIME:LLIMit? [MAXimum</td>
<td>MINimum]</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:SWEep:TRIGger:SOURce IMMEDIATE</td>
<td>BUS</td>
<td>EXTERNAL</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:SWEep:TRIGger:SOURce?</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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</tbody>
</table>

#### System Subsystem

<table>
<thead>
<tr>
<th>Command</th>
<th>83620B</th>
<th>83640B</th>
<th>83620L</th>
<th>83640L</th>
</tr>
</thead>
<tbody>
<tr>
<td>:SYSTem:ALTernate &lt;value&gt;</td>
<td>MAXimum</td>
<td>MINimum</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:SYSTem:ALTernate?</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:SYSTem:ALTernate:STATe ON</td>
<td>OFF</td>
<td>1</td>
<td>0</td>
<td>N</td>
</tr>
<tr>
<td>:SYSTem:ALTernate:STATe?</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:SYSTem:COMMunicate:GPIB:ADDRess &lt;number&gt;</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:SYSTem:DUMP:PRINTER?</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:SYSTem:ERROr?</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:SYSTem:LANGuage CIIL</td>
<td>COMPatible</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:SYSTem:LANGuage SCPI</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:SYSTem:MMHead:SELECT:AUTO ON</td>
<td>OFF</td>
<td>1</td>
<td>0</td>
<td>Y</td>
</tr>
<tr>
<td>:SYSTem:MMHead:SELECT:AUTO?</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:SYSTem:MMHead:SELECT FRONT</td>
<td>REAR</td>
<td>NONE</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:SYSTem:MMHead:SELECT?</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:SYSTem:PRESet[:EXECute]</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:SYSTem:PRESet:SAVE</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:SYSTem:PRESet:TYPE FACTory</td>
<td>USER</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:SYSTem:PRESet:TYPE?</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>
Table 7-3  836xxB/L SCPI Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>83620B &amp; 83640B</th>
<th>83620L &amp; 83640L</th>
</tr>
</thead>
<tbody>
<tr>
<td>:SYSTem:SECurity:COUNt &lt;value&gt;</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:SYSTem:SECurity:COUNt?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:SYSTem:SECurity[:STATe] ON</td>
<td>OFF</td>
<td>1</td>
</tr>
<tr>
<td>:SYSTem:SECurity[:STATe]?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:SYSTem:VERSion?</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

**Trigger Subsystem**

<table>
<thead>
<tr>
<th>Command</th>
<th>83620B &amp; 83640B</th>
<th>83620L &amp; 83640L</th>
</tr>
</thead>
<tbody>
<tr>
<td>:TRIGger[:IMMediate]</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:TRIGger:ODELay &lt;value&gt;[time suffix]</td>
<td>MAXimum</td>
<td>MINimum</td>
</tr>
<tr>
<td>:TRIGger:ODELay? [MAXimum</td>
<td>MINimum]</td>
<td>N</td>
</tr>
<tr>
<td>:TRIGger:SOURce IMMEDIATE</td>
<td>BUS</td>
<td>EXTERNAL</td>
</tr>
<tr>
<td>:TRIGger:SOURce?</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

**TAscEEP Subsystem**

<table>
<thead>
<tr>
<th>Command</th>
<th>83620B &amp; 83640B</th>
<th>83620L &amp; 83640L</th>
</tr>
</thead>
<tbody>
<tr>
<td>:TSMeeP</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

**Unit Subsystem**

<table>
<thead>
<tr>
<th>Command</th>
<th>83620B &amp; 83640B</th>
<th>83620L &amp; 83640L</th>
</tr>
</thead>
<tbody>
<tr>
<td>:UNIT:AM DB</td>
<td>PCT</td>
<td>N</td>
</tr>
<tr>
<td>:UNIT:AM?</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>:UNIT:POWer {&lt;lvl suffix&gt;}</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:UNIT:POWer?</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

---

a. The identification information can be modified for the PSG to reflect the signal generator that is being replaced. Refer to " :SYSTem:IDN" on page 319 for more information.
b. A multiplier of zero is not allowed.
c. The PSG will accept this command, but it has no effect.
d. This command resets the power offset level to 0dBm. It does not turn off or disable the power offset feature.
e. Since the PSG does not have a front panel millimeter head (source module) interface connector, the "FRONT" suffix defaults to the rear connector.
f. Flash memory allows only a limited number of "writes and erasures", excessive use of this command will reduce the memory lifetime.
g. This command can take several hours to execute because the PSG memory size is much larger than the HP 836xx memory.
8373xB and 8371xB Compatible SCPI Commands

Table 7-4 is a comprehensive list of 8373xB and 8371xB SCPI commands arranged by subsystem. Commands that are supported by the PSG are identified, in addition to commands that are unsupported. Use the legend within the table to determine command compatibility.

To use the commands, select 8371xB or 8373xB as the remote language. See "LANguage" on page 87 for selecting the language type.

When using the programming codes in this section, you can:

- set the PSG system language to 8371xB or 8373xB for the current session:
  Utility > GPIB/RS-232 LAN > Remote Language > 8371xB or 8373xB
  or send the command:
  :SYST:LANG "83712" or "83732"

- set the PSG system language to 8360 so that it does not reset with either preset, instrument power cycle or *RST command:
  Utility > Power On/Preset > Preset Language > 8360 Series
  or send the command:
  :SYST:PRESET:LANG "83712" or "83732"

- set the *IDN? response to any 8373xB- or 8371xB-like response you prefer. Refer to the :SYSTem:IDNcommand on page 319.

NOTE Some of the PSG supported commands are subsets of the 8373xB and 8371xB commands. When this occurs, the syntax supported by the PSG is shown in addition to the syntax that is not supported.

---

Table 7-4 8373xB and 8371xB SCPI Commands

<table>
<thead>
<tr>
<th></th>
<th>83731B &amp; 83732B</th>
<th>83711B &amp; 83712B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IEEE Common Commands</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*CLS</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*DMC</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>*EMC</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>*EMC?</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>*ESE &lt;data&gt;</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*EER?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*ESR?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*GMC?</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

---
## SCPI Command Compatibility

### 8373xB and 8371xB Compatible SCPI Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>83731B &amp; 83732B</th>
<th>83711B &amp; 83712B</th>
</tr>
</thead>
<tbody>
<tr>
<td>*IDN?^a</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*LMC?</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>*LRN?</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>*OPC</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*OPC?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*OPT?</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>*PNC</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>*PSC</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*PSC?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*RCL &lt;reg_num&gt;</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*RMC</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>*RST?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*SAV &lt;reg_num&gt;</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*SRE &lt;data&gt;</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*SRE?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*STB?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*TST?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*WAI</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

### Abort Subsystem

:ABORt

### Amplitude Modulation Subsystem

[:SOURCE]:AM[:DEPTH] <val><unit>^b

[:SOURCE]:AM [:DEPTH] <num>[<PCT>]|<num>DB

[:SOURCE]:AM [:DEPTH]:STEP[:INCREMENT] incr|MINimum|MAXimum|DEFault

[:SOURCE]:AM:INTernal:FREQuency <num> [<freq suffix> | incr| MINimum|MAXimum|DEFault

[:SOURCE]:AM:INTernal:FREQuency:STEP[:INCREMENT] Y

---

^a Supported by PSG

^b Not supported by PSG

---

### Table 7-4 8373xB and 8371xB SCPI Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>83731B &amp; 83732B</th>
<th>83711B &amp; 83712B</th>
</tr>
</thead>
<tbody>
<tr>
<td>*IDN?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*LMC?</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>*LRN?</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>*OPC</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*OPC?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*OPT?</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>*PNC</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>*PSC</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*PSC?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*RCL &lt;reg_num&gt;</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*RMC</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>*RST?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*SAV &lt;reg_num&gt;</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*SRE &lt;data&gt;</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*SRE?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*STB?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*TST?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>*WAI</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

---

^a Supported by PSG

^b Not supported by PSG

---

### Abort Subsystem

:ABORt

### Amplitude Modulation Subsystem

[:SOURCE]:AM[:DEPTH] <val><unit>^b

[:SOURCE]:AM [:DEPTH] <num>[<PCT>]|<num>DB

[:SOURCE]:AM [:DEPTH]:STEP[:INCREMENT] incr|MINimum|MAXimum|DEFault

[:SOURCE]:AM:INTernal:FREQuency <num> [<freq suffix> | incr| MINimum|MAXimum|DEFault

[:SOURCE]:AM:INTernal:FREQuency:STEP[:INCREMENT] Y

---

^a Supported by PSG

^b Not supported by PSG

---
### Table 7-4 8373xB and 8371xB SCPI Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>83731B &amp; 83732B</th>
<th>83711B &amp; 83712B</th>
</tr>
</thead>
<tbody>
<tr>
<td>[:SOURce]:AM:FUNCTION SINusoid</td>
<td>SQUare</td>
<td>TRIangle</td>
</tr>
<tr>
<td>[:SOURce]:AM:SENSitivity &lt;val&gt;</td>
<td>MIN</td>
<td>MAX</td>
</tr>
<tr>
<td>[:SOURce]:AM:SOURce FEED</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>[:SOURce]:AM:SOURce?</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:AM:STATe ON</td>
<td>OFF</td>
<td>Y</td>
</tr>
<tr>
<td>[:SOURce]:AM:STATe?</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:AM:TYPE LINear</td>
<td>EXPonential</td>
<td>Y</td>
</tr>
<tr>
<td>[:SOURce]:AM:TYPE?</td>
<td>Y</td>
<td></td>
</tr>
</tbody>
</table>

### Display Subsystem

<table>
<thead>
<tr>
<th>Command</th>
<th>83731B &amp; 83732B</th>
<th>83711B &amp; 83712B</th>
</tr>
</thead>
<tbody>
<tr>
<td>:DISPLAY[:WINDOW]:STATe ON</td>
<td>OFF</td>
<td>1</td>
</tr>
<tr>
<td>:DISPLAY[:WINDOW]:STATe?</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

### Initiate Subsystem

<table>
<thead>
<tr>
<th>Command</th>
<th>83731B &amp; 83732B</th>
<th>83711B &amp; 83712B</th>
</tr>
</thead>
<tbody>
<tr>
<td>:INITiate:CONTinuous ON</td>
<td>OFF</td>
<td>1</td>
</tr>
<tr>
<td>:INITiate:CONTinuous?</td>
<td>Y</td>
<td></td>
</tr>
</tbody>
</table>

