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- 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

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
SCPI Basics

This section describes the general use of the SCPI language for the signal generator. 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>Characters</th>
<th>Meaning</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<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>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>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>Braces indicate that parameters can optionally be used in the command once, several times, or not at all.</td>
<td>[:SOURce]:LIST:POWer &lt;val&gt;{,&lt;val&gt;}</td>
</tr>
</tbody>
</table>

**Table 1-2  Command Syntax**

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</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, Either :FREQ, :FREQuency, or :FREQUENCY is correct.</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.</td>
<td>:TRIGger:OUTPut:POClarity? TRIGger is the root level keyword for this command.</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 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 uency or :POWer :LEVel are not allowed. A &lt;space&gt; between :LEVel and 6.2 is mandatory.</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.

**Figure 1-1  Command Types**

![Command Tree Diagram](ck706a)

**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.
Using this Guide

SCPI Basics

Table 1-3  Parameter and Response Types

<table>
<thead>
<tr>
<th>Parameter Types</th>
<th>Response Data Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numeric</td>
<td>Real, Integer</td>
</tr>
<tr>
<td>Extended Numeric</td>
<td>Real, Integer</td>
</tr>
<tr>
<td>Discrete</td>
<td>Discrete</td>
</tr>
<tr>
<td>Boolean</td>
<td>Numeric Boolean</td>
</tr>
<tr>
<td>String</td>
<td>String</td>
</tr>
</tbody>
</table>

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 any simple numeric value</td>
<td>DEFault resets parameter to its default value</td>
</tr>
<tr>
<td>1.2GHz GHZ can be used for exponential (E009)</td>
<td>UP increments the parameter</td>
</tr>
<tr>
<td>200MHz MHZ can be used for exponential (E006)</td>
<td>DOWN decrements the parameter</td>
</tr>
<tr>
<td>-100mV negative 100 millivolts</td>
<td>MINimum sets parameter to smallest possible value</td>
</tr>
<tr>
<td>10DEG 10 degrees</td>
<td>MAXimum sets parameter to largest possible value</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

:memory:copy "<filename>"."<filename>"

Command Syntax with the file name

:memory:copy "FLATCAL@USERFLAT"."FLATCAL@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

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

Command Syntax with the file name

:memory: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 37 for a listing of the file systems and types. The entries under file type are used in the directory path.
**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.
quotes, one set of single quotes, or back slashes 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 #HFFFF
2 System Commands

In the following sections, this chapter provides SCPI descriptions for subsystems dedicated to peripheral signal generator operations that are applicable to this signal generator:

- “Calibration Subsystem (:CALibration)” on page 16
- “Communication Subsystem (:SYSTem:COMMunicate)” on page 16
- “Diagnostic Subsystem (:DIAGnostic[:CPU]:INFormation)” on page 22
- “Display Subsystem (:DISPlay)” on page 24
- “IEEE 488.2 Common Commands” on page 28
- “Memory Subsystem (:MEMory)” on page 32
- “Mass Memory Subsystem (:MMEMory)” on page 36
- “Output Subsystem (:OUTPut)” on page 39
- “Status Subsystem (:STATus)” on page 41
- “System Subsystem (:SYSTem)” on page 52
- “Trigger Subsystem” on page 61
- “Unit Subsystem (:UNIT)” on page 64
System Commands
Calibration Subsystem (:CALibration)

Calibration Subsystem (:CALibration)

:DCFM
: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.

<table>
<thead>
<tr>
<th>Key Entry</th>
<th>DCFM/DCΦM Cal</th>
</tr>
</thead>
</table>

Communication Subsystem (:SYSTem:COMMunicate)

:GPIB:ADDRess
: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.

<table>
<thead>
<tr>
<th>Range</th>
<th>0–30</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Key Entry</th>
<th>GPIB Address</th>
</tr>
</thead>
</table>

:GTLocal
:SYSTem:COMMunicate:GTLocal

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

<table>
<thead>
<tr>
<th>Range</th>
<th>N/A</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Key Entry</th>
<th>Local</th>
</tr>
</thead>
</table>

Agilent E8663B Analog Signal Generator SCPI Command Reference
**:LAN:CONFig**

: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**

: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 "203.149.78.1.101"

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

**Key Entry**

Default Gateway
System Commands
Communication Subsystem (:SYStem:COMMunicate)

:LAN:HOSTname

: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

: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

: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**

**:PMETer:ADDRess**

: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**

: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

:PMETER:IDN

:SYST:COMM: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:PMETER: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

:SYST:COMM: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:PMETER: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
: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
: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
: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
: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
: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
: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
: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:OTIMe`

`:DIAGnostic[:CPU]:INFormation:DISPlay:OTIMe?`

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

**Key Entry**

**Diagnostic Info**

`:LICENse:AUXiliary`

`: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`

`:DIAGnostic[:CPU]:INFormation:OPTions?`

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

**Key Entry**

**Options Info**

`:OPTions:DETail`

`: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`

`: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 (:DISP)

:REVision
: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
:DIAGnostic[:CPU]:INFormation:SDATe?
This query returns the date and time stamp for the signal generator's firmware.

Key Entry Diagnostic Info

Display Subsystem (:DISP)

:ANNotation:AMPLitude:UNIT
:DISPly:ANNotation:AMPLitude:UNIT DBM|DBUV|DBUVEMF|V|VEMF|DB
:DISPly: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 90 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
:DISPly:ANNotation:CLOCk:DATE:FORMat MDY|DMY
:DISPly: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.

:ANN otation:CLOCk[:STATe]

:DISPlay:ANNotation:CLOCk[:STATe] ON|OFF|1|0
:DISPlay:ANNotation:CLOCk[: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

:DISPlay:BRIGHTness <val>
:DISPlay:BRIGHTness?

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
System Commands
Display Subsystem (:DISPlay)

:CAPTure

: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

: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:CONT .45
The preceding example sets the display contrast to .45.
Range
0–1
Key Entry
Display contrast hardkeys are located below the display.

:INVerse

: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.
Example
:DISP:INV OFF
The preceding example sets the display video to normal (not inverse).
Key Entry
Inverse Video Off On
System Commands
Display Subsystem (:DISP)

:REMote
:DISPlay:REMote ON|OFF|1|0
:DISPlay:REMote?
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
: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

*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 *Agilent Signal Generators Programming Guide* for more information on programming the status registers.

*ESE

*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 *Agilent Signal Generators 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?

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

Refer to the *Agilent Signal Generators Programming Guide* for more information on programming the status registers.
*ESR?

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 Agilent Signal Generators Programming Guide for more information.

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

*IDN?

*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 54 for more information.

Key Entry Diagnostic Info

*OPC

*OPC
The Operation Complete (OPC) command sets bit 0 in the Standard Event register.
Refer to the Agilent Signal Generators Programming Guide for more information on programming the status registers.

*OPC?

*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 Agilent Signal Generators Programming Guide for more information on programming the status registers.

*PSC

*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 Agilent Signal Generators 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.
System Commands
IEEE 488.2 Common Commands

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?

*PSC?

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

*RCL

*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

*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.

*SAV

*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, list sweep
values, table entries, and so forth are not stored. Only a reference to the data file name is saved.
Refer to the E8663B Analog Signal Generator User’s Guide and Agilent Signal Generators
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**

*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 *Agilent Signal Generators 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?**

*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 *Agilent Signal Generators Programming Guide* for more information on programming the status registers.

Range 0–63, 128–191

**STB?**

*STB?*

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

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

Range 0–255

**TRG**

*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 63 for more information on triggers.
**System Commands**

**Memory Subsystem (MEMory)**

*TST?

*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

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

**Memory Subsystem (MEMory)**

:CATalog:BINary

:MEMory: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:LIST

:MEMory:CATalog:LIST?

This command outputs a list of List Sweep 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**  List
System Commands
Memory Subsystem (MEMORY)

:CATalog:STATE

:MEMORY:CATalog:STATE?

This command outputs a list of state 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 State

:CATalog:UFLT

:MEMORY:CATalog:UFLT?

This command outputs a list of user-flatness correction 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 User Flatness

:CATalog[:ALL]

:MEMORY:CATalog[:ALL]?

This command outputs a list of all files in the memory subsystem. The return data is in the following
form:

<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 37 for file types, and “File Name Variables” on page 10 for syntax.

Key Entry All

:COPY[:NAME]

: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).
**System Commands**

**Memory Subsystem (:MEM)_aliases

"<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/LIST/LIST1","/USER/LIST/test_LIST"

The preceding example copies the LIST1 file in the signal generator’s /USER/LIST directory to a file named test_LIST and saves it in the same directory.

**Key Entry**  
Copy File

:DELeTe:ALL

**CAUTION**  
Using this command deletes all user files including binary, list, state, and flatness correction files, and any saved setups which use the front panel table editor. You cannot recover the files after executing this command.

:MEM:DELeTe:ALL

This command clears the file system of all user files.

**Key Entry**  
Delete All Files

:DELeTe:BINary

:MEM:DELeTe:BINary

This command deletes all binary files.

**Key Entry**  
Delete All Binary Files

:DELeTe:LIST

:MEM:DELeTe:LIST

This command deletes all List files.

**Key Entry**  
Delete All List Files

:DELeTe:STATe

:MEM:DELeTe:STATe

This command deletes all state files.

**Key Entry**  
Delete All State Files
:DELeTe:UFLT

:MEMory:DELeTe:UFLT

This command deletes all user-flatness correction files.

Key Entry  Delete All UFLT Files

:DELeTe[:NAM E]

:MEMory:DELeTe[:NAME] "<file_name>"

This clears the user file system of "<file_name>".

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]

:MEMory:FREE[:ALL]?

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

Key Entry  All

:LOAD:LIST

: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
System Commands
Mass Memory Subsystem (:MMEMory)

:MOVE
: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:COM M ent
: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]

:STORe:LIST
:MEMory:STORe: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: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
:MMEMory: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</td>
<td>BIN</td>
</tr>
<tr>
<td>BIT</td>
<td>BIT</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>LIST - sweep list file</td>
<td>LIST</td>
</tr>
<tr>
<td>SHAPE - burst shape file</td>
<td>SHAP</td>
</tr>
<tr>
<td>STATE</td>
<td>STAT</td>
</tr>
<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: `<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 specified file system. Each file listing will be in the following format: `"<file_name,file_type,file_size>"`

Refer to "MSUS (Mass Storage Unit Specifier) Variable" on page 12 for information on the use of the "<msus>" variable.

**Key Entry**

| COPY | Binary | List | State | User Flatness | Fir | Shape | Bit | FSK |

**:COPY**

`:MMEMory: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**

`:MMEM: COPY "/USER/LIST/LIST1","/USER/LIST/test_LIST"

The preceding example copies the LIST1 file in the signal generator's /USER/LIST directory to a file named test_LIST and saves it in the same directory.

