



**AWG70000 Series
Arbitrary Waveform Generators
Programmer**

REV B
www.tek.com

077-1452-00

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Preface

This programmer guide provides you with the information required to remotely control your instrument.

In addition to this manual, other resources available about your instrument include the following documents.

Documentation Review the following table to locate more information about this product.

You can download PDF files of the documents from www.tek.com/manual/downloads.

To read about	Use these documents
Installation and Safety	Read the Installation and Safety manual for proper instrument installation and general safety information. This document is provided with the instrument and is also available for download from the Tektronix web site.
Operation and User Interface Help	Access the user help from the Help menu for information on controls and screen elements. The user help information is also available as a PDF file available from the Tektronix web site.
Programmer commands	The Programmer document provides the proper syntax of remote commands. This document is available for download from the Tektronix web site.
Specifications and Performance Verification procedures	This Technical Reference document provides the specifications and the performance verification procedures. This document is available for download from the Tektronix web site.

Getting Started

Introduction

This programmer guide provides you with the information required to use Programmable Interface (PI) commands for remotely controlling your instrument over a LAN electronic interface. With this information, you can write computer programs that perform functions such as setting the front-panel controls, selecting clock source, setting sampling rate, and exporting data for use in other programs.

In addition to the LAN electronic interface, your AWG is provided with a *TekVISA* GPIB-compatible interface, (referred to as the virtual GPIB interface).

The programmer guide is divided into the following major sections:

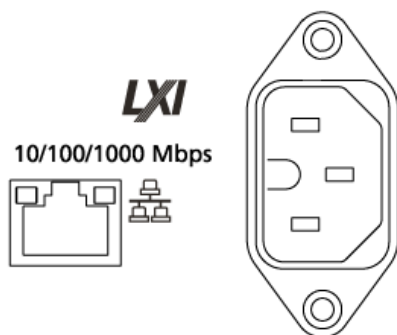
- Getting Started: provides basic information about setting up your AWG for remote control.
- Syntax and Commands: provides an overview of the command syntax used to communicate with the instrument and other general information about commands, such as how commands and queries are constructed, how to enter commands, constructed mnemonics, and argument types.
 - Command syntax:
 - Command groups: contains all the commands listed in functional groups. Each group consists of an overview of the commands in that group and a table that lists all the commands and queries for that group.
- Status and Events: discusses the status and event reporting system for the LAN interface. This system informs you of certain significant events that occur within the instrument.
- Appendices: contains miscellaneous information, such as LAN interface specifications that may be helpful when using remote commands.

Remote control

You can remotely control communications between your instrument and a PC via Ethernet or GPIB cables. Refer to the following sections describing the setups and connections required.

Ethernet control

If you are using Ethernet, start by connecting an appropriate Ethernet cable to the Ethernet port (RJ-45 connector) on the rear panel of the instrument. This connects the instrument to a 10BASE-T/100BASE-TX/1000BASE-T local area network.



The AWG accepts two types of Ethernet LAN connections:

- **VXI-11 Server:** VXI-11 protocol is used through TekVISA. TekVISA is preinstalled on the instrument, but to use this protocol, TekVISA must also be installed on the remote controller (PC).
- **Raw Socket:** Raw Socket is used through TekVISA. To use this protocol, TekVISA must also be installed on the remote controller (PC).

IP address. By default, the AWGs are specified to automatically acquire an IP address by DHCP. Refer to Windows documentation regarding network-related parameters.

GPIB control

The AWG has a USB 2.0 high-speed (HS) Device port to control the instrument through USBTMC or GPIB with a TEK-USB-488 Adapter. The USBTMC protocol allows USB devices to communicate using IEEE488 style messages. This lets you run your GPIB software applications on USB hardware.

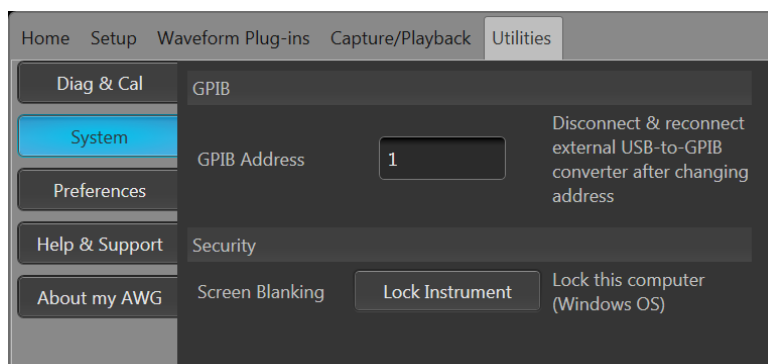
To use GPIB (General Purpose Interface Bus), start by connecting an appropriate USB cable to the USB 2.0 high-speed (HS) device port on the rear panel of the AWG. Connect the other end to the TEK-USB-488 Adapter host port. Then connect a GPIB cable from the TEK-USB-488 Adapter to your PC.

Before setting up the instrument for remote communication using the electronic (physical) GPIB interface, you should familiarize yourself with the following GPIB requirements:

- A unique device address must be assigned to each device on the bus. No two devices can share the same device address.
- No more than 15 devices can be connected to any one line.
- One device should be connected for every 6 feet (2 meters) of cable used.
- No more than 65 feet (20 meters) of cable should be used to connect devices to a bus.
- At least two-thirds of the devices on the network should be powered on while using the network.
- Connect the devices on the network in a star or linear configuration. Do not use loop or parallel configurations.

The default setting for the GPIB configuration is GPIB Address 1. If you need to change the GPIB address, do the following:

1. Display the Utilities screen and select System.
2. Set the GPIB address.
3. If the TEK-USB-488 adapter is connected to the instrument, disconnect and reconnect the adapter to ensure the new address is acquired.



Syntax and Commands

Command syntax

Syntax overview

Control the operations and functions of the AWG through the LAN interface using commands and queries. The related topics listed below describe the syntax of these commands and queries. The topics also describe the conventions that the AWG uses to process them. See the Command Groups topic for a listing of the commands by command group or use the index to locate a specific command.

Refer to the following table for the symbols that are used.

Table 2-1: Syntax symbols and their meanings

Symbol	Meaning
< >	Defined element
::=	Is defined as
	Exclusive OR
{ }	Group; one element is required
[]	Optional; can be omitted
...	Previous elements can be repeated
()	Comment

Command and query structure

Overview Commands consist of set commands and query commands (usually called commands and queries). Commands modify instrument settings or tell the instrument to perform a specific action. Queries cause the instrument to return data and status information.

Most commands have both a set form and a query form. The query form of the command differs from the set form by its question mark on the end. For example, the set command `AWGControl:RState` has a query form `AWGControl:RState?`. Not all commands have both a set and a query form. Some commands have only set and some have only query.

Messages A command message is a command or query name followed by any information the instrument needs to execute the command or query. Command messages may contain five element types, defined in the following table.

Table 2-2: Message symbols and their meanings

Symbol	Meaning
<Header>	This is the basic command name. If the header ends with a question mark, the command is a query. The header may begin with a colon (:) character. If the command is concatenated with other commands, the beginning colon is required. Never use the beginning colon with command headers beginning with a star (*).
<Mnemonic>	This is a header subfunction. Some command headers have only one mnemonic. If a command header has multiple mnemonics, a colon (:) character always separates them from each other.
<Argument>	This is a quantity, quality, restriction, or limit associated with the header. Some commands have no arguments while others have multiple arguments. A <space> separates arguments from the header. A <comma> separates arguments from each other.
<Comma>	A single comma is used between arguments of multiple-argument commands. Optionally, there may be white space characters before and after the comma.
<Space>	A white space character is used between a command header and the related argument. Optionally, a white space may consist of multiple white space characters.

Commands Commands cause the instrument to perform a specific function or change one of the settings. Commands have the structure:

```
[ : ] <Header> [ <Space> <Argument> [ <Comma> <Argument> ] . . . ]
```

A command header consists of one or more mnemonics arranged in a hierarchical or tree structure. The first mnemonic is the base or root of the tree and each subsequent mnemonic is a level or branch off the previous one. Commands at a higher level in the tree may affect those at a lower level. The leading colon (:) always returns you to the base of the command tree.

Queries Queries cause the instrument to return status or setting information. Queries have the structure:

```
[ : ] <Header> ?
```

```
[ : ] <Header> ? [ <Space> <Argument> [ <Comma> <Argument> ] . . . ]
```

Clearing the instrument

Use the Device Clear (DCL) or Selected Device Clear (SDC) functions to clear the Output Queue and reset the instrument to accept a new command or query.

Command entry

- Rules** The following rules apply when entering commands:
- You can enter commands in upper or lower case.
 - You can precede any command with white space characters. White space characters include any combination of the ASCII control characters 00 through 09 and 0B through 20 hexadecimal (0 through 9 and 11 through 32 decimal).
 - The instrument ignores commands consisting of any combination of white space characters and line feeds.

Abbreviating You can abbreviate many instrument commands. Each command in this documentation shows the abbreviations in capitals. For example, enter the command `TRIGger:LEVel` simply as `TRIG:LEV`.

Concatenating Use a semicolon (;) to concatenate any combination of set commands and queries. The instrument executes concatenated commands in the order received. When concatenating commands and queries, follow these rules:

1. Separate completely different headers by a semicolon and by the beginning colon on all commands except the first one. For example, the commands `TRIGger:IMPedance 50` and `SOURce:RMODE TRIGgered`, can be concatenated into the following single command:

```
TRIGger:IMPedance 50;:RMODE TRIGgered
```

2. If concatenated commands have headers that differ by only the last mnemonic, you can abbreviate the second command and eliminate the beginning colon. For example, you can concatenate the commands `TRIGger:SOURCE EXTErnal` and `TRIGger:SLOPe NEGAtive` into a single command:

```
TRIGger:SOURCE EXTErnal; SLOPe NEGAtive
```

The longer version works equally well:

```
TRIGger:SOURCE EXTErnal;:TRIGger:SLOPe NEGAtive
```

3. Never precede a star (*) command with a semicolon (;) or colon (:).

4. When you concatenate queries, the responses to all the queries are concatenated into a single response message. For example, if the high level of marker one of channel one is 1.0 V and the low level is 0.0 V, the concatenated query `SOURce1:MARKer1:VOLTage:HIGH?; SOURce1:MARKer1:VOLTage:LOW?` will return the following:
1.0;0.0
5. Set commands and queries may be concatenated in the same message. For example, `TRIGger:SOURce EXternal; SLOPe?` is a valid message that sets the trigger source to External. The message then queries the external trigger slope. Concatenated commands and queries are executed in the order received.

Terminating

This documentation uses <EOM> (end of message) to represent a message terminator.

Table 2-3: Message terminator and meaning

Symbol	Meaning
<EOM>	Message terminator

For messages sent to the instrument, the end-of-message terminator must be the END message (EOI asserted concurrently with the last data byte). The instrument always terminates messages with LF and EOI. It allows white space before the terminator. For example, it allows CR LF.

Parameter types

Parameters are indicated by angle brackets, such as <file_name>. There are several different types of parameters, as listed in the following table. The parameter type is listed after the parameter. Some parameter types are defined specifically for the instrument command set and some are defined by SCPI.

Table 2-4: Parameter types, their descriptions, and examples

Parameter type	Description	Example
Arbitrary block	A block of data bytes	#512234xxxxx... where 5 indicates that the following 5 digits (12234) specify the length of the data in bytes; xxxxx... indicates actual data or #0xxxxx...<LF><&EOI>
Boolean	Boolean numbers or values	ON or ≠ 0 OFF or 0
Discrete	A list of specific values	MINimum, MAXimum
NaN	Not a Number	9.91 ³⁷

Table 2-4: Parameter types, their descriptions, and examples (cont.)

Parameter type	Description	Example
NR1 numeric	Integers	0, 1, 15, -1
NR2 numeric	Decimal numbers	1.2, 3.141, -6.5
NR3 numeric	Floating point numbers	3.1415E+9
NRf numeric	Flexible decimal numbers that may be type NR1, NR2, or NR3	See NR1, NR2, and NR3 examples in this table
String	Alphanumeric characters (must be within quotation marks)	"Testing 1, 2, 3"

About MIN, MAX

You can also use MINimum and MAXimum keywords in the commands with the "Numeric" parameter. Set the minimum value or the maximum value using these keywords and query these values.

Block

Several instrument commands use a block argument form (see the following table).

Table 2-5: Block symbols and their meanings

Symbol	Meaning
<NZDig>	A nonzero digit character in the range of 1–9
<Dig>	<Dig> A digit character, in the range of 0–9
<DChar>	A character with the hexadecimal equivalent of 00 through FF (0 through 255 decimal) that represents actual data
<Block>	A block of data bytes defined as: <Block> ::= {#<NZDig><Dig>[<Dig>...][<DChar>...] [#0<DChar>...]<terminator>}

Arbitrary block An arbitrary block argument is defined as:

#<NZDig><Dig>[<Dig>...][<DChar>...]

or

#0[<DChar>...]<terminator>

<NZDig> specifies the number of <Dig> elements that follow. Taken together, the <NZDig> and <Dig> elements form a decimal integer that specifies how many <DChar> elements follow.

#0 means that the <Block> is an indefinite length block. The <terminator> ends the block.

NOTE. *The AWGs do not support the indefinite format (a block starts with #0).*

Quoted string

Some commands accept or return data in the form of a quoted string, which is simply a group of ASCII characters enclosed by a single quote (') or double quote ("). For example: "this is a quoted string". This documentation represents these arguments as follows:

Table 2-6: String symbol and meaning

Symbol	Meaning
<QString >	Quoted string of ASCII text

A quoted string can include any character defined in the 7-bit ASCII character set. Follow these rules when you use quoted strings:

1. Use the same type of quote character to open and close the string. For example: "this is a valid string".
2. You can mix quotation marks within a string as long as you follow the previous rule. For example, "this is an 'acceptable' string".
3. You can include a quote character within a string simply by repeating the quote.

For example: "here is a "" mark".
4. Strings can have upper or lower case characters.
5. A carriage return or line feed embedded in a quoted string does not terminate the string, but is treated as just another character in the string.
6. The maximum length of a quoted string returned from a query is 1000 characters.

Here are some invalid strings:

- "Invalid string argument" (quotes are not of the same type)
- "test<EOI>" (termination character is embedded in the string)

Units and SI prefix

If the decimal numeric argument refers to voltage, frequency, impedance, or time, express it using SI units instead of using the scaled explicit point input value format <NR3>. (SI prefixes are standardized for use in the International System of Units by the International Bureau of Weights and Measures.) For example, use the input format 200 mV or 1.0 MHz instead of 200.0E-3 or 1.0E+6, respectively, to specify voltage or frequency.

Omit the unit when you describe commands, but include the SI unit prefix. Enter both uppercase and lowercase characters. The following list shows examples of units you can use with the commands.

- V for voltage (V).
- HZ for frequency (Hz).
- OHM for impedance (ohm).
- S for time (s).
- DBM for power ratio.
- PCT for %.
- VPP for Peak-to-Peak Voltage (V p-p).
- UIPP for Peak-to-Peak, Unit is UI (UI p-p).
- UIRMS for RMS, Unit is UI (UIrms).
- SPP for Peak-to-Peak, Unit is second (s p-p).
- SRMS for RMS, Unit is second (srms).
- V/NS for SLEW's unit (V/ns).

The SI prefixes, which must be included, are shown in the following table. You can enter both uppercase and lowercase characters.

Table 2-7: SI prefixes and their indexes

SI prefix ¹	Corresponding power
EX	10 ¹⁸
PE	10 ¹⁵
T	10 ¹²
G	10 ⁹
MA	10 ⁶
K	10 ³

Table 2-7: SI prefixes and their indexes (cont.)

SI prefix ¹	Corresponding power
M	10^{-3}
U ²	10^{-6}
N	10^{-9}
P	10^{-12}
F	10^{-15}
A	10^{-18}

¹ Note that the prefix m/M indicates 10^{-3} when the decimal numeric argument denotes voltage or time, but indicates 10^6 when it denotes frequency.

² Note that the prefix u/U is used instead of "μ".

Since M (m) can be interpreted as 1E-3 or 1E6 depending on the units, use mV for V, and MHz for Hz.

The SI prefixes need units.

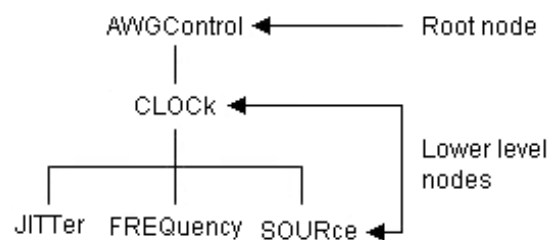
correct: 10MHz, 10E+6Hz, 10E+6

incorrect: 10M

SCPI commands and queries

The AWG uses a command language based on the SCPI standard. The SCPI (Standard Commands for Programmable Instruments) standard was created by a consortium to provide guidelines for remote programming of instruments. These guidelines provide a consistent programming environment for instrument control and data transfer. This environment uses defined programming messages, instrument responses and data formats that operate across all SCPI instruments, regardless of manufacturer.

The SCPI language is based on a hierarchical or tree structure that represents a subsystem (see following figure). The top level of the tree is the root node; it is followed by one or more lower-level nodes.



You can create commands and queries from these subsystem hierarchy trees. Commands specify actions for the instrument to perform. Queries return measurement data and information about parameter settings.

Sequential, blocking, and overlapping commands

Programming commands (and queries) fall into three command type categories:

- Sequential
- Blocking
- Overlapping

The type of command is important to consider when programming since they could cause unexpected results if not handled correctly. See the following explanations and examples.

Sequential commands

Most of the programming commands are sequential type commands. This simply means a command will not start until the previous command has finished.

Following is an example of a series of sequential commands.

```

OUTPut:OFF ON [————]
               |
MMEMory:CDIRectory [————]
                   |
                  *IDN? [————]
  
```

In normal operation, these commands could all be sent at once and they would be queued up and executed sequentially.

Blocking commands

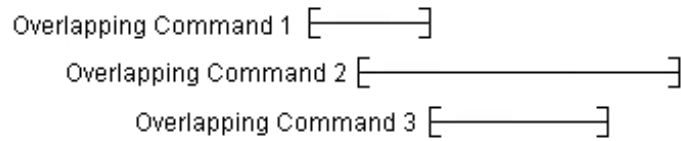
The AWG70000 series instruments have several commands that are blocking. A blocking command does not allow any further commands to be executed until it is finished performing its task, such as a command that changes a hardware setting.

Blocking commands perform similar to sequential commands, but they tend to take a longer amount of time to complete. Because of the time for a blocking command to complete, if a number of blocking commands are run in a sequence followed by a query, the query could time out because the previous blocking commands have not finished.

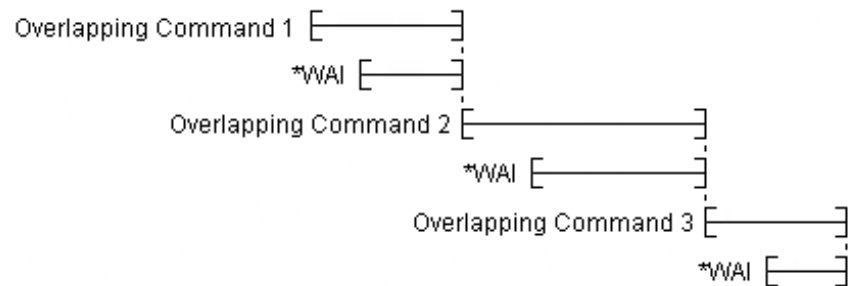
Blocking commands are noted in their command descriptions.

Overlapping commands

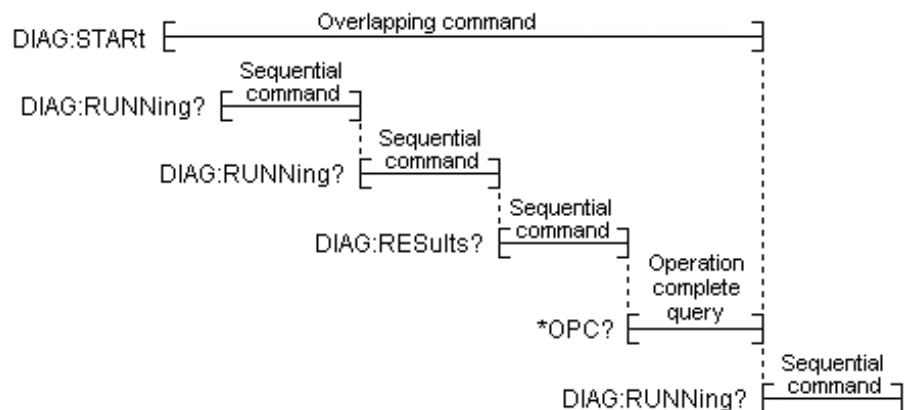
Overlapping commands run concurrently with other commands, allowing additional commands to start before the overlapping command has finished. The illustration below shows how a series of overlapping commands might start and end.



In some instances, you may want to make an overlapping command perform similarly to a sequential command. This is simply done by placing a *WAI command after the overlapping command as illustrated below.

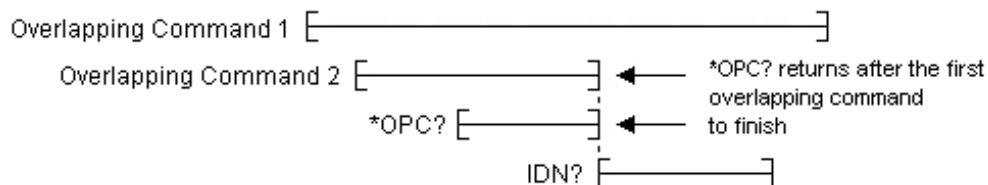


You always want to ensure the overlapping command has completed. This is done by using the *OPC? command. When an overlapping command starts, the operation complete status event is cleared. When the overlapping command completes, the operation complete status event is set. The *OPC? command requirement is to return a 1 when the operation complete status event is set. In the illustration below, the OPC? command blocks any further commands from being executed until the operation complete status event is set.



NOTE. Always ensure overlapping commands have completed by placing an *OPC? command after the overlapping command.

The AWG70000 series instruments are limited to one outstanding overlapping command per *OPC?. If two or more overlapping commands are sent and followed by an *OPC?, then the first overlapped command to finish will set the operation complete status event and *OPC? will return 1. This early return may produce undesirable results. The following illustration shows this behavior.



NOTE. The *OPC? query only supports one overlapping command, not the two or more overlapping commands as defined in the IEEE Std 488.2 standard.

Overlapping commands are noted in their command descriptions.

Command groups

Auxiliary out commands

Use the Auxiliary out commands to setup and control the Auxiliary outputs on the rear panel.