### Correction Subsystem

<table>
<thead>
<tr>
<th>Command</th>
<th>83731B &amp; 83732B</th>
<th>83711B &amp; 83712B</th>
</tr>
</thead>
<tbody>
<tr>
<td>[:SOURce]:CORRection:FLATness[:DATA] &lt;freq&gt;,&lt;corr.&gt;,... &lt;freq&gt;,&lt;corr.&gt;</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>[:SOURce]:CORRection:FLATness:POINts &lt;points&gt;</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>[:SOURce]:CORRection[:STATe] ON</td>
<td>OFF</td>
<td>Y</td>
</tr>
<tr>
<td>[:SOURce]:CORRection[:STATe]?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>[:SOURce]:CORRection:CSET[:SELect] tableno</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>[:SOURce]:CORRection:CSET[:SELect]?</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>[:SOURce]:CORRection:CSET:STATe ON</td>
<td>OFF</td>
<td>1</td>
</tr>
<tr>
<td>[:SOURce]:CORRection:CSET:STATe?</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

### Frequency Modulation Subsystem

<table>
<thead>
<tr>
<th>Command</th>
<th>83731B &amp; 83732B</th>
<th>83711B &amp; 83712B</th>
</tr>
</thead>
<tbody>
<tr>
<td>[:SOURce]:FM:COUPling AC</td>
<td>DC</td>
<td>Y</td>
</tr>
<tr>
<td>[:SOURce]:FM:COUPling?</td>
<td>Y</td>
<td></td>
</tr>
</tbody>
</table>
### Table 7-4  8373xB and 8371xB SCPI Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Y= Supported by PSG</th>
<th>N= Not supported by PSG</th>
<th>83731B &amp; 83732B</th>
<th>83711B &amp; 83712B</th>
</tr>
</thead>
<tbody>
<tr>
<td>[:SOURce]:PM[:DEviation] &lt;val&gt;&lt;unit&gt;</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:PM[:DEviation]:STEP[:INCrement] &lt;val&gt;</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:PM[:DEviation]:STEP</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:PM[:DEviation]:STEP?</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:PM:INternal:FREQuency &lt;num&gt;[&lt;freq suffix&gt;]</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:PM:INternal:FREQuency[:STEP]:[INCrement] incr</td>
<td>MINimum</td>
<td>MAXimum</td>
<td>DEFault</td>
<td>N</td>
</tr>
<tr>
<td>[:SOURce]:PM:INternal:FREQuency[:STEP]:MINimum</td>
<td>MAXimum</td>
<td>DEFault</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:PM:INternal:FREQuency[:STEP]:DEFault</td>
<td>N</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:PM:INternal:FREQuency[:CW</td>
<td>:FIXed]</td>
<td>MAXimum</td>
<td>MINimum</td>
<td>DEFault</td>
</tr>
<tr>
<td>[:SOURce]:PM:INternal:FREQuency[:CW</td>
<td>:FIXed]:STEP &lt;val&gt;&lt;unit&gt;</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:PM:INternal:FREQuency[:CW</td>
<td>:FIXed]:STEP?</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:PM:INternal:FREQuency:MULTiplier &lt;val&gt;</td>
<td>UP</td>
<td>DOWN</td>
<td>DEFault</td>
<td>Y</td>
</tr>
<tr>
<td>[:SOURce]:PM:INternal:FREQuency:MULTiplier?</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:PM:INternal:FREQuency:MULTiplier[:STEP]:[INCrement] incr</td>
<td>MINimum</td>
<td>MAXimum</td>
<td>DEFault</td>
<td>N</td>
</tr>
<tr>
<td>[:SOURce]:PM:INternal:FREQuency:MULTiplier[:STEP]:DEFault</td>
<td>N</td>
<td>N</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Frequency Subsystem

<table>
<thead>
<tr>
<th>Command</th>
<th>Y= Supported by PSG</th>
<th>N= Not supported by PSG</th>
<th>83731B &amp; 83732B</th>
<th>83711B &amp; 83712B</th>
</tr>
</thead>
<tbody>
<tr>
<td>[:SOURce]:PM:INternal:FREQuency:MULTiplier</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:PM:INternal:FREQuency:MULTiplier[:STEP]</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:PM:INternal:FREQuency:MULTiplier[:STEP]:MINimum</td>
<td>MAXimum</td>
<td>DEFault</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>[:SOURce]:PM:INternal:FREQuency:MULTiplier[:STEP]:DEFault</td>
<td>N</td>
<td>N</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Memory Subsystem

<table>
<thead>
<tr>
<th>Command</th>
<th>Y= Supported by PSG</th>
<th>N= Not supported by PSG</th>
<th>83731B &amp; 83732B</th>
<th>83711B &amp; 83712B</th>
</tr>
</thead>
<tbody>
<tr>
<td>:MEMory:CATalog[:ALL]?</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:MEMory:CATalog:TABLE?</td>
<td>N</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:MEMory:CATalog:MACRo</td>
<td>N</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:MEMory:RAM:INITialize</td>
<td>N</td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:MEMory:TABLE:FREQuency freq,...freq[:MINimum</td>
<td>MAXimum]</td>
<td>N</td>
<td>N</td>
<td></td>
</tr>
</tbody>
</table>
### Table 7-4  8373xB and 8371xB SCPI Commands

<table>
<thead>
<tr>
<th>Y= Supported by PSG</th>
<th>N= Not supported by PSG</th>
<th>S3731B &amp; S3732B</th>
<th>S3711B &amp; S3712B</th>
</tr>
</thead>
<tbody>
<tr>
<td>:MEMory:TABLE:FREQuency? MINimum</td>
<td>MAXimum</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:MEMory:TABLE:FREQuency:POINts?</td>
<td></td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:MEMory:TABLE:LOSS [:MAGNitude] cf,...cf</td>
<td>MINimum</td>
<td>MAXimum</td>
<td>N</td>
</tr>
<tr>
<td>:MEMory:TABLE:LOSS [:MAGNitude]?</td>
<td></td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:MEMory:TABLE:LOSS [:MAGNitude]:POINts?</td>
<td></td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:MEMory:TABLE:SELect tableno</td>
<td></td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:MEMory:TABLE:SELect?</td>
<td></td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

**Modulation Subsystem**

[[:SOURce]:MODulation:AOFF]

[[:SOURce]:MODulation:STATe ON|OFF]

[[:SOURce]:MODulation:STATe?]

**Output Subsystem**

[;OUTPut:IMPedance?]

[;OUTPut:PROTection[:STATe] ON|OFF]

[;OUTPut:PROTection[:STATe]?]

[;OUTPut[:STATe] ON|OFF|1|0]

[;OUTPut[:STATe]?]

**Phase Modulation Subsystem**

[[:SOURce]:PM:COUPling AC|DC]

[[:SOURce]:PM[:DEViation] <val><unit>]

[[:SOURce]:PM[:DEViation]:STEP[:INCRement]]

[[:SOURce]:PM:INTernal:FREQuency <val><unit>]

[[:SOURce]:PM:INTernal:FREQuency:STEP[:INCRement]]

[[:SOURce]:PM:INTernal:FUNCTION SINUsoid|SQUare|TRIAngle|RAMP|UNIFORM|GAUssian]

[[:SOURce]:PM:RANGe AUTO|LOW|HIGH]

[[:SOURce]:PM:SENSitivity sens|MINimum|MAXimum|DEFault]

N= Not supported by PSG

Y= Supported by PSG
### SCPI Command Compatibility

#### 8373xB and 8371xB SCPI Commands

Table 7-4  
<table>
<thead>
<tr>
<th>Command</th>
<th>83731B &amp; 83732B</th>
<th>83711B &amp; 83712B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Power Subsystem

- [:SOURCE]:POWer::PROTection:STATe ON|OFF
- [:SOURCE]:POWer::PROTection:STATe?
- [:SOURCE]:POWer::ATTenuation:AUTO ON|OFF
- [:SOURCE]:POWer::ATTenuation:AUTO?
- [:SOURCE]:POWer::LEVEL ampl|MINimum|MAXimum|UP|DOWN|DEFault
- [:SOURCE]:POWer::LEVEL?

#### Pulse Modulation Subsystem

- [:SOURCE]:PULM:EXTernal:POLarity NORMal|INVerted
- [:SOURCE]:PULM:EXTernal:POLarity?
- [:SOURCE]:PULM:SOURce INTernal|EXTernal
- [:SOURCE]:PULM:SOURce?

#### Pulse Subsystem

- [:SOURCE]:PULM:STATe ON|OFF|1|0
- [:SOURCE]:PULM:STATe?
### SCPI Command Compatibility

**8373xB and 8371xB Compatible SCPI Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>83731B &amp; 83732B</th>
<th>83711B &amp; 83712B</th>
</tr>
</thead>
<tbody>
<tr>
<td>[:SOURce]:PULSe:DELay delay</td>
<td>MINimum</td>
<td>MAXimum</td>
</tr>
<tr>
<td>[:SOURce]:PULSe:DELay?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:PULSe:DELay:STEP &lt;num&gt;[-time suffix] [DEFault]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:PULSe:DELay:STEP? [DEFault]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:PULSe:DOUBle[:STATE] ON</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:PULSe:DOUBle[:STATE]?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:PULSe:FRQuency freq</td>
<td>MINimum</td>
<td>MAXimum</td>
</tr>
<tr>
<td>[:SOURce]:PULSe:FRQuency?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:PULSe:FRQuency:STEP freq</td>
<td>DEFault</td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:PULSe:FRQuency:STEP? [MIN</td>
<td>MAX</td>
<td>DEF]</td>
</tr>
<tr>
<td>[:SOURce]:PULSe:PERiod &lt;num&gt;[-time suffix]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:PULSe:PERiod?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:PULSe:PERiod:STEP &lt;num&gt;[-time suffix]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:PULSe:PERiod:STEP?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:PULSe:TRANSition[:LEADing] SLOW</td>
<td>MEDium</td>
<td>FAST</td>
</tr>
<tr>
<td>[:SOURce]:PULSe:TRANSition[:LEADing]?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:PULSe:TRANSition:STATe ON</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:PULSe:TRANSition:STATe?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:PULSe:WIDTh MAXimum</td>
<td>MINimum</td>
<td>UP</td>
</tr>
<tr>
<td>[:SOURce]:PULSe:WIDTh? [MAXimum</td>
<td>MINimum</td>
<td>DEFault]</td>
</tr>
<tr>
<td>[:SOURce]:PULSe:WIDTh:STEP &lt;num&gt;[-time suffix] [DEFault]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[:SOURce]:PULSe:WIDTh:STEP? MINimum</td>
<td>MAXimum</td>
<td>DEFault</td>
</tr>
</tbody>
</table>

