

# SCPI Command Reference, Volume 1

## Agilent Technologies ESG Vector Signal Generator

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

**E4438C Vector Signal Generator**

*[www.agilent.com/find/signalgenerators](http://www.agilent.com/find/signalgenerators)*



**Agilent Technologies**

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# 1 SCPI Basics

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

- [“Command Reference Information” on page 2](#)
- [“SCPI Basics” on page 3](#)

## Command Reference Information

### SCPI Command 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
```

### Key and Data Field Cross Reference

The index is set up so applicable key and data field names can be cross-referenced to the appropriate SCPI command. There are two headings in the index where the key and data field names can be found:

- individual softkey, hardkey, or data field name
- subsystem name

### Supported Field

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



---

## SCPI Basics

This section describes the general use of the SCPI language for the ESG. 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:

- IEEE Standard 488.1-1987, *IEEE Standard Digital Interface for Programmable Instrumentation*. New York, NY, 1998.
- IEEE Standard 488.2-1992, *IEEE Standard Codes, Formats, Protocols and Command Commands for Use with ANSI/IEEE Standard 488.1-1987*. New York, NY, 1998.

## 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**

Characters	Meaning	Example
	A vertical stroke between keywords or parameters indicates alternative choices. For parameters, the effect of the command varies depending on the choice.	[ :SOURce ] :AM: MOD DEEP NORMAl  DEEP or NORMAl are the choices.
[ ]	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.	[ :SOURce ] :FREQuency [ :CW ] ?  SOURce and CW are optional items.
< >	Angle brackets around a word (or words) indicate they are not to be used literally in the command. They represent the needed item.	[ :SOURce ] :FREQuency: START <val><unit>  In this command, the words <val> and <unit> should be replaced by the actual frequency and unit.  :FREQuency: START 2.5GHZ
{ }	Braces indicate that parameters can optionally be used in the command once, several times, or not at all.	[ :SOURce ] :LIST: POWer <val>{ , <val> }  a single power listing: LIST:POWer 5 a series of power listings: LIST:POWer 5,10,15,20

**Table 1-2 Command Syntax**

<b>Characters, Keywords, and Syntax</b>	<b>Example</b>
Upper-case lettering indicates the minimum set of characters required to execute the command.	[:SOURce]:FREQuency[:CW]?, FREQ is the minimum requirement.
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 <a href="#">“Command Parameters and Responses” on page 8</a> for more information.	:FREQuency Either :FREQ, :FREQuency, or :FREQUENCY is correct.
When a colon is placed between two command mnemonics, it moves the current path down one level in the command tree. Refer to <a href="#">“Command Tree” on page 7</a> more information on command paths.	:TRIGger:OUTPut:POLarity? TRIGger is the root level keyword for this command.
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.	[:SOURce]:LIST: DWELl <val>{,<val>}
A semicolon separates two commands in the same program message without changing the current path.	:FREQ 2.5GHZ;:POW 10DBM
White space characters, such as <tab> and <space>, 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.	:FREQ uency or :POWer :LEVel are not allowed.  A <space> between :LEVel and 6.2 is mandatory.  :POWer:LEVel 6.2

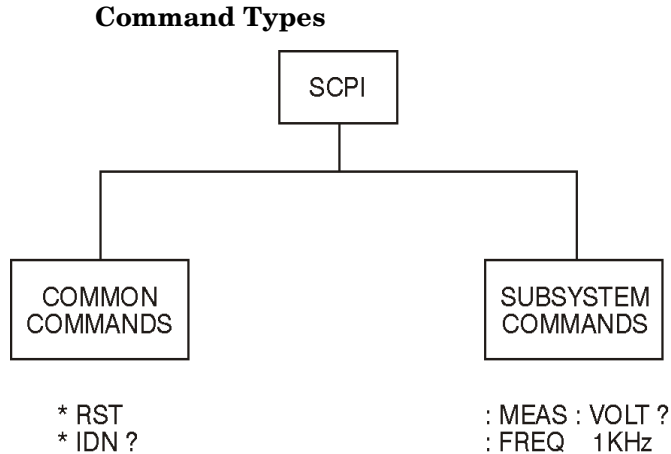
## Command Types

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**



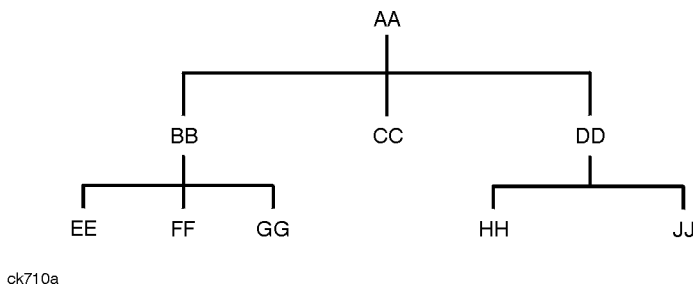
ck709a

## 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](#).

**Figure 1-2**

**Simplified Command Tree**



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`.

**Table 1-3** Parameter and Response Types

Parameter Types	Response Data Types
Numeric	Real, Integer
Extended Numeric	Real, Integer
Discrete	Discrete
Boolean	Numeric Boolean
String	String

### 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:

100	any simple numeric value
1.2GHZ	GHZ can be used for exponential (E009)
200MHZ	MHZ can be used for exponential (E006)
-100mV	negative 100 millivolts
10DEG	10 degrees

Extended numeric parameters also include the following special parameters:

DEFault	resets the parameter to its default value
UP	increments the parameter
DOWN	decrements the parameter
MINimum	sets the parameter to the smallest possible value
MAXimum	sets the parameter to the largest possible value

## 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 properly. 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
+4.000000000000000E+010
+1
0
```

## Integer Response Data

Integer response data are decimal representations of integer values including optional signs. Most status register related queries return integer response data.

The following are examples of integer response data:

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

### **Discrete Response Data**

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

The following are examples of discrete response data:

IMM

EXT

INT

NEG

### **Numeric Boolean Response Data**

Boolean response data returns a binary numeric value of one or zero.

### **String Response Data**

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

The following are examples of string response data:

"This is a string"

"one double quote inside brackets: ["]"

"Hello!"

## Program Messages

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

```
[ :SOURce ] :FREQUency :START           [ :SOURce ] :FREQUency :STOP  
[ :SOURce ] :FREQUency [ :CW]          [ :SOURce ] :POWer [ :LEVel ] :OFFSet
```

### Example 1

```
:FREQUency :START 500MHZ ; STOP 1000MHZ
```

This program message is correct and will not cause errors; `START` and `STOP` are at the same path level. It is equivalent to sending the following message:

```
FREQUency :START 500MHZ ; FREQUency :STOP 1000MHZ
```

### Example 2

```
:POWer 10DBM ; :OFFSet 5DB
```

This program message will result in an error. The message makes use of the default `POWER [ :LEVel ]` node (root command). When using a default node, there is no change to the current path position. Since there is no command `OFFSet` at the root level, an error results.

The following example shows the correct syntax for this program message:

```
:POWer 10DBM ; :POWer :OFFSet 5DB
```

### Example 3

```
:POWer :OFFSet 5DB ; POWer 10DBM
```

This program message results in a command error. The path is dropped one level at each colon. The first half of the message drops the command path to the lower level command `OFFSet`; `POWer` does not exist at this level.

The `POWer 10DBM` command is missing the leading colon and when sent, it causes confusion because the signal generator cannot find `POWER` at the `Power :OFFSet` level. By adding the leading colon, the current path is reset to the root. The following shows the correct program message:

```
:POWer :OFFSet 5DB ; :POWer 10DBM
```

### Example 4

```
FREQ 500MHZ ; POW 4DBM
```

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

## File Name Variables

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

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

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

The following examples demonstrate a command where Format 1 applies:

*Command Syntax with the file name variable*

```
:MEMory:STORe:LIST "<file name>"
```

*Command Syntax with the file name*

```
:MEMory:STORe:LIST "SWEEP_1"
```

This command has :LIST in the command syntax. This denotes that "SWEEP\_1" will be saved in the :List file type location as a list type file.

The following examples demonstrate a command where Format 2 applies:

*Command Syntax with the file name variable*

```
:MMEMory:COpy "<file name>","<file name>"
```

*Command Syntax with the file name*

```
:MMEMory:COpy "FLATCAL@USERFLAT","FLAT_2CAL@USERFLAT"
```

This command cannot distinguish which file type "FLATCAL" belongs to without the file type extension (@USERFLAT). If this command were executed without the extension, the command would assume the file type was Binary.

The following examples demonstrate a command where format 3 applies:

*Command Syntax with the file name variable*

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

*Command Syntax with the file name*

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

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

- A the number of decimal digits to follow in B.
- B a decimal number specifying the number of data bytes in C.
- C the binary waveform data.

Refer to [Table 3-1 on page 121](#) 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 14](#). 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 14](#):

```
: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 4](#) for a listing of the file systems and types.

## Quote Usage with SCPI Commands

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

```
":FM:EXTErnal:IMPedance 600"
```

However, when a string is the parameter for a SCPI command, additional quotes or other delimiters may be required to identify the string. Your programming language may use two sets of double quotes, one set of single quotes, or 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 #HFFBF7
```





---

## 2 Basic Function Commands

This chapter provides SCPI descriptions for subsystems dedicated to signal generator operations common to all ESG Vector Signal Generators. This chapter contains the following major sections:

- “Correction Subsystem ([:SOURce]:CORRection)” on page 20
- “Digital Modulation Subsystem ([:SOURce])” on page 23
- “Frequency Subsystem ([:SOURce])” on page 40
- “List/Sweep Subsystem ([:SOURce])” on page 51
- “Power Subsystem ([:SOURce]:POWer)” on page 59
- “Pulse Subsystem ([:SOURce]:PULSe)” on page 66

---

## Correction Subsystem ([:SOURce]:CORRection)

### :FLATness:LOAD

**Supported** All

```
[:SOURce]:CORRection:FLATness:LOAD "<file name>"
```

This command loads a user-flatness correction file.

**\*RST** N/A

**Range** N/A

**Key Entry** Load From Selected File

**Remarks** N/A

### :FLATness:PAIR

**Supported** All

```
[:SOURce]:CORRection:FLATness:PAIR <freq.>[<freq suffix>],  
<corr.>[<corr suffix>]
```

This command sets a frequency and amplitude correction pair.

<corr.> This variable is the power correction.

**\*RST** N/A

<b>Range</b>	<i>Frequency</i>	<i>Standard</i>	<i>Option UNB</i>
	<i>Option 501: 100kHz–1GHz</i>	–136 to 20DB	–136 to 25DB
	<i>Option 502: 100kHz–2GHz</i>	–136 to 20DB	–136 to 25DB
	<i>Option 503: 100kHz–3GHz</i>	–136 to 20DB	–136 to 25DB
	<i>Option 504: 100kHz–4GHz</i>	–136 to 20DB	–136 to 25DB
	<i>Option 506: 100kHz–6GHz</i>	–136 to 25DB	N/A

**Key Entry** Configure Cal Array

**Remarks** The maximum number of points that can be entered is 1601.

## :FLATness:POINTs

**Supported** All

`[:SOURCE]:CORREction:FLATness:POINTs?`

This query returns the number of points in the user-flatness correction file.

**\*RST** N/A

**Range** N/A

**Key Entry** N/A

**Remarks** N/A

## :FLATness:PRESet

**Supported** All

---

**CAUTION** The current correction data will be overwritten once this command is executed. Save the current data if needed. Refer to [“:FLATness:STORE” on page 21](#) for storing user-flatness files.

---

`[:SOURCE]:CORREction:FLATness:PRESet`

This command presets the user-flatness correction to a factory-defined setting that consists of one point.

**\*RST** N/A

**Range** N/A

**Key Entry** **Preset List**

**Remarks** N/A

## :FLATness:STORE

**Supported** All

`[:SOURCE]:CORREction:FLATness:STORE "<file name>"`

This command stores the current user-flatness correction data to a file.

**\*RST** N/A

**Range** N/A

**Correction Subsystem ([:SOURCE]:CORRection)**

**Key Entry**      **Store To File**

**Remarks**      For information on file name syntax, refer to “[File Name Variables](#)” on [page 14](#).

**[[:STATE]**

**Supported**      All

`[:SOURCE]:CORRection[:STATE] ON|OFF|1|0`

`[:SOURCE]:CORRection[:STATE]?`

This command enables or disables the user-flatness corrections.

**\*RST**            0

**Key Entry**      **Flatness Off On**

**Remarks**      N/A

---

## Digital Modulation Subsystem ([:SOURce])

### :BURSt:SOURce

**Supported** All

```
[ :SOURce ] :BURSt:SOURce EXT[1] | INT[1]  
[ :SOURce ] :BURSt:SOURce?
```

This command selects either an internally generated or an externally supplied burst source.

**\*RST** EXT

**Key Entry** Burst Envelope Int Ext Off

**Remarks** The external burst source is applied to the EXT 1 INPUT connector.  
The INTernal[1] choice will not work unless an internal burst source is active.

### :BURSt:STATe

**Supported** All

```
[ :SOURce ] :BURSt:STATe ON | OFF | 1 | 0  
[ :SOURce ] :BURSt:STATe?
```

This command enables or disables the burst envelope function.

**\*RST** 0

**Key Entry** Burst Envelope Int Ext Off

**Remarks** N/A

### :DM:EXTeRnal:ALC:BA NDwidth | BWIDth

**Supported** All

```
[ :SOURce ] :DM:EXTeRnal:ALC:BA NDwidth | BWIDth NORMal | NARRow  
[ :SOURce ] :DM:EXTeRnal:ALC:BA NDwidth | BWIDth?
```

This command sets the bandwidth of the automatic leveling control (ALC) loop.

**NORMal** This choice enables the signal generator to automatically select the ALC

	bandwidth for the current test conditions.
<b>NARROW</b>	This choice sets the narrowest possible ALC bandwidth and is useful when an external I/Q source is connected.
<b>*RST</b>	NORM
<b>Key Entry</b>	<b>ALC BW Normal Narrow</b>
<b>Remarks</b>	N/A

**:DM:EXTErnal:HICRest[:STATe]**

**Supported** All

```
[:SOURce]:DM:EXTErnal:HICRest[:STATe] ON|OFF|1|0
[:SOURce]:DM:EXTErnal:HICRest[:STATe]?
```

This command changes the operating condition to accommodate I/Q inputs with a high crest factor.

<b>ON(1)</b>	This choice turns high crest mode on for externally applied signals with high crest factors. High crest mode allows the signal generator to process these signals with less distortion. For crest factors higher than 4 dB, I/Q drive levels should be reduced by 1 dB for each dB above that level. In high crest mode, the maximum output level is reduced and power level accuracy is degraded.
<b>OFF(0)</b>	This choice disables the high crest mode.
<b>*RST</b>	0
<b>Key Entry</b>	<b>High Crest Mode Off On</b>
<b>Remarks</b>	N/A

**:DM:EXTErnal:FILTEr**

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:DM:EXTErnal:FILTEr 40e6|THROUGH
[:SOURce]:RADio:DM:EXTErnal:FILTEr?
```

This command selects the filter or through path for I/Q signals routed to the rear panel I and Q outputs. Selecting a filter using this command will automatically set “:DM:EXTErnal:FILTEr:AUTO” on page 25 to OFF(0) mode.

<b>40e6</b>	This choice applies a 40 MHz baseband filter.
-------------	---

**THRough**      This choice bypasses filtering.  
**\*RST**            **THR**  
**Key Entry**      **40.000 MHz    Through**  
**Remarks**        **N/A**

## **:DM:EXTernal:FILTer:AUTO**

**Supported**      All with Option 001 or 002

```
[:SOURce]:RADio:DM:EXTernal:FILTer:AUTO ON|OFF|1|0
[:SOURce]:RADio:DM:EXTernal:FILTer:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals routed to the rear panel outputs.

**ON(1)**            This choice will automatically select a digital modulation filter optimized for the current signal generator settings.

**OFF(0)**          This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to [“:DM:EXTernal:FILTer” on page 24](#) for selecting a filter or through path.

**\*RST**            **1**  
**Key Entry**      **I/Q Output Filter Manual Auto**  
**Remarks**        **N/A**

## **:DM:EXTernal:POLarity**

**Supported**      All

```
[:SOURce]:DM:EXTernal:POLarity NORMAL|INVERT
[:SOURce]:DM:EXTernal:POLarity?
```

This command sets the phase polarity for the I/Q signal.

**\*RST**            **NORM**  
**Key Entry**      **Int Phase Polarity Normal Invert**  
**Remarks**        This command is for backward compatibility with the appropriate ESG E44xxB.

## :DM:EXTERNAL:SOURce

**Supported** All

```
[:SOURce]:DM:EXTERNAL:SOURce EXTernal|INTERNAL|BBG1|EXT600|OFF
[:SOURce]:DM:EXTERNAL:SOURce?
```

This command selects the I/Q signal source that is routed to the rear panel I and Q output connectors.

- EXTernal** This choice routes a portion of the externally applied signals at the 50 ohm I and Q input connectors to the rear panel I and Q output connectors.
- INTERNAL** This choice is for backward compatibility with the appropriate ESG E44xxB and performs the same function as the BBG1 selection.
- BBG1** This choice routes a portion of the baseband generator I/Q signals to the rear panel I and Q connectors and requires Option 001 or 002.
- EXT600** This choice routes a portion of the externally applied signals at the 600 ohm I and Q input connectors to the rear panel I and Q output connectors.
- OFF** This choice disables the output to the rear panel I and Q output connectors.

**\*RST** EXT

**Key Entry** Ext 50 Ohm BBG1 Ext 600 Ohm Off

**Remarks** The output is the analog component of the I and Q signals.  
For selecting the I/Q source, refer to “:DM:SOURce” on page 38.

## :DM:IQADjustment:EXTERNAL:COFFset

**Supported** All

```
[:SOURce]:DM:IQADjustment:EXTERNAL:COFFset <val>
[:SOURce]:DM:IQADjustment:EXTERNAL:COFFset?
```

This command sets the common mode offset voltage for both the in-phase (I) and quadrature-phase (Q) signals going to the rear panel I and Q output connectors.

The variable <val> is expressed in units of volts (mV–V).

**\*RST** +0.00000000E+000

**Range** –3 to 3



**Key Entry**      **Common Mode I/Q Offset**

**Remarks**      This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to “:DM:IQADjustment[:STATe]” on page 32.

### **:DM:IQADjustment:EXTernal:DIOFfset**

**Supported**      All

```
[ :SOURCE ] :DM:IQADjustment:EXTernal:DIOFfset <val>  
[ :SOURCE ] :DM:IQADjustment:EXTernal:DIOFfset?
```

This command sets the differential offset voltage for an in-phase (I) signal routed to the I output connectors.

The variable <val> is expressed in units of volts (mV–V).

**\*RST**            +0.00000000E+000

**Range**            –3 to 3

**Key Entry**      **Diff. Mode I Offset**

**Remarks**      This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to “:DM:IQADjustment[:STATe]” on page 32.

### **:DM:IQADjustment:EXTernal:DQOFfset**

**Supported**      All

```
[ :SOURCE ] :DM:IQADjustment:EXTernal:DQOFfset <val>  
[ :SOURCE ] :DM:IQADjustment:EXTernal:DQOFfset?
```

This command sets the differential offset voltage for a quadrature-phase (Q) signal routed to the Q output connectors.

**\*RST**            +0.00000000E+000

**Range**            –4 to 4

**Key Entry**      **Diff. Mode Q Offset**

**Remarks**      This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to “:DM:IQADjustment[:STATe]” on page 32.

**:DM:IQADjustment:EXTernal:GAIN****Supported** All

[:SOURce]:DM:IQADjustment:EXTernal:GAIN &lt;val&gt;

[:SOURce]:DM:IQADjustment:EXTernal:GAIN?

This command sets the I/Q gain ratio for signals routed to the rear panel I and Q output connectors.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000**Range** -4 to 4**Key Entry** I/Q Out Gain Balance

**Remarks** This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to “:DM:IQADjustment[:STATe]” on [page 32](#).

**:DM:IQADjustment:EXTernal:IOFFset****Supported** All

[:SOURce]:DM:IQADjustment:EXTernal:IOFFset &lt;val&gt;

[:SOURce]:DM:IQADjustment:EXTernal:IOFFset?

This command sets the offset voltage for a signal applied to the 600 ohm I input connector.

The variable <val> is expressed in units of volts (mV–V).

**\*RST** +0.00000000E+000**Range** -5 to 5**Key Entry** Ext In 600 Ohm I Offset

**Remarks** This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to “:DM:IQADjustment[:STATe]” on [page 32](#).

## **:DM:IQADjustment:EXTernal:IQATten**

**Supported** All

```
[ :SOURce ] :DM:IQADjustment:EXTernal:IQATten <val>  
[ :SOURce ] :DM:IQADjustment:EXTernal:IQATten?
```

This command sets the I/Q output attenuation level.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +6.00000000E+000

**Range** 0–40

**Key Entry** I/Q Output Atten

**Remarks** The value set by this command is active even if the I/Q adjustment function is off.

## **:DM:IQADjustment:EXTernal:QOFFset**

**Supported** All

```
[ :SOURce ] :DM:IQADjustment:EXTernal:QOFFset <val>  
[ :SOURce ] :DM:IQADjustment:EXTernal:QOFFset?
```

This command sets the offset voltage for a signal applied to the 600 ohm Q input connector.

The variable <val> is expressed in units of volts (mV–V).

**\*RST** +0.00000000E+000

**Range** –5 to 5

**Key Entry** Ext In 600 Ohm Q Offset

**Remarks** This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to “[:DM:IQADjustment\[:STATE\]](#)” on [page 32](#).

## **:DM:IQADjustment:GAIN**

**Supported** All

```
[ :SOURce ] :DM:IQADjustment:GAIN <val>  
[ :SOURce ] :DM:IQADjustment:GAIN?
```

This command sets the gain for the I signal relative to the Q signal.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000

**Range** -4 to 4

**Key Entry** I/Q Gain Balance Source 1

**Remarks** This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to “:DM:IQADjustment[:STATe]” on page 32.

### :DM:IQADjustment:IOFFset

**Supported** All

[[:SOURce]:DM:IQADjustment:IOFFset <val>

[[:SOURce]:DM:IQADjustment:IOFFset?

This command adjusts the I channel offset value.

The variable <val> is expressed in units of percent with a minimum resolution of 0.025.

**\*RST** +0.00000000E+000

**Range** -50.000 to 50.000

**Key Entry** I Offset

**Remarks** When using this command to minimize the LO feedthrough signal, optimum performance is achieved when the command is sent after all other I/Q path commands are executed, such as those that change the internal phase polarity or adjust the modulator attenuator. If other adjustments are made after minimizing is performed, the LO feedthrough signal may increase.

This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to “:DM:IQADjustment[:STATe]” on page 32.

### :DM:IQADjustment:QOFFset

**Supported** All

[[:SOURce]:DM:IQADjustment:QOFFset <val>

[[:SOURce]:DM:IQADjustment:QOFFset?

This command adjusts the Q channel offset value.

The variable <val> is expressed in units of percent with a minimum resolution of 0.025.

**\*RST** +0.00000000E+000

**Range** -50.000 to 50.000

**Key Entry** **Q Offset**

**Remarks** When using this command to minimize the LO feedthrough signal, optimum performance is achieved when the command is sent after all other I/Q path commands are executed, such as those that change the internal phase polarity or adjust the modulator attenuator. If other adjustments are made after minimizing is performed, the LO feedthrough signal may increase.

This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to “:DM:IQADjustment[:STATe]” on [page 32](#).

## :DM:IQADjustment:QSKew

**Supported** All

[ :SOURce ] :DM:IQADjustment:QSKew <val>

[ :SOURce ] :DM:IQADjustment:QSKew?

This command adjusts the phase angle between the I and Q vectors.

The variable <val> is expressed in units of degrees with a minimum resolution of 0.1.

**\*RST** +0.00000000E+000

**Range** -10.0 to 10.0

**Key Entry** **Quadrature Skew**

**Remarks** If the signal generator is operating at frequencies greater than 3.3 GHz, quadrature skew settings greater than ±5 degrees will not be within specifications.

Positive skew increases the angle from 90 degrees while negative skew decreases the angle from 90 degrees.

When the quadrature skew is zero, the phase angle is 90 degrees.

This command is effective only if the state of the I/Q adjustment function is set to ON. Refer to “:DM:IQADjustment[:STATe]” on [page 32](#).

**:DM:IQADjustment:SKEW****Supported** All

[:SOURce]:DM:IQADjustment:SKEW &lt;val&gt;&lt;unit&gt;

[:SOURce]:DM:IQADjustment:SKEW?

This command changes the input skew to the I and Q paths. Equal and opposite skew is applied to both paths (RF Output path and I/Q output paths) simultaneously. A positive value delays the I signal relative to the Q signal, and a negative value delays the Q signal relative to the I signal.

If the internal I/Q correction path is set to RF or BB the I/Q signals are already optimized and adjusting I/Q skew would add an impairment to the signals. If the internal I/Q correction path is set to Off, then adjusting the I/Q skew could improve the I/Q signals. The I/Q skew adjustment cannot be performed on the MSK, FSK, and C4FM constant envelope modulations.

I/Q skew adjustments are preserved when the instrument state is saved. I/Q skew adjustment are also preserved when instrument settings are changed. If the signal generator is calibrated, the skew adjustments are added to the calibration value used for the given signal generator state. If the signal generator is uncalibrated, the skew adjustments re applied directly.

Using I/Q skew while playing a user FIR file greater than 32 symbols will generate an error.

The variable <val> is expressed in units of pico seconds or nano seconds.

**\*RST** +0.00000000E+000**Range** -5.0 to 5.0**Key Entry** I/Q Skew**Remarks** N/A**:DM:IQADjustment[:STATe]****Supported** All

[:SOURce]:DM:IQADjustment[:STATe] ON|OFF|1|0

[:SOURce]:DM:IQADjustment[:STATe]?

This command enables or disables the I/Q adjustments.

**\*RST** 0**Key Entry** I/Q Adjustments Off On

**Remarks** N/A

## **:DM:MODulation:FILTer**

**Supported** All with Option 001 or 002

```
[ :SOURce ] :RADio:DM:MODulation:FILTer 2.1e6 | 40e6 | THROugh
[ :SOURce ] :RADio:DM:MODulation:FILTer?
```

This command enables you to select a filter or through path for I/Q signals modulated onto the RF carrier. Selecting a filter using this command will automatically set “:DM:MODulation:FILTer:AUTO” on page 33 to OFF(0) mode.

2.1E6 This choice applies a 2.1 MHz baseband filter to the I/Q signals.  
 40E6 This choice applies a 40 MHz baseband filter to the I/Q signals.  
 THROugh This choice bypasses filtering.

**\*RST** THR

**Key Entry** 2.100 MHz 40.000 MHz Through

**Remarks** N/A

## **:DM:MODulation:FILTer:AUTO**

**Supported** All with Option 001 or 002

```
[ :SOURce ] :RADio:DM:MODulation:FILTer:AUTO ON | OFF | 1 | 0
[ :SOURce ] :RADio:DM:MODulation:FILTer:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals modulated onto the RF carrier.

ON(1) This choice will automatically select a digital modulation filter.  
 OFF(0) This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “:DM:MODulation:FILTer” on page 33 for selecting a filter or through path.

**\*RST** 1

**Key Entry** I/Q Mod Filter Manual Auto

**Remarks** N/A

**:DM:MODulation:ATTen**

**Supported** All with Option 001 or 002

```
[ :SOURce ] :RADio:DM:MODulation:ATTen <val>
```

```
[ :SOURce ] :RADio:DM:MODulation:ATTen?
```

This command attenuates the I/Q signals being modulated through the signal generator RF path.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +2.00000000E+000

**Range** 0–40

**Key Entry** Modulator Atten Manual Auto

**Remarks** N/A

**:DM:MODulation:ATTen:AUTO**

**Supported** All with Option 001 or 002

```
[ :SOURce ] :RADio:DM:MODulation:ATTen:AUTO ON|OFF|1|0
```

```
[ :SOURce ] :RADio:DM:MODulation:ATTen:AUTO?
```

This command enables or disables the I/Q attenuation auto mode.

ON (1) This choice enables the attenuation auto mode which optimizes the modulator attenuation for the current conditions.

OFF (0) This choice holds the attenuator at its current setting or at a selected value. Refer to “[:DM:MODulation:ATTen](#)” on page 34 for setting the attenuation value.

**\*RST** 1

**Key Entry** Modulator Atten Manual Auto

**Remarks** N/A

**:DM:MODulation:ATTen:EXTernal**

**Supported** All with Option 001 or 002

```
[ :SOURce ] :RADio:DM:MODulation:ATTen:EXTernal Default|MANual|MEASure
```

```
[ :SOURce ] :RADio:DM:MODulation:ATTen:EXTernal?
```

This command selects the method for setting the external I/Q input level for automatic



attenuation.

<b>DEFault</b>	This choice sets the external I/Q input level to the default value of 500.0 mV rms.
<b>MANual</b>	This choice is used to manually set the external I/Q input level. After selecting this parameter, refer to <a href="#">“:DM:MODulation:ATTen:EXTernal:LEVel”</a> on page 35 to set the voltage level for automatic attenuation.
<b>MEASure</b>	This choice is used to measure the voltage level at the external I/Q inputs. The measurement will be used as the input level setting. Refer to <a href="#">“:DM:MODulation:ATTen:EXTernal:LEVel:MEASurement”</a> on page 35 to perform the measurement.
<b>*RST</b>	DEF
<b>Key Entry</b>	<b>Ext Input Level 500 mV rms Default Man Meas</b>
<b>Remarks</b>	This command is inactive until an external triggering source is selected.

### **:DM:MODulation:ATTen:EXTernal:LEVel**

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:DM:MODulation:ATTen:EXTernal:LEVel <val>
[:SOURce]:RADio:DM:MODulation:ATTen:EXTernal:LEVel?
```

This command manually sets the external I/Q input level for automatic attenuation.

The variable <val> is expressed in units of volts root-mean-square (V rms).

**\*RST** +5.00000000E-001

**Range** 5E-1 to 1E0

**Key Entry** **Ext Input Level 500 mV rms Default Man Meas**

**Remarks** N/A

### **:DM:MODulation:ATTen:EXTernal:LEVel:MEASurement**

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:DM:MODulation:ATTen:EXTernal:LEVel:MEASurement
```

This command measures the voltage level at the external I/Q inputs. The measurement will be used as the input level setting for automatic attenuation.

## Digital Modulation Subsystem ([:SOURce])

<b>*RST</b>	N/A
<b>Key Entry</b>	<b>Ext Input Level 500 mV rms Default Man Meas</b>
<b>Remarks</b>	N/A

**:DM:MODulation:ATTen:OPTimize:BANDwidth**

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:DM:MODulation:ATTen:OPTimize:BANDwidth <val>
[:SOURce]:RADio:DM:MODulation:ATTen:OPTimize:BANDwidth?
```

This command sets the expected bandwidth of the external I/Q signal. The I/Q modulator attenuator will use this bandwidth setting to optimize the attenuation level.

The variable <val> is expressed in units of samples per second (sps).

<b>*RST</b>	+1.00000000E+008
<b>Range</b>	1E-3 to 100E6
<b>Key Entry</b>	<b>Optimize for 1.00000000Msps Bandwidth</b>
<b>Remarks</b>	N/A

**:DM:POLarity[:ALL]**

**Supported** All

```
[:SOURce]:DM:POLarity[:ALL] NORMal|INVert
[:SOURce]:DM:POLarity?
```

This command sets the digital modulation phase polarity.

**NORMal** This choice selects normal phase polarity for the I and Q signals.

**INVert** This choice flips the I and Q signals by routing the I signal to the Q input of the I/Q modulator and the Q signal to the I input.

<b>*RST</b>	NORM
<b>Key Entry</b>	<b>Int Phase Polarity Normal Invert</b>
<b>Remarks</b>	N/A

## :DM:SKEW:PATH

**Supported** All

```
[ :SOURce ] :DM:SKEW:PATH RF | BB | OFF
[ :SOURce ] :DM:SKEW:PATH ?
```

This command selects the skew path.

- |            |  |
|------------|--|
| <b>RF</b>  | When RF is selected, the skew is optimized for the I/Q signal applied to the RF Output. The BB output will be functional, but the I/Q skew applied will be optimized for the RF path. When using this choice, seven symbols of latency are added to the Arb based waveform. While in real-time mode, the maximum number of user symbols for the FIR is limited to 32.  |
| <b>BB</b>  | When BB is selected, the skew is optimized for the I/Q signal outputs on the rear panel. The RF Output will be functional, but the I/Q skew applied will be optimized for the BB path. When using this choice, seven symbols of latency are added to the Arb based waveform. While in real-time mode, the maximum number of user symbols for the FIR is limited to 32. |
| <b>OFF</b> | When Off is selected, the factory I/Q skew correction is turned off. Using the signal generator in this mode does not add any latency symbols. This setting allows the instrument to operate in a mode prior to the installation of firmware C.03.10.  |

**\*RST** INT

**Key Entry** Int I/Q Skew Corrections RF BB Off

**Remarks** N/A

## :DM:SKEW[:STATe]

**Supported** All

```
[ :SOURce ] :DM:SKEW[ :STATe ] ON | OFF | 1 | 0
[ :SOURce ] :DM:SKEW[ :STATe ] ?
```

This command enables or disables the I/Q skew correction function.

**\*RST** 1

**Key Entry** Int I/Q Skew Corrections RF BB Off

**Remarks** N/A

## :DM:SOURce

**Supported** All

```
[:SOURce]:DM:SOURce EXTernal | INTernal | BBG1 | EXT600 | OFF
[:SOURce]:DM:SOURce?
```

This command selects the I/Q modulator source.

<b>EXTernal</b>	This choice selects a 50 ohm impedance for the I and Q input connectors and routes the applied signals to the I/Q modulator.
<b>INTernal</b>	This choice is for backward compatibility with the appropriate ESG E44xxB and performs the same function as the BBG1 selection.
<b>BBG1</b>	This choice selects the baseband generator as the source for the I/Q modulator and requires Option 001 or 002.
<b>EXT600</b>	This choice selects a 600 ohm impedance for the I and Q input connectors and routes the applied signals to the I/Q modulator.
<b>OFF</b>	This choice disables the digital modulation source.
<b>*RST</b>	EXT
<b>Key Entry</b>	Ext 50 Ohm    BBG1    Ext 600 Ohm    Off
<b>Remarks</b>	N/A

## :DM:STATe

**Supported** All

```
[:SOURce]:DM:STATe ON|OFF|1|0
[:SOURce]:DM:STATe?
```

This command enables or disables the I/Q modulator.

<b>ON (1)</b>	This choice enables the internal I/Q modulator.
<b>OFF (0)</b>	This choice disables the internal I/Q modulator. You can turn off the I/Q modulation with this choice even though a digital modulation format is enabled. With this configuration, the RF output signal will not be modulated, but the I/Q signals may be present at the rear panel I and Q outputs depending on the rear panel output selection.
<b>*RST</b>	0
<b>Key Entry</b>	I/Q Off On
<b>Remarks</b>	The I/Q modulator is enabled whenever a digital format is turned on.

The I/Q annunciator will be shown on the signal generator display whenever the I/Q modulator is on.

## Frequency Subsystem ([:SOURce])

### :FREQuency:CHANnels:BAND

**Supported**      All

```
[ :SOURce ] :FREQuency:CHANnels:BAND NBASe | NMOBile | BPGSm | MPGSm | BEGSm | MEGSm |
BRGSm | MRGSm | BDCS | MDCS | BPCS | MPCS | B450 | GM450 | B480 | M480 | B850 | M850 | B8 | M8 | B15
|M15 | B390 | B420 | B460 | B915 | M380 | M410 | M450 | M870 | PHS | DECT
[ :SOURce ] :FREQuency:CHANnels:BAND?
```

This command sets the frequency of the signal generator by specifying a frequency channel band.

- NBASe      This choice selects Standard Base as the frequency band for NADC.
- NMOBile    This choice selects Standard Mobile as the frequency band for NADC.
- BPGSm      This choice selects P-Gsm 900 Base as the frequency band for GSM.
- MPGSm      This choice selects P-Gsm 900 Mobile as the frequency band for GSM.
- BEGSm      This choice selects E-Gsm 900 Base as the frequency band for GSM.
- MEGSm      This choice selects E-Gsm 900 Mobile as the frequency band for GSM.
- BRGSm      This choice selects R-Gsm 900 Base as the frequency band for GSM.
- MRGSm      This choice selects R-Gsm 900 Mobile as the frequency band for GSM.
- BDCS        This choice selects DCS 1800 Base as the frequency band for GSM.
- MDCS        This choice selects DCS 1800 Mobile as the frequency band for GSM.
- BPCS        This choice selects PCS 1900 Base as the frequency band for GSM.
- MPCS        This choice selects PCS 1900 Mobile as the frequency band for GSM.
- B450        This choice selects Gsm 450 Base as the frequency band for GSM.
- GM450       This choice selects Gsm 450 Mobile as the frequency band for GSM.
- B480        This choice selects Gsm 480 Base as the frequency band for GSM.
- M480        This choice selects Gsm 480 Mobile as the frequency band for GSM.
- B850        This choice selects Gsm 850 Base as the frequency band for GSM.
- M850        This choice selects Gsm 850 Mobile as the frequency band for GSM.
- B8           This choice selects 800MHz Base as the frequency band for PDC.

M8	This choice selects 800MHz Mobile as the frequency band for PDC.
B15	This choice selects 1500MHz Base as the frequency band for PDC.
M15	This choice selects 1500MHz Mobile as the frequency band for PDC.
B390	This choice selects Base 390-400 as the frequency band for TETRA.
B420	This choice selects Base 420-430 as the frequency band for TETRA.
B460	This choice selects Base 460-470 as the frequency band for TETRA.
B915	This choice selects Base 915-921 as the frequency band for TETRA.
M380	This choice selects Mobile 380-390 as the frequency band for TETRA.
M410	This choice selects Mobile 410-420 as the frequency band for TETRA.
M450	This choice selects Mobile 450-460 as the frequency band for TETRA.
M870	This choice selects Mobile 870-876 as the frequency band for TETRA.
PHS	This choice selects Standard PHS as the frequency band.
DECT	This choice selects Standard DECT as the frequency band.

**\*RST**

BPGS

**Key Entry**

**P-GSM Base   E-GSM Base   R-GSM Base   DCS Base**  
**PCS Base   GSM 450 Base   GSM 480 Base   GSM 850 Base**  
**NADC Base   800MHZ Base   1500MHZ Base**  
**Tetra Base 390/400   Tetra Base 420/430   Tetra Base 460/470**  
**Tetra Base 915/921   PHS Standard   DECT Standard**  
**P-GSM Mobile   E-GSM Mobile   R-GSM Mobile   DCS Mobile**  
**PCS Mobile   GSM 450 Mobile   GSM 480 Mobile   GSM 850 Mobile**  
**NADC Mobile   800MHZ Mobile   1500MHZ Mobile**  
**Tetra Mobile 380/390   Tetra Mobile 410/420   Tetra Mobile 450/460**  
**Tetra Mobile 870/876**

**Remarks**

The frequency channel state must be enabled for this command to work. Refer to [“:FREQuency:CHANnels\[:STATe\]” on page 43.](#)

**:FREQuency:CHANnels:NUMBer**

**Supported** All

[ :SOURCE ] :FREQuency:CHANnels:NUMBer <number>

[ :SOURCE ] :FREQuency:CHANnels:NUMBer?

This command sets the frequency of the signal generator by specifying a channel number of a given frequency band.

**\*RST** +1

<b>Range</b>	<i>P-GSM Base / Mobile:</i>	1–24
	<i>E-GSM and R-GSM Base / Mobile:</i>	1–1023
	<i>DCS Base / Mobile:</i>	512–885
	<i>PCS Base / Mobile:</i>	512–900
	<i>GSM-450 Base / Mobile:</i>	259–293
	<i>GSM-480 Base / Mobile:</i>	306–340
	<i>GSM-850 Base / Mobile:</i>	128–251
	<i>NADC Base / Mobile:</i>	1–1023
	<i>800MHZ Base / Mobile:</i>	0–640
	<i>1500MHZ Base / Mobile:</i>	0–960
	<i>TETRA 380 / 390 Mobile:</i>	3600–4000
	<i>TETRA 390 / 4000 Base:</i>	3600–4000
	<i>TETRA 410 / 420 Mobile:</i>	800–1200
	<i>TETRA 420 / 430 Base:</i>	800–1200
	<i>TETRA 460/470: 2400 through 2800</i>	2400–2800
	<i>TETRA 870 / 876 Mobile:</i>	600–640
	<i>TETRA 915 / 921 Base:</i>	600–940
	<i>PHS Standard:</i>	1–255
	<i>DECT Standard:</i>	0–9

**Key Entry** Channel Number

**Remarks** The frequency channel state must be enabled for this command to work. Refer to “:FREQuency:CHANnels[:STATE]” on page 43.



## **:FREQuency:CHANnels[:STATe]**

**Supported** All

```
[ :SOURce ] :FREQuency:CHANnels [ :STATe ] ON | OFF | 1 | 0
[ :SOURce ] :FREQuency:CHANnels [ :STATe ] ?
```

This command enables or disables the frequency channel and band selection to set the output frequency.

**\*RST** 0

**Key Entry** Freq Channels Off On

**Remarks** To set frequency channels band refer to  
 “:FREQuency:CHANnels:BAND” on page 40.

## **:FREQuency:FIXed**

**Supported** All

```
[ :SOURce ] :FREQuency:FIXed <val><unit>
[ :SOURce ] :FREQuency:FIXed?
```

This command sets the signal generator output frequency.

**\*RST** *Option 501:* +10000000000000E+09  
*Option 502:* +20000000000000E+09  
*Option 503:* +30000000000000E+09  
*Option 504:* +40000000000000E+09  
*Option 506:* +60000000000000E+09

**Range** *Option 501:* 100kHz–1GHZ  
*Option 502:* 100kHz–2GHZ  
*Option 503:* 100kHz–3GHZ  
*Option 504:* 100kHz–4GHZ  
*Option 506:* 100kHz–6GHZ

**Key Entry** N/A

**Remarks** A frequency change may affect the current output power. Refer to  
 “[:LEVel][:IMMediate][:AMPLitude]” on page 65 for the correct  
 specified frequency and amplitude settings. To set the frequency mode  
 refer to “:FREQuency:MODE” on page 44.

**:FREQuency:MODE****Supported** All

[:SOURce]:FREQuency:MODE CW|FIXed|LIST

[:SOURce]:FREQuency:MODE?

This command sets the frequency mode of the signal generator.

CW and FIXed	These choices are synonymous with one another and they let the signal generator operate at a fixed frequency. Refer to “:FREQuency[:CW]” on page 48 for setting the frequency in the CW frequency mode. Refer to “:FREQuency:FIXed” on page 43 for setting the frequency in the fixed frequency mode.
LIST	This choice lets the currently selected sweep (LIST or STEP) frequency settings control the output frequency. Refer to “:LIST:TYPE” on page 56 for setting the sweep type.
<b>*RST</b>	CW
<b>Key Entry</b>	N/A
<b>Remarks</b>	N/A

**:FREQuency:MULTiplier****Supported** All

[:SOURce]:FREQuency:MULTiplier &lt;val&gt;

[:SOURce]:FREQuency:MULTiplier?

This command sets the multiplier for the signal generator carrier frequency.

<b>*RST</b>	+1.00000000E+000
<b>Range</b>	<i>Negative Values:</i> -100 to -.001 <i>Positive Values:</i> .001-1000
<b>Key Entry</b>	<b>Freq Multiplier</b>
<b>Remarks</b>	For any multiplier other than one, the MULT indicator is shown in the frequency area of the display.

## **:FREQuency:OFFSet**

**Supported** All

```
[ :SOURce ] :FREQuency:OFFSet <val><unit>  
[ :SOURce ] :FREQuency:OFFSet?
```

This command sets the frequency offset.

The query of this command returns a value equal to the original output frequency times the multiplier value, plus the frequency offset value.

**\*RST** +0.00000000000000E+00

**Range** -200GHZ to 200GHZ

**Key Entry** Freq Offset

**Remarks** When an offset has been entered, the OFFS indicator is turned on in the frequency area of the display.

The frequency offset state is turned on when any non-zero value is entered; entering zero will turn it off. Refer to [“:FREQuency:OFFSet:STATe”](#) for setting the offset state independent of entering offset values.

## **:FREQuency:OFFSet:STATe**

**Supported** All

```
[ :SOURce ] :FREQuency:OFFSet:STATe ON|OFF|1|0  
[ :SOURce ] :FREQuency:OFFSet:STATe?
```

This command enables or disables the offset frequency.

**\*RST** 0

**Key Entry** Freq Offset

**Remarks** Entering OFF (0) will set the frequency offset to 0 Hz.

## **:FREQuency:REFerence**

**Supported** All

```
[ :SOURce ] :FREQuency:REFerence <val><unit>  
[ :SOURce ] :FREQuency:REFerence?
```

This command sets the output reference frequency.

## Frequency Subsystem ([:SOURce])

<b>*RST</b>	+0.00000000000000E+00
<b>Range</b>	<i>Option 501: 0HZ–1GHZ</i> <i>Option 502: 0HZ–2GHZ</i> <i>Option 503: 0HZ–3GHZ</i> <i>Option 504: 0HZ–4GHZ</i> <i>Option 506: 0HZ–6GHZ</i>
<b>Key Entry</b>	<b>Freq Ref Set</b>
<b>Remarks</b>	N/A

**:FREQuency:REFerence:STATe**

**Supported** All

```
[ :SOURce ] :FREQuency:REFerence:STATe ON|OFF|1|0
[ :SOURce ] :FREQuency:REFerence:STATe?
```

This command enables or disables the frequency reference mode.

**\*RST** 0

**Key Entry** **Freq Ref Off On**

**Remarks** When the frequency reference mode is on, subsequent frequency parameters are set relative to the reference value.

**:FREQuency:STARt**

**Supported** All

```
[ :SOURce ] :FREQuency:STARt <val><unit>
[ :SOURce ] :FREQuency:STARt?
```

This command sets the frequency start point for a step sweep.

**\*RST** *Option 501: +10000000000000E+09*  
*Option 502: +20000000000000E+09*  
*Option 503: +30000000000000E+09*  
*Option 504: +40000000000000E+09*  
*Option 506: +60000000000000E+09*

**Range** *Option 501: 100kHz–1GHZ*  
*Option 502: 100kHz–2GHZ*

	<i>Option 503: 100kHz–3GHz</i>
	<i>Option 504: 100kHz–4GHz</i>
	<i>Option 506: 100kHz–6GHz</i>
<b>Key Entry</b>	<b>Freq Start</b>
<b>Remarks</b>	N/A

## **:FREQuency:STOP**

**Supported** All

```
[ :SOURce ] :FREQuency:STOP <val><unit>
[ :SOURce ] :FREQuency:STOP?
```

This command sets the frequency stop point for a step sweep.