NOTE. The AWG70000A series label these outputs as *Flag outputs*.

Table 2-8: Auxiliary output group commands and their descriptions

Command	Description
AUXoutput[n]:SOURce	Sets or returns the signal source for the specified Auxiliary Output connector.
AUXoutput[n]:SOURce:CMAPping	Sets or returns the Auxiliary Output channel mapping.

Basic waveform editor commands

Use the Basic waveform editor commands to setup and create waveforms using the Basic waveform editor plug-in.

Table 2-9: Basic waveform editor group commands and their descriptions

Command	Description
BWAVEform:AMPLitude	Sets or returns the peak-to-peak Amplitude value for the waveform created by the Basic Waveform editor plug-in.
BWAVEform:AUTO	Sets or returns the Basic Waveform editor plug-in Auto Calculate setting, determining which value is automatically calculated.
BWAVEform:COMPIle	Initiates the Basic Waveform editor plug-in compile process.
BWAVEform:COMPIle:CASSign	Sets or returns the state (enabled or disabled) of the Basic Waveform editor to compile the waveform and immediately assign it to a specified channel (enabled) or just compile the waveform (disabled).
BWAVEform:COMPIle:CHANnel	Sets or returns the playout channel intended for the compiled waveform of the Basic Waveform editor plug-in.
BWAVEform:COMPIle:NAME	Sets or returns the name of the Basic Waveform editor plug-in compiled waveform.
BWAVEform:COMPIle:PLAY	Sets or returns the state (enabled or disabled) of the Basic Waveform editor to either immediately play the waveform after compile or just compile.
BWAVEform:CYCLE	Sets or returns the Cycle value (number of times the waveform repeats) for the waveform created by the Basic Waveform editor plug-in.
BWAVEform:FREQuency	Sets or returns the Frequency for the waveform created by the Basic Waveform editor plug-in.

Table 2-9: Basic waveform editor group commands and their descriptions (cont.)

Command	Description
BWAVEform:FDRange	Sets or returns the state (enabled or disabled) of the Basic Waveform editor plug-in to use or not use the full DAC range during compile.
BWAVEform:FUNction	Sets or returns the Basic Waveform editor plug-in waveform type.
BWAVEform:HIGH	Sets or returns the high voltage value for the waveform created by the Basic Waveform editor plug-in.
BWAVEform:LENGth	Sets or returns the length for the waveform created by the Basic Waveform editor plug-in.
BWAVEform:LOW	Sets or returns the low voltage value for the waveform created by the Basic Waveform editor plug-in.
BWAVEform:OFFSet	Sets or returns the offset voltage value for the waveform created by the Basic Waveform editor plug-in.
BWAVEform:RESet	Resets the Basic Waveform editor plug-in to its default values.
BWAVEform:SRATe	Sets or returns the Sample Rate for the waveform created by the Basic Waveform editor plug-in.

Calibration group commands

Use the calibration commands to calibrate the arbitrary waveform generator and obtain calibration data.

Table 2-10: Calibration group commands and their descriptions

Command	Description
CALibration:ABORt	Stops the self calibration process and restores the previous calibration constants.
CALibration[:ALL]	Performs a full calibration of the AWG. The query form performs a full calibration and returns a status of the operation.
CALibration:CATalog?	Returns the list of subsystems, areas, or procedures.
CALibration:LOG?	Returns a string of continuous concatenated calibration results.
CALibration:LOG:CLEar	Clears the results log.
CALibration:LOG:FAILuresonly	Sets and returns the flag that controls the amount of result information saved into the log.
CALibration:REStore	Restores the calibration constants from the factory non-volatile memory and copied to user storage.
CALibration:RESult?	Returns the status about the results of the last start of a set of selected calibration procedures.
CALibration:RESult:TEMPerature?	Returns the temperature from the results of the last start of a set of selected procedures.
CALibration:RESult:TIME?	Returns the time from the results of the last start of a set of selected procedures.
CALibration:RUNNing?	Returns the name of the subsystem, area, and procedure in progress.
CALibration:STARt	Starts the selected set of calibrations.
CALibration:STATe:FACTory?	Returns the current factory state of the calibration for the AWG.
CALibration:STATe:USER?	Returns the current factory state of the calibration for the AWG.
CALibration:STOP:STATe?	Returns the state of the calibration procedure.

Capture and playback group commands

Use the capture and playback commands to import I/Q data files to compile into RF waveform files for playout.

Table 2-11: Capture and playback group commands and their descriptions

Command	Description
CPLayback:CAPTure:FILE	Imports baseband IQ waveform data and adds the waveform to the specified Signal Name in the captured signal list.
CPLayback:CAPTure:INSTrument:OSCilloscope	Connects to the specified oscilloscope, transfers the existing acquisition from the oscilloscope to the AWG, and adds it to the specified signal.
CPLayback:CAPTure:INSTrument:RSA	Connects to the specified RSA (Realtime Spectrum Analyzer), transfers the existing acquisition to the AWG, and adds it to the specified signal.
CPLayback:CAPTure:WLIST	This command adds the specified IQ waveform from the Waveform List to the specified signal in the Captured Signal List.
CPLayback:CLISt:NAME?	Returns the name of a signal from the Captured Signal List in the position specified by the index value.
CPLayback:CLISt:SIGNAL:DELeTe	Removes the specified signal from the Captured Signal List.
CPLayback:CLISt:SIGNAL:SCOMpile	Selects or deselects a signal from the captured signal list to be compiled. The query form returns the list of selected files.
CPLayback:CLISt:SIGNAL:WAVEform:FOFFset	This command sets or returns the frequency offset of the specified waveform segment of the specified signal in the Captured Signal List.
CPLayback:CLISt:SIGNAL:WAVEform:NAME?	Returns the name of the specified waveform segment of the specified signal in the Captured Signal List.
CPLayback:CLISt:SIGNAL:WAVEform:OTIME	Sets or returns the Off time between waveform segments of the specified signal in the Captured Signal List.
CPLayback:CLISt:SIGNAL:WAVEform:SRATe	Sets or returns the sample rate of a waveform segment of a signal in the captured signal list.
CPLayback:CLISt:SIGNAL:WCOunt?	Returns the number of waveforms in the specified signal in the Captured Signal List.
CPLayback:CLISt:SIZE?	Returns the number of signals in the Captured Signal List.
CPLayback:COMPIle	Resamples and upconverts the selected signal to the specified carrier frequency. A sequence will be generated if selected signal contains more than one waveform or off time is specified. Otherwise, a waveform will be generated.
CPLayback:COMPIle:CFRequency	Sets or returns the carrier frequency for the compiled signals.
CPLayback:COMPIle:LSEquence	Sets or returns if the compiled sequence should loop on itself.
CPLayback:COMPIle:NORMalize	Sets or returns if the IQ waveforms will be normalized during import.
CPLayback:COMPIle:SRATe	Sets or returns the output sampling rate for the compiled signals.
CPLayback:COMPIle:SRATe:AUTO	Sets or returns if the system will calculate the output sampling rate automatically when compiling the selected signals.

Clock group commands

Use the clock commands to define the instrument's sampling rate and adjust clock and reference sources.

Table 2-12: Clock group commands and their descriptions

Command	Description
CLOCK:EClock:DIVider	Sets or returns the divider rate of the external clock.
CLOCK:EClock:FREQuency	Sets or returns the expected frequency being provided by the external clock.
CLOCK:EClock:FREQuency:ADJust	Adjusts the external clock to the frequency specified by the user or set by the external clock frequency detect.
CLOCK:EClock:FREQuency:DETEct	Detects the frequency of the signal applied to the Clock In connector and adjusts the system to use the signal.
CLOCK:EClock:MULTiplier	Sets or returns the multiplier rate of the external clock.
CLOCK:EREFerence:DIVider	Sets or returns the divider rate of the external reference oscillator.
CLOCK:EREFerence:FREQuency	Sets or returns the expected frequency of the signal applied to the EXT REF input connector.
CLOCK:EREFerence:FREQuency:DETEct	Detects the frequency of the signal applied to the EXT REF input connector and adjusts the system to use the signal.
CLOCK:EREFerence:MULTiplier	Sets or returns the multiplier rate of the variable external reference signal.
CLOCK:JITTer	Sets or returns the state (enabled or disabled) to apply or not apply jitter reduction to the internal system clock or the clock signal applied to the Reference In connector.
CLOCK:OUTPut:FREQuency?	Returns the frequency of the output clock.
CLOCK:OUTPut[:STATe]	Sets or returns the output state of the clock output.
CLOCK:PHASe[:ADJust[:DEGREes]]	Sets or returns the phase adjustment, in units of degrees, to synchronize multiple AWGs when using an external trigger.
CLOCK:PHASe[:ADJust]:TIME	Sets or returns the internal clock phase adjustment of the AWG.
CLOCK:SOURce	Sets or returns the source of the clock.
CLOCK:SOUT[:STATe]	Sets or returns the state of the Sync Clock Out output.
CLOCK:SRATE	Sets or returns the sample rate for the clock.

Control group commands

Use the control commands to control operating modes, such as the run state, interleave adjustment, and pattern jump.

The commands noted for backwards compatibility should not be used for new programming applications.

Table 2-13: Control group commands and their descriptions

Command	Description
AWGControl:ARSettings	Sets or returns the state (enabled or disabled) of whether or not to apply the recommended settings of waveforms and sequences when they are assigned to a channel.
AWGControl[:CLOCK]:DRATe	NOTE. This command exists for backwards compatibility. Use the command CLOCK:EClock:DIVider . Sets or returns the divider rate for the external clock.
AWGControl:CLOCK:PHASe[:ADJust]	NOTE. This command exists for backwards compatibility. Use the command CLOCK:PHASe[:ADJust]:TIME . Sets or returns the phase of the internal clock.
AWGControl[:CLOCK]:SOURce	NOTE. This command exists for backwards compatibility. Use the command CLOCK:SOURce . Sets or returns the clock source.
AWGControl:COMPIle	Compiles an equation file and imports the waveforms (created by the equation file) into the arbitrary waveform generator.
AWGControl:CONFigure:CNUMber?	Returns the number of channels available on the AWG.
AWGControl:DLOading:ENABLE	Sets or returns the state (enabled or disabled) to either allow or not allow dynamic loading of waveforms into a sequence while the sequence is playing.
AWGControl:DOUtput[n]:STATe]	NOTE. This command exists for backwards compatibility. Use the command OUTPut[n]:PATH . Enables the raw DAC waveform outputs for the specified channel. The query form of this command returns the status of raw DAC waveform output for the specified channel. When the state is ON, filter settings for the channel are ignored.
AWGControl:INTerleave:ADJustment:AMPLitude	Sets or returns the interleave adjustment amplitude percentage.
AWGControl:INTerleave:ADJustment:PHASe	Sets or returns the interleave adjustment phase.
AWGControl:LSState?	Returns the waveform loading state of the arbitrary waveform generator when Dynamic Loading is enabled.
AWGControl:PJUMp:JSTRobe	Sets or returns if the pattern jump is set (enabled or disabled) to always occur on the strobe signal.
AWGControl:PJUMp:SEDGe	Sets or returns the active Strobe Edge to use for Pattern Jump when Pattern Jump is enabled for Sequencing.

Table 2-13: Control group commands and their descriptions (cont.)

Command	Description
AWGControl:RMODe	NOTE. This command exists for backwards compatibility. Use the command [SOURce[n]:]RMODe . Sets or returns the run mode of the AWG.
AWGControl:RSTate?	Returns the state of the AWG.
AWGControl:RUN[:IMMediate]	Initiates the output of a waveform or sequence.
AWGControl:SNAME?	Returns the most recently saved setup location.
AWGControl:SREStore	NOTE. This command exists for backwards compatibility. Use the command MMEMory:OPEN:SETup . Opens a setup file into the AWG's setup memory.
AWGControl:SSAVe	NOTE. This command exists for backwards compatibility. Use the command MMEMory:SAVE:SETup . Saves the AWG's setup with waveforms.
AWGControl:STOP[:IMMediate]	Stops the output of a waveform or sequence.
AWGControl:STReaming:ENABle AWG70000B series only	Sets or returns the state (enabled or disabled) of Streaming ID .
AWGControl:STReaming:JEVent AWG70000B series only	Sets or returns the jump event for Streaming ID.
AWGControl:TIMer:INTERval:HZ	Sets or returns the internal timer interval period in Hertz.
AWGControl:TIMer:INTERval[:SEConds]	Sets or returns the internal timer interval period in seconds.
AWGControl:TIMer:RSTate?	Returns the state of the internal timer (running or stopped).
AWGControl:TIMer:RUN	Starts the internal timer immediately.
AWGControl:TIMer:SOPLay	Sets or returns the state (enabled or disabled) of the timer to start and stop when waveform playout starts and stops.
AWGControl:TIMer:STOP	Stops the internal timer immediately.

Diagnostic group commands

Use the diagnostic commands to control self-test diagnostic routines.

Table 2-14: Diagnostic group commands and their descriptions

Command	Description
ACTive:MODE	Enables and disables access to diagnostics or calibration.
DIAGnostic:ABORt	Stops the current diagnostic test.
DIAGnostic:CATalog?	Returns the list of all diagnostic tests per selected type.
DIAGnostic:CONTRol:COUNT	Sets or returns the number of loop counts used when the selected loop mode is COUNT.
DIAGnostic:CONTRol:HALT	Determines or returns whether the next execution of diagnostics looping stops on the first diagnostic failure that occurs or continues to loop on the selected set of diagnostic functions.
DIAGnostic:CONTRol:LOOP	Determines or queries whether the next start of diagnostics runs once, runs continuous loops, or loops for a number times for the selected set of tests.
DIAGnostic:DATA?	Returns the results of last executed tests for the NORMal diagnostic type.
DIAGnostic[:IMMEDIATE]	Executes all of the NORMal diagnostic tests. The query form executes the selected tests and returns the results.
DIAGnostic:LOG?	Returns a string of continuous concatenated test results.
DIAGnostic:LOG:CLEar	Clears the diagnostics results log.
DIAGnostic:LOG:FAILuresonly	Sets or returns the flag that controls the amount of result information saved into the log.
DIAGnostic:LOOPs?	Returns the number of times that the selected diagnostics set was completed during the current running or the last diagnostic running of the set.
DIAGnostic:RESult?	Returns the status about the results of the last start of a set of selected tests.
DIAGnostic:RESult:TEMPerature?	Returns the temperature from the results of the last start of a set of selected tests.
DIAGnostic:RESult:TIME?	Returns the time from the results of the last start of a set of selected tests.
DIAGnostic:RUNNing?	Returns the name of the subsystem, area, and test of the current diagnostic test.
DIAGnostic:SElect	Selects one or more tests of the current test list.
DIAGnostic:SElect:VERify?	Returns selection status of one specific test.
DIAGnostic:START	This command starts the execution of the selected set of diagnostic tests.
DIAGnostic:STOP	Stops the diagnostic tests from running, after the diagnostic test currently in progress completes.
DIAGnostic:STOP:STATe?	Returns the current state of diagnostic testing.
DIAGnostic:TYPE	Sets or returns the diagnostic type.
DIAGnostic:TYPE:CATalog?	Returns a list of diagnostic types available depending on the end user.
DIAGnostic:UNSelect	Unselects one or more tests of the current test list.

Display group commands

Use the display commands to adjust the display plot area.

Table 2-15: Display group commands and their descriptions

Command	Description
DISPlay[:PLOT][:STATe]	Minimizes or restores the plot's display area on the Home screen's channel window of the AWG.

Function generator group commands

Use the function generator commands to generate basic waveshapes.

Table 2-16: Function generator group commands and their descriptions

Command	Description
FGEN[:CHANnel[n]]:AMPLitude:POWer	Sets or returns the function generator's waveform amplitude value of the specified channel in units of dBm.
FGEN[:CHANnel[n]]:AMPLitude[:VOLTage]	Sets or returns the amplitude of the generated waveform of the selected channel in units of volts.
FGEN[:CHANnel[n]]:DCLevel	Sets or returns the DC level of the generated waveform of the selected channel.
FGEN[:CHANnel[n]]:FREQuency	Sets or returns the frequency of the generated waveform.
FGEN[:CHANnel[n]]:HIGH	Sets or returns the generated waveform's high voltage value of the selected channel.
FGEN[:CHANnel[n]]:LOW	Sets or returns the generated waveform's low voltage value of the selected channel.
FGEN[:CHANnel[n]]:OFFSet	Sets or returns the offset of the generated waveform of the selected channel.
FGEN[:CHANnel[n]]:PATH	Sets or returns the function generator's signal path for the specified channel.
FGEN[:CHANnel[n]]:PERiod?	Returns the generated waveform's period.
FGEN[:CHANnel[n]]:PHASe	Sets or returns the generated waveform's phase of the selected channel.
FGEN[:CHANnel[n]]:SYMMetry	Sets or returns the generated waveform's symmetry value of the selected channel.
FGEN[:CHANnel[n]]:TYPE	Sets or returns the waveform type (shape) of the selected channel.

IEEE mandated and optional group commands

All AWG IEEE mandated and optional command implementations are based on the SCPI standard and the specifications for devices in IEEE 488.2.

Table 2-17: IEEE mandated and optional group commands and their descriptions

Command	Description
*CAL?	Runs all self calibrations and returns the result. Same as CALibration[:ALL] .
*CLS	Clears all event registers and queues.
*ESE	Sets or returns the Event Status Enable Register (ESER).
*ESR?	Returns the current contents of the Event Status Register (ESR).
*IDN?	Returns identification information for the AWG.
*OPC	This command causes the AWG to sense the internal flag referred to as the "No-Operation-Pending" flag. The command sets bit 0 in the Standard Event Status Register when pending operations are complete. The query form returns a "1" when the last overlapping command operation is finished.
*OPT?	Returns the implemented options for the AWG.
*RST	Resets the AWG to its default state.
*SRE	Sets or returns the bits in the Service Request Enable Register (SRER).
*STB?	Returns the contents of Status Byte Register (SBR).
*TRG	Generates a trigger event for Trigger A only.
*TST?	Executes a power-on self test and returns the results.
*WAI	Ensures the completion of the previous command before the next command is issued.

Instrument group commands

Use the instrument commands to set the coupled state of two channel instruments and set the mode (function mode or arbitrary waveform generator mode).

Table 2-18: Instrument group commands and their descriptions

Command	Description
INSTrument:COUPle:SOURce	Sets or returns the coupled state of the channels (two channel AWGs).
INSTrument:MODE	Sets or returns the AWG mode.

Mass memory group commands

Use the mass memory commands to read/write data from/to hard disk on the instrument.

Table 2-19: Mass memory group commands and their descriptions

Command	Description
MMEMory:CATalog?	Returns the current contents and state of the mass storage media.
MMEMory:CDIRectory	Sets or returns the current directory of the file system on the AWG.
MMEMory:DATA	Sets or returns block data to/from file in the current mass storage device.
MMEMory:DATA:SIZE?	Returns the size in bytes of a selected file.
MMEMory:DELeTe	Deletes a file or directory from the AWG's hard disk.
MMEMory:IMPort	NOTE. <i>This command exists for backwards compatibility. Use the command MMEMory:OPEN.</i> Loads a file into the AWG waveform list.
MMEMory:IMPort[:PARAmeter]:NORMalize	NOTE. <i>This command exists for backwards compatibility. Use the command MMEMory:OPEN[:PARAmeter]:NORMalize.</i> Sets or returns if the imported data is normalized during select file format import operations. The imported waveform data (for select file formats) is normalized based on the option set in this command.
MMEMory:MDIRectory	Creates a new directory in the current path on the mass storage system.
MMEMory:MSIS	Sets or returns a mass storage device used by all MMEMory commands.
MMEMory:OPEN	Loads a file into the AWG waveform list.
MMEMory:OPEN[:PARAmeter]:NORMalize	Sets or returns if the imported data is normalized during select file format import operations.
MMEMory:OPEN[:PARAmeter]:SIQ	Sets or returns if the IQ waveform (from supported formats) is separated into two separate _I and _Q waveforms while importing.
MMEMory:OPEN:SASSet:SEQuence	Loads all sequences or a single desired sequence from a file into the AWG's sequences list.
MMEMory:OPEN:SASSet:SEQuence:MROPened?	Returns which sequence was most recently added or replaced from the most recently opened or imported sequence file.
MMEMory:OPEN:SASSet:WAVeform]	Loads all waveforms or a single desired waveform from a file into the AWG's waveforms list.
MMEMory:OPEN:SETup	Opens a setup file into the AWG's setup memory.
MMEMory:OPEN:TXT	Loads a file into the AWG's waveform list.
MMEMory:SAVE:SEQuence	Exports a sequence given a unique name to an eligible storage location as the .SEQX file type.
MMEMory:SAVE:SETup	Saves the AWG's setup and optionally includes the waveforms.
MMEMory:SAVE[:WAVeform]:MAT	Exports a waveform given a unique waveform name to an eligible storage location from the AWG's waveforms with the AWG Specific MATLAB file format (MAT 5).

Table 2-19: Mass memory group commands and their descriptions (cont.)

Command	Description
MMEMory:SAVE[:WAVeform]:TIQ	Exports a waveform given a unique waveform name to an eligible storage location from the AWG's waveforms as the .TIQ file type.
MMEMory:SAVE[:WAVeform]:TXT	Exports a waveform given a unique waveform name to an eligible storage location from the AWG's waveforms as the .TXT file type.
MMEMory:SAVE[:WAVeform]:WFM	Exports a waveform given a unique waveform name to an eligible storage location from the AWG's waveforms as the .WFM file type.
MMEMory:SAVE[:WAVeform][:WFMX]	Exports a waveform given a unique waveform name to an eligible storage location from the AWG's waveforms as the .WFMX file type.

Output group commands

Use the output commands to set or return the characteristics of the output of the arbitrary waveform generator.