#### Reference Oscillator Subsystem

<table>
<thead>
<tr>
<th>Command</th>
<th>83731B &amp; 83732B</th>
<th>83711B &amp; 83712B</th>
</tr>
</thead>
<tbody>
<tr>
<td>[:SOURce]:ROSCillator:SOURce?</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

#### Status Subsystem

<table>
<thead>
<tr>
<th>Command</th>
<th>83731B &amp; 83732B</th>
<th>83711B &amp; 83712B</th>
</tr>
</thead>
<tbody>
<tr>
<td>:STATus:OPERation:CONDITION?</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>
### SCPI Command Compatibility

#### 8373xB and 8371xB Compatible SCPI Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>83731B &amp; 83732B</th>
<th>83711B &amp; 83712B</th>
</tr>
</thead>
<tbody>
<tr>
<td>:STATus:OPERation:ENABle &lt;value&gt;</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:OPERation:ENABle?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:OPERation[:EVENT]?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:OPERation:NTTransition &lt;value&gt;</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:OPERation:NTTransition?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:OPERation:PTRransition &lt;value&gt;</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:OPERation:PTRransition?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:PRESet</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:QUEStionable:CONDition?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:QUEStionable:ENABle &lt;value&gt;</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:QUEStionable:ENABle?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:QUEStionable[:EVENT]?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:QUEStionable:NTTransition &lt;value&gt;</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:QUEStionable:NTTransition?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:QUEStionable:PTRransition &lt;value&gt;</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:QUEStionable:PTRransition?</td>
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<td>Y</td>
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### System Subsystem

<table>
<thead>
<tr>
<th>Command</th>
<th>83731B &amp; 83732B</th>
<th>83711B &amp; 83712B</th>
</tr>
</thead>
<tbody>
<tr>
<td>:SYSTem:COMMunicate:GPIB:ADDRess &lt;number&gt;</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:SYSTem:COMMunicate:PMETer:ADDRess</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:SYSTem:ERRor?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:SYSTem:KEY keycode</td>
<td>MINimum</td>
<td>MAXimum</td>
</tr>
<tr>
<td>:SYSTem:KEY?</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:SYSTem:LANGuage &quot;COMP=8673&quot;</td>
<td>&quot;COMPatibility=8673&quot;</td>
<td>N</td>
</tr>
<tr>
<td>:SYSTem:LANGuage &quot;SCPI&quot;</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:SYSTem:LANGuage?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:SYSTem:PRESet</td>
<td>Y</td>
<td>Y</td>
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</table>
### Table 7-4 8373xB and 8371xB SCPI Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>83731B &amp; 83732B</th>
<th>83711B &amp; 83712B</th>
</tr>
</thead>
<tbody>
<tr>
<td>:SYSTem:VERSion?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Trigger Subsystem</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:TRIGger[:SEQUence</td>
<td>:START]:SOURce IMMediate</td>
<td>EXTernal</td>
</tr>
<tr>
<td>:TRIGger[:SEQUence</td>
<td>:START]:SOURce?</td>
<td>N</td>
</tr>
<tr>
<td>:TRIGger:SEQUence2:STOP:SOURce IMMediate</td>
<td>EXTernal</td>
<td>N</td>
</tr>
<tr>
<td>:TRIGger:SEQUence2:STOP:SOURce?</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>:TRIGger:SEQUence2:SLPe</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Unit Subsystem</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:UNIT:FREQuency {&lt;freq suffix&gt;}</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:UNIT:FREQuency?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:UNIT:POWer {&lt;lvl suffix&gt;}</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:UNIT:POWer?</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>:UNIT:TIME</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:UNIT:TIME?</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:UNIT:VOLTage {&lt;lvl suffix&gt;}</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>:UNIT:VOLTage?</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

a. The identification information can be modified for the PSG to reflect the signal generator that is being replaced. Refer to ":SYSTem:IDN" on page 319 for more information.
b. In linear mode, % cannot be used to select percent as the unit. Use PCT to specify percent as the unit.
c. A multiplier of zero is not allowed.
d. If FEED is selected, the query returns INT. FEED and INTernal are synonymous.

### 8375xB Compatible SCPI Commands

Table 7-5 is a comprehensive list of 83751B and 83752B SCPI commands, arranged by subsystem. Commands that are supported by the PSG are identified, in addition to commands that are unsupported. Use the legend within the table to determine command compatibility.

To use the commands, select 8375xB as the remote language. See ":LANGuage" on page 87 for selecting the language type.
When using the programming codes in this section, you can:

- set the PSG system language to 8375xB for the current session:
  
  Utility > GPIB/RS-232 LAN > Remote Language > 8375xB
  
  or send the command:
  
  :SYST:LANG "83752"

- set the PSG system language to 8375xB so that it does not reset with either preset, instrument power cycle or *RST command:
  
  Utility > Power On/Preset > Preset Language > 8375xB
  
  or send the command:
  
  :SYST:PRESET:LANG "83752"

- set the *IDN? response to any 8375xB-like response you prefer. Refer to the :SYSTem:IDNcommand on page 319.

**NOTE** Some supported commands require the installation of hardware or firmware options.

<table>
<thead>
<tr>
<th>Table 7-5 8375xB SCPI Commands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y= Supported by PSG</td>
</tr>
<tr>
<td>N= Not supported by PSG</td>
</tr>
<tr>
<td>IEEE Common Commands</td>
</tr>
<tr>
<td>Y</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>*CLS</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>*DMC</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>*EMC</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>*EMC?</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>*ESE &lt;value&gt;</td>
</tr>
<tr>
<td>Y</td>
</tr>
<tr>
<td>*ESE?</td>
</tr>
<tr>
<td>Y</td>
</tr>
<tr>
<td>*ESR?</td>
</tr>
<tr>
<td>Y</td>
</tr>
<tr>
<td>*GMC? &lt;label&gt;</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>*IDN?</td>
</tr>
<tr>
<td>Y</td>
</tr>
<tr>
<td>*LMC?</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>*LRN?</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>*OPC</td>
</tr>
<tr>
<td>Y</td>
</tr>
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</table>
Table 7-5  8375xB SCPI Commands (Continued)

<table>
<thead>
<tr>
<th>Command</th>
<th>83751B &amp; 83752B</th>
</tr>
</thead>
<tbody>
<tr>
<td>*OPC?</td>
<td>Y</td>
</tr>
<tr>
<td>*OPT?</td>
<td>N</td>
</tr>
<tr>
<td>*PMC</td>
<td>N</td>
</tr>
<tr>
<td>*PSC ON</td>
<td>OFF</td>
</tr>
<tr>
<td>*PSC?</td>
<td>Y</td>
</tr>
<tr>
<td>*RCL &lt;reg_num&gt;</td>
<td>Y</td>
</tr>
<tr>
<td>*RMC &lt;label&gt;</td>
<td>N</td>
</tr>
<tr>
<td>*RST</td>
<td>Y</td>
</tr>
<tr>
<td>*SAV &lt;reg_num&gt;</td>
<td>Y</td>
</tr>
<tr>
<td>*SRE &lt;value&gt;</td>
<td>Y</td>
</tr>
<tr>
<td>*SRE?</td>
<td>Y</td>
</tr>
<tr>
<td>*STB?</td>
<td>Y</td>
</tr>
<tr>
<td>*TRG</td>
<td>Y</td>
</tr>
<tr>
<td>*TST?</td>
<td>Y</td>
</tr>
<tr>
<td>*WAI</td>
<td>Y</td>
</tr>
</tbody>
</table>

_Abort Subsystem_

;ABORt                  Y

_Amplitude Modulation Subsystem_

;AM:SOURce1 INTernal|EXTernal          N | Y
;AM:SOURce INTernal|EXTernal

;AM:SOURce1?        N | Y
;AM:SOURce?         Y

;AM:STATE ON|OFF|1|0 | Y |

;AM:STATE?          Y

_Calibration Subsystem_

;CALibration:PEAk:[:EXECute] N
<table>
<thead>
<tr>
<th>SCPI Command Compatibility</th>
<th>8375xB SCPI Commands (Continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Y= Supported by PSG</strong></td>
<td><strong>N= Not supported by PSG</strong></td>
</tr>
<tr>
<td>:CALibration:PEAKing[:EXECute]? &lt;dac_va&gt;</td>
<td></td>
</tr>
<tr>
<td>:CALibration:PMETer:FLATness:INITiate? USER</td>
<td></td>
</tr>
<tr>
<td>:CALibration:SECurity:CODE &lt;old&gt; &lt;new&gt;</td>
<td></td>
</tr>
<tr>
<td>:CALibration:SECurity:PASSword &lt;passwd&gt;</td>
<td></td>
</tr>
<tr>
<td>:CALibration:TRACK</td>
<td></td>
</tr>
<tr>
<td><strong>Correction Subsystem</strong></td>
<td></td>
</tr>
<tr>
<td>:CORRection:FLATness:AMPL &lt;value&gt;[DB],&lt;value&gt;[DB]...</td>
<td></td>
</tr>
<tr>
<td>:CORRection:FLATness:AMPL?</td>
<td></td>
</tr>
<tr>
<td>:CORRection:FLATness:FREQ &lt;value&gt;[&lt;freqsuffix&gt;],&lt;value&gt;[&lt;freqsuffix&gt;]...</td>
<td></td>
</tr>
<tr>
<td>:CORRection:FLATness:FREQ?</td>
<td></td>
</tr>
<tr>
<td>:CORRection:FLATness:POINTs? MAXimum</td>
<td>MINimum</td>
</tr>
<tr>
<td>:CORRection:VOLTs:OFFSet</td>
<td></td>
</tr>
<tr>
<td>:CORRection:VOLTs:OFFSet?</td>
<td></td>
</tr>
<tr>
<td>:CORRection:VOLTs:SCALe</td>
<td></td>
</tr>
<tr>
<td>:CORRection:VOLTs:SCALe?</td>
<td></td>
</tr>
<tr>
<td>:CORRection[:STATe] ON</td>
<td>OFF</td>
</tr>
<tr>
<td>:CORRection[:STATe]?</td>
<td></td>
</tr>
<tr>
<td><strong>Diagnostics Subsystem</strong></td>
<td></td>
</tr>
<tr>
<td>:DIAG:LRNS?</td>
<td></td>
</tr>
<tr>
<td>:DIAGnostic:TEST:FULLtest:REPort?</td>
<td></td>
</tr>
<tr>
<td>:DIAGnostic:TEST:FULLtest?</td>
<td></td>
</tr>
<tr>
<td><strong>Display Subsystem</strong></td>
<td></td>
</tr>
<tr>
<td>:DISPlay[:STATe] ON</td>
<td>OFF</td>
</tr>
</tbody>
</table>
### SCPI Command Compatibility