**\*RST** *Option 501: +10000000000000E+09*  
*Option 502: +20000000000000E+09*  
*Option 503: +30000000000000E+09*  
*Option 504: +40000000000000E+09*  
*Option 506: +60000000000000E+09*

**Range** *Option 501: 100kHz–1GHz*  
*Option 502: 100kHz–2GHz*  
*Option 503: 100kHz–3GHz*  
*Option 504: 100kHz–4GHz*  
*Option 506: 100kHz–6GHz*

**Key Entry** **Freq Stop**  
**Remarks** N/A

## **:FREQuency:SYNThesis**

**Supported** All except Option UNJ

```
[ :SOURce ] :FREQuency:SYNThesis 1|2
[ :SOURce ] :FREQuency: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 optimize phase noise at offsets below 10 kHz.

Frequency Subsystem ([:SOURce])

2 This choice will select mode 2 which optimizes phase noise at offsets above 10 kHz.

<b>*RST</b>	+1
<b>Key Entry</b>	<b>Mode 1 Optimize &lt;10kHz Offset    Mode 2 Optimize &gt;10kHz Offset</b>
<b>Remarks</b>	N/A

**:FREQuency[:CW]**

**Supported**    All

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

This command sets the signal generator output frequency for the CW frequency mode.

<b>*RST</b>	<i>Option 501: +10000000000000E+09</i> <i>Option 502: +20000000000000E+09</i> <i>Option 503: +30000000000000E+09</i> <i>Option 504: +40000000000000E+09</i> <i>Option 506: +60000000000000E+09</i>
<b>Range</b>	<i>Option 501: 100kHz–1GHz</i> <i>Option 502: 100kHz–2GHz</i> <i>Option 503: 100kHz–3GHz</i> <i>Option 504: 100kHz–4GHz</i> <i>Option 506: 100kHz–6GHz</i>

<b>Key Entry</b>	<b>Frequency</b>
<b>Remarks</b>	To set the frequency mode to CW, refer to <a href="#">“:FREQuency:MODE” on page 44.</a>

**:PHASe:REFerence**

**Supported**    All

```
[:SOURce]:PHASe:REFerence
```

This command sets the current output phase as a zero reference.

<b>*RST</b>	N/A
<b>Range</b>	N/A
<b>Key Entry</b>	<b>Phase Ref Set</b>

**Remarks** Subsequent phase adjustments are set relative to the new reference.

### **:PHASe[:ADJust]**

**Supported** All

```
[:SOURce]:PHASe[:ADJust] <val><unit>
[:SOURce]:PHASe[:ADJust]?
```

This command adjusts the phase of the modulating signal.

The query will only return values in radians.

**\*RST** +0.00000000E+000

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

**Key Entry** **Adjust Phase**

**Remarks** N/A

### **:ROSCillator:SOURce**

**Supported** All

```
[:SOURce]:ROSCillator:SOURce?
```

This command queries the source of the reference oscillator. It returns either INT (internal) or EXT (external).

**\*RST** N/A

**Range** N/A

**Key Entry** N/A

**Remarks** N/A

### **:ROSCillator:SOURce:AUTO**

**Supported** All except signal generators with Option UNJ

```
[:SOURce]:ROSCillator:SOURce:AUTO ON|OFF|1|0
[:SOURce]:ROSCillator:SOURce:AUTO?
```

This command enables or disables the ability of the signal generator to automatically select between the internal and an external reference oscillator.

ON (1) This choice enables the signal generator to detect when a valid reference signal is present at the 10 MHz IN connector and automatically switches

**Frequency Subsystem ([:SOURce])**

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.

**\*RST** 1

**Key Entry** **Ref Oscillator Source Auto Off On**

**Remarks** N/A



---

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

### :LIST:DIRection

**Supported** All

[: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.

**\*RST** UP

**Key Entry** Sweep Direction Down Up

**Remarks** N/A

### :LIST:DWELl

**Supported** All

[:SOURce]:LIST:DWELl <val>{,<val>}

[:SOURce]:LIST:DWELl?

This command sets the dwell time for the current list sweep points.

The variable <val> is expressed in units of 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.

---

**\*RST** N/A

**Range** 0.001–60

**Key Entry** N/A

<b>Remarks</b>	Dwell time is used when IMMEDIATE is the trigger source. Refer to “:LIST:TRIGger:SOURce” on page 55 for the trigger setting.
	The dwell time is the amount of time the sweep is guaranteed to pause after setting the frequency and/or power for the current point.
	The setting enabled by this command is not affected by signal generator power-on, preset, or *RST.

**:LIST:DWELL:POINTs**

**Supported** All

[ :SOURce ] :LIST:DWELL:POINTs?

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

<b>*RST</b>	N/A
<b>Range</b>	N/A
<b>Key Entry</b>	N/A
<b>Remarks</b>	N/A

**:LIST:DWELL:TYPE**

**Supported** All

[ :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 51 for setting the list dwell points.
STEP	This choice selects the dwell time from the step sweep. Refer to “:SWEep:DWELL” on page 57 for setting the step dwell.
<b>*RST</b>	LIST
<b>Key Entry</b>	<b>Dwell Type List Step</b>
<b>Remarks</b>	N/A

## **:LIST:FREQuency**

**Supported** All

[ :SOURce ] :LIST:FREQuency <val>{ , <val> }

[ :SOURce ] :LIST:FREQuency?

This command sets the frequency values for the current list sweep points.

The variable <val> is expressed in units of Hertz.

**\*RST** N/A

**Range** *Option 501:* 100E3–1E9  
*Option 502:* 100E3–2E9  
*Option 503:* 100E3–3E9  
*Option 504:* 100E3–4E9  
*Option 506:* 100E3–6E9

**Key Entry** N/A

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

## **:LIST:FREQuency:POINts**

**Supported** All

[ :SOURce ] :LIST:FREQuency:POINts?

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

**\*RST** N/A

**Range** N/A

**Key Entry** N/A

**Remarks** N/A

## **:LIST:MANual**

**Supported** All

[ :SOURce ] :LIST:MANual <val>

[ :SOURce ] :LIST:MANual?

This command sets a list or step sweep point as the current sweep point controlling the

frequency and power output.

**\*RST** N/A

**Range** 1–1601

**Key Entry** **Manual Point**

**Remarks** If list or step mode is controlling frequency and/or power, then the indexed point in the respective list(s) will be used.

Entering a value with this command will have no effect, unless MANual is the selected mode. Refer to “:LIST:MODE” on page 54 for setting the proper mode.

If the point selected is beyond the length of the longest enabled list, then the point will be set to the maximum possible point, and an error will be generated.

## :LIST:MODE

**Supported** All

[ :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 a sweep point which controls the frequency and/or amplitude according to the sweep type. Refer to “:LIST:MANual” on page 53 for selecting a sweep point

**\*RST** AUTO

**Key Entry** **Manual Mode Off On**

**Remarks** N/A

## :LIST:POWer

**Supported** All

[ :SOURce ] :LIST:POWer <val>{ , <val> }

[ :SOURce ] :LIST:POWer?

This command sets the amplitude for the current list sweep points.

<b>*RST</b>	N/A
<b>Range</b>	Refer to “[:LEVel][:IMMediate][:AMPLitude]” on page 65 for output power ranges.
<b>Key Entry</b>	N/A
<b>Remarks</b>	<p>The setting enabled by this command is not affected by signal generator power-on, preset, or *RST.</p> <p>During an amplitude sweep operation, signal generators with Option UNB protect the step attenuator by automatically switching to attenuator hold (OFF) mode. The attenuator is locked at its current setting and the amplitude sweep range is limited to 40 dB.</p>

### **:LIST:POWer:POINts**

**Supported** All

`[:SOURce]:LIST:POWer:POINts?`

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

<b>*RST</b>	N/A
<b>Range</b>	N/A
<b>Key Entry</b>	N/A
<b>Remarks</b>	N/A

### **:LIST:TRIGger:SOURce**

**Supported** All

`[:SOURce]:LIST:TRIGger:SOURce BUS|IMMediate|EXTernal|KEY`

`[:SOURce]:LIST:TRIGger:SOURce?`

This command sets the point trigger source for a list or step sweep event.

<b>BUS</b>	This choice enables GPIB triggering using the *TRG or GET command or LAN and RS-232 triggering using the *TRG command.
<b>IMMediate</b>	This choice enables immediate triggering of the sweep event.
<b>EXTernal</b>	This choice enables the triggering of a sweep event by an externally applied signal at the TRIG IN connector.
<b>KEY</b>	This choice enables triggering through front panel interaction by

pressing the **Trigger** hardkey.

<b>*RST</b>	IMM
<b>Key Entry</b>	<b>Bus Free Run Ext Trigger Key</b>
<b>Remarks</b>	N/A

## :LIST:TYPE

**Supported** All

[[:SOURce]:LIST:TYPE LIST|STEP

[[:SOURce]:LIST:TYPE?

This command toggles between the two types of sweep.

<b>*RST</b>	STEP
<b>Key Entry</b>	<b>Sweep Type List Step</b>
<b>Remarks</b>	N/A

## :LIST:TYPE:LIST:INITialize:FSTep

**Supported** All

---

**CAUTION** The current list sweep data will be overwritten once this command is executed. If needed, save the current data. Refer to “:STORe:LIST” on [page 120](#) for storing list sweep files.

---

[[:SOURce]:LIST:TYPE:LIST:INITialize:FSTep

This command replaces the loaded list sweep data with the settings from the current step sweep data points.

<b>*RST</b>	N/A
<b>Range</b>	N/A
<b>Key Entry</b>	<b>Load List From Step Sweep</b>
<b>Remarks</b>	You can have only one sweep list at a time.

## :LIST:TYPE:LIST:INITialize:PRESet

**Supported** All

---

**CAUTION** The current list sweep data will be overwritten once this command is executed. If needed, save the current data. Refer to “:STORe:LIST” on [page 120](#) for storing list sweep files.

---

[: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.

**\*RST** N/A  
**Range** N/A  
**Key Entry** Preset List  
**Remarks** N/A

## :SWEep:DWELl

**Supported** All

[: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 units of 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.

---

**\*RST** +2.00000000E-003  
**Range** 0.001–60  
**Key Entry** Step Dwell  
**Remarks** Dwell time is used when the trigger source is set to IMMEDIATE. Refer to “:LIST:TRIGger:SOURce” on [page 55](#) for the trigger setting.  
The dwell time is the amount of time the sweep is guaranteed to pause after setting the frequency and/or power for the current point.

## :SWEep:POINts

**Supported** All

[ :SOURce ] :SWEep:POINts <val>

[ :SOURce ] :SWEep:POINts?

This command enables you to define the number of points in a step sweep.

**\*RST** 2

**Range** 2–1601

**Key Entry** # Points

**Remarks** N/A



---

## Power Subsystem ([:SOURce]:POWER)

### :ALC:BANDwidth

**Supported** All

```
[ :SOURce ] :POWer:ALC:BA NDwidth | BWIDth NORMAl | NARRow  
[ :SOURce ] :POWer:ALC:BA NDwidth | BWIDth ?
```

This command sets the bandwidth of the automatic leveling control (ALC) loop.

- |        |   |
|--------|---|
| NORMAl | This choice enables the signal generator to automatically select the ALC bandwidth for the current test conditions. |
| NARRow | This choice sets the narrowest possible ALC bandwidth and is useful when an external I/Q source is connected.       |

**\*RST** NORM

**Key Entry** ALC BW Normal Narrow

**Remarks** The bandwidth choices for this command are not effective if an internal I/Q source is being used.

### :ALC:SEARCh

**Supported** All

```
[ :SOURce ] :POWer:ALC:SEARCh ON | OFF | 1 | 0 | ONCE  
[ :SOURce ] :POWer:ALC:SEARCh ?
```

This command enables or disables the internal power search calibration.

- |         |  |
|---------|--|
| 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.                    |

**\*RST** 0

**Key Entry** Power Search Manual Auto Do Power Search

**Remarks** Use this command when the ALC state is set to OFF (0). Refer to “:ALC[:STATe]” on page 60 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.

### :ALC:SEARch:REFerence

**Supported** All

```
[:SOURce]:POWer:ALC:SEARch:REFerence FIXed|MODulated
[:SOURce]:POWer:ALC:SEARch:REFerence?
```

This command sets either fixed or modulated modes of power search.

**FIXed** This choice uses a 0.5 volt reference.

**MODulated** This choice uses the RMS value of the current I/Q modulation.

**\*RST** MOD

**Key Entry** Power Search Reference Fixed Mod

**Remarks** N/A

### :ALC[:STATe]

**Supported** All

```
[:SOURce]:POWer:ALC[:STATe] ON|OFF|1|0
[:SOURce]:POWer:ALC[:STATe]?
```

This command enables or disables the automatic leveling control (ALC) circuit.

**\*RST** 1

**Key Entry** ALC Off On

**Remarks** The purpose of the ALC circuit is to hold output power at the desired level in spite of drift due to temperature and time.

### :ALTErnate:AMPLitude

**Supported** All except signal generators with Option UNB or 506.

```
[:SOURce]:POWer:ALTErnate:AMPLitude <val>
[:SOURce]:POWer:ALTErnate:AMPLitude?
```

This command sets the delta value for the alternate amplitude.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +0.00000000E+000

<b>Range</b>	-156 to 156
<b>Key Entry</b>	<b>Alt Amp Delta</b>
<b>Remarks</b>	The actual RF output amplitude is equal to the Alternate Amplitude Delta value plus the RF output amplitude; this sum cannot exceed the minimum and maximum amplitude limits of the signal generator. For example, if the Alternate Amplitude Delta is set to -156 dB and the RF output amplitude is set to 20 dB, the sum is equal to -136 dB.

## **:ALternate:MANual**

**Supported** All

```
[ :SOURce ] :POWER:ALternal:MANual MAIN|DELTA  
[ :SOURce ] :POWER:ALternal:MANual?
```

This command toggles the alternate amplitude manual trigger source between main and alternate (delta).

**MAIN** The main power is present at the RF output.

**DELTA** The alternate power is present at the RF output.

**\*RST** MAIN

**Key Entry** **Manual Trigger Main Delta**

**Remarks** This command is effective only if MANual is the selection for trigger source. Refer to “[:ALternate:TRIGger\[:SOURce\]](#)” on page 62 for more information.

## **:ALternate:STATe**

**Supported** All

```
[ :SOURce ] :POWER:ALternate:STATe ON|OFF|1|0  
[ :SOURce ] :POWER:ALternate:STATe?
```

This command enables or disables the alternate amplitude.

**\*RST** 0

**Key Entry** **Alt Ampl Off On**

**Remarks** N/A

**:ALternate:TRIGger[:SOURce]****Supported** All

```
[:SOURce]:POWer:ALternate:TRIGger[:SOURce] INTernal|EXTernal|MANual
[:SOURce]:POWer:ALternate:TRIGger[:SOURce]?
```

This command sets the trigger source for the alternate amplitude signal.

- |          |   |
|----------|---|
| INTernal | This choice requires a baseband generator option. Each timeslot is allowed to output power with a user-selected main or alternate amplitude.      |
| EXTernal | This choice requires an external trigger to the TRIG IN rear panel connector to toggle the RF output power between main and alternate amplitudes. |
| MANual   | This choice enables the RF output power to be toggled between main and alternate amplitudes.  |

**\*RST** MAN**Key Entry** Int Ext Manual**Remarks** N/A**:ATTenuation:AUTO****Supported** All

```
[: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. |

**\*RST** 1**Key Entry** Atten Hold Off On

**Remarks** The OFF (0) choice eliminates the power discontinuity normally associated with the attenuator switching during power adjustments.

During an amplitude sweep operation, signal generators with Option UNB protect the step attenuator by automatically switching to attenuator hold (OFF) mode. The attenuator is locked at its current

setting and the amplitude sweep range is limited to 40 dB.

## :MODE

**Supported** All

```
[:SOURce]:POWER:MODE FIXed|LIST
[:SOURce]:POWER:MODE?
```

This command sets the signal generator RF output power operating mode.

**\*RST** FIX

**Key Entry** Amplitude

**Remarks** N/A

## :REFeRence

**Supported** All

```
[:SOURce]:POWER:REFeRence <val><unit>
[:SOURce]:POWER:REFeRence?
```

This command sets the power level for the signal generator RF output reference.

**\*RST** +0.00000000E+000

**Range** -400 to 300DBM

**Key Entry** Ampl Ref Set

**Remarks** The RF output power is referenced to the value entered in this command.

## :REFeRence:STATe

**Supported** All

```
[:SOURce]:POWER:REFeRence:STATe ON|OFF|1|0
[:SOURce]:POWER:REFeRence:STATe?
```

This command enables or disables the RF output reference.

ON(1) This choice will set the power reference state to ON. The unit displayed for commands, “:ANNOtation:AMPLitude:UNIT” on page 82 and “:POWER” on page 169 will be expressed in DB.

OFF(0) This choice will set the power reference state to OFF.

<b>*RST</b>	0
<b>Key Entry</b>	<b>Ampl Ref Off On</b>
<b>Remarks</b>	Once the reference state is ON, all subsequent output power settings are set relative to the reference value.  Amplitude offsets can be used with the amplitude reference mode.

**:START**

<b>Supported</b>	All
	<code>[:SOURce]:POWer:STARt &lt;val&gt;&lt;unit&gt;</code> <code>[:SOURce]:POWer:STARt?</code>
	This command sets the amplitude of the first point in a step sweep.
<b>*RST</b>	-1.35000000E+002
<b>Range</b>	Refer to “[:LEVel][:IMMediate][:AMPLitude]” on page 65 for the output power ranges.
<b>Key Entry</b>	<b>Ampl Start</b>
<b>Remarks</b>	During an amplitude sweep operation, signal generators with Option UNB protect the step attenuator by automatically switching to attenuator hold (ON) mode. The attenuator is locked at its current setting and the amplitude sweep range is limited to 40 dB.

**:STOP**

<b>Supported</b>	All
	<code>[:SOURce]:POWer:STOP &lt;val&gt;&lt;unit&gt;</code> <code>[:SOURce]:POWer:STOP?</code>
	This command sets the amplitude of the last point in a step sweep.
<b>*RST</b>	-1.35000000E+002
<b>Range</b>	Refer to “[:LEVel][:IMMediate][:AMPLitude]” on page 65 for the output power ranges.
<b>Key Entry</b>	<b>Ampl Stop</b>
<b>Remarks</b>	During an amplitude sweep operation, signal generators with Option UNB protect the step attenuator by automatically switching to

attenuator hold (ON) mode. The attenuator is locked at its current setting and the amplitude sweep range is limited to 40 dB.

### [:LEVel][:IMMediate]:OFFSet

**Supported** All

```
[:SOURce]:POWER[:LEVel][:IMMediate]:OFFSet <val><unit>
[:SOURce]:POWER[:LEVel][:IMMediate]:OFFSet?
```

This command sets the power offset value.

**\*RST** +0.00000000E+000

**Range** -200DB to 200DB

**Key Entry** **Ampl Offset**

**Remarks** 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 any time in either normal operation or amplitude reference mode.

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

**Supported** All

```
[:SOURce]:POWER[:LEVel][:IMMediate][:AMPLitude] <val><unit>
[:SOURce]:POWER[:LEVel][:IMMediate][:AMPLitude]?
```

This command sets the RF output power.

**\*RST** -1.35000000E+002

<b>Range</b>	<i>Frequency</i>	<i>Standard</i>	<i>Option UNB</i>	<i>Option 506</i>
	250kHz-1GHZ	-136 to 13DBM	-136 to 17DBM	-136 to 14DBM
	> 1-3GHZ	-136 to 10DBM	-136 to 16DBM	-136 to 13DBM
	> 3-4GHZ	-136 to 7DBM	-136 to 13DBM	-136 to 10DBM
	> 4-6GHZ	N/A	N/A	-136 to 10DBM

**Key Entry** **Amplitude**

**Remarks** The ranges for this command are specified values from the data sheet.

## Pulse Subsystem ([:SOURce]:PULSe)

### :FREQuency:STEP

**Supported** All

[[:SOURce]:PULSe:FREQuency:STEP freq

[[:SOURce]:PULSe:FREQuency:STEP?

This command sets the step increment for the pulse frequency.

**\*RST** +1.00000000E+005

**Range** 0–100

**Key Entry** N/A

**Remarks** N/A



---

## 3 System Commands

This chapter provides SCPI descriptions for subsystems dedicated to peripheral signal generator operations common to all ESG models. This chapter contains the following major sections:

- “Calibration Subsystem (:CALibration)” on page 68
- “Communication Subsystem (:SYSTem:COMMunicate)” on page 72
- “Diagnostic Subsystem (:DIAGnostic[:CPU]:INFORMation)” on page 78
- “Display Subsystem (:DISPlay)” on page 82
- “IEEE 488.2 Common Commands” on page 86
- “Memory Subsystem (:MEMory)” on page 93
- “Mass Memory Subsystem (:MMEMory)” on page 121
- “Output Subsystem (:OUTPut)” on page 127
- “Route Subsystem (:ROUTE:HARDware:DGENERator)” on page 129
- “Status Subsystem (:STATus)” on page 137
- “System Subsystem (:SYSTem)” on page 156
- “Trigger Subsystem” on page 165
- “Unit Subsystem (:UNIT)” on page 169

---

## Calibration Subsystem (:CALibration)

### :DCFM

**Supported** All

:CALibration:DCFM

This command initiates a DCFM or DC $\Phi$ M calibration depending on the currently active modulation. This calibration eliminates any dc or modulation offset of the carrier signal.

---

**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 disconnected to reset the carrier signal to the correct zero reference.

---

**\*RST** N/A

**Range** N/A

**Key Entry** DCFM/DC $\Phi$ M Cal

**Remarks** 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.

### :IQ

**Supported** All

:CALibration:IQ

This command initiates an I/Q calibration.

**\*RST** N/A

**Range** N/A

**Key Entry** Execute Cal

**Remarks** N/A

## :IQ:DEFault

**Supported** All

:CALibration:IQ:DEFault

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

**\*RST** N/A

**Range** N/A

**Key Entry** **Revert to Default Cal Settings**

**Remarks** N/A

## :IQ:FULL

**Supported** All

:CALibration:IQ:FULL

This command performs an adjustment to the I/Q offset, gain and quadrature for the full-frequency range (regardless of the start and stop frequency settings) and stores the results in the signal generator's firmware.

**\*RST** N/A

**Range** N/A

**Key Entry** **Execute Cal**

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

## :IQ:DC

**Supported** All

:CALibration:IQ:DC

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

**Calibration Subsystem (:CALibration)**

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

- RF frequency
- I/Q attenuation level
- Baseband generator settings
- I/Q polarity settings
- Baseband filter settings
- Path settings (Internal I/Q Mux Path 1 or Path 2)
- I/Q calibration (the I/Q DC calibration will be invalidated if any other I/Q calibration is executed or if the **Revert to Factory Default** key is pressed)
- Temperature ( $\pm 5$  degrees)

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

- Power level changes
- I/Q Impairments

<b>*RST</b>	N/A
<b>Key Entry</b>	<b>Execute Cal</b>
<b>Remarks</b>	N/A

**:IQ:STARt**

**Supported** All

```
:CALibration:IQ:STARt <val><unit>
:CALibration:IQ:STARt?
```

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

<b>*RST</b>	N/A
<b>Range</b>	<i>Option 501: 100kHz–1GHz</i>
	<i>Option 502: 100kHz–2GHz</i>
	<i>Option 503: 100kHz–3GHz</i>
	<i>Option 504: 100kHz–4GHz</i>

	<i>Option 506: 100kHz–6GHz</i>
<b>Key Entry</b>	<b>Start Frequency</b>
<b>Remarks</b>	The setting enabled by this command is not affected by signal generator power-on, preset, or *RST.

## **:IQ:STOP**

**Supported** All

```
:CALibration:IQ:STOP <val><unit>  
:CALibration:IQ:STOP?
```

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

**\*RST** N/A

**Range** *Option 501: 100kHz–1GHz*  
*Option 502: 100kHz–2GHz*  
*Option 503: 100kHz–3GHz*  
*Option 504: 100kHz–4GHz*  
*Option 506: 100kHz–6GHz*

**Key Entry** **Stop Frequency**

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

---

## Communication Subsystem (:SYSTEM:COMMunicate)

### :GPIB:ADDRess

**Supported** All

```
:SYSTEM:COMMunicate:GPIB:ADDRess <number>
```

```
:SYSTEM:COMMunicate:GPIB:ADDRess?
```

This command sets the signal generator's GPIB address.

**\*RST** N/A

**Range** 0–30

**Key Entry** GPIB Address

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

### :LAN:GATEway

**Supported** All

```
: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.

**\*RST** N/A

**Range** N/A

**Key Entry** Default Gateway

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

## :LAN:HOSTname

**Supported** All

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

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

**\*RST** N/A

**Range** N/A

**Key Entry** **Hostname**

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

## :LAN:IP

**Supported** All

```
: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.

**\*RST** N/A

**Range** N/A

**Key Entry** **IP Address**

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

## :LAN:SUBNet

**Supported** All

```
: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.

**\*RST** N/A

<b>Range</b>	N/A
<b>Key Entry</b>	<b>Subnet Mask</b>
<b>Remarks</b>	The setting enabled by this command is not affected by signal generator power-on, preset, or *RST.

### **:PMETer:ADDRess**

<b>Supported</b>	All
:SYSTem:COMMunicate:PMETer:ADDRess :SYSTem:COMMunicate:PMETer:ADDRess?	
This command sets the address for a power meter that is controlled by the signal generator.	
<b>*RST</b>	N/A
<b>Range</b>	0–30
<b>Key Entry</b>	<b>Meter Address</b>
<b>Remarks</b>	The setting enabled by this command is not affected by signal generator power-on, preset, or *RST.  The power meter is controlled only through a GPIB cable.  Ensure that the power meter address is different from the signal generator address.

### **:PMETer:CHANnel**

<b>Supported</b>	All
:SYSTem:COMMunicate:PMETer:CHANnel A B :SYSTem:COMMunicate:PMETer:CHANnel?	
This command sets the measurement channel on the power meter that is controlled by the signal generator.	
<b>*RST</b>	N/A
<b>Key Entry</b>	<b>Meter Channel A B</b>
<b>Remarks</b>	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 signal



generator power-on, preset, or \*RST.

The power meter is controlled only through a GPIB cable.

## **:PMETer:IDN**

**Supported** All

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

```
:SYSTem:COMMunicate:PMETer:IDN?
```

This command sets the model number of the power meter that is controlled by the signal generator.

**\*RST** N/A

**Key Entry** Power Meter

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

The power meter is controlled only through a GPIB cable.

## **:PMETer:TIMEout**

**Supported** All

```
:SYSTem:COMMunicate:PMETer:TIMEout <num>[<time suffix>]
```

```
:SYSTem:COMMunicate:PMETer:TIMEout?
```

This command sets the period of time which the signal generator will wait for a valid reading from the power meter.

The variable <num> has a resolution of 0.001.

**\*RST** N/A

**Range** 1mS–100S

**Key Entry** Meter Timeout

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

The power meter is controlled only through a GPIB cable.

If a time-out occurs, the signal generator reports an error message.

## :SERial:BAUD

**Supported** All

```
: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.

**\*RST** N/A

**Key Entry** **RS-232 Baud Rate**

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

## :SERial:ECHO

**Supported** All

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

```
:SYSTem:COMMunicate:SERial:ECHO?
```

This command enables or disables the RS-232 echo.

**\*RST** N/A

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

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

## :SERial:RESet

**Supported** All

```
:SYSTem:COMMunicate:SERial:RESet
```

This event command resets the RS-232 buffer and will discard any unprocessed SCPI input received by the RS-232 port.

**\*RST** N/A

**Range** N/A

**Key Entry** **Reset RS-232**

**Remarks** N/A

## :SERial:TOUT

**Supported** All

:SYSTem:COMMunicate:SERial:TOUT <val>

:SYSTem:COMMunicate:SERial:TOUT?

This command sets the RS-232 serial port time-out value.

If further input is not received within the time-out period specified, while a SCPI command is being processed, the command is aborted and the input buffer is cleared.

The variable <val> is entered in units of seconds.

**\*RST** N/A

**Range** 1–25

**Key Entry** RS-232 Timeout

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

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

### :BOARDs

**Supported** All

:DIAGnostic[:CPU]:INFORMATION:BOARDs?

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

"<board name,part number,serial number,version number,status>"

This information format will repeat with as many iterations as the number of detected boards in the signal generator.

<b>*RST</b>	N/A
<b>Range</b>	N/A
<b>Key Entry</b>	<b>Installed Board Info</b>
<b>Remarks</b>	N/A

### :CCOUNT:ATTENUATOR

**Supported** All

:DIAGnostic[:CPU]:INFORMATION:CCOUNT:ATTENUATOR?

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

<b>*RST</b>	N/A
<b>Range</b>	N/A
<b>Key Entry</b>	<b>Diagnostic Info</b>
<b>Remarks</b>	N/A

## **:CCOunt:PON**

**Supported**      All

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

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

**\*RST**            N/A

**Range**            N/A

**Key Entry**        **Diagnostic Info**

**Remarks**        N/A

## **:CCOunt:PROTection**

**Supported**      All

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

This query returns the cumulative number of times the reverse power protection has been cycled.

**\*RST**            N/A

**Range**            N/A

**Key Entry**        **Diagnostic Info**

**Remarks**        N/A

## **:DISPlay:OTIME**

**Supported**      All

:DIAGnostic[:CPU]:INFORMATION:DISPlay:OTIME?

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

**\*RST**            N/A

**Range**            N/A

**Key Entry**        **Diagnostic Info**

**Remarks**        N/A

### :OPTions

**Supported** All

:DIAGnostic[:CPU]:INFORMATION:OPTions?

This query returns a list of internally installed signal generator options.

**\*RST** N/A

**Range** N/A

**Key Entry** Options Info

**Remarks** N/A

### :OPTions:DETail

**Supported** All

:DIAGnostic[:CPU]:INFORMATION:OPTions:DETail?

This query returns the options that are installed along with the option revision and DSP version if applicable.

**\*RST** N/A

**Range** N/A

**Key Entry** Options Info

**Remarks** N/A

### :OTIME

**Supported** All

:DIAGnostic[:CPU]:INFORMATION:OTIME?

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

**\*RST** N/A

**Range** N/A

**Key Entry** Diagnostic Info

**Remarks** N/A

## :REVISION

**Supported** All

: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 of the main firmware.

**\*RST** N/A

**Range** N/A

**Key Entry** Diagnostic Info

**Remarks** N/A

## :SDATE

**Supported** All

:DIAGnostic[:CPU]:INFORMATION:SDATE?

This query returns the date and time of the main firmware.

**\*RST** N/A

**Range** N/A

**Key Entry** Diagnostic Info

**Remarks** N/A

## Display Subsystem (:DISPlay)

### :ANNotation:AMPLitude:UNIT

**Supported** All

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

This command sets the displayed front panel amplitude units.

If the amplitude reference state is set to on, the query returns units expressed in DB. Setting any other unit will cause a setting conflict error stating that the amplitude reference state must be set to off. Refer to, “:REFerence:STATe” on page 63 for more information.

**\*RST** DBM

**Key Entry** N/A

**Remarks** N/A

### :ANNotation:CLOCK:DATE:FORMat

**Supported** All

```
:DISPlay:ANNotation:CLOCK:DATE:FORMat MDY|DMY  
:DISPlay:ANNotation:CLOCK:DATE:FORMat?
```

This command enables the selection of the date format. The choices are month-day-year (MDY) or day-month-year (DMY) format.

**\*RST** N/A

**Key Entry** N/A

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



## :ANNotation:CLOCK[:STATe]

**Supported** All

```
:DISPlay:ANNotation:CLOCK[:STATe] ON|OFF|1|0  
:DISPlay:ANNotation:CLOCK[:STATe]?
```

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

**\*RST** N/A

**Key Entry** N/A

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

## :BRIGhtness

**Supported** All

```
:DISPlay:BRIGhtness <value>  
: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).

**\*RST** N/A

**Range** 0.02–1

**Key Entry** **Brightness**

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

## :CAPTure

**Supported** All

```
:DISPlay:CAPTure
```

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

**\*RST** N/A

**Range** N/A

<b>Key Entry</b>	N/A
<b>Remarks</b>	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 down-loaded in the following manner: <ol style="list-style-type: none"><li>1. Log on to the signal generator using ftp.</li><li>2. Change (cd) to the BIN directory.</li><li>3. Retrieve the file by using the get command.</li></ol>

## :CONTRast

<b>Supported</b>	All
	<code>:DISPlay:CONTRast &lt;value&gt;</code> <code>:DISPlay:CONTRast?</code>
	This command sets the contrast of the LCD display. 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).
<b>*RST</b>	N/A
<b>Range</b>	0–1
<b>Key Entry</b>	Display contrast hardkeys are located below the display.
<b>Remarks</b>	The setting enabled by this command is not affected by signal generator power-on, preset, or *RST.

## :INVerse

<b>Supported</b>	All
	<code>:DISPlay:INVerse ON OFF 1 0</code> <code>:DISPlay:INVerse?</code>
	This command sets the display of the source to inverse video mode.
<b>*RST</b>	N/A
<b>Key Entry</b>	<b>Inverse Video Off On</b>
<b>Remarks</b>	The setting enabled by this command is not affected by signal generator power-on, preset, or *RST.

## :REMOte

**Supported** All

:DISPlay:REMOte ON|OFF|1|0

:DISPlay:REMOte?

This command enables or disables the display updating when the signal generator is remotely controlled.

ON (1) This choice updates the signal generator display so you can see the settings as the commands are executed, however, this will degrade the signal generator speed.

OFF (0) This choice turns off the display updating while further optimizing the signal generator for speed.

**\*RST** N/A

**Key Entry** Update in Remote Off On

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

## [:WINDow][:STATe]

**Supported** All

: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).

**\*RST** N/A

**Key Entry** N/A

**Remarks** The setting enabled by this command is not affected by \*RST. However, presetting the signal generator or cycling the power will turn the display on.

---

## IEEE 488.2 Common Commands

### \*CLS

**Supported** All

\*CLS

The Clear Status (CLS) command clears the Status Byte Register, the Data Questionable Event Register, the Standard Event Status Register, the Standard Operation Status Register and any other registers that are summarized in the status byte.

**\*RST** N/A

**Range** N/A

**Key Entry** N/A

**Remarks** N/A

### \*ESE

**Supported** All

\*ESE <data>

The Standard Event Status Enable (ESE) command sets the Standard Event Status Enable Register.

The variable <data> represents the sum of the bits that will be enabled.

**\*RST** N/A

**Range** 0–255

**Key Entry** N/A

**Remarks** 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.

Refer to chapter 3 of the *Programming Guide* for more information.

## \*ESE?

**Supported** All

\*ESE?

The Standard Event Status Enable (ESE) query returns the value of the Standard Event Status Enable Register.

**\*RST** N/A

**Range** N/A

**Key Entry** N/A

**Remarks** Refer to chapter 3 of the *Programming Guide* for more information.

## \*ESR?

**Supported** All

---

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

---

\*ESR?

The Standard Event Status Register (ESR) query returns the value of the Standard Event Status Register.

**\*RST** N/A

**Range** N/A

**Key Entry** N/A

**Remarks** Refer to chapter 3 of the *Programming Guide* for more information.

## \*IDN?

**Supported** All

\*IDN?

The Identification (IDN) query outputs an identifying string. The response will show the following information:

<company name>, <model number>, <serial number>, <firmware revision>

**\*RST** N/A

<b>Range</b>	N/A
<b>Key Entry</b>	<b>Diagnostic Info</b>
<b>Remarks</b>	The identification information can be modified. Refer to “:IDN” on <a href="#">page 158</a> for more information.

**\*OPC**

**Supported** All

\*OPC

The Operation Complete (OPC) command sets bit 0 in the Standard Event Status Register when all pending operations have finished.

**\*RST** N/A

**Range** N/A

**Key Entry** N/A

**Remarks** N/A

**\*OPC?**

**Supported** All

\*OPC?

The Operation Complete (OPC) query returns the ASCII character 1 in the Standard Event Status Register when all pending operations have finished.

**\*RST** N/A

**Range** N/A

**Key Entry** N/A

**Remarks** N/A

**\*PSC**

**Supported**

\*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 device-specific event enable registers.

- 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.

**\*RST** N/A

**Key Entry** N/A

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

### \*PSC?

**Supported** All

\*PSC?

The Power-On Status Clear (PSC) query returns the flag setting as enabled by the \*PSC command.

**\*RST** N/A

**Range** N/A

**Key Entry** N/A

**Remarks** N/A

### \*RCL

**Supported** All

\*RCL <reg>, <seq>

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

**\*RST** N/A

**Range** *Registers: 0–99 Sequences: 0–9*

**Key Entry** **RECALL Reg Select Seq:**

**Remarks** N/A

## \*RST

**Supported** All

\*RST

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

**\*RST** N/A

**Range** N/A

**Key Entry** N/A

**Remarks** Each command shows the \*RST value if the setting is affected.

## \*SAV

**Supported** All

\*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>.

**\*RST** N/A

**Range** *Registers: 0–99 Sequences: 0–9*

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

**Remarks** N/A

## \*SRE

**Supported** All

\*SRE <data>

The Service Request Enable (SRE) command sets the value of the Service Request Enable Register.

The variable <data> is the decimal sum of the bits that will be enabled. Bit 6 (value 64) is ignored and cannot be set by this command.

**\*RST** N/A

**Range** 0–255

**Key Entry** N/A



**Remarks** Refer to chapter 3 of the *Programming Guide* for more information.  
Entering values from 64 to 127 is equivalent to entering values from 0 to 63.  
The setting enabled by this command is not affected by signal generator preset or \*RST. However, cycling the signal generator power will reset it to zero.

### \*SRE?

**Supported** All

\*SRE?

The Service Request Enable (SRE) query returns the value of the Service Request Enable Register.

**\*RST** N/A

**Range** 0–63 or 128–191

**Key Entry** N/A

**Remarks** Refer to chapter 3 of the *Programming Guide* for more information.

### \*STB?

**Supported** All

\*STB?

The Read Status Bye (STB) query returns the value of the status byte including the master summary status (MSS) bit.

**\*RST** N/A

**Range** 0–255

**Key Entry** N/A

**Remarks** Refer to chapter 3 of the *Programming Guide* for more information.

### \*TRG

**Supported** All

\*TRG

The Trigger (TRG) command triggers the device if BUS is the selected trigger source,

otherwise, \*TRG is ignored.

<b>*RST</b>	N/A
<b>Range</b>	N/A
<b>Key Entry</b>	N/A
<b>Remarks</b>	N/A

**\*TST?**

<b>Supported</b>	All
------------------	-----

\*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.

<b>*RST</b>	N/A
<b>Range</b>	N/A
<b>Key Entry</b>	<b>Run Complete Self Test</b>
<b>Remarks</b>	N/A

**\*WAI**

<b>Supported</b>	All
------------------	-----

\*WAI

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

<b>*RST</b>	N/A
<b>Range</b>	N/A
<b>Key Entry</b>	N/A
<b>Remarks</b>	N/A

---

## Memory Subsystem (:MEMory)

### :CATalog:BINary

**Supported** All

:MEMory:CATalog:BINary?

This command outputs a list of the 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 list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**\*RST** N/A

**Range** N/A

**Key Entry** Binary

**Remarks** Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

### :CATalog:BIT

**Supported** All

:MEMory:CATalog:BIT?

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

```
<mem used>,<mem free>{,"<file listing>"}
```

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

```
"<file name,file type,file size>"
```

**\*RST** N/A

**Memory Subsystem (:MEMory)**

<b>Range</b>	N/A
<b>Key Entry</b>	<b>Bit</b>
<b>Remarks</b>	Refer to <a href="#">“File Name Variables” on page 14</a> for information on the file name syntax.

**:CATalog:CDMa**

**Supported** All with Option 401

:MEMory:CATalog:CDMa?

This command outputs a list of the arbitrary waveform CDMA 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 list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**\*RST** N/A

**Range** N/A

**Key Entry** **CDMA**

**Remarks** Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

**:CATalog:DMOD**

**Supported** All with Option 001 or 002

:MEMory:CATalog:DMOD?

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

```
<mem used>,<mem free>{,"<file listing>"}
```

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

```
"<file name,file type,file size>"
```

<b>*RST</b>	N/A
<b>Range</b>	N/A
<b>Key Entry</b>	<b>DMOD</b>
<b>Remarks</b>	Refer to <a href="#">“File Name Variables” on page 14</a> for information on the file name syntax.

## **:CATalog:DWCDma**

**Supported** All with Option 400

:MEMory:CATalog:DWCDma?

This command outputs a list of the arbitrary waveform downlink W-CDMA 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 list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

<b>*RST</b>	N/A
<b>Range</b>	N/A
<b>Key Entry</b>	<b>DWCDMA</b>
<b>Remarks</b>	Refer to <a href="#">“File Name Variables” on page 14</a> for information on the file name syntax.

## **:CATalog:FCDMa**

**Supported** All with Option 401

:MEMory:CATalog:FCDMa?

This command outputs a list of the arbitrary waveform forward link cdma2000 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 list. Each file listing parameter will be in the following form:

**Memory Subsystem (:MEMory)**

"<file name,file type,file size>"

**\*RST**            N/A

**Range**            N/A

**Key Entry**        **FCDMA**

**Remarks**        Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

**:CATalog:FIR**

**Supported**        All

:MEMory:CATalog:FIR?

This command outputs a list of the finite impulse response filter files. The return data will be in the following form:

<mem used>,<mem free>{,"<file listing>"}

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

"<file name,file type,file size>"

**\*RST**            N/A

**Range**            N/A

**Key Entry**        **FIR**

**Remarks**        Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

**:CATalog:FSK**

**Supported**        All with Option 402

:MEMory:CATalog:FSK?

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

<mem used>,<mem free>{,"<file listing>"}

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

following form:

```
"<file name,file type,file size>"
```

**\*RST**            N/A

**Range**            N/A

**Key Entry**        FSK

**Remarks**        Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

## :CATalog:IQ

**Supported**        All

```
:MEMory:CATalog:IQ?
```

This command outputs a list of the IQ 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 list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**\*RST**            N/A

**Range**            N/A

**Key Entry**        I/Q

**Remarks**        Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

## :CATalog:LIST

**Supported**        All

```
:MEMory:CATalog:LIST?
```

This command outputs a list of the 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 list. Each file listing parameter will be in the

**Memory Subsystem (:MEMory)**

following form:

"<file name,file type,file size>"

**\*RST**            N/A

**Range**            N/A

**Key Entry**        List

**Remarks**        Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

**:CATalog:MCDMa**

**Supported**        All with Option 401

:MEMory:CATalog:MCDMa?

This command outputs a list of the arbitrary waveform multicarrier IS-95 CDMA 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 list. Each file listing parameter will be in the following form:

"<file name,file type,file size>"

**\*RST**            N/A

**Range**            N/A

**Key Entry**        MCDMA

**Remarks**        Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

**:CATalog:MDMod**

**Supported**        All with Option 001 or 002

:MEMory:CATalog:MDMod?

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

<mem used>,<mem free>{,"<file listing>"}

The signal generator will return the two memory usage parameters and as many file



listings as there are files in the directory list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**\*RST**            N/A

**Range**            N/A

**Key Entry**        MDMOD

**Remarks**        Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

## :CATalog:MDWCdma

**Supported**        All with Option 400

```
:MEMory:CATalog:MDWCdma?
```

This command outputs a list of the arbitrary waveform multicarrier downlink W-CDMA 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 list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**\*RST**            N/A

**Range**            N/A

**Key Entry**        MDWCDMA

**Remarks**        Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

## :CATalog:MFCdma

**Supported**        All with Option 401

```
:MEMory:CATalog:MFCdma?
```

This command outputs a list of the arbitrary waveform multicarrier forward link cdma2000 files. The return data will be in the following form:

```
<mem used>,<mem free>{,"<file listing>"}
```

**Memory Subsystem (:MEMory)**

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

"<file name,file type,file size>"

**\*RST**            N/A

**Range**            N/A

**Key Entry**        **MFCDMA**

**Remarks**        Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

**:CATalog:MTONE**

**Supported**        All with Option 001 or 002

:MEMory:CATalog:MTONE?

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

<mem used>,<mem free>{,"<file listing>"}

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

"<file name,file type,file size>"

**\*RST**            N/A

**Range**            N/A

**Key Entry**        **MTONE**

**Remarks**        Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

**:CATalog:RCDMa**

**Supported**        All with Option 401

:MEMory:CATalog:RCDMa?

This command outputs a list of the arbitrary waveform files for reverse link cdma2000. 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 list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**\*RST**            N/A

**Range**            N/A

**Key Entry**        RCDMA

**Remarks**        Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

## :CATalog:SEQ

**Supported**        All with Option 001 or 002

```
:MEMory:CATalog:SEQ?
```

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

```
<mem used>,<mem free>{,"<file listing>"}
```

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

```
"<file name,file type,file size>"
```

**\*RST**            N/A

**Range**            N/A

**Key Entry**        SEQ

**Remarks**        Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

## :CATalog:SHAPE

**Supported**        All with Option 402

```
:MEMory:CATalog:SHAPE?
```

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

**Memory Subsystem (:MEMory)**

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 list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**\*RST**            N/A

**Range**            N/A

**Key Entry**        **SHAPE**

**Remarks**        Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

**:CATalog:STATe**

**Supported**        All

:MEMory:CATalog:STATe?

This command outputs a list of the 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 list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**\*RST**            N/A

**Range**            N/A

**Key Entry**        **State**

**Remarks**        Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

## :CATalog:UFLT

**Supported** All

:MEMory:CATalog:UFLT?

This command outputs a list of the 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 list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**\*RST** N/A

**Range** N/A

**Key Entry** **User Flatness**

**Remarks** Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

## :CATalog:UWCDma

**Supported** All with Option 400

:MEMory:CATalog:UWCDma?

This command outputs a list of the arbitrary waveform uplink W-CDMA 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 list. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**\*RST** N/A

**Range** N/A

**Key Entry** **UWCDMA**

**Remarks** Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

**:CATalog[:ALL]****Supported** All

:MEMory:CATalog[:ALL] ?

This command outputs a list of all the files in the memory subsystem. However it does not include files stored on the Option 001 or 002 baseband generator. 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 memory subsystem. Each file listing parameter will be in the following form:

```
"<file name,file type,file size>"
```

**\*RST** N/A**Range** N/A**Key Entry** All

**Remarks** Refer to [Table 3-1 on page 121](#) for a listing of the file types and [“File Name Variables” on page 14](#) for information on the "<file name>" syntax.

**:COPY[:NAME]****Supported** All

:MEMory:COPY[:NAME] "&lt;file name&gt;","&lt;file name&gt;"

This command makes a duplicate of the requested file.

**\*RST** N/A**Range** N/A**Key Entry** Copy File

**Remarks** Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

When copying a waveform file from volatile to non-volatile memory, the marker and header files associated with the waveform file will automatically be copied at the same time.

## :DATA

**Supported** All

:MEMory:DATA "<file name>",<datablock>

:MEMory:DATA? "<file name>"

This command creates a user data file and stores it in the signal generator non-volatile binary memory catalog.

<file name> This variable represents the user file stored in the signal generator non-volatile memory.

<datablock> This variable represents the block-formatted data.

Example:

:MEMory:DATA "userfile", #1912S407897

userfile This is the user file as it appears in the signal generator.

1 This variable defines the number of decimal digits to follow.

9 This variable defines how many bytes of data are to follow.

12S407897 This is the ASCII representation of the data that is downloaded to the signal generator.

**\*RST** N/A

**Range** N/A

**Key Entry** N/A

**Remarks** Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

## :DATA:BIT

**Supported** All

:MEMory:DATA:BIT "<file name>",<bit\_count>,<datablock>

:MEMory:DATA:BIT? "<file name>"

This command creates a bit file and stores it in the signal generator non-volatile memory.

"<file name>" This variable represents the user file name as it will appear in the signal generator memory.

**Memory Subsystem (:MEMory)**

- <bit\_count> This variable represents the number of significant bits in the data block.
- <datablock> This variable represents the block-formatted data.

**Example:**

```
:MEMory:DATA:BIT "userfile1", 16, #12Qz
```

- "userfile1" This is the name of the user file as it appears in the signal generator.
- 16 This variable defines the actual number of data bits contained in the datablock.
- 1 This variable defines the number of decimal digits to follow.
- 2 This variable defines how many bytes of data are to follow.
- Qz This variable defines the ASCII representation of the 16 bits of data that are downloaded to the signal generator.

**\*RST** N/A

**Range** N/A

**Key Entry** N/A

**Remarks** Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

**:DATA:FIR**

**Supported** All

```
:MEMory:DATA:FIR "<file name>", osr, coefficient{, coefficient}
```

```
:MEMory:DATA:FIR? "<file name>"
```

This command creates a user-defined finite impulse response (FIR) file and stores it in the signal generator non-volatile memory.

- osr The oversample ratio (osr) is the number of filter taps per symbol.
- coefficient This variable is the FIR coefficient. The maximum total number of coefficients is 1024.
- {,coefficient} This optional variable is used when you enter additional coefficients.

**\*RST** N/A

**Range** *osr*: 1–32



	<i>coefficient</i> : -1000 to 1000
<b>Key Entry</b>	<b>Oversample Ratio</b>
<b>Remarks</b>	Refer to “ <a href="#">File Name Variables</a> ” on page 14 for information on the file name syntax.

## :DATA:FSK

**Supported** All with Option 001 or 002

```
:MEMory:DATA:FSK "<file name>",<num_states>,<f0>,<f1>,...<f(n)>
[,<diff_state>,<num_diff_states>,<diff1>,...<diff(n)>]
:MEMory:DATA:FSK? "<file name>"
```

This command creates a custom FSK file and stores it in the signal generator non-volatile memory.

The query returns data in the following form:

```
<num_states>,<f0>,<f1>,...<f(n)>,<diff_state>,<num_diff_states>,<diff1>,...<diff(n)>
```

"<file name>"	This variable string identifies the name of the FSK file.
<num_states>	This variable identifies the number of frequency states.
<f0>	This variable identifies the value of the first frequency state.
<f1>,...<f(n)>	This variable identifies the value of the second and subsequent frequency states with a frequency resolution of 0.1Hz.
<diff_state>	This variable enables or disables differential encoding.
<num_diff_states>	This variable identifies the number of differential states.
<diff0>	This variable identifies the value of the first differential state.
<diff1>,...<diff(n)>	This variable identifies the value of the second and subsequent differential states.

The following example creates and stores a four-level FSK file named 4FSK that has four states (frequencies): -2kHz, -1kHz, 2kHz, 1kHz; differential encoding is toggled ON, and there are two differential states 1 and 0.

```
:MEM:DATA:FSK "4FSK",4,-2kHz,-1kHz,2kHz,1kHz,ON,2,1,0
```

**\*RST** N/A



<diff1,...diff(n)> This variable identifies the value of the second and subsequent differential states.

The following example creates and stores a two-symbol I/Q file named `testBPSK` that has the Q offset.

```
:MEM:DATA:IQ "testBPSK",1,2,1,0,0,0
```

<b>*RST</b>	N/A
<b>Range</b>	<i>num_states</i> : 2–256 <i>i0–i(n)</i> : -1 to 1 <i>q0–q(n)</i> : -1 to 1 <i>num_diff_states</i> : 0–256 <i>diff0–diff(n)</i> : -128 to 127
<b>Key Entry</b>	N/A
<b>Remarks</b>	N/A

### **:DATA:PRAM[1]|2|3|4**

**Supported** All

```
:MEMory:DATA:PRAM[1]|2|3|4?
```

This query determines whether there is a user-defined pattern in the pattern RAM (PRAM).

<b>*RST</b>	0
<b>Range</b>	N/A
<b>Key Entry</b>	N/A
<b>Remarks</b>	N/A

### **:DATA:PRAM[1]|2|3|4:BLOCK**

**Supported** All

```
:MEMory:DATA:PRAM[1]|2|3|4:BLOCK <atablock>
```

This command downloads the block-formatted data directly into pattern RAM.

<b>*RST</b>	N/A
<b>Range</b>	N/A

## Memory Subsystem (:MEMory)

**Key Entry** N/A

**Remarks** N/A

**:DATA:PRAM[1] | 2 | 3 | 4:LIST**

**Supported** All

:MEMory:DATA:PRAM[1] | 2 | 3 | 4:LIST <uint8>[, <uint8>, <...>]

This command downloads the list-formatted data directly into pattern RAM.

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

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

**\*RST** N/A

**Range** 0–255

**Key Entry** N/A

**Remarks** N/A

**:DATA:SHAPE**

**Supported** All with Option 402

:MEMory:DATA:SHAPE <"filename">, <num\_rise\_points>, <rp0>, <rp1>, ... <num\_fall\_points>, <fp0>, <fp1>, ... <fp(n)>  
:MEMory:DATA:SHAPE? <"filename">

This command creates a new burst shape file and stores it in the signal generator non-volatile memory.

"<file name>" This variable string identifies the name of the burst shape file.

num\_rise\_points This variable specifies how many rise points used in the command.

rp0,...rp(n) This variable defines each successive rise point, where 0 is no power and 1 is full power.

num_fall_points	This variable specifies how many fall points used in the command.
fp0,...fp(n)	This variable defines each successive fall point, where 0 is no power and 1 is full power.
<b>*RST</b>	N/A
<b>Range</b>	<i>num_rise_points</i> : 2–256 <i>num_fall_points</i> : 2–256 <i>rp0–rp(n)</i> : 0.0–1.0 <i>fp0–fp(n)</i> : 0.0–1.0
<b>Key Entry</b>	N/A
<b>Remarks</b>	N/A

### **:DElete:ALL**

**Supported**    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. However, this does not include files stored on the Option 001 or 002 baseband generator. You cannot recover the files after executing this command.

---

:MEMory:DElete:ALL

This command clears the file system of all user files.

<b>*RST</b>	N/A
<b>Range</b>	N/A
<b>Key Entry</b>	<b>Delete All Files</b>
<b>Remarks</b>	N/A

### **:DElete:BINary**

**Supported**    All

:MEMory:DElete:BINary

This command deletes all binary files.

<b>*RST</b>	N/A
-------------	-----

## Memory Subsystem (:MEMory)

<b>Range</b>	N/A
<b>Key Entry</b>	<b>Delete All Binary Files</b>
<b>Remarks</b>	N/A

**:DELeTe:BIT**

<b>Supported</b>	All
:MEMory:DELeTe:BIT	
This command deletes all bit files.	
<b>*RST</b>	N/A
<b>Range</b>	N/A
<b>Key Entry</b>	<b>Delete All Bit Files</b>
<b>Remarks</b>	N/A

**:DELeTe:CDMa**

<b>Supported</b>	All with Option 401
:MEMory:DELeTe:CDMa	
This command deletes all arbitrary waveform IS-95 CDMA files.	
<b>*RST</b>	N/A
<b>Range</b>	N/A
<b>Key Entry</b>	<b>Delete All ARB CDMA Files</b>
<b>Remarks</b>	N/A

**:DELeTe:DMOD**

<b>Supported</b>	All with Option 001 or 002
:MEMory:DELeTe:DMOD	
This command deletes all arbitrary waveform digital modulation files.	
<b>*RST</b>	N/A
<b>Range</b>	N/A
<b>Key Entry</b>	<b>Delete All ARB DMOD Files</b>

**Remarks** N/A

### **:DELeTe:DWCDma**

**Supported** All with Option 400

:MEMory:DELeTe:DWCDma

This command deletes all arbitrary waveform downlink W-CDMA files.

**\*RST** N/A

**Range** N/A

**Key Entry** Delete All ARB DWCDMA Files

**Remarks** N/A

### **:DELeTe:FCDMa**

**Supported** All with Option 401

:MEMory:DELeTe:FCDMa

This command deletes all arbitrary waveform forward link W-CDMA files.

**\*RST** N/A

**Range** N/A

**Key Entry** Delete All ARB FCDMA Files

**Remarks** N/A

### **:DELeTe:FIR**

**Supported** All

:MEMory:DELeTe:FIR

This command deletes all finite impulse response filter files.

**\*RST** N/A

**Range** N/A

**Key Entry** Delete All FIR Files

**Remarks** N/A

### **:DELeTe:FSK**

**Supported** All with Option 001 or 002

:MEMory:DELeTe:FSK

This command deletes all FSK files.

**\*RST** N/A

**Range** N/A

**Key Entry** Delete All FSK Files

**Remarks** N/A

### **:DELeTe:IQ**

**Supported** All

:MEMory:DELeTe:IQ

This command deletes all I/Q files.

**\*RST** N/A

**Range** N/A

**Key Entry** Delete All I/Q Files

**Remarks** N/A

### **:DELeTe:LIST**

**Supported** All

:MEMory:DELeTe:LIST

This command deletes all List files.

**\*RST** N/A

**Range** N/A

**Key Entry** Delete All List Files

**Remarks** N/A



## **:DELeTe:MCDMa**

**Supported** All with Option 401

:MEMory:DELeTe:MCDMa

This command deletes all arbitrary waveform multicarrier IS-95 CDMA files.

**\*RST** N/A

**Range** N/A

**Key Entry** Delete All ARB MCDMA Files

**Remarks** N/A

## **:DELeTe:MDMod**

**Supported** All with Option 001 or 002

:MEMory:DELeTe:MDMod

This command deletes all arbitrary waveform multicarrier digital modulation files.

**\*RST** N/A

**Range** N/A

**Key Entry** Delete All ARB MDMOD Files

**Remarks** N/A

## **:DELeTe:MDWCdma**

**Supported** All with Option 400

:MEMory:DELeTe:MDWCdma

This command deletes all arbitrary waveform multicarrier downlink W-CDMA files.

**\*RST** N/A

**Range** N/A

**Key Entry** Delete All ARB MDWCdma Files

**Remarks** N/A

### **:DELeTe:MFCdma**

**Supported** All with Option 401

:MEMory:DELeTe:MFCdma

This command deletes all arbitrary waveform multicarrier forward link cdma2000 files.

**\*RST** N/A

**Range** N/A

**Key Entry** Delete All ARB MFCDMA Files

**Remarks** N/A

### **:DELeTe:MTONE**

**Supported** All with Option 001 or 002

:MEMory:DELeTe:MTONE

This command deletes all arbitrary waveform multitone files.

**\*RST** N/A

**Range** N/A

**Key Entry** Delete All ARB MTONE Files

**Remarks** N/A

### **:DELeTe:RCDMa**

**Supported** All with Option 401

:MEMory:DELeTe:RCDMa

This command deletes all arbitrary waveform reverse link cdma2000 files.

**\*RST** N/A

**Range** N/A

**Key Entry** Delete All ARB RCDMA Files

**Remarks** N/A

## **:DElete:SEQ**

**Supported** All with Option 001 or 002

:MEMory:DElete:SEQ

This command deletes all sequence files.

**\*RST** N/A

**Range** N/A

**Key Entry** Delete All Sequence Files

**Remarks** N/A

## **:DElete:SHAPE**

**Supported** All with Option 402

:MEMory:DElete:SHAPE

This command deletes all burst shape files.

**\*RST** N/A

**Range** N/A

**Key Entry** Delete All Shape Files

**Remarks** N/A

## **:DElete:STATE**

**Supported** All

:MEMory:DElete:STATE

This command deletes all state files.

**\*RST** N/A

**Range** N/A

**Key Entry** Delete All State Files

**Remarks** N/A

### :DElete:UFLT

<b>Supported</b>	All
:MEMory:DElete:UFLT	
This command deletes all user-flatness correction files.	
<b>*RST</b>	N/A
<b>Range</b>	N/A
<b>Key Entry</b>	Delete All UFLT Files
<b>Remarks</b>	N/A

### :DElete:UWCDma

<b>Supported</b>	All with Option 400
:MEMory:DElete:UWCDma	
This command deletes all arbitrary waveform uplink W-CDMA files.	
<b>*RST</b>	N/A
<b>Range</b>	N/A
<b>Key Entry</b>	Delete All ARB UWCDMA Files
<b>Remarks</b>	N/A

### :DElete[:NAME]

<b>Supported</b>	All
:MEMory:DElete[:NAME] "<file name>"	
This command clears the user file system of "<file name>".	
<b>*RST</b>	N/A
<b>Range</b>	N/A
<b>Key Entry</b>	Delete File
<b>Remarks</b>	Refer to <a href="#">“File Name Variables” on page 14</a> for information on the file name syntax.  When deleting a waveform (WFM1) file from memory, the marker and headers file associated with the waveform file will also be deleted.

## **:FREE[:ALL]**

**Supported** All

:MEMory:FREE[:ALL] ?

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

**\*RST** N/A

**Range** N/A

**Key Entry** All

**Remarks** N/A

## **:LOAD:LIST**

**Supported** All

:MEMory:LOAD:LIST "<file name>"

This command loads a list sweep file.

**\*RST** N/A

**Range** N/A

**Key Entry** Load From Selected File

**Remarks** N/A

## **:MOVE**

**Supported** All

:MEMory:MOVE "<src\_file>","<dest\_file>"

This command renames the requested file in the memory catalog.

**\*RST** N/A

**Range** N/A

**Key Entry** Rename File

**Remarks** Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

### **:STATe:COMMeNt**

**Supported**      All

: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 state <reg\_num>, <seq\_num>. Comments can be up to 55 characters long.

**\*RST**              N/A

**Range**             N/A

**Key Entry**        **Add Comment To Seq[n] Reg[nn]**

**Remarks**        N/A

### **:STORe:LIST**

**Supported**      All

:MEMory:STORe:LIST "<file name>"

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

**\*RST**              N/A

**Range**             N/A

**Key Entry**        **Store To File**

**Remarks**        N/A

## Mass Memory Subsystem (:MMEMory)

### :CATalog

**Supported**      All

:MMEMory:CATalog? "<msus>"

This command outputs a list of the files from the specified file system.

The variable "<msus>" (mass storage unit specifier) represents "<file system>:". The file systems and types are shown in [Table 3-1](#).

**Table 3-1**

File System	File Type
BINARY	BIN
BIT	BIT
CDMA	CDMA
DMOD - ARB digital modulation file	DMOD
DWCDMA - ARB downlink W-CDMA file	DWCD
FCDMA - ARB forward link cdma2000 file	FCDM
FIR - finite impulse response filter file	FIR
FSK - frequency shift keying modulation file	FSK
I/Q - modulation file	IQ
LIST - sweep list file	LIST
MCDMA - ARB multicarrier CDMA file	MCDM
MDMOD - ARB multicarrier digital modulation file	MDM
MDWCDMA - ARB multicarrier downlink W-CDMA file	MDWC
MFCDMA - ARB multicarrier forward link cdma2000 file	MFCD
MTONE - ARB multitone file	MTON
NVMKR - non-volatile arbitrary waveform marker file	NVMKR

**Table 3-1**

File System	File Type
NVWFM - non-volatile arbitrary waveform file	NVWFM
RCDMA - ARB reverse link cdma2000 file	RCDM
SEQ - ARB sequence file	SEQ
SHAPE - burst shape file	SHAP
STATE	STAT
USERFLAT - user-flatness file	UFLT
UWCDMA - ARB uplink W-CDMA file	UWCD
WFM1 - waveform file	WFM1

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>"
```

<b>*RST</b>	N/A
<b>Key Entry</b>	<b>Binary List State User Flatness FIR Shape Bit FSK</b> <b>IQ Seq DMOD MTONE MDMOD CDMA MCDMA FCDMA</b> <b>MFCDMA RCDMA WCDMA FWCDMA MFWCDMA RWCDMA</b> <b>DWCDMA MDWCDMA UWCDMA WFM1 NVMKR NVWFM</b>
<b>Remarks</b>	Refer to “ <a href="#">MSUS (Mass Storage Unit Specifier) Variable</a> ” on page 15 for information on the use of the "<msus>" variable.