Table 2-20: Output group commands and their descriptions

Command	Description
OUTPut[n]:ATTenuator:A1	Sets or returns the step value setting for the A1 attenuator (in units of dB) in the Band Pass Filter path.
OUTPut[n]:ATTenuator:A2	Sets or returns the step value setting for the A2 attenuator (in units of dB) in the Band Pass Filter path.
OUTPut[n]:ATTenuator:A3	Sets or returns the step value setting for the A3 attenuator (in units of dB) in the Band Pass Filter path.
OUTPut[n]:ATTenuator:DAC	Sets or returns the DAC output power level (in units of dBm) when in AC output mode.
OUTPut[n]:FILTer	Sets or returns the filter type for the signal path. Option AC required.
OUTPut[n]:FILTer:BPASs:RANGe	Sets or returns the filter range of the band pass filter for the signal path. Option AC required.
OUTPut:OFF	Sets or returns the state (enabled or disabled) of the 'All Outputs Off' control. Enabled causes each channel's output and markers to go to an ungrounded (or open) state.
OUTPut[n]:PATH	Sets or returns the signal path when Option AC is installed.
OUTPut[n][:STATe]	Sets or returns the output state of the channel.
OUTPut[n]:SVALue[:ANALog][:STATe]	Sets or returns the output condition of a waveform of the specified channel while the instrument is in the stopped state.
OUTPut[n]:SVALue:MARKer[m]	Sets or returns the output condition of the specified marker of the specified channel while the instrument is in the stopped state.
OUTPut[n]:WVALue[:ANALog][:STATe]	Sets or returns the output condition of a waveform of the specified channel while the instrument is in the waiting-for-trigger state.
OUTPut[n]:WVALue:MARKer[m]	Sets or returns the output condition of the specified marker of the specified channel while the instrument is in the waiting-for-trigger state.

S-Parameters group commands

Use these commands to control and apply the S-Parameter to waveforms.

Table 2-21: S-parameters group commands and their descriptions

Command	Description
WLIS:SPARameter:APPLY	Applies S-Parameters to a waveform that exists in the waveform list of the current setup.
WLIS:SPARameter:BANDwidth	Sets or returns the S-Parameter bandwidth value when the bandwidth is set to use a manual entry.
WLIS:SPARameter:BANDwidth:AUTO	Sets or returns how the S-Parameter bandwidth is defined.
WLIS:SPARameter:CASCading:AGGRessor2[:ENABLE]	Sets or returns whether the aggressor 2 signal type state (enabled or disabled) in Cascading mode. Aggressor2 signals are available when the number of ports is set to 12.
WLIS:SPARameter:CASCading:AGGRessor[n]:AMPLitude	Sets or returns the specified Aggressor's amplitude, in Cascading mode.
WLIS:SPARameter:CASCading:AGGRessor[n]:CTALK	Sets or returns the specified Aggressor's crosstalk type, in Cascading mode.
WLIS:SPARameter:CASCading:AGGRessor[n]:DRATe	Sets or returns the specified Aggressor's data rate, in Cascading mode.
WLIS:SPARameter:CASCading:AGGRessor[n]:SIGNal	Sets or returns specified Aggressor's signal type, in Cascading mode.
WLIS:SPARameter:CASCading:AGGRessor[n]:SIGNal:FILE	Sets or returns the filepath to the aggressor file for the specified Aggressor, in Cascading mode.
WLIS:SPARameter:CASCading:AGGRessor[n]:SIGNal:PRBS	Sets or returns the specified Aggressor's PRBS signal type, in Cascading mode.
WLIS:SPARameter:CASCading:DEEMbed	Sets or returns whether the Cascading S-Parameters is to de-embed (invert) the S-Parameters, in Cascading mode.
WLIS:SPARameter:CASCading:STAGe[m]:DRX[n]	Sets or returns the S-Parameter port assignment of the specified Stage and the channel's specified receiver port number (Rx-Port) in Cascading mode and Differential Signalling Scheme (where applicable).
WLIS:SPARameter:CASCading:STAGe[m]:DTX[n]	Sets or returns the S-Parameter port assignment of the specified Stage and the channel's specified transmission port number (Tx-Port) in Cascading mode and Differential Signalling Scheme (where applicable).
WLIS:SPARameter:CASCading:STAGe[m]:ENABLE	Sets or returns the state of the specified Cascaded S-Parameter stage (enabled or disabled).
WLIS:SPARameter:CASCading:STAGe[m]:FILE	Sets or returns the Filepath for the specified S-Parameters Cascading Stage, in Cascading mode.
WLIS:SPARameter:CASCading:STAGe[m]:RX[n]	Sets or returns the S-Parameter port assignment of the specified Stage and the channel's specified receiver port number (Rx-Port) in Cascading mode and Single-Ended Signalling Scheme (where applicable).
WLIS:SPARameter:CASCading:STAGe[m]:SSCHeme	Sets or returns the S-Parameter Signalling Scheme, in Cascading mode. Signalling Scheme is only available when the Number of Ports is set to 4, 8, or 12.

Table 2-21: S-parameters group commands and their descriptions (cont.)

Command	Description
WLIS:SPARAmeter:CASCading:STAGe[m]:TX[n]	Sets or returns the S-Parameter port assignment of the specified Stage and the channel's specified transmission port number (Tx-Port) in Cascading mode and Single-Ended Signalling Scheme (where applicable).
WLIS:SPARAmeter:CASCading:STYPe	Sets or returns S-Parameter signal type (victim or aggressor), in Cascading mode. The number of ports must be either 8 or 12.
WLIS:SPARAmeter:CASCading:TYPE	Sets or returns the S-Parameter number of ports, in Cascading mode.
WLIS:SPARAmeter:MODE	Sets or returns the S-Parameter mode (Cascading or Non-Cascading).
WLIS:SPARAmeter:NCASCading:AGGRessor2[:ENABLE]	Sets or returns the aggressor 2 signal type state (enabled or disabled) in Non-Cascading mode. Aggressor2 signals are available when the number of ports is set to 12.
WLIS:SPARAmeter:NCASCading:AGGRessor[n]:AMPLitude	Sets or returns the specified Aggressor's amplitude, in Non-Cascading mode.
WLIS:SPARAmeter:NCASCading:AGGRessor[n]:CTAlk	Sets or returns the specified Aggressor's crosstalk type, in Non-Cascading mode.
WLIS:SPARAmeter:NCASCading:AGGRessor[n]:DRATe	Sets or returns the specified Aggressor's data rate, in Non-Cascading mode.
WLIS:SPARAmeter:NCASCading:AGGRessor[n]:SIGNal	Sets or returns specified Aggressor's signal type, in Non-Cascading mode.
WLIS:SPARAmeter:NCASCading:AGGRessor[n]:SIGNal:FILE	Sets or returns the filepath to the aggressor file for the specified Aggressor, in Non-Cascading mode.
WLIS:SPARAmeter:NCASCading:AGGRessor[n]:SIGNal:PRBS	Sets or returns the specified Aggressor's PRBS signal type, in Non-Cascading mode.
WLIS:SPARAmeter:NCASCading:DEEMbed	Sets or returns whether the Non-Cascading S-Parameters is to de-embed (invert) the S-Parameters, in Non-Cascading mode.
WLIS:SPARAmeter:NCASCading:DRX[n]	Sets or returns the S-Parameter port assignment of the channel's specified receiver port number (Rx-Port) in Non-Cascading mode and Differential Signalling Scheme (where applicable).
WLIS:SPARAmeter:NCASCading:DTX[n]	Sets or returns the S-Parameter port assignment of the channel's specified transmission port number (Tx-Port) in Non-Cascading mode and Differential Signalling Scheme (where applicable).
WLIS:SPARAmeter:NCASCading:FILE	Sets or returns the filepath and file name of the S-Parameter file, in Non-Cascading mode.
WLIS:SPARAmeter:NCASCading:LAYout	Sets or returns the 4 port S-Parameter Matrix Configuration, in Non-Cascading mode.
WLIS:SPARAmeter:NCASCading:RX[n]	Sets or returns the S-Parameter port assignment of the channel's specified receiver port number (Rx-Port) in Non-Cascading mode and Single-Ended Signalling Scheme (where applicable).
WLIS:SPARAmeter:NCASCading:SSCHeme	Sets or returns the S-Parameter Signalling Scheme, in Non-Cascading mode. Signalling Scheme is only available when the Number of Ports is set to 4, 8, or 12.
WLIS:SPARAmeter:NCASCading:STYPe	Sets or returns S-Parameter signal type (victim or aggressor), in Non-Cascading mode. The number of ports must be either 8 or 12.

Table 2-21: S-parameters group commands and their descriptions (cont.)

Command	Description
WLIS:SPARAmeter:NCAScading:TX[n]	Sets or returns the S-Parameter port assignment of the channel's specified transmission port number (Tx-Port) in Non-Cascading mode and Single-Ended Signalling Scheme (where applicable).
WLIS:SPARAmeter:NCAScading:TYPE	Sets or returns the S-Parameter number of ports, in Non-Cascading mode.
WLIS:SPARAmeter:SFOFormat	Sets or returns the currently used signal format for setting the S-Parameter values.

Sequence group commands

Use the sequence commands to define create and define waveform sequences and subsequences.

Table 2-22: Sequence group commands and their descriptions

Command	Description
SLIS:NAME?	Returns the name of the sequence corresponding to the specified index in the sequence list.
SLIS:SEquence:AMPLitude	Sets or returns the Recommended Amplitude (peak-to-peak) of the specified sequence.
SLIS:SEquence:DELeTe	Deletes a specific sequence or all sequences from the sequence list.
SLIS:SEquence:EVENT:JTIMing	Sets or returns the jump timing of a sequence.
SLIS:SEquence:EVENT:PJUMp:DEFine	Sets or returns the pattern jump targets in the pattern jump table.
SLIS:SEquence:EVENT:PJUMp:ENABle	Sets or returns the pattern jump for a sequence.
SLIS:SEquence:EVENT:PJUMp:SIZE?	Returns number of patterns in the pattern table.
SLIS:SEquence:FREQuency	Sets or returns the recommended frequency of the specified sequence when the sequence contains IQ waveforms.
SLIS:SEquence:LENGth?	Returns the total number of steps in the named sequence.
SLIS:SEquence:NEW	Creates a new sequence.
SLIS:SEquence:OFFSet	Sets or returns the Recommended Offset of the specified sequence.
SLIS:SEquence:RFLag	Sets or returns the Enable Flag Repeat value for the sequence.
SLIS:SEquence:SRATe	Sets or returns the Recommended Sampling Rate of the specified sequence.
SLIS:SEquence:STEP:ADD	Adds steps to an existing sequence.
SLIS:SEquence:STEP:MAX?	Returns the maximum number of steps allowed in a sequence.
SLIS:SEquence:STEP:RCOunt:MAX?	Returns the maximum number of repeats allowed for a step in a sequence.
SLIS:SEquence:STEP[n]:EJINput	Sets or returns whether the sequence of play will jump when it receives Trigger A, Trigger B, or not jump at all.
SLIS:SEquence:STEP[n]:EJUMp	Sets or returns the step that the sequence of play will jump to on a trigger event.
SLIS:SEquence:STEP[n]:GOTO	Sets or returns the Goto target for a step.

Table 2-22: Sequence group commands and their descriptions (cont.)

Command	Description
SLIST:Sequence:STEP[n]:RCOUNT	Sets or returns the repeat count.
SLIST:Sequence:STEP[n]:TASSet:Sequence	Assigns a subsequence for a specific sequence's step and track.
SLIST:Sequence:STEP[n]:TASSet[m]?	Returns the name of the waveform assigned to a step.
SLIST:Sequence:STEP[n]:TASSet[m]:TYPE?	Returns the type of asset assigned at the step and track for a specified sequence.
SLIST:Sequence:STEP[n]:TASSet[m]:WAVEform	Assigns a waveform to the specified track of a step.
SLIST:Sequence:STEP[n]:TFLag[m]:AFLag	Sets or returns the Flag A value of the track in a sequence step.
SLIST:Sequence:STEP[n]:TFLag[m]:BFLag	Sets or returns the Flag B value of the track in a sequence step.
SLIST:Sequence:STEP[n]:TFLag[m]:CFLag	Sets or returns the Flag C value of the track in a sequence step.
SLIST:Sequence:STEP[n]:TFLag[m]:DFLag	Sets or returns the Flag D value of the track in a sequence step.
SLIST:Sequence:STEP[n]:WINPut	Sets or returns the wait input for a step.
SLIST:Sequence:TRACK?	Returns the total number of tracks in the named sequence.
SLIST:Sequence:TRACK:MAX?	Returns the maximum number of tracks allowed in a sequence.
SLIST:Sequence:TSTamp?	Returns the timestamp of the named sequence.
SLIST:Sequence:WMUSage?	Returns the total waveform memory usage (in sample points) for the specified sequence track for the named sequence.
SLIST:SIZE?	Returns the number of sequences in the sequence list.

Source group commands

Use the source commands to define the waveform and marker outputs and parameters.

Table 2-23: Source group commands and their descriptions

Command	Description
[SOURce:]FREQUENCY[:CW][[:FIXed]	Sets or returns the clock sample rate of the AWG. NOTE. This command exists for backwards compatibility. Use the command <i>CLOCK:SRATE</i> .
[SOURce[n]:]POWER[:LEVel][[:IMMediate][[:AMPLitude]	Sets or returns the amplitude for the waveform associated with the specified channel in units of dBm for the filtered path. This command is only valid when the output path is set to AC. Option AC is required.
[SOURce:]RCCouple	Sets or returns the Coupled state (enabled or disabled) of the Run Mode control of a multi-channel instrument. The Run controls consist of the Run Mode and Trigger Input.
[SOURce:]ROSCillator:MULTiplier	Sets or returns the multiplier of the external reference oscillator. NOTE. This command exists for backwards compatibility. Use the command <i>CLOCK:EREFerence:MULTiplier</i> .
[SOURce[n]:]CASSet?	Returns the waveform or sequence assigned to a channel.

Table 2-23: Source group commands and their descriptions (cont.)

Command	Description
[SOURce[n]:]CASSet:SEquence	Assigns a sequence to a channel.
[SOURce[n]:]CASSet:TYPE?	Returns the type of the asset (waveform or sequence) assigned to a channel.
[SOURce[n]:]CASSet:WAVeform	Assigns a waveform to a channel.
[SOURce[n]:]DAC:RESolution	Sets or returns the DAC resolution.
[SOURce[n]]:JUMP:FORCe	Forces the sequencer to jump to the specified step for the specified channel.
[SOURce[n]]:JUMP:PATtern:FORCe	Generates an event forcing the sequencer to the step specified by pattern in the pattern jump table.
[SOURce[n]:]MARKer[m]:DELay	Sets or returns the marker delay.
[SOURce[n]:]MARKer[m]:VOLTage[:LEVel][:IMMediate][:AMPLitude]	Sets or returns the marker amplitude.
[SOURce[n]:]MARKer[m]:VOLTage[:LEVel][:IMMediate]:HIGH	Sets or returns the marker high level.
[SOURce[n]:]MARKer[m]:VOLTage[:LEVel][:IMMediate]:LOW	Sets or returns the marker low level.
[SOURce[n]:]MARKer[m]:VOLTage[:LEVel][:IMMediate]:OFFSet	Sets or returns the marker offset.
[SOURce[n]:]RMODE	Sets or returns the run mode of the AWG.
[SOURce[n]:]SCSTep?	Returns the current step of the sequence while system is running.
[SOURce[n]:]SKEW	Sets or returns the skew for the waveform associated with a channel in a two channel configuration.
[SOURce[n]:]TINPut	Sets or returns the trigger input source.
[SOURce[n]:]VOLTage[:LEVel][:IMMediate][:AMPLitude]	Sets or returns the amplitude for the waveform associated with a channel. This command is only valid the output path is set to DC Amplified or Direct.
[SOURce[n]:]VOLTage[:LEVel][:IMMediate]:HIGH	Sets or returns the high voltage level for the waveform associated with a channel. This command is only valid when the output path is set to Direct.
[SOURce[n]:]VOLTage[:LEVel][:IMMediate]:LOW	Sets or returns the low voltage level for the waveform associated with a channel. This command is only valid when the output path is set to Direct.
[SOURce[n]:]VOLTage[:LEVel][:IMMediate]:OFFSet	Sets or returns the offset for the waveform associated with a channel in units of volts for the selected path. This command is valid only when the signal path is DC Amplified.
[SOURce[n]:]WAVeform	Sets or returns the name of the waveform assigned to a channel.

NOTE. This command exists for backwards compatibility. See the command description for preferred commands.

Status group command

The external controller uses the status commands to coordinate operation between the AWG and other devices on the bus. The status commands set and query the registers/queues of the AWG event/status reporting system. For more information about registers and queues, see the Status and Event reporting section.

Table 2-24: Status group commands and their descriptions

Command	Description
STATus:OPERation:CONDition?	Returns the contents of the Operation Condition Register (OCR).
STATus:OPERation:ENABLE	Sets or returns the mask for the Operation Enable Register (OENR).
STATus:OPERation[:EVENT]?	Returns the contents of Operation Event Register (OEVR).
STATus:OPERation:NTRansition	Sets or returns the negative transition filter value of the Operation Transition Register (OTR).
STATus:OPERation:PTRansition	Sets or returns the positive transition filter value of the Operation Transition Register (OTR).
STATus:PRESet	Sets the OENR and QENR registers.
STATus:QUESTionable:CONDition?	Returns the status of the Questionable Condition Register (QCR).
STATus:QUESTionable:ENABLE	Sets or returns the mask for Questionable Enable Register (QENR).
STATus:QUESTionable[:EVENT]?	Returns the contents of the Questionable Event (QEVR) Register and clears it.
STATus:QUESTionable:NTRansition	Sets or returns the negative transition filter value of the Questionable Transition Register (QTR).
STATus:QUESTionable:PTRansition	Sets or returns the positive transition filter value of the Questionable Transition Register (QTR).

Synchronization group commands

The external controller uses these commands and an AWGSYNC01 to synchronize two to four AWG70000 instruments.

Table 2-25: Synchronization group commands and their descriptions

Command	Description
SYNChronize:ADJust:[START]	Performs a system sample rate calibration.
SYNChronize:CONFigure	Configures the ports in a synchronized system.
SYNChronize:DESKew:ABORT	Cancels a system deskew calibration.
SYNChronize:DESKew:[START]	Performs a system deskew calibration.
SYNChronize:DESKew:STATe?	Returns the state of the system deskew condition.
SYNChronize:ENABLE	Enables or disables synchronization in the instrument.
SYNChronize:TYPE?	Returns the instrument type (master or slave) in the synchronized system.

System group commands

Use the system commands to control miscellaneous instrument functions and obtain instrument information.

Table 2-26: System group commands and their descriptions

Command	Description
SYSTem:DATE	Sets or returns the system date.
SYSTem:ERRor:ALL?	Returns the error and event queue for all the unread items and removes them from the queue.
SYSTem:ERRor:CODE:ALL?	Returns the error and event queue for the codes of all the unread items and removes them from the queue.
SYSTem:ERRor:CODE[:NEXT]?	Returns the error and event queue for the next item and removes it from the queue.
SYSTem:ERRor:COUNt?	Returns the error and event queue for the number of unread items.
SYSTem:ERRor:DIALog	Sets or returns the error dialog display status.
SYSTem:ERRor[:NEXT]?	Returns data from the error and event queue.
SYSTem:SID:GATeway	Sets or returns the gateway address of the Streaming ID Ethernet port.
SYSTem:SID:IP	Sets or returns the IP address of the Streaming ID Ethernet port.
SYSTem:SID:MAC?	Returns the MAC address of the Streaming ID port.
SYSTem:TIME	Sets or returns the system time.
SYSTem:VERSion?	Returns the SCPI version number to which the command conforms.

Trigger group commands

Use the trigger commands to synchronize the arbitrary waveform generator actions with events.

Table 2-27: Trigger group commands and their descriptions

Command	Description
TRIGger[:IMMediate]	Generates a trigger event.
TRIGger:IMPedance	Sets or returns the impedance of the external triggers.
TRIGger:INTerval	Sets or returns the internal trigger interval.
TRIGger:LEVel	Sets or returns the external trigger input levels (threshold).
TRIGger:MODE	Sets or returns the trigger timing used when an external trigger source is being used.
TRIGger:SLOPe	Sets or returns the external trigger slopes.

Table 2-27: Trigger group commands and their descriptions (cont.)

Command	Description
TRIGger:SOURce	Sets or returns the trigger source. NOTE. This command exists for backwards compatibility. Use the command [SOURce[n]:]TINPut .
TRIGger:WVALue	Sets or returns the output data position of a waveform while the instrument is in the waiting-for-trigger state NOTE. This command exists for backwards compatibility. Use the commands OUTPut[n]:WVALue[:ANALog][:STATE] and OUTPut[n]:WVALue:MARKer[m] .

Waveform group commands

Use the waveform commands to create and transfer waveforms between the instrument and the external controller.

Table 2-28: Waveform group commands and their descriptions

Command	Description
WLISt:LAST?	Returns the name of the most recently added waveform in the waveform list.
WLISt:LIST?	Returns a list of all waveform names in the waveform list.
WLISt:NAME?	Returns the waveform name of an element in the waveform list.
WLISt:SIZE?	Returns the size of the waveform list.
WLISt:WAVeform:ACFile	Applies user supplied correction coefficients from an external (precompensation) file to the specified waveform (or waveforms).
WLISt:WAVeform:ACFile:GAUSSian	Sets or returns whether a gaussian filter will be applied during the application of a precompensation file (correction coefficients file).
WLISt:WAVeform:ACFile:GAUSSian:BANDwidth	Sets or returns the bandwidth of the gaussian filter that is to be applied during application of a precompensation file (correction coefficients file).
WLISt:WAVeform:ACFile:RSINc	Sets or returns whether or not corrections for Sin(x)/x distortions will be removed during application of a correction file.
WLISt:WAVeform:ACFile:SKEW	Sets or returns whether the measured Skew will be applied during application of a precompensation file (correction coefficients file).
WLISt:WAVeform:AMPLitude	Sets or returns the Recommended Amplitude (peak-to-peak) of the specified waveform.
WLISt:WAVeform:AOffset	Adds a normalized offset factor to the specified waveform.
WLISt:WAVeform:DATA[:I]	Transfers waveform data from the external controller into the specified waveform or from a waveform to the external control program.
WLISt:WAVeform:DATA:Q	Transfers analog waveform data from the external controller into the specified waveform or from a waveform to the external control program.
WLISt:WAVeform:DELeTe	Deletes the waveform from the currently loaded setup.

Table 2-28: Waveform group commands and their descriptions (cont.)