**Key Entry**

| Copy File |
System Commands
Mass Memory Subsystem (:MMEMory)

:DELe[:NAME]

:MMEMory:DELe[: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 37. Refer to “MSUS (Mass Storage Unit Specifier) Variable” on page 12 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

:LOAD:LIST

: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
System Commands
Output Subsystem (:OUTPut)

:MOVE

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

This command renames the src_file to src_file_1 in the 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 in the signal generator's non-volatile memory.

Key Entry Rename File

:STORe:LIST

:MMEMory:STORe: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)

:BLANking:AUTO

[:SOURce]:OUTP:BLANking:AUTO ON|OFF|1|0
[:SOURce]:OUTP:BLANKing: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]

[: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]

:OUTP:MODulation[:STATe] ON|OFF|1|0
:OUTP: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]

:OUTP[:STATe] ON|OFF|1|0
:OUTP[: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.

**Example**

:OUTP ON

The preceding example turns on the signal generator’s RF output.

**Key Entry** RF On/Off

**Status Subsystem (:STATus)**

**:OPERation:CONDition**

: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 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 *Agilent Signal Generators Programming Guide* for more information on programming the status registers.

**Range** 0–32767

**:OPERation:ENABle**

: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 *Agilent Signal Generators Programming Guide* for more information on programming the status registers.

**Example**

:STAT:OPER:ENAB 43

This command enables 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
System Commands
Status Subsystem (:STATus)

:OPERation:NTRansition

: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 Agilent Signal Generators Programming Guide for more information on programming the status registers.

Example

:STAT:OPER:NTR 3

This command enables bit 1 (decimal 2, Settling) in the Standard Operation Negative Transition Filter register.

Range 0–32767

:OPERation:PTRansition

: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 Agilent Signal Generators Programming Guide for more information on programming the status registers.

Example

:STAT:OPER:PTR 3

This command enables bit 1 (decimal 2, Settling) in the Standard Operation Positive Transition Filter register.

Range 0–32767

:OPERation[:EVENt]

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 *Agilent Signal Generators Programming Guide* for more information on programming the status registers.

**Range**

0–32767

**:PRESet**

**:STATus**:PRESet

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

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

**:QUESTionable**:CALibration**:CONDition**

**: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 *Agilent Signal Generators Programming Guide* for more information on programming the status registers.

**Range**

0–32767

**:QUESTionable**:CALibration**:ENABle**

**: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 *Agilent Signal Generators 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
System Commands
Status Subsystem (:STATus)

:QUESTionable:CALibration:NTRansition

: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 Agilent Signal Generators 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) in the Data Questionable Calibration Negative Transition Filter register.

Range 0–32767

:QUESTionable:CALibration:PTRansition

: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 Agilent Signal Generators 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) in the Data Questionable Calibration Positive Transition Filter register.

Range 0–32767

:QUESTionable:CALibration[:EVENt]

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 Agilent Signal Generators Programming Guide for more information on programming the status registers.

**Range**

0–32767

:QUESTIONable:CONDition

: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 Agilent Signal Generators Programming Guide for more information on programming the status registers.

**Range**

0–32767

:QUESTIONable:ENABle

: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 Agilent Signal Generators 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

: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 Agilent Signal Generators Programming Guide for more information on programming the status registers.

**Range**

0–32767
System Commands
Status Subsystem (:STATus)

:QUESTIONable:FREQuency:ENABle
: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 Agilent Signal Generators 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
: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 Agilent Signal Generators 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
: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 *Agilent Signal Generators 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]`

**CAUTION**

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

`:STAT:QUESTIONable:FREQuency[:EVENt]?

This query returns the decimal sum of the bits in the Data Questionable Frequency Event register.

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

**Range**

0–32767

`:QUESTIONable:MODulation:CONDition`

`:STAT: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 *Agilent Signal Generators Programming Guide* for more information on programming the status registers.

**Range**

0–32767

`:QUESTIONable:MODulation:ENABLE`

`:STAT:QUESTIONable:MODulation:ENABLE <val>

`:STAT: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 *Agilent Signal Generators 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

:QUESTIONable:MODulation:NTRansition

: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 Agilent Signal Generators 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

: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 Agilent Signal Generators 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]

| 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 Agilent Signal Generators Programming Guide for more information on programming the status registers. 
Range 0–32767

:QUESTionable:NTRansition 
: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 Agilent Signal Generators Programming Guide for more information on programming the status registers. 
Example 
:STAT:QUES: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 
: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 unleveled (bit 1), a value of 2 is returned. 
The data in this register is continuously updated and reflects current conditions. 
Refer to the Agilent Signal Generators Programming Guide for more information on programming the status registers. 
Range 0–32767

:QUESTionable:POWer:ENABle 
: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 Agilent Signal Generators Programming Guide for more information on programming the status registers.
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

: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 Agilent Signal Generators 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

: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 Agilent Signal Generators 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]

**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:POWer[:EVENt]?

This query returns the decimal sum of the bits in the Data Questionable Power Event register.

*See the Agilent Signal Generators Programming Guide* for more information on programming the status register system.

**Range** 0–32767

:QUEStionable:PTRansition

: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 Agilent Signal Generators 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]

**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[:EVENt]?

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

*See the Agilent Signal Generators Programming Guide* for more information on programming the status register system.

**Range** 0–32767
System Subsystem (:SYSTem)

:CAPability

: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

: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]

: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]

: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 ERRor[: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

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.

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

:SYSTem:FILEsystem:SAFEmode?

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

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.

:HELP:MODE

: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
System Commands
System Subsystem (:SYSTem)

:IDN
: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 signal generator when used as a replacement.
The display diagnostic information, shown by pressing the Diagnostic Info softkey, is not affected by this command.

:LANGuage
:SYSTem:LANGuage "SCPI"|"8662"|"8663"
:SYSTem:LANGuage?
This command sets the remote language for the signal generator.
SCPI This choice provides compatibility for SCPI commands.
8662 This choice provides compatibility for the Agilent 8662A Synthesized Signal Generator. The 8662A is controlled only through a GPIB interface.
8663 This choice provides compatibility for the Agilent 8663A Synthesized Signal Generator. The 8663A is controlled only through a GPIB interface.
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 5, “SCPI Command Compatibility,” on page 131.
Example
:SYST:LANG "8662"
The preceding example enables the 8662 Synthesized Signal Generator language as the language used to control the signal generator.

Key Entry SCPI 8662A,8663A

:PON:TYPE
: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 56 for selecting the type of preset.
LAST This choice retains the settings at the time the signal generator was last powered down.
The setting enabled by this command is not affected by a signal generator power-on, preset, or *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

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 56 for selecting the type of defined conditions.

**Key Entry**  Preset

:PRESet:ALL

: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

:SYSTem:PRESet:LANGuage "SCPI" | "8662" | "8663" |

: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.

8662  This choice provides compatibility for 8662A series synthesized waveform generators, which are supported only through a GPIB interface.

8663  This choice provides compatibility for 8663A series synthesized waveform generators, which are supported only through a GPIB interface.

### Example

:SYST:PRES:LANG "8662"

The preceding example selects 8662 Synthesized Signal Generator as the language used by the signal generator following an instrument preset.
System Commands
System Subsystem (:SYSTem)

*RST "SCPI"

Key Entry SCPI 8662A, 8663A

: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

:SYSTem:PRESet:PN9 NORMal|QUICk
:SYSTem:PRESet:PN9?

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

: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

: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
: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 54 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 E8663B Analog Signal Generator User’s Guide.

Example
:SYST:SEC:DISP OFF

The preceding example enables the secure display mode.

*RST 1

Range N/A

Key Entry: Activate Security Display

:SECurity:ERASeAll
:SYStem:SECurity:ERASeAll

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 :DELete:ALL command, which does not reset table editors to factory values. For more information about security functions, refer to the E8663B Analog Signal Generator User’s Guide.

Key Entry: Erase All

:SECurity:LEVel
:SYStem:SECurity:LEVel NONE|ERASe|OVERwrite|SANitize
:SYStem:SECurity:LEVel?
This command selects the security level operation for the signal generator.

**NONE**  This selection causes the signal generator to reset to factory default settings.

**ERAS**e  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.

**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 :SECurity:LEVel:STATe to arm the security level.

**NOTE**  Once you select a security level and arm it, you cannot change the level.

For other cleaning and security operation descriptions, see "SECurity:ERAS**eall" on page 57, "SECurity:OVERwrite" on page 59, and "SECurity:SANitize" on page 59. For more information about security functions, refer to the E8663B Analog Signal Generator User’s Guide.

**Example**

: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.

**Key Entry**  None Erase Overwrite Sanitize

**SECurity:LEVel:STATe**

**CAUTION**  Ensure that you select the security level prior to executing this command with the ON (1) selection. Once you enable the state, you cannot reduce the security level.

:SYSTem:SECurity:LEVel:STATe ON|OFF|1|0
:SYSTem:SECurity:LEVel:STATe?

This command arms and executes the current security level parameter.

**On (1)**  This selection arms and prevents any changes to the current security level. Refer to "SECurity:LEVel" on page 57 for setting the security level.

**OFF (0)**  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 *E8663B Analog Signal Generator User’s Guide*.

**Example**

`:SYST:SEC:LEV:STAT ON`

The preceding example arms the secure mode selected with the SYSTem:SECurity:LEVel command.

**Key Entry**

*Enter Secure Mode*

**:SECurity:OVERwrite**

`: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 *E8663B Analog Signal Generator 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**

`: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 *E8663B Analog Signal Generator 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**

`: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 60 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

:SYSTem:SSAVer:MODE LIGHT|TEXT
:SYSTem:SSAVer:MODE?
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

:SYSTem:SSAVer:STATE ON|OFF|1|0
:SYSTem:SSAVer:STATE?
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**

:SYSTem:TIME <hour>,<minute>,<second>
:SYSTem:TIME?

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**

:SYSTem:VERSion?

This command returns the SCPI version number with which the signal generator complies.

**Trigger Subsystem**

**:ABORt**

: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]**

: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 62 for single sweep triggering information.

**Example**

:INIT:CONT ON

The preceding example enables the continuous mode for the sweep type.

*RST

0

**Key Entry**

Sweep Repeat Single Cont
System Commands
Trigger Subsystem

:INITiate[:IMMediate][:ALL]

:INITiate[:IMMediate][:ALL]
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 61 for setting continuous or single sweep. See “:TRIGger[:SEQuence]:SOURce” on page 63 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

:TRIGger:OUTPut:POLarity POSitive|NEGative
:TRIGger:OUTPut:POLarity?
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 continuous mode as the sweep type.