## :COPY

**Supported** All

:MMEMory:COPY "<file name>", "<file name>"

This command makes a duplicate of the requested file.

**\*RST** N/A

**Key Entry** Copy File

**Remarks** Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

When copying a waveform file from volatile to non-volatile memory, the marker and header files associated with the waveform file will automatically be copied at the same time.

## :DATA

**Supported** All

:MMEMory:DATA "<file name>", <datablock>

:MMEMory:DATA? "<file name>"

This command loads <datablock> into the memory location "<file name>".

The query returns the <datablock> associated with the "<file name>".

**\*RST** N/A

**Key Entry** N/A

**Remarks** Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

## :DELEte:NVWFm

**Supported** All with Option 001 or 002

:MMEMory:DELEte:NVWFm

This command clears the user file system of all non-volatile arbitrary waveform files.

**\*RST** N/A

**Key Entry** Delete All NVWFM Files

**Remarks** N/A

**:DELete:WFM**

**Supported** All with Option 001 or 002

:MMEMory:DELete:WFM

This command clears the user file system of all arbitrary waveform files.

**\*RST** N/A

**Key Entry** Delete All WFM1 Files

**Remarks** N/A

**:DELete:WFM1**

**Supported** All with Option 001 or 002

:MMEMory:DELete:WFM1

This command clears the user file system of all arbitrary waveform files.

**\*RST** N/A

**Key Entry** Delete All WFM1 Files

**Remarks** N/A

**:DELete[:NAME]**

**Supported** All

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

This command clears the user file system of "<file name>" with the option of specifying the file system separately.

The variable "<msus>" (mass storage unit specifier) represents "<file system>:". For a list of the file systems refer to [Table 3-1 on page 121](#).

**\*RST** N/A

**Range** N/A

**Key Entry** Delete File

**Remarks** If the optional variable "<msus>" is omitted, the file name needs to include the file system extension. Refer to [“File Name Variables” on page 14](#) and [“MSUS \(Mass Storage Unit Specifier\) Variable” on page 15](#) for information on the use of the file variables.

When deleting a waveform file from memory, the marker and headers file associated with the waveform file will also be deleted.

### **:HEADer:CLEar**

**Supported** All

`:MMEMory:HEADer:CLEar "<file name>"`

This command deletes the header file for the waveform file named.

**\*RST** N/A

**Key Entry** Clear Header

**Remarks** This command does not require a personality modulation to be on.

### **:HEADer:DESCRiption**

**Supported** All

`:MMEMory:HEADer:DESCRiption "<file name>","<description>"`  
`:MMEMory:HEADer:DESCRiption? "<file name>"`

This command inserts a description for the header file named.

**\*RST** N/A

**Key Entry** Edit Description

**Remarks** The header description is limited to 32 characters.

### **:LOAD:LIST**

**Supported** All

`:MMEMory:LOAD:LIST "<file name>"`

This command loads a List sweep file.

**\*RST** N/A

**Key Entry** Load From Selected File

**Remarks** N/A

## :MOVE

**Supported** All

:MMEMory:MOVE "<src\_file>", "<dest\_file>"

This command renames the requested file in the memory catalog.

**\*RST** N/A

**Key Entry** **Rename File**

**Remarks** Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

## :STORE:LIST

**Supported** All

:MMEMory:STORE:LIST "<file name>"

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

**\*RST** N/A

**Key Entry** **Store To File**

**Remarks** N/A

---

## Output Subsystem (:OUTPut)

### :BLANking:AUTO

**Supported** All

```
:OUTPut:BLANking:AUTO ON|OFF|1|0  
:OUTPut:BLANking:AUTO?
```

This command enables or disables the RF output blanking during frequency changes.

**ON** This choice causes the RF to always blank.

**OFF** This choice causes the RF to not blank.

**\*RST** 1

**Key Entry** Output Blanking Off On Auto

**Remarks** N/A

### :BLANking:STATe

**Supported** All

```
:OUTPut:BLANking:STATe ON|OFF|1|0  
:OUTPut:BLANking:STATe?
```

This command enables or disables the RF output blanking state.

**\*RST** 1

**Key Entry** N/A

**Remarks** N/A

### :MODulation[:STATe]

**Supported** All

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

This command enables or disables the modulation of the RF output with the currently active modulation type(s).

**Output Subsystem (:OUTPut)**

**\*RST** 1

**Key Entry** Mod On/Off

**Remarks** Most modulation types can be simultaneously enabled except FM with  $\Phi$ M.

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

**[:STATe]**

**Supported** All

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

:OUTPut[:STATe]?

This command enables or disables the RF output.

**\*RST** 0

**Key Entry** RF On/Off

**Remarks** Although you can configure and engage various modulations, no signal is available at the RF OUTPUT connector until this command is executed.

An annunciator is always displayed on the signal generator to indicate whether the RF output is switched on or off.

---

## Route Subsystem (:ROUTE:HARDware:DGENERator)

### :INPut:BPOLarity

**Supported** All

```
:ROUTE:HARDware:DGENERator:INPut:BPOLarity POSitive|NEGative  
:ROUTE:HARDware:DGENERator:INPut:BPOLarity?
```

This command configures the polarity of the TTL input signal at the BURST GATE IN connector. POSitive refers to normal logic, while NEGative refers to inverted logic.

**\*RST** POS

**Key Entry** Burst Gate In Polarity Neg Pos

**Remarks** This command performs the same function as “[:IPOLarity:BGATe](#)” on [page 131](#).

### :INPut:CPOLarity

**Supported** All

```
:ROUTE:HARDware:DGENERator:INPut:CPOLarity POSitive|NEGative  
:ROUTE:HARDware:DGENERator:INPut:CPOLarity?
```

This command configures the polarity of the TTL input signal at the DATA CLOCK connector. POSitive refers to normal logic, while NEGative refers to inverted logic.

**\*RST** POS

**Key Entry** Data Clock Polarity Neg Pos

**Remarks** This command performs the same function as “[:IPOLarity:CLOCK](#)” on [page 131](#).

### :INPut:DPOLarity

**Supported** All

```
:ROUTE:HARDware:DGENERator:INPut:DPOLarity POSitive|NEGative  
:ROUTE:HARDware:DGENERator:INPut:DPOLarity?
```

This command configures the polarity of the TTL input signal at the DATA connector.

POSitive refers to normal logic, while NEGative refers to inverted logic.

**\*RST**            POS

**Key Entry**        **Data Polarity Neg Pos**

**Remarks**        This command performs the same function as “:IPOPolarity:DATA” on [page 131](#).

## :INPut:SPOLarity

**Supported**        All

```
:ROUTE:HARDware:DGENERator:INPut:SPOLarity POSitive|NEGative  
:ROUTE:HARDware:DGENERator:INPut:SPOLarity?
```

This command configures the polarity of the TTL input signal at the SYMBOL SYNC connector. POSitive refers to normal logic, while NEGative refers to inverted logic.

**\*RST**            POS

**Key Entry**        **Symbol Sync Polarity Neg Pos**

**Remarks**        This command performs the same function as “:IPOPolarity:SSYNc” on [page 132](#).

## :INPut:TPOLarity

**Supported**        All

```
:ROUTE:HARDware:DGENERator:INPut:TPOLarity POSitive|NEGative  
:ROUTE:HARDware:DGENERator:INPut:TPOLarity?
```

This command configures the polarity of the of the input TTL signal at the PATT TRIG IN connector. POSitive refers to normal logic while NEGative refers to inverted logic.

**\*RST**            POS

**Key Entry**        **Pattern Trig In Polarity Neg Pos**

**Remarks**        This command performs the same function as “:IPOPolarity:TRIGger” on [page 132](#).



**:IPOLarity:BGATe****Supported** All

:ROUTE:HARDware:DGENERator:IPOLarity:BGATe POSitive|NEGative

:ROUTE:HARDware:DGENERator:IPOLarity:BGATe?

This command configures the polarity of the input signal at the BURST GATE IN connector. POSitive refers to normal logic, while NEGative refers to inverted logic.

**\*RST** POS**Key Entry** **Burst Gate In Polarity Neg Pos**

**Remarks** This command performs the same function as “:INPut:BPOLarity” on [page 129](#).

**:IPOLarity:CLOCK****Supported** All

:ROUTE:HARDware:DGENERator:IPOLarity:CLOCK POSitive|NEGative

:ROUTE:HARDware:DGENERator:IPOLarity:CLOCK?

This command configures the polarity of the TTL input signal at the DATA CLOCK connector. POSitive refers to normal logic, while NEGative refers to inverted logic.

**\*RST** POS**Key Entry** **Data Clock Polarity Neg Pos**

**Remarks** This command performs the same function as “:INPut:CPOLarity” on [page 129](#).

**:IPOLarity:DATA****Supported** All

:ROUTE:HARDware:DGENERator:IPOLarity:DATA POSitive|NEGative

:ROUTE:HARDware:DGENERator:IPOLarity:DATA?

This command configures the polarity of the TTL input signal at the DATA connector. POSitive refers to normal logic, while NEGative refers the inverted logic.

**\*RST** POS**Key Entry** **Data Polarity Neg Pos**

**Remarks** This command performs the same function as “:INPut:DPOLarity” on [page 129](#).

page 129.

**:IPOLarity:SSYNc****Supported** All

```
:ROUTE:HARDware:DGENERator:IPOLarity:SSYNc POSitive|NEGative
:ROUTE:HARDware:DGENERator:IPOLarity:SSYNc?
```

This command configures the polarity of the TTL input signal at the SYMBOL SYNC connector. POSitive refers to normal logic, while NEGative refers to inverted logic.

**\*RST** POS**Key Entry** Symbol Sync Polarity Neg Pos

**Remarks** This command performs the same function as “:INPut:SPOLarity” on [page 130](#).

**:IPOLarity:TRIGger****Supported** All

```
:ROUTE:HARDware:DGENERator:IPOLarity:TRIGger POSitive|NEGative
:ROUTE:HARDware:DGENERator:IPOLarity:TRIGger?
```

This command configures the polarity of the TTL signal at the PATT TRIG IN connector that triggers an event. POSitive refers to normal logic, while NEGative refers to inverted logic.

**\*RST** POS**Key Entry** Pattern Trig In Polarity Neg Pos

**Remarks** This command performs the same function as “:INPut:TPOLarity” on [page 130](#).

**:OPOLarity:CLOCK****Supported** All

```
:ROUTE:HARDware:DGENERator:OPOLarity:CLOCK POSitive|NEGative
:ROUTE:HARDware:DGENERator:OPOLarity:CLOCK?
```

This command configures the polarity of the TTL output Data Clock Out signal at the DATA CLK OUT pin on the rear panel AUX I/O connector. POSitive refers to normal logic, while the NEGative refers to inverted logic.

<b>*RST</b>	POS
<b>Key Entry</b>	<b>Data Clock Out Neg Pos</b>
<b>Remarks</b>	This command performs the same function as “:OUTPut:CPOLarity” on page 134.

## :OPOLarity:DATA

**Supported** All

```
:ROUTE:HARDware:DGENERator:OPOLarity:DATA POSitive|NEGative
:ROUTE:HARDware:DGENERator:OPOLarity:DATA?
```

This command configures the polarity of the TTL output DATA OUT signal at the DATA OUT pin on the rear panel AUX I/O connector. POSitive refers to normal logic, while NEGative refers to inverted logic.

<b>*RST</b>	POS
<b>Key Entry</b>	<b>Data Out Polarity Neg Pos</b>
<b>Remarks</b>	This command performs the same function as “:OUTPut:DPOLarity” on page 135.

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

**Supported** All

```
:ROUTE:HARDware:DGENERator:OPOLarity:EVENT[1]|2|3|4 POSitive|NEGative
:ROUTE:HARDware:DGENERator:OPOLarity:EVENT[1]|2|3|4?
```

This command configures the polarity of the TTL output signal at the EVENT 1 or EVENT 2 connector. POSitive refers to normal logic, while NEGative refers to inverted logic.

<b>*RST</b>	POS
<b>Key Entry</b>	<b>Event 1 Polarity Neg Pos    Event 2 Polarity Neg Pos</b>
<b>Remarks</b>	This command performs the same function as “:OUTPut:EPOL[1] 2 3 4” on page 135.

**:OPOLarity:SSYNc****Supported** All

```
:ROUTE:HARDWARE:DGENERATOR:OPOLarity:SSYNc POSitive|NEGative
:ROUTE:HARDWARE:DGENERATOR:OPOLarity:SSYNc?
```

This command configures the polarity of the TTL output SYMBOL SYNC signal at the SYM SYNC OUT pin on the rear panel AUX I/O connector. POSitive refers to normal logic, while NEGative refers to inverted logic.

**\*RST** POS**Key Entry** Symbol Sync Out Polarity Neg Pos

**Remarks** This command performs the same function as “:OUTPut:SPOLarity” on page 136.

**:OUTPut:CPOLarity****Supported** All

```
:ROUTE:HARDWARE:DGENERATOR:OUTPut:CPOLarity POSitive|NEGative
:ROUTE:HARDWARE:DGENERATOR:OUTPut:CPOLarity?
```

This command configures the polarity of the TTL output DATA CLOCK OUT signal at the DATA CLK OUT pin on the rear panel AUX I/O connector. POSitive refers to normal logic, while NEGative refers to inverted logic.

**\*RST** POS**Key Entry** Data Clock Polarity Neg Pos

**Remarks** This command performs the same function as “:OPOLarity:CLOCK” on page 132.

**:OUTPut:DCS[:STATe]****Supported** All

```
:ROUTE:HARDWARE:DGENERATOR:OUTPut:DCS[:STATe] ON|OFF|1|0
:ROUTE:HARDWARE:DGENERATOR:OUTPut:DCS[:STATe]?
```

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

**\*RST** 1  
**Key Entry** DATA/CLK/SYNC Rear Outputs Off On  
**Remarks** N/A

### **:OUTPut:DPOLarity**

**Supported** All

:ROUTE:HARDware:DGENERator:OUTPut:DPOLarity POSitive|NEGative  
:ROUTE:HARDware:DGENERator:OUTPut:DPOLarity?

This command configures the polarity of the TTL output signal at the DATA OUT connector. POSitive refers to normal logic, while NEGative refers to inverted logic.

**\*RST** POS  
**Key Entry** Data Out Polarity Neg Pos  
**Remarks** This command performs the same function as “:OPOLarity:DATA” on [page 133](#).

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

**Supported** All

:ROUTE:HARDware:DGENERator:OUTPut:EPOL[1]|2|3|4 POSitive|NEGative  
:ROUTE:HARDware:DGENERator:OUTPut:EPOL[1]|2|3|4?

This command configures the polarity of the TTL output signal at the EVENT1 or EVENT 2 connector. POSitive refers to normal logic, while NEGative refers to inverted logic.

**\*RST** POS  
**Key Entry** Event 1 Polarity Neg Pos  
Event 2 Polarity Neg Pos  
**Remarks** This command performs the same function as “:OPOLarity:EVENTt[1]|2|3|4” on [page 133](#).

## **:OUTPut:SPOLarity**

**Supported** All

:ROUTE:HARDware:DGENERator:OUTPut:SPOLarity POSitive|NEGative

:ROUTE:HARDware:DGENERator:OUTPut:SPOLarity?

This command configures the polarity of the TTL input signal at the SYMBOL SYNC connector. POSitive refers to normal logic, while NEGative refers to inverted logic.

**\*RST** POS

**Key Entry** Symbol Sync Out Polarity Neg Pos

**Remarks** N/A

---

## Status Subsystem (:STATUS)

### :OPERation:BASEband:CONDition

**Supported** All with Option 001 or 002

:STATus:OPERation:BASEband:CONDition?

This query returns the decimal sum of the bits in the Baseband Operation Condition Register. For example, if the baseband is busy (bit 0), the value 1 is returned.

**\*RST** N/A

**Range** 0–32767

**Key Entry** N/A

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

Refer to chapter 3 of the *Programming Guide* for more information.

### :OPERation:BASEband:ENABLE

**Supported** All with Option 001 or 002

:STATus:OPERation:BASEband:ENABLE <val>

:STATus:OPERation:BASEband:ENABLE?

This command determines which bits in the Baseband Operation Event Register will set the Baseband is Busy bit (bit 10) in the Standard Operation Condition Register.

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

**\*RST** N/A

**Range** 0–32767

**Key Entry** N/A

**Remarks** Refer to chapter 3 of the *Programming Guide* for more information.

## :OPERation:BASEband:NTRansition

**Supported** All with Option 001 or 002

```
:STATUS:OPERation:BASEband:NTRansition <val>  
:STATUS:OPERation:BASEband:NTRansition?
```

This command determines which bits in the Baseband Operation Condition Register will set the corresponding bit in the Baseband Operation Event Register when that bit has a negative transition (1 to 0).

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

**\*RST** N/A

**Range** 0–32767

**Key Entry** N/A

**Remarks** Refer to chapter 3 of the *Programming Guide* for more information.

## :OPERation:BASEband:PTRansition

**Supported** All with Option 001 or 002

```
:STATUS:OPERation:BASEband:PTRansition <val>  
:STATUS:OPERation:BASEband:PTRansition?
```

This command determines which bits in the Baseband Operation Condition Register will set the corresponding bit in the Baseband Operation Event Register when that bit has a positive transition (0 to 1).

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

**\*RST** N/A

**Range** 0–32767

**Key Entry** N/A

**Remarks** Refer to chapter 3 of the *Programming Guide* for more information.



## :OPERation:BASEband[:EVENT]

**Supported** All with Option 001 or 002

:STATus:OPERation:BASEband[:EVENT]?

---

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

---

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

**\*RST** N/A

**Range** 0–32767

**Key Entry** N/A

**Remarks** The equivalent PTR and NTR filters must be set before the condition register can set the corresponding bit in the event register.

Refer to chapter 3 of the *Programming Guide* for more information.

## :OPERation:CONDition

**Supported** All

:STATus:OPERation:CONDition?

This query returns the decimal sum of the bits for the registers that are set to one and are part of the Standard Operation Status Group. For example, if a sweep is in progress (bit 3), the value 8 is returned.

**\*RST** N/A

**Range** 0–32767

**Key Entry** N/A

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

Refer to chapter 3 of the *Programming Guide* for more information.

## :OPERation:ENABLE

**Supported** All

:STATUS:OPERation:ENABLE <val>

:STATUS:OPERation:ENABLE?

This command determines which bits in the Standard Operation Event Register will set the Standard Operation Status Summary bit (bit 7) in the Status Byte Register.

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

**\*RST** N/A

**Range** 0–32767

**Key Entry** N/A

**Remarks** Refer to chapter 3 of the *Programming Guide* for more information.

## :OPERation:NTRansition

**Supported** All

:STATUS:OPERation:NTRansition <val>

:STATUS:OPERation:NTRansition?

This command determines which bits in the Standard Operation Condition Register will set the corresponding bit in the Standard Operation Event Register when that bit has a negative transition (1 to 0).

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

**\*RST** N/A

**Range** 0–32767

**Key Entry** N/A

**Remarks** Refer to chapter 3 of the *Programming Guide* for more information.

## :OPERation:PTRansition

**Supported** All

:STATUS:OPERation:PTRansition <val>

:STATUS:OPERation:PTRansition?

This command determines which bits in the Standard Operation Condition Register will

set the corresponding bit in the Standard Operation Event Register when that bit has a positive transition (0 to 1).

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

<b>*RST</b>	N/A
<b>Range</b>	0–32767
<b>Key Entry</b>	N/A
<b>Remarks</b>	Refer to chapter 3 of the <i>Programming Guide</i> for more information.

### **:OPERation[:EVENT]**

**Supported** All

---

**CAUTION** 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.

<b>*RST</b>	N/A
<b>Range</b>	0–32767
<b>Key Entry</b>	N/A
<b>Remarks</b>	The equivalent PTR or NTR filters must be set before the condition register can set the corresponding bit in the event register.  Refer to chapter 3 of the <i>Programming Guide</i> for more information.

### **:PRESet**

**Supported** All

:STATUS:PRESet

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

<b>*RST</b>	N/A
<b>Range</b>	N/A

**Key Entry** N/A  
**Remarks** Refer to chapter 3 of the *Programming Guide* for more information.

### **:QUESTIONable:BERT:CONDition**

**Supported** All with Option UN7  
:STATUS:QUESTIONable:BERT:CONDition?

This query returns the decimal sum of the bits in the Data Questionable BERT Condition Register. For example, if no clock signal has been input for more than three seconds during the bit error rate measurement (bit 0), then a value of 1 is returned.

**\*RST** N/A  
**Range** 0–32767  
**Key Entry** N/A  
**Remarks** The data in this register is continuously updated and reflects the current conditions.  
Refer to chapter 3 of the *Programming Guide* for more information.

### **:QUESTIONable:BERT:ENABLE**

**Supported** All with Option UN7  
:STATUS:QUESTIONable:BERT:ENABLE <val>  
:STATUS:QUESTIONable:BERT:ENABLE?

This command determines which bits in the Data Questionable BERT Event Register will set the Data Questionable BERT Summary bit (bit 12) in the Data Questionable Condition Register.

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

**\*RST** N/A  
**Range** 0–32767  
**Key Entry** N/A  
**Remarks** Refer to chapter 3 of the *Programming Guide* for more information.

## **:QUEStionable:BERT:NTRansition**

**Supported** All with Option UN7

```
:STATUS:QUEStionable:BERT:NTRansition <val>  
:STATUS:QUEStionable:BERT:NTRansition?
```

This command determines which bits in the Data Questionable BERT Condition Register will set the corresponding bit in the Data Questionable BERT Event Register when that bit has a negative transition (1 to 0).

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

**\*RST** N/A

**Range** 0–32767

**Key Entry** N/A

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

Refer to chapter 3 of the *Programming Guide* for more information.

## **:QUEStionable:BERT:PTRansition**

**Supported** All with Option UN7

```
:STATUS:QUEStionable:BERT:PTRansition <val>  
:STATUS:QUEStionable:BERT:PTRansition?
```

This command determines which bits in the Data Questionable BERT Condition Register will set the corresponding bit in the Data Questionable BERT Event Register when that bit has a positive transition (0 to 1).

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

**\*RST** N/A

**Range** 0–32767

**Key Entry** N/A

**Remarks** Refer to chapter 3 of the *Programming Guide* for more information.

## :QUESTIONable:BERT[:EVENT]

**Supported** All with Option UN7

---

**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:BERT[:EVENT]?

This command returns the decimal value of the sum of the bits in the Data Questionable BERT Event Register.

**\*RST** N/A

**Range** 0–32767

**Key Entry** N/A

**Remarks** Note that the register requires that the equivalent PTR or NTR filters be set before a condition register bit can set a bit in the Event register.  
Refer to chapter 3 of the *Programming Guide* for more information.

## :QUESTIONable:CALibration:CONDition

**Supported** All

: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.

**\*RST** N/A

**Range** 0–32767

**Key Entry** N/A

**Remarks** The data in this register is continuously updated and reflects the current conditions.  
Refer to chapter 3 of the *Programming Guide* for more information.

## **:QUESTIONable:CALibration:ENABLE**

**Supported** All

```
:STATUS:QUESTIONable:CALibration:ENABLE <val>  
:STATUS:QUESTIONable:CALibration:ENABLE?
```

This command determines which bits in the Data Questionable Calibration Event 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.

**\*RST** N/A

**Range** 0–32767

**Key Entry** N/A

**Remarks** Refer to chapter 3 of the *Programming Guide* for more information.

## **:QUESTIONable:CALibration:NTRansition**

**Supported** All

```
:STATUS:QUESTIONable:CALibration:NTRansition <val>  
:STATUS:QUESTIONable:CALibration:NTRansition?
```

This command determines which bits in the Data Questionable Calibration Condition Register will set the corresponding bit in the Data Questionable Calibration Event Register when that bit has a negative transition (1 to 0).

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

**\*RST** N/A

**Range** 0–32767

**Key Entry** N/A

**Remarks** Refer to chapter 3 of the *Programming Guide* for more information.

## **:QUESTIONable:CALibration:PTRansition**

**Supported** All

```
:STATUS:QUESTIONable:CALibration:PTRansition <val>  
:STATUS:QUESTIONable:CALibration:PTRansition?
```

This command determines which bits in the Data Questionable Calibration Condition

Register will set the corresponding bit in the Data Questionable Calibration Event Register when that bit has a positive transition (0 to 1).

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

<b>*RST</b>	N/A
<b>Range</b>	0–32767
<b>Key Entry</b>	N/A
<b>Remarks</b>	Refer to chapter 3 of the <i>Programming Guide</i> for more information.

### **:QUESTIONable:CALibration[:EVENT]**

**Supported** All

---

**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:CALibration[:EVENT]?

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

<b>*RST</b>	N/A
<b>Range</b>	0–32767
<b>Key Entry</b>	N/A
<b>Remarks</b>	The equivalent PTR or NTR filters must be set before the condition register can set the corresponding bit in the event register. Refer to chapter 3 of the <i>Programming Guide</i> for more information.

### **:QUESTIONable:CONDition**

**Supported** All

:STATUS:QUESTIONable:CONDition?

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

<b>*RST</b>	N/A
-------------	-----



<b>Range</b>	0–32767
<b>Key Entry</b>	N/A
<b>Remarks</b>	The data in this register is continuously updated and reflects current conditions.  Refer to chapter 3 of the <i>Programming Guide</i> for more information.

### **:QUESTIONable:ENABLE**

<b>Supported</b>	All
	:STATUS:QUESTIONable:ENABLE <val>
	:STATUS:QUESTIONable:ENABLE?

This command determines which bits in the Data Questionable Event Register will set the Data Questionable Status Group Summary bit (bit 3) in the Status Byte Register.

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

<b>*RST</b>	N/A
<b>Range</b>	0–32767
<b>Key Entry</b>	N/A
<b>Remarks</b>	Refer to chapter 3 of the <i>Programming Guide</i> for more information.

### **:QUESTIONable:FREQuency:CONDition**

<b>Supported</b>	All
	: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.

<b>*RST</b>	N/A
<b>Range</b>	0–32767
<b>Key Entry</b>	N/A
<b>Remarks</b>	The data in this register is continuously updated and reflects current conditions.  Refer to chapter 3 of the <i>Programming Guide</i> for more information.

## **:QUESTIONable:FREQUENCY:ENABLE**

**Supported** All

```
:STATUS:QUESTIONable:FREQUENCY:ENABLE <val>  
:STATUS:QUESTIONable:FREQUENCY:ENABLE?
```

This command determines which bits in the Data Questionable Frequency Event Register will set the frequency summary bit (bit 5) in the Data Questionable Condition Register.

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

**\*RST** N/A

**Range** 0–32767

**Key Entry** N/A

**Remarks** Refer to chapter 3 of the *Programming Guide* for more information.

## **:QUESTIONable:FREQUENCY:NTRANSITION**

**Supported** All

```
:STATUS:QUESTIONable:FREQUENCY:NTRANSITION <val>  
:STATUS:QUESTIONable:FREQUENCY:NTRANSITION?
```

This command determines which bits in the Data Questionable Frequency Condition Register will set the corresponding bit in the Data Questionable Frequency Event Register when that bit has a negative transition (1 to 0).

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

**\*RST** N/A

**Range** 0–32767

**Key Entry** N/A

**Remarks** Refer to chapter 3 of the *Programming Guide* for more information.

## **:QUESTIONable:FREQUENCY:PTRANSITION**

**Supported** All

```
:STATUS:QUESTIONable:FREQUENCY:PTRANSITION <val>  
:STATUS:QUESTIONable:FREQUENCY:PTRANSITION?
```

This command determines which bits in the Data Questionable Frequency Condition

Register will set the corresponding bit in the Data Questionable Frequency Event Register when that bit has a positive transition (0 to 1).

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

**\*RST**            N/A

**Range**            0–32767

**Key Entry**        N/A

**Remarks**        Refer to chapter 3 of the *Programming Guide* for more information.

### **:QUESTIONable:FREQuency[:EVENT]**

**Supported**        All

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

:STATUS:QUESTIONable:FREQuency[:EVENT]?

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

**\*RST**            N/A

**Range**            0–32767

**Key Entry**        N/A

**Remarks**        The equivalent PTR or NTR filters must be set before the condition register can set the corresponding bit in the event register.

Refer to chapter 3 of the *Programming Guide* for more information.

### **:QUESTIONable:MODulation:CONDition**

**Supported**        All

:STATUS:QUESTIONable:MODulation:CONDition?

This command returns the decimal sum of the bits in the Data Questionable Modulation Condition Register. For example, if the modulation is uncalibrated (bit 4), a value of 16 is returned.

**\*RST**            N/A

<b>Range</b>	0–32767
<b>Key Entry</b>	N/A
<b>Remarks</b>	The data in this register is continuously updated and reflects current conditions.  Refer to chapter 3 of the <i>Programming Guide</i> for more information.

### **:QUESTIONable:MODulation:ENABLE**

<b>Supported</b>	All
<code>:STATUS:QUESTIONable:MODulation:ENABLE &lt;val&gt;</code>	
<code>:STATUS:QUESTIONable:MODulation:ENABLE?</code>	

This command determines which bits in the Data Questionable Modulation Event Register will set the modulation summary bit (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.

<b>*RST</b>	N/A
<b>Range</b>	0–32767
<b>Key Entry</b>	N/A
<b>Remarks</b>	Refer to chapter 3 of the <i>Programming Guide</i> for more information.

### **:QUESTIONable:MODulation:NTRansition**

<b>Supported</b>	All
<code>:STATUS:QUESTIONable:MODulation:NTRansition &lt;val&gt;</code>	
<code>:STATUS:QUESTIONable:MODulation:NTRansition?</code>	

This command determines which bits in the Data Questionable Modulation Condition Register will set the corresponding bit in the Data Questionable Modulation Event Register when that bit has a negative transition (1 to 0).

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

<b>*RST</b>	N/A
<b>Range</b>	0–32767
<b>Key Entry</b>	N/A
<b>Remarks</b>	Refer to chapter 3 of the <i>Programming Guide</i> for more information.

## **:QUEStionable:MODulation:PTRansition**

**Supported** All

```
:STATUS:QUEStionable:MODulation:PTRansition <val>  
:STATUS:QUEStionable:MODulation:PTRansition?
```

This command determines which bits in the Data Questionable Modulation Condition Register will set the corresponding bit in the Data Questionable Modulation Event Register when that bit has a positive transition (0 to 1).

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

**\*RST** N/A

**Range** 0–32767

**Key Entry** N/A

**Remarks** Refer to chapter 3 of the *Programming Guide* for more information.

## **:QUEStionable:MODulation[:EVENT]**

**Supported** All

---

**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.

**\*RST** N/A

**Range** 0–32767

**Key Entry** N/A

**Remarks** The equivalent PTR or NTR filters must be set before the condition register can set the corresponding bit in the event register.

Refer to chapter 3 of the *Programming Guide* for more information.

## :QUESTIONable:NTRANSITION

**Supported** All

```
:STATUS:QUESTIONable:NTRANSITION <val>  
:STATUS:QUESTIONable:NTRANSITION?
```

This command determines which bits in the Data Questionable Condition Register will set the corresponding bit in the Data Questionable Event Register when that bit has a negative transition (1 to 0).

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

**\*RST** N/A

**Range** 0–32767

**Key Entry** N/A

**Remarks** Refer to chapter 3 of the *Programming Guide* for more information.

## :QUESTIONable:POWER:CONDITION

**Supported** All

```
: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 unlevelled (bit 1), a value of 2 is returned.

**\*RST** N/A

**Range** 0–32767

**Key Entry** N/A

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

Refer to chapter 3 of the *Programming Guide* for more information.

## :QUESTIONable:POWER:ENABLE

**Supported** All

```
:STATUS:QUESTIONable:POWER:ENABLE <val>  
:STATUS:QUESTIONable:POWER:ENABLE?
```

This command determines which bits in the Data Questionable Power Event Register

will set the power summary bit (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.

**\*RST** N/A

**Range** 0–32767

**Key Entry** N/A

**Remarks** Refer to chapter 3 of the *Programming Guide* for more information.

### **:QUESTIONable:POWer:NTRansition**

**Supported** All

:STATUS:QUESTIONable:POWer:NTRansition <val>

:STATUS:QUESTIONable:POWer:NTRansition?

This command determines which bits in the Data Questionable Power Condition Register will set the corresponding bit in the Data Questionable Power Event Register when that bit has a negative transition (1 to 0).

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

**\*RST** N/A

**Range** 0–32767

**Key Entry** N/A

**Remarks** Refer to chapter 3 of the *Programming Guide* for more information.

### **:QUESTIONable:POWer:PTRansition**

**Supported** All

:STATUS:QUESTIONable:POWer:PTRansition <val>

:STATUS:QUESTIONable:POWer:PTRansition?

This command determines which bits in the Data Questionable Power Condition Register will set the corresponding bit in the Data Questionable Power Event Register when that bit has a positive transition (0 to 1).

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

**\*RST** N/A

**Range** 0–32767

**Key Entry** N/A

**Remarks** Refer to chapter 3 of the *Programming Guide* for more information.

## **:QUESTIONable:POWer[:EVENT]**

**Supported** All

---

**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.

**\*RST** N/A

**Range** 0–32767

**Key Entry** N/A

**Remarks** The equivalent PTR or NTR filters must be set before the condition register can set the corresponding bit in the event register.  
Refer to chapter 3 of the *Programming Guide* for more information.

## **:QUESTIONable:PTRansition**

**Supported** All

`:STATUS:QUESTIONable:PTRansition <val>`  
`:STATUS:QUESTIONable:PTRansition?`

This command determines which bits in the Data Questionable Condition Register will set the corresponding bit in the Data Questionable Event Register when that bit has a positive transition (0 to 1).

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

**\*RST** N/A

**Range** 0–32767

**Key Entry** N/A

**Remarks** Refer to chapter 3 of the *Programming Guide* for more information.



## :QUEStionable[:EVENT]

**Supported** All

---

**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 Data Questionable Event Register.

**\*RST** N/A

**Range** 0–32767

**Key Entry** N/A

**Remarks** The equivalent PTR or NTR filters must be set before the condition register can set the corresponding bit in the event register.

Refer to chapter 3 of the *Programming Guide* for more information.

## System Subsystem (:SYSTEM)

### :CAPability

**Supported** All

: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).

<b>*RST</b>	N/A
<b>Range</b>	N/A
<b>Key Entry</b>	N/A
<b>Remarks</b>	N/A

### :DATE

**Supported** All

: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>

<b>*RST</b>	N/A
<b>Range</b>	<month>: 1–12 <day>: 1–31
<b>Key Entry</b>	<b>Time/Date</b>
<b>Remarks</b>	N/A

## **:ERRor[:NEXT]**

**Supported**      All

: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.

**\*RST**              N/A

**Range**             N/A

**Key Entry**        **Error Info**    **View Next Error Message**

**Remarks**        The error messages are erased after being queried.

## **:ERRor:SCPI[:SYNTax]**

**Supported**      All

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

This command enables or disables the reporting of SCPI syntax errors to the error queue.

**\*RST**              1

**Key Entry**        N/A

**Remarks**        N/A

## **:HELP:MODE**

**Supported**      All

: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.

When the help dialog box is displayed, pressing the **Help** hardkey in either mode will turn help off.

**\*RST** N/A

**Key Entry** **Help Mode Single Cont**

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

## :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 of \*IDN? to its factory shipped setting. The maximum string length is 72 characters.

**\*RST** N/A

**Key Entry** N/A

**Remarks** 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

**Supported** All

:SYSTem: LANGuage "SCPI" | "COMP" | "NADC" | "PDC" | "PHS" | "8648"

:SYSTem: LANGuage?

This command sets the remote language for the signal generator.

SCPI This choice provides compatibility for SCPI commands.

COMP This choice provides compatibility for the 8656B, 8657A/B signal generator which is supported by using the GPIB interface.

NADC This choice provides compatibility for the 8657D NADC personality which is supported only through a GPIB interface.

PDC This choice provides compatibility for the 8657D PDC personality which is supported only through a GPIB interface.

PHS	This choice provides compatibility for the 8657J PHS personality which is supported only through a GPIB interface.
8648	This choice provides compatibility for the 8648A/B/C/D signal generator which is supported only through a GPIB interface.
<b>*RST</b>	N/A
<b>Key Entry</b>	<b>SCPI 8656B,8657A/B 8657D NADC 8657D PDC 8657J PHS 8648A/B/C/D</b>
<b>Remarks</b>	The setting enabled by this command is not affected by signal generator power-on, preset, or *RST.  For more information on supported SCPI commands and programming codes, refer to the <i>Programming Compatibility Guide</i> .

## :PON:TYPE

**Supported** All

: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 162 for selecting the type of preset.
LAST	This choice retains the settings at the time the signal generator was last powered down.

---

**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.

---

**\*RST** N/A

**Key Entry** **Power On Last Preset**

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

## :PRESet

**Supported** All

SYSTem:PRESet

This command returns the signal generator to a set of defined conditions. It is equivalent to pressing the front panel **Preset** hardkey.

**\*RST** N/A

**Range** N/A

**Key Entry** **Preset**

**Remarks** The defined conditions are either factory- or user-defined. Refer to [“:PRESet:TYPE” on page 162](#) for selecting the type of defined conditions.

## :PRESet:ALL

**Supported** 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 signal generator power-on, preset, or \*RST.

**\*RST** N/A

**Range** N/A

**Key Entry** N/A

**Remarks** N/A

## :PRESet:LANGuage

**Supported** All

:SYSTem:PRESet:LANGuage "SCPI" | "COMP" | "NADC" | "PDC" | "PHS" | "8648"  
: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.

COMP This choice provides compatibility for the 8656B, 8657A/B signal

	generator which is supported by using the GPIB interface.				
NADC	This choice provides compatibility for the 8657D NADC personality which is supported only through a GPIB interface.				
PDC	This choice provides compatibility for the 8657D PDC personality which is supported only through a GPIB interface.				
PHS	This choice provides compatibility for the 8657J PHS personality which is supported only through a GPIB interface.				
8648	This choice provides compatibility for the 8648A/B/C/D signal generator which is supported only through a GPIB interface.				
<b>*RST</b>	"SCPI"				
<b>Key Entry</b>	<b>SCPI</b>	<b>8656B,8657A/B</b>	<b>8657D NADC</b>	<b>8657D PDC</b>	<b>8657J PHS</b>
	<b>8648A/B/C/D</b>				
<b>Remarks</b>	N/A				

### **:PRESet:PERsistent**

**Supported** All  
:SYSTem:PRESet:PERsistent

This command sets the states that are not affected by signal generator power-on, preset, or \*RST to their factory default settings.

**\*RST** N/A  
**Range** N/A  
**Key Entry** Restore Sys Defaults  
**Remarks** N/A

### **:PRESet:PN9**

**Supported** All  
: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.

<b>QUICK</b>	This choice produces a truncated (216 bits) PN9 sequence.
<b>*RST</b>	NORM
<b>Key Entry</b>	<b>PN9 Mode Preset</b>
<b>Remarks</b>	N/A

### **:PRESet:TYPE**

<b>Supported</b>	All
	:SYSTem:PRESet:TYPE NORMal USER
	:SYSTem:PRESet:TYPE?

This command toggles the preset state between factory- and user-defined conditions.

<b>*RST</b>	N/A
<b>Key Entry</b>	<b>Preset Normal User</b>
<b>Remarks</b>	Refer to “:PRESet[:USER]:SAVE” for saving the USER choice preset settings.  The setting enabled by this command is not affected by signal generator power-on, preset, or *RST.

### **:PRESet[:USER]:SAVE**

<b>Supported</b>	All
	:SYSTem:PRESet[:USER]:SAVE

This command saves your user-defined preset conditions to a state file.

<b>*RST</b>	N/A
<b>Range</b>	N/A
<b>Key Entry</b>	<b>Save User Preset</b>
<b>Remarks</b>	Only one user-defined preset file can be saved. Subsequent saved user-defined preset files will overwrite the previously saved file.



## :SSAVer:DELAy

**Supported** All

: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. This will occur if there is no input via the front panel during the delay period.

The variable <val> is a whole number measured in hours.

**\*RST** N/A

**Range** 1–12

**Key Entry** **Screen Saver Delay:**

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

Refer to “:SSAVer:MODE” on page 163 for selecting the screen saver mode.

## :SSAVer:MODE

**Supported** All

:SYSTem:SSAVer:MODE LIGHT|TEXT

:SYSTem:SSAVer:MODE?

This command toggles the screen saver mode between light only or light and text.

**LIGHT** This choice enables only the light to turn off during the screen saver operation while leaving the text visible on the darkened screen.

**TEXT** This choice enables both the display light and text to turn off during the screen saver operation.

**\*RST** N/A

**Key Entry** **Screen Saver Mode**

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

## :SSAVer:STATe

**Supported** All

:SYSTem:SSAVer:STATe ON|OFF|1|0

:SYSTem:SSAVer:STATe?

This command enables or disables the display screen saver.

**\*RST** N/A

**Key Entry** Screen Saver Off On

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

## :TIME

**Supported** All

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

:SYSTem:TIME?

This command sets the time displayed in the lower right area of the signal generator's display.

**\*RST** N/A

**Range** <hour>: 0–23 <minute>: 0–59 <second>: 0–59

**Key Entry** Time/Date

**Remarks** N/A

## :VERSion

**Supported** All

:SYSTem:VERSion?

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

**\*RST** N/A

**Range** N/A

**Key Entry** N/A

**Remarks** N/A

---

## Trigger Subsystem

### :ABORt

**Supported** All

:ABORt

This command causes the list or step sweep in progress to abort.

**\*RST** N/A

**Range** N/A

**Key Entry** N/A

**Remarks** If `INIT:CONT[:ALL]` is set to ON, the sweep will immediately re-initiate.

The pending operation flag affecting `*OPC`, `*OPC?`, and `*WAI` will undergo a transition once the sweep has been reset.

### :INITiate:CONTInuous[:ALL]

**Supported** All

:INITiate:CONTInuous[:ALL] ON|OFF|1|0

:INITiate:CONTInuous[:ALL]?

This command selects either a continuous or single list or step sweep.

**ON (1)** This choice selects continuous sweep where, after the completion of the previous sweep, the current sweep will restart automatically or wait until the appropriate trigger source is received.

**OFF (0)** This choice selects a single sweep. Refer to “:INITiate:IMMEDIATE[:ALL]” on page 166 for single sweep triggering information.

**\*RST** 0

**Key Entry** Sweep Repeat Single Cont

**Remarks** Execution of this command will not affect a sweep in progress.

## **:INITiate[:IMMediate][:ALL]**

**Supported** All

:INITiate[:IMMediate][:ALL]

This command 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

**\*RST** N/A

**Range** N/A

**Key Entry** Single Sweep

**Remarks** This command is ignored if a sweep is in progress.

Refer to “[:INITiate:CONTinuous\[:ALL\]](#)” on page 165 for setting continuous or single sweep.

Refer to “[:TRIGger\[:SEQuence\]:SOURce](#)” on page 167 to select the trigger source.

## **:TRIGger:OUTPut:POLarity**

**Supported** All

:TRIGger:OUTPut:POLarity POSitive|NEGative

:TRIGger:OUTPut:POLarity?

This command sets the polarity of the TTL signal present at the TRIG OUT connector.

**\*RST** POS

**Key Entry** Trigger Out Polarity Neg Pos

**Remarks** 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 TRIG OUT at the beginning of each sweep.

## :TRIGger[:SEQuence]:SLOPe

**Supported** All

:TRIGger[:SEQuence]:SLOPe POSitive|NEGative

:TRIGger[:SEQuence]:SLOPe?

This command sets the polarity of the ramp or sawtooth waveform slope present at the TRIG IN connector that will trigger a list or step sweep.

**\*RST** POS

**Key Entry** Trigger In Polarity Neg Pos

**Remarks** N/A

## :TRIGger[:SEQuence]:SOURce

**Supported** All

: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 TRIG IN connector.

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

**\*RST** IMM

**Key Entry** Bus Free Run Ext Trigger Key

**Remarks** The wait for the BUS, EXTernal, or KEY trigger can be bypassed by sending the :TRIGger[:SEQuence][:IMMediate] command.

## **:TRIGger[:SEQuence][:IMMediate]**

**Supported** All

:TRIGger [:SEQuence] [:IMMediate]

This event command causes an armed list or step sweep to immediately start without the selected trigger occurring.

**\*RST** N/A

**Range** N/A

**Key Entry** N/A

**Remarks** N/A

## Unit Subsystem (:UNIT)

### :POWer

**Supported**      All

```
: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 and the DB choice will be displayed. 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 63](#) for more information.

**\*RST**              DBM

**Key Entry**        dBm   dBuV   dBuVemf   mV   uV   mVemf   uVemf   DB

**Remarks**        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.

System Commands  
**Unit Subsystem (:UNIT)**



---

## 4 Analog Commands

This chapter provides SCPI descriptions for subsystems dedicated to analog commands for the ESG Vector Signal Generator. This chapter contains the following major sections:

- “Amplitude Modulation Subsystem ([:SOURce])” on page 172
- “Frequency Modulation Subsystem ([:SOURce])” on page 180
- “Low Frequency Output Subsystem ([:SOURce]:LFOutput)” on page 187
- “Phase Modulation Subsystem ([:SOURce])” on page 193
- “Pulse Modulation Subsystem ([:SOURce]:PULM)” on page 201

---

## Amplitude Modulation Subsystem ([:SOURce])

### :AM[1]|2...

**Supported** All

[: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.

AM[1] **AM Path 1 2** with 1 selected

AM2 **AM Path 1 2** with 2 selected

When just AM is shown in a command, this means the command applies globally to both paths.

Each path is set up separately. When a SCPI command uses AM[1], 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.

Depth coupling links the depth value of AM[1] to AM2. 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:

- DUALsine or SWEPTsine is not the selection for the waveform type
- each path uses a different source (Internal 1, Ext1, or Ext2)

### :AM:INTernal:FREQuency:STEP[:INCRement]

**Supported** All

[:SOURce]:AM:INTernal:FREQuency:STEP[:INCRement] <num>

[:SOURce]:AM:INTernal:FREQuency:STEP[:INCRement]?

This command sets the step increment for the amplitude modulation internal frequency.

The variable <num> is expressed in units of Hertz.

**\*RST** N/A

**Range** 0.5–1E6

**Key Entry**      **Incr Set**

**Remarks**      The value set by this command is used with the UP and DOWN choices for the AM frequency setting. Refer to [“:AM\[1\] | 2:INTernal\[1\]:FREQuency” on page 174](#) for more information.