#### 8375xB Compatible SCPI Commands

**Table 7-5  8375xB SCPI Commands (Continued)**

<table>
<thead>
<tr>
<th>Y= Supported by PSG</th>
<th>N= Not supported by PSG</th>
<th>83751B &amp; 83752B</th>
</tr>
</thead>
<tbody>
<tr>
<td>:DISPlay[:STATE]?</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td><strong>Frequency Modulation Subsystem</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>:FM:COUPling AC</td>
<td>DC</td>
<td></td>
</tr>
<tr>
<td>:FM:COUPling?</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>:FM:SENSitivitY &lt;value&gt;&lt;freqsuffix/V&gt;</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>:FM:SENSitivitY?</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>:FM:SOURCe1 EXTernal</td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>:FM:SOURCe EXTernal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:FM:SOURCe1?</td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>:FM:SOURCe?</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>:FM:STATe ON</td>
<td>OFF</td>
<td>1</td>
</tr>
<tr>
<td>:FM:STATe?</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td><strong>Frequency Subsystem</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>:FREQuency:CENTer &lt;value&gt;&lt;freqsuffix&gt;</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>:FREQuency:CENTer?</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>:FREQuency:MANual &lt;value&gt;&lt;unit&gt;</td>
<td>UP</td>
<td>DOWN</td>
</tr>
<tr>
<td>[:SOURCe[1]]:FREQuency:MANual?</td>
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<td>N</td>
</tr>
<tr>
<td>[:SOURCe]:FREQuency:MANual?</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>:FREQuency:MODE FIXed</td>
<td>CW</td>
<td>SWEep</td>
</tr>
<tr>
<td>:FREQuency:MODE?</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>:FREQuency:MULTiplier &lt;value&gt;</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>:FREQuency:MULTiplier:STATe ON</td>
<td>OFF</td>
<td>1</td>
</tr>
<tr>
<td>:FREQuency:MULTiplier:STATe?</td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>:FREQuency:MULTiplier?</td>
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<td>Y</td>
</tr>
<tr>
<td>:FREQuency:OFFSet &lt;value&gt;</td>
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<td>Y</td>
</tr>
<tr>
<td>:FREQuency:OFFSet:STATe ON</td>
<td>OFF</td>
<td>1</td>
</tr>
<tr>
<td>:FREQuency:OFFSet:STATe?</td>
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<td>Y</td>
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### 8375xB SCPI Commands (Continued)

<table>
<thead>
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<th>PSG Compatibility</th>
<th>83751B &amp; 83752B</th>
</tr>
</thead>
<tbody>
<tr>
<td>:FREQuency:OFFSet?</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:FREQuency:SPAN &lt;value&gt;&lt;freqsuffix&gt;[&lt;freqsuffix&gt;]</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:FREQuency:SPAN?</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:FREQuency:STARt &lt;value&gt;&lt;freqsuffix&gt;[&lt;freqsuffix&gt;]</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:FREQuency:STARt?</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:FREQuency:STEP[:INCRement] &lt;value&gt;&lt;freqsuffix&gt;</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:FREQuency:STEP[:INCRement]?</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:FREQuency:STOP &lt;value&gt;&lt;freqsuffix&gt;[&lt;freqsuffix&gt;]</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:FREQuency:STOP?</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:FREQuency[:CW][:FIXed] &lt;value&gt;&lt;freqsuffix&gt;[&lt;freqsuffix&gt;]</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:FREQuency[:CW][:FIXed]:AUTO ON</td>
<td>OFF</td>
<td>1</td>
</tr>
<tr>
<td>:FREQuency[:CW][:FIXed]:AUTO?</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>:FREQuency[:CW][:FIXed]?</td>
<td>Y</td>
<td></td>
</tr>
</tbody>
</table>

**Initiate Subsystem**

<table>
<thead>
<tr>
<th>Command</th>
<th>PSG Compatibility</th>
<th>83751B &amp; 83752B</th>
</tr>
</thead>
<tbody>
<tr>
<td>:INITiate:CONTinuous ON</td>
<td>OFF</td>
<td>1</td>
</tr>
<tr>
<td>:INITiate:CONTinuous?</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:INITiate[:IMMediate]</td>
<td>Y</td>
<td></td>
</tr>
</tbody>
</table>

**Marker Subsystem**

<table>
<thead>
<tr>
<th>Command</th>
<th>PSG Compatibility</th>
<th>83751B &amp; 83752B</th>
</tr>
</thead>
<tbody>
<tr>
<td>[:SOURce[1]]::MARKer[n]::AMPLitude[:STATe] ON</td>
<td>OFF</td>
<td>1</td>
</tr>
<tr>
<td>[:SOURce]::MARKer[n]::AMPLitude[:STATe] ON</td>
<td>OFF</td>
<td>1</td>
</tr>
<tr>
<td>[:SOURce[1]]::MARKer[n]::AMPLitude[:STATe]?</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>[:SOURce]::MARKer[n]::AMPLitude[:STATe]?</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:MARKer[n]::AOFF</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:MARKer[n]::FREQuency &lt;value&gt;&lt;unit&gt;</td>
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<td></td>
</tr>
<tr>
<td>:MARKer[n]::FREQuency?</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>:MARKer[n]::MODE FREQuency</td>
<td>DELTa</td>
<td>Y</td>
</tr>
</tbody>
</table>
### SCPI Command Compatibility

#### 8375xB Compatible SCPI Commands

<table>
<thead>
<tr>
<th>Y= Supported by PSG</th>
<th>N= Not supported by PSG</th>
<th>83751B &amp; 83752B</th>
</tr>
</thead>
<tbody>
<tr>
<td>:MARKer[n]:MODE?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:MARKer[n]:REFerence &lt;n&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:MARKer[n]:REFerence?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>:MARKer[n][:STATe] ON</td>
<td>OFF</td>
<td>1</td>
</tr>
<tr>
<td>:MARKer[n][:STATe]?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Memory Subsystem

<table>
<thead>
<tr>
<th>:MEMory:RAM:INITialize[:ALL]</th>
<th></th>
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#### Output Subsystem

<table>
<thead>
<tr>
<th>:OUTPut:IMPedance?</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>:OUTPut[:STATe] ON</td>
<td>OFF</td>
</tr>
<tr>
<td>:OUTPut[:STATe]?</td>
<td></td>
</tr>
</tbody>
</table>

#### Power Subsystem

<table>
<thead>
<tr>
<th>:POWer:CFACtor &lt;value&gt;[DB]</th>
<th>UP</th>
<th>DOWN</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>:POWer:CFACtor?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>:POWer:ALC:SOURce1</td>
<td>INTERNAL</td>
<td>DIODE</td>
<td>PMETER</td>
</tr>
<tr>
<td>:POWer:ALC:SOURce</td>
<td>INTERNAL</td>
<td>DIODE</td>
<td>PMETER</td>
</tr>
<tr>
<td>:POWer:ALC:SOURce1?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>:POWer:ALC:SOURce?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>:POWer:ALC[:STATe] ON</td>
<td>OFF</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>:POWer:ALC[:STATe]?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>:POWer:ATTenuation &lt;value&gt;[DB]</td>
<td>UP</td>
<td>DOWN</td>
<td></td>
</tr>
<tr>
<td>:POWer:ATTenuation:AUTO ON</td>
<td>OFF</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>:POWer:ATTenuation:AUTO?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>:POWer:ATTenuation?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>:POWer:CENTer &lt;value&gt;[lvlsuffix]</td>
<td>UP</td>
<td>DOWN</td>
<td></td>
</tr>
<tr>
<td>:POWer:CENTer?</td>
<td></td>
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### Table 7-5 8375xB SCPI Commands (Continued)

<table>
<thead>
<tr>
<th>Command</th>
<th>Supported by PSG</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>:POWer:MODE FIXed</td>
<td>Y</td>
<td>Supported by PSG</td>
</tr>
<tr>
<td>:POWer:MODE?</td>
<td>Y</td>
<td>Supported by PSG</td>
</tr>
<tr>
<td>:POWer:OFFSet &lt;value&gt;[DB]</td>
<td>Y</td>
<td>Supported by PSG</td>
</tr>
<tr>
<td>:POWer:OFFSet:STATe ON</td>
<td>Y</td>
<td>Supported by PSG</td>
</tr>
<tr>
<td>:POWer:OFFSet?</td>
<td>Y</td>
<td>Supported by PSG</td>
</tr>
<tr>
<td>:POWer:SLOPe &lt;value&gt;[DB/freqsuffix]</td>
<td>N</td>
<td>Not supported by PSG</td>
</tr>
<tr>
<td>:POWer:SLOPe:STATe ON</td>
<td>N</td>
<td>Not supported by PSG</td>
</tr>
<tr>
<td>:POWer:SLOPe?</td>
<td>N</td>
<td>Not supported by PSG</td>
</tr>
<tr>
<td>:POWer:SPAN &lt;value&gt;[DB]</td>
<td>Y</td>
<td>Supported by PSG</td>
</tr>
<tr>
<td>:POWer:SPAN?</td>
<td>Y</td>
<td>Supported by PSG</td>
</tr>
<tr>
<td>:POWer:START &lt;value&gt;[&lt;lvlsuffix&gt;]</td>
<td>Y</td>
<td>Supported by PSG</td>
</tr>
<tr>
<td>:POWer:START?</td>
<td>Y</td>
<td>Supported by PSG</td>
</tr>
<tr>
<td>:POWer:STATe ON</td>
<td>Y</td>
<td>Supported by PSG</td>
</tr>
<tr>
<td>:POWer:STEP[:INCRement] &lt;value&gt;[DB]</td>
<td>Y</td>
<td>Supported by PSG</td>
</tr>
<tr>
<td>:POWer:STOP &lt;value&gt;[&lt;lvlsuffix&gt;]</td>
<td>Y</td>
<td>Supported by PSG</td>
</tr>
<tr>
<td>:POWer:STOP?</td>
<td>Y</td>
<td>Supported by PSG</td>
</tr>
<tr>
<td>:POWer[:LLevel] &lt;value&gt;[&lt;lvlsuffix&gt;]</td>
<td>Y</td>
<td>Supported by PSG</td>
</tr>
<tr>
<td>:POWer[:LLevel]?</td>
<td>Y</td>
<td>Supported by PSG</td>
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**Pulse Modulation Subsystem**