*RST POS
Key Entry Trigger Out Polarity Neg Pos
**System Commands**

**Trigger Subsystem**

:TRIGger[:SEQUence]:SLOPe

: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

: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
System Commands
Unit Subsystem (:UNIT)

**: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**

**: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 90 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.

**Key Entry**

<table>
<thead>
<tr>
<th align="left">dBm</th>
<th align="left">dBuV</th>
<th align="left">dBuVemF</th>
<th align="left">mV</th>
<th align="left">uV</th>
<th align="left">mVemF</th>
<th align="left">uVemF</th>
</tr>
</thead>
<tbody>
<tr>
<td align="left">*RST</td>
<td align="left">DBM</td>
<td align="left"></td>
<td align="left"></td>
<td align="left"></td>
<td align="left"></td>
<td align="left"></td>
</tr>
</tbody>
</table>
3 Basic Function Commands

In the following sections, this chapter provides SCPI descriptions for subsystems dedicated to signal generator operations that are applicable to this signal generator:

- “Correction Subsystem ([SOURce]:CORRection)” on page 65
- “Frequency Subsystem ([SOURce])” on page 67
- “List/Sweep Subsystem ([SOURce])” on page 77
- “Power Subsystem ([SOURce]:POWer)” on page 84
- “Trigger Sweep Subsystem ([SOURce])” on page 92

Correction Subsystem ([SOURce]:CORRection)

:FLATness:LOAD

[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 *Agilent Signal Generators 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

[: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 Agilent Signal Generators 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 92.

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 503: +.3000000000000E+10
Option 509: +.90000000000000E+10

Range Option 503: 100kHZ–3GHZ
Option 509: 100kHZ–9GHZ

Key Entry Configure Cal Array

[:FLATness]:POINts

[:SOURce]:CORRection:FLATness:POINts?
This query returns the number of points in the user-flatness correction file.

[:FLATness]:PRESet

CAUTION Once this command is executed, correction data is overwritten; If needed, save the
current correction data (see “:FLATness:STORe” on page 67).

[: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
Basic Function Commands
Frequency Subsystem ([SOURce])

:FLATness:STOR

[:SOURce]:CORRection:FLATness:STOR "<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]

[: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:CHANnels:BAND

[:SOURce]:FREQuency:CHANnels:BAND NBASe|NMOBile|BPGSm|MPGSm|BEGSm|MEGSm|BRGSm|MRGSm|BDCS|MDCS|BPCS|MPCS|B450|GM450|B480|M480|B850|M850|B380|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 70.

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.
### Basic Function Commands

#### Frequency Subsystem ([SOURce])

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRGSm</td>
<td>This choice selects R-Gsm 900 Mobile as the frequency band for GSM.</td>
</tr>
<tr>
<td>BDCS</td>
<td>This choice selects DCS 1800 Base as the frequency band for GSM.</td>
</tr>
<tr>
<td>MDCS</td>
<td>This choice selects DCS 1800 Mobile as the frequency band for GSM.</td>
</tr>
<tr>
<td>BPCS</td>
<td>This choice selects PCS 1900 Base as the frequency band for GSM.</td>
</tr>
<tr>
<td>MPCS</td>
<td>This choice selects PCS 1900 Mobile as the frequency band for GSM.</td>
</tr>
<tr>
<td>B450</td>
<td>This choice selects Gsm 450 Base as the frequency band for GSM.</td>
</tr>
<tr>
<td>GM450</td>
<td>This choice selects Gsm 450 Mobile as the frequency band for GSM.</td>
</tr>
<tr>
<td>B480</td>
<td>This choice selects Gsm 480 Base as the frequency band for GSM.</td>
</tr>
<tr>
<td>M480</td>
<td>This choice selects Gsm 480 Mobile as the frequency band for GSM.</td>
</tr>
<tr>
<td>B850</td>
<td>This choice selects Gsm 850 Base as the frequency band for GSM.</td>
</tr>
<tr>
<td>M850</td>
<td>This choice selects Gsm 850 Mobile as the frequency band for GSM.</td>
</tr>
<tr>
<td>B8</td>
<td>This choice selects 800MHz Base as the frequency band for PDC.</td>
</tr>
<tr>
<td>M8</td>
<td>This choice selects 800MHz Mobile as the frequency band for PDC.</td>
</tr>
<tr>
<td>B15</td>
<td>This choice selects 1500MHz Base as the frequency band for PDC.</td>
</tr>
<tr>
<td>M15</td>
<td>This choice selects 1500MHz Mobile as the frequency band for PDC.</td>
</tr>
<tr>
<td>B390</td>
<td>This choice selects Base 390-400 as the frequency band for TETRA.</td>
</tr>
<tr>
<td>B420</td>
<td>This choice selects Base 420-430 as the frequency band for TETRA.</td>
</tr>
<tr>
<td>B460</td>
<td>This choice selects Base 460-470 as the frequency band for TETRA.</td>
</tr>
<tr>
<td>B915</td>
<td>This choice selects Base 915-921 as the frequency band for TETRA.</td>
</tr>
<tr>
<td>M380</td>
<td>This choice selects Mobile 380-390 as the frequency band for TETRA.</td>
</tr>
<tr>
<td>M410</td>
<td>This choice selects Mobile 410-420 as the frequency band for TETRA.</td>
</tr>
<tr>
<td>M450</td>
<td>This choice selects Mobile 450-460 as the frequency band for TETRA.</td>
</tr>
<tr>
<td>M870</td>
<td>This choice selects Mobile 870-876 as the frequency band for TETRA.</td>
</tr>
<tr>
<td>PHS</td>
<td>This choice selects Standard PHS as the frequency band.</td>
</tr>
<tr>
<td>DECT</td>
<td>This choice selects Standard DECT as the frequency band.</td>
</tr>
</tbody>
</table>

#### Example

`:FREQ:CHAN:BAND DECT`

The preceding example sets the frequency band to standard DECT.

#### Key Entry

<table>
<thead>
<tr>
<th>Entry</th>
<th>P-GSM Base</th>
<th>E-GSM Base</th>
<th>R-GSM Base</th>
<th>DCS Base</th>
<th>Salel B-GSM Base</th>
<th>Salel E-GSM Base</th>
<th>Salel R-GSM Base</th>
<th>Salel DCS Base</th>
<th>NADC Base</th>
<th>800M HZ Base</th>
<th>1500M HZ Base</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCS Base</td>
<td>390/ 400</td>
<td>420/ 430</td>
<td>460/ 470</td>
<td>915/ 921</td>
<td>380/ 390</td>
<td>410/ 420</td>
<td>450/ 460</td>
<td>870/ 876</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tetra Base</td>
<td>390/ 400</td>
<td>420/ 430</td>
<td>460/ 470</td>
<td>915/ 921</td>
<td>380/ 390</td>
<td>410/ 420</td>
<td>450/ 460</td>
<td>870/ 876</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-GSM Mobile</td>
<td>380/ 390</td>
<td>410/ 420</td>
<td>450/ 460</td>
<td>870/ 876</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCS Mobile</td>
<td>380/ 390</td>
<td>410/ 420</td>
<td>450/ 460</td>
<td>870/ 876</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

68  Agilent E8663B Analog Signal Generator SCPI Command Reference
**:FREQuency:CHANnels:NUMBer**

[:SOURce]:FREQuency:CHANnels:NUMBer <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 70.

**Example**

`:FREQ:CHAN:NUMB 24`

The preceding example sets the channel number to 24 for the current band.

**Key Entry**

<table>
<thead>
<tr>
<th>Channel Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-GSM Base/Mobile:</td>
</tr>
<tr>
<td>E-GSM and R-GSM Base/Mobile:</td>
</tr>
<tr>
<td>DCS Base/Mobile:</td>
</tr>
<tr>
<td>PCS Base/Mobile:</td>
</tr>
<tr>
<td>GSM-450 Base/Mobile:</td>
</tr>
<tr>
<td>GSM-480 Base/Mobile:</td>
</tr>
<tr>
<td>GSM-850 Base/Mobile:</td>
</tr>
<tr>
<td>NADC Base/Mobile:</td>
</tr>
<tr>
<td>800MHZ Base/Mobile:</td>
</tr>
<tr>
<td>1500MHZ Base/Mobile:</td>
</tr>
<tr>
<td>TETRA 380/390 Mobile:</td>
</tr>
<tr>
<td>TETRA 390/4000 Base:</td>
</tr>
<tr>
<td>TETRA 410/420 Mobile:</td>
</tr>
<tr>
<td>TETRA 420/430 Base:</td>
</tr>
<tr>
<td>TETRA 460/470: 2400 through 2800</td>
</tr>
<tr>
<td>TETRA 870/876 Mobile:</td>
</tr>
<tr>
<td>TETRA 915/921 Base:</td>
</tr>
<tr>
<td>PHS Standard:</td>
</tr>
<tr>
<td>DECT Standard:</td>
</tr>
</tbody>
</table>
**Basic Function Commands**

**Frequency Subsystem ([SOURce])**

### :FREQ:CHANnels[:STATE]

```
[:SOURce]:FREQ:CHANnels[:STATE] ON|OFF|1|0
[:SOURce]:FREQ: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 `[FREQ:CHANnels:BAND]` on page 67.

**Example**

: FREQ: CHAN ON

The preceding example turns on the frequency channel.

**Key Entry**
Freq Channels Off On

### :FREQ:FIXed