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

### **:AM:WIDeband:STATe**

**Supported**      All

```
[:SOURce]:AM:WIDeband:STATe ON|OFF|1|0
[:SOURce]:AM:WIDeband:STATe?
```

This command enables or disables the wideband amplitude modulation for the selected path.

**\*RST**              0

**Key Entry**      **AM Off On**

**Remarks**      The RF carrier is modulated when the modulation state of the signal generator is set to ON, see [“:MODulation\[:STATe\]” on page 127](#) for more information.

Whenever amplitude modulation is enabled, the AM annunciator is turned on in the display

The two paths for amplitude modulation can be simultaneously enabled. Refer to [“:AM\[1\] | 2...” on page 172](#) for more information.

### **:AM[1] | 2:EXTernal[1] | 2:COUPling**

**Supported**      All

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

This command sets the coupling for the amplitude modulation source through 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.

**\*RST**              DC

**Key Entry**      **Ext Coupling DC AC**

**Remarks**      The command does not change the currently active source or switch the current modulation on or off. The modulating signal may be the sum of several signals, either internal or external sources.

## :AM[1] | 2:INTernal[1]:FREQuency

**Supported**      All

```
[ :SOURce ] :AM[1] | 2:INTernal[1] :FREQuency <val><unit> | UP | DOWN
[ :SOURce ] :AM[1] | 2:INTernal[1] :FREQuency?
```

This command sets the internal amplitude modulation rate for the following applications:

- the first tone of a dual-sine waveform
- the start frequency for a swept-sine waveform
- the frequency rate for all other waveforms

**\*RST**              +4.00000000E+002

**Range**            *Dual Sine, Swept-Sine & Sine:* 0.1HZ–100kHz  
*All Other Waveforms:* 0.1HZ–20kHz

**Key Entry**        **AM Tone 1 Rate**      **AM Start Rate**      **AM Rate**

**Remarks**        N/A

## :AM[1] | 2:INTernal[1]:FREQuency:ALternate

**Supported**      All

```
[ :SOURce ] :AM[1] | 2:INTernal[1] :FREQuency:ALternate <val><unit>
[ :SOURce ] :AM[1] | 2:INTernal[1] :FREQuency:ALternate?
```

This command sets the frequency for the alternate signal.

**\*RST**              +4.00000000E+002

**Range**            *Dual-Sine:* 0.1HZ–100kHz    *Swept-Sine:* 0.1HZ–100kHz

**Key Entry**        **AM Tone 2 Rate**      **AM Stop Rate**

**Remarks**        The alternate signal frequency is the second tone of a dual-sine or the stop frequency of a swept-sine waveform.

Refer to “:AM[1] | 2:INTernal[1]:FUNction:SHAPE” on page 175 for the waveform selection.

## **:AM[1] | 2:INTernal[1]:FREQuency:ALTErnate:AMPLitude:PERCent**

**Supported** All

```
[ :SOURce ] :AM[1] | 2:INTernal[1] :FREQuency:ALTErnate:AMPLitude:
PERCent <val><unit>
[ :SOURce ] :AM[1] | 2:INTernal[1] :FREQuency:ALTErnate:AMPLitude:PERCent?
```

This command sets the amplitude of the second tone for a dual-sine waveform as a percentage of the total amplitude. For example, if the second tone makes up 30% of the total amplitude, then the first tone is 70% of the total amplitude.

**\*RST** +5.00000000E+001

**Range** 0–100PCT

**Key Entry** AM Tone 2 Ampl Percent Of Peak

**Remarks** Refer to “[:AM\[1\] | 2:INTernal\[1\]:FUNCTion:SHAPE](#)” on page 175 for the waveform selection.

## **:AM[1] | 2:INTernal[1]:FUNCTion:SHAPE**

**Supported** All

```
[ :SOURce ] :AM[1] | 2:INTernal[1] :FUNCTion:SHAPE SINE|TRIangle|SQUare|RAMP|
NOISe|DUALsine|SWEPTsine
[ :SOURce ] :AM[1] | 2:INTernal[1] :FUNCTion:SHAPE?
```

This command sets the AM waveform type.

**\*RST** SINE

**Key Entry** Sine Triangle Square Ramp Noise Dual-Sine Swept-Sine

**Remarks** N/A

## **:AM[1] | 2:INTernal[1]:SWEep:TIME**

**Supported** All

```
[ :SOURce ] :AM[1] | 2:INTernal[1] :SWEep:TIME <val><unit>
[ :SOURce ] :AM[1] | 2:INTernal[1] :SWEep:TIME?
```

This command sets the sweep rate for the amplitude-modulated, swept-sine waveform.

**\*RST** +1.00000000E–001

**Range** 1mS–65.535S

<b>Key Entry</b>	<b>AM Sweep Time</b>
<b>Remarks</b>	N/A

## :AM[1] | 2:INTernal[1]:SWEep:TRIGger

**Supported** All

```
[ :SOURce ] :AM[1] | 2:INTernal[1] :SWEep:TRIGger BUS | IMMEDIATE | EXTernal | KEY
[ :SOURce ] :AM[1] | 2:INTernal[1] :SWEep:TRIGger?
```

This command sets the trigger source for the amplitude modulated swept-sine waveform.

<b>BUS</b>	This choice enables GPIB triggering using the *TRG or GET command or LAN and RS-232 triggering using the *TRG command.
<b>IMMEDIATE</b>	This choice enables immediate triggering of the sweep event.
<b>EXTernal</b>	This choice enables the triggering of a sweep event by an externally applied signal at the TRIG IN connector.
<b>KEY</b>	This choice enables triggering through front panel interaction by pressing the <b>Trigger</b> hardkey.
<b>*RST</b>	IMM
<b>Key Entry</b>	<b>Bus Free Run Ext Trigger Key</b>
<b>Remarks</b>	Refer to “:AM[1]   2:INTernal[1]:FUNction:SHAPE” on page 175 for the waveform selection.

## :AM[1] | 2:SOURce

**Supported** All

```
[ :SOURce ] :AM[1] | 2:SOURce INT[1] | EXT[1] | EXT2
[ :SOURce ] :AM[1] | 2:SOURce?
```

This command sets the source to generate the amplitude modulation.

<b>INT</b>	This choice selects the internal source to provide an ac-coupled signal.
<b>EXT</b>	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.
<b>*RST</b>	INT
<b>Key Entry</b>	<b>Internal Ext1 Ext2</b>

**Remarks**            A 1.0 V<sub>p</sub> input is required for calibrated AM depth settings.

The externally applied, ac-coupled input signal is tested for a voltage level and a display annunciator will report a high or low condition if that voltage is > ±3% of 1 V<sub>p</sub>.

### **:AM[1] | 2:STATe**

**Supported**        All

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

This command enables or disables the amplitude modulation for the selected path.

**\*RST**                0

**Key Entry**        **AM Off On**

**Remarks**        The RF carrier is modulated when you have set the signal generator's modulation state to ON, see “:MODulation[:STATe]” on page 127 for more information.

Whenever amplitude modulation is enabled, the AM annunciator is turned on in the display

The two paths for amplitude modulation can be simultaneously enabled. Refer to “:AM[1] | 2...” on page 172 for more information.

### **:AM[1] | 2[:DEPT]h**

**Supported**        All

```
[:SOURce]:AM[1] | 2[:DEPT]h <val><unit>|UP|DOWN
[:SOURce]:AM[1] | 2[:DEPT]h?
```

This commands sets the amplitude modulation depth in percent.

**\*RST**                +1.00000000E-001

**Range**             0.00–100PCT

**Key Entry**        **AM Depth**

**Remarks**        The value of AM depth applies only to whichever AM path configuration (AM[1] | 2) you have currently selected.

When the depth values are coupled, a change made to one path is applied to both. Refer to “:AM[1] | 2[:DEPT]h:TRACk” on page 178 for

AM depth value coupling.

Refer to “[:AM\[:DEPTH\]:STEP\[:INCREMENT\]](#)” on page 178 for setting the value associated with UP and DOWN choices.

## **:AM[1] | 2[:DEPTH]:TRACK**

**Supported** All

```
[:SOURce]:AM[1] | 2[:DEPTH]:TRACK ON|OFF|1|0
```

```
[:SOURce]:AM[1] | 2[:DEPTH]:TRACK?
```

This command enables or disables the coupling of the AM depth values between the paths (AM[1] and AM2).

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 the coupling and both paths will have independent depth values.

**\*RST** 0

**Key Entry** AM Depth Couple Off On

**Remarks** When the depth values are coupled, a change made to one path is applied both.

## **:AM[:DEPTH]:STEP[:INCREMENT]**

**Supported** All

```
[:SOURce]:AM[:DEPTH]:STEP[:INCREMENT] <val><unit>
```

```
[:SOURce]:AM[:DEPTH]:STEP[:INCREMENT]?
```

This command sets the AM depth step increment.

**\*RST** N/A

**Range** 0.1–100PCT

**Key Entry** Incr Set

**Remarks** The value set by this command is used with the UP and DOWN choices for the AM depth setting. Refer to “[:AM\[1\] | 2\[:DEPTH\]](#)” on page 177 for more information.



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

---

## Frequency Modulation Subsystem ([:SOURce])

### :FM[1]|2...

**Supported**      All

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

This prefix enables the selection of the FM path and is part of most SCPI commands associated with this subsystem. The two paths are equivalent to the **FM Path 1 2** softkey.

FM[1]              **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 globally to both paths.

Each path is set up separately. When a SCPI command uses FM[1], 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 FM[1] to FM2. 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:

- DUALsine or SWEPTsine is not the selection for the waveform type
- each path uses a different source (Internal 1, Ext1, or Ext2)
- FM2 must be set to a deviation less than FM[1]

### :FM:INTernal:FREQuency:STEP[:INCRement]

**Supported**      All

[:SOURce]:FM:INTernal:FREQuency:STEP[:INCRement] <num>

[:SOURce]:FM:INTernal:FREQuency:STEP[:INCRement]?

This command sets the step increment for the internal frequency modulation.

The variable <num> sets the entered value in units of Hertz.

\*RST                +5.00000000E+002

<b>Range</b>	0.5–1E6
<b>Key Entry</b>	<b>Incr Set</b>
<b>Remarks</b>	The value set by this command is used with the UP and DOWN choices for the FM frequency setting. Refer to <a href="#">“:FM[1] 2:INTernal[1]:FREQuency” on page 181</a> for more information.  The setting enabled by this command is not affected by signal generator power-on, preset, or *RST.

### **:FM[1]|2:EXTernal[1]|2:COUPLing**

**Supported** All

```
[:SOURce]:FM[1]|2:EXTernal[1]|2:COUPLing AC|DC
[:SOURce]:FM[1]|2:EXTernal[1]|2:COUPLing?
```

This command sets the coupling for the frequency modulation source through 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.
*RST	DC

**Key Entry** **Ext Coupling DC AC**

**Remarks** The command does not change the currently active source or switch the current modulation on or off. The modulating signal may be the sum of several signals, either internal or external sources.

### **:FM[1]|2:INTernal[1]:FREQuency**

**Supported** All

```
[:SOURce]:FM[1]|2:INTernal[1]:FREQuency <val><unit>|UP|DOWN
[:SOURce]:FM[1]|2:INTernal[1]:FREQuency?
```

This command sets the internal frequency modulation rate for the following applications:

- the first tone of a dual-sine waveform
- the start frequency for a swept-sine waveform
- the frequency rate for all other waveforms

## Frequency Modulation Subsystem ([:SOURce])

<b>*RST</b>	+4.00000000E+002
<b>Range</b>	<i>Dual-Sine</i> : 0.1HZ–100KHZ <i>Swept-Sine</i> : 0.1HZ–100KHZ <i>All Other Waveforms</i> : 0.1HZ–20KHZ
<b>Key Entry</b>	<b>FM Tone 1 Rate</b> <b>FM Start Rate</b> <b>FM Rate</b>
<b>Remarks</b>	N/A

**:FM[1] | 2:INTernal[1]:FREQuency:ALternate**

**Supported**    All

```
[ :SOURce ] :FM[1] | 2:INTernal[1]:FREQuency:ALternate <val><unit>
[ :SOURce ] :FM[1] | 2:INTernal[1]:FREQuency:ALternate?
```

This command sets the frequency for the alternate signal.

<b>*RST</b>	+4.00000000E+002
<b>Range</b>	<i>Dual-Sine</i> : 0.5HZ–1MHZ <i>Swept-Sine</i> : 1HZ–1MHZ
<b>Key Entry</b>	<b>FM Tone 2 Rate</b> <b>FM Stop Rate</b>
<b>Remarks</b>	The alternate signal frequency is the second tone of a dual-sine or the stop frequency of a swept-sine waveform.  Refer to “ <a href="#">:FM[1]   2:INTernal[1]:FUNction:SHAPE</a> ” on page 183 for the waveform selection.

**:FM[1] | 2:INTernal[1]:FREQuency:ALternate:AMPLitude:PERCent**

**Supported**    All

```
[ :SOURce ] :FM[1] | 2:INTernal[1]:FREQuency:ALternate:AMPLitude:
PERCent <val><unit>
[ :SOURce ] :FM[1] | 2:INTernal[1]:FREQuency:ALternate:AMPLitude:PERCent?
```

This command sets the amplitude of the second tone for a dual-sine waveform as a percentage of the total amplitude. For example, if the second tone makes up 30% of the total amplitude, then the first tone is 70% of the total amplitude.

<b>*RST</b>	+1.00000000E+002
<b>Range</b>	0–100PCT
<b>Key Entry</b>	<b>FM Tone 2 Ampl Percent Of Peak</b>
<b>Remarks</b>	Refer to “ <a href="#">:FM[1]   2:INTernal[1]:FUNction:SHAPE</a> ” for the waveform selection.

## **:FM[1]|2:INTernal[1]:FUNction:SHApe**

**Supported** All

```
[:SOURce]:FM[1]|2:INTernal[1]:FUNction:SHApe SINE|TRIangle|SQUare|RAMP|
NOISe|DUALsine|SWEptsine
```

```
[:SOURce]:FM[1]|2:INTernal[1]:FUNction:SHApe?
```

This command sets the FM waveform type.

**\*RST** SINE

**Key Entry** Sine Triangle Square Ramp Noise Dual-Sine Swept-Sine

**Remarks** The waveform selection is only valid when INT[1] is the source selection. Refer to “:FM[1]|2:SOURce” on page 184 for type source selection.

## **:FM[1]|2:INTernal[1]:SWEep:TIME**

**Supported** All

```
[:SOURce]:FM[1]|2:INTernal[1]:SWEep:TIME <val><unit>
```

```
[:SOURce]:FM[1]|2:INTernal[1]:SWEep:TIME?
```

This command sets the sweep time for the swept-sine waveform.

**\*RST** +1.00000000E-001

**Range** 1.0mS-65.535S

**Key Entry** FM Sweep Time

**Remarks** Refer to “:FM[1]|2:INTernal[1]:FUNction:SHApe” on page 183 for the waveform selection.

## **:FM[1]|2:INTernal[1]:SWEep:TRIGger**

**Supported** All

```
[:SOURce]:FM[1]|2:INTernal[1]:SWEep:TRIGger BUS|IMMediate|EXTernal|KEY
```

```
[:SOURce]:FM[1]|2:INTernal[1]:SWEep:TRIGger?
```

This command sets the trigger source for the frequency 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.

## Frequency Modulation Subsystem ([:SOURce])

<b>EXTernal</b>	This choice enables the triggering of a sweep event by an externally applied signal at the TRIG IN connector.
<b>KEY</b>	This choice enables triggering through front panel interaction by pressing the <b>Trigger</b> hardkey.
<b>*RST</b>	IMM
<b>Key Entry</b>	<b>Bus Free Run Ext Trigger Key</b>
<b>Remarks</b>	Refer to “:FM[1]   2:INTernal[1]:FUNction:SHAPE” on page 183 for the waveform selection.

## :FM[1] | 2:SOURce

<b>Supported</b>	All
	<code>[:SOURce]:FM[1]   2:SOURce INT[1]   EXT1   EXT2</code> <code>[:SOURce]:FM[1]   2:SOURce?</code>
	This command sets the source to generate the frequency modulation.
<b>INT</b>	This choice selects the internal source to provide an ac-coupled signal.
<b>EXT</b>	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.
<b>*RST</b>	INT
<b>Key Entry</b>	<b>Internal Ext1 Ext2</b>
<b>Remarks</b>	The externally applied, ac-coupled input signal is tested for a voltage level and a display annunciator will report a high or low condition if that voltage is $> \pm 3\%$ of $1 V_p$ .

## :FM[1] | 2:STATe

<b>Supported</b>	All
	<code>[:SOURce]:FM[1]   2:STATe ON   OFF   1   0</code> <code>[:SOURce]:FM[1]   2:STATe?</code>
	This command enables or disables the frequency modulation for the selected path.
<b>*RST</b>	0
<b>Key Entry</b>	<b>FM Off On</b>
<b>Remarks</b>	The RF carrier is modulated when you set the signal generator’s

modulation state to ON, see “:MODulation[:STATe]” on page 127 for more information.

Whenever frequency modulation is enabled, the FM annunciator is turned on in the display

The two paths for frequency modulation can be simultaneously enabled. Refer to “:FM[1] | 2...” on page 180 for more information.

### **:FM[1] | 2[:DEVIation]**

**Supported**      All

```
[:SOURCE]:FM[1] | 2[:DEVIation] <val><unit>
[:SOURCE]:FM[1] | 2[:DEVIation]?
```

This command sets the frequency modulation deviation.

**\*RST**            +1.00000000E+003

<b>Range</b>	<i>Frequency</i>	<i>Deviation</i>	<i>Deviation Option UNJ</i>
	250kHz–249.999MHz	0–8MHz	0–1MHz
	> 249.999–500MHz	0–4MHz	0–500kHz
	> 500MHz–1GHz	0–8MHz	0–1MHz
	> 1–2GHz	0–16MHz	0–2MHz
	> 2–4GHz	0–32MHz	0–4MHz
	> 4–6GHz	0–8MHz	0–8MHz

**Key Entry**      **FM DEV**

**Remarks**      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 185 for more information and setting the deviation tracking.

### **:FM[1] | 2[:DEVIation]:TRACk**

**Supported**      All

```
[:SOURCE]:FM[1] | 2[:DEVIation]:TRACk ON|OFF|1|0
[:SOURCE]:FM[1] | 2[:DEVIation]:TRACk?
```

This command enables or disables the deviation coupling between the paths (FM[1] and FM2).

- ON (1)      This choice will link the deviation value of FM[1] with FM2; FM2 will assume the FM[1] deviation value. For example, if FM[1] deviation is set

**Frequency Modulation Subsystem ([:SOURce])**

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 (FM[1] or FM2) selected in this command

OFF (0) This choice disables the coupling and both paths will have independent deviation values.

**\*RST** 0

**Key Entry** **FM Dev Couple Off On**

**Remarks** This command uses exact match tracking, not offset tracking.



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

### :AMPLitude

**Supported** All

```
[:SOURce]:LFOutput:AMPLitude <val><unit>
```

```
[:SOURce]:LFOutput:AMPLitude?
```

This command sets the amplitude for the signal at the LF OUTPUT connector.

**\*RST** 0.00

**Range** 0.000VP–5.0VP

**Key Entry** LF Out Amplitude

**Remarks** N/A

### :FUNction[1]:FREQuency

**Supported** All

```
[:SOURce]:LFOutput:FUNction[1]:FREQuency <val><unit>
```

```
[:SOURce]:LFOutput:FUNction[1]:FREQuency?
```

This command sets the internal modulation frequency for the following applications:

- the first tone of a dual-sine waveform
- the start frequency for a swept-sine waveform
- the frequency rate for all other waveforms

**\*RST** +4.00000000E+002

**Range** *Sine*: 0.1HZ–100KHZ *Dual-Sine*: 0.1HZ–100KHZ  
*Swept-Sine*: 0.1HZ–100KHZ  
*All Other Waveforms*: 0.1HZ–20KHZ

**Key Entry** LF Out Tone 1 Freq LF Out Start Freq LF Out Freq

**Remarks** Refer to “:FUNction[1]:SHApe” on page 190 for selecting the waveform type.

**:FUNction[1]:FREQuency:ALternate****Supported** All

[:SOURce]:LFOutput:FUNction[1]:FREQuency:ALternate &lt;val&gt;&lt;unit&gt;

[:SOURce]:LFOutput:FUNction[1]:FREQuency:ALternate?

This command sets the frequency for the alternate LF output signal.

**\*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**Remarks** The alternate frequency is the second tone of a dual-sine or the stop frequency of a swept-sine waveform.

Refer to “:FUNction[1]:SHAPE” on page 190 for selecting the waveform type.

**:FUNction[1]:FREQuency:ALternate:AMPLitude:PERCent****Supported** All

[:SOURce]:LFOutput:FUNction[1]:FREQuency:ALternate:AMPLitude:

PERCent &lt;val&gt;&lt;unit&gt;

[:SOURce]:LFOutput:FUNction[1]:FREQuency:ALternate:AMPLitude:PERCent?

This command sets the amplitude of the second tone for a dual-sine waveform as a percentage of the total LF output amplitude. For example, if the second tone makes up 30% of the total amplitude, then the first tone is 70% of the total amplitude.

**\*RST** +5.00000000E+001**Range** 0–100PCT**Key Entry** LF Out Tone 2 Ampl % of Peak**Remarks** Refer to “:FUNction[1]:SHAPE” on page 190 for selecting the waveform type.

## :FUNCTION[1]:PERiod

**Supported** All

[ :SOURCE ] :LFOutput :FUNCTION[1] :PERiod <val><unit>

[ :SOURCE ] :LFOutput :FUNCTION[1] :PERiod?

This command sets the pulse period of the internally generated pulsed low frequency waveform.

**\*RST** +1.60000000E-005

**Range** 16uS-30S

**Key Entry** LF Out Period

**Remarks** N/A

## :FUNCTION[1]:PWIDth

**Supported** All

[ :SOURCE ] :LFOutput :FUNCTION[1] :PWIDth <val><unit>

[ :SOURCE ] :LFOutput :FUNCTION[1] :PWIDth?

This command sets the pulse width of the internally-generated pulsed low frequency waveform.

The upper limit range value is restricted by the current value of the pulse period. For example, if the pulse period value is set to 16  $\mu$ S, the pulse width is limited to a maximum range value of 16  $\mu$ S.

**\*RST** +8.00000000E-006

**Range** 8uS-30S

**Key Entry** LF Out Width

**Remarks** To change the pulse period value, refer to [“:FUNCTION\[1\]:PERiod” on page 189](#).

**:FUNction[1]:SHAPE****Supported** All[:SOURce]:LFOutput:FUNction[1]:SHAPE SINE|DUALsine|SWEPTsine|TRIangle|  
SQUare|RAMP|PULSe|NOISe|DC

[:SOURce]:LFOutput:FUNction[1]:SHAPE?

This command sets the waveform type for the generated signal at the LF output.

**\*RST** SINE**Key Entry** Sine Dual-Sine Swept-Sine Triangle Square Ramp Pulse  
Noise DC**Remarks** Function Generator must be the source selection to support DUALsine or the SWEPTsine waveform. Refer to “:SOURce” on page 191.**:FUNction[1]:SWEep:TIME****Supported** All

[:SOURce]:LFOutput:FUNction[1]:SWEep:TIME &lt;val&gt;&lt;unit&gt;

[:SOURce]:LFOutput:FUNction[1]:SWEep:TIME?

This command sets the sweep time for an internally generated swept-sine signal at the LF output.

**\*RST** +1.00000000E-001**Range** 1mS-65.535S**Key Entry** LF Out Sweep Time**Remarks** N/A**:FUNction[1]:SWEep:TRIGger****Supported** All

[: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 waveform signal at the LF output.

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

IMMEDIATE	This choice enables immediate triggering of the sweep event.
EXTERNAL	This choice enables the triggering of a sweep event by an externally applied signal at the TRIG IN connector.
KEY	This choice enables triggering through front panel interaction by pressing the <b>Trigger</b> hardkey.
<b>*RST</b>	IMM
<b>Key Entry</b>	<b>Bus Free Run Ext Trigger Key</b>
<b>Remarks</b>	Refer to “:FUNCTION[1]:SHAPE” on page 190 for selecting the waveform type.

## :SOURce

**Supported** All

```
[ :SOURce ] :LFOutput :SOURce INT[1] | FUNCTION
[ :SOURce ] :LFOutput :SOURce?
```

This command sets the low frequency source for the LF output.

INT[1]	This choice enables you to output a signal where the frequency and shape of the signal is set by the internal source as it is being used by a modulation. 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.
<b>*RST</b>	FUNC
<b>Key Entry</b>	<b>Internal Monitor Function Generator</b>
<b>Remarks</b>	N/A

## :STATe

**Supported** All

```
[ :SOURce ] :LFOutput :STATe ON | OFF | 1 | 0
[ :SOURce ] :LFOutput :STATe?
```

This command enables or disables the low frequency output.

**\*RST** 0

## Analog Commands

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

**Key Entry**      LF Out Off On

**Remarks**      N/A

---

## Phase Modulation Subsystem ([:SOURce])

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

**Supported**      All

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

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

PM[1]             $\Phi$ 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 globally to both paths.

Each path is set up separately. When a SCPI command uses PM[1], 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 PM[1] 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:

- DUALsine or SWEPTsine is not the selection for the waveform type
- each path uses a different source (Internal 1, Ext1, or Ext2)
- PM2 must be set to a deviation less than or equal to PM[1]

### :PM:INTernal:FREQuency:STEP[:INCRement]

**Supported**      All

[ :SOURce ] :PM:INTernal:FREQuency:STEP [ :INCRement ] <num>

[ :SOURce ] :PM:INTernal:FREQuency:STEP [ :INCRement ] ?

This command sets the step increment of the phase modulation internal frequency.

The variable <num> sets the entered value in units of Hertz.

\*RST            N/A

## Phase Modulation Subsystem ([:SOURce])

<b>Range</b>	0.5–1E6
<b>Key Entry</b>	<b>Incr Set</b>
<b>Remarks</b>	The value set by this command is used with the UP and DOWN choices for the $\Phi$ M frequency command. Refer to “:PM[1]   2:INTernal[1]:FREQUency” on page 195 for more information.  The setting enabled by this command is not affected by signal generator power-on, preset, or *RST.

**:PM[1] | 2:BANDwidth | BWIDth**

<b>Supported</b>	All
	[ :SOURce ] :PM[1]   2:BANDwidth   BWIDth NORMal   HIGH
	[ :SOURce ] :PM[1]   2:BANDwidth   BWIDth?

This command toggles between normal phase modulation and high bandwidth phase modulation mode.

<b>*RST</b>	NORM
<b>Key Entry</b>	<b>FM <math>\Phi</math>M Normal High BW</b>
<b>Remarks</b>	N/A

**:PM[1] | 2:EXTernal[1]:COUPLing**

<b>Supported</b>	All
	[ :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 through 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.
<b>*RST</b>	DC
<b>Key Entry</b>	<b>Ext Coupling DC AC</b>
<b>Remarks</b>	This command does not change the currently active source or switch the current modulation on or off. The modulating signal may be the sum of several signals, either internal or external sources.



## :PM[1] | 2:INTernal[1]:FREQuency

**Supported** All

```
[ :SOURce ] :PM[1] | 2:INTernal[1] :FREQuency <val><unit> | UP | DOWN
[ :SOURce ] :PM[1] | 2:INTernal[1] :FREQuency?
```

This command sets the internal modulation frequency rate for the following applications:

- the first tone of a dual-sine waveform
- the start frequency for a swept-sine waveform
- the frequency rate for all other waveforms

**\*RST** +4.00000000E+002

**Range** *Dual-Sine:* 0.1HZ–100KHZ *Swept-Sine:* 0.1HZ–100KHZ  
*All Other Waveforms:* 0.1HZ–20KHZ

**Key Entry**  $\Phi$ M Tone 1 Rate  $\Phi$ M Start Rate  $\Phi$ M Rate

**Remarks** Refer to “:FUNCTion[1]:SHAPE” on page 190 for selecting the waveform type.

## :PM[1] | 2:INTernal[1]:FREQuency:ALTErnate

**Supported** All

```
[ :SOURce ] :PM[1] | 2:INTernal[1] :FREQuency:ALTErnate <val><unit>
[ :SOURce ] :PM[1] | 2:INTernal[1] :FREQuency:ALTErnate?
```

This command sets the frequency for the alternate signal.

**\*RST** +4.00000000E+002

**Range** *Dual-Sine:* 0.1HZ–100KHZ *Swept-Sine:* 0.1HZ–100KHZ

**Key Entry**  $\Phi$ M Stop Rate  $\Phi$ M Tone 2 Rate

**Remarks** The alternate frequency is the second tone of a dual-sine or the stop frequency of a swept-sine waveform.

Refer to “:PM[1] | 2:INTernal[1]:FUNCTion:SHAPE” on page 196 for the waveform selection.

**:PM[1] | 2:INTernal[1]:FREQuency:ALTErnate:AMPLitude:PERCent****Supported** All

```
[:SOURce]:PM[1]|2:INTernal[1]:FREQuency:ALTErnate:AMPLitude:
PERCent <val><unit>
[:SOURce]:PM[1]|2:INTernal[1]:FREQuency:ALTErnate:AMPLitude:PERCent?
```

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.

**\*RST** +5.00000000E+001**Range** 0–100PCT**Key Entry**  $\Phi$ M Tone 2 Ampl Percent of Peak**Remarks** Refer to “:PM[1] | 2:INTernal[1]:FUNCTion:SHAPE” on page 196 for the waveform selection.**:PM[1] | 2:INTernal[1]:FUNCTion:SHAPE****Supported** All

```
[: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.

**\*RST** SINE**Key Entry** Sine Triangle Square Ramp Noise Dual-Sine Swept-Sine**Remarks** The INTernal1 source selection does not support the DUALsine and SWEPTsine waveform choices.**:PM[1] | 2:INTernal[1]:SWEep:TIME****Supported** All

```
[:SOURce]:PM[1]|2:INTernal[1]:SWEep:TIME <val><unit>
[:SOURce]:PM[1]|2:INTernal[1]:SWEep:TIME?
```

This command sets the sweep time for a phase-modulated, swept-sine waveform.

**\*RST** +1.00000000E–001

<b>Range</b>	1.0mS–65.535S
<b>Key Entry</b>	$\Phi$ M Sweep Time
<b>Remarks</b>	Refer to “:PM[1] 2:INTernal[1]:FUNction:SHApe” for the waveform selection.

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

**Supported** All

```
[: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.

<b>BUS</b>	This choice enables GPIB triggering using the *TRG or GET command or LAN and RS-232 triggering using the *TRG command.
<b>IMMEDIATE</b>	This choice enables immediate triggering of the sweep event.
<b>EXTernal</b>	This choice enables the triggering of a sweep event by an externally applied signal at the TRIG IN connector.
<b>KEY</b>	This choice enables triggering through front panel interaction by pressing the <b>Trigger</b> hardkey.

**\*RST** IMM

**Key Entry** Bus Free Run Ext Trigger Key

**Remarks** Refer to “:PM[1]|2:INTernal[1]:FUNction:SHApe” on page 196 for the waveform selection.

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

**Supported** All

```
[:SOURce]:PM[1]|2:SOURce INT[1]|EXT1|EXT2
[:SOURce]:PM[1]|2:SOURce?
```

This command sets the source to generate the phase modulation.

<b>INT</b>	This choice selects internal source 1 to provide an ac-coupled signal.
<b>EXT</b>	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.

**\*RST** INT

**Key Entry** Internal 1 Ext1 Ext2

**Remarks** The externally applied, ac-coupled input signal is tested for a voltage level and a display annunciator will report a high or low condition if that voltage is  $> \pm 3\%$  of  $1 V_p$ .

## :PM[1] | 2:STATe

**Supported** All

```
[ :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.

**\*RST** 0

**Key Entry**  $\Phi$ M Off On

**Remarks** The RF carrier is modulated when you set the signal generator's modulation state to ON, see “:MODulation[:STATe]” on page 127 for more information.

Whenever phase modulation is enabled, the  $\Phi$ M annunciator is turned on in the display

The two paths for phase modulation can be simultaneously enabled. Refer to “:PM[1] | 2...” on page 193 for more information.

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

**Supported** All

```
[ :SOURce ] :PM[1] | 2 [ :DEViation ] <val><unit> | UP | DOWN
```

```
[ :SOURce ] :PM[1] | 2 [ :DEViation ] ?
```

This command sets the deviation of the phase modulation.

The variable <unit> will accept RAD (radians), PIRAD (pi-radians), and DEG (degrees); however, the query will only return values in radians.

**\*RST** +0.00000000E+000

<b>Range</b>	<i>Frequency</i>	<i>Normal Bandwidth</i>	<i>High Bandwidth</i>
	250kHz–249.999MHZ	0–10RAD	0–1RAD
	> 249.999–500MHZ	0–5RAD	0–0.5RAD
	> 500MHZ–1GHZ	0–10RAD	0–1RAD
	> 1–2GHZ	0–20RAD	0–2RAD

	> 2–4GHZ	0–40RAD	0–4RAD
	> 4–6GHZ	0–80RAD	0–8RAD
<b>Key Entry</b>	$\Phi$ M Dev		
<b>Remarks</b>	If deviation tracking is active, a change to the deviation value on one path will apply to both.		
	Refer to “ <a href="#">:PM[:DEVIation]:STEP[:INCRement]</a> ” on page 199 for setting the value associated with the UP and DOWN choices.		

### **:PM[1] | 2[:DEVIation]:TRACk**

**Supported**     All

```
[: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 paths (PM[1] and PM2).

- ON (1)     This choice will link the deviation value of PM[1] with PM2; PM2 will assume the PM[1] deviation value. For example, if PM[1] 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 (PM[1] or PM2) selected in this command.
- OFF (0)     This choice disables the coupling and both paths will have independent deviation values.

**\*RST**             0

**Key Entry**         $\Phi$ M Dev Couple Off On

**Remarks**        This command uses exact match tracking, not offset tracking.

### **:PM[:DEVIation]:STEP[:INCRement]**

**Supported**     All

```
[:SOURce]:PM[:DEVIation]:STEP[:INCRement] <val><unit>
[:SOURce]:PM[:DEVIation]:STEP[:INCRement]?
```

This command sets the phase modulation deviation step increment.

**\*RST**             N/A

**Range**            0.001–1E3RAD

**Key Entry**

**Incr Set**

**Remarks**

The value set by this command is used with the UP and DOWN choices for the  $\Phi$ M deviation command. Refer to “:PM[1] | 2[:DEViation]” on [page 198](#) for more information.

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

---

## Pulse Modulation Subsystem ([:SOURce]:PULM)

### :INTernal[1]:FREQuency

**Supported** All

```
[ :SOURce ] :PULM :INTernal [ 1 ] :FREQuency <val><unit> | UP | DOWN
[ :SOURce ] :PULM :INTernal [ 1 ] :FREQuency ?
```

This command sets the rate of the internal square wave pulse modulation source.

**\*RST** +4.00000000E+002

**Range** 0.1HZ–20.0kHz

**Key Entry** **Pulse Rate**

**Remarks** This command is used when SQUare is the current pulse modulation type. Refer to “[:SOURce]” on page 203 for the pulse modulation type selection.

### :INTernal[1]:FUNCTion:SHAPE

**Supported** All

```
[ :SOURce ] :PULM :INTernal [ 1 ] :FUNCTion :SHAPE PULSe | SQUARE
[ :SOURce ] :PULM :INTernal [ 1 ] :FUNCTion :SHAPE ?
```

This command sets the internal pulse modulation waveform type.

**\*RST** PULS

**Key Entry** **Internal Square** **Internal Pulse**

**Remarks** N/A

### :INTernal[1]:PERiod

**Supported** All

```
[ :SOURce ] :PULM :INTernal [ 1 ] :PERiod <val><unit> | UP | DOWN
[ :SOURce ] :PULM :INTernal [ 1 ] :PERiod ?
```

This command sets the period for the internally generated pulse modulation source.

## Pulse Modulation Subsystem ([:SOURce]:PULM)

<b>*RST</b>	+8.00000000E-005
<b>Range</b>	8uS–30S
<b>Key Entry</b>	<b>Pulse Period</b>
<b>Remarks</b>	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 equal to the pulse period.  Refer to “ <a href="#">:INTernal[1]:PERiod:STEP[:INCRement]</a> ” on page 202 for setting the value associated with the UP and DOWN choices.

**:INTernal[1]:PERiod:STEP[:INCRement]**

<b>Supported</b>	All
[:SOURce]:PULM:INTernal[1]:PERiod:STEP[:INCRement] <val><unit> UP DOWN [:SOURce]:PULM:INTernal[1]:PERiod:STEP[:INCRement]?	
This command sets the period time step increment for the internally-generated pulse modulation source.	
<b>*RST</b>	+1.00000000E-006
<b>Range</b>	4uS–30S
<b>Key Entry</b>	<b>Incr Set</b>
<b>Remarks</b>	The value set by this command is used with the UP and DOWN choices for the pulse period command. Refer to “ <a href="#">:INTernal[1]:PERiod</a> ” on <a href="#">page 201</a> for more information.

**:INTernal[1]:PWIDth**

<b>Supported</b>	All
[:SOURce]:PULM:INTernal[1]:PWIDth <val><unit>  UP DOWN [:SOURce]:PULM:INTernal[1]:PWIDth?	
This command sets the pulse width for the internally generated pulse modulation source.	
<b>*RST</b>	+4.00000000E-005
<b>Range</b>	4uS–30S
<b>Key Entry</b>	<b>Pulse Width</b>



**Remarks** If the entered value for the pulse width is equal to or greater than the value for the pulse period, the pulse width will change to a value that is equal to the pulse period.

Refer to “[:INTernal\[1\]:PWIDth:STEP](#)” on page 203 for setting the value associated with the UP and DOWN choices.

## **:INTernal[1]:PWIDth:STEP**

**Supported** All

```
[:SOURce]:PULM:INTernal[1]:PWIDth:STEP <num>[<time suffix>]
[:SOURce]:PULM:INTernal[1]:PWIDth:STEP?
```

This command sets the step increment for the pulse width.

The optional variable [<time suffix>] accepts nS (nano-seconds) to S (seconds).

**\*RST** +1.00000000E-006

**Range** 4uS-30S

**Key Entry** N/A

**Remarks** The value set by this command is used by the UP and DOWN choices for the pulse width command. Refer to “[:INTernal\[1\]:PWIDth](#)” on page 202 for more information.

## **:SOURce**

**Supported** All

```
[:SOURce]:PULM:SOURce INT|EXT[1]|EXT2
[:SOURce]:PULM:SOURce?
```

This command sets the source that will generate the pulse modulation.

**\*RST** INT

**Key Entry** Internal Square Internal Pulse Ext1 DC-Coupled Ext2 DC-Coupled

**Remarks** N/A

## :STATe

**Supported** All

[ :SOURce ] :PULM:STATe ON | OFF | 1 | 0

[ :SOURce ] :PULM:STATe?

This command enables or disables the operating state of the pulse modulation source.

**\*RST** 0

**Key Entry** Pulse Off On

**Remarks** When pulse modulation is enabled, the PULSE annunciator is shown in the display

---

## 5 Component Test Digital Commands

This chapter provides SCPI descriptions for subsystems dedicated to digital component testing for the ESG Vector Signal Generator. This chapter contains the following major sections:

- “All Subsystem–Option 001 or 002 ([:SOURce])” on page 206
- “AWGN ARB Subsystem–Option 403 ([:SOURce]:RADio:AWGN:ARB)” on page 207
- “CDMA ARB Subsystem–Option 401 ([:SOURce]:RADio:CDMA:ARB)” on page 216
- “CDMA2000 ARB Subsystem–Option 401 ([:SOURce]:RADio:CDMA2000:ARB)” on page 240
- “Dmodulation Subsystem–Option 001 or 002 ([:SOURce]:RADio:DMODulation:ARB)” on page 269
- “Dual ARB Subsystem–Option 001 or 002 ([:SOURce]:RADio:ARB)” on page 290
- “Multitone Subsystem–Option 001 or 002 ([:SOURce]:RADio:MTONe:ARB)” on page 309
- “Wideband CDMA ARB Subsystem–Option 400 ([:SOURce]:RADio:WCDMa:TGPP:ARB)” on page 322

---

## All Subsystem–Option 001 or 002 ([:SOURce])

### **:RADio:ALL:OFF**

**Supported** All with Option 001 or 002

[[:SOURce]]:RADio:ALL:OFF

This command disables all digital modulation personalities on a particular baseband.

**\*RST** N/A

**Range** N/A

**Key Entry** N/A

**Remarks** This command does not affect analog modulation.

---

## AWGN ARB Subsystem–Option 403 ([:SOURce]:RADio:AWGN:ARB)

### :BWIDth

**Supported** All with Option 403

```
[:SOURce]:RADio:AWGN:ARB:BWIDth <val>  
[:SOURce]:RADio:AWGN:ARB:BWIDth?
```

This command adjusts the bandwidth of the AWGN waveform.

The variable <val> is expressed in units of Hertz (Hz–MHz).

**\*RST** +1.00000000E+006

**Range** 5E4–1.5E7

**Key Entry** Bandwidth

**Remarks** N/A

### :IQ:EXtErnal:FiLTer

**Supported** All with Option 403

```
[:SOURce]:RADio:AWGN:ARB:IQ:EXtErnal:FiLTer 40e6|THROUGH  
[:SOURce]:RADio:AWGN:ARB:IQ:EXtErnal:FiLTer?
```

This command selects the filter or through path for I/Q signals routed to the rear panel I and Q outputs. Selecting a filter setting with this command will automatically set the “:IQ:EXtErnal:FiLTer:AUTO” on page 208 command to Off mode.

40e6 This choice applies a 40 MHz baseband filter.

THROUGH This choice bypasses filtering.

**\*RST** THR

**Key Entry** 40.000 MHz Through

**Remarks** N/A

## :IQ:EXTErnal:FILTEr:AUTO

**Supported** All with Option 403

```
[ :SOURCE ] :RADio:AWGN:ARB:IQ:EXTErnal:FILTEr:AUTO ON|OFF|1|0
```

```
[ :SOURCE ] :RADio:AWGN:ARB:IQ:EXTErnal:FILTEr:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals routed to the rear panel I/Q outputs.

ON(1) This choice will automatically select a digital modulation filter optimized for the current signal generator settings.

OFF(0) This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “:IQ:EXTErnal:FILTEr” on [page 207](#) for selecting a filter or through path.

\*RST ON

**Key Entry** I/Q Output Filter Manual Auto

**Remarks** N/A

## :HEADer:CLEAr

**Supported** All with Option 403

```
[ :SOURCE ] :RADio:AWGN:ARB:HEADer:CLEAr
```

This command clears the header information from the header file used by this modulation format.

\*RST N/A

**Key Entry** Clear Header

**Remarks** The **AWGN Off On** softkey must be set to On for this command to function.

## :HEADer:SAVE

**Supported** All with Option 403

```
[ :SOURCE ] :RADio:AWGN:ARB:HEADer:SAVE
```

This command saves the header information to the header file used by this modulation format.

\*RST N/A

<b>Key Entry</b>	<b>Save Setup To Header</b>
<b>Remarks</b>	The <b>AWGN Off On</b> softkey must be set to On for this command to function.

## **:IQ:MODulation:ATTen**

**Supported** All with Option 403

```
[ :SOURCE ] :RADio:AWGN:ARB:IQ:MODulation:ATTen <val>  
[ :SOURCE ] :RADio:AWGN:ARB:IQ:MODulation:ATTen?
```

This command attenuates the I/Q signals being modulated through the signal generator RF path.

The variable <val> is expressed in units of decibels (dB).

<b>*RST</b>	+2.00000000E+000
<b>Range</b>	0–40
<b>Key Entry</b>	<b>Modulator Atten Manual Auto</b>
<b>Remarks</b>	N/A

## **:IQ:MODulation:ATTen:AUTO**

**Supported** All with Option 403

```
[ :SOURCE ] :RADio:AWGN:ARB:IQ:MODulation:ATTen:AUTO ON|OFF|1|0  
[ :SOURCE ] :RADio:AWGN:ARB:IQ:MODulation:ATTen:AUTO?
```

This command enables or disables the I/Q attenuation auto mode.

- ON (1) This choice enables the attenuation auto mode which optimizes the modulator attenuation for the current conditions.
- OFF (0) This choice holds the attenuator at its current setting or at a selected value. Refer to “[:IQ:MODulation:ATTen](#)” on page 209 for setting the attenuation value.

<b>*RST</b>	1
<b>Key Entry</b>	<b>Modulator Atten Manual Auto</b>
<b>Remarks</b>	N/A

### :IQ:MODulation:FILTer

**Supported** All with Option 403

```
[:SOURce]:RADio:AWGN:ARB:IQ:MODulation:FILTer 2.1e6|40e6|THROUGH
[:SOURce]:RADio:AWGN:ARB:IQ:MODulation:FILTer?
```

This command enables you to select a filter or through path for I/Q signals modulated onto the RF carrier. Selecting a filter with this command will automatically set “:IQ:MODulation:ATTen:AUTO” on page 209 to Off(0) mode.

2.1E6 This choice applies a 2.1 MHz baseband filter to the I/Q signals.

40E6 This choice applies a 40 MHz baseband filter to the I/Q signals.

THROUGH This choice bypasses filtering.

**\*RST** THR

**Key Entry** 2.100 MHz 40.000 MHz Through

**Remarks** N/A

### :IQ:MODulation:FILTer:AUTO

**Supported** All with Option 403

```
[:SOURce]:RADio:AWGN:ARB:IQ:MODulation:FILTer:AUTO ON|OFF|1|0
[:SOURce]:RADio:AWGN:ARB:IQ:MODulation:FILTer:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals modulated onto the RF carrier.

ON(1) This choice will automatically select a digital modulation filter.

OFF(0) This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “:IQ:MODulation:FILTer” on page 294 for selecting a filter or through path.

**\*RST** 1

**Key Entry** I/Q Mod Filter Manual Auto

**Remarks** N/A



## :MDEStination:PULSe

**Supported** All with Option 403

```
[ :SOURce ] :RADio:AWGN:ARB:MDEStination:PULSe NONE | M1 | M2 | M3 | M4  
[:SOURce]:RADio:AWGN:ARB:MDEStination:PULSe?
```

This command routes the selected marker to the Pulse/RF Blanking function. The NONE parameter clears the marker for the Pulse/RF Blanking functions.

**\*RST** NONE

**Key Entry** None Marker 1 Marker 2 Marker 3 Marker 4

**Remarks** N/A

## :MDEStination:AAMPLitude

**Supported** All with Option 403

```
[ :SOURce ] :RADio:AWGN:ARB:MDEStination:AAMPLitude NONE | M1 | M2 | M3 | M4  
[:SOURce]:RADio:AWGN:ARB:MDEStination:AAMPLitude?
```

This command routes the selected marker to the Alternate Amplitude function. The NONE parameter clears the marker for the Alternate Amplitude function.

**\*RST** NONE

**Key Entry** None Marker 1 Marker 2 Marker 3 Marker 4

**Remarks** N/A

## :MDEStination:ALCHold

**Supported** All with Option 403

```
[ :SOURce ] :RADio:AWGN:ARB:MDEStination:ALCHold NONE | M1 | M2 | M3 | M4  
[:SOURce]:RADio:AWGN:ARB:MDEStination:ALCHold?
```

This command routes the selected marker to the ALC Hold function. The NONE parameter clears the marker for the ALC Hold function.

**\*RST** NONE

**Key Entry** None Marker 1 Marker 2 Marker 3 Marker 4

**Remarks** N/A

## :MPOLarity:MARKer1

**Supported** All with Option 403

```
[:SOURce]:RADio:AWGN:ARB:MPOLarity:MARKer1 NEGative|POSitive  
[:SOURce]:RADio:AWGN:ARB:MPOLarity:MARKer1?
```

This command sets the polarity for marker 1.

**\*RST** POS

**Key Entry** Marker 1 Polarity Neg Pos

**Remarks** N/A

## :MPOLarity:MARKer2

**Supported** All with Option 403

```
[:SOURce]:RADio:AWGN:ARB:MPOLarity:MARKer2 NEGative|POSitive  
[:SOURce]:RADio:AWGN:ARB:MPOLarity:MARKer2?
```

This command sets the polarity for marker 2.

**\*RST** POS

**Key Entry** Marker 2 Polarity Neg Pos

**Remarks** N/A

## :MPOLarity:MARKer3

**Supported** All with Option 403

```
[:SOURce]:RADio:AWGN:ARB:MPOLarity:MARKer3 NEGative|POSitive  
[:SOURce]:RADio:AWGN:ARB:MPOLarity:MARKer3?
```

This command sets the polarity for marker 3.

**\*RST** POS

**Key Entry** Marker 3 Polarity Neg Pos

**Remarks** N/A

## :MPOLarity:MARKer4

**Supported** All with Option 403

```
[:SOURCE]:RADio:AWGN:ARB:MPOLarity:MARKer4 NEGative|POSitive  
[:SOURCE]:RADio:AWGN:ARB:MPOLarity:MARKer4?
```

This command sets the polarity for marker 4.

**\*RST** POS

**Key Entry** Marker 4 Polarity Neg Pos

**Remarks** N/A

## :LENGth

**Supported** All with Option 403

```
[:SOURCE]:RADio:AWGN:ARB:LENGth 1048576|524288|262144|131072|65536|  
32768|16384  
[:SOURCE]:RADio:AWGN:ARB:LENGth?
```

This command specifies the length (number of points) of the AWGN waveform.

**\*RST** +524288

**Key Entry** 1048576 524288 262144 131072 65536 32768 16384

**Remarks** A longer waveform yields a statistically more correct waveform.

## :REFerence:EXTernal:FREQuency

**Supported** All with Option 403

```
[:SOURCE]:RADio:AWGN:ARB:REFerence:EXTernal:FREQuency <val>  
[:SOURCE]:RADio:AWGN:ARB:REFerence:EXTernal:FREQuency?
```

This command allows you to enter the frequency of the applied external reference.

The variable <val> is expressed in units of Hertz (Hz–MHz).

**\*RST** +1.00000000E+007

**Range** 2.5E5–1E8

**Key Entry** Reference Freq

**Remarks** The value specified by this command is effective only when you are using an external ARB reference applied to the BASEBAND GEN REF IN rear panel connector.

To specify external as the ARB reference source type, refer to “:REFerence[:SOURce]” on page 278.

## :REFerence[:SOURce]

**Supported** All with Option 403

```
[ :SOURce ] :RADio:AWGN:ARB:REFerence [ :SOURce ] INTernal | EXTernal
[ :SOURce ] :RADio:AWGN:ARB:REFerence [ :SOURce ] ?
```

This command selects either an internal or external reference for the waveform clock.

**\*RST** INT

**Key Entry** ARB Reference Ext Int

**Remarks** If the EXTernal choice is selected, the external frequency *value must* be entered and the signal must be applied to the BASEBAND GEN REF IN rear panel connector.

Refer to “:REFerence:EXTernal:FREQuency” on page 278 to enter the external reference frequency.

## :SCLock:RATE

**Supported** All with Option 403

```
[ :SOURce ] :RADio:AWGN:ARB:SCLock:RATE <val>
[ :SOURce ] :RADio:AWGN:ARB:SCLock:RATE ?
```

This command sets the sample clock rate for the AWGN modulation format.

The variable <val> is expressed in units of hertz.

**\*RST** +1.00000000E+008

**Range** 1–1E8

**Key Entry** ARB Sample Clock

**Remarks** The modulation format should be active before executing this command. If this command is executed before the modulation format is active, the entered value will be overridden by a calculated factory default value. Refer to “[:STATe]” on page 215 to activate the modulation format.

## :SEED

**Supported** All with Option 403

[:SOURCE]:RADIO:AWGN:ARB:SEED FIXED|RANDOM

[:SOURCE]:RADIO:AWGN:ARB:SEED?

This command toggles the AWGN waveform noise seed value type.

**FIXED** This choice selects a fixed noise seed value.

**RANDOM** This choice selects a randomly generated noise seed value.

**\*RST** FIX

**Key Entry** Noise Seed Fixed Random

**Remarks** N/A

## [:STATE]

**Supported** All with Option 403

[:SOURCE]:RADIO:AWGN:ARB[:STATE] ON|OFF|1|0

[:SOURCE]:RADIO:AWGN:ARB[:STATE]?

This command enables or disables the AWGN generator function.