<table>
<thead>
<tr>
<th>Command</th>
<th>Supported by PSG</th>
</tr>
</thead>
<tbody>
<tr>
<td>:PULM:SOURce1 INTernal</td>
<td>N</td>
</tr>
<tr>
<td>:PULM:SOURce INTernal</td>
<td>N</td>
</tr>
<tr>
<td>SCPI Command Compatibility</td>
<td>83751B &amp; 83752B</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td><strong>Pulse Subsystem</strong></td>
<td></td>
</tr>
<tr>
<td>:PULSe:FREQuency &lt;value&gt;[&lt;freqsuffix&gt;]</td>
<td>Y</td>
</tr>
<tr>
<td>:PULSe:FREQuency?</td>
<td>Y</td>
</tr>
<tr>
<td>:PULSe:PERiod &lt;value&gt;[&lt;timesuffix&gt;]</td>
<td>Y</td>
</tr>
<tr>
<td>:PULSe:PERiod?</td>
<td>Y</td>
</tr>
<tr>
<td>:PULSe:WIDTh &lt;value&gt;[&lt;timesuffix&gt;]</td>
<td>Y</td>
</tr>
<tr>
<td>:PULSe:WIDTh?</td>
<td>Y</td>
</tr>
<tr>
<td><strong>Reference Oscillator Subsystem</strong></td>
<td></td>
</tr>
<tr>
<td>:ROSCillator:SOURcel1 INTernal</td>
<td>EXTernal</td>
</tr>
<tr>
<td>:ROSCillator:SOURcel1 AUTO ON</td>
<td>OFF</td>
</tr>
<tr>
<td>:ROSCillator:SOURcel1 AUTO?</td>
<td>Y</td>
</tr>
<tr>
<td>:ROSCillator:SOURcel1?</td>
<td>Y</td>
</tr>
<tr>
<td>:ROSCillator:SOURcel?</td>
<td>Y</td>
</tr>
<tr>
<td><strong>Status Subsystem</strong></td>
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</tr>
<tr>
<td>:STATus:OPERation:CONDition?</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:OPERation:ENABLE &lt;value&gt;</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:OPERation:ENABLE?</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:OPERation:NTRansition &lt;value&gt;</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:OPERation:NTRansition?</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:OPERation:PTRansition &lt;value&gt;</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:OPERation:PTRansition?</td>
<td>Y</td>
</tr>
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</table>
### SCPI Command Compatibility

#### 8375xB Compatible SCPI Commands

<table>
<thead>
<tr>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>:STATus:OPERation[:EVENT]?</td>
</tr>
<tr>
<td>:STATus:PRESet</td>
</tr>
<tr>
<td>:STATus:QUESTionable:CONDition?</td>
</tr>
<tr>
<td>:STATus:QUESTionable:ENABLE &lt;value&gt;</td>
</tr>
<tr>
<td>:STATus:QUESTionable:ENABLE?</td>
</tr>
<tr>
<td>:STATus:QUESTionable:NTRansition &lt;value&gt;</td>
</tr>
<tr>
<td>:STATus:QUESTionable:NTRansition?</td>
</tr>
<tr>
<td>:STATus:QUESTionable:PTRansition &lt;value&gt;</td>
</tr>
<tr>
<td>:STATus:QUESTionable:PTRansition?</td>
</tr>
<tr>
<td>:STATus:QUESTionable[:EVENT]?</td>
</tr>
</tbody>
</table>

**Sweep Subsystem**

<table>
<thead>
<tr>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>:SWEep:CONTrol:TYPE MASTer</td>
</tr>
<tr>
<td>:SWEep:CONTrol:TYPE?</td>
</tr>
<tr>
<td>:SWEep:DWELl &lt;value&gt;[&lt;timesuffix&gt;]</td>
</tr>
<tr>
<td>:SWEep:DWELl:AUTO ON</td>
</tr>
<tr>
<td>:SWEep:DWELl:AUTO?</td>
</tr>
<tr>
<td>:SWEep:DWELl?</td>
</tr>
<tr>
<td>:SWEep:GENERation ANALog</td>
</tr>
<tr>
<td>:SWEep:GENERation?</td>
</tr>
<tr>
<td>:SWEep:MANual:POINT &lt;value&gt;</td>
</tr>
<tr>
<td>:SWEep:MANual:POINT?</td>
</tr>
<tr>
<td>:SWEep:MANual[:RELative] &lt;value&gt;</td>
</tr>
<tr>
<td>:SWEep:MANual[:RELative]?</td>
</tr>
<tr>
<td>:SWEep:MARKer:STATe ON</td>
</tr>
<tr>
<td>:SWEep:MARKer:STATe?</td>
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<table>
<thead>
<tr>
<th>Command</th>
<th>83751B &amp; 83752B</th>
</tr>
</thead>
<tbody>
<tr>
<td>:STATus:OPERation[:EVENT]?</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:PRESet</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:QUESTionable:CONDition?</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:QUESTionable:ENABLE &lt;value&gt;</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:QUESTionable:ENABLE?</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:QUESTionable:NTRansition &lt;value&gt;</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:QUESTionable:NTRansition?</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:QUESTionable:PTRansition &lt;value&gt;</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:QUESTionable:PTRansition?</td>
<td>Y</td>
</tr>
<tr>
<td>:STATus:QUESTionable[:EVENT]?</td>
<td>Y</td>
</tr>
<tr>
<td>:SWEep:CONTrol:TYPE MASTer</td>
<td>SLAVe</td>
</tr>
<tr>
<td>:SWEep:CONTrol:TYPE?</td>
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</tr>
<tr>
<td>:SWEep:DWELl &lt;value&gt;[&lt;timesuffix&gt;]</td>
<td>Y</td>
</tr>
<tr>
<td>:SWEep:DWELl:AUTO ON</td>
<td>OFF</td>
</tr>
<tr>
<td>:SWEep:DWELl:AUTO?</td>
<td>N</td>
</tr>
<tr>
<td>:SWEep:DWELl?</td>
<td>Y</td>
</tr>
<tr>
<td>:SWEep:GENERation ANALog</td>
<td>STEPped</td>
</tr>
<tr>
<td>:SWEep:GENERation?</td>
<td>Y</td>
</tr>
<tr>
<td>:SWEep:MANual:POINT &lt;value&gt;</td>
<td>Y</td>
</tr>
<tr>
<td>:SWEep:MANual:POINT?</td>
<td>Y</td>
</tr>
<tr>
<td>:SWEep:MANual[:RELative] &lt;value&gt;</td>
<td>N</td>
</tr>
<tr>
<td>:SWEep:MANual[:RELative]?</td>
<td>N</td>
</tr>
<tr>
<td>:SWEep:MARKer:STATe ON</td>
<td>OFF</td>
</tr>
<tr>
<td>:SWEep:MARKer:STATe?</td>
<td>N</td>
</tr>
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### Table 7-5 8375xB SCPI Commands (Continued)

<table>
<thead>
<tr>
<th>Command</th>
<th>83751B &amp; 83752B</th>
</tr>
</thead>
<tbody>
<tr>
<td>:SWEep:MARKer:XFER</td>
<td>N</td>
</tr>
<tr>
<td>:SWEep:MODE AUTO</td>
<td>MANual</td>
</tr>
<tr>
<td>:SWEep:MODE?</td>
<td>Y</td>
</tr>
<tr>
<td>:SWEep:POINts &lt;value&gt;</td>
<td>Y</td>
</tr>
<tr>
<td>:SWEep:POINts?</td>
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</tr>
<tr>
<td>:SWEep:POWer:STEP &lt;value&gt;[&lt;lvlsuffix&gt;]</td>
<td>N</td>
</tr>
<tr>
<td>:SWEep:POWer:STEP?</td>
<td>N</td>
</tr>
<tr>
<td>:SWEep:TIME &lt;value&gt;[&lt;timesuffix&gt;]</td>
<td>N</td>
</tr>
<tr>
<td>:SWEep:TIME:AUTO ON</td>
<td>OFF</td>
</tr>
<tr>
<td>:SWEep:TIME:AUTO?</td>
<td>Y</td>
</tr>
<tr>
<td>:SWEep:TIME:LLIMIT &lt;value&gt;[&lt;timesuffix&gt;]</td>
<td>Y</td>
</tr>
<tr>
<td>:SWEep:TIME:LLIMIT?</td>
<td>Y</td>
</tr>
<tr>
<td>:SWEep:TIME?</td>
<td>Y</td>
</tr>
<tr>
<td>:SWEep[:FREQuency]:STEP &lt;value&gt;[&lt;freqsuffix&gt;]</td>
<td>N</td>
</tr>
<tr>
<td>:SWEep[:FREQuency]:STEP?</td>
<td>N</td>
</tr>
<tr>
<td>:SWEep[:POINts]:TRIGger:SOURce IMMEDIATE</td>
<td>BUS</td>
</tr>
<tr>
<td>:SWEep[:POINts]:TRIGger:SOURce IMMEDIATE</td>
<td>BUS</td>
</tr>
<tr>
<td>:SWEep[:POINts]:TRIGger:SOURce?</td>
<td>N</td>
</tr>
<tr>
<td>:SWEep[:POINts]:TRIGger[:IMMediate]</td>
<td>N</td>
</tr>
<tr>
<td><strong>System Subsystem</strong></td>
<td></td>
</tr>
<tr>
<td>:SYSTem:ALTernate &lt;reg num&gt;</td>
<td>Y</td>
</tr>
<tr>
<td>:SYSTem:ALTernate:STATe ON</td>
<td>OFF</td>
</tr>
<tr>
<td>:SYSTem:ALTernate:STATe?</td>
<td>Y</td>
</tr>
<tr>
<td>:SYSTem:ALTernate?</td>
<td>Y</td>
</tr>
<tr>
<td>:SYSTem:COMMunicate:GPIB:ADDRess &lt;value&gt;</td>
<td>Y</td>
</tr>
</tbody>
</table>
### SCPI Command Compatibility