```
[:SOURce]:FREQ:FIXed <val><units>
[:SOURce]:FREQ:FIXed?
```

This command sets the signal generator output frequency. To set the frequency mode, see `[FREQ:MODE]` on page 71. For a listing of signal generator frequency and power specifications, refer to `[LEVel][IMMediate][AMPLitude]` on page 92.

**Example**

: FREQ: FIX 1GHZ

The preceding example sets the signal generator frequency to 1 GHz.

**Key Entry**
Freq CW
**:FREQuency:MODE**

[:SOURce]:FREQuency: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 “**:FREQuency:[CW]” on page 75.

To set the frequency in the fixed frequency mode, see “**:FREQuency:FIXed” on page 70.

**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 as the power mode (see “**:MODE” on page 89).

**Example**

:FREQ:MODE LIST

The preceding example selects a list frequency sweep.

*RST  

CW

| Key Entry | Freq CW | Sweep Type | Freq | Off | Freq & Ampl |

**:FREQuency:MULTiplier**

[:SOURce]:FREQuency:MULTiplier <val>

[:SOURce]:FREQuency: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 2 GHz and a multiplier of 3 is selected, the displayed frequency will be 6 GHz. This feature is useful when working with mixers and multipliers.
Basic Function Commands
Frequency Subsystem ([SOURce])

Example

:FREQ:MULT 2
The preceding example sets the carrier multiplier to 2.

:*RST +1.00000000E+000

Key Entry Freq Multiplier

:FREQuency:OFFSet

[: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 1GHZ
The preceding example sets the frequency offset to 1 GHz.

:*RST +0.0000000000000E+00

Range -200GHZ to 200GHZ

Key Entry Freq Offset

:FREQuency:OFFSet:STATe

[: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`

[:SOURce]:FREQuency:REference <val><units>
[:SOURce]:FREQuency:REference?

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

:FRQ:REF 100MHZ
The preceding example sets the output reference frequency to 100 megahertz.

*RST +0.0000000000000E+00

Key Entry
Freq Ref Set

:`FREQuency:REference:SET`

[:SOURce]:FREQuency:REference:Set

This command sets the current CW output frequency, along with any offset, as a 0 hertz reference value.

*RST +0.0000000000000E+00

Key Entry
Freq Ref Set

:`FREQuency:REference:STATe`

[: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

:FRQ:REF:STAT OFF
The preceding example turns off the reference frequency mode.

*RST 0

Key Entry Freq Ref Off On

:`FREQuency:STARt`

[:SOURce]:FREQuency:STARt <val><units>
[:SOURce]:FREQuency:STARt?

---

Agilent E8663B Analog Signal Generator SCPI Command Reference 73
Basic Function Commands
Frequency Subsystem ([SOURce])

This command sets the frequency start point for a step sweep.
Refer to "[:LEVEL][:IMMediate][:AMPLitude]" on page 92 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 503: +.3000000000000E+10  
Option 509: +.90000000000000E+10

Range  
Option 503: 100kHZ–3GHZ  
Option 509: 100kHZ–9GHZ

**Key Entry**  
Freq Start

**:FREQ:STOP**

[:SOURce]:FREQ:STOP <val><units>  
[:SOURce]:FREQ:STOP?

This command sets the stop frequency for a step sweep.
Refer to "[:LEVEL][:IMMediate][:AMPLitude]" on page 92 for frequency and power specifications for different signal generator options and model numbers.

**Example**

**:FREQ:STOP 1GHZ**

The preceding example sets the stop frequency for a sweep to 1 GHz.

*RST  
Option 503: +.3000000000000E+10  
Option 509: +.90000000000000E+10

Range  
Option 503: 100kHZ–3GHZ  
Option 509: 100kHZ–9GHZ

**Key Entry**  
Freq Stop

**:FREQ:SYNThesis**

[:SOURce]:FREQ:SYNThesis 1|2  
[:SOURce]:FREQ:SYNThesis?

This command sets the phase-lock loop (PLL) bandwidth to optimize phase noise for offsets above and below 10 kHz.

1  
This choice will select mode 1 which optimizes phase noise at offsets below 10 kHz.

2  
This choice will select mode 2 which optimizes phase noise at offsets above 10 kHz.
Example
:FREQ:SYNT 2
The preceding example sets PLL bandwidth to mode 2.

*RST +1

Key Entry Mode 1 Optimize <10kHz Offset Mode 2 Optimize >10kHz Offset

:FREQuency[:CW]
[:SOURce]:FREQuency[:CW] <val><unit>
[:SOURce]:FREQuency[:CW]?

This command sets the signal generator output frequency for the CW frequency mode.
To set the frequency mode to CW, refer to “:FREQuency:MODE” on page 71.

Example
:FREQ 2GHZ
The preceding example sets signal generator’s output frequency to 2 GHz.

*RST Option 503: +.3000000000000E+10
Option 509: +.90000000000000E+10

Range Option 503: 100kHz–3GHz
Option 509: 100kHz–9GHz

Key Entry Frequency

:PHASe:REFerence
[: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[:ADJ ust]
[:SOURce]:PHAse[:ADJ ust] <val><unit>
[:SOURce]:PHAse[:ADJ ust]?

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.
**Basic Function Commands**  
**Frequency Subsystem ([SOURce])**

*:RST*  
+0.0000000E+00

**Range**  
*Radians*: –3.14 to 3.14RAD  
*Degrees*: –180 to 179DEG

**Key Entry**  
*Adjust Phase*

**:ROSCillator:BANDwidth:DEFaults**

[: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**

[:SOURce]:ROSCillator:BANDwidth:EXTernal 25HZ|55HZ|125HZ|300HZ|650HZ

[:SOURce]:ROSCillator:BANDwidth:EXTernal?

This command sets the bandwidth of the external reference oscillator.

**Example**  
:ROSC:BAND:EXT 300HZ

The preceding example sets the bandwidth of the external oscillator to 300 hertz.

**Key Entry**  
*External Ref Bandwidth*

**:ROSCillator:BANDwidth:INTernal**

[:SOURce]:ROSCillator:BANDwidth:INTernal 25HZ|55HZ|125HZ|300HZ|650HZ

[:SOURce]:ROSCillator:BANDwidth:INTernal?

This command sets the bandwidth of the internal reference oscillator.

**Example**  
:ROSC:BAND:INT 125HZ

The preceding example sets the bandwidth of the internal oscillator to 125 hertz.

**Key Entry**  
*Internal Ref Bandwidth*

**:ROSCillator:SOURce**

[:SOURce]:ROSCillator:SOURce?

This command queries the reference oscillator source: INT (internal) or EXT (external).
**Basic Function Commands**

**List/Sweep Subsystem ([:SOURce])**

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.

**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><code>~FREQuency:MODE</code> (page 71)</td>
<td>Freq Off</td>
</tr>
<tr>
<td></td>
<td>Start/stop amplitude sweep</td>
<td><code>~MODE</code> (page 89)</td>
<td>Ampl Off</td>
</tr>
<tr>
<td></td>
<td>Start/stop frequency and amplitude sweep</td>
<td><code>~MODE</code> (page 89) <code>~FREQuency:MODE</code> (page 71)</td>
<td>Freq &amp; Ampl Off</td>
</tr>
<tr>
<td></td>
<td>Set up &amp; control sweep triggering</td>
<td><code>Trigger Sweep Subsystem ([:SOURce])</code> (page 92)</td>
<td>See the Trigger Sweep Subsystem ([:SOURce])</td>
</tr>
<tr>
<td>Step</td>
<td>Start frequency sweep</td>
<td><code>~FREQuency:STARt</code> (page 73)</td>
<td>Freq Start</td>
</tr>
<tr>
<td></td>
<td>Stop frequency sweep</td>
<td><code>~FREQuency:STOP</code> (page 74)</td>
<td>Freq Stop</td>
</tr>
<tr>
<td></td>
<td>Start amplitude sweep</td>
<td><code>~START</code> (page 91)</td>
<td>Ampl Start</td>
</tr>
<tr>
<td></td>
<td>Stop amplitude sweep</td>
<td><code>~STOP</code> (page 91)</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 81.
Basic Function Commands
List/Sweep Subsystem ([SOURce])

:list:diRection

[: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.

Example
:list:DIR UP
The preceding example selects an ascending sweep direction.

*RST
Key Entry Sweep Direction Down Up

:list:dwEL1

[: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 81 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/Sweep Subsystem ([SOURce])**

### :LIST:DWELL:POINTS

[:SOURce]:LIST:DWELL:POINTS?

This command queries the signal generator for the number of dwell points in the list sweep file.

### :LIST:DWELL:TYPE

[: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 78 for setting the list dwell points.

**STEP**

This choice selects the dwell time from the step sweep. Refer to ":SWEep:DWELL" on page 83 for setting the step dwell.

**Example**

:LIST:DWELL:TYPE STEP

The preceding example selects the dwell time from step sweep values.

*RST

**Key Entry**

Dwell Type List Step

### :LIST:FREQuency

[:SOURce]:LIST:FREQuency <val>|<val>?

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 92.

**Example**

:LIST:FREQ 1GHZ,2GHZ,3GHZ,6GHZ

The preceding example sets the frequency value for a four point sweep.

*RST

**Range**

Option 503: +.3000000000000E+10

Option 509: +.9000000000000E+10

Option 503: 100KHZ–3GHZ

Option 509: 100KHZ–9GHZ
Basic Function Commands
List/Sweep Subsystem ([SOURce])

**:LIST:FREQuency:POINts**

[:SOURce]:LIST:FREQuency:POINts?

This command queries the current list sweep file for the number of frequency points.

**:LIST:MANual**

[: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

**:LIST:MODE**

[:SOURce]:LIST:MODE AUTO | MANual

[:SOURce]:LIST:MODE?

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 80.

**Example**

:LIST:MODE AUTO

The preceding example sets the mode to automatic.

*RST  AUTO

**Key Entry**

Manual Mode Off On
Basic Function Commands
List/ Sweep Subsystem ([SOURce])

:LIST:POWER

[: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, the signal generator protects 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 92.

:LIST:POWER:POINTS

[:SOURce]:LIST:POWER:POINTS?

This command queries the number of power points in the current list sweep file.

:LIST:RETRace

[: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 or step 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

[: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.
Basic Function Commands
List/Sweep Subsystem ([SOURce])

To set the sweep trigger, see "TRIGGER[:SEQUence]:SOURce" on page 102.

BUS This choice enables GPIB triggering using the TRG or GET command, or LAN and RS-232 triggering using the *TRIG 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

:LIST:TYPE
[: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


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:STEP
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
Basic Function Commands
List/Sweep Subsystem ([SOURce])

:[SOURce]:LIST:TYPE:LIST:INITialize:PRESet

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

:SWEep:DWELl

[: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 81.
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

:SWEep:POINts

[: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

**Power Subsystem ([:SOURce]:POWer)**

::ALC:BANDwidth|BWIDth

[[: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. Refer to the *E8663B Analog Signal Generator 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

[[: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:LEVEL
[:SOURce]:POWER:ALC:LEVEL <value>DB
[:SOURce]:POWER:ALC:LEVEL?
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 88 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:SEARCH
[: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
E8663B Analog Signal Generator 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 88 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:SEARCH 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

:ALC:SEARCH:REFERENCE
[:SOURce]:POWER:ALC:SEARCH:REFERENCE FIXed|MODulated
[:SOURce]:POWER:ALC:SEARCH:REFERENCE?
This command sets either fixed or modulated modes for power search.
Basic Function Commands
Power Subsystem ([SOURce]:POWer)

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
[: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 2GHZ
The preceding example selects 2 GHz as the start frequency for a power search.

Key Entry  Start Frequency

:ALC:SEARch:SPAN:STOP
[: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 3GHZ
The preceding example selects 3GHz as the stop frequency for a power search.

Key Entry  Stop Frequency

:ALC:SEARch:SPAN:TYPE FULL|USER
[:SOURce]:POWer:ALC:SEARch:SPAN:TYPE FULL|USER
[:SOURce]:POWer:ALC:SEARch:SPAN:TYPE?
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

```plaintext
:ALC:SEARch:SPAN[:STATe] ON|OFF|1|0

[:SOURce]:POWer:ALC:SEARch:SPAN[:STATe] ON|OFF|1|0

[:SOURce]:POWer:ALC:SEARch:SPAN[:STATe]?
```

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.

**:ALC:SOURce**

```plaintext
[:SOURce]:POWer:ALC:SOURce INTernal|DIODe

[:SOURce]:POWer:ALC:SOURce?
```

This command enables you to select an automatic level control (ALC) source. You can select the internal ALC source or an external detector source. Refer to the **E8663B Analog Signal Generator User’s Guide** for more information on ALC leveling, bandwidth, and the power search function.

**Example**

`:POW:ALC:SOUR DIODe`

The preceding example selects the diode detector as the ALC source detector.

**RST**

**Key Entry**

Leveling Mode

**:ALC:SOURce:EXTernal:COUpling**

```plaintext
[: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 87). (0 to 32 coupling value).