**\*RST** 0

**Key Entry** Arb AWGN Off On

**Remarks** N/A

## CDMA ARB Subsystem–Option 401 ([:SOURce]:RADio:CDMA:ARB)

### :CLIPping:I

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA:ARB:CLIPping:I <val>  
[:SOURce]:RADio:CDMA:ARB:CLIPping:I?
```

This command clips (limits) the modulation level of the waveform’s I component to a percentage of full scale.

The variable <val> is expressed in units of percent.

**\*RST** +1.00000000E+002

**Range** 10–100

**Key Entry** Clip III To

**Remarks** N/A

### :CLIPping:POSition

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA:ARB:CLIPping:POSition PRE|POST  
[:SOURce]:RADio:CDMA:ARB:CLIPping:POSition?
```

This command specifies whether a waveform is clipped before (PRE) or after (POST) FIR filtering.

**\*RST** PRE

**Key Entry** Clip At PRE POST FIR Filter

**Remarks** N/A

## :CLIPping:Q

**Supported** All with Option 401

[:SOURCE]:RADIO:CDMA:ARB:CLIPping:Q <val>

[:SOURCE]:RADIO:CDMA:ARB:CLIPping:Q?

This command clips (limits) the modulation level of the waveform's Q component to a percentage of full scale.

The variable <val> is expressed in units of percent.

**\*RST** +1.00000000E+002

**Range** 10–100

**Key Entry** Clip |Q| To

**Remarks** N/A

## :CLIPping:TYPE

**Supported** All with Option 401

[:SOURCE]:RADIO:CDMA:ARB:CLIPping:TYPE IJQ|IORQ

[:SOURCE]:RADIO:CDMA:ARB:CLIPping:TYPE?

This command selects either IJQ or IORQ as the clipping type.

IJQ The combined I and Q waveform will be clipped (circular clipping).

IORQ The I and Q components of the waveform are clipped independently (rectangular clipping). I and Q can be clipped to different levels using this mode.

**\*RST** IJQ

**Key Entry** Clipping Type II+jQ| III,|Q|

**Remarks** N/A.

## :CLIPping[:IJQ]

**Supported** All with Option 401

[:SOURCE]:RADIO:CDMA:ARB:CLIPping[:IJQ] <val>

[:SOURCE]:RADIO:CDMA:ARB:CLIPping[:IJQ]?

This command clips (limits) the modulation level of the combined I and Q waveform to a percentage of full scale.

The variable <val> is expressed in units of percent.

<b>*RST</b>	+1.00000000E+002
<b>Range</b>	10–100
<b>Key Entry</b>	Clip  I+jQ  To
<b>Remarks</b>	N/A

### :CRATe

**Supported** All with Option 401

[:SOURce]:RADio:CDMA:ARB:CRATe <val>  
[:SOURce]:RADio:CDMA:ARB:CRATe?

This command sets the chip rate value.

The variable <val> is expressed as chips per second (cps–Mcps).

<b>*RST</b>	+1.22880000E+006
<b>Range</b>	10–8E6
<b>Key Entry</b>	<b>Chip Rate</b>
<b>Remarks</b>	N/A

### :IQ:EXTeRnal:FiLTeR

**Supported** All with Option 401

[:SOURce]:RADio:CDMA:ARB:IQ:EXTeRnal:FiLTeR 40e6|THROUGH  
[:SOURce]:RADio:CDMA:ARB:IQ:EXTeRnal:FiLTeR?

This command selects the filter or through path for I/Q signals routed to the rear panel I and Q outputs. Selecting a filter using this command will automatically set “:IQ:EXTeRnal:FiLTeR:AUTO” on page 219 to OFF(0) mode.

- 40e6 This choice applies a 40 MHz baseband filter.
- THROUGH This choice bypasses filtering.

<b>*RST</b>	THR
<b>Key Entry</b>	<b>40.000 MHz Through</b>
<b>Remarks</b>	N/A



## **:IQ:EXTeRnal:FILTer:AUTO**

**Supported**      All with Option 401

```
[:SOURCE]:RADio:CDMA:ARB:IQ:EXTeRnal:FILTer:AUTO ON|OFF|1|0
[:SOURCE]:RADio:CDMA:ARB:IQ:EXTeRnal:FILTer:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals routed to the rear panel I/Q outputs.

ON(1)            This choice will automatically select a digital modulation filter optimized for the current signal generator settings.

OFF(0)           This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to [“:IQ:EXTeRnal:FILTer” on page 218](#) for selecting a filter or through path.

**\*RST**            1

**Key Entry**      I/Q Output Filter Manual Auto

**Remarks**      N/A

## **:FILTer**

**Supported**      All with Option 401

```
[:SOURCE]:RADio:CDMA:ARB:FILTer RNYQuist|NYQuist|GAUSSian|RECTangle|
IS95|IS95_EQ|IS95_MOD|IS95_MOD_EQ|WCDMA|AC4Fm|IS2000SR3DS|UGGaussian|
"<user FIR>"
[:SOURCE]:RADio:CDMA:ARB:FILTer?
```

This command selects the pre-modulation filter type.

IS95             This choice selects a filter that meets the criteria of the IS-95 standard.

IS95\_EQ          This choice selects a filter which is a combination of the IS-95 filter (above) and the equalizer filter described in the IS-95 standard. This filter is only used for IS-95 baseband filtering.

IS95\_MOD        This choice selects a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection than the filter specified in the IS-95 standard.

IS95\_MOD\_EQ    This choice selects a filter which is a combination of the equalizer filter described in the IS-95 standard and a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance), with lower passband rejection.

**CDMA ARB Subsystem—Option 401 ([:SOURce]:RADio:CDMA:ARB)**

WCDMa	This choice selects a 0.22 Nyquist filter optimized for ACP.
AC4Fm	This choice selects a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.
IS2000SR3DS	This choice selects an IS-2000 standard, spread rate 3 direct spread filter.
UGGaussian	This choice selects a backwards compatible GSM Gaussian filter (Gaussian filter with a fixed BbT value of 0.300) for the ESG E44xxB Option UN3 or UN4.
"<user FIR>"	This variable is any filter file that you have stored into memory.
<b>*RST</b>	GUAS
<b>Key Entry</b>	Root Nyquist   Nyquist   Gaussian   Rectangle   IS-95   IS-95 w/EQ IS-95 Mod   IS-95 Mod w/EQ   WCDMA   APCO 25 C4FM   IS-2000 SR3 DS UN3/4 GSM Gaussian   User FIR
<b>Remarks</b>	Refer to <a href="#">“File Name Variables” on page 14</a> for information on the file name syntax.

**:FILTer:ALPHa**

**Supported**      All with Option 401

```
[ :SOURce ] :RADio:CDMA:ARB:FILTer:ALPHa <val>
[ :SOURce ] :RADio:CDMA:ARB:FILTer:ALPHa?
```

This command changes the Nyquist or root Nyquist filter’s alpha value.

The filter alpha value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST**              +5.00000000E–001

**Range**             0.000–1.000

**Key Entry**        **Filter Alpha**

**Remarks**        To change the current filter type, refer to [“:FILTer” on page 219](#).

## :FILTer:BBT

**Supported** All with Option 401

```
[ :SOURce ] :RADio:CDMA:ARB:FILTer:BBT <val>  
[ :SOURce ] :RADio:CDMA:ARB:FILTer:BBT?
```

This command changes the bandwidth-multiplied-by-bit-time (BbT) filter parameter.

The filter BbT value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +5.00000000E-001

**Range** 0.000–1.000

**Key Entry** Filter BbT

**Remarks** This command is effective only after choosing a Gaussian filter. It does not have an effect on other types of filters.

To change the current filter type, refer to “:FILTer” on page 219.

## :FILTer:CHANnel

**Supported** All with Option 401

```
[ :SOURce ] :RADio:CDMA:ARB:FILTer:CHANnel EVM|ACP  
[ :SOURce ] :RADio:CDMA:ARB:FILTer:CHANnel?
```

This command optimizes the Nyquist and root Nyquist filters to minimize error vector magnitude (EVM) or to minimize adjacent channel power (ACP).

EVM This choice provides the most ideal passband.

ACP This choice improves stopband rejection.

**\*RST** EVM

**Key Entry** Optimize FIR For EVM ACP

**Remarks** To change the current filter type, refer to “:FILTer” on page 219.

## :HEADer:CLEar

**Supported** All with Option 401

```
[ :SOURce ] :RADio:CDMA:ARB:HEADer:CLEar
```

This command clears the header information from the header file used by this modulation format.

**CDMA ARB Subsystem—Option 401 ([:SOURce]:RADio:CDMA:ARB)**

<b>*RST</b>	N/A
<b>Key Entry</b>	<b>Clear Header</b>
<b>Remarks</b>	The <b>CDMA Off On</b> softkey must be set to On for this command to function.

**:HEADer:SAVE**

**Supported** All with Option 401

`[:SOURce]:RADio:CDMA:ARB:HEADer:SAVE`

This command saves the header information to the header file used by this modulation format.

<b>*RST</b>	N/A
<b>Key Entry</b>	<b>Save Setup To Header</b>
<b>Remarks</b>	The <b>CDMA Off On</b> softkey must be set to On for this command to function.

**:IQMap**

**Supported** All with Option 401

`[:SOURce]:RADio:CDMA:ARB:IQMap NORMAL|INVERTed`  
`[:SOURce]:RADio:CDMA:ARB:IQMap?`

This command selects whether the Q output will be normal or inverted.

- NORMAL** This choice selects normal polarity.
- INVERTed** This choice inverts the internal Q signal.

<b>*RST</b>	<b>NORM</b>
<b>Key Entry</b>	<b>I/Q Mapping Normal Invert</b>
<b>Remarks</b>	Inverting the Q output inverts the RF spectrum after the modulation.

**:IQ:MODulation:ATTen**

**Supported** All with Option 401

`[:SOURce]:RADio:CDMA:ARB:IQ:MODulation:ATTen <val>`  
`[:SOURce]:RADio:CDMA:ARB:IQ:MODulation:ATTen?`

This command attenuates the I/Q signals being modulated through the signal generator

RF path.

The variable <val> is expressed in units of decibels (dB).

<b>*RST</b>	+2.00000000E+000
<b>Range</b>	0–40
<b>Key Entry</b>	<b>Modulator Atten Manual Auto</b>
<b>Remarks</b>	N/A

### **:IQ:MODulation:ATTen:AUTO**

**Supported** All with Option 401

```
[ :SOURce]:RADio:CDMA:ARB:IQ:MODulation:ATTen:AUTO ON|OFF|1|0
[:SOURce]:RADio:CDMA:ARB:IQ:MODulation:ATTen:AUTO?
```

This command enables or disables the I/Q attenuation auto mode.

- ON (1) This choice enables the attenuation auto mode which optimizes the modulator attenuation for the current conditions.
- OFF (0) This choice holds the attenuator at its current setting or at a selected value. Refer to “:IQ:MODulation:ATTen” on page 222 for setting the attenuation value.

<b>*RST</b>	1
<b>Key Entry</b>	<b>Modulator Atten Manual Auto</b>
<b>Remarks</b>	N/A

### **:IQ:MODulation:FILTer**

**Supported** All with Option 401

```
[ :SOURce]:RADio:CDMA:ARB:IQ:MODulation:FILTer 2.1e6|40e6|THROUGH
[:SOURce]:RADio:CDMA:ARB:IQ:MODulation:FILTer?
```

This command enables you to select a filter or through path for I/Q signals modulated onto the RF carrier. Selecting a filter using this command will automatically set “:IQ:MODulation:ATTen:AUTO” on page 223 to OFF(0) mode.

- 2.1E6 This choice applies a 2.1 MHz baseband filter to the I/Q signals.
- 40E6 This choice applies a 40 MHz baseband filter to the I/Q signals.
- THROUGH This choice bypasses filtering.

<b>*RST</b>	THR
<b>Key Entry</b>	2.100 MHz 40.000 MHz Through
<b>Remarks</b>	N/A

**:IQ:MODulation:FILTer:AUTO**

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA:ARB:IQ:MODulation:FILTer:AUTO ON|OFF|1|0
[:SOURce]:RADio:CDMA:ARB:IQ:MODulation:FILTer:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals modulated onto the RF carrier.

ON(1) This choice will automatically select a digital modulation filter.

OFF(0) This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “[:IQ:MODulation:FILTer](#)” on [page 294](#) for selecting a filter or through path.

<b>*RST</b>	1
<b>Key Entry</b>	I/Q Mod Filter Manual Auto
<b>Remarks</b>	N/A

**:MDESTination:PULSe**

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA:ARB:MDESTination:PULSe NONE|M1|M2|M3|M4
[:SOURce]:RADio:CDMA:ARB:MDESTination:PULSe?
```

This command routes the selected marker to the Pulse/RF Blanking function. The NONE parameter clears the marker for the Pulse/RF Blanking functions.

<b>*RST</b>	NONE
<b>Key Entry</b>	None Marker 1 Marker 2 Marker 3 Marker 4
<b>Remarks</b>	N/A

## :MDESTINATION:AAMPLITUDE

**Supported** All with Option 401

```
[:SOURCE]:RADIO:CDMA:ARB:MDESTINATION:AAMPLITUDE NONE | M1 | M2 | M3 | M4  
[:SOURCE]:RADIO:CDMA:ARB:MDESTINATION:AAMPLITUDE?
```

This command routes the selected marker to the Alternate Amplitude function. The NONE parameter clears the marker for the Alternate Amplitude function.

**\*RST** NONE

**Key Entry** None Marker 1 Marker 2 Marker 3 Marker 4

**Remarks** N/A

## :MDESTINATION:ALCHOLD

**Supported** All with Option 401

```
[:SOURCE]:RADIO:CDMA:ARB:MDESTINATION:ALCHOLD NONE | M1 | M2 | M3 | M4  
[:SOURCE]:RADIO:CDMA:ARB:MDESTINATION:ALCHOLD?
```

This command routes the selected marker to the ALC Hold function. The NONE parameter clears the marker for the ALC Hold function.

**\*RST** NONE

**Key Entry** None Marker 1 Marker 2 Marker 3 Marker 4

**Remarks** N/A

## :MPOLARITY:MARKER1

**Supported** All with Option 401

```
[:SOURCE]:RADIO:CDMA:ARB:MPOLARITY:MARKER1 NEGATIVE | POSITIVE  
[:SOURCE]:RADIO:CDMA:ARB:MPOLARITY:MARKER1?
```

This command sets the polarity for marker 1.

**\*RST** POS

**Key Entry** Marker 1 Polarity Neg Pos

**Remarks** N/A

### **:MPOLarity:MARKer2**

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA:ARB:MPOLarity:MARKer2 NEGative|POSitive  
[:SOURce]:RADio:CDMA:ARB:MPOLarity:MARKer2?
```

This command sets the polarity for marker 2.

**\*RST** POS

**Key Entry** Marker 2 Polarity Neg Pos

**Remarks** N/A

### **:MPOLarity:MARKer3**

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA:ARB:MPOLarity:MARKer3 NEGative|POSitive  
[:SOURce]:RADio:CDMA:ARB:MPOLarity:MARKer3?
```

This command sets the polarity for marker 3.

**\*RST** POS

**Key Entry** Marker 3 Polarity Neg Pos

**Remarks** N/A

### **:MPOLarity:MARKer4**

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA:ARB:MPOLarity:MARKer4 NEGative|POSitive  
[:SOURce]:RADio:CDMA:ARB:MPOLarity:MARKer4?
```

This command sets the polarity for marker 4.

**\*RST** POS

**Key Entry** Marker 4 Polarity Neg Pos

**Remarks** N/A



## :OSAMple

**Supported** All with Option 401

[:SOURCE]:RADio:CDMA:ARB:OSAMple <val>

[:SOURCE]:RADio:CDMA:ARB:OSAMple?

This command sets the oversampling ratio (number of filter taps per symbol) for CDMA modulation.

**\*RST** +5

**Range** 2–8

**Key Entry** Oversample Ratio

**Remarks** The upper limit of the oversample ratio is adjusted based on the waveform length and chip rate.

Using larger oversample ratios result in more completely filtered images, but this action also uses up more waveform memory.

The maximum oversample ratio is the smaller of 8, 40 Mcps/Chip Rate, or 32/Waveform Length (number of CDMA short codes).

## :REFerence:EXTernal:FREQuency

**Supported** All with Option 401

[:SOURCE]:RADio:CDMA:ARB:REFerence:EXTernal:FREQuency <val>

[:SOURCE]:RADio:CDMA:ARB:REFerence:EXTernal:FREQuency?

This command allows you to enter the frequency of the applied external reference.

The variable <val> is expressed in units of Hertz (Hz–MHz).

**\*RST** +1.00000000E+007

**Range** 2.5E5–1E8

**Key Entry** Reference Freq

**Remarks** The value specified by this command is effective only when you are using an external ARB reference applied to the BASEBAND GEN REF IN rear panel connector.

To specify external as the ARB reference source type, refer to “:REFerence[:SOURCE]” on page 228.

**:REFerence[:SOURce]****Supported** All with Option 401

```
[:SOURce]:RADio:CDMA:ARB:REFerence[:SOURce] INTernal|EXTernal
[:SOURce]:RADio:CDMA:ARB:REFerence[:SOURce]?
```

This command selects either an internal or external reference for the waveform clock.

**\*RST** INT**Key Entry** ARB Reference Ext Int

**Remarks** If the EXTernal choice is selected, the external frequency value *must* be entered and the signal must be applied to the BASEBAND GEN REF IN rear panel connector.

Refer to “:REFerence:EXTernal:FREQuency” on page 227 to enter the external reference frequency.

**:RETRigger****Supported** All with Option 401

```
[:SOURce]:RADio:CDMA:ARB:RETRigger ON|OFF|IMMEDIATE
[:SOURce]:RADio:CDMA:ARB:RETRigger?
```

This command enables or disables the ARB retriggering mode; the retrigger mode controls how the retriggering function performs while a waveform is playing.

ON(1) This choice specifies that if a trigger occurs while a waveform is playing, the waveform will retrigger at the end of the current waveform sequence and play once more.

OFF(0) This choice specifies that if a trigger occurs while a waveform is playing, the trigger will be ignored.

IMMEDIATE This choice specifies that if a trigger occurs while a waveform is playing, the waveform will reset and replay from the start immediately upon receiving a trigger.

**\*RST** ON**Key Entry** On Off Immediate**Remarks** N/A

## :SCLock:RATE

**Supported** All with Option 401

```
[:SOURCE]:RADio:CDMA:ARB:SCLock:RATE <val>  
[:SOURCE]:RADio:CDMA:ARB:SCLock:RATE?
```

This command sets the sample clock rate for the CDMA modulation format.

The variable <val> is expressed in units of hertz.

**\*RST** +1.00000000E+008

**Range** 1–1E8

**Key Entry** ARB Sample Clock

**Remarks** The modulation format should be active before executing this command. If this command is executed before the modulation format is active, the entered value will be overridden by a calculated factory default value. Refer to “[:STATE]” on page 238 to activate the modulation format.

## :SETup

**Supported** All with Option 401

```
[:SOURCE]:RADio:CDMA:ARB:SETup FWD9|FWD32|FWD64|PILot|REVerse|MCARrier|  
"<file name>"  
[:SOURCE]:RADio:CDMA:ARB:SETup?
```

This command selects a pre-defined CDMA channel setup.

- |          |  |
|----------|--|
| FWD9     | This CDMA setup consists of 9 forward channels (pilot, paging, sync, and 6 traffic channels) at IS-97-defined power levels.  |
| FWD32    | This CDMA setup consists of 32 forward channels (pilot, paging, sync, and 29 traffic channels) at IS-97-defined power levels.  |
| FWD64    | This CDMA setup consists of 64 forward channels (pilot, 7 paging, sync, and 55 traffic channels) at IS-97-defined power levels.  |
| PILot    | This choice selects single pilot channel.  |
| REVerse  | A single reverse link traffic channel.   |
| MCARrier | This choice activates Multicarrier mode (3 carrier setup) and deactivates any other mode that was previously selected. To change multicarrier setup, refer to “[:SETup:MCARrier]” on page 231. |

<b>*RST</b>	FWD9
<b>Key Entry</b>	9 Ch Fwd   32 Ch Fwd   64 Ch Fwd   Pilot   Reverse   Multicarrier Off On Multicarrier Off On   Custom CDMA State
<b>Remarks</b>	Refer to “File Name Variables” on page 14 for information on the file name syntax.

**:SETup:CHANnel**

**Supported**      All with Option 401

```
[:SOURce]:RADio:CDMA:ARB:SETup:CHANnel IS97|EQUal|SCALE|NONE {,PILOt|
SYNC|PAGing|TRAFfic,<walsh_value>,<power_value>,<pn_offset>,RANDom|
<data_value>}
[:SOURce]:RADio:CDMA:ARB:SETup:CHANnel?
```

This command defines the channel parameters of the CDMA signal. This allows for customizing of the channel type, the channel parameters, and the data value.

The variable <power\_value> is expressed in units of decibels (dB).

- IS97      This choice sets the channel power levels to IS-97-defined power levels.
- EQUAL    This choice sets the channel power levels so that all channels are of equal power and the total power equals 0 dBm.
- SCALE    This choice scales all of the current channel powers so that the total power equals 0 dB while keeping the previous power ratios between the individual channels.
- NONE     This choice bypasses the power level setting.
- PILOt    This choice selects a single traffic channel.
- SYNC     This choice selects a sync channel.
- PAGing   This choice selects a paging channel.
- TRAFfic   This choice selects a traffic channel.
- RANDom   This choice selects a randomly generated data value.

The channel type, walsh code, power, PN offset, and data values are returned when a query is initiated. The output format is as follows:

```
<channel type>,<walsh_value>,<power>,<pn_offset>,<data_value>
```

<b>*RST</b>	<i>Channel #</i>	<i>Channel Type</i>	<i>Walsh Code</i>	<i>Power</i>	<i>PN Offset</i>	<i>Data</i>
	1	PIL	+0	-7.00000000E+000	+0	+0

<b>*RST</b>	<i>Channel #</i>	<i>Channel Type</i>	<i>Walsh Code</i>	<i>Power</i>	<i>PN Offset</i>	<i>Data</i>
	2	PAG	+1	-7.26000023E+000	+0	RAND
	3	TRAF	+8	-1.02600002E+001	+0	RAND
	4	TRAF	+9	-1.02600002E+001	+0	RAND
	5	TRAF	+10	-1.02600002E+001	+0	RAND
	6	TRAF	+11	-1.02600002E+001	+0	RAND
	7	TRAF	+12	-1.02600002E+001	+0	RAND
	8	TRAF	+13	-1.02600002E+001	+0	RAND
	9	SYNC	+32	-1.02600002E+001	+0	RAND
<b>Range</b>	<i>&lt;power_value&gt;</i> : -40 to 0 <i>&lt;walsh_value&gt;</i> : 0–63 <i>&lt;pn_offset&gt;</i> : 0–511					
<b>Key Entry</b>	<b>IS-97 Levels</b>	<b>Equal Powers</b>	<b>Scale to 0dB</b>	<b>Sync</b>	<b>Pilot</b>	<b>Paging Traffic</b>
<b>Remarks</b>	N/A					

## **:SETup:MCARrier**

**Supported**      All with Option 401

```
[:SOURCE]:RADio:CDMA:ARB:SETup:MCARrier CAR3 | CAR4 | "<file name>"
[:SOURCE]:RADio:CDMA:ARB:SETup:MCARrier?
```

This command selects a pre-defined type of multicarrier CDMA setup required for your application.

**CAR3**      This choice selects three 9 channel forward carriers with a power level of 0.00 dB, the first with a -1.25 MHz frequency offset, the second with no frequency offset, and the third with +1.25 MHz frequency offset.

**CAR4**      This choice selects four 9 channel forward carriers with a power level of 0.00 dB, the first with a -1.875 MHz frequency offset, the second with a -625 kHz frequency offset, the third with +625 kHz frequency offset, and the fourth with a +1.875 MHz frequency offset.

**\*RST**      CAR3

**Key Entry**      **3 Carriers**    **4 Carriers**    **Custom CDMA Multicarrier**

**Remarks**      Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

## :SETup:MCARrier:STORe

**Supported** All with Option 401

```
[:SOURCE]:RADio:CDMA:ARB:SETup:MCARrier:STORe "<file name>"
```

This command stores the current multicarrier setup information.

The stored file contains information including the digital modulation format, number of carriers, frequency spacing, and power settings for the multicarrier setup.

**\*RST** N/A

**Range** N/A

**Key Entry** **Store Custom Multicarrier**

**Remarks** Refer to “[File Name Variables](#)” on page 14 for information on the file name syntax.

## :SETup:MCARrier:TABLE

**Supported** All with Option 401

```
[:SOURCE]:RADio:CDMA:ARB:SETup:MCARrier:TABLE {FWD9|FWD32|FWD64|PILot|
CUSTom, "<file name>" | "", <freq_offset>, <power>}
[:SOURCE]:RADio:CDMA:ARB:SETup:MCARrier:TABLE?
```

This command defines the multicarrier CDMA waveform.

The variable <freq\_offset> is expressed in units of Hertz (kHz to MHz).

The variable <power> is expressed in units of decibels (dB).

The carrier type, carrier name, frequency offset, and power level are returned when a query is initiated. The output format is as follows:

```
<carrier type>, <carrier_name>, <freq_offset>, <power>
```

- FWD9 This CDMA setup consists of 9 forward channels (pilot, paging, sync, and 6 traffic channels) at IS-97-defined power levels.
- FWD32 This CDMA setup consists of 32 forward channels (pilot, paging, sync, and 29 traffic channels) at IS-97-defined power levels.
- FWD64 This CDMA setup consists of 64 forward channels (pilot, 7 paging, sync, and 55 traffic channels) at IS-97-defined power levels.
- PILot This choice selects single pilot channel.

" "	A null string, entered for any non-custom carrier.
<b>*RST</b>	<i>carrier type</i> : FWD9    < <i>freq_offset</i> >: +1.25000000E+006 < <i>power</i> >: +0.00000000E+000
<b>Range</b>	< <i>freq_offset</i> >: -7.5E6 to 7.5E6    < <i>power</i> >: -40 to 0
<b>Key Entry</b>	<b>9 Ch Fwd    32 Ch Fwd    64 Ch Fwd    Pilot    Custom CDMA State</b>
<b>Remarks</b>	Refer to “ <a href="#">File Name Variables</a> ” on page 14 for information on the file name syntax. To store a multicarrier setup refer to “ <a href="#">:SETup:MCARrier:STORe</a> ” on page 232  The file name specified must be a single carrier CDMA file.

## :SETup:STORe

**Supported**      All with Option 401

[ :SOURCE ] :RADio:CDMA:ARB:SETup:STORe "<file name>"

This command stores the current custom CDMA state, using a designated file name, to the signal generator non-volatile memory.

Along with the contents of the CDMA channel table editor (channel types, Walsh code, power levels, PN offset, and data), this command stores the following information to the signal generator non-volatile memory:

- FIR filter
- FIR filter file name
- FIR filter alpha
- FIR filter BbT
- FIR filter channel (EVM or ACP)
- chip rate
- waveform length
- oversample ratio
- ARB reference clock source (internal or external)
- ARB reference clock frequency

**\*RST**            N/A

**Range**            N/A

**Key Entry**        **Store Custom CDMA State**

**Remarks**        Recall the stored file by executing the following command:

[ :SOURCE ] :RADio:CDMA:ARB:SETup: "<file name>"

Refer to “[File Name Variables](#)” on page 14 for information on the file

name syntax.

## :TRIGger:TYPE

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA:ARB:TRIGger:TYPE CONTInuous|SINGLE|GATE
[:SOURce]:RADio:CDMA:ARB:TRIGger:TYPE?
```

This command sets the trigger type.

- CONTInuous** The waveform repeats continuously; the waveform restarts every time the previous playback is completed. To customize continuous triggering, refer to “:TRIGger:TYPE:CONTInuous[:TYPE]” on page 234.
- SINGLE** The waveform segment or sequence plays once for every trigger received.
- GATE** An external trigger signal interrupts the playback while the gating signal is in the inactive state. Playback resumes when the external control signal returns to the active state. The active state can be set high or low.

**\*RST** CONT

**Key Entry** Continuous Single Gated

**Remarks** To change the polarity of the gated trigger, refer to “:TRIGger:TYPE:GATE:ACTive” on page 235.

## :TRIGger:TYPE:CONTInuous[:TYPE]

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA:ARB:TRIGger:TYPE:CONTInuous[:TYPE] FREE|TRIGger|
RESet
[:SOURce]:RADio:CDMA:ARB:TRIGger:TYPE:CONTInuous[:TYPE]?
```

This command customizes the continuous trigger selection.

- FREE** This choice immediately transmits a waveform that is continuously repeated.
- TRIGger** This choice causes the waveform to wait for a trigger. Once a trigger is received, the transmission of a continuously repeated waveform begins.
- RESet** This choice immediately restarts a continuously repeated waveform upon receiving a trigger.



**\*RST**           FREE

**Key Entry**     **Free Run   Trigger & Run   Reset & Run**

**Remarks**     To select CONTinuous as the trigger type, refer to “:TRIGger:TYPE” on page 234.

### **:TRIGger:TYPE:GATE:ACTive**

**Supported**     All with Option 401

[:SOURCE]:RADio:CDMA:ARB:TRIGger:TYPE:GATE:ACTive LOW|HIGH  
[:SOURCE]:RADio:CDMA:ARB:TRIGger:TYPE:GATE:ACTive?

This command toggles the polarity of the active state of the external gating input signal; GATE must be selected as the arb trigger type.

**LOW**        The sequence runs while the selected external control gating signal is low and restarts when the gate returns to the high level.

**HIGH**       The sequence runs while the selected external control gating signal is high and restarts when the gate returns to the low level.

**\*RST**           HIGH

**Key Entry**     **Gate Active Low High**

**Remarks**     To select GATE as the ARB trigger type, refer to “:TRIGger:TYPE” on page 234.

### **:TRIGger[:SOURCE]**

**Supported**     All with Option 401

[:SOURCE]:RADio:CDMA:ARB:TRIGger[:SOURCE] KEY|EXT|BUS  
[:SOURCE]:RADio:CDMA:ARB:TRIGger[:SOURCE]?

This command sets the trigger source.

**KEY**    This choice enables triggering by pressing the front panel **Trigger** hardkey.

**EXT**    This choice enables triggering using an externally applied signal at the PATT TRIG IN rear panel connector or the PATT TRIG IN 2 pin on the rear panel AUX I/O connector. To select the appropriate connector, refer to “:TRIGger[:SOURCE]:EXTernal[:SOURCE]” on page 236.

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

<b>*RST</b>	KEY		
<b>Key Entry</b>	<b>Trigger Key</b>	<b>Ext</b>	<b>Bus</b>
<b>Remarks</b>	N/A		

**:TRIGger[:SOURce]:EXTernal[:SOURce]**

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA:ARB:TRIGger[:SOURce]:EXTernal[:SOURce] EPT1|EPT2|
EPTRIGGER1|EPTRIGGER2
[:SOURce]:RADio:CDMA:ARB:TRIGger[:SOURce]:EXTernal[:SOURce]?
```

This command specifies which PATT TRIG IN connection, rear panel connector or AUX I/O connector, will be used to accept an externally applied trigger signal.

- EPT1 This choice is synonymous with EPTRIGGER1 and selects the PATT TRIG IN rear panel connector for the external signal connection.
- EPT2 This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear panel AUX I/O connector for the external signal connection.
- EPTRIGGER1 This choice is synonymous with EPT1 and selects the PATT TRIG IN rear panel connector for the external signal connection.
- EPTRIGGER2 This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear panel AUX I/O connector for the external signal connection.

<b>*RST</b>	EPT1
<b>Key Entry</b>	<b>Patt Trig In 1</b> <b>Patt Trig In 2</b>

**Remarks** This command is effective only if an external trigger is selected as the trigger source. Refer to “:TRIGger[:SOURce]” on page 235.

For more information about the rear panel AUX I/O connector pin configuration, refer to the *User’s Guide*.

## **:TRIGger[:SOURce]:EXTernal:DELay**

**Supported** All with Option 401

```
[ :SOURce ] :RADio:CDMA:ARB:TRIGger [ :SOURce ] :EXTernal:DELay <val>  
[ :SOURce ] :RADio:CDMA:ARB:TRIGger [ :SOURce ] :EXTernal:DELay?
```

This command specifies the time (seconds) for the external trigger delay.

The variable <val> is expressed as seconds ( $\mu\text{sec}$ –sec).

**\*RST** +1.00000000E-003

**Range** 1E-8 to 4E1

**Key Entry** Ext Delay Time

**Remarks** This command is effective only if an external trigger is selected as the trigger source. Refer to “:TRIGger[:SOURce]” on page 235.

## **:TRIGger[:SOURce]:EXTernal:DELay:STATE**

**Supported** All with Option 401

```
[ :SOURce ] :RADio:CDMA:ARB:TRIGger [ :SOURce ] :EXTernal:DELay:STATE ON|OFF|  
1|0  
[ :SOURce ] :RADio:CDMA:ARB:TRIGger [ :SOURce ] :EXTernal:DELay:STATE?
```

This command enables or disables the operating state of the external trigger delay function.

**\*RST** 0

**Key Entry** Ext Delay Off On

**Remarks** This command is effective only if an external trigger is selected as the trigger source. Refer to “:TRIGger[:SOURce]” on page 235.

## **:TRIGger[:SOURce]:EXTernal:SLOPe**

**Supported** All with Option 401

```
[ :SOURce ] :RADio:CDMA:ARB:TRIGger [ :SOURce ] :EXTernal:SLOPe POSitive|  
NEGative  
[ :SOURce ] :RADio:CDMA:ARB:TRIGger [ :SOURce ] :EXTernal:SLOPe?
```

This command sets the polarity of the external trigger.

**\*RST** NEG

<b>Key Entry</b>	<b>Ext Polarity Neg Pos</b>
<b>Remarks</b>	This command is effective only if an external trigger is selected as the trigger source. Refer to “:TRIGger[:SOURce]” on page 235.

**:WLENgth**

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA:ARB:WLENgth <val>
[:SOURce]:RADio:CDMA:ARB:WLENgth?
```

This command specifies the waveform length (in short codes).

**\*RST** +1

**Range** 1–6

**Key Entry** **Waveform Length**

**Remarks** The upper limit is adjusted based on the oversample ratio to fit the signal within the available memory.  
The maximum waveform length is 32/oversample ratio.

**[:STATe]**

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA:ARB[:STATe] ON|OFF|1|0
[:SOURce]:RADio:CDMA:ARB[:STATe]?
```

This command enables or disables the CDMA modulation format.

Executing the command `[:SOURce]:RADio:CDMA:ARB[:STATe] ON` sets up the internal hardware to generate the currently selected CDMA signal selection. This also activates the I/Q state and sets the I/Q source to internal.

ON (1) This choice sets up the internal hardware to generate the currently selected CDMA signal selection. This also activates the I/Q state and sets the I/Q source to internal.

OFF (0) This choice disables the CDMA modulation format.

**\*RST** 0

**Key Entry** **CDMA Off On**

**Remarks** The enabled modulation is not present on RF carrier until you have activated the modulation by executing the command

:OUTPut:MODulation[:STATe] ON.

Overriding the I/Q state and I/Q source functions can be achieved by using the I/Q menu.

## CDMA2000 ARB Subsystem–Option 401 ([:SOURce]:RADio:CDMA2000:ARB)

### :CLIPping:I

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:CLIPping:I <val>  
[:SOURce]:RADio:CDMA2000:ARB:CLIPping:I?
```

This command clips (limits) the modulation level of the waveform's I component to a percentage of full scale.

The variable <val> is expressed in units of percent.

**\*RST** +1.00000000E+002

**Range** 10–100

**Key Entry** Clip III To

**Remarks** N/A

### :CLIPping:POSition

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:CLIPping:POSition PRE|POST  
[:SOURce]:RADio:CDMA2000:ARB:CLIPping:POSition?
```

This command specifies whether a waveform is clipped before (PRE) or after (POST) FIR filtering.

**\*RST** PRE

**Key Entry** Clip At PRE POST FIR Filter

**Remarks** N/A

## :CLIPping:Q

**Supported** All with Option 401

```
[:SOURCE]:RADIO:CDMA2000:ARB:CLIPping:Q <val>  
[:SOURCE]:RADIO:CDMA2000:ARB:CLIPping:Q?
```

This command clips (limits) the modulation level of the waveform's Q component to a percentage of full scale.

The variable <val> is expressed in units of percent.

**\*RST** +1.00000000E+002

**Range** 10–100

**Key Entry** Clip IQI To

**Remarks** N/A

## :CLIPping:TYPE

**Supported** All with Option 401

```
[:SOURCE]:RADIO:CDMA2000:ARB:CLIPping:TYPE IJQ|IORQ  
[:SOURCE]:RADIO:CDMA2000:ARB:CLIPping:TYPE?
```

This command selects either IJQ or IORQ as the clipping type.

IJQ This choice clips (circular clipping) the combined I and Q waveform.

IORQ This choice independently clips (rectangular clipping) I and Q components of the waveform. I and Q can be clipped to different levels using this mode.

**\*RST** IORQ

**Key Entry** Clipping Type II+jQI III,IQI

**Remarks** N/A

## :CLIPping[:IJQ]

**Supported** All with Option 401

```
[:SOURCE]:RADIO:CDMA2000:ARB:CLIPping[:IJQ] <val>  
[:SOURCE]:RADIO:CDMA2000:ARB:CLIPping[:IJQ]?
```

This command clips (limits) the modulation level of the combined I and Q waveform to a percentage of full scale.

The variable <val> is expressed in units of percent.

**\*RST**            +1.00000000E+002  
**Range**            10–100  
**Key Entry**        **Clip I+|jQ| To**  
**Remarks**        N/A

**:IQ:EXtErnal:FILTer**

**Supported**        All with Option 401

[:SOURce]:RADio:CDMA2000:ARB:IQ:EXtErnal:FILTer 40e6|THROUGH  
[:SOURce]:RADio:CDMA2000:ARB:IQ:EXtErnal:FILTer?

This command selects the filter or through path for I/Q signals routed to the rear panel I and Q outputs. Selecting a filter using this command will automatically set “:IQ:EXtErnal:FILTer:AUTO” on page 242 to OFF(0) mode.

40e6            This choice applies a 40 MHz baseband filter.  
THROUGH        This choice bypasses filtering.

**\*RST**            THR  
**Key Entry**        **40.000 MHz    Through**  
**Remarks**        N/A

**:IQ:EXtErnal:FILTer:AUTO**

**Supported**        All with Option 401

[:SOURce]:RADio:ARB:IQ:EXtErnal:FILTer:AUTO ON|OFF|1|0  
[:SOURce]:RADio:ARB:IQ:EXtErnal:FILTer:AUTO?

This command enables or disables the automatic selection of the filters for I/Q signals routed to the rear panel I/Q outputs.

ON(1)            This choice will automatically select a digital modulation filter optimized for the current signal generator settings.  
OFF(0)            This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “:IQ:EXtErnal:FILTer” on page 242 for selecting a filter or through path.

**\*RST**            1  
**Key Entry**        **I/Q Output Filter Manual Auto**



**Remarks**            N/A

## **:FILTer**

**Supported**            All with Option 401

```
[ :SOURce ]:RADio:CDMA2000:ARB:FILTer RNYquist|NYquist|GAUSSian|RECTangle|
IS95|IS95_EQ|IS95_MOD|IS95_MOD_EQ|AC4Fm|WCDMA|IS2000SR3DS|UGGaussian|
"<user FIR>"
```

```
[ :SOURce ]:RADio:CDMA2000:ARB:FILTer?
```

This command selects the pre-modulation filter type.

IS95	This choice selects a filter that meets the criteria of the IS-95 standard.
IS95_EQ	This choice selects a filter which is a combination of the IS-95 filter (above) and the equalizer filter described in the IS-95 standard. This filter is only used for IS-95 baseband filtering.
IS95_MOD	This choice selects a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection than the filter specified in the IS-95 standard.
IS95_MOD_EQ	This choice selects a filter which is a combination of the equalizer filter described in the IS-95 standard and a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance), with lower passband rejection.
WCDMa	This choice selects a 0.22 Nyquist filter optimized for ACP.
AC4Fm	This choice selects a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.
IS2000SR3DS	This choice selects an IS-2000 standard, spread rate 3 direct spread filter.
UGGaussian	This choice selects a backwards compatible GSM Gaussian filter (Gaussian filter with a fixed BbT value of 0.300) for the ESG E44xxB Option UN3 or UN4.
"<user FIR>"	This variable is any filter file that you have stored into memory.

**\*RST**                    IS95\_MOD\_EQ

**Key Entry**            **Root Nyquist    Nyquist    Gaussian    Rectangle    IS-95    IS-95 w/EQ**  
**IS-95 Mod    IS-95 Mod w/EQ    APCO 25 C4FM    WCDMA**

**UN3/4 GSM Gaussian IS-2000 SR3 DS User FIR**

**Remarks** Refer to “File Name Variables” on page 14 for information on the file name syntax.

**:FILTer:ALPHa**

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer:ALPHa <val>
[:SOURce]:RADio:CDMA2000:ARB:FILTer:ALPHa?
```

This command changes the Nyquist or root Nyquist filter alpha value.

The filter alpha value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +5.00000000E–001

**Range** 0.000–1.000

**Key Entry** Filter Alpha

**Remarks** To change the current filter type, refer to “:FILTer” on page 243.

**:FILTer:BBT**

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer:BBT <val>
[:SOURce]:RADio:CDMA2000:ARB:FILTer:BBT?
```

This command changes the bandwidth-multiplied-by-bit-time (BbT) filter parameter.

The filter BbT value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +5.00000000E–001

**Range** 0.000–1.000

**Key Entry** Filter BbT

**Remarks** This command is effective only after choosing a Gaussian filter. It does not have an effect on other types of filters.

To change the current filter type, refer to “:FILTer” on page 243.

## :FILTER:CHANnel

**Supported** All with Option 401

```
[ :SOURCE ] :RADio:CDMA2000:ARB:FILTer:CHANnel EVM|ACP  
[ :SOURCE ] :RADio:CDMA2000:ARB:FILTer:CHANnel?
```

This command optimizes the Nyquist and root Nyquist filters to minimize error vector magnitude (EVM) or to minimize adjacent channel power (ACP).

**EVM** This choice provides the most ideal passband.

**ACP** This choice improves stopband rejection.

**\*RST** EVM

**Key Entry** Optimize FIR For EVM ACP

**Remarks** To change the current filter type, refer to “:FILTer” on page 243.

## :HEADer:CLEar

**Supported** All with Option 401

```
[ :SOURCE ] :RADio:CDMA2000:ARB:HEADer:CLEar
```

This command clears the header information from the header file used by this modulation format.

**\*RST** N/A

**Key Entry** Clear Header

**Remarks** The **CDMA2000 Off On** softkey must be set to On for this command to function.

## :HEADer:SAVE

**Supported** All with Option 401

```
[ :SOURCE ] :RADio:CDMA2000:ARB:HEADer:SAVE
```

This command saves the header information to the header file used by this modulation format.

**\*RST** N/A

**Key Entry** Save Setup To Header

**Remarks** The **CDMA2000 Off On** softkey must be set to On for this command to function.

### :IQ:MODulation:ATTen

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:IQ:MODulation:ATTen <val>
[:SOURce]:RADio:CDMA2000:ARB:IQ:MODulation:ATTen?
```

This command attenuates the I/Q signals being modulated through the signal generator RF path.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +2.00000000E+000  
**Range** 0–40  
**Key Entry** Modulator Atten Manual Auto  
**Remarks** N/A

### :IQ:MODulation:ATTen:AUTO

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:IQ:MODulation:ATTen:AUTO ON|OFF|1|0
[:SOURce]:RADio:CDMA2000:ARB:IQ:MODulation:ATTen:AUTO?
```

This command enables or disables the I/Q attenuation auto mode.

- ON (1) This choice enables the attenuation auto mode which optimizes the modulator attenuation for the current conditions.
- OFF (0) This choice holds the attenuator at its current setting or at a selected value. Refer to “[:IQ:MODulation:ATTen](#)” on page 246 for setting the attenuation value.

**\*RST** 1  
**Key Entry** Modulator Atten Manual Auto  
**Remarks** N/A

### :IQ:MODulation:FILTer

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:IQ:MODulation:FILTer 2.1e6|40e6|THROUGH
[:SOURce]:RADio:CDMA2000:ARB:IQ:MODulation:FILTer?
```

This command enables you to select a filter or through path for I/Q signals modulated

onto the RF carrier. Selecting a filter using this command will automatically set “:IQ:MODulation:FILTer:AUTO” on page 247 to OFF(0) mode.

2.1E6	This choice applies a 2.1 MHz baseband filter to the I/Q signals.
40E6	This choice applies a 40 MHz baseband filter to the I/Q signals.
THRough	This choice bypasses filtering.
<b>*RST</b>	THR
<b>Key Entry</b>	<b>2.100 MHz 40.000 MHz Through</b>
<b>Remarks</b>	N/A

### **:IQ:MODulation:FILTer:AUTO**

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:IQ:MODulation:FILTer:AUTO ON|OFF|1|0
[:SOURce]:RADio:CDMA2000:ARB:IQ:MODulation:FILTer:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals modulated onto the RF carrier.

ON(1)	This choice will automatically select a digital modulation filter.
OFF(0)	This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “:IQ:MODulation:FILTer” on page 294 for selecting a filter or through path.
<b>*RST</b>	1
<b>Key Entry</b>	<b>I/Q Mod Filter Manual Auto</b>
<b>Remarks</b>	N/A

### **:IQMap**

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:IQMap NORMal|INVerted
[:SOURce]:RADio:CDMA2000:ARB:IQMap?
```

This command selects whether the Q output will be normal or inverted.

NORMal	This choice selects normal polarity.
INVerted	This choice inverts the internal Q signal.
<b>*RST</b>	NORM

<b>Key Entry</b>	<b>I/Q Mapping Normal Invert</b>
<b>Remarks</b>	Inverting the Q output inverts the RF spectrum after the modulation.

**:LINK**

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:LINK FORWard|REVerse
[:SOURce]:RADio:CDMA2000:ARB:LINK?
```

This command selects the CDMA2000 forward or reverse link channel setup.

- FORW This choice selects a basestation to mobile configuration.
- REV This choice selects a mobile to basestation configuration.

**\*RST** FORW

**Key Entry** **Link Forward Reverse**

**Remarks** N/A

**:LINK:FORWARD:SETup**

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup S1Pilot|S3DPilot|
S3MPilot|S19Chan|S3D9chan|S3M9chan|MCARrier| "<file name>"
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup?
```

This command selects a previously defined channel configuration for the CDMA2000 forward link.

- S1Pilot This choice selects a spread rate 1, pilot-channel setup.
- S3DPilot This choice selects a spread rate 3, direct spread, pilot-channel setup.
- S3MPilot This choice selects a spread rate 3, multicarrier spread, pilot-channel setup.
- S19Chan This choice selects a spread rate 1, 9-channel setup.
- S3D9Chan This choice selects a spread rate 3, direct spread, 9-channel setup.
- S3M9Chan This choice selects a spread rate 3, multicarrier spread, 9-channel setup.
- MCARrier This choice enables the multicarrier mode. To set the CDMA2000 multicarrier type, refer to “:LINK:FORWARD:SETup:MCARrier” on page 249.

<b>*RST</b>	S19C
<b>Key Entry</b>	<b>Pilot 9 Channel Spread Rate 1 Spread Rate 3 Multicarrier Off On</b> <b>Spreading Type Direct Mcarrier Custom CDMA2000 Carrier</b>
<b>Remarks</b>	Refer to “ <a href="#">File Name Variables</a> ” on <a href="#">page 14</a> for information on the file name syntax.