**8375xB Compatible SCPI Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>PSG Support</th>
<th>83751B &amp; 83752B</th>
</tr>
</thead>
<tbody>
<tr>
<td>:SYSTem:COMMunicate:PMETer:ADDRess &lt;value&gt;</td>
<td>Y</td>
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<tr>
<td>:SYSTem:COMMunicate:PMETer:TYPE SCPI</td>
<td>70100A</td>
<td>437B</td>
</tr>
<tr>
<td>:SYSTem:COMMunicate:PMETer:TYPE?</td>
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<td></td>
</tr>
<tr>
<td>:SYSTem:ERRor?</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:SYSTem:KEY:DISable SAVE</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>:SYSTem:KEY:DISable? SAVE</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>:SYSTem:KEY:ENABLE SAVE</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>:SYSTem:KEY:ENABLE? SAVE</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>:SYSTem:KEY[:CODE] &lt;value&gt;</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>:SYSTem:KEY[:CODE]?</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>:SYSTem:LANGuage <em>SCPI</em>&quot;&quot;&quot;&quot;&quot;&quot;TM&quot;&quot;&quot;&quot;&quot;&quot;COMP*</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>:SYSTem:LANGuage?</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:SYSTem:PRESet:TYPE FACTory</td>
<td>USER</td>
<td>Y</td>
</tr>
<tr>
<td>:SYSTem:PRESet:TYPE?</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:SYSTem:PRESet[:EXECute]</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:SYSTem:PRESet[:USER]:SAVE</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:SYSTem:SECurity:CLEar</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>:SYSTem:SECurity:COUNt &lt;value&gt;</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>:SYSTem:SECurity:KLOCK ON</td>
<td>OFF</td>
<td>O</td>
</tr>
<tr>
<td>:SYSTem:SECurity:ZERO ON</td>
<td>OFF</td>
<td>O</td>
</tr>
<tr>
<td>:SYSTem:VERSion?</td>
<td>Y</td>
<td></td>
</tr>
</tbody>
</table>

#### Trigger Subsystem

<table>
<thead>
<tr>
<th>Command</th>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>:TRIGger:SOURce1 IMMEDIATE</td>
<td>BUS</td>
</tr>
<tr>
<td>:TRIGger:SOURce IMMEDIATE</td>
<td>BUS</td>
</tr>
</tbody>
</table>
SCPI Command Compatibility
8662A/63A Compatible Commands

Table 7-5 8375xB SCPI Commands (Continued)

<table>
<thead>
<tr>
<th>Command</th>
<th>Y= Supported by PSG</th>
<th>N= Not supported by PSG</th>
<th>83751B &amp; 83752B</th>
</tr>
</thead>
<tbody>
<tr>
<td>:TRIGger:SOURcel?</td>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>:TRIGger:SOURce?</td>
<td></td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>:TRIGger[:IMMediate]</td>
<td></td>
<td></td>
<td>Y</td>
</tr>
</tbody>
</table>

Tweep Subsystem

Table 7-6 on page 371: a comprehensive list of 8662A/63A programming commands, listed in alphabetical order. The equivalent SCPI command sequence for each supported code is provided. Codes that have no equivalent SCPI command sequence are indicated in the command column, as are codes that are not supported by the PSG family.

Table 7-7 on page 377: a list of the implemented 8662B/63B programming commands that set the active function. This table also indicates which codes are compatible with the increment (up), and the decrement (down) SCPI commands.

To use the commands, select 866xA as the remote language. See ":LANGuage" on page 87 for selecting the language type.

When using the programming codes in this section, you can:

- set the PSG system language to 866xA for the current session:
  Utility > GPIB/RS-232 LAN > Remote Language > 866xA
  or send the command:
  :SYST:LANG "8662" or "8663"

- set the PSG system language to 866xA so that it does not reset on a preset, an instrument power cycle or a *RST command:
  Utility > Power On/Preset > Preset Language > 866xA
  or send the command:
  :SYST:PRESET:LANG "8662" or "8663"


NOTE Compatibility is provided for GPIB only; RS-232 and LAN are not supported.

Device Clear does not preset the instrument.
To reproduce the sweep functionality, use the PSG List Sweep features.
### Table 7-6 8662A/63A Commands & Equivalent SCPI Sequences

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>8662</th>
<th>8663</th>
<th>Equivalent SCPI Command Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Write require service mask</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>#2</td>
<td>Deferred execution mode</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>#3</td>
<td>Immediate execution mode</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>&lt;D</td>
<td>&lt;dBm</td>
<td>Y</td>
<td>Y</td>
<td>DBM</td>
</tr>
<tr>
<td>AM</td>
<td>AM modulation</td>
<td>Y</td>
<td></td>
<td>AM:DEPTH &lt;val&gt; &lt;units&gt; AM:TRAC ON FM:STAT OFF AM:STAT ON</td>
</tr>
<tr>
<td></td>
<td>See also: Table 7-7 on page 377</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AO</td>
<td>Amplitude off</td>
<td>Y</td>
<td>Y</td>
<td>OUTPut:STATe OFF</td>
</tr>
<tr>
<td>AP</td>
<td>Amplitude</td>
<td>Y</td>
<td>Y</td>
<td>POW:REF:STATe OFF, POWer:AMPL &lt;val&gt; &lt;units&gt; OUTPut:STATe ON</td>
</tr>
<tr>
<td>AS</td>
<td>BLSQ</td>
<td>Auto sequence</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>CT</td>
<td>Configure trigger</td>
<td>Y</td>
<td>Y</td>
<td>no equivalent SCPI command sequence</td>
</tr>
<tr>
<td>−D</td>
<td>−dBm</td>
<td>Y</td>
<td>Y</td>
<td>DBM</td>
</tr>
<tr>
<td>DB</td>
<td>dB</td>
<td>Y</td>
<td>Y</td>
<td>DB</td>
</tr>
<tr>
<td>DG</td>
<td>Degree</td>
<td>Y</td>
<td></td>
<td>DBG</td>
</tr>
<tr>
<td>DM</td>
<td>dBm</td>
<td>Y</td>
<td>Y</td>
<td>DBM</td>
</tr>
<tr>
<td>DN</td>
<td>Decrement</td>
<td>Y</td>
<td>Y</td>
<td>See Table 7-7 on page 377</td>
</tr>
<tr>
<td>FA</td>
<td>Start frequency</td>
<td>Y</td>
<td>Y</td>
<td>See W2, W3, W4, and Table 7-7 on page 377</td>
</tr>
<tr>
<td>FB</td>
<td>Stop frequency</td>
<td>Y</td>
<td>Y</td>
<td>See W2, W3, W4, and Table 7-7 on page 377</td>
</tr>
<tr>
<td>FM</td>
<td>FM modulation</td>
<td>Y</td>
<td></td>
<td>FM:DEV &lt;val&gt; &lt;units&gt; AM:STAT OFF AM:STAT ON</td>
</tr>
<tr>
<td></td>
<td>See also: Table 7-7 on page 377</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FR</td>
<td>Center frequency</td>
<td>Y</td>
<td>Y</td>
<td>See W2, W3, W4, and Table 7-7 on page 377</td>
</tr>
<tr>
<td>FS</td>
<td>Span frequency</td>
<td>Y</td>
<td>Y</td>
<td>See W2, W3, W4, and Table 7-7 on page 377</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
<td>8662</td>
<td>8663</td>
<td>Equivalent SCPI Command Sequence</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
<td>------</td>
<td>------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>GZ</td>
<td>GHz</td>
<td>Y</td>
<td>Y</td>
<td>GZ</td>
</tr>
<tr>
<td>HZ</td>
<td>Hz</td>
<td>Y</td>
<td>Y</td>
<td>Hz</td>
</tr>
<tr>
<td>IS</td>
<td>Set increment. Adds &quot;STEP:INCR&quot; to active function command.</td>
<td>Y</td>
<td>Y</td>
<td>no equivalent SCPI command sequence</td>
</tr>
<tr>
<td>KZ</td>
<td>kHz</td>
<td>Y</td>
<td>Y</td>
<td>KZ</td>
</tr>
<tr>
<td>L1</td>
<td>Learn front panel</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>L2</td>
<td>Fast learn</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>M0</td>
<td>M0</td>
<td>Modulation off</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>M1</td>
<td>For 8662A: &lt;mod&gt; = FM or AM, depending on which is on.</td>
<td>Y</td>
<td></td>
<td>&lt;mod&gt;:SOURCE INT1 &lt;mod&gt;:INT1:FREQ 400Hz</td>
</tr>
<tr>
<td></td>
<td>Modulation source internal 400 Hz</td>
<td></td>
<td></td>
<td>AM:INT1:FREQ 400 MHz PM:INT2:FREQ 400 MHz PULM:INT1:FREQ 400 MHz</td>
</tr>
<tr>
<td></td>
<td>For 8663A: Executes MF with &lt;freq&gt; = 400 Hz</td>
<td></td>
<td></td>
<td>AM:INT1:FREQ 1 kHz PM:INT2:FREQ 1 kHz PULM:INT:FREQ 1 kHz</td>
</tr>
<tr>
<td>M2</td>
<td>For 8662A: &lt;mod&gt; = FM or AM, depending on which is on.</td>
<td>Y</td>
<td></td>
<td>&lt;mod&gt;:SOURCE INT1 &lt;mod&gt;:INT1:FREQ 1kHz</td>
</tr>
<tr>
<td></td>
<td>Modulation source internal 1 kHz</td>
<td></td>
<td></td>
<td>AM:INT1:FREQ 1 kHz PM:INT2:FREQ 1 kHz PULM:INT:FREQ 1 kHz</td>
</tr>
<tr>
<td></td>
<td>For 8663A: Executes MF with &lt;freq&gt; = 1 kHz</td>
<td></td>
<td></td>
<td>AM:INT1:FREQ 1 kHz PM:INT2:FREQ 1 kHz PULM:INT:FREQ 1 kHz</td>
</tr>
<tr>
<td>M3</td>
<td>For 8662A: &lt;mod&gt; = FM or AM, depending on which is on.</td>
<td>Y</td>
<td></td>
<td>&lt;mod&gt;:SOURCE EXT &lt;mod&gt;:EXT:COUPling AC &lt;mod&gt;:EXT:IMP 600</td>
</tr>
<tr>
<td></td>
<td>Modulation source external AC</td>
<td></td>
<td></td>
<td>AM:EXT:FREQ 400 Hz PM:EXT:FREQ 400 Hz PULM:EXT:FREQ 400 Hz</td>
</tr>
<tr>
<td></td>
<td>For 8663A: &lt;mod&gt; = AM, FM, or PM, depending on which is on.</td>
<td>Y</td>
<td></td>
<td>&lt;mod&gt;:SOURCE EXT&lt;n&gt; &lt;mod&gt;:EXT&lt;n&gt;:COUPling AC &lt;mod&gt;:EXT&lt;n&gt;:IMP 600</td>
</tr>
<tr>
<td></td>
<td>&lt;n&gt; = 1 for AM, 2 for FM or PM</td>
<td></td>
<td></td>
<td>AM:EXT:FREQ 400 Hz PM:EXT:FREQ 400 Hz PULM:EXT:FREQ 400 Hz</td>
</tr>
<tr>
<td>M4</td>
<td>For 8662A: &lt;mod&gt; = FM or AM, depending on which is on.</td>
<td>Y</td>
<td></td>
<td>&lt;mod&gt;:SOURCE EXT &lt;mod&gt;:EXT:COUPling DC &lt;mod&gt;:EXT:IMP 600</td>
</tr>
<tr>
<td></td>
<td>Modulation source external DC</td>
<td></td>
<td></td>
<td>AM:EXT:FREQ 400 Hz PM:EXT:FREQ 400 Hz PULM:EXT:FREQ 400 Hz</td>
</tr>
<tr>
<td></td>
<td>For 8663A: &lt;mod&gt; = AM, FM, or PM, depending on which is on.</td>
<td>Y</td>
<td></td>
<td>&lt;mod&gt;:SOURCE EXT&lt;n&gt; &lt;mod&gt;:EXT&lt;n&gt;:COUPling DC &lt;mod&gt;:EXT&lt;n&gt;:IMP 600</td>
</tr>
<tr>
<td></td>
<td>&lt;n&gt; = 1 for AM, 2 for FM or PM</td>
<td></td>
<td></td>
<td>AM:EXT:FREQ 400 Hz PM:EXT:FREQ 400 Hz PULM:EXT:FREQ 400 Hz</td>
</tr>
<tr>
<td>MF</td>
<td>Modulation frequency</td>
<td></td>
<td></td>
<td>AM:AM:SOURCE INT1 AM:SOURCE INT1:FREQ &lt;freq&gt;</td>
</tr>
<tr>
<td></td>
<td>&lt;mod&gt; = FM, or PM, depending on which is on.</td>
<td></td>
<td></td>
<td>FM or PM &lt;mod&gt;:SOURCE INT2 &lt;mod&gt;:SOURCE INT2:FREQ &lt;freq&gt;</td>
</tr>
<tr>
<td></td>
<td>Also see: M1, M2, and Table 7-7 on page 377</td>
<td></td>
<td></td>
<td>Pulse: PULM:SOURCE INT1 PULM:INT:FREQ &lt;freq&gt; PULM:SOURCE INT SQUARE</td>
</tr>
</tbody>
</table>
### Table 7-6 8662A/63A Commands & Equivalent SCPI Sequences (Continued)