Command	Description
WLISt:WAVEform:FREQuency	Sets or returns the Recommended Center Frequency of the named IQ waveform.
WLISt:WAVEform:GRANularity?	Returns the granularity of sample points required for the waveform to be valid.
WLISt:WAVEform:INVert	Inverts the named waveform (in the waveform list).
WLISt:WAVEform:LENGth?	Returns the size of the waveform.
WLISt:WAVEform:LMAximum?	Returns the maximum number of waveform sample points allowed.
WLISt:WAVEform:LMINimum?	Returns the minimum number of waveform sample points required for a valid waveform.
WLISt:WAVEform:MARKer:DATA	Sets or returns the waveform marker data.
WLISt:WAVEform:MIQ	Creates an IQ waveform from two real waveforms.
WLISt:WAVEform:NEW	Creates a new empty waveform in the waveform list of current setup.
WLISt:WAVEform:NORMalize	Normalizes a waveform that exists in the waveform list.
WLISt:WAVEform:OFFSet	Sets or returns the Recommended Offset of the specified waveform.
WLISt:WAVEform:RESample	Resamples a waveform that exists in the waveform list.
WLISt:WAVEform:REVerse	Reverses the order of the named waveform (in the waveform list).
WLISt:WAVEform:ROTate[:DEGRees]	Rotates the specified waveform by the specified number of degrees.
WLISt:WAVEform:ROTate:POINts	Rotates the specified waveform by the specified number of points.
WLISt:WAVEform:SCALe	Scales the amplitude of the specified waveform by the specified multiplication factor.
WLISt:WAVEform:SDCorrection	Applies the $\sin(x)/x$ distortion correction to the specified waveform. Optionally, you can define the end frequency of the $\sin(x)/x$ distortion correction.
WLISt:WAVEform:SFOrmat	Sets or returns the signal format listed as part of the properties of the specified waveform.
WLISt:WAVEform:SHIFt	Shifts the phase of a waveform that exists in the waveform list.
WLISt:WAVEform:SRATe	Sets or returns the Recommended Sampling Rate of the specified waveform.
WLISt:WAVEform:TSTamp?	Returns the timestamp of the waveform.
WLISt:WAVEform:TYPE?	Returns the type of the waveform.
NOTE. This command exists for backwards compatibility.	

Waveform data format

The AWG supports the Floating Point format of waveform data.

Floating data format is the same as the IEEE 754 single precision format. It occupies 4 bytes per waveform data point. It stores normalized data without any scaling. When the waveform in real data format is output, the data is rounded off to the nearest integer value and clipped to fit the DAC range.

The waveforms in the real format retains normalized values. The format for the waveform analog data in the real format is IEEE754 single precision.

The real data format is shown in the following table.

Table 2-29: Real data format

Byte offset 3	Byte offset 2	Byte offset 1	Byte offset 0
IEEE754 single precision format (32 bits)			

DAC resolution affects the way hardware interprets the bits in the waveform. Therefore it is necessary to reload waveforms once the DAC resolution is modified. To understand how to change the DAC resolution, see the [\[SOURce\[n\]:\]DAC:RESolution](#) command. To understand how to load a waveform into hardware memory, see the [\[SOURce\[n\]:\]WAVEform](#) command.

Byte order during transfer Waveform data is always transferred in LSB first format.

Waveform plug-in group commands

Use the waveform plug-in commands to set the active waveform plug-in.

Table 2-30: Waveform plug-in group commands and their descriptions

Command	Description
WPLugin:ACTive	Sets or returns the active waveform creation plug-in.
WPLugin:PLUGins?	Returns all the available waveform creation plug-ins.

Command descriptions

This section contains all available commands. They are presented in alphabetical order.

Use the Command Groups section to simplify navigating to specific groups of commands.

ACTive:MODE

This command enables and disables access to diagnostics or calibration. When the active mode is DIAGnostic or CALibration, all other non-diagnostic and non-calibration commands are ignored and no action occurs.

If a test or procedure is in progress, errors are not returned; they are added to the system error queue, which can be accessed with [SYSTem:ERRor\[:NEXT\]?](#). For example:

- -200, "[D|C] are still running;"
- -300, "Device-specific error; Diagnostics tests still in progress - act:mode diag"
- -300, "Device-specific error; Calibration procedures still in progress - act:mode cal"

To avoid this error, use the command [DIAGnostic:STOP:STATe?](#) or [CALibration:STOP:STATe?](#) to test for this condition.

This command blocks when changing any state. Changing the state to NORMal causes a hardware initialization process and any related system settings are restored.

If any diagnostic tests are in progress, then the request to change the active mode fails and the mode will not change.

When changing the active mode, it's recommended to follow the action with an operation complete command (*OPC) to ensure the command has finished before other commands are processed.

Conditions	This is a blocking command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i> .)
Group	Diagnostic
Syntax	ACTive:MODE {NORMal CALibration DIAGnostic} ACTive:MODE?
Related Commands	DIAGnostic:ABORt , DIAGnostic:STOP , CALibration:ABORt
Arguments	<p>NORMal disables any active state for either calibration or diagnostics. When entering the active state of normal, the hardware is set to a default state and the previous system state is restored and waveform payout is set to off.</p> <p>CALibration enables the active state for the calibration. Entering the active state of calibration turns waveform payout off.</p>

DIAGnostic enables the active state for the diagnostics. Entering the active state of diagnostics turns waveform payout off.

*RST sets this to NORM.

Returns NORM
CAL
DIAG

Examples ACTIVE:MODE DIAGNOSTIC enables the diagnostics mode.
ACTIVE:MODE? might return DIAG if in the diagnostics mode.

AUXoutput[n]:SOURce

This command sets or returns the signal source for the specified Auxiliary Output connector.

NOTE. *The AWG70000A series label these outputs as Flag outputs.*

Group Auxiliary output

Syntax AUXoutput[n]:SOURce {AFLag|BFLag|CFLag|DFLag|TImer}
AUXoutput[n]:SOURce?

Related Commands [AUXoutput\[n\]:SOURce:CMAPping](#)

Arguments AFLag (A Flag)
BFLag (B Flag)
CFLag (C Flag)
DFLag (D Flag)
TImer (Internal timer)

[n] determines the Auxiliary Output connector. If omitted, interpreted as 1.

Range of [n] is instrument dependent:

AWG70001: 1 – 4

AWG70002: 1 – 8

Returns AFL (A sequencer flag)
BFL (B sequencer flag)
CFL (C sequencer flag)
DFL (D sequencer flag)
TIM (Internal timer)

Examples AUXOUTPUT1:SOURCE AFLAG sets the Auxiliary 1 connector to output Sequencer Flag A.

AUXOUTPUT2:SOURCE? might return CFL, indicating that the Auxiliary 2 connector is set to output Sequencer Flag C.

AUXoutput[n]:SOURce:CMAPping

This command sets or returns the Auxiliary Output channel mapping.

NOTE. *The AWG70000A series label these outputs as Flag outputs.*

Group Auxiliary output

Syntax AUXoutput[n]:SOURce:CMAPping <channel>
AUXoutput[n]:SOURce:CMAPping?

Related Commands [AUXoutput\[n\]:SOURce](#)

Arguments <channel>::={1} for AWG70001
<channel>::={1|2} for AWG70002
[n] determines the Auxiliary Output connector. If omitted, interpreted as 1.
Range of [n] is instrument dependent:
AWG70001: 1 – 4
AWG70002: 1 – 8

Returns A single <NR1> value.

Examples AUXOUTPUT1:SOURce:CMAPPING 2 maps channel 2 to the Auxiliary 1 output connector.
AUXOUTPUT1:SOURce:CMAPPING? might return 1, indicating that channel 1 is mapped to the Auxiliary 1 output connector.

AWGControl:ARSettings

This command sets or returns the state (enabled or disabled) of whether or not to apply the recommended settings of waveforms and sequences when they are assigned to a channel.

When enabled, the system attempts to use the waveform's recommended settings (sample rate, amplitude, and offset) when the waveform is assigned to a channel. This includes waveforms within sequence tracks assigned to a channel.

Recommended settings are defined as part the waveform properties and sequence properties.

Conditions	<p>If the waveform is of an IQ type, the recommended frequency is also used.</p> <p>If a recommended value is not included with the waveform, the current system values remains unchanged.</p>
Group	Control
Syntax	AWGControl:ARSettings {0 1 ON OFF}
Arguments	<p>OFF or 0 causes the system to ignore the recommended settings. OFF or 0 is the default value.</p> <p>ON or 1 causes the system to attempt to use the recommended settings.</p>
Returns	A single <Boolean> value.
Examples	<p>AWGCONTROL:ARSETTINGS ON applies the recommended settings when waveforms are assigned to a channel.</p> <p>AWGCONTROL:ARSETTINGS? might return 0, indicating that the recommended settings will be ignored when waveforms are assigned to a channel.</p>

AWGControl[:CLOCK]:DRATe

NOTE. This command exists for backwards compatibility. Use the command [CLOCK:EClock:DIVider](#).

This command sets or returns the divider rate for the external clock.

Conditions Setting the clock divider rate forces the clock multiplier rate to a value of 1.

This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

When synchronization is enabled and the instrument is not the master, this command is not available.

Group Control

Syntax AWGControl[:CLOCK]:DRATe <NR1>
AWGControl[:CLOCK]:DRATe?

Related Commands [CLOCK:EClock:MULTiplier](#), [CLOCK:SRATe](#), [AWGControl\[:CLOCK\]:SOURce](#)

Arguments A single <NR1> value that is a power of 2.

Range: 1 to 16777216

*RST sets this to 1.

Returns A single <NR1> value.

Examples AWGCONTROL:CLOCK:DRATE 4
*OPC?
sets the external clock divider rate to 4. The overlapping command is followed with an Operation Complete query.

AWGCONTROL:CLOCK:DRATE? might return 4.

AWGControl:CLOCK:PHASE[:ADJust]

NOTE. This command exists for backwards compatibility. Use the command [CLOCK:PHASE\[:ADJust\]:TIME](#).

This command sets or returns the internal clock phase adjustment of the AWG.

Conditions	This is a blocking command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i> .)
Group	Control
Syntax	AWGControl:CLOCK:PHASE[:ADJust] <NR1> AWGControl:CLOCK:PHASE[:ADJust]?
Arguments	A single <NR1> value. Range: –10800 degrees to 10800 degrees.
Returns	A single <NR1> value.
Examples	AWGCONTROL:CLOCK:PHASE:ADJUST 100 sets the clock phase to 100 degrees. AWGCONTROL:CLOCK:PHASE:ADJUST? might return 100, indicating the clock phase is set to 100 degrees.

AWGControl[:CLOCK]:SOURce

NOTE. This command exists for backwards compatibility. Use the command [CLOCK:SOURce](#).

This command sets or returns the source of the clock.

Conditions	<p>This is an overlapping command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i>.)</p> <p>When synchronization is enabled and the instrument is not the master, this command is not available.</p>
Group	Control
Syntax	<pre>AWGControl[:CLOCK]:SOURce {INTernal EXTernal EFIXed EVARiable} AWGControl[:CLOCK]:SOURce?</pre>
Related Commands	CLOCK:SOURce
Arguments	<p>INTernal – clock signal is generated internally and the reference frequency is derived by the internal oscillator.</p> <p>EFIXed – clock is generated internally and the reference frequency is derived from a fixed 10 MHz reference supplied at the Reference In connector.</p> <p>EVARiable – clock is generated internally and the reference frequency is derived from a variable reference supplied at the Reference In connector.</p> <p>EXTernal – clock signal supplied by the Clock In connector and the reference frequency is derived from the internal precision oscillator.</p> <p>*RST sets this to INT.</p>
Returns	INT (internal), EXT (external), EFIX (external fixed), EVAR (external variable)
Examples	<pre>AWGCONTROL:CLOCK:SOURCE INTERNAL</pre> <p>*OPC? sets the clock source to internal. The overlapping command is followed with an Operation Complete query.</p> <p>AWGCONTROL:CLOCK:SOURCE? might return EXT, indicating that the clock source is set to use the Clock In connector.</p>

AWGControl:COMPILE (No Query Form)

This command compiles an equation file and imports the waveforms (created by the equation file) into the arbitrary waveform generator.

Conditions Only accepts equation files, with the ".equ" suffix.

Group Control

Syntax `AWGControl:COMPILE <filename>`

Arguments `<filename>::= <string>`

File names may include full and relative paths. If a path is not specified, then the path of "C:\ProgramData\Tektronix\AWG\model\EquationEditor" is assumed. "model" is the model of the instrument family type.

Examples `AWGCONTROL:COMPILE "SIN.EQU"` compiles the equation file named "sin.equ". The default path is assumed.

AWGControl:CONFigure:CNUMber? (Query Only)

This command returns the number of channels available on the AWG.

Group Control

Syntax AWGControl:CONFigure:CNUMber?

Returns A single <NR1> value.

Examples AWGCONTROL:CONFIGURE:CNUMBER? might return 2.

AWGControl:DLoading:ENABle

This command sets or returns the state (enabled or disabled) to either allow or not allow dynamic loading of waveforms into a sequence while the sequence is playing.

Group Control

Syntax `AWGControl:DLoading:ENABle {OFF|ON|0|1}`
`AWGControl:DLoading:ENABle?`

Arguments 0 or OFF disables Dynamic Loading.
 1 or ON enables Dynamic Loading.

Returns A single Boolean value.

Examples `AWGCONTROL:DLOADING:ENABLE 1` enables Dynamic Loading.
`AWGCONTROL:DLOADING:ENABLE?` might return 0, indicating that Dynamic Loading is disabled.

AWGControl:LState? (Query Only)

This command returns the waveform loading state of the arbitrary waveform generator when Dynamic Loading is enabled.

Group Control

Syntax `AWGControl:LState?`

Related Commands [AWGControl:DLoading:ENABLE](#)

Returns <NR1>

0 indicates that the instrument is not loading a waveform into a sequence.
1 indicates that the instrument is busy loading a waveform into a sequence.

Examples `AWGCONTROL:LSTATE?` might return 1, indicating that the generator is actively loading a waveform.

AWGControl:DOUTput[n][:STATe]

This command sets or returns the state of the Direct signal path output (enabled or disabled) for the specified channel.

Conditions	NOTE. <i>This command exists for backwards compatibility. Use the command OUTPut[n]:PATH.</i>
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This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Group	Control
-------	---------

Syntax	AWGControl:DOUTput[n][:STATe] {OFF ON 0 1} AWGControl:DOUTput[n][:STATe]?
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Arguments	OFF or 0 performs no function. ON or 1 sets signal path directly to output (OUTPut:PATH = DIRection). ON or 1 is the default value. (This is opposite the AWG7000 Series default value.) [n] determines the channel number. If omitted, interpreted as 1.
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Returns	A single <Boolean> value.
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Examples	AWGCONTROL:DOUTPUT1:STATE 1 sets the signal output path for channel 1 to Direct, ignoring the filter settings. AWGCONTROL:DOUTPUT1:STATE? might return 0, indicating that the Channel 1 output path is not set to Direct.
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AWGControl:INTerleave:ADJustment:AMPLitude

This command sets or returns the interleave amplitude adjustment as a percentage of the analog output voltage. The percentage is applied to both of the channel's interleave DACs such that the analog output voltage is minimally affected. When the analog output is changed, this amplitude percentage is applied at the same time.

Conditions This command is only valid on a single channel model.

Group Control

Syntax `AWGControl:INTerleave:ADJustment:AMPLitude <NRf>`
`AWGControl:INTerleave:ADJustment:AMPLitude?`

Arguments A single <NRf> value.

Maximum percentage changed is $\pm 10\%$ up to and including Min and Max of the analog output amplitude.
Minimum percentage that can change is 1%.

*RST sets this to 0%.

Returns <NRf>

Examples `AWGCONTROL:INTERLEAVE:ADJUSTMENT:AMPLITUDE 10` adjusts the relationship between the two DACs by 10% of the analog output. The actual analog output is minimally affected.

`AWGCONTROL:INTERLEAVE:ADJUSTMENT:AMPLITUDE?` might return `10.0000000000`, indicating that the interleave adjustment amplitude percentage is 10% of the analog output.

AWGControl:INTerleave:ADJustment:PHASe

This command sets or returns the interleave adjustment phase. The phase adjustment is applied to both of the channel's interleave DACs.

Conditions	This command is valid only for single channel models.
Group	Control
Syntax	<p>AWGControl:INTerleave:ADJustment:PHASe <NRf></p> <p>AWGControl:INTerleave:ADJustment:PHASe?</p>
Arguments	<p>A single <NRf> value.</p> <p>Range: –180 to 180 degrees, Resolution: 0.1 degrees.</p> <p>*RST sets this to 0 degrees.</p>
Returns	A single <NRf> value
Examples	<p>AWGCONTROL:INTERLEAVE:ADJUSTMENT:PHASE 120 sets the interleave adjustment phase to 120 degrees.</p> <p>AWGCONTROL:INTERLEAVE:ADJUSTMENT:PHASE? might return 120.0000000000, indicating that the interleave adjustment phase is 120 degrees.</p>

AWGControl:PJUMP:JSTrobe

This command sets or returns if the pattern jump is set (enabled or disabled) to always occur on the strobe signal. With this setting disabled, the pattern jump requires a strobe signal and a pattern address change to initiate a jump. With this setting enabled, the pattern jump disregards the pattern address change condition, causing the jump to always occur on the strobe signal.

Conditions	When synchronization is enabled and the instrument is not the master, this command is not available.
Group	Control
Syntax	<code>AWGControl:PJUMP:JSTrobe {0 1 OFF ON}</code> <code>AWGControl:PJUMP:JSTrobe?</code>
Arguments	OFF or 0: A jump requires both a strobe signal and an address change. ON or 1: Enables the Jump on Strobe Always condition; only requiring a strobe signal to jump.
Returns	A single Boolean value.
Examples	<code>AWGCONTROL:PJUMP:JSTROBE ON</code> enables the pattern jump to occur on every strobe. <code>AWGCONTROL:PJUMP:JSTROBE?</code> might return 0, indicating that pattern jump is enabled.

AWGControl:PJUMp:SEdGe

This command sets or returns the active Strobe Edge to use for Pattern Jump when Pattern Jump is enabled for Sequencing.

Conditions	When synchronization is enabled and the instrument is not the master, this command is not available.
Group	Control
Syntax	AWGControl:PJUMp:SEdGe {FALLing RISing} AWGControl:PJUMp:SEdGe?
Arguments	<p>FALLing sets the falling edge of the strobe signal to the active edge. 256 input patterns are available.</p> <p>RISing sets the rising edge of the strobe signal to the active edge. 256 input patterns are available.</p>
Returns	<p>FALL (Falling)</p> <p>RIS (Rising)</p>
Examples	<p>AWGCONTROL:PJUMP:SEdGE FALLING sets the pattern jump to occur on the falling edge of the strobe signal.</p> <p>AWGCONTROL:PJUMP:SEdGE? might return FALL, indicating the pattern jump occurs on the falling edge of the strobe signal.</p>

AWGControl:RMODe

NOTE. This command exists for backwards compatibility. Use the command [\[SOURce\[n\]:\]RMODe](#).

This command sets or returns the run mode of the AWG for Channel 1.

Group Control

Syntax AWGControl:RMODe {CONTinuous|TRIGgered}
AWGControl:RMODe?

Related Commands [\[SOURce\[n\]:\]RMODe](#)

Arguments CONTinuous sets the Run Mode to Continuous (not waiting for a trigger event).
TRIGgered sets the Run Mode to Triggered, waiting for a trigger event. One waveform play out cycle completes, then play out stops, waiting for the next trigger event.
*RST sets this to CONT.

Returns CONT
TRIG

Examples AWGCONTROL:RMODE TRIGGERED sets the Channel 1 Run mode to Triggered.
AWGCONTROL:RMODE? might return CONT, indicating that the Channel 1 Run mode is set to Continuous.

AWGControl:RSTate? (Query Only)

This command returns the run state of the AWG.

Group Control


Syntax AWGControl:RSTate?

Related Commands [\[SOURce\[n\]:\]RMODe](#)

Returns A single <NR1> value.
 0 indicates that the AWG has stopped.
 1 indicates that the AWG is waiting for trigger.
 2 indicates that the AWG is running.

Examples AWGCONTROL:RSTATE? might return 0, indicating that waveform generation is stopped.

AWGControl:RUN[:IMMediate] (No Query Form)

This command initiates the output of a waveform or sequence. This is equivalent to pushing the play button  on the front-panel or display. The AWG can be put in the run state only when waveforms or sequences are assigned to channels.

Conditions This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

When synchronization is enabled and the instrument is not the master, this command is not available.

Group Control

Syntax `AWGControl:RUN[:IMMediate]`

Related Commands [AWGControl:STOP\[:IMMediate\]](#)

Examples `AWGCONTROL:RUN:IMMEDIATE`
puts the AWG in the run state.

AWGControl:SNAME? (Query Only)

This command returns the AWG's most recently saved setup location.

The response contains the full path for the file, including the disk drive letter (msus or, mass storage unit specifier).

Group	Control
Syntax	AWGControl:SNAME?
Returns	<p>Returns <file_name>,<msus></p> <p><file_name> ::= <string></p> <p>a<msus> (mass storage unit specifier) ::= <string></p> <p>By default (when there has been no save setup command), this value is "", "C:"</p>
Examples	<p>AWGCONTROL:SNAME? might return the following response:</p> <p>"\my\project\setups\mySetup.awgx", "D:"</p>

AWGControl:SREStore (No Query Form)

NOTE. This command exists for backwards compatibility. Use the command [MMEMory:OPEN:SETup](#).

This command opens a setup file into the AWG's setup memory.

Conditions This is a blocking command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Group Control

Syntax `AWGControl:SREStore <filepath>[,<msus>]`

Related Commands [MMEMory:OPEN:SETup](#)

Arguments `<filepath>::=<string>`
`<msus> (mass storage unit specifier) ::=<string>`

Examples With mass storage unit specifier specified as a parameter:
`AWGCONTROL:SRESTORE "\TestFiles\mySetup.awgx", "C:"`

With mass storage unit specifier specified within the file path:
`AWGCONTROL:SRESTORE "C:\TestFiles\mySetup.awgx"`

AWGControl:SSAVe (No Query Form)

NOTE. *This command exists for backwards compatibility. Use the command [MMEMory:SAVE:SETup](#).*

This command saves the AWG's setup with waveforms.

Conditions This is a blocking command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Group Control

Syntax `AWGControl:SSAVE <filepath>[,<msus>]`

Related Commands [MMEMory:SAVE:SETup](#)

Arguments `<filepath>::=<string>`
`<msus> (mass storage unit specifier)::=<string>`

Examples `AWGCONTROL:SSAVE "C:\TestFiles\mySetup.awgx"`
`AWGCONTROL:SSAVE "\"TestFiles\mySetup.awgx", "C:"`

AWGControl:STOP[:IMMediate] (No Query Form)

This command stops the output of a waveform or a sequence.

Conditions This is a blocking command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

When synchronization is enabled and the instrument is not the master, this command is not available.

Group Control

Syntax `AWGControl:STOP[:IMMediate]`

Related Commands [AWGControl:RUN\[:IMMediate\]](#)

Examples `AWGCONTROL:STOP:IMMEDIATE`
`*OPC?`
stops the output of a waveform or sequence.

AWGControl:STReaming:ENABle

This command sets or returns the state (enabled or disabled) of Streaming ID .