## **:LINK:FORWARD:SETup:MCARrier**

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWARD:SETup:MCARrier CAR2|CAR3|CAR4|
"<file name>"
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWARD:SETup:MCARrier?
```

This command defines the type of multicarrier CDMA2000 setup.

- |             |   |
|-------------|---|
| <b>CAR2</b> | This choice specifies the following standard 2-carrier setup:<br><br><i>Carrier 1:</i> spread rate 3, direct spread, 9 channel; -2.5 MHz frequency offset; 0 dB power<br><br><i>Carrier 2:</i> spread rate 3, direct spread, 9 channel; 2.5 MHz frequency offset; 0 dB power  |
| <b>CAR3</b> | This choice specifies the following standard 3-carrier setup:<br><br><i>Carrier 1:</i> spread rate 1, 9 channel; -1.25 MHz frequency offset; 0 dB power<br><br><i>Carrier 2:</i> spread rate 1, 9 channel; 0 kHz frequency offset; 0 dB power<br><br><i>Carrier 3:</i> spread rate 1, 9 channel; 1.25 MHz frequency offset; 0 dB power  |
| <b>CAR4</b> | This choice specifies the following standard 2-carrier setup:<br><br><i>Carrier 1:</i> spread rate 1, 9 channel; -1.875 MHz frequency offset; 0 dB power<br><br><i>Carrier 2:</i> spread rate 1, 9 channel; -625 kHz frequency offset; 0 dB power<br><br><i>Carrier 3:</i> spread rate 1, 9 channel; 625 kHz frequency offset; 0 dB power<br><br><i>Carrier 4:</i> spread rate 1, 9 channel; 1.875 MHz frequency offset; 0 dB power |

<b>*RST</b>	CAR2
<b>Key Entry</b>	2 SR3 Carriers   3 Carriers   4 Carriers   Custom CDMA2000 Multicarrier
<b>Remarks</b>	Refer to “File Name Variables” on page 14 for information on the file name syntax.

## :LINK:FORWARD:SETup:MCARrier:STORE

**Supported**      All with Option 401

```
[:SOURCE]:RADIO:CDMA2000:ARB:LINK:FORWARD:SETup:MCARrier:
STORE "<file name>"
```

This command stores the current multicarrier setup information.

The stored file contains information including the digital modulation format, number of carriers, frequency spacing, and power settings for the multicarrier setup.

<b>*RST</b>	N/A
<b>Range</b>	N/A
<b>Key Entry</b>	<b>Store Custom Multicarrier</b>
<b>Remarks</b>	Recall stored files from memory by executing the following command:  [:SOURCE]:RADIO:CDMA2000:ARB:LINK:FORWARD:SETup:MCARrier "<file name>"  Refer to “File Name Variables” on page 14 for information on the file name syntax.

## :LINK:FORWARD:SETup:MCARrier:TABLE

**Supported**      All with Option 401

```
[:SOURCE]:RADIO:CDMA2000:ARB:LINK:FORWARD:SETup:MCARrier:TABLE INIT|
APPend|<chan_num>,S1Pilot|S3DPilot|S3MPilot|S19Chan|S3D9chan|S3M9chan|
"<file name>",<freq_offset>,<power>
[:SOURCE]:RADIO:CDMA2000:ARB:LINK:FORWARD:SETup:MCARrier:
TABLE? <chan_num>
```

This command defines the multicarrier CDMA2000 waveform.

The variable <freq\_offset> is expressed in units of Hertz (MHz).

The variable <power> is expressed in units of decibels (dB).

Channel type, frequency offset, and power level are returned when a query is initiated.



The output format is as follows:

<channel type>, <freq\_offset>, <power>

INIT	This choice clears the current information and creates a new one-row table, allowing for further definition using additional parameters.
APPend	This choice adds rows to an existing table. The maximum number of rows for one table is 25.
S1Pilot	This choice sets a single SR1 Pilot forward channel.
S3DPilot	This choice sets a single direct spread pilot forward channel.
S3MPilot	This choice sets a single SR3 multicarrier spread pilot forward channel.
S19Chan	This choice sets a SR1 9 forward channel.
S3D9chan	This choice sets a SR3 direct spread forward channel.
S3M9chan	This choice sets a SR3 multicarrier spread 9 forward channel.
<b>*RST</b>	<i>channel type</i> : S3D9CHAN <i>&lt;freq_offset&gt;</i> : -2.50000000E+006 <i>&lt;power&gt;</i> : +0.00000000E+000
<b>Range</b>	<i>&lt;freq_offset&gt;</i> : -15E6 to 15E6 <i>&lt;power&gt;</i> : -40 to 0
<b>Key Entry</b>	<b>Select File    Insert Row    SR1 Pilot    SR3 Direct Pilot    SR3 Mcarrier Pilot</b> <b>SR3 Mcarrier Pilot    SR1 9 Channel    SR3 Direct 9 Channel</b> <b>SR3 Mcarrier 9 Channel    Custom CDMA2000 Carrier</b>
<b>Field Entry</b>	Freq Offset                  Power
<b>Remarks</b>	Refer to “ <a href="#">File Name Variables</a> ” on page 14 for information on the file name syntax.

## **:LINK:FORWARD:SETup:MCARrier:TABLE:NCARriers**

**Supported**      All with Option 401

[ :SOURce ] :RADio:CDMA2000:ARB:LINK:FORWARD:SETup:MCARrier:TABLE:NCARriers?

This command queries the number of carriers specified for the multicarrier CDMA2000 waveform.

**\*RST**                  +2

**Range**                  N/A

**Key Entry**        N/A

**Remarks**        N/A

**:LINK:FORWARD:SETup:STORE**

**Supported**        All with Option 401

[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWARD:SETup:STORE "<file name>"

This command stores the current custom CDMA2000 state, using a designated file name, to the signal generator memory.

Along with the contents of the CDMA2000 channel table editor (channel types, Walsh code, power levels, PN offset, and data), this command stores the following information to the signal generator memory:

- FIR filter
- FIR filter file name
- FIR filter alpha
- FIR filter BbT
- FIR filter channel (EVM or ACP)
- I/Q mapping
- link
- spread type
- spread rate
- ARB reference clock source (internal or external)
- ARB reference clock frequency
- clipping
- multicarrier spacing
- radio configuration

**\*RST**                N/A

**Range**              N/A

**Key Entry**        **Store Custom CDMA State**

**Remarks**        Recall this stored file by executing the following command:

[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWARD:  
SETup "<file name>"

Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

## **:LINK:FORWARD:SETup:TABLE:APPLy**

**Supported** All with Option 401

[ :SOURce ] :RADio:CDMA2000:ARB:LINK:FORWARD:SETup:TABLE:APPLy

This command generates a CDMA2000 signal based on the current values in the CDMA2000 channel setup table editor.

**\*RST** N/A

**Range** N/A

**Key Entry** Apply Channel Setup

**Remarks** N/A

## **:LINK:FORWARD:SETup:TABLE:CHANnel**

**Supported** All with Option 401

[ :SOURce ] :RADio:CDMA2000:ARB:LINK:FORWARD:SETup:TABLE:CHANnel INIT | APPend | <chan\_num>, <chan\_type>, <config>, <data\_rate>, <walsh>, <power>, <pn\_offset>, RANDOM | <data\_val>

[ :SOURce ] :RADio:CDMA2000:ARB:LINK:FORWARD:SETup:TABLE: CHANnel? <chan\_num>

This command defines the channel parameters of the CDMA2000 signal.

The variable <power> is expressed in units of decibels (dB).

The variable <data\_rate> is expressed in units bits per second (bps).

The channel type, configuration type, data rate, walsh code, power, pn offset, and data value are returned when a query is initiated. The output format is as follows:

<chan\_type>,<config>,<data\_rate>,<walsh>,<power>,<pn\_offset>,<data\_val>

INIT This choice clears the current information and creates a new one-row table, allowing for further definition using additional parameters.

APPend This choice adds rows to an existing table.

RANDom This choice selects a randomly generated data value.

<data\_val> This variable specifies a specific data value.

**\*RST** *channel type:* PIL *<config>:* +3 *<data\_rate>:* +3.84000000E+004  
*<walsh>:* +0 *<power>:* -7.00000000E+000 *<pn\_offset>:* +0  
*<data\_val>:* 0

**CDMA2000 ARB Subsystem–Option 401 ([:SOURce]:RADio:CDMA2000:ARB)**

<b>Range</b>	<data_rate>: 1500–307200 <walsh>: 0–63 <power>: –40 to 0 <pn_offset>: 0–511 <data_val>: 0000000–11111111
<b>Key Entry</b>	<b>Edit Channel Setup   Insert Row   Config   Rate</b> <b>Walsh Code   PN Offset</b>
<b>Remarks</b>	Queries initiated for this command must be followed by a specific channel number.  The above *RST value represents a query of channel one.

**:LINK:FORWARD:SETup:TABLE:NCHannels**

<b>Supported</b>	All with Option 401
	[ :SOURce ] :RADio:CDMA2000:ARB:LINK:FORWARD:SETup:TABLE:NCHannels?
	This command queries the number of channels specified for the CDMA2000 link setup.
<b>*RST</b>	+9
<b>Range</b>	N/A
<b>Key Entry</b>	N/A
<b>Remarks</b>	N/A

**:LINK:FORWARD:SETup:TABLE:PADJust**

<b>Supported</b>	All with Option 401
	[ :SOURce ] :RADio:CDMA2000:ARB:LINK:FORWARD:SETup:TABLE:PADJust EQUal   SCALE
	This command sets the code domain power (the relative power in each of the channels).
<b>EQUal</b>	Sets all channels to equal power, and the total power to 0 dB.
<b>SCALE</b>	Scales all of the current channel powers so that the total power equals 0 dB, keeping the previous power ratios between the individual channels.
<b>*RST</b>	N/A
<b>Key Entry</b>	<b>Equal Powers   Scale To 0dB</b>
<b>Remarks</b>	N/A

## :LINK:REVERSE:RCONfig

**Supported** All with Option 401

```
[:SOURCE]:RADIO:CDMA2000:ARB:LINK:REVERSE:RCONfig <val>  
[:SOURCE]:RADIO:CDMA2000:ARB:LINK:REVERSE:RCONfig?
```

This command sets the radio configuration for all reverse link channels.

**\*RST** +1

**Range** 1–4

**Key Entry** Radio Config

**Remarks** Changing the radio configuration results in changes to the channel data rate.

## :LINK:REVERSE:SETup

**Supported** All with Option 401

```
[:SOURCE]:RADIO:CDMA2000:ARB:LINK:REVERSE:SETup S1Pilot|S3Pilot|  
S15Chan|S35Chan|S18Chan| "<file name>"  
[:SOURCE]:RADIO:CDMA2000:ARB:LINK:REVERSE:SETup?
```

This command selects a previously defined channel configuration for the CDMA2000 reverse link.

**S1Pilot** This choice selects a spread rate 1, pilot-channel setup.

**S3Pilot** This choice selects a spread rate 3, pilot-channel setup.

**S15Chan** This choice selects a spread rate 1, 5-channel setup.

**S35Chan** This choice selects a spread rate 3, 5-channel setup.

**S18Chan** This choice selects a spread rate 1, 8-channel setup.

**\*RST** S15Chan

**Key Entry** Pilot 5 Channel 8 Channel Custom CDMA2000 State  
Spread Rate 1 Spread Rate 3

**Remarks** Refer to “File Name Variables” on page 14 for information on the file name syntax.

## :LINK:REVerse:SETup:STORE

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:STORE "<file name>"
```

This command stores the current custom CDMA2000 state, using a designated file name, to the signal generator memory.

Along with the contents of the CDMA2000 channel table editor (channel types, Walsh code, power levels, PN offset, and data), this command stores the following information to the signal generator memory:

- FIR filter
- FIR filter file name
- FIR filter alpha
- FIR filter BbT
- FIR filter channel (EVM or ACP)
- I/Q mapping
- link
- spread type
- spread rate
- ARB reference clock source (internal or external)
- ARB reference clock frequency
- clipping
- multicarrier spacing
- radio configuration

**\*RST** N/A

**Range** N/A

**Key Entry** **Store Custom CDMA State**

**Remarks** Recall this stored file by executing the following command:

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:  
SETup "<file name>"
```

Refer to “[File Name Variables](#)” on page 14 for information on the file name syntax.

## **:LINK:REVERSE:SETup:TABLE:APPLy**

**Supported** All with Option 401

[ :SOURCE ] :RADio:CDMA2000:ARB:LINK:REVERSE:SETup:TABLE:APPLy

This command generates a CDMA2000 signal based on the current values in the CDMA2000 channel setup table editor.

**\*RST** N/A

**Range** N/A

**Key Entry** **Apply Channel Setup**

**Remarks** N/A

## **:LINK:REVERSE:SETup:TABLE:CHANnel**

**Supported** All with Option 401

[ :SOURCE ] :RADio:CDMA2000:ARB:LINK:REVERSE:SETup:TABLE:CHANnel INIT | APPend | <chan\_num>, <chan\_type>, <data\_rate>, <power>, RANDom | <data\_val> [ :SOURCE ] :RADio:CDMA2000:ARB:LINK:REVERSE:SETup:TABLE: CHANnel? <chan\_num>

This command defines the channel parameters for the CDMA2000 signal.

The channel number, configuration type, data rate, walsh code, power, pn offset, and data value are returned when a query is initiated. The output format is as follows:

<chan\_type>,<data\_rate>,<power>,<data\_val>

The variable <data\_rate> is expressed as bits per second (bps).

The variable <power> is expressed in units of decibels (dB).

**INIT** This choice clears the current information and creates a new one-row table, allowing for further definition using additional parameters.

**APPend** This choice adds rows to an existing table. The maximum number of channels in a table is eight.

**RANDom** This choice selects a randomly generated data value.

<data\_val> This variable customizes a specific data value.

**\*RST** *channel type:* PIL *<data\_rate>:* +3.84000000E+004  
*<power>:* -7.00000000E+000 *<pn\_offset>:* +0 *<data\_val>:* 0

**Range** *<data\_rate>:* 1500–9600 *<power>:* –40 to 0

	<data_val>: 0000000–11111111
<b>Key Entry</b>	<b>Edit Channel Setup    Insert Row    Config    Rate</b> <b>Walsh Code    PN Offset</b>
<b>Remarks</b>	Queries initiated for this command must be followed by a specific channel number.  The above *RST value represents a query of channel one.

**:LINK:REVerse:SETup:TABLE:NCHannels**

<b>Supported</b>	All with Option 401
	[ :SOURce ] :RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLE:NCHannels?
	This command query returns the number of channels for the CDMA2000 link reverse setup.
<b>*RST</b>	+5
<b>Range</b>	N/A
<b>Key Entry</b>	N/A
<b>Remarks</b>	N/A

**:LINK:REVerse:SETup:TABLE:PADJust**

<b>Supported</b>	All with Option 401
	[ :SOURce ] :RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLE:PADJust EQUal   SCALE
	This command customizes the code domain power (the relative power in each of the channels).
<b>EQUal</b>	This choice changes all channels to equal power, and the total power to 0 dB.
<b>SCALE</b>	This choice scales all of the current channel powers so that the total power equals 0 dB, keeping the previous power ratios between the individual channels.
<b>*RST</b>	N/A
<b>Key Entry</b>	<b>Equal Powers    Scale To 0dB</b>
<b>Remarks</b>	N/A



## **:MDEStination:PULSe**

**Supported**      All with Option 401

```
[:SOURCE]:RADio:CDMA2000:ARB:MDEStination:PULSe NONE | M1 | M2 | M3 | M4
[:SOURCE]:RADio:CDMA2000:ARB:MDEStination:PULSe?
```

This command routes the selected marker to the Pulse/RF Blanking function. The NONE parameter clears the marker for the Pulse/RF Blanking function.

**\*RST**            NONE

**Key Entry**      **None**   **Marker 1**   **Marker 2**   **Marker 3**   **Marker 4**

**Remarks**      N/A

## **:MDEStination:AAMPlitude**

**Supported**      All with Option 401

```
[:SOURCE]:RADio:CDMA2000:ARB:MDEStination:AAMPlitude NONE | M1 | M2 | M3 | M4
[:SOURCE]:RADio:CDMA2000:ARB:MDEStination:AAMPlitude?
```

This command routes the selected marker to the Alternate Amplitude function. The NONE parameter clears the marker for the Alternate Amplitude function.

**\*RST**            NONE

**Key Entry**      **None**   **Marker 1**   **Marker 2**   **Marker 3**   **Marker 4**

**Remarks**      N/A

## **:MDEStination:ALCHold**

**Supported**      All with Option 401

```
[:SOURCE]:RADio:CDMA2000:ARB:MDEStination:ALCHold NONE | M1 | M2 | M3 | M4
[:SOURCE]:RADio:CDMA2000:ARB:MDEStination:ALCHold?
```

This command routes the selected marker to the ALC Hold function. The NONE parameter clears the marker for the ALC Hold function.

**\*RST**            NONE

**Key Entry**

**Remarks**      N/A

### **:MPOLarity:MARKer1**

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:MPOLarity:MARKer1 NEGative|POSitive  
[:SOURce]:RADio:CDMA2000:ARB:MPOLarity:MARKer1?
```

This command sets the polarity for marker 1.

**\*RST** POS

**Key Entry** Marker 1 Polarity Neg Pos

**Remarks** N/A

### **:MPOLarity:MARKer2**

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:MPOLarity:MARKer2 NEGative|POSitive  
[:SOURce]:RADio:CDMA2000:ARB:MPOLarity:MARKer2?
```

This command sets the polarity for marker 2.

**\*RST** POS

**Key Entry** Marker 2 Polarity Neg Pos

**Remarks** N/A

### **:MPOLarity:MARKer3**

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:MPOLarity:MARKer3 NEGative|POSitive  
[:SOURce]:RADio:CDMA2000:ARB:MPOLarity:MARKer3?
```

This command sets the polarity for marker 3.

**\*RST** POS

**Key Entry** Marker 3 Polarity Neg Pos

**Remarks** N/A

## :MPOLarity:MARKer4

**Supported** All with Option 401

```
[ :SOURCE ] :RADio:CDMA2000:ARB:MPOLarity:MARKer4 NEGative | POSitive  
[ :SOURCE ] :RADio:CDMA2000:ARB:MPOLarity:MARKer4?
```

This command sets the polarity for marker 4.

**\*RST** POS

**Key Entry** Marker 4 Polarity Neg Pos

**Remarks** N/A

## :REFerence:EXTernal:FREQuency

**Supported** All with Option 401

```
[ :SOURCE ] :RADio:CDMA2000:ARB:REFerence:EXTernal:FREQuency <val>  
[ :SOURCE ] :RADio:CDMA2000:ARB:REFerence:EXTernal:FREQuency?
```

This command allows you to enter the frequency of the applied external reference.

The variable <val> is expressed in units of Hertz (KHz–MHz).

**\*RST** +1.00000000E+007

**Range** 2.5E5–1E8

**Key Entry** Reference Freq

**Remarks** The value specified by this command is effective only when you are using an external ARB reference applied to the BASEBAND GEN REF IN rear panel connector.

To specify external as the ARB reference source type, refer to “:REFerence[:SOURCE]” on page 261.

## :REFerence[:SOURCE]

**Supported** All with Option 401

```
[ :SOURCE ] :RADio:CDMA2000:ARB:REFerence[:SOURCE] INTernal | EXTernal  
[ :SOURCE ] :RADio:CDMA2000:ARB:REFerence[:SOURCE] ?
```

This command selects either an internal or external reference for the waveform clock.

**\*RST** INT

**Key Entry** ARB Reference Ext Int

**Remarks** If the EXTERNAL choice is selected, the external frequency value must be entered and the signal must be applied to the BASEBAND GEN REF IN rear panel connector.

Refer to “:REFERENCE:EXTERNAL:FREQUENCY” on page 261 to enter the external reference frequency.

**:RETRigger**

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA:ARB:RETRigger ON|OFF|IMMEDIATE
[:SOURce]:RADio:CDMA:ARB:RETRigger?
```

This command enables or disables the ARB retriggering mode; the retrigger mode controls how the retriggering function performs while a waveform is playing.

- ON (1) This choice specifies that if a trigger occurs while a waveform is playing, the waveform will retrigger at the end of the current waveform sequence and play once more.
- OFF (0) This choice specifies that if a trigger occurs while a waveform is playing, the trigger will be ignored.
- IMMEDIATE This choice specifies that if a trigger occurs while a waveform is playing, the waveform will reset and replay from the start immediately upon receiving a trigger.

**\*RST** ON

**Key Entry** On Off Immediate

**Remarks** N/A

**:REVISION**

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:REVISION?
```

This command queries the revision number of the current CDMA2000 format.

**\*RST** 8

**Range** N/A

**Key Entry** N/A

**Remarks** N/A

## :SCLock:RATE

**Supported** All with Option 401

```
[ :SOURCE ] :RADio:CDMA2000:ARB:SCLock:RATE <val>
```

```
[ :SOURCE ] :RADio:CDMA2000:ARB:SCLock:RATE?
```

This command sets the sample clock rate for the CDMA2000 modulation format.

The variable <val> is expressed in units of hertz.

**\*RST** +1.00000000E+008

**Range** 1–1E8

**Key Entry** ARB Sample Clock

**Remarks** The modulation format should be active before executing this command. If this command is executed before the modulation format is active, the entered value will be overridden by a calculated factory default value. Refer to “[:STATE]” on page 268 to activate the modulation format.

## :SPReading:RATE

**Supported** All with Option 401

```
[ :SOURCE ] :RADio:CDMA2000:ARB:SPReading:RATE 1|3
```

```
[ :SOURCE ] :RADio:CDMA2000:ARB:SPReading:RATE?
```

This command opens a submenu that provides the available spread rate choices for the CDMA2000 waveform.

**\*RST** +1

**Key Entry** Spread Rate 1 Spread Rate 3

**Remarks** The spread rate multiplied by 1.2288 MHz is equal to the chip rate. For example, spread rate 3 equals a 3.6864 Mcps chip rate.

Higher data rates can be achieved using spread rate 3, though offset by greater bandwidth/spectrum usage.

Changing the spread rate to either 1 or 3 will also change the initial setup menu, resulting in a configuration that is specific to the current spread rate.

### :SPReading:TYPE

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:SPReading:TYPE DIRect |MCArrier
[:SOURce]:RADio:CDMA2000:ARB:SPReading:TYPE?
```

This command selects the spreading type for a CDMA2000 waveform.

**\*RST** DIR

**Key Entry** Spreading Type Direct Mcarrier

**Remarks** Multicarrier is not available in the reverse link setup.

Note that changing the spreading type will result in the setup changing to a setup for the current spreading type.

### :SPReading:TYPE:MCARrier:SPACing

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:SPReading:TYPE:MCARrier:SPACing 1.23MHz |
1.25MHz
[:SOURce]:RADio:CDMA2000:ARB:SPReading:TYPE:MCARrier:SPACing?
```

This command selects the multicarrier frequency spacing.

**\*RST** +1.25000000E+006

**Key Entry** 1.23 MHz 1.25 MHz

**Remarks** Cellular band uses 1.23 MHz and PCS band uses 1.25 MHz.

### :TRIGger:TYPE

**Supported** All with Option 401

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE CONTInuous |SINGLe |GATE
[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE?
```

Execute this command to set the trigger type.

**CONTInuous** The waveform repeats continuously; the waveform restarts every time the previous playback is completed. To customize continuous triggering, refer to “:TRIGger:TYPE:CONTInuous[:TYPE]” on page 265.

**SINGLe** The waveform segment or sequence plays once for every trigger received.

**GATE** An external trigger signal interrupts the playback while the gating

signal is in the inactive state. Playback resumes when the external control signal returns to the active state. The active state can be set high or low.

<b>*RST</b>	CONT
<b>Key Entry</b>	<b>Continuous   Single   Gated</b>
<b>Remarks</b>	To change the polarity of the gated trigger, refer to “:TRIGger:TYPE:GATE:ACTive” on page 265.

### **:TRIGger:TYPE:CONTInuous[:TYPE]**

**Supported**      All with Option 401

```
[ :SOURCE ] :RADio:CDMA2000:ARB:TRIGger:TYPE:CONTInuous [ :TYPE ] FREE |
TRIGger | RESet
[ :SOURCE ] :RADio:CDMA2000:ARB:TRIGger:TYPE:CONTInuous [ :TYPE ] ?
```

This command customizes the continuous trigger selection.

<b>FREE</b>	This choice immediately transmits a waveform that is continuously repeated.
<b>TRIGger</b>	This choice causes the waveform to wait for a trigger. Once a trigger is received, the transmission of a continuously repeated waveform begins.
<b>RESet</b>	This choice immediately restarts a continuously repeated waveform upon receiving a trigger.

<b>*RST</b>	FREE
<b>Key Entry</b>	<b>Free Run   Trigger &amp; Run   Reset &amp; Run</b>
<b>Remarks</b>	To select CONTInuous as the trigger type, refer to “:TRIGger:TYPE” on page 264.

### **:TRIGger:TYPE:GATE:ACTive**

**Supported**      All with Option 401

```
[ :SOURCE ] :RADio:CDMA2000:ARB:TRIGger:TYPE:GATE:ACTive LOW | HIGH
[ :SOURCE ] :RADio:CDMA2000:ARB:TRIGger:TYPE:GATE:ACTive ?
```

This command toggles the polarity of the active state of the external gating input signal; GATE must be selected as the arb trigger type.

<b>LOW</b>	The sequence runs while the selected external control gating signal is low and restarts when the gate returns to the high level.
------------	--

HIGH	The sequence runs while the selected external control gating signal is high and restarts when the gate returns to the low level.
<b>*RST</b>	HIGH
<b>Key Entry</b>	<b>Gate Active Low High</b>
<b>Remarks</b>	Refer to “:TRIGger:TYPE” on page 264 to select GATE as the trigger.

### :TRIGger[:SOURCE]

**Supported** All with Option 401

```
[:SOURCE]:RADio:CDMA2000:ARB:TRIGger[:SOURCE] KEY|EXT|BUS
[:SOURCE]:RADio:CDMA2000:ARB:TRIGger[:SOURCE]?
```

This command changes the characteristics of the trigger source.

KEY	This choice enables triggering by pressing the front panel <b>Trigger</b> hardkey.
EXT	This choice enables triggering using an externally applied signal at the PATT TRIG IN rear panel connector or the PATT TRIG IN 2 pin on the rear panel AUX I/O connector. To select the appropriate connector, refer to “:TRIGger[:SOURCE]:EXTernal[:SOURCE]” on page 266.
BUS	This choice enables GPIB triggering using the *TRG or GET command or LAN and RS-232 triggering using the *TRG command.
<b>*RST</b>	EXT
<b>Key Entry</b>	<b>Trigger Key Ext Bus</b>
<b>Remarks</b>	N/A

### :TRIGger[:SOURCE]:EXTernal[:SOURCE]

**Supported** All with Option 401

```
[:SOURCE]:RADio:CDMA2000:ARB:TRIGger[:SOURCE]:EXTernal[:SOURCE] EPT1|
EPT2|EPTRIGGER1|EPTRIGGER2
[:SOURCE]:RADio:CDMA2000:ARB:TRIGger[:SOURCE]:EXTernal[:SOURCE]?
```

This command specifies which PATT TRIG IN connection, rear panel connector or AUX I/O connector, will be used to accept an externally applied trigger signal.

EPT1	This choice is synonymous with EPTRIGGER1 and selects the PATT TRIG IN rear panel connector for the external signal connection.
------	---



<b>EPT2</b>	This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear panel AUX I/O connector for the external signal connection.
<b>EPTRIGGER1</b>	This choice is synonymous with EPT1 and selects the PATT TRIG IN rear panel connector for the external signal connection.
<b>EPTRIGGER2</b>	This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear panel AUX I/O connector for the external signal connection.
<b>*RST</b>	EPT1
<b>Key Entry</b>	<b>Patt Trig In 1    Patt Trig In 2</b>
<b>Remarks</b>	This command is effective only if an external trigger is selected as the trigger source. Refer to “:TRIGger[:SOURCE]” on page 266.  For more information about the rear panel AUX I/O connector pin configuration, refer to the <i>User’s Guide</i> .

### :TRIGger[:SOURCE]:EXTernal:DELay

**Supported**      All with Option 401

```
[:SOURCE]:RADio:CDMA2000:ARB:TRIGger[:SOURCE]:EXTernal:DELay <val>
[:SOURCE]:RADio:CDMA2000:ARB:TRIGger[:SOURCE]:EXTernal:DELay?
```

This command specifies the time (seconds) for the external trigger delay.

The variable <val> is expressed as seconds ( $\mu$ sec–Msec).

**\*RST**            +1.00000000E–003

**Range**            1E–8 to 4E1

**Key Entry**        **Ext Delay Time**

**Remarks**        This command is effective only if an external trigger is selected as the trigger source. Refer to “:TRIGger[:SOURCE]” on page 266.

### :TRIGger[:SOURCE]:EXTernal:DELay:STATE

**Supported**      All with Option 401

```
[:SOURCE]:RADio:CDMA2000:ARB:TRIGger[:SOURCE]:EXTernal:DELay:STATE ON|
OFF|1|0
[:SOURCE]:RADio:CDMA2000:ARB:TRIGger[:SOURCE]:EXTernal:DELay:STATE?
```

This command enables or disables the operating state of the external trigger delay

function.

**\*RST** 0

**Key Entry** Ext Delay Off On

**Remarks** This command is effective only if an external trigger is selected as the trigger source. Refer to “:TRIGger[:SOURce]” on page 266.

### :TRIGger[:SOURce]:EXTernal:SLOPe

**Supported** All with Option 401

[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]:EXTernal:SLOPe POSitive|NEGative

[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]:EXTernal:SLOPe?

This command sets the polarity of the external trigger.

**\*RST** NEG

**Key Entry** Ext Polarity Neg Pos

**Remarks** This command is effective only if an external trigger is selected as the trigger source. Refer to “:TRIGger[:SOURce]” on page 266.

### [:STATe]

**Supported** All with Option 401

[:SOURce]:RADio:CDMA2000:ARB[:STATe] ON|OFF|1|0

[:SOURce]:RADio:CDMA2000:ARB[:STATe]?

This command enables or disables the CDMA2000 modulation format.

ON (1) This choice enables the CDMA2000 modulation capability and sets up the internal hardware to generate the currently selected CDMA2000 signal selection.

This choice also activates the I/Q state and sets the I/Q source to internal.

OFF (0) This choice disables the CDMA2000 baseband signal capability.

**\*RST** 0

**Key Entry** CDMA2000 Off On

**Remarks** N/A

---

## Dmodulation Subsystem–Option 001 or 002 [:SOURce]:RADio:DMODulation:ARB)

### :IQ:EXTErnal:FILTer

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:IQ:EXTErnal:FILTer 40e6|THROUGH
[:SOURce]:RADio:DMODulation:ARB:IQ:EXTErnal:FILTer?
```

This command selects the filter or through path for I/Q signals routed to the rear panel I and Q outputs. Selecting a filter using this command will automatically set “:IQ:EXTErnal:FILTer:AUTO” on page 269 to OFF(0) mode.

40e6 This choice applies a 40 MHz baseband filter.

THROUGH This choice bypasses filtering.

**\*RST** THR

**Key Entry** 40.000 MHz Through

**Remarks** N/A

### :IQ:EXTErnal:FILTer:AUTO

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:IQ:EXTErnal:FILTer:AUTO ON|OFF|1|0
[:SOURce]:RADio:DMODulation:ARB:IQ:EXTErnal:FILTer:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals routed to the rear panel I/Q outputs.

ON(1) This choice will automatically select a digital modulation filter optimized for the current signal generator settings.

OFF(0) This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “:IQ:EXTErnal:FILTer” on page 269 for selecting a filter or through path.

**\*RST** 1

**Key Entry** I/Q Output Filter Manual Auto

**Remarks** N/A

## :FILTer

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:FILTer RNYQuist|NYQuist|GAUSSian|
RECTangle|IS95|IS95_EQ|IS95_MOD|IS95_MOD_EQ|WCDMa|AC4Fm|IS2000SR3DS|
UGGaussian|"<user FIR>"
[:SOURce]:RADio:DMODulation:ARB:FILTer?
```

This command specifies the pre-modulation filter type.

- IS95 This choice selects a filter that meets the criteria of the IS-95 standard.
- IS95\_EQ This choice selects a filter which is a combination of the IS-95 filter (above) and the equalizer filter described in the IS-95 standard. This filter is only used for IS-95 baseband filtering.
- IS95\_MOD This choice selects a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance) with lower passband rejection than the filter specified in the IS-95 standard.
- IS95\_MOD\_EQ This choice selects a filter which is a combination of the equalizer filter described in the IS-95 standard and a filter that meets the criteria of the IS-95 error function (for improved adjacent channel performance), with lower passband rejection.
- WCDMa This choice selects a 0.22 Nyquist filter optimized for ACP.
- AC4Fm This choice selects a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.
- IS2000SR3DS This choice selects an IS-2000 standard, spread rate 3 direct spread filter.
- UGGaussian This choice selects a backwards compatible GSM Gaussian filter (Gaussian filter with a fixed BbT value of 0.300) for the ESG E44xxB Option UN3 or UN4.
- "<User FIR>" This variable is any filter file that you have stored into memory.

**\*RST** RNYQuist

**Key Entry** Root Nyquist Nyquist Gaussian Rectangle IS-95 IS-95 w/EQ  
 IS-95 Mod IS-95 Mod w/EQ WCDMA IS-2000 SR3 DS APCO 25 C4FM  
 UN3/4 GSM Gaussian User FIR

**Remarks** Refer to [“File Name Variables” on page 14](#) for information on the file

name syntax.

## :FILTER:ALPHA

**Supported** All with Option 001 or 002

```
[:SOURCE]:RADIO:DMODULATION:ARB:FILTER:ALPHA <val>
[:SOURCE]:RADIO:DMODULATION:ARB:FILTER:ALPHA?
```

This command changes the Nyquist or root Nyquist filter alpha value.

The filter alpha value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +3.50000000E-001

**Range** 0.000–1.000

**Key Entry** Filter Alpha

**Remarks** To change the current filter type, refer to “:FILTER” on page 270.

## :FILTER:BBT

**Supported** All with Option 001 or 002

```
[:SOURCE]:RADIO:DMODULATION:ARB:FILTER:BBT <val>
[:SOURCE]:RADIO:DMODULATION:ARB:FILTER:BBT?
```

This command changes the bandwidth-multiplied-by-bit-time (BbT) filter parameter.

The filter BbT value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

**\*RST** +5.00000000E-001

**Range** 0.000–1.000

**Key Entry** Filter BbT

**Remarks** This command is effective only after choosing a Gaussian filter. It does not have an effect on other types of filters.

To change the current filter type, refer to “:FILTER” on page 270.

**:FILTer:CHANnel**

**Supported** All with Option 001 or 002

```
[ :SOURCE ] :RADio:DMODulation:ARB:FILTer:CHANnel EVM|ACP
[ :SOURCE ] :RADio:DMODulation:ARB:FILTer:CHANnel?
```

This command optimizes the Nyquist and root Nyquist filters to minimize error vector magnitude (EVM) or to minimize adjacent channel power (ACP).

**EVM** This choice provides the most ideal passband.

**ACP** This choice improves stopband rejection.

**\*RST** EVM

**Key Entry** **Optimize FIR For EVM ACP**

**Remarks** To change the current filter type, refer to “:FILTer” on page 270.

**:HEADer:CLEar**

**Supported** All with Option 001 or 002

```
[ :SOURCE ] :RADio:DMODulation:ARB:HEADer:CLEar
```

This command clears the header information from the header file used by this modulation format.

**\*RST** N/A

**Key Entry** **Clear Header**

**Remarks** The **Digital Modulation Off On** softkey must be set to On for this command to function.

**:HEADer:SAVE**

**Supported** All with Option 001 or 002

```
[ :SOURCE ] :RADio:DMODulation:ARB:HEADer:SAVE
```

This command saves the header information to the header file used by this modulation format.

**\*RST** N/A

**Key Entry** **Save Setup To Header**

**Remarks** The **Digital Modulation Off On** softkey must be set to On for this command to function.

**:IQ:MODulation:ATTen****Supported** All with Option 001 or 002

[:SOURCE]:RADio:DMODulation:ARB:IQ:MODulation:ATTen &lt;val&gt;

[:SOURCE]:RADio:DMODulation:ARB:IQ:MODulation:ATTen?

This command sets the attenuation level of the I/Q signals being modulated through the signal generator RF path.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +2.00000000E+000**Range** 0–40**Key Entry** Modulator Atten Manual Auto**Remarks** N/A**:IQ:MODulation:ATTen:AUTO****Supported** All with Option 001 or 002

[:SOURCE]:RADio:DMODulation:ARB:IQ:MODulation:ATTen:AUTO ON|OFF|1|0

[:SOURCE]:RADio:DMODulation:ARB:IQ:MODulation:ATTen:AUTO?

This command enables or disables the I/Q attenuation auto mode.

**ON (1)** This choice enables the attenuation auto mode which optimizes the modulator attenuation for the current conditions.

**OFF (0)** This choice holds the attenuator at its current setting or at a selected value. Refer to “[:IQ:MODulation:ATTen](#)” on page 273 for setting the attenuation value.

**\*RST** 1**Key Entry** Modulator Atten Manual Auto**Remarks** N/A**:IQ:MODulation:FILTer****Supported** All with Option 001 or 002

[:SOURCE]:RADio:DMODulation:ARB:IQ:MODulation:FILTer 2.1e6|40e6|THROUGH

[:SOURCE]:RADio:DMODulation:ARB:IQ:MODulation:FILTer?

This command enables you to select a filter or through path for I/Q signals modulated

**Dmodulation Subsystem—Option 001 or 002 ([:SOURce]:RADio:DMODulation:ARB)**

onto the RF carrier. Selecting a filter using this command will automatically set “:IQ:MODulation:FILTer:AUTO” on page 274 to OFF(0) mode.

2.1E6	This choice applies a 2.1 MHz baseband filter to the I/Q signals.
40E6	This choice applies a 40 MHz baseband filter to the I/Q signals.
THRough	This choice bypasses filtering.
<b>*RST</b>	THR
<b>Key Entry</b>	<b>2.100 MHz 40.000 MHz Through</b>
<b>Remarks</b>	N/A

**:IQ:MODulation:FILTer:AUTO**

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:IQ:MODulation:FILTer:AUTO ON|OFF|1|0
[:SOURce]:RADio:DMODulation:ARB:IQ:MODulation:FILTer:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals modulated onto the RF carrier.

ON(1)	This choice will automatically select a digital modulation filter.
OFF(0)	This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “:IQ:MODulation:FILTer” on page 294 for selecting a filter or through path.
<b>*RST</b>	1
<b>Key Entry</b>	<b>I/Q Mod Filter Manual Auto</b>
<b>Remarks</b>	N/A

**:MDESTination:PULSe**

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:MDESTination:PULSe NONE|M1|M2|M3|M4
[:SOURce]:RADio:DMODulation:ARB:MDESTination:PULSe?
```

This command routes the selected marker to the Pulse/RF Blanking function. The NONE parameter clears the marker for the Pulse/RF Blanking function.

<b>*RST</b>	NONE
<b>Key Entry</b>	<b>None Marker 1 Marker 2 Marker 3 Marker 4</b>



**Remarks** N/A

### **:MDEStination:AAMPlitude**

**Supported** All with Option 001 or 002

```
[:SOURCE]:RADio:DMODulation:ARB:MDEStination:AAMPlitude NONE|M1|M2|M3|M4
[:SOURCE]:RADio:DMODulation:ARB:MDEStination:AAMPlitude?
```

This command routes the selected marker to the Alternate Amplitude function. The NONE parameter clears the marker for the Alternate Amplitude function.

**\*RST** NONE

**Key Entry** None Marker 1 Marker 2 Marker 3 Marker 4

**Remarks** N/A

### **:MDEStination:ALCHold**

**Supported** All with Option 001 or 002

```
[:SOURCE]:RADio:DMODulation:ARB:MDEStination:ALCHold NONE|M1|M2|M3|M4
[:SOURCE]:RADio:DMODulation:ARB:MDEStination:ALCHold?
```

This command routes the selected marker to the ALC Hold function. The NONE parameter clears the marker for the ALC Hold function.

**\*RST** NONE

**Key Entry** None Marker 1 Marker 2 Marker 3 Marker 4

**Remarks** N/A

### **:MODulation:FSK[:DEVIation]**

**Supported** All with Option 001 or 002

```
[:SOURCE]:RADio:DMODulation:ARB:MODulation:FSK[:DEVIation] <val>
[:SOURCE]:RADio:DMODulation:ARB:MODulation:FSK[:DEVIation]?
```

This command sets the symmetric FSK frequency deviation value.

The variable <val> is expressed in units of Hertz and the maximum range value equals the current symbol rate value multiplied by ten, limited to 20 MHz.

**\*RST** +4.00000000E+002

**Range** 0–2E7

<b>Key Entry</b>	<b>Freq Dev</b>
<b>Remarks</b>	To change the modulation type, refer to “:MODulation[:TYPE]” on page 276. Refer to “:SRATE” on page 283 for a list of the minimum and maximum symbol rate values. To set an asymmetric FSK deviation value, refer to the <i>User’s Guide for more information</i> .

**:MODulation[:TYPE]**

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:MODulation[:TYPE] BPSK|QPSK|IS95QPSK|
GRAYQPSK|OQPSK|IS95OQPSK|P4DQPSK|PSK8|PSK16|D8PSK|EDGE|MSK|FSK2|FSK4|
FSK8|FSK16|C4FM|QAM4|QAM16|QAM32|QAM64|QAM256
[:SOURce]:RADio:DMODulation:ARB:MODulation[:TYPE]?
```

This command sets the modulation type for the digital modulation personality.

<b>*RST</b>	P4DQPSK
<b>Key Entry</b>	<b>BPSK QPSK IS-95 QPSK Gray Coded QPSK OQPSK</b> <b>IS-95 OQPSK <math>\pi/4</math> DQPSK 8PSK 16PSK D8PSK EDGE MSK</b> <b>2-Lvl FSK 4-Lvl FSK 8-Lvl FSK 16-Lvl FSK C4FM 4QAM 16QAM</b> <b>32QAM 64QAM 256QAM User I/Q User FSK</b>
<b>Remarks</b>	N/A

**:MPOlarity:MARKer1**

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:MPOlarity:MARKer1 NEGative|POSitive
[:SOURce]:RADio:DMODulation:ARB:MPOlarity:MARKer1?
```

This command sets the polarity for marker 1.

<b>*RST</b>	POS
<b>Key Entry</b>	<b>Marker 1 Polarity Neg Pos</b>
<b>Remarks</b>	N/A

**:MPOLarity:MARKer2****Supported** All with Option 001 or 002[:SOURCE]:RADio:DMODulation:ARB:MPOLarity:MARKer2 NEGative|POSitive  
[:SOURCE]:RADio:DMODulation:ARB:MPOLarity:MARKer2?

This command sets the polarity for marker 2.

**\*RST** POS**Key Entry** Marker 2 Polarity Neg Pos**Remarks** N/A**:MPOLarity:MARKer3****Supported** All with Option 001 or 002[:SOURCE]:RADio:DMODulation:ARB:MPOLarity:MARKer3 NEGative|POSitive  
[:SOURCE]:RADio:DMODulation:ARB:MPOLarity:MARKer3?

This command sets the polarity for marker 3.

**\*RST** POS**Key Entry** Marker 3 Polarity Neg Pos**Remarks** N/A**:MPOLarity:MARKer4****Supported** All with Option 001 or 002[:SOURCE]:RADio:DMODulation:ARB:MPOLarity:MARKer4 NEGative|POSitive  
[:SOURCE]:RADio:DMODulation:ARB:MPOLarity:MARKer4?

This command sets the polarity for marker 4.

**\*RST** POS**Key Entry** Marker 4 Polarity Neg Pos**Remarks** N/A

**:REFerence:EXTernal:FREQuency**

**Supported** All with Option 001 or 002

```
[ :SOURce ] :RADio:DMODulation:ARB:REFerence:EXTernal:FREQuency <val>
```

```
[ :SOURce ] :RADio:DMODulation:ARB:REFerence:EXTernal:FREQuency?
```

This command conveys the expected reference frequency value of an externally applied reference the signal generator.

The variable <val> is expressed in units of Hertz (Hz–MHz).

**\*RST** +1.00000000E+007

**Range** 2.5E5–1E8

**Key Entry** Reference Freq

**Remarks** The value specified by this command is effective only when you are using an external ARB reference applied to the BASEBAND GEN REF IN rear panel connector.

To specify external as the ARB reference source type, refer to “:REFerence[:SOURce]” on page 278.

**:REFerence[:SOURce]**

**Supported** All with Option 001 or 002

```
[ :SOURce ] :RADio:DMODulation:ARB:REFerence[ :SOURce ] INTernal | EXTernal
```

```
[ :SOURce ] :RADio:DMODulation:ARB:REFerence[ :SOURce ] ?
```

This command selects either an internal or external reference for the waveform clock.

**\*RST** INT

**Key Entry** ARB Reference Ext Int

**Remarks** If the EXTernal choice is selected, the external frequency value *must* be entered and the signal must be applied to the BASEBAND GEN REF IN rear panel connector.

Refer to “:REFerence:EXTernal:FREQuency” on page 278 to enter the external reference frequency.

**:RETRigger****Supported** All with Option 001 or 002

```
[:SOURCE]:RADio:DMODulation:ARB:RETRigger ON|OFF|IMMEDIATE
[:SOURCE]:RADio:DMODulation:ARB:RETRigger?
```

This command enables or disables the ARB retriggering mode; the retrigger mode controls how the retriggering function performs while a waveform is playing.

- ON (1) This choice specifies that if a trigger occurs while a waveform is playing, the waveform will retrigger at the end of the current waveform sequence and play once more.
- OFF (0) This choice specifies that if a trigger occurs while a waveform is playing, the trigger will be ignored.
- IMMEDIATE This choice specifies that if a trigger occurs while a waveform is playing, the waveform will reset and replay from the start immediately upon receiving a trigger.

**\*RST** ON**Key Entry** On Off Immediate**Remarks** N/A**:SCLock:RATE****Supported** All with Option 001 or 002

```
[:SOURCE]:RADio:DMODulation:ARB:SCLock:RATE <val>
[:SOURCE]:RADio:DMODulation:ARB:SCLock:RATE?
```

This command sets the sample clock rate.

The variable <val> is expressed in units of Hertz (Hz – MHz)

**\*RST** +1.00000000E+008**Range** 1–1E8**Key Entry** ARB Sample Clock

**Remarks** The modulation format should be active before executing this command. If this command is executed before the modulation format is active, the entered value will be overridden by a calculated factory default value. Refer to “[:STATe]” on page 289 to activate the modulation format.

## :SETup

**Supported** All with Option 001 or 002

```
[:SOURCE]:RADio:DMODulation:ARB:SETup GSM|NADC|PDC|PHS|DECT|AC4Fm|
ACQPsk|CDPD|PWT|EDGE|TETRA|MCARrier "<file name>"
[:SOURCE]:RADio:DMODulation:ARB:SETup?
```

This command selects the digital modulation format type.

**\*RST** NADC

**Key Entry** GSM NADC PDC PHS DECT APCO 25 w/C4FM APCO w/CQPSK  
 CDPD PWT EDGE TETRA Multicarrier Off On Select File

**Remarks** Refer to “File Name Variables” on page 14 for information on the file name syntax.

## :SETup:MCARrier

**Supported** All with Option 001 or 002

```
[:SOURCE]:RADio:DMODulation:ARB:SETup:MCARrier (GSM|NADC|PDC|PHS|DECT|
AC4Fm|ACQPsk|CDPD|PWT|EDGE|TETRA,<num carriers>,<freq spacing>)|
"<file name>"
[:SOURCE]:RADio:DMODulation:ARB:SETup:MCARrier?
```

This command builds a table with the specified number of carriers and frequency spacing or retrieves the setup stored in the specified user file.

The carrier type, number of carriers, and frequency spacing value are returned when a query is initiated. The output format is as follows:

<carrier type>,<num carriers>,<freq spacing>

If a specific file is loaded and then queried, only the file name is returned.

The variable <freq spacing> is expressed in units of Hertz (kHz–MHz).

**\*RST** Carrier: NADC <num carriers>: 2  
 <freq spacing>: +1.0000000000000E+06

**Range** <num carriers>: 2–100  
 <freq spacing>: 2 ÷ (<num carriers> – 1) × 80 MHz

**Key Entry** GSM NADC PDC PHS DECT APCO 25 w/C4FM APCO w/CQPSK  
 CDPD PWT EDGE TETRA # of Carriers Freq Spacing  
 Custom Digital Mod State

**Remarks** Refer to “File Name Variables” on page 14 for information on the file name syntax.

The file specified must be a single carrier CDMA file. To store a multicarrier setup refer to “:SETup:MCARrier:STORE” on page 232.

## :SETup:MCARrier:PHASe

**Supported** All with Option 001 or 002

```
[ :SOURCE ] :RADio:DMODulation:ARB:SETup:MCARrier:PHASe FIXed|RANDom
[ :SOURCE ] :RADio:DMODulation:ARB:SETup:MCARrier:PHASe?
```

This command toggles the phase settings for multicarrier digital modulation.

**FIXed** This choice sets the phase of all carriers to 0.

**RANDom** This choice sets random phase values for all of the carriers.

**\*RST** FIX

**Key Entry** Carrier Phases Fixed Random

**Remarks** N/A

## :SETup:MCARrier:STORE

**Supported** All with Option 001 or 002

```
[ :SOURCE ] :RADio:DMODulation:ARB:SETup:MCARrier:STORE "<file name>"
```

This command stores the current multicarrier setup information.

The stored file contains information that includes the digital modulation format, number of carriers, frequency spacing, and power settings for the multicarrier setup.

**\*RST** N/A

**Range** N/A

**Key Entry** Load/Store

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

Refer to “File Name Variables” on page 14 for information on the file name syntax.

## :SETup:MCARrier:TABLE

**Supported** All with Option 001 or 002

```
[ :SOURCE ] :RADio:DMODulation:ARB:SETup:MCARrier:TABLE INIT|APPend|
<carrier_num>, GSM|NADC|PDC|PHS|DECT|AC4Fm|ACQPsk|CDPD|PWT|EDGE|TETRa|
"<file name>", <freq_offset>, <power>
[ :SOURCE ] :RADio:DMODulation:ARB:SETup:MCARrier:TABLE? <carrier_num>
```

This command modifies the parameters of one of the available multicarrier digital modulation formats.

The variable <freq\_offset> is expressed in units of Hertz (kHz–MHz).

The variable <power> is expressed in units of decibels (dB).

**INIT** This choice clears the current information and creates a new one-row table, allowing for further definition using additional parameters.

**APPend** This choice adds rows to an existing table.

**<carrier\_num>** This variable specifies the number of the carriers in the multicarrier table that will be modified.

The value of the variable <carrier\_num> must be specified prior to selecting the digital modulation format.

Carrier type, frequency offset, and power level are returned when a query is initiated. The output format is as follows:

```
<carrier type>, <freq_offset>, <power>
*RST carrier type: NADC <freq_offset>: -5.00000000E+004
<power>: +0.00000000E+000
```

**Range** <freq\_offset>: -1E5 to 1E6 <power>: -40 to 0

**Key Entry** Initialize Table Insert Row GSM NADC PDC PHS DECT  
APCO 25 w/C4FM APCO w/CQPSK CDPD PWT EDGE TETRA  
Custom Digital Mod State

**Remarks** Refer to “File Name Variables” on page 14 for information on the file name syntax.

The file specified must be a single carrier CDMA file. To store a multicarrier setup refer to “:SETup:MCARrier:STORE” on page 232.



**:SETup:MCARrier:TABLE:NCARriers****Supported** All with Option 001 or 002

[:SOURCE]:RADio:DMODulation:ARB:SETup:MCARrier:TABLE:NCARriers?

This query returns the number of carriers in the current multicarrier setup.

**\*RST** +2**Range** 1–100**Key Entry** # of Carriers**Remarks** N/A**:SETup:STORe****Supported** All with Option 001 or 002

[:SOURCE]:RADio:DMODulation:ARB:SETup:STORe "&lt;file name&gt;"

This command stores the current custom digital modulation state.

The saved file contains information that includes the modulation type, filter and symbol rate for the custom modulation setup.

**\*RST** N/A**Range** N/A**Key Entry** Store Custom Dig Mod State**Remarks** Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.**:SRATe****Supported** All with Option 001 or 002

[:SOURCE]:RADio:DMODulation:ARB:SRATe &lt;val&gt;

[:SOURCE]:RADio:DMODulation:ARB:SRATe?

This command sets the transmission symbol rate.

The variable &lt;val&gt; is expressed in units of bits per second (bps–Mbps) and the maximum range value is dependent upon the source of data (internal or external), the modulation type, and filter.

**\*RST** +2.43000000E+004

**Range**

<i>Modulation Type</i>	<i>Bits per Symbol</i>	<i>Internal Data</i>	<i>External Serial Data</i>
BPSK	1	1–50 Msps	1–50 Msps
FSK2			
MSK			
C4FM	2	1–50 Msps	1–25 Msps
FSK4			
OQPSK			
OQPSK195			
P4QPPSK			
QAM4			
QPSK			
QPSKIS95			
QPSKISAT			
D8PSK	3	1–33.33 Msps	1–16.67 Msps
EDGE			
FSK8			
PSK8			
FSK16	4	1–25 Msps	1–12.5 Msps
PSK16			
QAM16			
QAM32	5	1–20 Msps	1–10 Msps
QAM64	6	1–16.67 Msps	1–8.33 Msps
QAM256	7	1–12.50 Msps	1–6.25 Msps

**Key Entry**

**Symbol Rate**

**Remarks**

When user-defined filters are selected using the command in section “:FILTer” on page 270, the upper bit rate will be restricted in line with the following symbol rate restriction:

- FIR filter length > 32 symbols: upper limit is 12.5 Msps
- FIR filter length > 16 symbols: upper limit is 25 Msps

When internal FIR filters are used, the limits of the above table always apply. For higher symbol rates, the FIR filter length will be truncated as follows:

- Above 12.5 Msps, the FIR length will be truncated to 32 symbols
- Above 25 Msps, the FIR length will be truncated to 16 symbols

This will impact the relative timing of the modulated data, as well as the actual filter response.

To change the modulation type, refer to “:MODulation[:TYPE]” on page 276.

## :TRIGger:TYPE

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:TRIGger:TYPE CONTinuous|SINGLE|GATE
[:SOURce]:RADio:DMODulation:ARB:TRIGger:TYPE?
```

This command sets the trigger type.

**CONTinuous** The waveform repeats continuously; the sequence restarts every time the previous playback is completed. To customize continuous triggering, refer to “:TRIGger:TYPE:CONTinuous[:TYPE]” on page 285.

**SINGLE** The waveform segment or sequence plays once for every trigger received.

**GATE** An external trigger signal interrupts the playback while the gating signal is in the inactive state. Playback resumes when the external control signal returns to the active state. The active state can be set high or low.

**\*RST** CONT

**Key Entry** Continuous Single Gated

**Remarks** To change the polarity of the gated trigger, refer to “:TYPE:GATE:ACTive” on page 286.

## :TRIGger:TYPE:CONTinuous[:TYPE]

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:TRIGger:TYPE:CONTinuous[:TYPE] FREE|
TRIGger|RESet
[:SOURce]:RADio:DMODulation:ARB:TRIGger:TYPE:CONTinuous[:TYPE]?
```

This command customizes the continuous trigger selection.

**FREE** This choice immediately transmits a waveform that is continuously repeated.

**TRIGger** This choice causes the waveform to wait for a trigger. Once a trigger is received, the transmission of a continuously repeated waveform begins.

**RESet** This choice immediately restarts a continuously repeated waveform upon receiving a trigger.

<b>*RST</b>	FREE
<b>Key Entry</b>	Free Run    Trigger & Run    Reset & Run
<b>Remarks</b>	To select CONTinuous as the trigger type, refer to “:TRIGger:TYPE” on page 285.

**:TYPE:GATE:ACTive**

**Supported**      All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:TRIGger:TYPE:GATE:ACTive LOW|HIGH
[:SOURce]:RADio:DMODulation:ARB:TRIGger:TYPE:GATE:ACTive?
```

This command sets the arb trigger gate polarity; GATE must first be selected as the trigger type.

LOW            The sequence runs while the selected external control gating signal is low and restarts when the gate returns to the high level.

HIGH           The sequence runs while the selected external control gating signal is high and restarts when the gate returns to the low level.

<b>*RST</b>	HIGH
<b>Key Entry</b>	Gate Active Low High
<b>Remarks</b>	To select a GATE as the trigger type, refer to “:TRIGger:TYPE” on page 285.

**:TRIGger[:SOURce]**

**Supported**      All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:TRIGger[:SOURce] KEY|EXT|BUS
[:SOURce]:RADio:DMODulation:ARB:TRIGger[:SOURce]?
```

This command sets the trigger source.