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>8662</th>
<th>8663</th>
<th>Equivalent SCPI Command Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS</td>
<td>Read status key message</td>
<td>Y</td>
<td>Y</td>
<td>no equivalent SCPI command sequence</td>
</tr>
<tr>
<td>MV</td>
<td>mV</td>
<td>Y</td>
<td>Y</td>
<td>MV</td>
</tr>
<tr>
<td>MZ</td>
<td>MHz</td>
<td>Y</td>
<td>Y</td>
<td>MHz</td>
</tr>
<tr>
<td>N1</td>
<td>Linear 100 steps</td>
<td>Y</td>
<td>Y</td>
<td>See W2, W3, and W9</td>
</tr>
<tr>
<td>N2</td>
<td>Linear 1000 steps</td>
<td>Y</td>
<td>Y</td>
<td>See W2, W3, and W9</td>
</tr>
<tr>
<td>N3</td>
<td>Step size</td>
<td>Y</td>
<td>Y</td>
<td>See W2, W3, W4, and Table 7-7 on page 377</td>
</tr>
<tr>
<td>N4</td>
<td>Log 10% steps</td>
<td>Y</td>
<td>Y</td>
<td>See W2, W3, and W9</td>
</tr>
<tr>
<td>N5</td>
<td>Log 1% steps</td>
<td>Y</td>
<td>Y</td>
<td>See W2, W3, and W9</td>
</tr>
<tr>
<td>PC</td>
<td>%</td>
<td>Y</td>
<td>Y</td>
<td>PCT</td>
</tr>
<tr>
<td>PL</td>
<td>Pulse modulation</td>
<td>Y</td>
<td></td>
<td>PULM:STAT ON</td>
</tr>
<tr>
<td>PM</td>
<td>Phase modulation</td>
<td>Y</td>
<td></td>
<td>PM:STAT ON See also Table 7-7 on page 377</td>
</tr>
<tr>
<td>R1</td>
<td>Knob resolution x10</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>R2</td>
<td>Knob resolution /10</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>R3</td>
<td>Knob off</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>R5/BLR1</td>
<td>Knob hold</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>R5/BLR2</td>
<td>Knob increment</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>RC</td>
<td>Recall</td>
<td>Y</td>
<td>Y</td>
<td>*RCL</td>
</tr>
<tr>
<td>RD</td>
<td>Knob down</td>
<td>Y</td>
<td>Y</td>
<td>LIST:MANual DOWN</td>
</tr>
<tr>
<td>EM</td>
<td>Read require service mask</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>RU</td>
<td>Knob up</td>
<td>Y</td>
<td>Y</td>
<td>LIST:MANual UP</td>
</tr>
<tr>
<td>SP00</td>
<td>System preset</td>
<td>Y</td>
<td>Y</td>
<td>SYSTem:PRESet</td>
</tr>
<tr>
<td>SP10</td>
<td>Frequency offset off</td>
<td>Y</td>
<td>Y</td>
<td>FREQ:OFFS:STAT OFF</td>
</tr>
<tr>
<td>SP11</td>
<td>Positive frequency offset</td>
<td>Y</td>
<td>Y</td>
<td>FREQ:OFFS &lt;value&gt; FREQ:OFFS:STAT ON FREQ:CN &lt;displayed value&gt;</td>
</tr>
<tr>
<td>SP12</td>
<td>Negative frequency offset</td>
<td>Y</td>
<td>Y</td>
<td>FREQ:OFFS &lt;value&gt; FREQ:OFFS:STAT ON FREQ:CN &lt;displayed value&gt;</td>
</tr>
</tbody>
</table>
### Table 7-6 8662A/63A Commands & Equivalent SCPI Sequences (Continued)