Conditions	Streaming ID must be licensed. AWG70000B series only
Group	Control
Syntax	AWGControl:STReaming:ENABle {OFF ON 0 1} AWGControl:STReaming:ENABle?
Arguments	0 or OFF disables Streaming ID. This is the default state. 1 or ON enables Streaming ID.
Returns	A single <Boolean> value.
Examples	AWGCONTROL:STREAMING:ENABLE 1 enables Streaming ID. AWGCONTROL:STREAMING:ENABLE? might return 0, indicating that Streaming ID is disabled.

AWGControl:STReaming:JEVent

This command sets or returns the jump event for Streaming ID.

Conditions Streaming ID must be licensed.
AWG70000B series only

Group Control

Syntax `AWGControl:STReaming:JEVent {ATRigger|BTRigger|T1}`
`AWGControl:STReaming:JEVent?`

Related Commands [AWGControl:TiMer:RUN](#),
[AWGControl:TiMer:SOPLay](#)

Arguments ATRigger = Trigger A input
BTRigger = Trigger B input
T1 = Internal timer

Returns ATR = External Trigger A input
BTR = External Trigger B input
T1 = Internal timer

Examples `AWGCONTROL:STREAMING:JEVENT T1` sets the Streaming ID jump event control to use the internal timer.

`AWGCONTROL:STREAMING:JEVENT?` might return ATR, indicating that the Streaming ID jump event control is set to use the A external trigger input.

AWGControl:TIMer:INTERval:HZ

This command sets or returns the internal timer interval period in Hertz. The timer stops running on any change to the interval period or the instrument sample rate.

Group Control

Syntax `AWGControl:TIMer:INTERval:HZ <period>`
`AWGControl:TIMer:INTERval:HZ?`

Related Commands [AWGControl:TIMer:INTERval\[:SEConds\]](#)

Arguments `<period>:= <NRf> value.`
 Range: 1 Hz to 100 kHz.

Returns A single `<NR3>` value.

Examples `AWGCONTROL:TIMER:INTERVAL:HZ 50E3` sets the Timer Period to 50 kHz.
`AWGCONTROL:TIMER:INTERVAL:HZ?` might return `5.0000000000E+3`, indicating that the Timer Period is set to 5 kHz.

AWGControl:TIMer:INTerval[:SECONDS]

This command sets or returns the internal timer interval period in seconds. The timer stops running on any change to the interval period or the instrument sample rate.

Group Control

Syntax `AWGControl:TIMer:INTerval[:SECONDS] <period>`
`AWGControl:TIMer:INTerval[:SECONDS]?`

Related Commands [AWGControl:TIMer:INTerval:HZ](#)

Arguments `<period>:= <NRf>` value.

Range: 1 s to 10 μ s.

Returns A single `<NR3>` value.

Examples `AWGCONTROL:TIMER:INTERVAL:SECONDS 10E-6` sets the Timer Period to 10 μ s.

`AWGCONTROL:TIMER:INTERVAL:SECONDS?` might return 1.0000000000, indicating that the Timer Period is set to 1 s.

AWGControl:TIMer:RStAtE? (Query Only)

This command returns the state of the internal timer (running or stopped).

The timer can be stopped and started manually or automatically when the waveform playout starts and stops.

Group	Control
Syntax	AWGControl:TIMer:RStAtE?
Returns	1 is returned if the timer is running. 0 is returned if the timer is stopped.
Examples	AWGCONTROL:TIMER:RSTATE? might return 1, indicating that the timer is running.

AWGControl:TIMer:RUN (No Query Form)

This command starts the internal timer immediately.

Conditions Start on Play must not be enabled.

Group Control

Syntax `AWGControl:TIMer:RUN`

Related Commands [AWGControl:TIMer:STOP](#),
[AWGControl:TIMer:SOPPlay](#)

Examples `AWGCONTROL:TIMER:RUN` starts the internal timer immediately.

AWGControl:TIMer:SOPLay

This command sets or returns the state (enabled or disabled) of the timer to start and stop when waveform playout starts and stops.

Group Control

Syntax `AWGControl:TIMer:SOPLay {OFF|ON|0|1}`
`AWGControl:TIMer:SOPLay?`

Related Commands

Arguments 0 or OFF disables the starting the timer on waveform playout. This is the default value.

1 or ON enables starting the timer on waveform playout.

Returns A single <Boolean> value.

Examples `AWGCONTROL:TIMER:SOPLAY 1` enables starting the timer on waveform playout.
`AWGCONTROL:TIMER:SOPLAY?` might return 0, indicating that timer will not start on waveform playout.

AWGControl:TiMer:STOP (No Query Form)

This command stops the internal timer immediately.

Conditions Start on Play must not be enabled.

Group Control

Syntax `AWGControl:TiMer:STOP`

Related Commands [AWGControl:TiMer:RUN](#),
[AWGControl:TiMer:SOPlay](#)

Examples `AWGCONTROL:TIMER:STOP` stops the internal timer immediately.

BWAVEform:AMPLitude

This command sets or returns the peak-to-peak Amplitude value for the waveform created by the Basic Waveform editor plug-in.

This setting can be affected if the system is set to use the full DAC range. Using the full DAC range is the default setting. Refer to the command [BWAVEform:FDRange](#) for more information.

Conditions	The amplitude settings for Offset, High, and Low voltage values can be affected by the Amplitude setting.
Group	Basic waveform editor
Syntax	<code>BWAVEform:AMPLitude <amplitude></code>
Related Commands	BWAVEform:OFFSet , BWAVEform:HIGh , BWAVEform:LOW BWAVEform:FDRange
Arguments	<code><amplitude>::= <NR3> value.</code>
Returns	A single <code><NR3></code> value.
Examples	<code>BWAVEFORM:AMPLITUDE 200E-3</code> sets the Amplitude to 200 mV _{pp} . <code>BWAVEFORM:AMPLITUDE?</code> might return <code>500.0000000000E-3</code> , indicating the Amplitude for the compiled waveforms is set to 500 mV _{pp} .

BWAVEform:AUTO

This command sets or returns the Basic Waveform editor plug-in Auto Calculate setting, determining which value is automatically calculated.

Conditions When the function is set to DC or Noise the options are: Length, Duration, or Sample Rate.

When the function is set to Sine, Square, Triangle, or Ramp the options are: Length, Cycle, Frequency, or Sample Rate.

Group Basic waveform editor

Syntax BWAVEform:AUTO {length|cycle|duration|frequency|sample rate}
BWAVEform:AUTO?

Related Commands [BWAVEform:FUNCTION](#)

Arguments *RST sets this to Cycle.

Returns Length
Cycle
Duration
Frequency
Sample Rate

Examples BWAVEFORM:AUTO "length" sets the Length as the automatically calculated value in the Basic Waveform editor plug-in.

BWAVEFORM:AUTO? might return "Cycle", indicating that the Basic Waveform editor plug-in is set to automatically calculate the cycle value.

BWAVEform:COMPILE (No Query Form)

This command initiates the Basic Waveform editor plug-in compile process. The created waveform is placed in the Waveform List.

Group Basic waveform editor

Syntax BWAVEform:COMPILE

Examples BWAVEFORM:COMPILE starts compiling the waveform as defined by the Basic Waveform editor.

BWAVEform:COMPIle:CASSign

This command sets or returns the state (enabled or disabled) of the Basic Waveform editor to compile the waveform and immediately assign it to a specified channel (enabled) or just compile the waveform (disabled).

Group Basic waveform editor

Syntax BWAVEform:COMPIle:CASSign {0|1|OFF|ON}
BWAVEform:COMPIle:CASSign?

Related Commands [BWAVEform:COMPIle:CHANnel](#),
[BWAVEform:COMPIle:PLAY](#)

Arguments 0 or OFF sets the Basic Waveform editor to compile only.
1 or ON sets the Basic Waveform editor to compile and assign the waveform to a channel.

Returns A single <Boolean> value.

Examples BWAVEFORM:COMPILE:CASSIGN 1 enables the compile and assign function.
BWAVEFORM:COMPILE:CASSIGN? might return 0, indicating that the compile and assign function is disabled.

BWAVEform:COMPILE:CHANnel

This command sets or returns the playout channel intended for the compiled waveform of the Basic Waveform editor plug-in. The selected channel is also used to define the amplitude and offset range.

Group Basic waveform editor

Syntax BWAVEform:COMPILE:CHANnel {NONE|<channel_number>}

Arguments NONE sets the compile settings to Compile Only and compiled waveforms are not assigned to a channel.

<channel_number>::= <NR1> value. This enables the Compile and Assign setting and sets the specified channel assignment and uses the channel's settings for amplitude and offset values.

The channel value can not exceed the number of available channels.

Returns NONE
A single <NR1> value.

Examples BWAVEFORM:COMPILE:CHANNEL 2 sets the Basic Waveform editor to compile the waveform, use channel 2 to define the amplitude and offset, and assign the waveform to channel 2.

BWAVEFORM:COMPILE:CHANNEL? might return NONE, indicating that the Basic Waveform editor will only compile the waveform, and not assign the waveform to a channel.

BWAVEform:COMPILE:NAME

This command sets or returns the name of the Basic Waveform editor plug-in compiled waveform.

If the name already exists in the Waveform List, the name is appended with an underscore suffix such as “Waveform_1”.

Group Basic waveform editor

Syntax BWAVEform:COMPILE:NAME <waveform_name>
BWAVEform:COMPILE:NAME?

Arguments <waveform_name>::= <string>

Examples BWAVEFORM:COMPILE:NAME “Basic_waveform” sets name of the compiled waveform from the Basic Waveform editor plug-in to “Basic_Waveform”.
BWAVEFORM:COMPILE:NAME? might return “Basic_waveform” as the name of the compiled waveform from the Basic Waveform editor plug-in.

BWAVEform:COMPILE:PLAY

This command sets or returns the state (enabled or disabled) of the Basic Waveform editor to either immediately play the waveform after compile or just compile.

Conditions This command requires that the compiled waveform is assigned to a channel.

Group Basic waveform editor

Syntax BWAVEform:COMPILE:PLAY {0|1|OFF|ON}
BWAVEform:COMPILE:PLAY?

Related Commands [BWAVEform:COMPILE:CHANnel](#)

Arguments 0 or OFF disables Play After Assign.
1 or ON enables Play After Assign.

Returns A single <Boolean> value.

Examples BWAVEFORM:COMPILE:PLAY 1 enables the play after assign function.
BWAVEFORM:COMPILE:PLAY? might return 0, indicating that play after assign function is disabled.

BWAVEform:CYCLe

This command sets or returns the Cycle value (number of times the waveform repeats) for the waveform created by the Basic Waveform editor plug-in.

Conditions This command has no effect if "Cycle" is set to auto-calculate.

Group Basic waveform editor

Syntax BWAVEform:CYCLe <cycle>

Related Commands [BWAVEform:AUTO](#)

Arguments <cycle>::= <NR2> value.

Returns A single <NR2> value.

Examples BWAVEFORM:CYCLE 100 sets the number of Cycles to 100.
BWAVEFORM:CYCLE? might return 500.0000000000, indicating the Cycle value for the compiled waveforms is set to 500.

BWAVEform:FREQuency

This command sets or returns the Frequency for the waveform created by the Basic Waveform editor plug-in.

Conditions This command has no effect if "Frequency" is set to auto-calculate.

Group Basic waveform editor

Syntax BWAVEform:FREQuency <frequency>

Related Commands [BWAVEform:AUTO](#)

Arguments <frequency>::= <NR3> value.

Returns A single <NR3> value.

Examples BWAVEFORM:FREQUENCY 1E9 sets the Frequency to 1 GHz.
 BWAVEFORM:FREQUENCY? might return 1.000000000E+9, indicating the Frequency for the compiled waveforms is set to 1 GHz.

BWAVEform:FDRange

This command sets or returns the state (enabled or disabled) of the Basic Waveform editor plug-in to use or not use the full DAC range during compile.

Using the full DAC range when compiling waveforms results in waveforms with the best resolution.

When enabled, if the selected offset and amplitude are within the range of the instrument's hardware, then the compiled waveform is compiled using the full DAC range and the compiled waveform's recommended amplitude and offset properties are set to the requested amplitude and offset values. If the selected offset and amplitude will result in a compiled waveform that does not take advantage of the full DAC range, the instrument adjusts the compiled waveform's recommended amplitude and offset values to use the full DAC range. If the system cannot achieve the full DAC range, a warning message is displayed.

When disabled, the waveform is compiled using the specified amplitude and offset values and the compiled waveform's recommended amplitude is set to the maximum value and the recommended offset is set to 0. The control is not available for a DC waveform.

Conditions This setting is not applied for DC waveforms.

Group Basic waveform editor

Syntax BWAVEform:FDRange {OFF|ON|0|1}

Arguments 0 or OFF disables Use full DAC range.
1 or ON enables Use full DAC range.
ON is the default setting.

Returns A single <Boolean> value.

Examples BWAVEFORM:FDRANGE 1 enables the "Use full DAC range" state.
BWAVEFORM:FDRANGE? might return 0, indicating the "Use full DAC range" state is disabled.

BWAVEform:FUNction

This command sets or returns the Basic Waveform editor plug-in waveform type.

Group	Basic waveform editor
Syntax	BWAVEform:FUNCTION {sine square triangle ramp noise DC} BWAVEform:FUNCTION?
Arguments	*RST sets this to SINE.
Returns	Sine Square Triangle Ramp Noise DC
Examples	<p>BWAVEFORM:FUNCTION "sine" sets the Basic Waveform editor plug-in waveform type to a Sinewave.</p> <p>BWAVEFORM:FUNCTION? might return "Sine", indicating that the Basic Waveform editor plug-in waveform type is set to Sinewave.</p>

BWAVEform:HIGH

This command sets or returns the High voltage value for the waveform created by the Basic Waveform editor plug-in.

Conditions The High and Low values are initially one half the amplitude of the waveform (with an offset of 0 V). Changing these values causes the Amplitude value to adjust. Changing the High and Low to uneven values cause a change to the Offset value.

Group Basic waveform editor

Syntax BWAVEform:HIGH <high>

Related Commands [BWAVEform:OFFSet](#),
[BWAVEform:HIGH](#),
[BWAVEform:LOW](#)

Arguments <high>::= <NR3> value.

Returns A single <NR3> value.

Examples BWAVEFORM:HIGH 200E-3 sets the High value to 200 mV.
BWAVEFORM:HIGH? might return 250.0000000000E-3, indicating the High for the compiled waveforms is set to 250 mV.

BWAVEform:LENGth

This command sets or returns the Length for the waveform created by the Basic Waveform editor plug-in.

Conditions This command has no effect if "Length" is set to auto-calculate.

Group Basic waveform editor

Syntax BWAVEform:LENGth <length>

Related Commands [BWAVEform:AUTO](#)

Arguments <frequency>::= <NR3> value.

Returns A single <NR3> value.

Examples BWAVEFORM:LENGTH 1E9 sets the Length to 1 GSamples.
 BWAVEFORM:LENGTH? might return 2.000000000E+9, indicating the Length for the compiled waveforms is set to 2 GSamples.

BWAVEform:LOW

This command sets or returns the Low voltage value for the waveform created by the Basic Waveform editor plug-in.

Conditions The High and Low values are initially one half the amplitude of the waveform (with an offset of 0 V). Changing these values causes the Amplitude value to adjust. Changing the High and Low to uneven values cause a change to the Offset value.

Group Basic waveform editor

Syntax BWAVEform:LOW <low>

Related Commands [BWAVEform:OFFSet](#),
[BWAVEform:HIGh](#),
[BWAVEform:LOW](#)

Arguments <low>::= <NR3> value.

Returns A single <NR3> value.

Examples BWAVEFORM:LOW 200E-3 sets the Low value to 200 mV.
BWAVEFORM:LOW? might return 250.000000000E-3, indicating the Low for the compiled waveforms is set to 250 mV.

BWAVEform:OFFSet

This command sets or returns the Offset voltage value for the waveform created by the Basic Waveform editor plug-in.

This setting can be affected if the system is set to use the full DAC range. Using the full DAC range is the default setting. Refer to the command [BWAVEform:FDRange](#) for more information.

Conditions	The amplitude settings for High and Low voltage values can be affected by the Offset setting.
Group	Basic waveform editor
Syntax	BWAVEform:OFFSet <offset>
Related Commands	BWAVEform:OFFSet , BWAVEform:HIGh , BWAVEform:LOW , BWAVEform:FDRange
Arguments	<offset>::= <NR3> value.
Returns	A single <NR3> value.
Examples	<p>BWAVEFORM:OFFSET 2E-3 sets the Offset to 2 mV.</p> <p>BWAVEFORM:OFFSET? might return 5.000000000E-3, indicating the Offset for the compiled waveforms is set to 5 mV.</p>

BWAVEform:RESet (No Query Form)

This command resets the Basic Waveform editor plug-in to its default values.

Group	Basic waveform editor
Syntax	BWAVEform:RESet
Examples	BWAVEFORM:RESET sets the Basic Waveform editor plug-in parameters to their default values.

BWAVEform:SRATe

This command sets or returns the Sample Rate for the waveform created by the Basic Waveform editor plug-in.

Conditions	This command has no effect if "Sample Rate" is set to auto-calculate.
Group	Basic waveform editor
Syntax	BWAVEform:SRATe <sample_rate>
Related Commands	BWAVEform:AUTO
Arguments	<sample_rate>::= <NR3> value.
Returns	A single <NR3> value.
Examples	<p>BWAVEFORM:SRATE 2E9 sets the Sample Rate to 2 GS/s.</p> <p>BWAVEFORM:SRATE? might return 3.000000000E+9, indicating the Sample Rate for the compiled waveforms is set to 3 GS/s.</p>

*CAL? (Query Only)

This query runs all selected calibrations and returns a status code indicating the success or failure of all calibrations. Any single calibration failure returns a failure code. *CAL? is equivalent to the [CALibration\[:ALL\]](#) command.

Use [CALibration:RESult?](#) to retrieve more detailed error information.

Conditions	All calibrations are selected by default and cannot be modified by the user.
Group	IEEE mandated and optional
Syntax	*CAL?
Related Commands	CALibration[:ALL] , CALibration:RESult?
Returns	A single <NR1> value, {0 -340}
Examples	*CAL? might return -340 on any failure, 0 on all pass.

CALibration:ABORt (No Query Form)

This command stops the self calibration process and restores the previous calibration constants.

Conditions Setting only works in the active mode for calibration. See the [ACTive:MODE](#) command.

This command does not abort the [CALibration\[:ALL\]](#) command.

This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Group Calibration

Syntax CALibration:ABORt

Related Commands [ACTive:MODE](#), [CALibration:STARt](#)

Examples CALIBRATION:ABORT
*OPC?
stops the calibration process. The overlapping command is followed with an Operation Complete query.

CALibration[:ALL]

This command does a full calibration of the AWG. In its query form, the command does a full calibration and returns a status indicating the success or failure of the operation. This command is equivalent to the [*CAL?](#) command.

Conditions This command cannot be aborted.

This is a blocking command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Group Calibration

Syntax CALibration[:ALL]
CALibration[:ALL]?

Related Commands [*CAL?](#)

Returns <calibration error code> ::= <NR1>

0 indicates no error
–340 indicates an error

Examples CALIBRATION:ALL performs a calibration.

CALIBRATION:ALL? performs a calibration and returns results. For example, it might return 0, indicating that the calibration completed without any errors.

CALibration:CATalog? (Query Only)

This command returns the list of calibration procedures.

All tests are grouped by areas. All areas are grouped by subsystems. The available subsystems, areas, and tests depend on the type of testing (such as POST or ALL).

Group	Calibration
Syntax	CALibration:CATalog? [{ALL <subsystem>}[, {ALL <area>}]]
Arguments	<p>ALL – Keyword or as a string. <subsystem> – a subsystem as a string. <area> – an area as a string.</p> <p>If there are no parameters, then the list of subsystems is returned. If there is a valid subsystem parameter, then the list of areas for that subsystem is returned. If the subsystem parameter is "ALL", then all the procedures of all the areas of all the subsystems is returned. Each procedure is prefixed with "<subsystem>:<area>:" and separated by a comma. Lists are always in priority of desired execution. If the area parameter is "ALL", then all the procedures of all the areas for a specified subsystem is returned. Each procedure is prefixed with "<area>:" and separated by a comma. Lists are always in priority of desired execution. If the subsystem and area parameters are valid, then the list of procedures for that subsystem and area is returned.</p>
Returns	String of all calibration "subsystems", "areas" and/or "procedures" separated by commas.
Examples	<p>CALIBRATION:CATALOG? might return "Initialization,Channel1,Channel2,System".</p> <p>CALIBRATION:CATALOG? "Channel1" might return "Dc,Adc,Clock,Align,Dac,Marker1,Marker2"</p> <p>CALIBRATION:CATALOG? "ALL" might return "Initialization:Init:Calibration Initialization,Channel1:Dc:Differential Offset,Channel1:Dc:Common Mode,Channel1:Dc:Amplitude,Channel1:Adc:Adc Internal,Channel1:Clock:Clock Amplitude,Channel1:Clock:Clock Offset, Channel1:Align:Sample Point, Channel1:Dac:Speed"</p>

CALibration:LOG? (Query Only)

This command returns a string of continuous concatenated calibration results. The start time is recorded plus one or more <cal path>:<cal name> <result>. This command can be issued while calibration is still in progress. Use the [CALibration:LOG:CLEar](#) command to start a fresh log and provide additional information.

Log results are still valid if the calibration is aborted and the calibration constants are restored.

NOTE. *The returned string is limited, which can cause lost results. Only the first 64K of text is recorded.*

Group Calibration

Syntax CALibration:LOG?

Related Commands [CALibration:LOG:CLEar](#)

Returns <string>::="<Started timestamp><LF delimiter><calibration name and result>[<LF delimiter><calibration name and result>]"

Examples CALIBRATION:LOG? might return "Channel1:Dc:Amplitude Started 6/14/2011 10:19 AM<LF CR>Channel1:Dc:Amplitude FAIL<LF CR>Channel1:Dc:Common Mode Offset Started 6/14/2011 10:23 AM<LF CR>Channel1:Dc:Common Mode Offset PASS<LF CR>"

CALibration:LOG:CLEAr (No Query Form)

This command clears the results log.

The command works when in the active mode for calibration. See the [ACTive:MODE](#) command.

Group Calibration

Syntax CALibration:LOG:CLEAr

Related Commands [ACTive:MODE](#)

Examples CALIBRATION:LOG:CLEAR clears the results log.

CALibration:LOG:FAILuresonly

This command sets or returns the flag that controls the amount of result information saved into the log. This controls all tests that pass or fail or only tests that fail. It is important to note, that details are generated during the test, and need to be saved during the test execution.