**Example**

`:POW:ALC:SOUR:EXT:COUP 20DB`

The preceding example sets the external coupling factor to 20 dB.

**RST**

**Range**

−200DB to 200DB.

**Key Entry**

Ext Detector Coupling Factor
Basic Function Commands
Power Subsystem ([SOURce]:POWer)

:ALC[:STATe]

[: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 E8663B Analog Signal Generator 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

[:SOURce]:POWER:ATTenuation <val><unit>
[:SOURce]:POWER:ATTenuation?

This command sets the attenuation level when the attenuator hold is active. The attenuation is set to values of 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 88 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

[: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, the signal generator protects 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

Key Entry Atten Hold Off On

:MODE

[: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 92 for more information on running power sweeps and setting CW amplitude settings that control the output power.

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 71).

Example

:POW:MODE LIST

The preceding example sets list as the amplitude sweep mode.

*RST FIX

Key Entry Sweep Type Ampl Off Freq & Ampl

:PROTection:STATe

[: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.
Basic Function Commands
Power Subsystem [:SOURce]:POWER

**NOTE**
Continual or excessive use of the power search protection function can decrease attenuator life.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ON</strong> (1)</td>
<td>Causes the attenuator to switch to and hold its maximum level setting during a power search.</td>
</tr>
<tr>
<td><strong>OFF</strong> (0)</td>
<td>Sets the attenuator normal mode. The attenuator is not used during power search.</td>
</tr>
</tbody>
</table>

**Example**

:POW:PROT ON

The preceding example enables the power inhibit function.

**RST** 0

**Example**

:POW:REF 50DBM

The preceding example sets the RF output power reference to 50 dBm.

**RST** 0

**Example**

:POW:REF:STAT 1

The preceding example sets the reference state on.

**RST** 0
Basic Function Commands
Power Subsystem [:SOURce]:POWer

:STARt
[:SOURce]:POWer:STARt <val><unit>
[:SOURce]:POWer:STARt?
This command sets the amplitude of the first point in a step sweep.
During an amplitude sweep operation, the signal generator protects 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.
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 92 for the output power ranges.
Key Entry
Ampl Start

:STOP
[:SOURce]:POWer:STOP <val><unit>
[:SOURce]:POWer:STOP?
This command sets the amplitude of the last point in a step sweep.
During an amplitude sweep, the signal generator protects 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 92 for the available power ranges.
Key Entry
Ampl Stop

[:LEVel][:IMMediate]:OFFSet
[:SOURce]:POWer[:LEVel][:IMMediate]:OFFSet <val><unit>
[:SOURce]:POWer[: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.
Basic Function Commands
Trigger Sweep Subsystem [:SOURce]

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

[:LEVel][:IMMediate][:AMPLitude]

[:SOURce]:POWer[:LEVel][:IMMediate][:AMPLitude] <val><unit>
[:SOURce]:POWer[:LEVel][:IMMediate][:AMPLitude]?
This command sets the RF output power.

Example
:POW 0DBM
The preceding example sets the signal generator output power level to 0 dBm.

*RST Depends on model and option number
Range The ranges for this command are specified values from the data sheet.

E8663B

<table>
<thead>
<tr>
<th>Option</th>
<th>Standard</th>
<th>with Option UNW</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 kHz–3.2 GHz</td>
<td>−135 to 15DBM</td>
<td>−135 to 12DBM</td>
</tr>
<tr>
<td>100 kHz–3.2 GHz</td>
<td>−135 to 14DBM</td>
<td>−135 to 11DBM</td>
</tr>
<tr>
<td>&gt;3.2 GHz–9 GHz</td>
<td>−135 to 16DBM</td>
<td>−135 to 16DBM</td>
</tr>
</tbody>
</table>

Key Entry Amplitude

Trigger Sweep Subsystem [:SOURce]

:TSWeeple

[:SOURce]:TSWeep
This command aborts the current sweep, then either arms or arms 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

Key Entry Single Sweep
4 Analog Commands

This chapter provides SCPI descriptions for subsystems dedicated to the E8663B Analog signal generator. The following is a list of the subsystems:

- “Amplitude Subsystem ([SOURce])” on page 93
- “Frequency Modulation Subsystem ([SOURce])” on page 102
- “Low Frequency Output Subsystem ([SOURce]:LFOutput)” on page 109
- “Phase Modulation Subsystem ([SOURce])” on page 115
- “Pulse Modulation Subsystem ([SOURce])” on page 124

Amplitude Subsystem ([SOURce])

[: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]

[: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
command.

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

[: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 NORM

Key Entry AM Mode Normal Deep
Analog Commands
Amplitude Subsystem ([SOURce])


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


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


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 95 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 94.

*RST

+4.00000000E+002

Range Dual-Sine & Sine: 0.5HZ–1MHZ Swept-Sine: 1HZ–1MHZ

All Other Waveforms: 0.5HZ–100kHz

Key Entry AM Tone 1 Rate AM Start Rate AM Rate


[: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 AM Tone 2 Rate AM Stop Rate


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.


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

**:AM\[1\]|2:INTernal\[1\]|2:FUNCTION:NOIsE**


This command selects a gaussian or uniform noise modulation for the selected waveform.


**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

**:AM\[1\]|2:INTernal\[1\]|2:FUNCTION:RAMP**


This command selects a positive or negative slope for the modulating ramp waveform.


**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])


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**

<table>
<thead>
<tr>
<th>SINE</th>
<th>Triangle</th>
<th>Square</th>
<th>Ramp</th>
<th>Noise</th>
<th>Dual-Sine</th>
<th>Swept-Sine</th>
</tr>
</thead>
</table>


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 1 to 1 kHz.

```
*RST
```

**Range**

0.5HZ–100kHz

**Key Entry**

| AM Sweep Rate |


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.
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 “:AM\[1\]|2:INTernal\[1\]|2:FUNCtion:SHAPe” on page 98 for the waveform selection.

Example

:AM1:INT1:SWE:TRIG EXT

The preceding example sets an external trigger source for the swept–sine waveform on AM path 1.

*RST IMM

Key Entry Bus Free Run Ext Trigger Key

:AM\[1\]|2:SOURce

[:SOURce]:AM\[1\]|2:SOURce INT[1]|2|EXT[1]|2
[:SOURce]:AM\[1\]|2:SOURce?

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.

*RST INT

Key Entry Internal 1 Internal 2 Ext1 Ext2

:AM\[1\]|2:STATe

[:SOURce]:AM\[1\]|2:STATe ON|OFF|1|0
[:SOURce]:AM\[1\]|2:STATe?

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 40 for more information.

Whenever amplitude modulation is enabled, the AM annunciator appears on the signal generator’s front-panel display.

The two paths for amplitude modulation can be simultaneously enabled. Refer to “:AM[1]|2...” on page 93 for more information.
Analog Commands
Amplitude Subsystem ([:SOURce])

Example
:AM1:STAT ON
The preceding example turns on AM modulation for AM path 1.
*RST

Example
:AM2:TYPE EXP
The preceding example selects exponential type depth values for AM path 2.
*RST

Example
:AM[1]|2[:DEPTh]:EXPonential
This command 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

Range
0.00–40.00DB

Key Entry
AM Depth
Analog Commands
Amplitude Subsystem ([SOURce])

:AM[1]|2[:DEPTh][:LINear]

[: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 101 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 100 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 101.

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

[: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 100 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

:AM [:DEPTh]:STEP[:INCREMENT]

[: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...

[: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
:FM :INTernal:FREQuency:STEP[:INCRement]
[: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 :FM[1]|2:INTternal[1]|2:FREQuency command on page 106. 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

[:SOURce]:FM[1]|2:EXTernal[1]|2:COUPLing?

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


This command sets the impedance for the external input.
Analog Commands
Frequency Modulation Subsystem ([SOURce])

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

:FM [1]|2:INternal[1]:FREQuency:ALTernate

[:SOURce]:FM[1]|2:INTernal[1]:FREQuency:ALTerbate <val><units>
[:SOURce]:FM[1]|2:INTernal[1]:FREQuency:ALTerbate?

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


[:SOURce]:FM[1]|2:INTernal[1]:FREQuency:ALTerbate:AMPLitude:PERCent <val><units>
[:SOURce]:FM[1]|2:INTernal[1]:FREQuency:ALTerbate: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 107 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 Ampl Percent Of Peak
Analog Commands
Frequency Modulation Subsystem ([SOURCE])


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 107 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

Key Entry

FM Sweep Rate


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])


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 103 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** FM Tone 1 Rate FM Start Rate FM Rate


This command selects a gaussian or uniform noise type as the modulation. Refer to ":*FM[1]|2:INTernal[1]|2:FUNCTION:SHAPe" on page 107 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])

:[FM] [2:INTernal[1]] 2:FUNCtion:RAMP


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

<table>
<thead>
<tr>
<th>Key Entry</th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
</table>


[:SOURce]:FM[1]|2:INTernal[1]|2:FUNCtion:SHAPE SINE|TRIangle|SQUare|RAMP|NOISe|DUALsine|SWEPtsine

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:SHAPE SQU

The preceding example selects a square wave as the internal modulating waveform.

*RST SINE

<table>
<thead>
<tr>
<th>Key Entry</th>
<th>Sine</th>
<th>Triangle</th>
<th>Square</th>
<th>Ramp</th>
<th>Noise</th>
<th>Dual-Sine</th>
<th>Swept-Sine</th>
</tr>
</thead>
</table>

:[FM] [1]|2:SOURce

[:SOURce]:FM[1]|2:SOURce?

This command selects the FM source.

<table>
<thead>
<tr>
<th>INT</th>
<th>This choice selects internal source 1 or 2 to provide an ac-coupled signal.</th>
</tr>
</thead>
</table>

| 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**

:FM2:SOUR INT2

The preceding example selects internal source 2 as the FM source for FM path 2.
Analog Commands
Frequency Modulation Subsystem ([SOURce])

*RST

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 40 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 102 for more information.

Example
:FM2:STAT ON
The preceding example enables FM path 2.
*RST

Key Entry
Internal 1 Internal 2 Ext1 Ext2


[:SOURce]:FM[1]|2:STATe ON|OFF|1|0
[:SOURce]:FM[1]|2:STATe?
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 109 for more information on setting the deviation tracking.

Example
:FM2 1MHZ
The preceding example sets the frequency deviation to 1 megahertz.