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>8662</th>
<th>8663</th>
<th>Equivalent SCPI Command Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP20</td>
<td>ALC bandwidth normal</td>
<td>Y</td>
<td>Y</td>
<td>POWER:ALC:BANDwidth:AUTO ON</td>
</tr>
<tr>
<td>SP21</td>
<td>ALC bandwidth &lt; 1 kHz</td>
<td>Y</td>
<td>Y</td>
<td>POWER:ALC:BANDwidth:AUTO OFF:POWER:ALC:BANDwidth 1KHZ</td>
</tr>
<tr>
<td>SP30</td>
<td>Amplitude reference off</td>
<td>Y</td>
<td>Y</td>
<td>POWER:REF:STATe OFF</td>
</tr>
<tr>
<td>SP31</td>
<td>Amplitude reference</td>
<td>Y</td>
<td>Y</td>
<td>POWER:REF &lt;val&gt; &lt;val&gt; = current amplitude setting POWER:REF:STATe ON</td>
</tr>
<tr>
<td>SP32</td>
<td>Amplitude reference relative to 1 μV</td>
<td>Y</td>
<td>Y</td>
<td>POWER:REF 106.99DBM POWER:REF:STATe ON POWER 1UV</td>
</tr>
<tr>
<td>SP40</td>
<td>External AM off</td>
<td>Y</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td></td>
<td>Modulation frequency sweep mode off</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>SP41</td>
<td>Internal FM + external AM (AC)</td>
<td>Y</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td></td>
<td>Modulation frequency sweep mode on</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>SP42</td>
<td>Internal FM + external AM (DC)</td>
<td>Y</td>
<td>Y</td>
<td>FM1:SCRB INT1 FM1:INT1:FRQ 400 Hz FM1:STAT ON FM1:SCRB EXT1 FM1:EXT1:IMP 600 FM1:DEPTH 95 PCT FM1:EXT1:COUP AC FM1:STAT ON</td>
</tr>
<tr>
<td>SP50</td>
<td>AUX FM off</td>
<td>Y</td>
<td>Y</td>
<td>FM2:STAT OFF</td>
</tr>
<tr>
<td>SP51</td>
<td>AUX FM on</td>
<td>Y</td>
<td>Y</td>
<td>FM2:STAT OFF</td>
</tr>
<tr>
<td></td>
<td>RF (MHz) FM Deviation (kHz)</td>
<td>Y</td>
<td>Y</td>
<td>FM2:SCRB EXT2 FM2:EXT2:COUP DC FM2:EXT2:IMP 600 FM2:DEV &lt;dev&gt; kHz FM2:STAT ON</td>
</tr>
<tr>
<td>0.01–120</td>
<td>25</td>
<td>Y</td>
<td>Y</td>
<td>FM2:SCRB EXT2 FM2:EXT2:COUP DC FM2:EXT2:IMP 600 FM2:DEV &lt;dev&gt; kHz FM2:STAT ON</td>
</tr>
<tr>
<td>1280–2560</td>
<td>100</td>
<td>Y</td>
<td>Y</td>
<td>FM2:SCRB EXT2 FM2:EXT2:COUP DC FM2:EXT2:IMP 600 FM2:DEV &lt;dev&gt; kHz FM2:STAT ON</td>
</tr>
<tr>
<td>SP60</td>
<td>Parameter shift keying off</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>SP61</td>
<td>Parameter shift keying up/down (two-key)</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>SP62</td>
<td>Parameter shift keying up/down (one-key)</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>SP70</td>
<td>External PM input impedance 50Ω Effects the behavior of M3 and M4.</td>
<td>Y</td>
<td>N</td>
<td>no equivalent SCPI command sequence</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
<td>8662</td>
<td>8663</td>
<td>Equivalent SCPI Command Sequence</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
<td>------</td>
<td>------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>SP71</td>
<td>External PM input impedance 60Ω2</td>
<td>Y</td>
<td>Y</td>
<td>no equivalent SCPI command sequence</td>
</tr>
<tr>
<td>SP80</td>
<td>Special functions 10-62 off</td>
<td>Y</td>
<td>Y</td>
<td>FM2:STAT OFF AM:STAT OFF FREQ:OFFS:STAT OFF</td>
</tr>
<tr>
<td>SP81</td>
<td>Amplitude conversion (V-dBm)</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>SP82</td>
<td>Display GPIB address</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>SP83</td>
<td>ROM test</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>SP84</td>
<td>RAM test</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>SP85</td>
<td>Amplitude correction off</td>
<td>Y</td>
<td>Y</td>
<td>POWER:ALC:STATe OFF</td>
</tr>
<tr>
<td>SP86</td>
<td>Amplitude correction on</td>
<td>Y</td>
<td>Y</td>
<td>POWER:ALC:STATe ON</td>
</tr>
<tr>
<td>SP87</td>
<td>Amplitude correction on (includes sweep)</td>
<td>Y</td>
<td>Y</td>
<td>POWER:ALC:STATe ON</td>
</tr>
<tr>
<td>SP88</td>
<td>GPIB operator request response</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>SP89</td>
<td>Auto sequence</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>SP90</td>
<td>Set auto sequence step delay</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>SP91</td>
<td>Enable frequency hopping mode</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>SP92</td>
<td>Knob (restore normal operation)</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>SP93</td>
<td>Manual amplitude level control</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>SP94</td>
<td>Knob, 120 increments per revolution</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>SP95</td>
<td>Knob, 120 increments per revolution, reconfigure AUX con.</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>SP96</td>
<td>Modulation oscillator off when modulation is off</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>SP97</td>
<td>Modulation oscillator on</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>SP98</td>
<td>Turn display on</td>
<td>Y</td>
<td>Y</td>
<td>DISP ON</td>
</tr>
<tr>
<td>SP99</td>
<td>Turn display off</td>
<td>Y</td>
<td>Y</td>
<td>DISP OFF</td>
</tr>
<tr>
<td>SP2.0</td>
<td>Power up preset off</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>SP2.1</td>
<td>Power up preset on</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>SQ</td>
<td>Sequence</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>SS</td>
<td>BLSST</td>
<td>Set sequence</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>ST</td>
<td>Store</td>
<td>Y</td>
<td>Y</td>
<td>*SAV</td>
</tr>
<tr>
<td>T1</td>
<td>0.5 ms per step</td>
<td>Y</td>
<td>Y</td>
<td>SWEEP:DWELL 0.5ms Beyond PSG range limit, is set to 1ms.</td>
</tr>
<tr>
<td>T2</td>
<td>1 ms per step</td>
<td>Y</td>
<td>Y</td>
<td>SWEEP:DWELL 1ms</td>
</tr>
</tbody>
</table>
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### 8662A/63A Compatible Commands

### Table 7-6  8662A/63A Commands & Equivalent SCPI Sequences (Continued)

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<th>Command</th>
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<th>8662</th>
<th>8663</th>
<th>Equivalent SCPI Command Sequence</th>
</tr>
</thead>
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<tr>
<td><strong>T3</strong></td>
<td>2 ms per step</td>
<td>Y</td>
<td>Y</td>
<td>SWEEP:DWELL 2ms</td>
</tr>
<tr>
<td><strong>T4</strong></td>
<td>10 ms per step</td>
<td>Y</td>
<td>Y</td>
<td>SWEEP:DWELL 10ms</td>
</tr>
<tr>
<td><strong>T5</strong></td>
<td>100 ms per step</td>
<td>Y</td>
<td>Y</td>
<td>SWEEP:DWELL 100ms</td>
</tr>
<tr>
<td><strong>TR</strong></td>
<td>Trigger</td>
<td>Y</td>
<td>Y</td>
<td>no equivalent SCPI command sequence</td>
</tr>
<tr>
<td><strong>UP</strong></td>
<td>Increment</td>
<td>Y</td>
<td>Y</td>
<td>See Table 7-7 on page 377</td>
</tr>
<tr>
<td><strong>UV</strong></td>
<td>mV</td>
<td>Y</td>
<td>Y</td>
<td>UV</td>
</tr>
<tr>
<td><strong>W1</strong></td>
<td>Sweep off</td>
<td>Y</td>
<td>Y</td>
<td>FREQ:MODE ON LIST:TRIG:SOUR IMM</td>
</tr>
<tr>
<td><strong>W2</strong></td>
<td>Auto sweep mode on</td>
<td>Y</td>
<td>Y</td>
<td>INIT:CONT ON SWEEP:MODE AUTO LIST:TRIG:SOUR IMM LIST:DWELL:TYPE STEP LIST:TYPE LIST FREQ:MODE LIST</td>
</tr>
<tr>
<td><strong>W4</strong></td>
<td>Single sweep mode on</td>
<td>Y</td>
<td>Y</td>
<td>INIT:CONT OFF SWEEP:MODE AUTO LIST:DWELL:TYPE STEP LIST:TYPE LIST FREQ:MODE LIST INIT</td>
</tr>
<tr>
<td><strong>X1</strong></td>
<td>Marker 1</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td><strong>X2</strong></td>
<td>Marker 2</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td><strong>X3</strong></td>
<td>Marker 3</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td><strong>X4</strong></td>
<td>Marker 4</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td><strong>X5</strong></td>
<td>Marker 5</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td><strong>X6</strong></td>
<td>Marker off</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td><strong>X7</strong></td>
<td>All markers off</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td><strong>Y0</strong></td>
<td>Remote stepped sweep off</td>
<td>Y</td>
<td>Y</td>
<td>FREQ:MODE ON LIST:TRIG:SOUR IMM</td>
</tr>
</tbody>
</table>
## Table 7-6  8662A/63A Commands & Equivalent SCPI Sequences  (Continued)

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Sets Active Function</th>
<th>Compatible with UP/DN</th>
<th>8662</th>
<th>8663</th>
<th>Equivalent SCPI Command Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y1/Y2</td>
<td>Remote stepped sweep on</td>
<td>Y Y Y</td>
<td>Y</td>
<td>Y</td>
<td>INIT:CONT ON&lt;br&gt;SINGLE:MODE AUTO&lt;br&gt;LIST:DWELL:TYPE STEP&lt;br&gt;LIST:TYPE LIST&lt;br&gt;FREQ:MODE LIST&lt;br&gt;LIST:TRIG:SOUR BUS</td>
<td></td>
</tr>
<tr>
<td>Y3</td>
<td>Execute remote stepped sweep</td>
<td>Y Y Y</td>
<td>Y</td>
<td>*TSO</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Table 7-7  8662/63B Command Compatibility

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Sets Active Function</th>
<th>Compatible with UP/DN</th>
<th>8662</th>
<th>8663</th>
<th>Equivalent SCPI Commands for UP/DN and Increment</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM</td>
<td>AM modulation</td>
<td>Y Y Y Y</td>
<td>Y</td>
<td>AM:DEPTH UP&lt;br&gt;AM:DEPTH:STP:INCR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AP</td>
<td>Amplitude</td>
<td>Y Y Y Y</td>
<td>Y</td>
<td>POW:AMPL UP&lt;br&gt;POW:AMPL:STP:INC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FA</td>
<td>Start frequency</td>
<td>Y Y Y Y</td>
<td>Y</td>
<td>FREQ:CN:STEP:INC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FB</td>
<td>Stop frequency</td>
<td>Y Y Y Y</td>
<td>Y</td>
<td>FREQ:CN:STEP:INC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FM</td>
<td>FM modulation</td>
<td>Y Y Y Y</td>
<td>Y</td>
<td>FM:DEV UP&lt;br&gt;FM:DEV:STP:INCR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FR</td>
<td>Center frequency</td>
<td>Y Y Y Y</td>
<td>Y</td>
<td>FREQ:CN UP&lt;br&gt;FREQ:CN:STEP:INC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FS</td>
<td>Span frequency</td>
<td>Y Y Y Y</td>
<td>Y</td>
<td>FREQ:CN:STEP:INC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MF</td>
<td>Modulation frequency</td>
<td>Y Y Y</td>
<td>Y&lt;br&gt;MOD:INT:FREQ UP&lt;br&gt;MOD:INT:FREQ:STP:INC&lt;br&gt;MOD = AM</td>
<td>FM</td>
<td>PM</td>
<td>PULM</td>
</tr>
<tr>
<td>N3</td>
<td>Step size</td>
<td>Y Y Y Y</td>
<td>Y</td>
<td>no equivalent SCPI commands</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PM</td>
<td>Phase modulation&lt;br&gt;Not compatible with any FM modulation.</td>
<td>Y Y</td>
<td>Y</td>
<td>PM:DEV UP&lt;br&gt;PM:DEV:STP:INC</td>
<td></td>
<td></td>
</tr>
</tbody>
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SCPI Command Compatibility
8662A/63A Compatible Commands
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