KEY            This choice enables triggering by pressing the front panel **Trigger** hardkey.

EXT            This choice enables triggering using an externally applied signal at the PATT TRIG IN rear panel connector or the PATT TRIG IN 2 pin on the rear panel AUX I/O connector. To select the appropriate connector, refer to “:TRIGger[:SOURce]:EXTernal[:SOURce]” on page 288.

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

<b>*RST</b>	EXT		
<b>Key Entry</b>	<b>Trigger Key</b>	<b>Ext</b>	<b>Bus</b>
<b>Remarks</b>	N/A		

### **:TRIGger[:SOURce]:EXTernal:DELay**

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:TRIGger[:SOURce]:EXTernal:DELay <val>
[:SOURce]:RADio:DMODulation:ARB:TRIGger[:SOURce]:EXTernal:DELay?
```

This command sets the time for the external trigger delay.

The variable <val> is expressed as seconds ( $\mu$ sec–sec).

**\*RST** +1.00000000E–003

**Range** 1E–8 to 4E1

**Key Entry** **Ext Delay Time**

**Remarks** This command is effective only if an external trigger is selected as the trigger source. Refer to “:TRIGger[:SOURce]” on page 286.

### **:TRIGger[:SOURce]:EXTernal:DELay:STATe**

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:TRIGger[:SOURce]:EXTernal:DELay:
STATe ON|OFF|1|0
[:SOURce]:RADio:DMODulation:ARB:TRIGger[:SOURce]:EXTernal:DELay:STATe?
```

This command enables or disables the external trigger delay function.

**\*RST** 0

**Key Entry** **Ext Delay Off On**

**Remarks** This command is effective only if an external trigger is selected as the trigger source. Refer to “:TRIGger[:SOURce]” on page 286.

### :TRIGger[:SOURce]:EXTernal:SLOPe

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:TRIGger[:SOURce]:EXTernal:
SLOPe POSitive|NEGative
[:SOURce]:RADio:DMODulation:ARB:TRIGger[:SOURce]:EXTernal:SLOPe?
```

This command sets the polarity for the external trigger.

**\*RST** NEG

**Key Entry** Ext Polarity Neg Pos

**Remarks** This command is effective only if an external trigger is selected as the trigger source. Refer to “:TRIGger[:SOURce]” on page 286.

### :TRIGger[:SOURce]:EXTernal[:SOURce]

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:DMODulation:ARB:TRIGger[:SOURce]:
EXTernal[:SOURce] EPT1|EPT2|EPTRIGGER1|EPTRIGGER2
[:SOURce]:RADio:DMODulation:ARB:TRIGger[:SOURce]:EXTernal[:SOURce]?
```

This command specifies which PATT TRIG IN connection, rear panel connector or AUX I/O connector, will be used to accept an externally applied trigger signal.

**EPT1** This choice is synonymous with EPTRIGGER1 and selects the PATT TRIG IN rear panel connector for the external signal connection.

**EPT2** This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear panel AUX I/O connector for the external signal connection.

**EPTRIGGER1** This choice is synonymous with EPT1 and selects the PATT TRIG IN rear panel connector for the external signal connection.

**EPTRIGGER2** This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear panel AUX I/O connector for the external signal connection.

**\*RST** EPT1

**Key Entry** Patt Trig In 1 Patt Trig In 2

**Remarks** This command is effective only if an external trigger is selected as the trigger source. Refer to “:TRIGger[:SOURce]” on page 286.

For more information about the rear panel AUX I/O connector pin

configuration, refer to the *User's Guide*.

## [:STATe]

**Supported** All with Option 001 or 002

```
[:SOURCE]:RADIO:DMODULATION:ARB[:STATe] ON|OFF|1|0  
[:SOURCE]:RADIO:DMODULATION:ARB[:STATe]?
```

This command enables or disables the digital modulation capability.

ON (1) This choice sets up the internal hardware to generate the currently selected digital modulation format signal selection.

OFF (0) This choice disables the digital modulation capability.

**\*RST** 0

**Key Entry** **Digital Modulation Off On**

**Remarks** When ON is selected, the I/Q state is activated and the I/Q source is set to internal.

## Dual ARB Subsystem—Option 001 or 002 ([:SOURce]:RADio:ARB)

### :CLIPping

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:ARB:CLIPping "<file name>", IJQ|IORQ, <val>[, <val>]
```

This command sets the clipping level of the selected waveform segment to a percentage of its highest peak.

The variable <val> is expressed in units of percent.

**IJQ** This choice clips the composite I/Q waveform.

**IORQ** This choice clips I and Q separately. When this choice is enabled, percentage values for both I and Q must be specified.

**\*RST** IJQ <val>: +100

**Range** <val>: 10–100 (0.1% resolution)

**Key Entry** Clipping Type II+jQI III,IQI

**Remarks** A value of 100 percent equates to no clipping.

Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

### :IQ:EXTeRnal:FILTer

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:ARB:IQ:EXTeRnal:FILTer 40e6|THRough
[:SOURce]:RADio:ARB:IQ:EXTeRnal:FILTer?
```

This command selects the filter or through path for I/Q signals routed to the rear panel I and Q outputs. The filter has not effect on the modulated RF signal. Selecting a filter using this command will automatically set [“:IQ:EXTeRnal:FILTer:AUTO” on page 293](#) to OFF(0) mode.

**40e6** This choice applies a 40 MHz baseband filter.

**THRough** This choice bypasses filtering.



<b>*RST</b>	THR
<b>Key Entry</b>	40.000 MHz Through
<b>Remarks</b>	N/A

## :GENErate:SINE

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:ARB:GENErate:SINE ["<filename>"] [, <osr>] [, <scale>]
[, I|Q|IQ]
```

This command creates a file (using a specific file name) and stores a generated sine wave.

**<osr>** This variable sets the oversample ratio, which must be a value that is  $\geq 4$ . If the specified over sample ratio is  $< 60$  (the minimum number of samples), multiple periods are generated to create a waveform with at least 60 samples. The number of periods that will be created is  $60 \div \text{<osr>}$  (quotient will round off to a whole number). A waveform with an oversample ratio  $\geq 60$  has one period.

The maximum value for the range below is determined by the option and available baseband memory.

<b>*RST</b>	N/A
<b>Range</b>	<i>&lt;osr&gt; Option 001:</i> 4–8Msamples <i>Option 002:</i> 4–32Msamples

**Key Entry** N/A

**Remarks** Executing this command without the "<file name>" variable will generate a factory default SINE\_TEST\_WFM file.

When using the variable "<file name>" for this command, the "@" or ":" character is not allowed.

The file is always generated as "WFM#: <file name>", where "#" is replaced by the baseband generator number.

## :HEADer:CLEAr

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:ARB:HEADer:CLEAr
```

This command clears the header information from the header file used by this

modulation format.

**\*RST** N/A

**Key Entry** Clear Header

**Remarks** The **ARB Off On** softkey must be set to On for this command to function.

## :HEADer:SAVE

**Supported** All with Option 001 or 002

[:SOURce]:RADio:ARB:HEADer:SAVE

This command saves the header information to the header file used by this modulation format.

**\*RST** N/A

**Key Entry** Save Setup To Header

**Remarks** The **ARB Off On** softkey must be set to On for this command to function.

## :HCRest[:STATe]

**Supported** All with Option 001 or 002

[:SOURce]:RADio:ARB:HCRest[:STATe] ON|OFF|1|0

[:SOURce]:RADio:ARB:HCRest[:STATe]?

This command enables or disables the operating state of the high crest mode.

ON(1) This choice turns high crest mode on for arbitrary I/Q waveforms with high crest factors (such as downloaded Signal Studio for 802.11 signals). High crest mode reduces the ALC vernier level by 7.5 dB, allowing the signal generator to process these signals with less distortion and improved EVM. For crest factors higher than 4 dB, I/Q drive levels should be reduced by 1 dB for each dB above that level. In high crest mode, the maximum output level is reduced and power level accuracy is degraded.

OFF(0) This choice disables the high crest mode.

**\*RST** 0

**Key Entry** High Crest Mode Off On

**Remarks** The high crest mode is automatically turned on by some Signal Studio applications. You can manually override this automatic selection at

any time.

## **:IQ:EXTeRnal:FiLTeR:AUTO**

**Supported** All with Option 001 or 002

```
[ :SOURce ] :RADio:ARB:IQ:EXTeRnal:FiLTeR:AUTO ON|OFF|1|0  
[ :SOURce ] :RADio:ARB:IQ:EXTeRnal:FiLTeR:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals routed to the rear panel I/Q outputs.

ON(1) This choice will automatically select a digital modulation filter optimized for the current signal generator settings.

OFF(0) This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “[:IQ:EXTeRnal:FiLTeR](#)” on [page 290](#) for selecting a filter or through path.

**\*RST** 1

**Key Entry** I/Q Output Filter Manual Auto

**Remarks** N/A

**:IQ:MODulation:ATTen****Supported** All with Option 001 or 002

[:SOURce]:RADio:ARB:IQ:MODulation:ATTen &lt;val&gt;

[:SOURce]:RADio:ARB:IQ:MODulation:ATTen?

This command sets the attenuation level of the I/Q signals being modulated through the signal generator RF path.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +2.00000000E+000**Range** 0–40**Key Entry** Modulator Atten Manual Auto**Remarks** N/A**:IQ:MODulation:ATTen:AUTO****Supported** All with Option 001 or 002

[:SOURce]:RADio:ARB:IQ:MODulation:ATTen:AUTO ON|OFF|1|0

[:SOURce]:RADio:ARB:IQ:MODulation:ATTen:AUTO?

This command enables or disables the I/Q attenuation auto mode.

**ON (1)** This choice enables the attenuation auto mode which optimizes the modulator attenuation for the current conditions.

**OFF (0)** This choice holds the attenuator at its current setting or at a selected value. Refer to “[:IQ:MODulation:ATTen](#)” on page 294 for setting the attenuation value.

**\*RST** 1**Key Entry** Modulator Atten Manual Auto**Remarks** N/A**:IQ:MODulation:FILTer****Supported** All with Option 001 or 002

[:SOURce]:RADio:ARB:IQ:MODulation:FILTer 2.1e6|40e6|THROUGH

[:SOURce]:RADio:ARB:IQ:MODulation:FILTer?

This command enables you to select a filter or through path for I/Q signals modulated

onto the RF carrier. This filter has no effect on the I/Q signal out the rear panel. Selecting a filter using this command will automatically set “:IQ:MODulation:FILTer:AUTO” on page 295 to OFF(0) mode.

2.1E6	This choice applies a 2.1 MHz baseband filter to the I/Q signals.
40E6	This choice applies a 40 MHz baseband filter to the I/Q signals.
THRough	This choice bypasses filtering.
<b>*RST</b>	THR
<b>Key Entry</b>	<b>2.100 MHz 40.000 MHz Through</b>
<b>Remarks</b>	N/A

### :IQ:MODulation:FILTer:AUTO

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:ARB:IQ:MODulation:FILTer:AUTO ON|OFF|1|0
[:SOURce]:RADio:ARB:IQ:MODulation:FILTer:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals modulated onto the RF carrier.

- ON(1) This choice will automatically select a digital modulation filter.
- OFF(0) This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “:IQ:MODulation:FILTer” on page 294 for selecting a filter or through path.

<b>*RST</b>	1
<b>Key Entry</b>	<b>I/Q Mod Filter Manual Auto</b>
<b>Remarks</b>	N/A

### :MARKer:CLEar

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:ARB:MARKer:CLEar "<filename>",<mkr1|2|3|4>,<first_point>,<last_point>
```

This command clears markers from a waveform segment.

- "<file name>" This variable specifies the name of the waveform segment file.
- <mkr1|2|3|4> This variable designates which marker is to be cleared (1, 2, 3, or 4).

## Dual ARB Subsystem—Option 001 or 002 ([:SOURce]:RADio:ARB)

<first_point>	This variable defines the first point in a range of points (must be $\geq 1$ , and $\leq$ the total number of waveform points).
<last_point>	This variable defines the last point in a range of points (must be $\geq 1$ , and $\leq$ the total number of waveform points).
<b>*RST</b>	N/A
<b>Range</b>	<first_Point>: 1–# of waveform points <last_point>: 1–# of waveform points
<b>Key Entry</b>	<b>Marker 1 2 3 4    First Mkr Point    Last Mkr Point</b>
<b>Remarks</b>	Refer to “File Name Variables” on page 14 for information on the file name syntax.

**:MARKer:CLEAr:ALL**

**Supported**      All with Option 001 or 002

[ :SOURce ] :RADio:ARB:MARKer:CLEAr:ALL "<file name>", <mkr1|2|3|4>

This command clears all markers from a waveform segment simultaneously.

"<file name>"    This variable specifies the name of the waveform segment file.

<mkr1|2|3|4>    This variable designates which marker is to be cleared (1, 2, 3, or 4).

**\*RST**            N/A

**Range**            N/A

**Key Entry**        **Set Marker Off All Points**

**Remarks**        Refer to “File Name Variables” on page 14 for information on the file name syntax.

**:MARKer:ROtate**

**Supported**      All with Option 001 or 002

[ :SOURce ] :RADio:ARB:MARKer:ROtate "<file name>", <rotate\_count>

This command shifts the marker bits in a waveform segment.

**\*RST**            N/A

**Range**            <rotate\_count>: number of points in the waveform – 1

**Key Entry**        N/A

**Remarks** To define the maximum allowable points in a waveform, refer to “:MARKer:[SET]” on page 297.  
Refer to “File Name Variables” on page 14 for information on the file name syntax.

## :MARKer:[SET]

**Supported** All with Option 001 or 002

```
[:SOURCE]:RADio:ARB:MARKer:[SET] "<filename>",<mkr1|2|3|4>,<first_point>,<last_point>,<skip_count>
```

This command defines a marker over a range of points on a waveform segment.

"<file name>" This choice specifies the name of the waveform segment file.

<mkr1|2|3|4> This variable designates which marker is to be set (1, 2, 3, or 4).

<first\_point> This variable defines the first point in the range over which the marker will be placed. This number must be greater than or equal to 1, and less than or equal to the total number of waveform points.

If you enter a value for either the first marker point or the last marker point that would make the first marker point occur after the last, the last marker point is automatically adjusted to match the first marker point.

<last\_point> This variable defines the last point in the range over which the marker will be placed. This value must be greater than or equal to 1, and less than or equal to the total number of waveform points.

<skip\_count> This variable creates a repeating pattern of markers.

Defining a skip count causes the marker to appear on the first point in the defined range, disappear over the number of points defined as the skip count, then reappear for one point. The pattern repeats until the end of the defined range. This enables you to set repetitively spaced markers. For example, a skip of 2 produces two points between each marker across the defined range.

**\*RST** N/A

**Range** <first\_Point>: 1–# of waveform points

<last\_point>: 1–# of waveform points <skip\_count>: 0–65535

**Key Entry** Marker 1 2 3 4 First Mkr Point Last Mkr Point # Skipped Points

**Remarks** Refer to “File Name Variables” on page 14 for information on the file

name syntax.

### :MDEStination:PULSe

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:ARB:MDEStination:PULSe NONE|M1|M2|M3|M4
[:SOURce]:RADio:ARB:MDEStination:PULSe?
```

This command routes the selected marker to the Pulse/RF Blanking function. The NONE parameter clears the marker for the Pulse/RF Blanking function.

**\*RST** NONE

**Key Entry** None Marker 1 Marker 2 Marker 3 Marker 4

**Remarks** N/A

### :MDEStination:AAMPlitude

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:ARB:MDEStination:AAMPlitude NONE|M1|M2|M3|M4
[:SOURce]:RADio:ARB:MDEStination:AAMPlitude?
```

This command routes the selected marker to the Alternate Amplitude function. The NONE parameter clears the marker for the Alternate Amplitude function.

**\*RST** NONE

**Key Entry** None Marker 1 Marker 2 Marker 3 Marker 4

**Remarks** N/A

### :MDEStination:ALCHold

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:ARB:MDEStination:ALCHold NONE|M1|M2|M3|M4
[:SOURce]:RADio:ARB:MDEStination:ALCHold?
```

This command routes the selected marker to the ALC Hold function. The NONE parameter clears the marker for the ALC Hold function.

**\*RST** NONE

**Key Entry** None Marker 1 Marker 2 Marker 3 Marker 4

**Remarks** N/A



## **:MPOLarity:MARKer1**

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:ARB:MPOLarity:MARKer1 NEGative|POSitive  
[:SOURce]:RADio:ARB:MPOLarity:MARKer1?
```

This command sets the polarity for marker 1.

**\*RST** POS

**Key Entry** Marker 1 Polarity Neg Pos

**Remarks** N/A

## **:MPOLarity:MARKer2**

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:ARB:MPOLarity:MARKer2 NEGative|POSitive  
[:SOURce]:RADio:ARB:MPOLarity:MARKer2?
```

This command sets the polarity for marker 2.

**\*RST** POS

**Key Entry** Marker 2 Polarity Neg Pos

**Remarks** N/A

## **:MPOLarity:MARKer3**

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:ARB:MPOLarity:MARKer3 NEGative|POSitive  
[:SOURce]:RADio:ARB:MPOLarity:MARKer3?
```

This command sets the polarity for marker 3.

**\*RST** POS

**Key Entry** Marker 3 Polarity Neg Pos

**Remarks** N/A

### **:MPOLaRity:MARKer4**

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:ARB:MPOLaRity:MARKer4 NEGative|POSitive
[:SOURce]:RADio:ARB:MPOLaRity:MARKer4?
```

This command sets the polarity for marker 4.

**\*RST** POS

**Key Entry** Marker 4 Polarity Neg Pos

**Remarks** N/A

### **:REFerence:EXTeRnal:FREQuency**

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:ARB:REFerence:EXTeRnal:FREQuency <val>
[:SOURce]:RADio:ARB:REFerence:EXTeRnal:FREQuency?
```

This command allows you to enter the frequency of the applied external reference.

The variable <val> is expressed in units of Hertz (Hz–MHz).

**\*RST** +1.00000000E+007

**Range** 2.5E5–1E8

**Key Entry** Reference Freq

**Remarks** The value specified by this command is effective only when you are using an external ARB reference applied to the BASEBAND GEN REF IN rear panel connector.

To specify external as the ARB reference source type, refer to “:REFerence[:SOURce]” on page 300.

### **:REFerence[:SOURce]**

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:ARB:REFerence[:SOURce] INTernal|EXTernal
[:SOURce]:RADio:ARB:REFerence[:SOURce]?
```

This command selects either an internal or external reference for the waveform clock.

**\*RST** INT

**Key Entry** ARB Reference Ext Int

**Remarks** If the EXTERNAL choice is selected, the external frequency value *must* be entered and the signal must be applied to the BASEBAND GEN REF IN rear panel connector.

Refer to “:REFERENCE:EXTERNAL:FREQUENCY” on page 300 to enter the external reference frequency.

## :RETRigger

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:ARB:RETRigger ON|OFF|IMMEDIATE
[:SOURce]:RADio:ARB:RETRigger?
```

This command enables or disables the ARB retriggering mode; the retrigger mode controls how the retriggering function performs while a waveform is playing.

- ON (1) This choice specifies that if a trigger occurs while a waveform is playing, the waveform will retrigger at the end of the current waveform sequence and play once more.
- OFF (0) This choice specifies that if a trigger occurs while a waveform is playing, the trigger will be ignored.
- IMMEDIATE This choice specifies that if a trigger occurs while a waveform is playing, the waveform will reset and replay from the start immediately upon receiving a trigger.

**\*RST** ON

**Key Entry** On Off Immediate

**Remarks** N/A

## :RSCAling

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:ARB:RSCAling <val>
[:SOURce]:RADio:ARB:RSCAling?
```

This command adjusts the scaling value that is applied to a waveform while it is playing.

The variable <val> is expressed in units of percent.

**\*RST** +7.00000000E+001

**Range** 1–100

**Key Entry** Waveform Runtime Scaling

**Remarks** Runtime scaling does not alter the waveform data file.

## :SCALing

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:ARB:SCALing "<file name>",<val>
```

This command sets the scaling value of the selected waveform segment.

The variable <val> is expressed in units of percent.

**\*RST** N/A

**Range** <val>: 1–100

**Key Entry** **Scaling**

**Remarks** Refer to “File Name Variables” on page 14 for information on the file name syntax.

## :SCLock:RATE

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:ARB:SCLock:RATE <val>
```

```
[:SOURce]:RADio:ARB:SCLock:RATE?
```

This command sets the sample clock rate for the Dual ARB format.

The variable <val> is expressed in units of hertz.

**\*RST** +1.00000000E+008

**Range** 1–1E8

**Key Entry** **ARB Sample Clock**

**Remarks** N/A

## :SEQuence

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:ARB:SEQuence "<file name>",<waveform>",<reps>,  
<mkr1(1|0)>,<mkr2(1|0)>,{ "<waveform>",<reps>,<mkr1(1|0)>,<mkr2(1|0)>}  
[:SOURce]:RADio:ARB:SEQuence? "<file name>"
```

This command creates or defines a waveform sequence. The waveform file consists of the subsequent waveform segment files (combined in the same order in which the variables

are listed above).

"<file name>"	This variable specifies the name of the waveform sequence file.
"<waveform>"	This variable specifies the exact name of the waveform file.
<reps>	This variable edits the number times the waveform should repeat.
<mkr1(1 0)>	This variable toggles marker 1 on (1) or off (0).
<mk2(1 0)>	This variable toggles marker 2 on (1) or off (0).
<b>*RST</b>	N/A
<b>Range</b>	<reps>: 1–65535
<b>Key Entry</b>	<b>Build New Waveform Sequence    Edit Selected Waveform Sequence</b> <b>Toggle Marker 1    Toggle Marker 2    Edit Repetitions</b>
<b>Remarks</b>	Refer to “ <a href="#">File Name Variables</a> ” on page 14 for information on the file name syntax. compilations.

## **:TRIGger:TYPE**

**Supported**      All with Option 001 or 002

[:SOURce]:RADio:ARB:TRIGger:TYPE CONTInuous | SINGle | GATE | SADVance  
[:SOURce]:RADio:ARB:TRIGger:TYPE?

This command sets the trigger type.

CONTInuous	The waveform repeats continuously; the sequence restarts every time the previous playback is completed.
SINGle	The waveform segment or sequence plays once for every trigger received.
GATE	An external trigger signal interrupts the playback while the gating signal is in the inactive state. Playback resumes when the external control signal returns to the active state. The active state can be set high or low.
SADVance	The selected trigger controls the advance to the next segment in the sequence. To customize segment advance, refer to “ <a href="#">:TRIGger:TYPE:SADVance[:TYPE]</a> ” on page 305.
<b>*RST</b>	CONT
<b>Key Entry</b>	<b>Continuous    Single    Gate    Segment Advance</b>
<b>Remarks</b>	The SADvance choice can only be activated when a waveform sequence is active.

**:TRIGger:TYPE:CONTInuous[:TYPE]****Supported** All with Option 001 or 002

```
[:SOURce]:RADio:ARB:TRIGger:TYPE:CONTInuous[:TYPE] FREE|TRIGger|RESet
[:SOURce]:RADio:ARB:TRIGger:TYPE:CONTInuous[:TYPE]?
```

This command customizes the continuous trigger selection.

- FREE** This choice immediately transmits a waveform that is continuously repeated.
- TRIGger** This choice causes the waveform to wait for a trigger. Once a trigger is received, the transmission of a continuously repeated waveform begins.
- RESet** This choice immediately restarts a continuously repeated waveform upon receiving a trigger.

**\*RST** FREE**Key Entry** Free Run Trigger & Run Reset & Run**Remarks** To select CONTInuous as the trigger type, refer to “:TRIGger:TYPE” on [page 303](#).**:TRIGger:TYPE:GATE:ACTive****Supported** All with Option 001 or 002

```
[:SOURce]:RADio:ARB:TRIGger:TYPE:GATE:ACTive LOW|HIGH
[:SOURce]:RADio:ARB:TRIGger:TYPE:GATE:ACTive?
```

This command toggles the polarity of the active state of the external gating input signal; GATE must be selected as the arb trigger type.

- LOW** The sequence runs while the selected external control gating signal is low and restarts when the gate returns to the high level.
- HIGH** The sequence runs while the selected external control gating signal is high and restarts when the gate returns to the low level.

**\*RST** HIGH**Key Entry** Gate Active Low High**Remarks** To select GATE as the trigger type, refer to “:TRIGger:TYPE” on [page 303](#).

## **:TRIGger:TYPE:SADVance[:TYPE]**

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE] SINGLE|CONTinuous
[:SOURce]:RADio:ARB:TRIGger:TYPE:SADVance[:TYPE]?
```

This command customizes the segment advance trigger type setting.

**SINGLE** This choice will play the next segment in the sequence only once.

**CONTinuous** This choice will instruct the sequencer to continually play the next segments in the waveform sequence in a continuous pattern.

**\*RST** CONT

**Key Entry** **Single** **Continuous**

**Remarks** This command is valid when SADVance has been selected as the trigger type.

To select SADVance as the trigger type, refer to “:TRIGger:TYPE” on [page 303](#).

## **:TRIGger[:SOURce]**

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:ARB:TRIGger[:SOURce] KEY|EXT|BUS
[:SOURce]:RADio:ARB:TRIGger[:SOURce]?
```

This command sets the trigger source.

**KEY** This choice enables triggering by pressing the front panel **Trigger** hardkey.

**EXT** This choice enables triggering using an externally applied signal at the PATT TRIG IN rear panel connector or the PATT TRIG IN 2 pin on the rear panel AUX I/O connector. To select the appropriate connector, refer to “:TRIGger[:SOURce]:EXTernal[:SOURce]” on [page 306](#).

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

**\*RST** EXT

**Key Entry** **Trigger Key** **Ext** **Bus**

**Remarks** N/A

**:TRIGger[:SOURce]:EXTernal[:SOURce]****Supported** All with Option 001 or 002

```
[:SOURce]:RADio:ARB:TRIGger[:SOURce]:EXTernal[:SOURce] EPT1|EPT2|
EPTRIGGER1|EPTRIGGER2
[:SOURce]:RADio:ARB:TRIGger[:SOURce]:EXTernal[:SOURce]?
```

This command specifies which PATT TRIG IN connection, rear panel connector or AUX I/O connector, will be used to accept an externally applied trigger signal.

EPT1	This choice is synonymous with EPTRIGGER1 and selects the PATT TRIG IN rear panel connector for the external signal connection.
EPT2	This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear panel AUX I/O connector for the external signal connection.
EPTRIGGER1	This choice is synonymous with EPT1 and selects the PATT TRIG IN rear panel connector for the external signal connection.
EPTRIGGER2	This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear panel AUX I/O connector for the external signal connection.
<b>*RST</b>	EPT1
<b>Key Entry</b>	<b>Patt Trig In 1    Patt Trig In 2</b>
<b>Remarks</b>	This command is effective only if an external trigger is selected as the trigger source. Refer to <a href="#">“:TRIGger[:SOURce]” on page 305</a> .  For more information about the rear panel AUX I/O connector pin configuration, refer to the <i>User’s Guide</i> .

**:TRIGger[SOURce]:EXTernal:DELay****Supported** All with Option 001 or 002

```
[:SOURce]:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay <val>
[:SOURce]:RADio:ARB:TRIGger[:SOURce]:EXTernal:DELay?
```

This command specifies the value for the external trigger delay.

The variable <val> is expressed as seconds ( $\mu$ sec–sec).

<b>*RST</b>	+1.00000000E–003
<b>Range</b>	1E–8 to 4E1



<b>Key Entry</b>	<b>Ext Delay Time</b>
<b>Remarks</b>	This command is effective only if an external trigger is selected as the trigger source. Refer to “:TRIGger[:SOURce]” on page 305.

## :TRIGger[:SOURce]:EXTernal:DELay:STATe

**Supported** All with Option 001 or 002

```
[ :SOURce ] :RADio:ARB:TRIGger [ :SOURce ] :EXTernal:DELay:STATe ON|OFF|1|0  
[ :SOURce ] :RADio:ARB:TRIGger [ :SOURce ] :EXTernal:DELay:STATe?
```

This command enables or disables the operating state of the external trigger delay function.

**\*RST** 0

**Key Entry** **Ext Delay Off On**

**Remarks** This command is effective only if an external trigger is selected as the trigger source. Refer to “:TRIGger[:SOURce]” on page 305.

## :TRIGger[:SOURce]:EXTernal:SLOPe

**Supported** All with Option 001 or 002

```
[ :SOURce ] :RADio:ARB:TRIGger [ :SOURce ] :EXTernal:SLOPe POSitive|NEGative  
[ :SOURce ] :RADio:ARB:TRIGger [ :SOURce ] :EXTernal:SLOPe?
```

This command sets the polarity of the external trigger.

**\*RST** NEG

**Key Entry** **Ext Polarity Neg Pos**

**Remarks** This command is effective only if an external trigger is selected as the trigger source. Refer to “:TRIGger[:SOURce]” on page 305.

## :WAVEform

**Supported** All with Option 001 or 002

```
[ :SOURce ] :RADio:ARB:WAVEform "WFM1|SEQ:<file_name>"  
[ :SOURce ] :RADio:ARB:WAVEform?
```

This command selects the waveform type and file to be played by the dual arbitrary waveform generator.

WFM1 This choice selects a single waveform segment.

## Dual ARB Subsystem—Option 001 or 002 ([:SOURce]:RADio:ARB)

<b>SEQ</b>	This choice selects a sequence of segments.  The appropriate file name of the sequence replaces the <file name> variable.
<b>*RST</b>	N/A
<b>Key Entry</b>	<b>Select Waveform</b>
<b>Remarks</b>	N/A

## [:STATe]

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:ARB[:STATe] ON|OFF|1|0
[:SOURce]:RADio:ARB[:STATe]?
```

This command enables or disables the arbitrary waveform generator function.

<b>*RST</b>	0
<b>Key Entry</b>	<b>ARB Off On</b>
<b>Remarks</b>	N/A

---

## Multitone Subsystem—Option 001 or 002 ([:SOURCE]:RADio:MTONE:ARB)

### Creating a Multitone Waveform

Use the following steps to create a multitone waveform:

1. Initialize the phase for the multitone waveform. Refer to “:SETup:TABLE:PHASe:INITialize” on page 320.
2. Assign the frequency spacing between the tones. Refer to “:SETup:TABLE:FSPacing” on page 319.
3. Define the number of tones within the waveform. Refer to “:SETup:TABLE:NTONes” on page 319.
4. Modify the power level, phase, and state of any individual tones. Refer to “:ROW” on page 316.

### :IQ:EXTErnal:FIILTER

**Supported** All with Option 001 or 002

```
[ :SOURce ] :RADio:MTONE:ARB:IQ:EXTErnal:FIILTER 40e6 | THROugh  
[ :SOURce ] :RADio:MTONE:ARB:IQ:EXTErnal:FIILTER?
```

This command selects the filter or through path for I/Q signals routed to the rear panel I and Q outputs. Selecting a filter using this command will automatically set “:IQ:EXTErnal:FIILTER:AUTO” on page 310 to OFF(0) mode.

40e6 This choice applies a 40 MHz baseband filter.

THROugh This choice bypasses filtering.

**\*RST** THR

**Key Entry** 40.000 MHz Through

**Remarks** N/A

## :IQ:EXTErnal:FILTEr:AUTO

**Supported** All with Option 001 or 002

```
[ :SOURCE ] :RADio:MTONE:ARB:IQ:EXTErnal:FILTEr:AUTO ON|OFF|1|0
```

```
[ :SOURCE ] :RADio:MTONE:ARB:IQ:EXTErnal:FILTEr:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals routed to the rear panel I/Q outputs.

ON(1) This choice will automatically select a digital modulation filter optimized for the current signal generator settings.

OFF(0) This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “:IQ:EXTErnal:FILTEr” on [page 309](#) for selecting a filter or through path.

\*RST 1

**Key Entry** I/Q Output Filter Manual Auto

**Remarks** N/A

## :HEADer:CLEAr

**Supported** All with Option 001 or 002

```
[ :SOURCE ] :RADio:MTONE:ARB:HEADer:CLEAr
```

This command clears the header information from the header file used by this modulation format.

\*RST N/A

**Key Entry** Clear Header

**Remarks** The **Multitone Off On** softkey must be set to On for this command to function.

## :HEADer:SAVE

**Supported** All with Option 001 or 002

```
[ :SOURCE ] :RADio:MTONE:ARB:HEADer:SAVE
```

This command saves the header information to the header file used by this modulation format.

\*RST N/A

<b>Key Entry</b>	<b>Save Setup To Header</b>
<b>Remarks</b>	The <b>Multitone Off On</b> softkey must be set to On for this command to function.

## **:IQ:MODulation:ATTen**

**Supported** All with Option 001 or 002

```
[ :SOURce ] :RADio:MTONE:ARB:IQ:MODulation:ATTen <val>  
[ :SOURce ] :RADio:MTONE:ARB:IQ:MODulation:ATTen?
```

This command attenuates the I/Q signals being modulated through the signal generator RF path.

The variable <val> is expressed in units of decibels (dB).

<b>*RST</b>	+2.00000000E+000
<b>Range</b>	0–40
<b>Key Entry</b>	<b>Modulator Atten Manual Auto</b>
<b>Remarks</b>	N/A

## **:IQ:MODulation:ATTen:AUTO**

**Supported** All with Option 001 or 002

```
[ :SOURce ] :RADio:MTONE:ARB:IQ:MODulation:ATTen:AUTO ON|OFF|1|0  
[ :SOURce ] :RADio:MTONE:ARB:IQ:MODulation:ATTen:AUTO?
```

This command enables or disables the I/Q attenuation auto mode.

- ON (1) This choice enables the attenuation auto mode which optimizes the modulator attenuation for the current conditions.
- OFF (0) This choice holds the attenuator at its current setting or at a selected value. Refer to “[:IQ:MODulation:ATTen](#)” on page 311 for setting the attenuation value.

<b>*RST</b>	1
<b>Key Entry</b>	<b>Modulator Atten Manual Auto</b>
<b>Remarks</b>	N/A

### :IQ:MODulation:FILTer

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:MTONe:ARB:IQ:MODulation:FILTer 2.1e6|40e6|THROUGH
[:SOURce]:RADio:MTONe:ARB:IQ:MODulation:FILTer?
```

This command enables you to select a filter or through path for I/Q signals modulated onto the RF carrier. Selecting a filter using this command will automatically set “:IQ:MODulation:FILTer:AUTO” on page 312 to OFF(0) mode.

- 2.1E6 This choice applies a 2.1 MHz baseband filter to the I/Q signals.
- 40E6 This choice applies a 40 MHz baseband filter to the I/Q signals.
- THROUGH This choice bypasses filtering.

**\*RST** THR

**Key Entry** 2.100 MHz 40.000 MHz Through

**Remarks** N/A

### :IQ:MODulation:FILTer:AUTO

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:MTONe:ARB:IQ:MODulation:FILTer:AUTO ON|OFF|1|0
[:SOURce]:RADio:MTONe:ARB:IQ:MODulation:FILTer:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals modulated onto the RF carrier.

- ON(1) This choice will automatically select a digital modulation filter.
- OFF(0) This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “:IQ:MODulation:FILTer” on page 294 for selecting a filter or through path.

**\*RST** 1

**Key Entry** I/Q Mod Filter Manual Auto

**Remarks** N/A

## :MDEStination:PULSe

**Supported** All with Option 001 or 002

```
[ :SOURCE ] :RADio:MTONE:ARB:MDEStination:PULSe NONE | M1 | M2 | M3 | M4  
[ :SOURCE ] :RADio:MTONE:ARB:MDEStination:PULSe?
```

This command routes the selected marker to the Pulse/RF Blanking function. The NONE parameter clears the marker for the Pulse/RF Blanking function.

**\*RST** NONE

**Key Entry** None Marker 1 Marker 2 Marker 3 Marker 4

**Remarks** N/A

## :MDEStination:AAMPlitude

**Supported** All with Option 001 or 002

```
[ :SOURCE ] :RADio:MTONE:ARB:MDEStination:AAMPlitude NONE | M1 | M2 | M3 | M4  
[ :SOURCE ] :RADio:MTONE:ARB:MDEStination:AAMPlitude?
```

This command routes the selected marker to the Alternate Amplitude function. The NONE parameter clears the marker for the Alternate Amplitude function.

**\*RST** NONE

**Key Entry** None Marker 1 Marker 2 Marker 3 Marker 4

**Remarks** N/A

## :MDEStination:ALCHold

**Supported** All with Option 001 or 002

```
[ :SOURCE ] :RADio:MTONE:ARB:MDEStination:ALCHold NONE | M1 | M2 | M3 | M4  
[ :SOURCE ] :RADio:MTONE:ARB:MDEStination:ALCHold?
```

This command routes the selected marker to the ALC Hold function. The NONE parameter clears the marker for the ALC Hold function.

**\*RST** NONE

**Key Entry** None Marker 1 Marker 2 Marker 3 Marker 4

**Remarks** N/A

### **:MPOLarity:MARKer1**

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:MTONE:ARB:MPOLarity:MARKer1 NEGative|POSitive  
[:SOURce]:RADio:MTONE:ARB:MPOLarity:MARKer1?
```

This command sets the polarity for marker 1.

**\*RST** POS

**Key Entry** Marker 1 Polarity Neg Pos

**Remarks** N/A

### **:MPOLarity:MARKer2**

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:MTONE:ARB:MPOLarity:MARKer2 NEGative|POSitive  
[:SOURce]:RADio:MTONE:ARB:MPOLarity:MARKer2?
```

This command sets the polarity for marker 2.

**\*RST** POS

**Key Entry** Marker 2 Polarity Neg Pos

**Remarks** N/A

### **:MPOLarity:MARKer3**

**Supported** All with Option 001 or 002

```
[:SOURce]:RADio:MTONE:ARB:MPOLarity:MARKer3 NEGative|POSitive  
[:SOURce]:RADio:MTONE:ARB:MPOLarity:MARKer3?
```

This command sets the polarity for marker 3.

**\*RST** POS

**Key Entry** Marker 3 Polarity Neg Pos

**Remarks** N/A



## **:MPOLarity:MARKer4**

**Supported**      All with Option 001 or 002

```
[:SOURce]:RADio:MTONE:ARB:MPOLarity:MARKer4 NEGative|POSitive
[:SOURce]:RADio:MTONE:ARB:MPOLarity:MARKer4?
```

This command sets the polarity for marker 4.

**\*RST**            POS

**Key Entry**      **Marker 4 Polarity Neg Pos**

**Remarks**      N/A

## **:REFerence:EXTernal:FREQuency**

**Supported**      All with Option 001 or 002

```
[:SOURce]:RADio:MTONE:ARB:REFerence:EXTernal:FREQuency <val>
[:SOURce]:RADio:MTONE:ARB:REFerence:EXTernal:FREQuency?
```

This command allows you to enter the frequency of the applied external reference.

The variable <val> is expressed in units of Hertz (Hz–MHz).

**\*RST**            +1.00000000E+007

**Range**           2.5E5–1E8

**Key Entry**      **Reference Freq**

**Remarks**      The value specified by this command is effective only when you are using an external ARB reference applied to the BASEBAND GEN REF IN rear panel connector.

To specify external as the ARB reference source type, refer to “:REFerence[:SOURce]” on page 315.

## **:REFerence[:SOURce]**

**Supported**      All with Option 001 or 002

```
[:SOURce]:RADio:MTONE:ARB:REFerence[:SOURce] INTernal|EXTernal
[:SOURce]:RADio:MTONE:ARB:REFerence[:SOURce]?
```

This command selects either an internal or external reference for the waveform clock.

**\*RST**            INT

**Key Entry**      ARB Reference Ext Int

**Multitone Subsystem—Option 001 or 002 ([:SOURce]:RADio:MTONE:ARB)**

- Remarks** If the EXTERNAL choice is selected, the external frequency *value must* be entered and the signal must be applied to the BASEBAND GEN REF IN rear panel connector.
- Refer to “[:REFERENCE:EXTERNAL:FREQUENCY](#)” on page 315 to enter the external reference frequency.

**:ROW**

- Supported** All with Option 001 or 002

```
[ :SOURce ] :RADio:MTONE:ARB:SETup:TABLE:ROW <row_number> , <power> ,  
<phase> , <state>
```

```
[ :SOURce ] :RADio:MTONE:ARB:SETup:TABLE:ROW? <row_number>
```

This command modifies the indicated tone (row) of the multitone waveform.

<row\_number> The number of rows for this variable are determined by the :SETup:TABLE command.

The variable <power> is expressed in units of decibels (dB).

The variable <phase> is expressed in units of degrees (deg).

Frequency offset, power, phase, and state value are returned when a query is initiated. The output format is as follows:

```
<frequency offset> , <power> , <phase> , <state>
```

```
*RST          frequency offset: -3.50000000E+004  <power>: +0.00000000E+000  
              <phase>: +0.00000000E+000  <state>: 1
```

```
Range         frequency offset: -4E7 to 4E7  <power>: -80 to 0  <phase>: 0-359  
              <state>: 1
```

**Key Entry** **Goto Row** **Toggle State**

**Remarks** Refer to “[:SETup:TABLE](#)” on page 318 for information on how to change the number of rows.

This command is the final step in creating a multitone waveform. Refer to “[Creating a Multitone Waveform](#)” on page 309 for all four steps.

## :SCLock:RATE

**Supported** All with Option 001 or 002

```
[ :SOURCE ] :RADio:MTONE:ARB:SCLock:RATE <val>
```

```
[ :SOURCE ] :RADio:MTONE:ARB:SCLock:RATE?
```

This command sets the sample clock rate for the Multitone modulation format.

The variable <val> is expressed in units of hertz.

**\*RST** +1.00000000E+008

**Range** 1–1E8

**Key Entry** ARB Sample Clock

**Remarks** The modulation format should be active before executing this command. If this command is executed before the modulation format is active, the entered value will be overridden by a calculated factory default value. Refer to “[STATE]” on page 321 to activate the modulation format.

## :SETup

**Supported** All with Option 001 or 002

```
[ :SOURCE ] :RADio:MTONE:ARB:SETup "<file name>"
```

```
[ :SOURCE ] :RADio:MTONE:ARB:SETup?
```

This command retrieves a multitone waveform file.

**\*RST** N/A

**Range** N/A

**Key Entry** Load From Selected File

**Remarks** The name of a multitone waveform file is stored in the signal generator file system of MTONE files. This information is held in memory until you send the command that turns the waveform on.

Refer to “File Name Variables” on page 14 for information on the file name syntax.

## :SETup:STORe

**Supported** All with Option 001 or 002

[:SOURce]:RADio:MTONE:ARB:SETup:STORe "<file name>"

This command stores the current multitone waveform setup in the signal generator file system of MTONE files.

**\*RST** N/A

**Range** N/A

**Key Entry** **Store To File**

**Remarks** N/A

## :SETup:TABLE

**Supported** All with Option 001 or 002

[:SOURce]:RADio:MTONE:ARB:SETup:TABLE <freq\_spacing>, <num\_tones>, {<phase>, <state>}

[:SOURce]:RADio:MTONE:ARB:SETup:TABLE?

This command creates and configures a multitone waveform.

The frequency offset, power, phase, and state value are returned when a query is initiated. The output format is as follows:

<frequency offset>, <power>, <phase>, <state>

The variable <freq\_spacing> is expressed in units of Hertz (Hz–MHz).

The variable <power> is expressed in units of decibels (dB).

*RST	Tone	<frequency offset>	<power>	<phase>	<state>
	Tone 1	-35000	+0.00000000E+000	+0	+1
	Tone 2	-25000	+0.00000000E+000	+0	+1
	Tone 3	-15000	+0.00000000E+000	+0	+1
	Tone 4	-5000	+0.00000000E+000	+0	+1
	Tone 5	+5000	+0.00000000E+000	+0	+1
	Tone 6	+15000	+0.00000000E+000	+0	+1
	Tone 7	+25000	+0.00000000E+000	+0	+1
	Tone 8	+35000	+0.00000000E+000	+0	+1

**Range** <freq\_spacing> (2 tones): 1E4–8E7 <num\_tones>: 2–64

*<freq\_spacing>* (>2 tones): 1E4 to (80 MHz ÷ (num\_tones – 1))  
*<phase>*: 0–359

**Key Entry**      **Freq Spacing    Number Of Tones    Toggle State**

**Remarks**      To set the frequency spacing, refer to “:SETup:TABLE:FSPacing” on page 319.

## **:SETup:TABLE:FSPacing**

**Supported**      All with Option 001 or 002

```
[ :SOURCE ] :RADio:MTONE:ARB:SETup:TABLE:FSPacing <freq_spacing>
[ :SOURCE ] :RADio:MTONE:ARB:SETup:TABLE:FSPacing?
```

This command sets the frequency spacing between the tones.

The variable *<freq\_spacing>* is expressed in units of Hertz (Hz–MHz).

**\*RST**            +1.00000000E+004

**Range**            *<freq\_spacing>* (2 tones): 1E4–8E7  
*<freq\_spacing>* (>2 tones): 1E4 to (80 MHz ÷ (num\_tones – 1))

**Key Entry**      **Freq Spacing**

**Remarks**      To set frequency spacing and additional parameters required to create or configure a multitone waveform, refer to “:SETup:TABLE” on page 318.

This command is the second step in creating a multitone waveform. Refer to “Creating a Multitone Waveform” on page 309 for all four steps.

## **:SETup:TABLE:NTONes**

**Supported**      All with Option 001 or 002

```
[ :SOURCE ] :RADio:MTONE:ARB:SETup:TABLE:NTONes <num_tones>
[ :SOURCE ] :RADio:MTONE:ARB:SETup:TABLE:NTONes?
```

This command defines the number of tones in the multitone waveform.

**\*RST**            +8

**Range**            2–64

**Key Entry**      **Number Of Tones**

Multitone Subsystem—Option 001 or 002 ([:SOURce]:RADio:MTONE:ARB)

**Remarks** To specify the number of tones and additional parameters required to create or configure a multitone waveform, refer to “:SETup:TABLE” on page 318.

This command is the third step in creating a multitone waveform. Refer to “Creating a Multitone Waveform” on page 309 for all four steps.

**:SETup:TABLE:PHASe:INITialize**

**Supported** All with Option 001 or 002

```
[ :SOURce ] :RADio:MTONE:ARB:SETup:TABLE:PHASe:INITialize FIXed|RANDom  
[ :SOURce ] :RADio:MTONE:ARB:SETup:TABLE:PHASe:INITialize?
```

This command initializes the phase in the multitone waveform table.

**FIXed** This choice sets the phase of all tones to the fixed value of 0 degrees.

**RANDom** This choice sets the phase of all tones to random values based on the setting on the random seed generator.

**\*RST** FIX

**Key Entry** Initialize Phase Fixed Random

**Remarks** To change the random number generator seed value, refer to “:SETup:TABLE:PHASe:INITialize:SEED” on page 320.

This command is the first step in creating a multitone waveform. Refer to “Creating a Multitone Waveform” on page 309 for all four steps.

**:SETup:TABLE:PHASe:INITialize:SEED**

**Supported** All with Option 001 or 002

```
[ :SOURce ] :RADio:MTONE:ARB:SETup:TABLE:PHASe:INITialize:SEED FIXed|RANDom  
[ :SOURce ] :RADio:MTONE:ARB:SETup:TABLE:PHASe:INITialize:SEED?
```

This command initializes the random number generator seed that is used to generate the random phase values for the multitone waveform.

**FIXed** This choice sets the random number generator seed to a fixed value.

**RANDom** This choice sets the random number generator seed to a random value. This changes the phase value after each initialization of the phase.

**\*RST** FIX

**Key Entry**      **Random Seed Fixed Random**

**Remarks**      N/A

### **[ :STATe ]**

**Supported**      All with Option 001 or 002

[ :SOURCE ] : RADio : MTONE : ARB [ :STATe ] ON | OFF | 1 | 0

[ :SOURCE ] : RADio : MTONE : ARB [ :STATe ] ?

This command enables or disables the multitone waveform generator function.

**\*RST**            0

**Key Entry**      **Multitone Off On**

**Remarks**      N/A

## Wideband CDMA ARB Subsystem–Option 400 ([:SOURCE]:RADio:WCDMa:TGPP:ARB)

### :CLIPping:I

**Supported** All with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP:ARB:CLIPping:I <val>  
[:SOURCE]:RADio:WCDMa:TGPP:ARB:CLIPping:I?
```

This command limits the modulation level of the waveform’s I component to a percentage of full scale.

The variable <val> is expressed in units of percent.

**\*RST** +1.00000000E+002

**Range** 10–100

**Key Entry** Clip III To

**Remarks** N/A

### :CLIPping:POSition

**Supported** All with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP:ARB:CLIPping:POSition PRE|POST  
[:SOURCE]:RADio:WCDMa:TGPP:ARB:CLIPping:POSition?
```

This command specifies whether a waveform is clipped before (PRE) or after (POST) FIR filtering.

**\*RST** PRE

**Key Entry** Clip At PRE POST FIR Filter

**Remarks** N/A



**:CLIPping:Q****Supported** All with Option 400

[:SOURce]:RADio:WCDMa:TGPP:ARB:CLIPping:Q &lt;val&gt;

[:SOURce]:RADio:WCDMa:TGPP:ARB:CLIPping:Q?

This command limits the modulation level of the waveform's Q component to a percentage of full scale.

The variable <val> is expressed in units of percent.

**\*RST** +1.00000000E+002**Range** 10–100**Key Entry** **Clip IQI To****Remarks** N/A**:CLIPping:TYPE****Supported** All with Option 400

[:SOURce]:RADio:WCDMa:TGPP:ARB:CLIPping:TYPE IJQ|IORQ

[:SOURce]:RADio:WCDMa:TGPP:ARB:CLIPping:TYPE?

This command selects either IJQ or IORQ as the clipping type.

IJQ The combined I and Q waveform will be clipped (circular clipping).

IORQ The I and Q components of the waveform are clipped independently (rectangular clipping). I and Q can be clipped to different levels using this mode.

**\*RST** IJQ**Key Entry** **Clipping Type II+jQI III,IQI****Remarks** N/A**:CLIPping[:IJQ]****Supported** All with Option 400

[:SOURce]:RADio:WCDMa:TGPP:ARB:CLIPping[:IJQ] &lt;val&gt;

[:SOURce]:RADio:WCDMa:TGPP:ARB:CLIPping[:IJQ]?

This command clips (limits) the modulation level of the combined I and Q waveform to a percentage of full scale.

The variable <val> is expressed in units of percent.

<b>*RST</b>	+1.00000000E+002
<b>Range</b>	10–100
<b>Key Entry</b>	<b>Clip I+jQI To</b>
<b>Remarks</b>	N/A

**:CRATe**

**Supported** All with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:CRATe <val>
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:CRATe?
```

This command sets the chip rate value.

<b>*RST</b>	+3.84000000E+006
<b>Range</b>	3456000–4224000
<b>Key Entry</b>	<b>Chip Rate</b>
<b>Remarks</b>	N/A

**:FILTER**

**Supported** All with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:FILTe RNYQuist|NYQuist|GAUSSian|
RECTangle|WCDMA|AC4Fm|IS2000SRDS|UGGaussian|"<User FIR>"
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:FILTe?
```

This command selects the pre-modulation filter type.

WCDMA	This choice selects a 0.22 Nyquist filter optimized for ACP.
AC4Fm	This choice selects a predefined Association of Public Safety Communications Officials (APCO) specified compatible 4-level frequency modulation (C4FM) filter.
IS2000SR3DS	This choice selects an IS-2000 standard, spread rate 3 direct spread filter.
UGGaussian	This choice selects a backwards compatible GSM Gaussian filter (Gaussian filter with a fixed BbT value of 0.300) for the ESG E44xxB Option UN3 or UN4.

"<User FIR>" This variable is any filter file that you have stored into memory.

<b>*RST</b>	WCDMA
<b>Key Entry</b>	Root Nyquist   Nyquist   Gaussian   Rectangle   WCDMA APCO 25 C4FM   IS-95   UN3/4 GSM Gaussian   IS-2000 SR3 DS User FIR
<b>Remarks</b>	Refer to “File Name Variables” on page 14 for information on the file name syntax.

## :FILTer:ALPHa

**Supported** All with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:FILTer:ALPHa <val>
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:FILTer:ALPHa?
```

This command sets the alpha value for the Nyquist or root Nyquist filter.