Conditions The set form of this command only works in the active mode for calibration. See the [ACTive:MODE](#) command.

Group Calibration

Syntax CALibration:LOG:FAILuresonly {OFF|ON|0|1}
CALibration:LOG:FAILuresonly?

Related Commands [ACTive:MODE](#)

Arguments OFF disables the failures only mode.
ON enables the failures only mode.
<Boolean> {0|1}. 0 and 1 are the equivalent of OFF and ON respectively.
*RST sets this to 0.

Returns A single <Boolean> value representing current calibration log failures only state {0|1}.

Examples CALIBRATION:LOG:FAILURESONLY OFF disables the failure only log mode.
CALIBRATION:LOG:FAILURESONLY 1 enables the failure only log mode.
CALIBRATION:LOG:FAILURESONLY? might return 1, indicating the failure only log mode is enabled.

CALibration:REStore (No Query Form)

This command restores the calibration constants from the factory non-volatile memory and copied to user storage.

Conditions Setting only works in the active mode for calibration. See the [ACTive:MODE](#) command.

This is a blocking command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Group Calibration

Syntax CALibration:REStore

Related Commands [ACTive:MODE](#)

Examples CALIBRATION:RESTORE sets all calibration constants to their factory settings.

CALibration:RESult? (Query Only)

This command returns the status of the last calibration procedure. This query-only command can be issued while calibration is in progress.

Group	Calibration
Syntax	CALibration:RESult?
Returns	<p>"<result record>"</p> <p><result record>::= <subsystem>:[<area>:[<procedure>:]]<details></p> <p><details>::= <Status>,<Loop Count>,<Pass>,<Fail></p> <p><Status>::= S(C R U) Reflexs the "current" or "last" state. Currently by request, when the status reflects only the subsystem or area, then a U for Unknown/Uncalibrated will be set for any of the procedures that are unknown even if it is only 1 out of 10 selected procedures.</p> <p><Loop Count> ::= LC(#)</p> <p><Pass> ::= P(#)</p> <p><Fail> ::= F(#)</p> <p>C ::= Calibrated</p> <p>I ::= Initialized (selected) but has not run</p> <p>R ::= Running</p> <p>U ::= Unknown or Uncalibrated</p> <p># ::= <NR1></p>
Examples	<p>Query a specific calibration result: CAL:RESult?</p> <p>"Channel1" "Clock", "Amplitude" might return</p> <p>"Channel1:Clock:Clock Amplitude::=S(C),LC(0),P(0),F(0);"</p> <p>Query all calibration results: CAL:RESult? "INT::=(C);" signifying internal calibration completed and passed.</p> <p>Query a specific area result: CAL:RESult? "Channel1" "Clock" might return "Channel1:Clock::=(C);"</p> <p>Query a specific subsystem result: CAL:RESult? "Channel1" might return "Channel1::=(R);"</p> <p>Query all calibration results of a specific area:</p> <p>CAL:RESult? "Channel1", "Clock", ALL</p> <p>might return "Channel1:Clock:Clock</p> <p>Amplitude::=S(C),LC(0),P(0),F(0);Channel1:Clock:Clock</p> <p>Offset::=S(U),LC(0),P(0),F(0);"</p> <p>Asking for all calibration results of a specific subsystem: CAL:RESult?</p> <p>"Channel1", ALL might return</p>

```
"Channel1:Dc::=(U);Channel1:Adc::=(U);Channel1:Clock::=(U);
Channel1:Align::=(U);Channel1:Dac::=(U);Channel1:Marker1::=(U);
Channel1:Marker2::=(U);"
```

CALibration:RESult:TEMPerature? (Query Only)

This command returns the temperature of the last calibration. All temperatures are in °C.

Group	Calibration
Syntax	CALibration:RESult:TEMPerature?
Returns	<T> ::= {<NR1>} Returns the temp in °C. Uncalibrated returns an empty string.
Examples	Query a temperature result: CAL:RES:TEMP? might return "INT::=Temp(33) ,".

CALibration:RESult:TIME? (Query Only)

This command returns the time of the last calibration.

Group	Calibration
Syntax	CALibration:RESult:TIME?
Returns	<T> ::= "mm/dd/yyyy hh:mm {A P}M"
Examples	Query a specific time result: CAL:RES:TIM? might return "INT::=Time(2/6/2013 8:38:34 AM) ,".

CALibration:RUNNing? (Query Only)

This command returns the name of the subsystem, area, and procedure in progress. This command can be issued while procedure is in progress.

Group	Calibration
Syntax	CALibration:RUNNing?
Returns	A string of colon separated "subsystem", "area:" and "procedure".
Examples	CALIBRATION:RUNNING? might return "Channel1:Dc:Amplitude", indicating the subsystem, area, and procedure in progress. A return of "" indicates there isn't a currently running procedure.

CALibration:STARt (No Query Form)

This command starts the calibration.

Conditions	Setting only works in the active mode for calibration. See the ACTive:MODE command. This is an overlapping command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i> .)
Group	Calibration
Syntax	CALibration:STARt
Related Commands	ACTive:MODE , CALibration:ABORt
Examples	CALIBRATION:STARt *OPC? starts the execution of calibration routines. The overlapping command is followed with an Operation Complete query.

CALibration:STAtE:FACTory? (Query Only)

This command returns the current factory state of the calibration for the AWG.

- A calibration state will be Calibrated or Uncalibrated.
- Areas will be calibrated when all procedures for that area have been executed and passed.
- Subsystems will be calibrated when all areas for that subsystem are calibrated.
- Each calibrated (as opposed to uncalibrated) state will have a temperature and date time.
- An uncalibrated state will not have a valid temperature or date time and should be ignored.

Conditions Results will be undetermined if there is a calibration procedure in progress.

Group Calibration

Syntax CALibration:STAtE:FACTory? [<subsystem>] [, <area>]]

Arguments <subsystem> ::= <string>
 <area> ::= <string>
 <test> ::= <string>

Returns "<State>"
 <State> ::= S(C|U) Reflects the "current" state.
 C ::= Calibrated
 U ::= Uncalibrated
 D ::= Date and time
 T ::= Temperature in °C

Examples Query the factory calibration state of the system: CALIBRATION:STATE:FACTORY? might return "INT::=S(C),D(2/1/2013 12:00:00 AM),T(44)"

Query a specific area state: CALIBRATION:STATE:FACTORY?"Channel1", "Dc" might return "Channel1:Dc::=S(U),D(1/1/1970 12:00:00 AM),T(0)".

CALibration:STAtE:USER? (Query Only)

This command returns the current user state of the calibration for the AWG.

- A calibration state will be Calibrated or Uncalibrated.
- Areas will be calibrated when all procedures for that area have been executed and passed.
- Subsystems will be calibrated when all areas for that subsystem are calibrated.
- Each calibrated (as opposed to uncalibrated) state will have a temperature and date time.
- An uncalibrated state will not have a valid temperature or date time and should be ignored.

Group Calibration

Syntax CALibration:STAtE:USER? [<subsystem>[,<area>]]

Arguments <subsystem> ::= <string>
<area> ::= <string>

Returns "<State>"

<State> ::= S(C|U) Reflects the "current" state.
C ::= Calibrated
U ::= Uncalibrated
D ::= Date and time
T ::= Temperature in °C

Examples Asking for a specific subsystem state: CALIBRATION:STATE:USER?
"Channel1" might return "Channel1::=S(C),D(1/1/2013 12:01:52 AM),T(112)"

Query a specific area state: CALIBRATION:STATE:USER? "Channel1","Dc"
might return "Channel1:Dc::=S(C),D(1/1/2013 12:00:02 AM),T(32)".

CALibration:STOP:STATE? (Query Only)

This command returns the state of the calibration procedure.

Group Calibration

Syntax CALibration:STOP:STATE?

Returns A single <Boolean> value, {0|1} 1 is stopped and 0 is not stopped.

Examples CALIBRATION:STOP:STATE? might return 1.

CLOCK:EClock:DIVider

This command sets or returns the divider rate for the external clock.

Conditions Setting the external clock divider rate forces the external clock multiplier rate to a value of 1.

This command is only valid if the clock source is set to External. See the [CLOCK:SOURce](#) command.

This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

When synchronization is enabled and the instrument is not the master, this command is not available.

Group Clock

Syntax CLOCK:EClock:DIVider <NR1>
CLOCK:EClock:DIVider?

Related Commands [CLOCK:EClock:MULTiplier](#), [CLOCK:SRATe](#), [CLOCK:SOURce](#)

Arguments A single <NR1> value that is a power of 2.
Range: 1 to 16777216
*RST sets this to 1.

Returns A single <NR1> value.

Examples CLOCK:ECLOCK:DIVIDER 4
*OPC?
sets the external clock divider rate to 4. The overlapping command is followed with an Operation Complete query.

CLOCK:ECLOCK:DIVIDER? might return 4, indicating the external clock divider rate is set to 4.

CLOCK:EClock:FREQuency

This command sets or returns the expected frequency being provided by the external clock.

Conditions This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

When synchronization is enabled and the instrument is not the master, this command is not available.

Group Clock

Syntax CLOCK:EClock:FREQuency <NR3>
CLOCK:EClock:FREQuency?

Related Commands [CLOCK:SOURce](#)

Arguments A single <NR3> value.
Range: 6.25 GHz to 12.5 GHz
*RST sets this to 6.25 GHz

Returns A single <NR3> value.

Examples CLOCK:ECLOCK:FREQUENCY 10E9
*OPC?
sets the expected frequency of the external clock to 10 GHz. The overlapping command is followed with an Operation Complete query.

LOCK:ECLOCK:FREQUENCY? might return 10.000000000E+9, indicating that the expected frequency of the external clock is 10 GHz.

CLOCK:ECLOCK:FREQUENCY:ADJUST (No Query Form)

This command initiates an adjustment (calibration) to the system clock circuitry.

The adjustment can be run at any time, but if the system detects setting changes that impact clock accuracy, the adjustment is required before any signals can be played.

A message is displayed in the status area when an adjustment is required.

A error message is generated if the adjustment fails.

Conditions This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

When synchronization is enabled and the instrument is not the master, this command is not available.

Group Clock

Syntax CLOCK:ECLOCK:FREQUENCY:ADJUST

Examples CLOCK:ECLOCK:FREQUENCY:ADJUST
*OPC?
performs a calibration of the system clock circuitry when using an external clock signal. The overlapping command is followed with an Operation Complete query.

CLOCK:EClock:FREQuency:DETECT (No Query Form)

This command detects the frequency of the signal applied to the Clock In connector and adjusts the system to use the signal. The frequency is detected once each time the command executes.

An error message is generated if no frequency is detected or is out of range.

- Conditions** This command is only valid if the clock source is set to External. See the [CLOCK:SOURce](#) command.
- This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)
- When synchronization is enabled and the instrument is not the master, this command is not available.

Group Clock

Syntax CLOCK:EClock:FREQuency:DETECT

Related Commands [CLOCK:SOURce](#)

Examples CLOCK:ECLOCK:FREQUENCY:DETECT
*OPC?
detects the clock frequency applied to the Clock In connector. The overlapping command is followed with an Operation Complete query.

CLOCK:EClock:MULTiplier

This command sets or returns the multiplier rate of the external clock.

Conditions This command is only valid if the clock source is set to External. See the [CLOCK:SOURce](#) command.

This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

When synchronization is enabled and the instrument is not the master, this command is not available.

Group Clock

Syntax CLOCK:EClock:MULTiplier <NR1>
CLOCK:EClock:MULTiplier?

Related Commands [CLOCK:EClock:DIVider](#), [CLOCK:SRATe](#), [CLOCK:SOURce](#)

Arguments A single <NR1> value.
Range: 1, 2, or 4 (AWG70001)
Range: 1 or 2 (AWG70002)
*RST sets this to 1.

Returns A single <NR1> value

Examples CLOCK:ECLOCK:MULTIPLIER 4
*OPC?
sets the external clock multiplier to 4. The overlapping command is followed with an Operation Complete query.

CLOCK:ECLOCK:MULTIPLIER? might return 1.0000000000, indicating the clock multiplier is set to 1.

CLOCK:EREFerence:DIVider

This command sets or returns the divider rate of the external reference signal when the external reference is variable.

Conditions Setting the external reference divider rate forces the external reference multiplier rate to a value of 1.

This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

When synchronization is enabled and the instrument is not the master, this command is not available.

Group Clock

Syntax CLOCK:EREFerence:DIVider <NR1>
CLOCK:EREFerence:DIVider?

Arguments A single <NR1> value that is a power of 2.

Range: 1 to 16777216.

*RST sets this to 1.

Returns A single <NR1> value.

Examples CLOCK:EREFERENCE:DIVIDER 1
*OPC?
sets the external reference divider to 1. The overlapping command is followed with an Operation Complete query.

CLOCK:EREFERENCE:DIVIDER? might return 1, indicating the divider rate is set to 1.

CLOCK:EReference:FREQuency

This command sets or returns the expected frequency of the signal applied to the Reference In connector.

Conditions This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

When synchronization is enabled and the instrument is not the master, this command is not available.

Group Clock

Syntax CLOCK:EReference:FREQuency <NRf>
CLOCK:EReference:FREQuency?

Arguments A single <NRf> value.
Range: 35 MHz to 250 MHz.
*RST sets this to 35 MHz.

Returns A single <NRf> value.

Examples CLOCK:EReference:FREQUENCY 35E6
*OPC?
sets the expected reference frequency applied to the Reference In connector to be 35 MHz. The overlapping command is followed with an Operation Complete query.

CLOCK:EReference:FREQUENCY? might return 200.000000000E+6,
indicating that the expected frequency of the signal applied to the Reference In connector is set to 200 MHz.

CLOCK:EREFerence:FREQuency:DETECT

This command detects the frequency of the signal applied to the Reference In connector and adjusts the system to use the signal. The frequency is detected once each time the command executes.

An error message is generated if no frequency is detected, is out of range, or if the adjustment fails.

This command is only valid when the clock source is external.

Errors are not returned. They are added to the system error queue which can be accessed with [SYSTem:ERRor\[:NEXT\]?](#).

Conditions This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

When synchronization is enabled and the instrument is not the master, this command is not available.

Group Clock

Syntax CLOCK:EREFerence:FREQuency:DETECT

Examples CLOCK:REFERENCE:FREQUENCY:DETECT
*OPC?

detects the clock frequency applied to the Reference In connector. The overlapping command is followed with an Operation Complete query.

CLOCK:EReference:MuLTiplier

This command sets or returns the multiplier rate of the variable external reference signal.

Conditions	<p>Setting the external reference multiplier rate forces the external reference divider rate to a value of 1.</p> <p>This is an overlapping command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i>.)</p> <p>When synchronization is enabled and the instrument is not the master, this command is not available.</p>
Group	Clock
Syntax	<p>CLOCK:EReference:MuLTiplier <NR1> CLOCK:EReference:MuLTiplier?</p>
Arguments	<p>A single <NR1> value.</p> <p>Range: Min = 1. Max: Multiplier * External Reference must be \leq to the maximum sample rate of the instrument.</p> <p>*RST sets this to 1.</p>
Returns	A single <NR1> value.
Examples	<p>CLOCK:EReference:MuLTiPLIER 50 *OPC? sets the multiplier to 50. The overlapping command is followed with an Operation Complete query.</p> <p>CLOCK:EReference:MuLTiPLIER? might return 100, indicating that the external clock multiplier rate is set to 100.</p>

CLOCK:JITTer

This command sets or returns the state (enabled or disabled) to apply or not apply jitter reduction to the internal system clock or the clock signal applied to the Reference In connector.

Conditions This is a blocking command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

When synchronization is enabled and the instrument is not the master, this command is not available.

Group Clock

Syntax CLOCK:JITTer {0|1|OFF|ON}

Arguments 0 or OFF disables jitter reduction.
1 or ON enables jitter reduction.
*RST sets this to 0.

Returns A single <Boolean> value.

Examples CLOCK:JITTER ON
enables the jitter reduction mode for system clock.

CLOCK:JITTER? might return 0, indicating that the jitter reduction mode is not enabled for the system clock.

CLOCK:OUTPut:FREQuency? (Query Only)

This command returns the frequency of the output clock on the Clock Out connector.

Conditions	<p>If clock output state is not enabled, 0.0000 is returned.</p> <p>When synchronization is enabled and the instrument is not the master, this command is not available.</p>
Group	Clock
Syntax	CLOCK:OUTPut:FREQuency?
Returns	<p>A single <NR3> value.</p> <p>If the clock output state is not enabled, 0.0000 is returned.</p> <p>If the clock output state is enabled, a value between 6.25 GHz and 12.5 GHz is returned, depending on the sample rate.</p>
Examples	CLOCK:OUTPUT:FREQUENCY? might return 12.4999955600E+9, indicating that the clock output is enabled and the frequency is essentially 12.5 GHz.

CLOCK:OUTPut[:STATe]

This command sets or returns the state of the output clock (enabled or disabled). Enabling Clock Out provides a high speed clock (that is related to sample rate) to drive other devices or to measure.

Conditions This is a blocking command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

When synchronization is enabled and the instrument is the master, the command choice is limited to ON or 1.

When synchronization is enabled and the instrument is not the master, this command is not available.

Group Clock

Syntax CLOCK:OUTPut[:STATe] {0|1|OFF|ON}
CLOCK:OUTPut[:STATe]?

Related Commands [CLOCK:SOURce](#)

Arguments A single <Boolean> value.
0 or OFF disables the clock out.
1 or ON enables the clock out.
*RST sets this to 0.

Returns A single <Boolean> value.

Examples CLOCK:OUTPUT:STATE ON
sets the Clock Output to ON.

CLOCK:OUTPUT:STATE? might return 1, indicating that the output clock is enabled.

CLOCK:PHASe[:ADJust[:DEGREes]]

This command sets or returns the phase adjustment, in units of degrees, to synchronize multiple AWGs when using an external trigger. Setting the phase adjusts the phase of all signal outputs relative to the system clock.

Conditions This is a blocking command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Group Clock

Syntax CLOCK:PHASe[:ADJust[:DEGREes]] <NR1>
CLOCK:PHASe[:ADJust[:DEGREes]]?

Related Commands [CLOCK:SOUT\[:STATe\]](#)

Arguments A single <NR1> value.
Range: -10800 to 10800.
*RST sets this to 0.

Returns A single <NR1> value.

Examples CLOCK:PHASE:ADJUST 100
*OPC?
sets the clock phase to 100 degrees. The blocking command is followed with an Operation Complete query.

CLOCK:PHASE:ADJUST? might return 1, indicating the clock phase is set to 1 degree.

CLOCK:PHASe[:ADJust]:TIMe

This command sets or returns the phase adjustment, in units of time, to synchronize multiple AWGs when using an external trigger. Setting the phase adjusts the phase of all signal outputs relative to the system clock.

Conditions This is a blocking command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Group Clock

Syntax CLOCK:PHASe[:ADJust]:TIMe <NRf>
CLOCK:PHASe[:ADJust]:TIMe?

Related Commands [CLOCK:SOUT\[:STATe\]](#)

Arguments A single <NR3> value.
*RST sets this to 0 ps.

Returns A single <NR3> value.

Examples CLOCK:PHASE:ADJUST:TIME 100
*OPC?
sets the clock phase to 100 ps. The blocking command is followed with an Operation Complete query.

CLOCK:PHASE:ADJUST? might return 1E-12, indicating the clock phase is set to 1 ps.

CLOCK:SOURce

This command sets or returns the source of the clock.

Conditions	<p>This is an overlapping command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i>.)</p> <p>When synchronization is enabled and the instrument is not the master, this command is not available.</p>
Group	Clock
Syntax	<p>CLOCK:SOURce {INTERNAL EFIXed EVARiable EXTERNAL}</p> <p>CLOCK:SOURce?</p>
Arguments	<p>INTERNAL - Clock signal is generated internally and the reference frequency is derived from the internal oscillator.</p> <p>EFIXed – Clock is generated internally and the reference frequency is derived from a fixed 10 MHz reference supplied at the Reference In connector.</p> <p>EVARiable – Clock is generated internally and the reference frequency is derived from a variable reference supplied at the Reference In connector.</p> <p>EXTERNAL – Clock signal supplied by the Clock In connector. The reference frequency is deactivated.</p> <p>*RST sets this to INT.</p>
Returns	INT, EFIX, EVAR, EXT
Examples	<p>CLOCK:SOURce INTERNAL</p> <p>*OPC?</p> <p>sets the clock source to internal. The overlapping command is followed with an Operation Complete query.</p> <p>CLOCK:SOURce? might return EFIX, indicating that the clock source is set to use the Reference In connector.</p>

CLOCK:SOUT[:STATe]

This command sets or returns the state of the Sync Clock Out output.

Group Clock

Syntax CLOCK:SOUT[:STATe] {0|1|OFF|ON}
CLOCK:SOUT[:STATe]?

Arguments 0 or OFF disables the Sync Clock Out.
1 or ON enables the Sync Clock Out.

*RST sets this to 0.

Returns A single <Boolean> value.

Examples CLOCK:SOUT:STATE 1 sets the Sync Clock Out output to ON.

CLOCK:SOUT:STATE? might return 0, indicating that the Sync Clock Out output is off.

CLOCK:SRATe

This command sets or returns the sample rate for the clock.

When CLOCK:SOURce is set to EXTERNAL, the maximum sample rate is:

4 * External Clock In frequency (AWG70001)

2 * External Clock In frequency (AWG70002)

Conditions This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

When synchronization is enabled and the instrument is not the master, this command is not available.

Group Clock

Syntax CLOCK:SRATe <NRf>
CLOCK:SRATe?

Related Commands [CLOCK:SOURce](#)

Arguments A single <NRf> value.

Range:	AWG70001	1.49 kS/s to 50 GS.
		When Clock Source is set to External:
		4 times the External Clock In frequency
	AWG70002	1.49 kS/s to 25 GS.
		When Clock Source is set to External:
		2 times the External Clock In frequency

*RST sets this to the maximum value.

Returns A single <NR3> value.

Examples CLOCK:SRATE 5E8
*OPC?
sets the clock sample rate to 500 MS/s. The overlapping command is followed with an Operation Complete query.

CLOCK:SRATE? might return 25.0000000000E+9, indicating the clock sample rate is set to 25 GS/s.

***CLS (No Query Form)**

This command clears all event registers and queues. (See page 3-1, *Status and events*.)

Group IEEE mandated and optional

Syntax *CLS

Examples *CLS clears all the event registers and queues.

CPLayback:CAPTure:FILE (No Query Form)

The command imports baseband IQ waveform data and adds the waveform to the specified Signal Name in the captured signal list. If the specified Signal Name does not exist, it is created and added to the captured signal list.

You can import a single IQ waveform, containing both the I and Q data, or you can import separate I and Q data files.