[:SOURce]:FM[1]|2[:DEViation] <val><units>
[:SOURce]:FM[1]|2[:DEViation]?

Key Entry
Internal 1 Internal 2 Ext1 Ext2

:FM[1]|2[:DEViation]
Analog Commands

Low Frequency Output Subsystem ([SOURce]:LFOoutput)

*SRT

+1.00000000E+003

Key Entry

FM DEV

:FM [1]|2[;DEViation]:TRACk

[:SOURce]:FM[1]|2[:DEViation]:TRACk ON|OFF|1|0
[:SOURce]:FM[1]|2[:DEViation]:TRACk?

This command enables or disables deviation coupling between FM paths 1 and 2.

ON (1) This choice will link the deviation value of FM1 with FM2; FM2 will assume the
FM1 deviation value. For example, if FM1 deviation is set to 500 Hz and FM2 is
set to 2 kHz, enabling the deviation tracking will cause the FM2 deviation value to
change to 500 Hz. This applies regardless of the path (FM1 or FM2) selected.

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.

*RST

0

Key Entry

FM Dev Couple Off On

Low Frequency Output Subsystem ([SOURce]:LFOoutput)

:LFOoutput:AMPLitude

[:SOURce]:LFOoutput:AMPLitude <val><units>
[:SOURce]:LFOoutput: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
```

### :LFO:FUNCTION[1]|2:FREQuency

```
[:SOURce]:LFOoutput:FUNCTION[1]|2:FREQuency <val><units>
[:SOURce]:LFOoutput: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 “:LFOoutput:FUNCTION[1]|2:SHApe” on page 111 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
   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

**:LFOutput:FUNCTION[1]:FREQuency:ALTerminate**

[:SOURce]:LFOutput:FUNCTION[1]:FREQuency:ALTerminate <val><units>
[:SOURce]:LFOutput:FUNCTION[1]:FREQuency:ALTerminate?

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 “:LFOutput:FUNCTION[1]|2:SHAPe” on page 111 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

**:LFOutput:FUNCTION[1]:FREQuency:ALTerminate:AMPLitude:PERCent**

[:SOURce]:LFOutput:FUNCTION[1]:FREQuency:ALTerminate:AMPLitude:PERCent <val><units>
[:SOURce]:LFOutput:FUNCTION[1]:FREQuency:ALTerminate: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 “:LFOutput:FUNCTION[1]|2:SHAPe” on page 111 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

**:LFOutput:FUNCTION[1]|2:SHAPe**

[: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 114.

Example
:LFO:FUNC2:SHAP TRI
The preceding example selects a triangle wave for the Function Generator 2 LF output.

*RST

Key Entry   Sine   Dual-Sine   Swept-Sine  Triangle  Square  Ramp  Pulse
            Noise   DC

[:SOURce]:LFOoutput:FUNCTION[1]|2:SHAPE:NOISE UNIFORM|GAUSsian
[:SOURce]:LFOoutput: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 111 for selecting the waveform type.

Example
:LFO:FUNC1:SHAPE:NOIS GAUS
The preceding example selects a gaussian noise modulation for the Function Generator 1 LF output.

*RST

Key Entry   Uniform  Gaussian

[:SOURce]:LFOoutput:FUNCTION[1]|2:SHAPE:RAMP POSitive|NEGative
[:SOURce]:LFOoutput: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 111 for selecting the waveform type.

Example
:LFO:FUNC1:SHAPE:RAMP POS
The preceding example selects a positive ramp slope modulation for the Function Generator 1 LF output.

*RST

Key Entry   Positive  Negative

:LFOoutput:FUNCTION[1]:SWEEP:RATE
[:SOURce]:LFOoutput:FUNCTION[1]:Sweep:RATE <val><units>
[:SOURce]:LFOoutput:FUNCTION[1]:Sweep:RATE?
This command sets the sweep rate for an internally generated swept-sine signal.
**Analog Commands**

**Low Frequency Output Subsystem ([:SOURce]:LFOutput)**

### Analog Commands

#### Low Frequency Output Subsystem ([:SOURce]:LFOutput)

#### Example

: <BR>
LFO:FUNC1:SWE:RATE 1E5<BR>
The preceding example sets the sweep rate for the swept-sine waveform to 100 kHz.<BR>

* **RST**<BR>
+4.00000000E+002<BR>

**Range**<BR>
0.5HZ–100kHz<BR>

**Key Entry**<BR>
LF Out Sweep Rate<BR>

:FUNCTION[1]:SWEEP:TRIGGER

[: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.<BR>

**BUS**<BR>This choice enables GPIB triggering using the *TRG or GET command or LAN and RS-232 triggering using the *TRG command.<BR>

**IMMediate**<BR>This choice enables immediate triggering of the sweep event.<BR>

**EXTernal**<BR>This choice enables the triggering of a sweep event by an externally applied signal at the TRIGGER IN connector.<BR>

**KEY**<BR>This choice enables triggering through front panel interaction by pressing the **Trigger** hardkey.<BR>

Refer to "[:LFOoutput:FUNCTION[1]|2:SHAPE" on page 111 for selecting the waveform type.<BR>

#### Example

: <BR>
LFO:FUNC1:SWE:TRIG EXT<BR>
The preceding example sets an external trigger as the trigger for the swept-sine signal.<BR>

* **RST**<BR>
Free Run<BR>

**Key Entry**<BR>
Bus Free Run Ext Trigger Key
Analog Commands
Low Frequency Output Subsystem ([SOURce]:LFOutput)

[:SOURce]:LFOutput:SOURce

[: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

Internal 1 Monitor  Function Generator 1  Internal 2 Monitor  Function Generator 2

[:LFOoutput:STATe

[:SOURce]:LFOoutput:STATe ON|OFF|1|0
[:SOURce]:LFOoutput: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...

This prefix enables the selection of the $\Phi$M path and associated with all SCPI commands in this subsystem. The two paths are equivalent to the $\Phi$M Path 1 2 softkey.

PM1 $\Phi$M Path 1 2 with 1 selected
PM2 $\Phi$M Path 1 2 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]

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 117.

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
[: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

[:PM[1]|2]:EXTernal[1]:COUPling
[:SOURce]:PM[1]|2:EXTernal[1]:COUPling AC|DC [:SOURce]:PM[1]|2:EXTernal[1]:COUPling?

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])


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 ΦM 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**


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 111 for selecting the waveform type.

**Example**
:PM1:INT1:FREQ 20KHZ

The preceding example sets the ΦM 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** ΦM Tone 1 Rate ΦM Start Rate ΦM Rate

**PM [1]|2:INTernal[1]:FREQuency:ALTerate**


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.

Analog Commands
Phase Modulation Subsystem ([SOURce])

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


This commands selects a gaussian or uniform noise modulation for the selected path(s).

Example
:PM1:INT1:FUNCTION:NOISE GAUS
The preceding example selects a gaussian noise modulation for ΦM path 1, source 1.

*RST UNIF
Key Entry

Gaussian  Uniform


This command selects a positive or negative slope for the ramp modulating waveform.

Example
:PM1:INT2:FUNCTION: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 <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 119 for the waveform selection.

Example

The preceding example sets the alternate tone amplitude to 40% of the total amplitude.

*RST

Range 0–100PCT

Key Entry Φ M Tone 2 Ampl Percent of Peak

:PM [1]|2:INTernal[1]:FUNCTION:SHApe

[:SOURce]:PM[1]|2:INTernal[1]:FUNCTION:SHApe SINE|TRIangle|SQUARE|RAMP|NOISe|DUALsine|SWEPtsine

[:SOURce]:PM[1]|2:INTernal[1]:FUNCTION:SHApe?

This command sets the phase modulation waveform type.

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
Analog Commands
Phase Modulation Subsystem ([:SOURce])

:PM [1]|2:INTernal[1]:SWEep:RATE

[:SOURce]:PM[1]|2:INTernal[1]:SWEep:RATE <val><units>
 [:SOURce]:PM[1]|2:INTernal[1]:SWEep:RATE?

This command sets the sweep rate for a phase-modulated, swept–sine waveform. Refer to 

Example
:PM1:INT:SWE:RATE 30KHZ
The preceding example sets the sweep rate to 30 kHz.

*RST +4.00000000E+002
Range 0.5HZ–100kHZ
Key Entry ΦM Sweep Rate

:PM [1]|2:INTernal[1]:SWEep:TRIGger

[:SOURce]:PM[1]|2:INTernal[1]:SWEep:TRIGger BUS|IMMediate|EXTernal|KEY
 [:SOURce]:PM[1]|2:INTernal[1]:SWEep:TRIGger?

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 
Trigger hardkey.

Refer to “:PM[1]|2:INTernal[1]:FUNCTION:SHApe” on page 119 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
**Analog Commands**

**Phase Modulation Subsystem ([SOURce])**

### :PM[1]|2:SOURce

```
[: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 $> \pm 3\%$ of $1 \text{ V}_p$.

**Example**

`:PM2:SOUR EXT1`

The preceding example selects an external signal on the EXT 1 INPUT connector as the source for $\Phi M$ path 2 modulation.

**:*RST**

**Key Entry**

<table>
<thead>
<tr>
<th>Key Entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal 1</td>
</tr>
<tr>
<td>Internal 2</td>
</tr>
<tr>
<td>Ext1</td>
</tr>
<tr>
<td>Ext2</td>
</tr>
</tbody>
</table>

### :PM[1]|2:STATe

```
[: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 40 for more information.

The $\Phi M$ 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 115 for more information.

**Example**

`:PM2:STAT 1`

The preceding example turns on $\Phi M$ path 2 phase modulation.

**:*RST**

**Key Entry**

<table>
<thead>
<tr>
<th>Key Entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\Phi M$ Off On</td>
</tr>
</tbody>
</table>
Analog Commands
Phase Modulation Subsystem [:SOURce]

:PM[1]|2[:DEViation]

[: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 123 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 Frequency Normal Bandwidth High Bandwidth
250KHZ–250MHZ 0–20rad 0–2rad
> 250–500MHZ 0–10rad 0–1rad
> 0.5–1GHZ 0–20rad 0–2rad
> 1–2GHZ 0–40rad 0–4rad
> 2–3.2GHZ 0–80rad 0–8rad
> 3.2–9GHZ 0–160rad 0–16rad
Key Entry ΦM Dev
Analog Commands
Phase Modulation Subsystem ([SOURce])

**:PM [1]|2[:DEViation]:TRACk**

[:SOURce]:PM[1]|2[:DEViation]:TRACk ON|OFF|1|0
[:SOURce]:PM[1]|2[:DEViation]:TRACk?

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**

:PM:TRAC OFF

The preceding example disables deviation coupling.

**RST**  0

**Key Entry**  Φ M Dev Couple Off On

**:PM [:DEViation]:STEP[:INCRement]**

[: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 122 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
Analog Commands
Pulse Modulation Subsystem ([SOURce])

**Pulse Modulation Subsystem ([SOURce])**

[:PULM :EXTernal:POLarity NORMal|INVerted]

[:SOURce]:PULM:EXTernal:POLarity NORMal|INVerted
[:SOURce]:PULM:EXTernal:POLarity?