The filter alpha value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

<b>*RST</b>	+2.20000000E–001
<b>Range</b>	0.000–1.000
<b>Key Entry</b>	<b>FiLter Alpha</b>
<b>Remarks</b>	To change the current filter type, refer to “:FILTer” on page 324.

## :FILTer:BBT

**Supported** All with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:FILTer:BBT <val>
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:FILTer:BBT?
```

This command changes the bandwidth-multiplied-by-bit-time (BbT) filter parameter.

The filter BbT value can be set to the minimum level (0), the maximum level (1), or in between by using fractional numeric values (0.001–0.999).

<b>*RST</b>	+5.00000000E–001
<b>Range</b>	0.000–1.000
<b>Key Entry</b>	<b>Filter BbT</b>
<b>Remarks</b>	This command is effective only after choosing a Gaussian filter. It does

not have an effect on other types of filters.

To change the current filter type, refer to “:FILTer” on page 324.

## :FILTer:CHANnel

**Supported** All with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:FILTer:CHANnel EVM|ACP  
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:FILTer:CHANnel?
```

This command optimizes the Nyquist and root Nyquist filters to minimize error vector magnitude (EVM) or to minimize adjacent channel power (ACP).

**EVM** This choice provides the most ideal passband.

**ACP** This choice improves stopband rejection.

**\*RST** ACP

**Key Entry** Optimize FIR For EVM ACP

**Remarks** To change the current filter type, refer to “:FILTer” on page 324.

## :HEADer:CLEar

**Supported** All with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:HEADer:CLEar
```

This command clears the header information from the header file used by this modulation format.

**\*RST** N/A

**Key Entry** Clear Header

**Remarks** The **W-CDMA Off On** softkey must be set to On for this command to function.

## :HEADer:SAVE

**Supported** All with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:HEADer:SAVE
```

This command saves the header information to the header file used by this modulation format.

**\*RST** N/A

<b>Key Entry</b>	<b>Save Setup To Header</b>
<b>Remarks</b>	The <b>W-CDMA Off On</b> softkey must be set to On for this command to function.

## **:IQ:EXtErnal:FiLTer**

**Supported** All with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:IQ:EXtErnal:FiLTer 40e6|THROUGH
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:IQ:EXtErnal:FiLTer?
```

This command selects the filter or through path for I/Q signals routed to the rear panel I and Q outputs. Selecting a filter using this command will automatically set “:IQ:EXtErnal:FiLTer:AUTO” on page 327 to OFF(0) mode.

40e6 This choice applies a 40 MHz baseband filter.

THROUGH This choice bypasses filtering.

**\*RST** THR

**Key Entry** 40.000 MHz Through

**Remarks** N/A

## **:IQ:EXtErnal:FiLTer:AUTO**

**Supported** All with Option 400

```
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:IQ:EXtErnal:FiLTer:AUTO ON|OFF|1|0
[ :SOURce ] :RADio:WCDMa:TGPP:ARB:IQ:EXtErnal:FiLTer:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals routed to the rear panel I/Q outputs.

ON(1) This choice will automatically select a digital modulation filter optimized for the current signal generator settings.

OFF(0) This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “:IQ:EXtErnal:FiLTer” on page 327 for selecting a filter or through path.

**\*RST** 1

**Key Entry** I/Q Output Filter Manual Auto

**Remarks** N/A

## :IQMap

**Supported** All with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:IQMap NORMal | INVert
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:IQMap?
```

This command selects whether or not the I/Q outputs will be inverted.

**NORMal** This choice selects normal polarity.

**INVerted** This choice inverts the internal Q signal.

**\*RST** NORM

**Key Entry** I/Q Mapping Normal Invert

**Remarks** N/A

## :IQ:MODulation:ATTen

**Supported** All with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:IQ:MODulation:ATTen <val>
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:IQ:MODulation:ATTen?
```

This command attenuates the I/Q signals being modulated through the signal generator RF path.

The variable <val> is expressed in units of decibels (dB).

**\*RST** +2.00000000E+00

**Range** 0–40

**Key Entry** Modulator Atten Manual Auto

**Remarks** N/A

## :IQ:MODulation:ATTen:AUTO

**Supported** All with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:IQ:MODulation:ATTen:AUTO ON|OFF|1|0
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:IQ:MODulation:ATTen:AUTO?
```

This command enables or disables the I/Q attenuation auto mode.

**ON (1)** This choice enables the attenuation auto mode which optimizes the modulator attenuation for the current conditions.

OFF (0)	This choice holds the attenuator at its current setting or at a selected value. Refer to “:IQ:MODulation:ATTen” on page 328 for setting the attenuation value.
<b>*RST</b>	1
<b>Key Entry</b>	<b>Modulator Atten Manual Auto</b>
<b>Remarks</b>	N/A

## :IQ:MODulation:FILTer

**Supported** All with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP:ARB:IQ:MODulation:FILTer 2.1e6|40e6|THROUGH
[:SOURCE]:RADio:WCDMa:TGPP:ARB:IQ:MODulation:FILTer?
```

This command enables you to select a filter or through path for I/Q signals modulated onto the RF carrier. Selecting a filter using this command will automatically set “:IQ:MODulation:FILTer:AUTO” on page 329 to OFF(0) mode.

2.1E6	This choice applies a 2.1 MHz baseband filter to the I/Q signals.
40E6	This choice applies a 40 MHz baseband filter to the I/Q signals.
THROUGH	This choice bypasses filtering.

<b>*RST</b>	THR
<b>Key Entry</b>	<b>2.100 MHz 40.000 MHz Through</b>
<b>Remarks</b>	N/A

## :IQ:MODulation:FILTer:AUTO

**Supported** All with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP:ARB:IQ:MODulation:FILTer:AUTO ON|OFF|1|0
[:SOURCE]:RADio:WCDMa:TGPP:ARB:IQ:MODulation:FILTer:AUTO?
```

This command enables or disables the automatic selection of the filters for I/Q signals modulated onto the RF carrier.

ON(1)	This choice will automatically select a digital modulation filter.
OFF(0)	This choice disables the auto feature which lets you select a digital modulation filter or through path. Refer to “:IQ:MODulation:FILTer” on page 294 for selecting a filter or through path.

<b>*RST</b>	1
-------------	---

**Key Entry**        I/Q Mod Filter Manual Auto

**Remarks**        N/A

## :LINK

**Supported**        All with Option 400

[ :SOURCE ] :RADIO:WCDMA:TGPP:ARB:LINK DOWN|UP

[ :SOURCE ] :RADIO:WCDMA:TGPP:ARB:LINK?

This command selects either a downlink or uplink channel configuration.

**\*RST**              DOWN

**Key Entry**        Link Down Up

**Remarks**        N/A

## :LINK:DOWN:OACP

**Supported**        All with Option 400

[ :SOURCE ] :RADIO:WCDMA:TGPP:ARB:LINK:DOWN:OACP ADJ|ALT

[ :SOURCE ] :RADIO:WCDMA:TGPP:ARB:LINK:DOWN:OACP?

This command selects the channel power optimization type for any downlink channel W-CDMA setup.

ADJ                This choice optimizes for adjacent channel power.

ALT                This choice optimizes for alternate channel power.

**\*RST**              ADJ

**Key Entry**        Optimize ACP ADJ ALT

**Remarks**        This command is operational for any downlink channel W-CDMA setup.

To change the current W-CDMA setup information, refer to  
“:LINK:DOWN:SETup” on page 331.



**:LINK:DOWN:SETup****Supported** All with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup DPCH1 | DPCH3 | PPSCH |
PPDPCH1 | PPDPCH3 | TM1D16 | TM1D32 | TM1D64 | TM2 | TM3D16 | TM3D32 | TM4 | TM5H2 | TM5H4 |
TM5H8 | MCArrier | "<file name>"
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup?
```

This command defines the multicarrier waveform.

DPCH1	This choice selects 1 dedicated physical channel.
DPCH3	This choice selects 3 dedicated physical channels.
PPSCH	This choice selects a primary command control physical channel (PCCPCH) with a synchronization channel (SCH).
PPDPCH1	This choice selects a primary command control physical channel (PCCPCH) with a dedicated physical channel (DPCH).
PPDPCH3	This choice selects a primary command control physical channel (PCCPCH) with 3 dedicated physical channels.
TM1D16	This choice selects a Test Model 1 with 16 dedicated physical channels.
TM1D32	This choice selects a Test Model 1 with 32 dedicated physical channels.
TM1D64	This choice selects a Test Model 1 with 64 dedicated physical channels.
TM2	This choice selects a Test Model 2 downlink W-CDMA setup.
TM3D16	This choice selects a Test Model 3 with 16 dedicated physical channels.
TM3D32	This choice selects a Test Model 3 with 32 dedicated physical channels.
TM4	This choice selects a Test Model 4 downlink W-CDMA setup.
TM5H2	This choice selects a Test Model 5 with 6 DPCH and 2 HS-PDSCH (high speed physical shared channel) channels downlink W-CDMA setup.
TM5H4	This choice selects a Test Model 5 with 14 DPCH and 4 HS-PDSCH (high speed-physical downlink shared channel) channels downlink W-CDMA setup.
TM5H8	This choice selects a Test Model 5 with 30 DPCH and 8 HS-PDSCH (high speed physical shared channel) channels downlink WCDMA setup.

<b>*RST</b>	DPCH1
<b>Key Entry</b>	1 DPCH 3 DPCH PCCPCH + SCH PCCPCH + SCH + 1 DPCH PCCPCH + SCH + 3 DPCH Test Model 1 w/ 16 DPCH Test Model 1 w/ 32 DPCH Test Model 1 w/ 64 DPCH Test Model 2 Test Model 3 w/ 16 DPCH Test Model 3 w/ 32 DPCH Test Model 4 Test Model 5 w/2HSPDSCH Test Model 5 w/4HSPDSCH Test Model 5 w/8HSPDSCH
<b>Remarks</b>	Refer to “File Name Variables” on page 14 for information on the file name syntax.

**:LINK:DOWN:SETup:MCARrier**

**Supported** All with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup:MCARrier
CAR2|CAR3|CAR4|CAR4TM1D64|"<file name>"
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup:MCARrier?
```

This command defines the type of multicarrier W-CDMA setup.

- CAR2 a standard 2-carrier setup with the following settings:  
Carrier 1: PCCPCH + SCH, -7.5 MHz frequency offset, 0 dB power  
Carrier 2: PCCPCH + SCH, 7.5 MHz frequency offset, 0 dB power
- CAR3 a standard 3-carrier setup with the following settings:  
Carrier 1: PCCPCH + SCH, -5 MHz frequency offset, 0 dB power  
Carrier 2: PCCPCH + SCH, 0 kHz frequency offset, 0 dB power  
Carrier 3: PCCPCH + SCH, 5 MHz frequency offset, 0 dB power
- CAR4 a standard 4-carrier setup with the following settings:  
Carrier 1: PCCPCH + SCH, -7.5 MHz frequency offset, 0 dB power  
Carrier 2: PCCPCH + SCH, -2.5 MHz frequency offset, 0 dB power  
Carrier 3: PCCPCH + SCH, 2.5 MHz frequency offset, 0 dB power  
Carrier 4: PCCPCH + SCH, 7.5 MHz frequency offset, 0 dB power
- CAR4TM1D64 a standard 4-carrier test model 1 with 64 dedicated physical channels setup with the following settings:

## Wideband CDMA ARB Subsystem—Option 400 ([:SOURCE]:RADIO:WCDMA:TGPP:ARB)

Carrier 1: Test Model 1 w/64 DPCH, -7.5 MHz frequency offset,  
0 dB power

Carrier 2: Test Model 1 w/64 DPCH, -2.5 MHz frequency offset,  
0 dB power

Carrier 3: Test Model 1 w/64 DPCH, 2.5 MHz frequency offset,  
0 dB power

Carrier 4: Test Model 1 w/64 DPCH, 7.5 MHz frequency offset,  
0 dB power

<b>*RST</b>	CAR2
<b>Key Entry</b>	<b>2 Carriers 3 Carriers 4 Carriers</b>
<b>Remarks</b>	Refer to “ <a href="#">File Name Variables</a> ” on page 14 for information on the file name syntax.

**:LINK:DOWN:SETup:MCARrier:CLIPping:I**

**Supported** All with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup:MCARrier:CLIPping:I <val>

[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup:MCARrier:CLIPping:I?

This command limits the modulation level of the waveform’s I component to a percentage of full scale.

The variable <val> is expressed in units of percent.

**\*RST** +1.00000000E+002

**Range** 10–100

**Key Entry** **Clip III To**

**Remarks** N/A

**:LINK:DOWN:SETup:MCARrier:CLIPping:Q**

**Supported** All with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup:MCARrier:CLIPping:Q <val>

[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup:MCARrier:CLIPping:Q?

This command limits the modulation level of the waveform’s Q component to a percentage of full scale.

The variable <val> is expressed in units of percent.

**\*RST** +1.00000000E+002  
**Range** 10–100  
**Key Entry** **Clip IQI To**  
**Remarks** N/A

**:LINK:DOWN:SETup:MCARrier:CLIPping:TYPE**

**Supported** All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:LINK:DOWN:SETup:MCARrier:CLIPping:TYPE
IJQ|IORQ
[:SOURce]:RADio:WCDMa:TGPP:ARB:LINK:DOWN:SETup:MCARrier:CLIPping:TYPE?
```

This command selects either IJQ or IORQ as the clipping type.

- IJQ The combined I and Q waveform will be clipped (circular clipping).
- IORQ The I and Q components of the waveform are clipped independently (rectangular clipping). I and Q can be clipped to different levels using this mode.

**\*RST** IJQ  
**Key Entry** **Clipping Type II+jQI III,IQI**  
**Remarks** N/A

**:LINK:DOWN:SETup:MCARrier:CLIPping[:IJQ]**

**Supported** All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:LINK:DOWN:SETup:MCARrier:
CLIPping[:IJQ] <val>
[:SOURce]:RADio:WCDMa:TGPP:ARB:LINK:DOWN:SETup:MCARrier:CLIPping[:IJQ]?
```

This command clips (limits) the modulation level of the combined I and Q waveform to a percentage of full scale.

The variable <val> is expressed in units of percent.

**\*RST** +1.00000000E+002  
**Range** 10–100  
**Key Entry** **Clip II+jQI To**  
**Remarks** N/A

**:LINK:DOWN:SETup:MCARrier:SCODE:AINCrement****Supported** All with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup:MCARrier:SCODE:AINCrement

This command will sort carriers by frequency offset and auto-increment scramble codes starting from the current scramble code value for the lowest frequency carrier.

**\*RST** N/A**Range** N/A**Key Entry** **Increment Scramble Code**

**Remarks** If the lowest frequency carrier has a scramble code value of N/A, the auto-increment value will start at 0.

**:LINK:DOWN:SETup:MCARrier:STORE****Supported** All with Option 400[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup:MCARrier:  
STORE "<file name>"

This command stores the current multicarrier setup information.

The stored file contains information including the digital modulation format, number of carriers, frequency spacing, and power settings for the multicarrier setup.

**\*RST** N/A**Key Entry** **Store Custom Multicarrier**

**Remarks** User defined files created using firmware prior to C.02.40 did not save the setting for Increment Scramble Code, Increment Timing Offset, and Clipping Type settings. When loading user defined files created with firmware prior to C.02.40, Increment Scramble Code and Increment Timing Offset will default to Off and the Clipping Type settings will default to 100%. Firmware C.02.40 will save the Increment Scramble Code, Increment Timing Offset and Clipping Type settings.

Refer to [“File Name Variables” on page 14](#) for information on the file name syntax.

**:LINK:DOWN:SETup:MCARrier:TABLE****Supported** All with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup:MCARrier:TABLE INIT |
APPend <carrier_num>, DPCH1 | DPCH3 | PPSCH | PPDCH1 | PPDCH3 | TM1D16 | TM1D32 |
TM1D64 | TM2 | TM3D16 | TM3D32 | TM4 | TM5H2 | TM5H4 | TM5H8 | "<filename>", <freq_offset
>, <power>[, <scramble code>, <timing offset>, <initial phase>,
<pre-FIR circular clipping>[<clipping units {pct}>|dB],
<post-FIR circularclipping>[<clipping units {pct}>|dB]]
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup:MCARrier:
TABLE? <carrier_num>
```

This command defines the multicarrier format and waveform.

Use INIT to clear the table and define the parameters for the first carrier; use APPend to add new channels. To edit an existing carrier, use its carrier number (<carrier\_num>).

The variable <freq\_offset> is expressed in units of Hertz (kHz–MHz).

The variable <power> is expressed in units of decibels (dB).

The carrier type, frequency offset, and power level are returned when a query is initiated. The output format is as follows:

```
<carrier type>, <freq_offset>, <power>
```

INIT	This choice clears the current information and creates a new one-row table, allowing for further definition using additional parameters.
APPend	This choice adds rows to an existing table. The maximum number of rows for one table is 16.
DPCH1	This choice selects 1 dedicated physical channel.
DPCH3	This choice selects 3 dedicated physical channels.
PPSCH	This choice selects a primary command control physical channel (PCCPCH) with a synchronization channel (SCH).
PPDPCH1	This choice selects a primary command control physical channel (PCCPCH) with a dedicated physical channel (DPCH).
PPDPCH3	This choice selects a primary command control physical channel (PCCPCH) with 3 dedicated physical channels.
TM1D16	This choice selects a test model 1 with 16 dedicated physical channels.
TM1D32	This choice selects a test model 1 with 32 dedicated physical channels.
TM1D64	This choice selects a test model 1 with 64 dedicated physical channels.

TM2	This choice selects a test model 2.
TM3D16	This choice selects a test model 3 with 16 dedicated physical channels.
TM3D32	This choice selects a test model 3 with 32 dedicated physical channels.
TM4	This choice selects a test model 4.
TM5H2	This choice selects a Test Model 5 with 6 DPCH and 2 HS-PDSCH (high speed physical shared channel) channels downlink W-CDMA setup.
TM5H4	This choice selects a Test Model 5 with 14 DPCH and 4 HS-PDSCH (high speed-physical downlink shared channel) channels downlink W-CDMA setup.
TM5H8	This choice selects a Test Model 5 with 30 DPCH and 8 HS-PDSCH (high speed physical shared channel) channels downlink W-CDMA setup.
<scramble code>	This variable sets the scramble code value.
<timing offset>	This variable sets the timing offset value.
<initial phase>	This variable sets the initial phase value. The units are not specified but the value represents degrees.
<clipping>	This variable sets the clipping value. If the units are not specified, the value will default to percent.
<carrier_num>	This variable specifies the number of multicarriers.
<b>*RST</b>	<i>carrier type</i> : PPSCH <i>&lt;freq_offset&gt;</i> : +7.50000000E+006 <i>&lt;power&gt;</i> : +0.00000000E+000
<b>Range</b>	<i>&lt;freq_offset&gt;</i> : -37.5E6 to 37.5E6 <i>&lt;power&gt;</i> : -40 to 0 <i>scramble code</i> : 0–511 <i>timing offset</i> : 0–149 <i>initial phase</i> : 0–359 <i>clipping(in units of percent)</i> : 0.0–100.0 or 0.0 to -20.0 (if units are dB)
<b>Key Entry</b>	<b>1 DPCH    3 DPCH    PCCPCH + SCH    PCCPCH + SCH + 1 DPCH</b> <b>PCCPCH + SCH + 3 DPCH    Test Model 1 w/ 16 DPCH</b> <b>Test Model 1 w/ 32 DPCH    Test Model 1 w/ 64 DPCH    Test Model 2</b> <b>Test Model 3 w/ 16 DPCH    Test Model 3 w/ 32 DPCH    Test Model 4</b> <b>Test Model 5 w/2HSPDSCH    Test Model 5 w/4HSPDSCH</b> <b>Test Model 5 w/8HSPDSCH</b>
<b>Remarks</b>	Refer to “ <a href="#">File Name Variables</a> ” on page 14 for information on the file name syntax.

If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:LINK:DOWN:SETup:TABLE:APPLY” on page 339.

### :LINK:DOWN:SETup:MCARrier:TABLE:NCARriers

**Supported** All with Option 400

[ :SOURCE ] : RADIO : WCDMA : TGPP : ARB : LINK : DOWN : SETup : MCARrier : TABLE : NCARriers ?

This command queries the number of carriers specified for the W-CDMA multicarrier waveform.

**\*RST** +2  
**Choices** N/A  
**Key Entry** N/A  
**Remarks** N/A

### :LINK:DOWN:SETup:MCARrier:TOFFset:AInCrement

**Supported** All with Option 400

[ :SOURCE ] : RADIO : WCDMA : TGPP : ARB : LINK : DOWN : SETup : MCARrier : TOFFset : AInCrement

This command will sort carriers by frequency offset and auto-increment timing offsets. The new values will start with the current timing offset for the lowest frequency carrier and increment by one for each subsequent carrier.

**\*RST** N/A  
**Range** N/A  
**Key Entry** Increment Timing Offset  
**Remarks** N/A

### :LINK:DOWN:SETup:STORe

**Supported** All with Option 400

[ :SOURCE ] : RADIO : WCDMA : TGPP : ARB : LINK : DOWN : SETup : STORe "<file name>"

This command stores the current downlink setup information into the memory catalog with the entered file name.



Along with the contents of the W-CDMA channel table editor (channel types, Walsh code, power levels, PN offset, and data), this command stores the following information to the signal generator memory:

- FIR filter
- FIR filter file name
- FIR filter alpha
- FIR filter BbT
- FIR filter channel (EVM or ACP)
- I/Q mapping
- increment scramble code
- increment timing offset
- link
- spread type
- spread rate
- ARB reference clock source (internal or external)
- ARB reference clock frequency
- clipping
- multicarrier spacing
- radio configuration

**\*RST**            N/A

**Range**            N/A

**Key Entry**        **Store Custom W-CDMA State**

**Remarks**        Refer to “[File Name Variables](#)” on page 14 for information on the file name syntax.

## **:LINK:DOWN:SETup:TABLE:APPLy**

**Supported**        All with Option 400

[ :SOURCE ] :RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup:TABLE:APPLy

This command generates a W-CDMA signal based on the current values in the W-CDMA channel setup table editor.

**\*RST**            N/A

**Choices**        N/A

**Key Entry**        **Apply Channel Setup**

**Remarks**        N/A

**:LINK:DOWN:SETup:TABLE:CHANnel****Supported** All with Option 400

```
[ :SOURCE ] :RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup:TABLE:CHANnel INIT |
APPend | <chan_num>, <chan_type>, <symbol_rate>, <spread_code>, <power>,
<timing_offset>, <TFCl>, <TPC>, <scramble_code>, STANdard | RALternate |
LALternate, <scramble_offset>, RANDom | PN9 | PINDicator |
<data_val>, <TFCl_power>, <TPC_power>, <pilot_power>, <pilot_bits>
[ :SOURCE ] :RADIO:WCDMA:TGPP:ARB:LINK:DOWN:SETup:TABLE:CHANnel? <chan_num>
```

This command sets up the W-CDMA downlink channel type parameters.

Use INIT to clear the table editor and define the parameters for the first channel; use APPend to add new channels. To edit an existing channel, use its channel number <chan\_num>.

The <power>, <TFCl\_power>, <TPC\_power>, and <pilot\_power> variables are expressed in units of decibels (dB).

The channel type, symbol rate, spread code, power, timing offset, TFCl value, TPC value, scramble code, scramble type, scramble offset, data type, TFCl power, TPC power, pilot power, and the number of pilot bits are returned when a query is initiated. The output format is as follows:

```
<chan_type>, <symbol_rate>, <spread_code>, <power>, <tDPCH_offset>, <TFCl>,
<TPC>, <scramble_code>, <scramble_type>, <scramble_code>, <scramble_offset>,
<data_type>, <TFCl_power>, <TPC_power>, <pilot_power>, <pilot_bits>
```

INIT	This choice clears the current information and creates a new one-row table, allowing for further definition using additional parameters.
APPend	This choice adds a row to an existing table.
<chan_num>	This variable sets the physical channel number.
<chan_type>	This variable sets the channel type.
<timing_offset>	This variable sets the symbol offset.
<TFCl>	This variable sets the transport format combination indicator.
<TPC>	This variable sets the transmit power control.
STANdard	This choice sets the scramble type to standard.
RALternate	This choice sets the scramble type to right alternate.
LALternate	This choice sets the scramble type to left alternate.

RANDom	This choice sets a randomly generated pseudo-random sequence pattern as output data.
PN9	This choice sets an internally generated 9-bit pseudo-random sequence pattern as output data.
PINdicator	This choice sets the paging indicator channel (PICH).
<data_val>	This variable sets the data value.
<TFCI_power>	This variable sets the transport format combination indicator power offset.
<TPC_power>	This variable sets the transport power control power offset.
<pilot_power>	This variable sets the pilot power offset.
<pilot_bits>	This variable sets the number of pilot bits that will be in the dedicated physical channel (DPCH).

**Table 1 Variables and Channel Types**

	SSCH	CPICH	PCCPCH	SCCPCH	PICH	DPCH	OCNS	PSCH
Channel number	X	X	X	X	X	X	X	X
Symbol rate	N/A	N/A	N/A	X	N/A	X	X	N/A
Spread code	N/A	X	X	X	X	X	X	N/A
Power	X	X	X	X	X	X	X	X
Symbol offset	N/A	N/A	N/A	N/A	X	X	N/A	N/A
TFCI	N/A	N/A	N/A	X	N/A	X	N/A	N/A
TPC	N/A	N/A	N/A	N/A	N/A	X	N/A	N/A
Scramble code	X	X	X	X	X	X	X	N/A
Standard	X	X	X	N/A	X	X	X	N/A
Right alternate	X	X	X	N/A	X	X	X	N/A
Left alternate	X	X	X	N/A	X	X	X	N/A
Scramble offset	X	X	X	X	X	X	X	N/A
Random	N/A	N/A	X	X	X	X	X	N/A
PN9	N/A	N/A	X	X	X	X	X	N/A
Paging Indicator	N/A	N/A	N/A	N/A	X	N/A	N/A	N/A

**Table 1** Variables and Channel Types

	SSCH	CPICH	PCCPCH	SCCPCH	PICH	DPCH	OCNS	PSCH
Data value	N/A	N/A	X	N/A	X	X	X	N/A
TFCI power	N/A	N/A	N/A	N/A	X	N/A	N/A	N/A
Pilot power offset	N/A	N/A	N/A	N/A	X	N/A	N/A	N/A
Pilot bits	N/A	N/A	N/A	X	X	N/A	N/A	N/A

**Table 2** Variables and Channel Types

	HSPDSCH	HSSCCH
Channel number	X	X
Symbol rate	N/A (fixed to 30ksps)	N/A (fixed to 240ksps)
Spread code	X	X
Power	X	X
Symbol offset	X	X
TFCI	N/A	N/A
TPC	N/A	N/A
Scramble code	X	X
Standard	X	X
Right alternate	X	X
Left alternate	X	X
Scramble offset	X	X
Random	X	X
PN9	X	X
Paging Indicator	N/A	N/A
Data value	X	X
TFCI power	N/A	N/A
Pilot power offset	N/A	N/A

**Table 2**                      **Variables and Channel Types**

	HSPDSCH	HSSCCH
Pilot bits	N/A	N/A

**\*RST**                      <chan\_type>: DPCH <symbol\_rate>: +3.00000000E+004  
 <spread\_code>: +8   <scramble\_offset>: +0.00000000E+000  
 power: +0.00000000E+000   <tDPCH\_offset>: +0   <TFCI>: +0  
 <TPC>: #H5555   <scramble\_code>: +0   scramble type: STAN  
 <TFCI\_power>: +0.00000000E+000  
 <TPC\_power>: +0.00000000E+000   <pilot\_power>: +0.00000000E+000  
 <pilot\_bits>: +4

**Range**                      <chan\_type>: PSCH   SSCH   CPICH   PCCPch   SCCPch  
 DPCH   PICH   OCNS   HSSCch   HSPDsch  
 <power>: -40 to 0   <tDPCH\_offset>: 0–149   <TFCI>: 0–1023  
 <TPC>: 0000–7FFF   <scramble\_code>: 0–511  
 <scramble\_offset>: 0–15   <data\_val>: 00000000–11111111  
 <TFCI\_power>: -20 to 20   <TPC\_power>: -20 to 20  
 <pilot\_power>: 0000–7FFF   <pilot\_bits>: 0–511

*SCCPCH Channel*

<symbol_rate>	<spread_code>	*<pilot_bits>
15 ksp/s	0–256	0,8
30 ksp/s	0–128	0,8
60 ksp/s	0–64	0,8
120 ksp/s	0–32	0,8
240 ksp/s	0–16	0,16
480 ksp/s	0–8	0,16
960 ksp/s	0–4	0,16

*All Other Channels*

<symbol_rate>	<spread_code>	<pilot_bits>
7.5 ksp/s	0–511	4
15 ksp/s	0–255	2,4,8
30 ksp/s	0–127	4,8
60 ksp/s	0–63	8
120 ksp/s	0–31	8
240 ksp/s	0–15	16
480 ksp/s	0–7	16
960 ksp/s	0–3	16

Wideband CDMA ARB Subsystem–Option 400 ([:SOURce]:RADio:WCDMa:TGPP:ARB)

<b>Key Entry</b>	Channel Type Symbol Rate First Spread Code Power Spread Code TFCI Field Off On Scramble Code Scramble Offset Random PN9 Standard Left Alternate Right Alternate PCCPCH SCCPCH PSCH SSCH CPICH DPCH PICH OCNS HSPDSCH HSSCCH
<b>Field Entry</b>	Spread Code Power Timing Offset TFCI Scramble Code TFCI Power TPC Power Pilot Power Pilot Bits Data Scramble Type Scramble Offset
<b>Remarks</b>	For additional information, refer to the 3GPP TS 25.211 (V 3.7) standard.  If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:LINK:DOWN:SETup:TABLE:APPLY” on page 339.

**:LINK:DOWN:SETup:TABLE:NChannels?**

<b>Supported</b>	All with Option 400
	[ :SOURce ] :RADio:WCDMa:TGPP:ARB:LINK:DOWN:SETup:TABLE:NChannel?
	This command queries the number of channels being used for the carrier.
<b>*RST</b>	1
<b>Key Entry</b>	N/A
<b>Remarks</b>	N/A

**:LINK:DOWN:SETup:TABLE:PADJust**

<b>Supported</b>	All with Option 400
	[ :SOURce ] :RADio:WCDMa:TGPP:ARB:LINK:DOWN:SETup:TABLE:PADJust EQUal   SCALE
	This command sets the code domain power.
<b>EQUal</b>	This choice will adjust all channel powers to have equal energy per symbol, referenced to 7.5 ksp/s and increasing by 3 dB for each doubling of the symbol rate.
<b>SCALE</b>	This choice will scale the channel power levels so that the sum of the powers are equal to 0 dB.

<b>*RST</b>	N/A
<b>Key Entry</b>	<b>Equal Energy per Symbol    Scale To 0dB</b>
<b>Remarks</b>	This command is available in downlink only.

**:LINK:DOWN:TFCI**

**Supported**      All with Option 400

```
[ :SOURCE ] :RADIo:WCDMa:TGPP:ARB:LINK:DOWN:TFCI ON|OFF|1|0
```

```
[ :SOURCE ] :RADIo:WCDMa:TGPP:ARB:LINK:DOWN:TFCI?
```

This command enables or disables the transport format combination indicator (TFCI) field for all channels.

<b>*RST</b>	1
<b>Key Entry</b>	<b>TFCI Field Off On</b>
<b>Remarks</b>	N/A

**:LINK:UP:OACP**

**Supported**      All with Option 400

```
[ :SOURCE ] :RADIo:WCDMa:TGPP:ARB:LINK:UP:OACP ADJ|ALT
```

```
[ :SOURCE ] :RADIo:WCDMa:TGPP:ARB:LINK:UP:OACP?
```

This command selects the channel power optimization type for any uplink channel W-CDMA setup.

ADJ      This choice optimizes for adjacent channel power.

ALT      This choice optimizes for alternate channel power.

<b>*RST</b>	ADJ
<b>Key Entry</b>	<b>Optimize ACP ADJ ALT</b>
<b>Remarks</b>	This command is only operational for any uplink channel W-CDMA setup.  To change the current W-CDMA setup information, refer to “:LINK:UP:SETup” on page 346.

**:LINK:UP:SCRAMBLE****Supported** All with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:UP:SCRAMBLE <val>
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:UP:SCRAMBLE?
```

This command sets the scramble code for the uplink.

**\*RST** #H000000**Range** #H0–FFFFFFF**Key Entry** Scramble Code**Remarks** N/A**:LINK:UP:SDPDch****Supported** All with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:UP:SDPDch I|Q
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:UP:SDPDch?
```

This command selects whether the second dedicated physical data channel (SDPDCH) will be put onto I or Q.

**\*RST** Q**Key Entry** Second DPDCH I Q**Remarks** N/A**:LINK:UP:SETup****Supported** All with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:UP:SETup DPCCH|DDPDCH1|DDPDCH2|
DDPDCH3|DDPDCH4|DDPDCH5|"<file name>"
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:UP:SETup?
```

This command selects a dedicated physical control channel (DPCCH) for uplink with the option to add one or more dedicated physical data channel (DPDCH) or a previously stored setup.

DPCCH This choice selects 1 dedicated physical control channel.

DDPDCH1 This choice selects 1 dedicated physical control channel and 1 dedicated physical data channel.



DDPDCH2	This choice selects 1 dedicated physical control channel and 2 dedicated physical data channel.
DDPDCH3	This choice selects 1 dedicated physical control channel and 3 dedicated physical data channel.
DDPDCH4	This choice selects 1 dedicated physical control channel and 4 dedicated physical data channel.
DDPDCH5	This choice selects 1 dedicated physical control channel and 5 dedicated physical data channel.
<b>*RST</b>	DPCCH
<b>Key Entry</b>	DPCCH   DPCCH + 1 DPDCH   DPCCH + 2 DPDCH   DPCCH + 3 DPDCH DPCCH + 4 DPDCH   DPCCH + 5 DPDCH   Custom WCDMA State
<b>Remarks</b>	Refer to “ <a href="#">File Name Variables</a> ” on <a href="#">page 14</a> for information on the file name syntax.  If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “ <a href="#">:LINK:UP:SETup:TABLE:APPLY</a> ” on <a href="#">page 348</a> .

## :LINK:UP:SETup:STORe

**Supported**     All with Option 400

[ :SOURCE ] :RADIO:WCDMA:TGPP:ARB:LINK:UP:SETup:STORe "<file name>"

This command stores the current state into a designated file name.

**\*RST**            N/A

**Range**            N/A

**Key Entry**        **Store To File**

**Remarks**        You can recall a saved state from signal generator memory (non-volatile) by executing the following commands (using a designated file name):

For downlink, refer to “[:LINK:DOWN:SETup](#)” on [page 331](#).

For uplink, refer to “[:LINK:UP:SETup](#)” on [page 346](#).

Refer to “[File Name Variables](#)” on [page 14](#) for information on the file name syntax.

## :LINK:UP:SETup:TABLE:APPLy

**Supported** All with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:UP:SETup:TABLE:APPLy
```

This command applies the signal based on the current values in the W-CDMA channel setup table editor.

**\*RST** N/A

**Range** N/A

**Key Entry** **Apply Channel Setup**

**Remarks** Refer to “[File Name Variables](#)” on page 14 for information on the file name syntax.

## :LINK:UP:SETup:TABLE:CHANnel

**Supported** All with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:UP:SETup:TABLE:CHANnel
INIT|APPend|<chan_num>,<chan_type>,<symbol_rate>,<spread_code>,
<power>,<TFCI>,<TCP>,RANDom|<data_val>,<fbi_bits_count>,<fbi_bits_value>
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:LINK:UP:SETup:TABLE:CHANnel? <chan_num>
```

This command defines the channel parameters of the signal.

Use INIT to clear the table editor and define the parameters for the first channel; use APPend to add new channels. To edit an existing channel, use its channel number <chan\_num>.

The variable <power> is expressed in units of decibels (dB).

The channel type, symbol rate, spread code, power, TFCI value, TPC value, data value, FBI bit count, and FBI bit value are returned when a query is initiated. The output format is as follows:

```
<chan_type>,<symbol_rate>,<spread_code>,<power>,<TFCI>,<TCP>,<data_val>,
<fbi_bits_count>,<fbi_bits_value>
```

**INIT** This choice clears the current information and creates a new one-row table, allowing for further definition using additional parameters.

**APPend** This choice adds a row to an existing table.

**RANDom** This choice selects random data format for the digital modulation

	signal.
<fbi_bits_count>	This variable sets the number of feedback information (FBI) bits.
<fbi_bits_value>	This variable sets the value of the FBI bits.
<b>*RST</b>	<chan_type>: DPCH <symbol_rate>: +1.50000000E+ <spread_code>: +0 <power>: +0.00000000E+000 <TFCl>: +0 <TPC>: #H5555 <data_val>: RAND <FBI Bits Count>: +0 <FBI Bit Count>: +0
<b>Range</b>	<power>: -40 to 0 <data_val>: 00000000-11111111 <fbi_bits_count>: 0-2 <fbi_bits_value>: 0-3  <symbol_rate> <spread_rate> 7.5 ksps 0-511 15 ksps 0-255 30 ksps 0-127 60 ksps 0-63 120 ksps 0-31 240 ksps 0-15 480 ksps 0-7 960 ksps 0-3
<b>Key Entry</b>	<b>Channel Type Symbol Rate First Spread Code Power</b> <b>Spread Code TFCI Field Off On Scramble Code Scramble Offset</b> <b>Random</b>
<b>Remarks</b>	If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “ <a href="#">:LINK:UP:SETup:TABLE:APPLY</a> ” on page 348.

## :LINK:UP:SETup:TABLE:GUNit

**Supported** All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:LINK:UP:SETup:TABLE:GUNit DB|LINear|INDEX
[:SOURce]:RADio:WCDMa:TGPP:ARB:LINK:UP:SETup:TABLE:GUNit?
```

This command selects the uplink power measurement units.

DB	The power is set in decibels-exponential.
LINear	The power is set to increase linearly.
INDEX	The power is set at an index level - steps.

**\*RST** DB

<b>Key Entry</b>	<b>Gain Unit dB Lin Index</b>
<b>Remarks</b>	If the parameter set by this command is changed while the signal is active, the apply command must be executed for the change to occur. Refer to “:LINK:UP:SETup:TABLE:APPLy” on page 348.

### :LINK:UP:SETup:TABLE:NCHannel

**Supported** All with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP:ARB:LINK:UP:SETup:TABLE:NCHannels?
```

This command queries the setup table for the number of uplink channels.

**\*RST** 1

**Key Entry** N/A

**Remarks** N/A

### :LINK:UP:TFCI

**Supported** All with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP:ARB:LINK:UP:TFCI ON|OFF|1|0
```

```
[:SOURCE]:RADio:WCDMa:TGPP:ARB:LINK:UP:TFCI?
```

This command enables or disables the transport format combination indicator (TFCI) field for all channels in the table.

**\*RST** 1

**Key Entry** TCFI Field Off On

**Remarks** N/A

### :MDESTination:PULSe

**Supported** All with Option 400

```
[:SOURCE]:RADio:WCDMa:TGPP:ARB:MDESTination:PULSe NONE|M1|M2|M3|M4
```

```
[:SOURCE]:RADio:WCDMa:TGPP:ARB:MDESTination:PULSe?
```

This command routes the selected marker to the Pulse/RF Blanking function. The NONE parameter clears the marker for the Pulse/RF Blanking function.

**\*RST** NONE

**Key Entry** None Marker 1 Marker 2 Marker 3 Marker 4

**Remarks** N/A

### **:MDESTINATION:AAMPLITUDE**

**Supported** All with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:MDESTINATION:AAMPLITUDE NONE|M1|M2|M3|M4
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:MDESTINATION:AAMPLITUDE?
```

This command routes the selected marker to the Alternate Amplitude function. The NONE parameter clears the marker to the Alternate Amplitude function.

**\*RST** NONE

**Key Entry** None Marker 1 Marker 2 Marker 3 Marker 4

**Remarks** N/A

### **:MDESTINATION:ALCHOLD**

**Supported** All with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:MDESTINATION:ALCHOLD NONE|M1|M2|M3|M4
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:MDESTINATION:ALCHOLD?
```

This command routes the selected marker to the ALC Hold function. The NONE parameter clears the marker for the ALC Hold function.

**\*RST** NONE

**Key Entry** None Marker 1 Marker 2 Marker 3 Marker 4

**Remarks** N/A

### **:MPOLARITY:MARKER1**

**Supported** All with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:MPOLARITY:MARKER1 NEGATIVE|POSITIVE
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:MPOLARITY:MARKER1?
```

This command sets the polarity for marker 1.

**\*RST** POS

**Key Entry** Marker 1 Polarity Neg Pos

**Remarks** N/A

### **:MPOLarity:MARKer2**

**Supported** All with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:MPOLarity:MARKer2 NEGative|POSitive  
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:MPOLarity:MARKer2?
```

This command sets the polarity for marker 2.

**\*RST** POS

**Key Entry** Marker 2 Polarity Neg Pos

**Remarks** N/A

### **:MPOLarity:MARKer3**

**Supported** All with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:MPOLarity:MARKer3 NEGative|POSitive  
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:MPOLarity:MARKer3?
```

This command sets the polarity for marker 3.

**\*RST** POS

**Key Entry** Marker 3 Polarity Neg Pos

**Remarks** N/A

### **:MPOLarity:MARKer4**

**Supported** All with Option 400

```
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:MPOLarity:MARKer4 NEGative|POSitive  
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:MPOLarity:MARKer4?
```

This command sets the polarity for marker 4.

**\*RST** POS

**Key Entry** Marker 4 Polarity Neg Pos

**Remarks** N/A

**:REFERENCE:EXTERNAL:FREQUENCY****Supported** All with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP:ARB:REFERENCE:EXTERNAL:FREQUENCY &lt;val&gt;

[:SOURCE]:RADIO:WCDMA:TGPP:ARB:REFERENCE:EXTERNAL:FREQUENCY?

This command sets the external reference frequency.

The variable &lt;val&gt; is expressed in Hertz (Hz).

**\*RST** +1.00000000E+007**Range** 2.5E5–1E8**Key Entry** Reference Freq**Remarks** The value specified by this command is effective only when you are using an external ARB reference applied to the BASEBAND GEN REF IN rear panel connector.

To specify external as the ARB reference source type, refer to “:REFERENCE[:SOURCE]” on page 353.

**:REFERENCE[:SOURCE]****Supported** All with Option 400

[:SOURCE]:RADIO:WCDMA:TGPP:ARB:REFERENCE[:SOURCE] INTERNAL|EXTERNAL

[:SOURCE]:RADIO:WCDMA:TGPP:ARB:REFERENCE[:SOURCE]?

This command selects either an internal or external reference for the waveform clock.

**\*RST** 0**Key Entry** ARB Reference Ext Int**Remarks** If the EXTERNAL choice is selected, the external frequency value must be entered and the signal must be applied to the BASEBAND GEN REF IN rear panel connector.

Refer to “:REFERENCE[:SOURCE]” on page 353 to enter the external reference frequency.

## :RETRigger

**Supported** All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:RETRigger ON|OFF|IMMediate
[:SOURce]:RADio:WCDMa:TGPP:ARB:RETRigger?
```

This command sets the retrigger mode.

- ON This choice specifies that if a trigger occurs while a waveform is initiated, the waveform will retrigger at the end of the previous waveform sequence and play once more.
- OFF This choice specifies that if a trigger occurs while a waveform is initiated, the action will be ignored.
- IMMediate This choice specifies that if a trigger occurs while a waveform is playing, the waveform will reset and replay from the start immediately upon receiving a trigger.

**\*RST** 0

**Key Entry** Retrigger Mode Off On

**Remarks** N/A

## :REVIsion

**Supported** All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:REVIsion?
```

This command checks the version for the arbitrary waveform generator firmware.

**\*RST** 3GPP 06-2001

**Key Entry** N/A

**Remarks** N/A

## :SCLock:RATE

**Supported** All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:SCLock:RATE <val>
[:SOURce]:RADio:WCDMa:TGPP:ARB:SCLock:RATE?
```

This command sets the sample clock rate for the W-CDMA modulation format.

The variable <val> is expressed in units of hertz.



<b>*RST</b>	+1.00000000E+008
<b>Range</b>	1–1E8
<b>Key Entry</b>	<b>ARB Sample Clock</b>
<b>Remarks</b>	The modulation format should be active before executing this command. If this command is executed before the modulation format is active, the entered value will be overridden by a calculated factory default value. Refer to “[:STATe]” on page 359 to activate the modulation format.

### **:TRIGger:TYPE:CONTInuous[:TYPE]**

**Supported** All with Option 400

```
[ :SOURCE ] :RADio:WCDMa:TGPP:ARB:TRIGger:CONTInuous [ :TYPE ] FREE |
TRIGger | RESet
[ :SOURCE ] :RADio:WCDMa:TGPP:ARB:TRIGger:CONTInuous [ :TYPE ] ?
```

This command sets the trigger type.

<b>FREE</b>	This choice immediately transmits a waveform that is continuously repeated.
<b>TRIGger</b>	This choice causes the waveform to wait for a trigger. Once a trigger is received, the transmission of a continuously repeated waveform begins.
<b>RESet</b>	This choice immediately restarts a continuously repeated waveform upon receiving a trigger.

<b>*RST</b>	<b>FREE</b>
<b>Key Entry</b>	<b>Free Run    Trigger &amp; Run    Reset &amp; Run</b>
<b>Remarks</b>	To select CONTInuous as the trigger type, refer to “:TRIGger:TYPE” on page 356.

## :TRIGGER:TYPE

**Supported** All with Option 400

```
[ :SOURCE ] :RADIO:WCDMA:TGPP:ARB:TRIGGER:TYPE CONTInuous | SINGLE | GATE
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:TRIGGER:TYPE?
```

This command sets the arbitrary waveform trigger type.

**CONTInuous** The waveform repeats continuously; the sequence restarts every time the previous playback is completed. To customize continuous triggering, refer to “:TRIGGER:TYPE:CONTInuous[:TYPE]” on page 355.

**SINGLE** The waveform segment or sequence plays once for every trigger received.

**GATE** An external trigger signal interrupts a segment’s playback. The active level can be set high or low when the external signal returns to the active state of the playback.

To change the polarity of the gated trigger, refer to “:TRIGGER:TYPE:GATE:ACTive” on page 356.

**\*RST** CONT

**Key Entry** Continuous Single Gated

**Remarks** N/A

## :TRIGGER:TYPE:GATE:ACTive

**Supported** All with Option 400

```
[ :SOURCE ] :RADIO:WCDMA:TGPP:ARB:TRIGGER:TYPE:GATE:ACTive LOW | HIGH
[:SOURCE]:RADIO:WCDMA:TGPP:ARB:TRIGGER:TYPE:GATE:ACTive?
```

This command sets the arb trigger gate polarity; GATE must first be selected as the trigger type.

**LOW** This choice outputs a trigger signal when the signal level at the PATT TRIG IN rear panel connector is in a low state.

**HIGH** This choice outputs a trigger signal when the signal level at the PATT TRIG IN rear panel connector is in a high state.

**\*RST** HIGH

**Key Entry** Gate Active Low High

**Remarks** To select a GATE as the trigger type, refer to “:TRIGGER:TYPE” on page 356.

## **:TRIGger[:SOURce]**

**Supported**      All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:TRIGger[:SOURce] KEY|EXT|BUS
[:SOURce]:RADio:WCDMa:TGPP:ARB:TRIGger[:SOURce]?
```

This command sets the trigger source.

- |            |  |
|------------|--|
| <b>KEY</b> | This choice enables triggering by pressing the front panel <b>Trigger</b> hardkey.   |
| <b>EXT</b> | This choice enables triggering using an externally applied signal at the PATT TRIG IN rear panel connector or the PATT TRIG IN 2 pin on the rear panel AUX I/O connector. To select the appropriate connector, refer to “:TRIGger[:SOURce]:EXTernal[:SOURce]” on page 358. |
| <b>BUS</b> | This choice enables GPIB triggering using the *TRG or GET command or LAN and RS-232 triggering using the *TRG command.   |

<b>Key Entry</b>	<b>Trigger Key    Bus    Ext</b>
------------------	----------------------------------

<b>Remarks</b>	N/A
----------------	-----

## **:TRIGger[:SOURce]:EXTernal:DELay**

**Supported**      All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:TRIGger[:SOURce]:EXTernal:DELay <val>
[:SOURce]:RADio:WCDMa:TGPP:ARB:TRIGger[:SOURce]:EXTernal:DELay?
```

This command sets the arbitrary waveform generator’s external trigger delay.

The variable <val> is expressed in units of seconds (μsec–ksec).

<b>*RST</b>	+1.00000000E–003
-------------	------------------

<b>Range</b>	1E–8 to 4E1
--------------	-------------

<b>Key Entry</b>	<b>Ext Delay Time</b>
------------------	-----------------------

<b>Remarks</b>	This command is effective only if an external trigger is selected as the trigger source. Refer to “:TRIGger[:SOURce]” on page 357.
----------------	--

### **:TRIGger[:SOURce]:EXTernal:DELay:STATe**

**Supported** All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:TRIGger[:SOURce]:EXTernal:DELay:
STATe ON|OFF|1|0
```

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:TRIGger[:SOURce]:EXTernal:DELay:STATe?
```

This command enables or disables the arbitrary waveform generator’s external trigger delay.

**\*RST** 0

**Key Entry** Ext Delay Off On

**Remarks** This command is effective only if an external trigger is selected as the trigger source. Refer to “:TRIGger[:SOURce]” on page 357.

### **:TRIGger[:SOURce]:EXTernal:SLOPe**

**Supported** All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:TRIGger[:SOURce]:EXTernal:
SLOPe POSitive|NEGative
```

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:TRIGger[:SOURce]:EXTernal:SLOPe?
```

This command sets the polarity for the external trigger.

**\*RST** NEG

**Key Entry** Ext Polarity Neg Pos

**Remarks** This command is effective only if an external trigger is selected as the trigger source. Refer to “:TRIGger[:SOURce]” on page 357.

### **:TRIGger[:SOURce]:EXTernal[:SOURce]**

**Supported** All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:TRIGger[:SOURce]:EXTernal
```

```
[:SOURce] EPT1|EPT2|EPTRIGGER1|EPTRIGGER2
```

```
[:SOURce]:RADio:WCDMa:TGPP:ARB:TRIGger[:SOURce]:EXTernal[:SOURce]?
```

This command specifies which PATT TRIG IN connection, rear panel connector or AUX I/O connector, will be used to accept an externally applied trigger signal.

EPT1 This choice is synonymous with EPTRIGGER1 and selects the PATT TRIG IN rear panel connector for the external signal connection.

<b>EPT2</b>	This choice is synonymous with EPTRIGGER2 and selects the PATT TRIG IN 2 pin on the rear panel AUX I/O connector for the external signal connection.
<b>EPTRIGGER1</b>	This choice is synonymous with EPT1 and selects the PATT TRIG IN rear panel connector for the external signal connection.
<b>EPTRIGGER2</b>	This choice is synonymous with EPT2 and selects the PATT TRIG IN 2 pin on the rear panel AUX I/O connector for the external signal connection.
<b>*RST</b>	EPT1
<b>Choices</b>	EPT1 EPT2 EPTRIGGER1 EPTRIGGER2
<b>Remarks</b>	This command is effective only if an external trigger is selected as the trigger source. Refer to “:TRIGger[:SOURce]” on page 357.  For more information about the rear panel AUX I/O connector pin configuration, refer to the <i>User’s Guide</i> .

**[:STATe]**

**Supported** All with Option 400

```
[:SOURce]:RADio:WCDMa:TGPP:ARB[:STATe] ON|OFF|1|0
[:SOURce]:RADio:WCDMa:TGPP:ARB[:STATe]?
```

This command enables or disables the W-CDMA modulation format.

<b>ON (1)</b>	This choice enables the W-CDMA modulation capability and sets up the internal hardware to generate the currently selected W-CDMA signal selection.
<b>OFF (0)</b>	This choice disables the W-CDMA baseband signal capability.
<b>*RST</b>	0
<b>Key Entry</b>	<b>W-CDMA Off On</b>
<b>Remarks</b>	This choice also activates the I/Q state and sets the I/Q source to internal.

Component Test Digital Commands

**Wideband CDMA ARB Subsystem—Option 400 ([:SOURCE]:RADIO:WCDMA:TGPP:ARB)**

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**Numerics**

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