When importing a single IQ waveform, the following file types are supported:

- .IQT - RSA3000 Series waveform file format
- .TIQ - RSA6000 Series waveform file format
- .MAT - MATLAB file format
- .TMP - Midas Blue file format
- .PRM - Midas Blue file format

When importing individual I and Q data files, the following file types are supported:

- .WFMX - AWG70000 Series waveform file format
- .TXT - AWG400/AWG500/AWG600/AWG700/AWG5000/AWG7000 Series waveform
- .WFM - AWG400/AWG500/AWG600/AWG700/AWG5000/AWG7000 Series waveform
- .MAT - MATLAB file format
- .RFD - RFXpress waveform file format

Conditions	This is an overlapping command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i> .)
Group	Capture and playback
Syntax	<code>CPLayback:CAPTure:FILE</code> <code><signal_name>,{SIQ CIQ},<file_path>[,<file_path>]</code>
Arguments	<p><code><signal_name>::=<string></code> defines the signal name to be created and added to the captured signal list.</p> <p>SIQ sets the command to import separate I and Q waveform files. The I and Q files are combined into one file during the import and retains the name of the first specified waveform.</p> <p>CIQ sets the command to import a combined waveform file containing both I and Q data.</p> <p><code><file_path>::=<string></code></p>

Examples

CPLAYBACK:CAPTURE:FILE
"chirp",SIQ,"C:\TestFiles\chirp_I.wfm", "C:\TestFiles\
chirp_Q.wfm" imports the I and Q waveform data files named chirp_I.wfm
and chirp_Q.wfm.

CPLAYBACK:CAPTURE:FILE "chirp",CIQ,"C:\TestFiles\chirp.tiq"
imports waveform file chirp.tiq containing both I and Q data.

CPLayback:CAPTure:INSTrument:OSCilloscope (No Query Form)

This command connects to the specified oscilloscope, transfers the existing acquisition from the oscilloscope to the AWG, and adds it to the specified signal. If the specified signal does not exist, it is created and added to the captured signal list.

Group Capture and playback

Syntax `CPLayback:CAPTure:INSTrument:OSCilloscope <signal_name>
,<instrument_name>,<source_1>,<source_2>`

Arguments `<signal_name>::=<string>` Name of the signal to be modified or created.

`<instrument_name>::=<string>` Specifies the host name of the acquisition instrument to connect to. The host name can be in the form of an IP Address or a Visa Alias.

`<source_1>::=<string>` Specifies the I signal source in the Oscilloscope.

`<source_2>::=<string>` Specifies the Q signal source in the Oscilloscope.

Sources can be imported from oscilloscope channels, references, or math signals.

Channel syntax = `<Chn>` where n represents the channel source.

Reference syntax = `<Refn>` where n represents the reference signal source.

Math syntax = `<Mathn>` where n represents the math signal source.

Examples `CPLAYBACK:CAPTURE:INSTRUMENT:OSCILLOSCOPE "chirp",
"MyDpo","Ch1","Ch2"` imports I and Q signal from Channel 1 and Channel 2 (respectively) of the oscilloscope named MyDpo and adds it to the signal named chirp.

CPLayback:CAPTure:INSTrument:RSA (No Query Form)

This command connects to the specified RSA (Realtime Spectrum Analyzer), transfers the existing acquisition to the AWG, and adds it to the specified signal. If the specified signal does not exist, it is created and added to the captured signal list.

Group Capture and playback

Syntax CPLayback:CAPTure:INSTrument:RSA
<signal_name>,<instrument_name>

Arguments <signal_name>::=<string> Name of the signal to be modified or created.
<instrument_name>::=<string> Specifies the host name of the acquisition instrument to connect to. The host name can be in the form of an IP Address or a Visa Alias.

Examples CPLAYBACK:CAPTURE:INSTRUMENT:RSA "chirp","MyRSA" imports the signal from that analyzer named MyRSA and adds it to the signal named chirp.

CPLayback:CAPTURE:WLIST (No Query Form)

This command adds the specified IQ waveform from the Waveform List to the specified signal in the Captured Signal List. If the specified signal does not exist, a new signal is created and added to the captured signal list.

Conditions	This is an overlapping command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i> .)
Group	Capture and playback
Syntax	CPLayback:CAPTURE:WLIST <signal_name>,<waveform_name>
Related Commands	WLIST:LIST? , CPLayback:CLIST:NAME?
Arguments	<signal_name>::=<string> Name of the signal to be modified or created. <waveform_name>::=<string> Name of the IQ waveform in the Waveform List.
Examples	CPLAYBACK:CAPTURE:WLIST "Signal_1","IQwaveform" adds the waveform "IQWaveform" from the Waveform List to the Signal named "Signal_1" in the Captured Signal List.

CPlayback:CLIST:NAME? (Query Only)

This command returns the name of a signal from the Captured Signal List in the position specified by the index value.

Group Capture and playback

Syntax CPlayback:CLIST:NAME? <index>

Arguments <index>::=<NR1>

Returns <string>::=<signal_name> is the signal name specified by <index>.

Examples CPLAYBACK:CLIST:NAME? 1 might return "Signal_1", indicating that the file named Signal_1 is the first file listed in the Captured Signal List.

CPlayback:CLIST:SIGNAL:DELeTe (No Query Form)

This command removes the specified signal from the Captured Signal List.

Group Capture and playback

Syntax CPlayback:CLIST:SIGNAL:DELeTe {ALL|signal_name}

Arguments ALL - Removes all signals from the Captured Signal List.
<signal_name>::=<string>

Examples CPLAYBACK:CLIST:SIGNAL:DELETE "Signal_1" removes the signal named Signal_1 from the Captured Signal List.

CPLayback:CLIST:SIGNAL:SCOMpile

This command selects or deselects a signal from the captured signal list to be compiled. Single signals are selected with the command but more than one signal can be selected for compilation by sending multiple commands. Signals remain selected until deselected with this command.

The query form returns the list of selected signals.

Group Capture and playback

Syntax CPLayback:CLIST:SIGNAL:SCOMpile <signal_name>,{OFF|ON|1|0}
CPLayback:CLIST:SIGNAL:SCOMpile?

Arguments <signal_name>::=<string>

0 or OFF disables the compile selection.

1 or ON enables the compile selection.
*RST sets this to 0.

Returns A single <Boolean> value.

Examples CPLAYBACK:CLIST:SIGNAL:SCOMPILE "Signal_1",1 selects "Signal_1" to be compiled.

CPLAYBACK:CLIST:SIGNAL:SCOMPILE? "Signal_1" might return 1, indicating "Signal_1" is selected to be compiled.

CPlayback:CLIST:SIGNAL:WAVEform:FOFFset

This command sets or returns the frequency offset of the specified waveform segment of the specified signal in the Captured Signal List.

Group	Capture and playback
Syntax	<pre>CPlayback:CLIST:SIGNAL:WAVEform:FOFFset <signal_name>,<ALL NR1>,<NRf> CPlayback:CLIST:SIGNAL:WAVEform:FOFFset? <signal_name>,<NR1></pre>
Arguments	<p><code><signal_name>::=<string></code></p> <p><code><NR1></code> - Specifies the index number of a specified waveform.</p> <p>ALL - Specifies all waveforms of a specified signal.</p> <p><code><NRf></code> - The frequency offset. Range equals 0 to 20 GHz.</p>
Returns	A single <code><NRf></code> value indicating the frequency offset for the specified waveform in the specified signal.
Examples	<p><code>CPLAYBACK:CLIST:SIGNAL:WAVEFORM:FOFFSET "Signal_1",1,1E6</code> sets the frequency offset to 1 MHz for the first waveform contained in the signal named Signal_1.</p> <p><code>CPLAYBACK:CLIST:SIGNAL:WAVEFORM:FOFFSET? "Signal_1",1</code> might return <code>1.0000000000E+6</code>, indicating a frequency offset of 1 MHz for the first waveform contained in the signal named Signal_1.</p>

CPLayback:CLIST:SIGNAL:WAVEform:NAME? (Query Only)

This command returns the name of the specified waveform segment of the specified signal in the Captured Signal List.

Group Capture and playback

Syntax CPLayback:CLIST:SIGNAL:WAVEform:NAME? <signal_name>,<NR1>

Related Commands [CPLayback:CLIST:SIGNAL:WCOunt?](#)

Arguments <signal_name>::=<string>
<NR1> - The index number of the waveform in the specified signal.

Returns <signal_name>::=<string>

Examples CPLAYBACK:CLIST:SIGNAL:WAVEFORM:NAME? "Signal_1",1 might return "pulse_1", which is the name of the first waveform in the signal named Signal_1.

CPLayback:CLIST:SIGNAL:WAVEform:OTIME

This command sets or returns the Off time between waveform segments of the specified signal in the Captured Signal List.

Group Capture and playback

Syntax CPLayback:CLIST:SIGNAL:WAVEform:OTIME
 <signal_name>, <ALL|<NR1>, <NRf>
 CPLayback:CLIST:SIGNAL:WAVEform:OTIME? <signal_name>, <NR1>

Arguments <signal_name>::= <string>

A single <NRf> value.
 Range: 1 ns to 1 s.

Returns A single <NR3> value.

Examples CPLAYBACK:CLIST:SIGNAL:WAVEFORM:OTIME "Signal_1", 1e-3 sets the off time for the signal named Signal_1 to 1 ms.

CPLAYBACK:CLIST:SIGNAL:WAVEFORM:OTIME? "Signal_1" might return 1.0000000000E-3, indicating the off time for the signal named Signal_1 is set to 1 ms.

CPLayback:CLIST:SIGNAL:WAVEform:SRATe

This command sets or returns the baseband sample rate of a waveform segment of a signal in the Captured Signal List.

Group Capture and playback

Syntax CPLayback:CLIST:SIGNAL:WAVEform:SRATe
 <signal_name>,<ALL|NR1>,<NRf>
 CPLayback:CLIST:SIGNAL:WAVEform:SRATe? <signal_name>,<NR1>

Arguments <signal_name>::=<string>
 <NR1> - Specifies the index number of a specified waveform.
 ALL - Specifies all waveforms of a specified signal.
 <NRf> - The sample rate. Range is product dependent.

Range:	AWG70001	1.49 kS/s to 50 GS.
	AWG70002	1.49 kS/s to 25 GS.

Returns A single <NR3> value indicating the sample rate for the specified waveform in the specified signal.

Examples CPLAYBACK:CLIST:SIGNAL:WAVEFORM:SRATE "Signal_1",1,25E9 sets the sample rate to 25 GHz for the first waveform contained in the signal named Signal_1.
 CPLAYBACK:CLIST:SIGNAL:WAVEFORM:SRATE? "Signal_1",1 might return 1.000000000E+6, indicating sample rate of the first waveform contained in the signal named Signal_1 is 1 MHz.

CPlayback:CLIST:SIGNAL:WCount? (Query Only)

This command returns the number of waveform segments in the specified signal in the Captured Signal List.

Group	Capture and playback
Syntax	CPlayback:CLIST:SIGNAL:WCount? <signal_name>
Arguments	<signal_name>::=<string>
Returns	A single <NR1> value indicating the number of waveform segments in the specified signal.
Examples	CPLAYBACK:CLIST:SIGNAL:WCount? "Signal_1" might return 2, indicating that the signal named Signal_1 contains 2 waveform segments.

CPlayback:CLIST:SIZE? (Query Only)

This command returns the number of signals in the Captured Signal List.

Group	Capture and playback
Syntax	CPlayback:CLIST:SIZE?
Returns	A single <NR1> value.
Examples	CPLAYBACK:CLIST:SIZE? might return 2, indicating there are two signals in the Captured Signal List.

CPLayback:COMPILE (No Query Form)

The command resamples and upconverts the selected signal to the specified carrier frequency.

- With Option 03 (Sequencing) enabled: A sequence is generated containing all waveform segments in the signal (even if the signal contains only one waveform segment).
- Without Option 03 (Sequencing): A waveform is generated if there is only one waveform segment in the signal. If the signal contains multiple waveform segments, the compile fails and an error message is generated.

You can select to compile more than one signal at a time. The compile process generates a sequence (or waveform) for each of the selected signals.

Conditions This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Group Capture and playback

Syntax CPLayback:COMPILE

Related Commands [CPLayback:COMPILE:CFrequency](#)
[CPLayback:CLIST:SIGNAL:SCOMpile](#)
[CPLayback:CLIST:SIGNAL:WAVEform:OTIME](#)

Examples CPLAYBACK:COMPILE initiates the compile process on all selected signals in the Captured Signal List.

CPlayback:COMPILE:CFrequency

This command sets or returns the Carrier Frequency for the compiled signals.

Group	Capture and playback
Syntax	CPlayback:COMPILE:CFrequency <carrier_frequency> CPlayback:COMPILE:CFrequency?
Arguments	<p><carrier_frequency>::= <NR3> value.</p> <p>Range: 1 kHz to 20 GHz</p> <p>*RST sets this to 1 GHz.</p>
Returns	A single <NR3> value.
Examples	<p>CPLAYBACK:COMPILE:CFREQUENCY 1E9 sets the carrier frequency to 1 GHz.</p> <p>CPLAYBACK:COMPILE:CFREQUENCY? might return 1.000000000E+9, indicating the carrier frequency for the compiled signals is set to 1 GHz.</p>

CPLayback:COMPILE:LSEquence

This command sets or returns if the compiled sequence should loop on itself, setting the GoTo of last sequence step to First.

Group	Capture and playback
Syntax	<code>CPLayback:COMPILE:LSEquence {OFF ON 0 1}</code> <code>CPLayback:COMPILE:LSEquence?</code>
Arguments	OFF disables the loop mode. This is the default value. ON enables the loop mode. <Boolean> of 0 or 1 only. 0 and 1 are equivalent to OFF and ON respectively.
Returns	A single <Boolean> value {0 1}.
Examples	<code>CPLAYBACK:COMPILE:LSEQUENCE ON</code> enables the loop mode of the compiled sequence. <code>CPLAYBACK:COMPILE:LSEQUENCE?</code> might return 1, indicating the loop mode is enabled for the compiled sequence.

CPLayback:COMPile:NORMalize

This command sets or returns if the IQ waveforms will be normalized during import.

Group Capture and playback

Syntax CPLayback:COMPile:NORMalize {NONE|FSCale|ZREFerence}
CPLayback:COMPile:NORMalize?

Arguments NONE – The imported data is not normalized. The resulting waveform may contain points outside of the instruments amplitude range.
FSCale – The imported data is normalized with the full amplitude range.
ZREFerence – The imported data is normalized and the offset is preserved.

Returns NONE
FSC (Full Scale
ZREF (Z Reference)

Examples CPLAYBACK:COMPILE:NORMALIZE NONE will not normalize the imported IQ waveforms when importing.

CPLAYBACK:COMPILE:NORMALIZE? might return ZREF, indicating that the IQ waveforms will be normalized to the full amplitude range and the offset will be preserved when importing.

CPLayback:COMPIle:SRATe

This command sets or returns the output sampling rate for the compiled signals.

Conditions This command is ignored if the Auto calculate sample rate is enabled.

Group Capture and playback

Syntax CPLayback:COMPIle:SRATe <NRf>
CPLayback:COMPIle:SRATe?

Related Commands [CPLayback:COMPIle:SRATe:AUTO](#)

Arguments A single <NRf> value.

Range: AWG70001 1.49 kS/s to 50 GS.
 AWG70002 1.49 kS/s to 25 GS.

*RST sets this to the maximum sample rate.

Returns A single <NR3> value.

Examples CPLAYBACK:COMPILE:SRATE 25E9 sets the output sample rate to 25 GS/s.
CPLAYBACK:COMPILE:SRATE? might return 25.0000000000E+9, indicating the output sample rate is set to 25 GS/s.

CPLayback:COMPile:SRATe:AUTO

This command sets or returns if the system will calculate the output sampling rate automatically when compiling the selected signals.

Group	Capture and playback
Syntax	CPLayback:COMPi le:SRATe:AUTO {0 1 OFF ON} CPLayback:COMPi le:SRATe:AUTO?
Arguments	0 or OFF disables the automatic calculation of the sample rate for Capture and Playback. 1 or ON enables the automatic calculation of the sample rate for Capture and Playback.
Returns	A single <Boolean> value.
Examples	CPLAYBACK:COMPILE:SRATE:AUTO 1 enables the automatic calculation of the sample rate for Capture and Playback. CPLAYBACK:COMPILE:SRATE:AUTO? might return 1, indicating that the automatic calculation of the sample rate for Capture and Playback is enabled.

DIAGnostic:ABORt (No Query Form)

This command attempts to stop the current diagnostic test and stops the execution of any additional selected tests.

This may result in loss of logging information collected for the current test that responds to the abort event.

Conditions This command requires that [ACTive:MODE](#) is set to DIAGnostic.
This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Group Diagnostic

Syntax `DIAGnostic:ABORt`

Related Commands [ACTive:MODE](#), [DIAGnostic:STARt](#)

Examples `DIAGNOSTIC:ABORT`
`*OPC?`
stops the current diagnostic test. The overlapping command is followed with an Operation Complete query.

DIAGnostic:CATalog? (Query Only)

This command returns the list of all diagnostic tests per selected type per subsystems, areas, or ALL. All tests are grouped by areas. All areas are grouped by subsystems. The available subsystems, areas, and tests depend on the type of testing (such as POST only or Full diagnostics).

The selected type is set with the command [DIAGnostic:TYPE](#).

Conditions	NOTE. <i>This can be queried anytime and does not depend on ACTIVE:MODE being set to DIAGnostic.</i>
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	<i>It does however depend on the DIAG:TYPE which can only be changed if the ACTIVE:MODE is set to DIAGnostic.</i>
--	---

Group	Diagnostic
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Syntax	DIAGnostic:CATalog? [{ALL <subsystem>}[, {ALL <area>}]]
--------	---

Related Commands	DIAGnostic:TYPE
------------------	---------------------------------

Arguments	This works in the current context as set by the DIAG:TYPE command.
-----------	--

- ALL – Keyword or as a string.
- <subsystem> – A subsystem as a string.
- <area> – An area as a string.

If there are no parameters, then the list of subsystems is returned.

If there is a valid subsystem parameter, then the list of areas for that subsystem is returned.

If the subsystem parameter is "ALL", then all the tests of all the areas of all the subsystems are returned. Each test is prefixed with "<subsystem>:<area>:" and separated by a comma. Lists are always in priority of the desired execution.

If the area parameter is "ALL", then all the tests of all the areas for a specified subsystem are returned. Each test is prefixed with "<area>:" and separated by a comma. Lists are always in priority of the desired execution.

If the subsystem and area parameters are valid, then the list of tests for that subsystem and area are returned.

Returns	String of diagnostic "subsystems", "areas" and/or "procedures" separated by commas.
---------	---

Examples `DIAGNOSTIC:CATALOG?` might return "System,Clock1,Channel1,Channel2"

`DIAGNOSTIC:CATALOG? "Channel1"` might return "Host
Communications,Waveform Memory,Real Time,Marker1,Marker2"

`DIAGNOSTIC:CATALOG? "Channel1","Waveform Memory"` might return
"Calibration,Data Lines,Address Lines,Cells"

`DIAGNOSTIC:CATALOG? "ALL"` might return "...,Channel1:Waveform
Memory:Calibration,Channel1:Waveform Memory:Data
Lines,Channel1:Waveform Memory:Address Lines,Channel1:Waveform
Memory:Cells,..."

DIAGnostic:CONTRol:COUNT

This command sets or returns the number of loop counts used when the loop mode is set to COUNT. See [DIAGnostic:CONTRol:LOOP](#).

Conditions [DIAGnostic:CONTRol:LOOP](#) must be set to COUNT.

The set form of this command requires that [ACTive:MODE](#) is set to DIAGnostic.

Group Diagnostic

Syntax `DIAGnostic:CONTRol:COUNT <NR1>`
`DIAGnostic:CONTRol:COUNT?`

Related Commands [ACTive:MODE](#), [DIAGnostic:CONTRol:LOOP](#)

Arguments A single <NR1> value.

Range: ≥ 0 to 1073741823 or $0x3FFFFFFF(2^{30} - 1)$. A count of 0 is the same as a count of 1.

*RST sets this to 0.

Returns A single <NR1> value.

Examples `DIAGNOSTIC:CONTROL:COUNT 1000` sets the diagnostic looping to occur for 1000 times before exiting.

`DIAGNOSTIC:CONTROL:COUNT?` might return 1000, indicating that the diagnostic tests will loop 1000 times before halting.

DIAGnostic:CONTrol:HALT

This command sets or returns whether the next execution of diagnostics looping stops on the first diagnostic failure that occurs or continues to loop on the selected set of diagnostic functions.

Group Diagnostic

Syntax `DIAGnostic:CONTrol:HALT {0|1|OFF|ON}`

Arguments 0 or OFF disables the halt function, allowing the AWG to continue to loop on the entire set of diagnostics, even if a diagnostic failure occurs.

1 or ON enables the halt function, causing the execution of diagnostics looping to halt at the first diagnostic failure that occurs.

*RST sets this to 0.

Returns A single <Boolean> value, 0 or 1.

Examples `DIAGNOSTIC:CONTROL:HALT ON` enables the halt function, causing the execution of diagnostics looping to halt at the first diagnostic failure.

`DIAGNOSTIC:CONTROL:HALT?` might return 0, indicating that the halt function is disabled.

DIAGnostic:CONTrol:LOOP

This command sets or returns whether the next start of diagnostics runs once, runs continuous loops, or loops for a number times for the selected set of tests. All loops may be affected by the [DIAGnostic:CONTrol:HALT](#) command which determines what happens if an error occurs.

Conditions	This command requires that ACTive:MODE is set to DIAGnostic.
Group	Diagnostic
Syntax	DIAGnostic:CONTrol:LOOP {ONCE CONTinuous COUNT} DIAGnostic:CONTrol:LOOP?
Related Commands	ACTive:MODE , DIAGnostic:CONTrol:COUNt , DIAGnostic:CONTrol:HALT
Arguments	<p>ONCE disables the loop function, causes the execution of selected test(s), which may be one or more, of diagnostics once and then halt.</p> <p>CONTinuous enables the loop function, causing the execution of diagnostics to continuously loop.</p> <p>COUNT enables the loop function, causing the execution of diagnostics to loop for a predefined count. Exit of the loop happens when the predefined loop count occurs.</p> <p>*RST sets this to ONCE.</p>
Returns	ONCE CONT COUN
Examples	<p>DIAGNOSTIC:CONTROL:LOOP CONTinuous enables the diagnostics loop continuously.</p> <p>DIAGNOSTIC:CONTROL:LOOP? might return ONCE, indicating that the test or tests will execute a single time before halting.</p>

DIAGnostic:DATA? (Query Only)

This command returns the results of last executed tests for the NORMAl diagnostic type in the form of a numeric value of 0 for no errors or -330 for one or more tests failed.