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

**Key Entry**

Ext Polarity Normal Inverted

[:PULM :INTernal[1]:DELay]

[: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 125 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 126 for pulse period settings.

**Example**

[:PULM:INT:DEL 200E-9

The preceding example sets the internal pulse delay to 200 nanoseconds.

*RST

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**

[: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 124 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**

[: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>. 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 128 for the pulse modulation type selection.

**Example**

:PULM:INT:FREQ 1MHZ

The preceding example sets the square wave pulse rate to 1 megahertz.

**Range**

0.1HZ–10MHZ

**Key Entry**

Pulse Rate

*RST +4.00000000E+002

Range 0.1HZ–10MHZ
Analog Commands
Pulse Modulation Subsystem ([SOURce])

[:PULM :INTernal[1]:FREQuency:STEP]

[: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 “-PULM:SOURce” on page 128 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

[:PULM :INTernal[1]:PERiod]

[: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 127 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])

:PUlt:INternal[1]:PERiod:STEP[:INCRement]

[:SOURce]:PUlt:INternal[1]:PERiod:STEP[:INCRement]<val><units>|MAXimum|MINimum|DEFault
[:SOURce]:PUlt: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 :PUlt: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

:PUlt:INternal[1]:PWIDth

[:SOURce]:PUlt:INternal[1]:PWIDth <num><time_suffix>|UP|DOWN
[:SOURce]:PUlt: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 :PUlt: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 “:PUlt:INternal[1]:PWIDth” on page 127.

NOTE A power search is recommended for signals with pulse widths less than one microsecond. Refer to “:ALC:SEARch” on page 85.

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])

[:PULM:INTernal[1]:PWIDth:STEP]

[: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 :SOURce:INTernal]

[: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

[:PULM :SOURce]

[: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
:PULM:STATe

[: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
Analog Commands
Pulse Modulation Subsystem ([SOURce])
5 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 E8663B Analog signal generator:

- "::SYSTem:IDN" on page 131
- "8662A/63A Compatible Commands" on page 132

::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 signal generator 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, Exxx, US4000000, c.00.00.1234"

The preceding example changes and sets the identification string for the signal generator.
8662A/ 63A Compatible Commands

The tables in this section provide the following:

Table 5-1 on page 132: 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 signal generator family.

Table 5-2 on page 139: a list of the implemented 8662A/63A 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 54 for selecting the language type.

When using the programming codes in this section, you can:

• set the signal generator 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 signal generator 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"

• set the *IDN? response to any 866xA-like response you prefer. Refer to the :SYSTem:IDNcommand on page 131.

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 signal generator List Sweep features.

Table 5-1 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>+D</td>
<td>+dBm</td>
<td>Y</td>
<td>Y</td>
<td>dBm</td>
</tr>
</tbody>
</table>
### SCPI Command Compatibility

#### 8662A/63A Compatible Commands

<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>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></td>
<td></td>
<td></td>
<td>AM:DEPTh &lt;val&gt; &lt;units&gt; AM:TRAC ON AM:STAT ON</td>
</tr>
<tr>
<td>AO</td>
<td>Amplitude off</td>
<td>Y</td>
<td>Y</td>
<td>OUTPUT:STAt OFF</td>
</tr>
<tr>
<td>AP</td>
<td>Amplitude</td>
<td>Y</td>
<td>Y</td>
<td>POWER:REF:STAt OFF POWER:AMPL &lt;val&gt; &lt;units&gt; OUTPUT:STAt ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>See also Table 5-2 on page 139</td>
</tr>
<tr>
<td>AS</td>
<td>BLSQ</td>
<td>Auto sequence</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>BP</td>
<td>BPSK modulation</td>
<td>N</td>
<td></td>
<td>not supported</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 Negates the power value.</td>
<td>Y</td>
<td>Y</td>
<td>DM</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>DEG</td>
</tr>
<tr>
<td>DM</td>
<td>dBm</td>
<td>Y</td>
<td>Y</td>
<td>DM</td>
</tr>
<tr>
<td>DN</td>
<td>Decrement</td>
<td>Y</td>
<td>Y</td>
<td>See Table 5-2 on page 139</td>
</tr>
<tr>
<td></td>
<td>Passes DOWN as parameter of active function command.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FA</td>
<td>Start frequency</td>
<td>Y</td>
<td>Y</td>
<td>See W2, W3, W4, and Table 5-2 on page 139</td>
</tr>
<tr>
<td>FB</td>
<td>Stop frequency</td>
<td>Y</td>
<td>Y</td>
<td>See W2, W3, W4, and Table 5-2 on page 139</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 FM:STAT ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FM:DEV &lt;val&gt; &lt;units&gt; FM:STAT ON</td>
</tr>
<tr>
<td>FR</td>
<td>Center frequency</td>
<td>Y</td>
<td>Y</td>
<td>FREQuency:CM &lt;val&gt; &lt;units&gt; See also W2, W3, and W4, and Table 5-2 on page 139</td>
</tr>
<tr>
<td>FS</td>
<td>Span frequency</td>
<td>Y</td>
<td>Y</td>
<td>See W2, W3, W4, and Table 5-2 on page 139</td>
</tr>
<tr>
<td>GZ</td>
<td>GHz</td>
<td>Y</td>
<td>Y</td>
<td>GHz</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</td>
<td>Y</td>
<td>Y</td>
<td>no equivalent SCPI command sequence</td>
</tr>
<tr>
<td></td>
<td>Adds STEP:INCR to active function command.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KZ</td>
<td>kHz</td>
<td>Y</td>
<td>Y</td>
<td>kHz</td>
</tr>
</tbody>
</table>
### Table 5-1 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>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>Modulation off</td>
<td>Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>M1</td>
<td>For 8662A: (&lt;\text{mod}&gt; = \text{FM} \text{ or AM}, \text{ depending on which is on.}) Modulation source internal 400 Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>For 8663A: Executes (&lt;\text{mod}&gt; ) with (&lt;\text{freq}&gt; = 400 \text{ Hz})</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M2</td>
<td>For 8662A: (&lt;\text{mod}&gt; = \text{FM} \text{ or AM}, \text{ depending on which is on.}) Modulation source internal 1 kHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>For 8663A: Executes (&lt;\text{mod}&gt; ) with (&lt;\text{freq}&gt; = 1 \text{ kHz})</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M3</td>
<td>For 8662A: (&lt;\text{mod}&gt; = \text{FM} \text{ or AM}, \text{ depending on which is on.}) Modulation source external AC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>For 8663A: (&lt;\text{mod}&gt; = \text{AM}, \text{FM}, \text{ or PM}, \text{ depending on which is on.}) (&lt;\nu&gt; = 1 \text{ for AM}, 2 \text{ for FM or PM})</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>NOTE: For PM, the impedance value is set using the SP71/SP70 commands</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M4</td>
<td>For 8662A: (&lt;\text{mod}&gt; = \text{FM} \text{ or AM}, \text{ depending on which is on.}) Modulation source external DC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>For 8663A: (&lt;\text{mod}&gt; = \text{AM}, \text{FM}, \text{ or PM}, \text{ depending on which is on.}) (&lt;\nu&gt; = 1 \text{ for AM}, 2 \text{ for FM or PM})</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>NOTE: For PM, the impedance value is set using the SP71/SP70 commands</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MP</td>
<td>Modulation frequency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(&lt;\text{mod}&gt; = \text{FM}, \text{ or PM}, \text{ depending on which is on.})</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Also see: M1, M2, and Table 5-2 on page 119</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MS</td>
<td>Read status key message</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Returns status string</td>
<td></td>
<td></td>
<td></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 W4</td>
</tr>
</tbody>
</table>
Table 5-1  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>N2</td>
<td>Linear 1000 steps</td>
<td>Y</td>
<td>Y</td>
<td>See W2, W3, and W4</td>
</tr>
<tr>
<td>N3</td>
<td>Step size</td>
<td>Y</td>
<td>Y</td>
<td>See W2, W3, W4, and Table 5-2 on page 139</td>
</tr>
<tr>
<td>N4</td>
<td>Log 1% steps</td>
<td>Y</td>
<td>Y</td>
<td>See W2, W3, and W4</td>
</tr>
<tr>
<td>N5</td>
<td>Log 1% steps</td>
<td>Y</td>
<td>Y</td>
<td>See W2, W3, and W4</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>Y</td>
<td>PULm:STAT ON</td>
</tr>
<tr>
<td>PM</td>
<td>Phase modulation</td>
<td>Y</td>
<td>Y</td>
<td>PHm:STAT ON</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>R4</td>
<td>BLR1 Knob hold</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>R5</td>
<td>BLR2 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>Only for manual sweep</td>
<td>Y</td>
<td>Y LIST:MANual DOWN</td>
</tr>
<tr>
<td>RM</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>Only for manual sweep</td>
<td>Y</td>
<td>Y LIST:MANual UP</td>
</tr>
<tr>
<td>SP00</td>
<td>System preset Presets the instrument, including the compatibility language</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 The 8662 modifies the output, but does not change the displayed frequency; the signal generator modifies the displayed frequency, but does not change the output.</td>
<td>Y</td>
<td>Y</td>
<td>FREQ:OFFS &lt;-&lt;value&gt; FREQ:OFFS:STAT ON FREQ:CW &lt;displayed value&gt;</td>
</tr>
<tr>
<td>SP12</td>
<td>Negative frequency offset The 8662 modifies the output, but does not change the displayed frequency; the signal generator modifies the displayed frequency, but does not change the output. Because of this, you must first set the offset, then reaply the frequency to change the output.</td>
<td>Y</td>
<td>Y</td>
<td>FREQ:OFFS &lt;-&lt;value&gt; FREQ:OFFS:STAT ON FREQ:CW &lt;displayed value&gt;</td>
</tr>
<tr>
<td>SP20</td>
<td>ALC bandwidth normal</td>
<td>Y</td>
<td></td>
<td>PWm:ALC: BANDwidth: AUTO ON</td>
</tr>
<tr>
<td>SP21</td>
<td>ALC bandwidth &lt; 1 kHz</td>
<td>Y</td>
<td></td>
<td>PWm:ALC: BANDwidth: AUTO OFF PWm:ALC: BANDwidth: 1KHZ</td>
</tr>
<tr>
<td>SP30</td>
<td>Amplitude reference off</td>
<td>Y</td>
<td>Y</td>
<td>PWm:REF:STAT OFF</td>
</tr>
</tbody>
</table>
Table 5-1 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>SP31</td>
<td>Amplitude reference</td>
<td>Y</td>
<td>Y</td>
<td>POW:REF &lt;val&gt; POW:REF:STATe ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>{current amplitude setting}</td>
</tr>
<tr>
<td>SP32</td>
<td>Amplitude reference relative to 1 µV</td>
<td>Y</td>
<td></td>
<td>POW:REF 106.99DBM POW:REF:STATe ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>POW 1UV</td>
</tr>
<tr>
<td>SP40</td>
<td>External AM off</td>
<td>Y</td>
<td></td>
<td>AM:STAT OFF</td>
</tr>
<tr>
<td></td>
<td>Modulation frequency sweep mode off</td>
<td>N</td>
<td></td>
<td>not supported</td>
</tr>
<tr>
<td>SP41</td>
<td>Internal FM + external AM (AC)</td>
<td>Y</td>
<td></td>
<td>FM:SOUR INT1 FM:INT1:FREQ 400 Hz</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FM:STAT ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AM:SOUR EXT1 AM:EXT1:IMP 600</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AM:DEPTH 95 PCT AM:EXT1:COUP AC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FM:STAT ON</td>
</tr>
<tr>
<td></td>
<td>Modulation frequency sweep mode on</td>
<td>N</td>
<td></td>
<td>not supported</td>
</tr>
<tr>
<td>SP42</td>
<td>Internal FM + external AM (DC)</td>
<td>Y</td>
<td></td>
<td>FM:SOUR INT1 FM:INT1:FREQ 400 Hz</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FM:STAT ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AM:SOUR EXT1 AM:EXT1:IMP 600</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AM:DEPTH 95 PCT AM:EXT1:COUP DC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AM:STAT ON</td>
</tr>
<tr>
<td>SP50</td>
<td>AUX FM off</td>
<td>Y</td>
<td>Y</td>
<td>FM2:SOUR EXT2 FM2:DEV &lt;dev&gt; kHz</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FM2:STAT ON</td>
</tr>
<tr>
<td>SP51</td>
<td>AUX FM on</td>
<td></td>
<td></td>
<td>FM2:SOUR EXT2 FM2:EXT2:COUP DC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FM2:STAT ON</td>
</tr>
<tr>
<td></td>
<td>RF (MHz)</td>
<td></td>
<td></td>
<td>FM2:STAT OFF</td>
</tr>
<tr>
<td></td>
<td>FM Deviation (kHz)</td>
<td></td>
<td></td>
<td>FM2:STAT OFF</td>
</tr>
<tr>
<td></td>
<td>0.01–120</td>
<td>25</td>
<td></td>
<td>FM2:DEV &lt;dev&gt; kHz</td>
</tr>
<tr>
<td></td>
<td>120–160</td>
<td>6.25</td>
<td></td>
<td>FM2:STAT ON</td>
</tr>
<tr>
<td></td>
<td>160–320</td>
<td>12.5</td>
<td></td>
<td>FM2:STAT OFF</td>
</tr>
<tr>
<td></td>
<td>320–640</td>
<td>25</td>
<td></td>
<td>FM2:STAT OFF</td>
</tr>
<tr>
<td></td>
<td>640–1280</td>
<td>50</td>
<td></td>
<td>FM2:STAT OFF</td>
</tr>
<tr>
<td></td>
<td>1280–2560</td>
<td>100</td>
<td></td>
<td>FM2:STAT OFF</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 FM input impedance 50Ω</td>
<td>Y</td>
<td></td>
<td>no equivalent SCPI command sequence</td>
</tr>
<tr>
<td></td>
<td>Effects the behavior of H3 and H4.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SP71</td>
<td>External FM input impedance 600Ω</td>
<td>Y</td>
<td></td>
<td>no equivalent SCPI command sequence</td>
</tr>
<tr>
<td></td>
<td>Effects the behavior of H3 and H4.</td>
<td></td>
<td></td>
<td></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</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>POWQ:OFFS:STAT OFF</td>
</tr>
</tbody>
</table>
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<thead>
<tr>
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<th>8663</th>
<th>Equivalent SCPI Command Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SP81</strong></td>
<td>Amplitude conversion (V-dBm)</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td><strong>SP82</strong></td>
<td>Display GPIB address</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td><strong>SP83</strong></td>
<td>ROM test</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td><strong>SP84</strong></td>
<td>RAM test</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td><strong>SP85</strong></td>
<td>Amplitude correction off</td>
<td>Y</td>
<td>Y</td>
<td>POWER:ALC:STATe OFF</td>
</tr>
<tr>
<td><strong>SP86</strong></td>
<td>Amplitude correction on signal generator ALC ON always works with sweep.</td>
<td>Y</td>
<td>Y</td>
<td>POWER:ALC:STATe ON</td>
</tr>
<tr>
<td><strong>SP87</strong></td>
<td>Amplitude correction on (includes Sweep)</td>
<td>Y</td>
<td>Y</td>
<td>POWER:ALC:STATe ON</td>
</tr>
<tr>
<td><strong>SP88</strong></td>
<td>GPIB operator request response</td>
<td>N</td>
<td></td>
<td>not supported</td>
</tr>
<tr>
<td><strong>SP89</strong></td>
<td>Auto sequence</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td><strong>SP90</strong></td>
<td>GPIB operator request response</td>
<td>N</td>
<td></td>
<td>not supported</td>
</tr>
<tr>
<td><strong>SP91</strong></td>
<td>Set auto sequence step delay</td>
<td>N</td>
<td></td>
<td>not supported</td>
</tr>
<tr>
<td><strong>SP92</strong></td>
<td>Enable frequency hopping mode</td>
<td>N</td>
<td></td>
<td>not supported</td>
</tr>
<tr>
<td><strong>SP93</strong></td>
<td>Knob (restore normal operation)</td>
<td>N</td>
<td></td>
<td>not supported</td>
</tr>
<tr>
<td><strong>SP94</strong></td>
<td>Manual amplitude level control</td>
<td>N</td>
<td></td>
<td>not supported</td>
</tr>
<tr>
<td><strong>SP95</strong></td>
<td>Knob, 120 increments per revolution</td>
<td>N</td>
<td></td>
<td>not supported</td>
</tr>
<tr>
<td><strong>SP96</strong></td>
<td>Modulation oscillator off when modulation is off</td>
<td>N</td>
<td></td>
<td>not supported</td>
</tr>
<tr>
<td><strong>SP97</strong></td>
<td>Modulation oscillator on</td>
<td>N</td>
<td></td>
<td>not supported</td>
</tr>
<tr>
<td><strong>SP98</strong></td>
<td>Turn display on</td>
<td>Y</td>
<td></td>
<td>DISP ON</td>
</tr>
<tr>
<td><strong>SP99</strong></td>
<td>Turn display off</td>
<td>Y</td>
<td></td>
<td>DISP OFF</td>
</tr>
<tr>
<td><strong>T1</strong></td>
<td>Power up preset off</td>
<td>N</td>
<td></td>
<td>not supported</td>
</tr>
<tr>
<td><strong>T2</strong></td>
<td>Power up preset on</td>
<td>N</td>
<td></td>
<td>not supported</td>
</tr>
<tr>
<td><strong>SQ</strong></td>
<td>Sequence</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td><strong>SST</strong></td>
<td>Set sequence</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td><strong>ST</strong></td>
<td>Store Saves/recalls register to sequence 0.</td>
<td>Y</td>
<td>Y</td>
<td>*SAV</td>
</tr>
<tr>
<td><strong>T1</strong></td>
<td>0.5 ms per step</td>
<td>Y</td>
<td>Y</td>
<td>SWEEP:DWELL 0.5ms  Beyond signal generator range limit; is set to 1ms.</td>
</tr>
<tr>
<td><strong>T2</strong></td>
<td>1 ms per step</td>
<td>Y</td>
<td>Y</td>
<td>SWEEP:DWELL 1ms</td>
</tr>
<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>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>T5</td>
<td>100 ms per step</td>
<td>Y</td>
<td>Y</td>
<td>SWEEP:DWELL 100ms</td>
</tr>
<tr>
<td>TR</td>
<td>Trigger</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UP</td>
<td>Increment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UV</td>
<td>mV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W1</td>
<td>Sweep off</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W4</td>
<td>Single sweep mode on</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W3</td>
<td>Manual sweep mode on</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X1</td>
<td>Marker 1</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>X2</td>
<td>Marker 2</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>X3</td>
<td>Marker 3</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>X4</td>
<td>Marker 4</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>X5</td>
<td>Marker 5</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>X6</td>
<td>Marker off</td>
<td>N</td>
<td>N</td>
<td>not supported</td>
</tr>
<tr>
<td>X7</td>
<td>X8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y0</td>
<td>Remote stepped sweep off</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 5-1 8662A/63A Commands & Equivalent SCPI Sequences (Continued)**
### Table 5-1 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>
</table>
| Y1|Remote stepped sweep on|Y|Y|INIT:CONT ON
SWEEP:MODE AUTO
LIST:TYPE:STEPLIST
LIST:TYPE LIST
LIST:TRIG SOUR BUS|
| Y2|Remote stepped sweep on|Y|Y|*TRG|

### Table 5-2 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>
</table>
| AM | AM modulation | Y | Y | Y | Y | AM:DEPTH UP
AM:DEPTH DOWN
AM:DEPTH:STEP:INCR |
| AP | Amplitude | Y | Y | Y | Y | POW:AMPL UP
POW:AMPL DOWN
POW:AMPL:STEP:INCR |
| FA | Start frequency | Y | Y | Y | Y | FREQ:CW:STEP:INCR |
| FB | Stop frequency | Y | Y | Y | Y | FREQ:CW:STEP:INCR |
| FM | FM modulation | Y | Y | Y | Y | FM:DEV UP
FM:DEV DOWN
FM:DEV:STEP:INCR |
| FR | Center frequency | Y | Y | Y | Y | FREQ:CW UP
FREQ:CW DOWN
FREQ:CW:STEP:INCR |
| FS | Span frequency | Y | Y | Y | Y | FREQ:CW:STEP:INCR |
| MF | Modulation frequency | Y | Y | | Y | <mod>:INT:FREQ UP
<mod>:INT:FREQ DOWN
<mod>:INT:FREQ:STEP:INCR
<mod> = AM|FM|PM|PULM |
| N3 | Step size | Y | Y | Y | Y | no equivalent SCPI commands |
| PM | Phase modulation | Y | Y | Y | Y | PM:DEV UP
PM:DEV DOWN
PM:DEV:STEP:INCR |
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   AM Depth Couple Off On, 101
   AM Mode Normal Deep, 94
   AM Off On, 99
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   AM Tone 1 Rate, 95
   AM Tone 2 Ampl Percent Of Peak, 96
   AM Type LIN EXP, 100
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   AM Depth, 100, 101
   AM Depth Couple Off On, 101
   AM Mode Normal Deep, 94
   AM Off On, 99
   AM Path 1 2, 93
   AM Rate, 95
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   Ext Impedance 50 Ohm 600 Ohm, 95
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