Additional error details can be found by using the subsystem, area, and test queries such as `DIAGnostic:RESult? <subsystem>[,<area>[,<test>]]`.

Group Diagnostic

Syntax `DIAGnostic:DATA?`

Related Commands [DIAGnostic:TYPE](#), [DIAGnostic:RESult?](#)

Returns A single <NR1> value.
0 indicates no error.
-330 indicates that the self test failed.

Examples `DIAGNOSTIC:DATA?` might return 0, indicating that the diagnostics completed without any errors.

DIAGnostic[:IMMediate]

This command executes all of the NORMAl diagnostic tests. The query form of this command executes all of the NORMAl diagnostics and returns the results in the form of numeric of values of 0 for no errors or -330 for one or more tests failed.

This changes the active mode to DIAGnostic, if necessary, and returns back to the original active mode when done.

This makes a single pass of all of the NORMAl diagnostics.

Conditions This is a blocking command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Group Diagnostic

Syntax DIAGnostic[:IMMediate]
DIAGnostic[:IMMediate]?

Related Commands [DIAGnostic:DATA?](#), [DIAGnostic:RESult?](#)

Returns A single <NR1> value.
0 indicates no error.
-330 indicates that the test failed.

Examples DIAGNOSTIC executes the NORMAl test routines.
DIAGNOSTIC? executes the NORMAl test routines and might return 0, indicating there are no errors.

DIAGnostic:LOG? (Query Only)

This command returns a string of continuous concatenated test results. The start time is recorded for each of the selected tests.

This command can be issued at any time including while diagnostics are in progress.

Conditions The return string is limited to only the first 64K of text, which can cause a loss of results. Use the [DIAGnostic:LOG:CLEar](#) command to start a fresh log.

Group Diagnostic

Syntax `DIAGnostic:LOG?`

Related Commands [DIAGnostic:LOG:CLEar](#)

Returns `<string> ::= "<Started timestamp><LF delimiter><test name and result>[<LF delimiter><test name and result>]`

Examples `DIAGNOSTIC:LOG?` might return "Channel1:Memory:Data Lines Started 6/14/2011 10:19 AM Channel1:Memory:DataLines PASS Channel1:Memory:Address Lines Started 6/14/2011 10:20 AM Channel1:Memory:Address Lines PASS"

DIAGnostic:LOG:CLEAr (No Query Form)

This command clears the diagnostics results log.

Conditions This command requires that [ACTive:MODE](#) is set to DIAGnostic.

Group Diagnostic

Syntax DIAGnostic:LOG:CLEAr

Related Commands [ACTive:MODE](#)

Examples DIAGNOSTIC:LOG:CLEAR deletes the contents of the diagnostics log.

DIAGnostic:LOG:FAILuresonly

This command sets or returns the flag that controls the amount of result information saved into the diagnostic log. This controls all tests that pass or fail or only tests that fail.

The flag must be set before starting the diagnostic tests to obtain the expected data.

Conditions The set form of this command only works when [ACTive:MODE](#) is set to DIAGnostic.

Group Diagnostic

Syntax `DIAGnostic:LOG:FAILuresonly {0|1|OFF|ON}`
`DIAGnostic:LOG:FAILuresonly?`

Related Commands [ACTive:MODE](#), [DIAGnostic:LOG?](#), [DIAGnostic:LOG:CLEAr](#)

Arguments 0 or OFF disables the failure only mode.
1 or ON enables the failure only mode.

*RST sets this to 0.

Returns A single <Boolean> value, 0 or 1.

Examples `DIAGNOSTIC:LOG:FAILURESONLY OFF` disables the failure only mode.
`DIAGNOSTIC:LOG:FAILURESONLY 1` enables the failure only mode.
`DIAGNOSTIC:LOG:FAILURESONLY?` might return 1, showing the failure only mode is enabled.

DIAGnostic:LOOPS? (Query Only)

This command returns the number of times that the selected diagnostics set was completed during the current running or the last diagnostic running of the set. The current loop is reset after every start.

This command can be issued while diagnostics are still in progress.

Group	Diagnostic
Syntax	DIAGnostic:LOOPS?
Returns	A single <NR1> value, representing the number of loops completed.
Examples	DIAGNOSTIC:LOOPS? might return 5, indicating that the selected set of diagnostics has completed five times.

DIAGnostic:RESult? (Query Only)

This command returns the status about the results of the last start of a set of selected tests.

An individual test result can have a status of Pass, Fail or Running.

Status for an area or a subsystem have the following requirements:

- The results only reflect the "selected" tests.
- The selected tests have to have results of pass or fail or be in the running state.
- Only selected tests in an area or subsystem contribute to the result. As an example, if 3 of the 4 tests in an area has been selected, then only those 3 contribute to the "area" result. If only 2 of the selected 3 have run and completed (a stop event occurred) then only those 2 contribute to the result.
- If all contributors have passed, then the result is passed. If any contributor has failed, then the result is failed. If any contributor is running, then the result is running.

Group Diagnostic

Syntax `DIAGnostic:RESult? [{ALL|<path>}]`

Arguments ALL: Keyword as a string.

<path> = <subsystem>[,<area>[,<test>]]

<subsystem>: One of the strings listed by DIAGnostic:CATalog?

<area>: One of the strings listed by DIAGnostic:CATalog? <subsystem>

<test>: One of the strings listed by DIAGnostic:CATalog? <subsystem>,<area>

Returns "<result record>"

<result record>: = <subsystem>:[<area>:[<test>:]] <details>

<details>: <Status>,<Loop Count>,<Pass>,<Fail>

<Status>: S(P|F|R) Reflects the "current" or "last" state. When the status reflects only the subsystem or area, then an F for Fail will be set for any of the tests that have failed.

<Loop Count> ::= LC(#)

<Pass> ::= P(#)

<Fail> ::= F(#)

P ::= Pass

F ::= Fail

R ::= Running

#: <NR1>

Examples

Asking for a specific test result:

DIAGNOSTIC:RESULT? "Channel1", "waveform
Memory", "Calibration" might return "Channel1:waveform
Memory:Calibration::=S(F),LC(1),P(0),F(1)".

Asking for a specific area result:

DIAGNOSTIC:RESULT? "Channel1", "waveform Memory" might return
"Channel1:waveform Memory::=S(F)".

Asking for a specific subsystem result:

DIAGNOSTIC:RESULT? "Channel1" might return "Channel1::=S(F)".

Asking for all test results of a specific area:

DIAGNOSTIC:RESULT? "Channel1", "waveform
Memory", ALL might return "Channel1:Waveform
Memory:Calibration::=S(F),LC(1),P(0),F(1);Channel1:Waveform Memory:Data
Lines::=S(P),LC(1),P(1),F(0);Channel1:Waveform Memory:Address
Lines::=S(P),LC(1),P(1),F(0);".

DIAGnostic:RESult:TEMPerature? (Query Only)

This command returns the temperature from the results of the last start of a set of selected tests. All temperatures will be in °C.

Temperature for an area or subsystem have the following requirements.

- The temperature only reflects the "selected" tests.
- The "selected" tests must have results of pass or fail. As an example, if 3 of the 4 tests in an area has been selected, then only those 3 contribute to the "area" result. If only 2 of the selected 3 have run and completed (a stop event occurred) then only those 2 contribute to the result.
- The highest temperature is returned when the results for more than one test is requested (as in an area). The time will also be recorded for the highest temperature and may be found with the Diag:Result:Time? query.

Group Diagnostic

Syntax `DIAGnostic:RESult:TEMPerature?`
`"<subsystem>"[, "<area>"[, "<test>"]]`

Related Commands [DIAGnostic:RESult:TIME?](#)

Arguments `<subsystem> ::= <string>`
`<area> ::= <string>`
`<test> ::= <string>`

Returns `"<temperature>"`
`<temperature> ::= <string>`
`<string> ::= Ascii text where a number will be in °C or "NA".`

Examples Asking for a specific temperature result:
`DIAGNOSTIC:RESULT:TEMPERATURE? "Channel1", "Waveform Memory", "Calibration"` might return "32".

DIAGnostic:RESult:TIME? (Query Only)

This command returns the time from the results of the last start of a set of selected tests. Time is returned as a date time string as in the following example of "3/14/2013 10:19 AM".

Time for an area or subsystem have the following requirements:

- The time only reflects the "selected" tests.
- The "selected" tests must have results of pass or fail. As an example, if 3 of the 4 tests in an area has been selected, then only those 3 contribute to the "area" result. If only 2 of the selected 3 have run and completed (a stop event occurred) then only those 2 contribute to the result.
- The time returned, which is associated with the highest temperature of any selected test, is returned when the results for more than one test is requested as in an area.

Group	Diagnostic
Syntax	DIAGnostic:RESult:TIME? "<subsystem>"[, "<area>"[, "<test>"]]
Arguments	<subsystem> ::= <string> <area> ::= <string> <test> ::= <string>
Returns	"<time>" <time> ::= <string> <string> ::= Ascii text in the form of mm/dd/yy followed by the time in hr:min as in the example of "3/14/2013 10:19 AM".
Examples	DIAGNOSTIC:RESULT:TIME? "Channel1","Waveform Memory","Calibration" might return "Channel1:Waveform Memory:Calibration::=Time(2/5/2013 4:51:53 PM)".

DIAGnostic:RUNNing? (Query Only)

This command returns the name of the subsystem, area, and test of the current diagnostic test. This command can be issued at any time.

Group Diagnostic

Syntax `DIAGnostic:RUNNing?`

Returns String of the path of the test which includes subsystem, area and test names of currently running test. If there is no currently running test, then the string is empty.

Examples `DIAGNOSTIC:RUNNING?` might return "Channel1:waveform
Memory:Calibration", indicating the currently running diagnostic test by the subsystem name, area name, and test name.

DIAGnostic:SElect (No Query Form)

This command (no query form) selects one or more tests of the current test list. Tests can be selected by the keyword ALL, by "subsystem", by "area", or by "test". The selection by "area" requires "subsystem" and a "test" requires both the "subsystem" and "area".

NOTE. *The keywords may be in quotes but is not necessary.*

This command requires that **ACTive:MODE** is set to **DIAGnostic**. If not, the following error is generated:

■ -300,"Device-specific error; Not in Diagnostics mode - diag:sel ""Channel1"""

If in the proper active of **DIAGnostic**, then an invalid string generates the following error:

■ -220,"Parameter error; Invalid subsystem - diag:sel ""Channel2"""

Group Diagnostic

Syntax **DIAGnostic:SElect** {ALL|<path>}

Related Commands [ACTive:MODE](#), [DIAGnostic:UNSelect](#)

Arguments ALL selects all available tests

<path> ::= <subsystem>[,<area>[,<test>]]

<subsystem> One of the strings listed by the **DIAGnostic:CATalog?** command.

<area> One of the strings listed by the **DIAGnostic:CATalog?<subsystem>** command.

<test> One of the strings listed by the **DIAGnostic:CATalog?<subsystem>,<area>** command.

Examples **DIAGNOSTIC:SELECT All** selects all available tests.

DIAGNOSTIC:SELECT "System" selects all tests in System subsystem.

DIAGNOSTIC:SELECT "Clock1","Clock Internal" selects all tests in the Clock Internal area of the Clock1 subsystem.

DIAGNOSTIC:SELECT "Clock1","Clock Internal","ALL" selects all tests in the Clock Internal area of the Clock1 subsystem.

DIAGNOSTIC:SELECT "Channel1","Waveform Memory","Data Lines" selects one test.

DIAGnostic:SElect:VERify? (Query Only)

This command returns selection status of one specific test. A specific test requires the "subsystem", "area", and "test".

This is context sensitive and is dependent on the type as set with the command [DIAGnostic:TYPE](#).

Group Diagnostic

Syntax `DIAGnostic:SElect:VERify? <subsystem>,<area>,<test>`

Related Commands [DIAGnostic:TYPE](#), [DIAGnostic:UNSelect](#)

Arguments

- `<subsystem>` One of subsystems listed in by the system:catalog
- `<area>` One of the areas listed by the area:catalog
- `<test>` One of the tests listed by the test:catalog

Returns A single <Boolean> value, 0 or 1. 0 is not selected, 1 is selected.

Examples

`DIAGNOSTIC:SELECT "Channel1","Waveform Memory","Data Lines"`
selects one test.

`DIAGNOSTIC:SELECT:VER? "Channel1","Waveform Memory","Data Lines"` returns 1.

`DIAG:UNS "Channel1", "Waveform Memory", "Data Lines"` unselects one test.

`DIAG:SEL:VER? "Channel1", "Waveform Memory", "Data Lines"` returns 0.

DIAGnostic:START (No Query Form)

This command starts the execution of the selected set of diagnostic tests.

Conditions This command requires that [ACTive:MODE](#) is set to DIAGnostic.
This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Group Diagnostic

Syntax DIAGnostic:START

Related Commands [ACTive:MODE](#), [DIAGnostic:ABORT](#), [DIAGnostic:STOP](#)

Examples DIAGNOSTIC:START
*OPC?
starts the execution of the selected set of tests. The overlapping command is followed with an Operation Complete query.

DIAGnostic:STOP (No Query Form)

This command stops the diagnostic tests from running, after the diagnostic test currently in progress completes.

This also terminates diagnostic test looping.

Conditions This command requires that [ACTive:MODE](#) is set to DIAGnostic.
This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Group Diagnostic

Syntax `DIAGnostic:STOP`

Related Commands [ACTive:MODE](#), [DIAGnostic:ABORt](#), [DIAGnostic:STOP](#), [DIAGnostic:STOP:STATe?](#)

Examples `DIAGNOSTIC:STOP`
`*OPC?`
stops the execution of the selected set of tests. The overlapping command is followed with an Operation Complete query.

DIAGnostic:STOP:STATe? (Query Only)

This command returns the current state of diagnostic testing.

Group	Diagnostic
Syntax	DIAGnostic:STOP:STATe?
Returns	A single <Boolean> value, 0 or 1. 1 represents a stopped state and 0 represents running state.
Examples	DIAGNOSTIC:STOP:STATE? might return 1, indicating that testing has stopped.

DIAGnostic:TYPE

This command sets or returns the diagnostic type. The diagnostics work on a list of tests that support different types of testing.

This sets the context for other commands such as selecting a test to run.

Conditions	<p>This command requires that ACTive:MODE is set to DIAGnostic. If not, the following error is generated:</p> <ul style="list-style-type: none"> ■ -300,"Device-specific error;Not in Diagnostics mode - diag:type post" <p>The diagnostic type can only be changed if no testing is currently in progress. If there is, the following error is generated:</p> <ul style="list-style-type: none"> ■ -300,"Device-specific error;Diagnostics procedures still in progress - diag:type post"
Group	Diagnostic
Syntax	<pre>DIAGnostic:TYPE {NORMal POST} DIAGnostic:TYPE?</pre>
Related Commands	DIAGnostic:SElect , DIAGnostic:UNSelect , DIAGnostic:START
Arguments	<p>NORMal – Normal operating mode POST – Power On Self Test</p> <p>*RST sets this to NORM.</p>
Returns	<p>NORM POST</p>
Examples	<p>DIAGNOSTIC:TYPE NORMAL sets the AWG to normal operating mode.</p> <p>DIAGNOSTIC:TYPE? might return NORM.</p>

DIAGnostic:TYPE:CATalog? (Query Only)

This command returns a list of diagnostic types available.

NOTE. *This can be queried anytime and does not depend on ACTIVE:MODE being set to DIAGnostic.*

Group	Diagnostic
Syntax	DIAGnostic:TYPE:CATalog?
Returns	NORM – Normal operating mode POST – Power On Self Test
Examples	DIAGNOSTIC:TYPE:CATALOG? might return NORM.

DIAGnostic:UNSelect (No Query Form)

This command unselects one or more tests of the current test list.

Tests can be unselected by the keyword ALL, by "subsystem", by "area", or by "test". To unselect an "area", the "subsystem" is required. To unselect a "test" requires both the "subsystem" and "area".

Conditions This command requires that [ACTive:MODE](#) is set to DIAGnostic.

Group Diagnostic

Syntax `DIAGnostic:UNSelect {ALL|<"subsystem">,<"area">,<"test">}`

Related Commands [DIAGnostic:CATalog?](#),
[ACTive:MODE](#),
[DIAGnostic:SElect](#)

Arguments

- <subsystem> One of subsystems listed by the system:catalog
- <area> One of the areas listed by the area:catalog
- <test> One of the tests listed by the test:catalog
- ALL selects all available tests

Examples

DIAGNOSTIC:UNSELECT "ALL" unselects all available tests.

DIAGNOSTIC:UNSELECT "System" unselects all the tests in System subsystem.

DIAGNOSTIC:UNSELECT "Channel1","Host Communications" unselects all the tests in the Host Communications area of in the Channel1 subsystem.

DIAGNOSTIC:UNSELECT "Channel1","Host Communications","ALL" unselects all the tests in Host Communications area of the Channel1 subsystem.

DIAGNOSTIC:UNSELECT "Channel1","Host Communications", "Local Bus" unselects the single test named Local Bus in the Host Communications area of the Channel1 subsystem.

DISPlay[:PLOT][:STATE]

This command minimizes or restores the plot's display area on the Home screen's channel window of the AWG. This command only minimizes or restores the display area; it does not close the window.

Plots in the Function generator window are not affected.

Group Display

Syntax DISPlay[:PLOT][:STATE] {0|1|OFF|ON}
DISPlay[:PLOT][:STATE]?

Arguments 0 or OFF minimizes the plot display.
1 or ON restores the plot display.
*RST sets this to 1.

Returns A single <NR1> value 0 or 1.

Examples DISPLAY:PLOT:STATE 0 minimizes the plots on the Home screen window.
DISPLAY:PLOT:STATE? might return 1, indicating that the plot display area on the Home screen is not minimized.

*ESE

This command sets or returns the status of Event Status Enable Register (ESER).
(See page 3-1, *Status and events*.)

Group IEEE mandated and optional

Syntax *ESE <NR1>
*ESE?

Related Commands [*CLS](#), [*ESR?](#), [*SRE](#), [*STB?](#)

Arguments A single <NR1> value.

Returns A single <NR1> value.

Examples *ESE 177 sets the ESER to 177 (binary 10110001), which sets the PON, CME, EXE, and OPC bits.
*ESE? might return 177.

*ESR? (Query Only)

This command returns the status of Standard Event Status Register (SESR). (See page 3-1, *Status and events*.)

Group IEEE mandated and optional

Syntax *ESR?

Related Commands [*CLS](#), [*ESE](#), [*SRE](#), [*STB?](#)

Returns A single <NR1> value.

Examples *ESR? might return 181, which indicates that the SESR contains the binary number 10110101.

FGEN:[CHANnel[n]]:AMPLitude:POWER

This command sets or returns the function generator's waveform amplitude value for the specified channel in units of dBm.

Group Function generator

Syntax FGEN:[CHANnel[n]]:AMPLitude:POWER <NRf>
FGEN:[CHANnel[n]]:AMPLitude:POWER?

Related Commands [INSTrument:MODE](#),
[FGEN\[:CHANnel\[n\]\]:HIGH](#),
[FGEN\[:CHANnel\[n\]\]:LOW](#),
[FGEN\[:CHANnel\[n\]\]:OFFSet](#),
[FGEN\[:CHANnel\[n\]\]:AMPLitude\[:VOLTage\]](#)

Arguments A single <NRf> value.

[n] determines the channel number. If omitted, interpreted as 1.
Range: is dependent on the Output Mode selection.

Returns A single <NRf> value.

Examples FGEN:CHANNEL1:AMPLITUDE:POWER 1 sets the function generator output for channel 1 to 2 dBm.

FGEN:CHANNEL1:AMPLITUDE:VOLTAGE? might return 2.0000000000, indicating that the function generator output for channel 1 is set to 2 dBm.

FGEN[:CHANnel[n]]:AMPLitude[:VOLTage]

This command sets or returns the function generator's waveform amplitude value for the specified channel in units of volts.

Group Function generator

Syntax FGEN[:CHANnel[n]]:AMPLitude[:VOLTage] <NRf>
FGEN[:CHANnel[n]]:AMPLitude[:VOLTage]?

Related Commands [INSTrument:MODE](#),
[FGEN\[:CHANnel\[n\]\]:HIGH](#),
[FGEN\[:CHANnel\[n\]\]:LOW](#),
[FGEN\[:CHANnel\[n\]\]:OFFSet](#),
[FGEN:\[CHANnel\[n\]\]:AMPLitude:POWer](#)

Arguments A single <NRf> value.

[n] determines the channel number. If omitted, interpreted as 1.
Range: is dependent on the Output Mode selection.

*RST sets this to 500 mV.

Returns A single <NR3> value.

Examples FGEN:CHANNEL1:AMPLITUDE:VOLTAGE 0.35 sets the function generator output for channel 1 to 350 mV_{pp}.

FGEN:CHANNEL1:AMPLITUDE:VOLTAGE? might return 250.0000000000E-3, indicating that the function generator output for channel 1 is set to 250 mV.

FGEN[:CHANnel[n]]:DCLevel

This command sets or returns the DC level of the generated waveform for the specified channel.

Conditions If the value exceeds the designated maximum or minimum offset, then the respective max/min values are used.

Group Function generator

Syntax FGEN[:CHANnel[n]]:DCLevel <NRf>
FGEN[:CHANnel[n]]:DCLevel?

Arguments A single <NR3> value.
Range: –250 mV to 250 mV.
[n] determines the channel number. If omitted, interpreted as 1.
*RST sets this to 0.

Returns A single <NRf> value.

Examples FGEN:CHANNEL1:DCLEVEL 0.12 sets the function generator DC level for channel 1 to 120 mV.
FGEN:CHANNEL1:DCLEVEL? might return 250.0000000000E-3, indicating that the function generator DC level for channel 1 is set to 250 mV.

FGEN[:CHANnel[n]]:FREQuency

This command sets or returns the function generator's waveform frequency for the specified channel.

All channels on a multi-channel instrument use the same frequency setting.

Conditions If the value entered is higher than the designated maximum frequency or lower than the designated minimum, then the respective max/min values are used.

Group Function generator

Syntax FGEN[:CHANnel[n]]:FREQuency <NRf>
FGEN[:CHANnel[n]]:FREQuency?

Related Commands [INSTrument:MODE](#)

Arguments A single <NRf> value.
Range: 1 Hz to 50 MHz.
[n] determines the channel number. If omitted, interpreted as 1.
*RST sets this to 1.2 MHz.

Returns A single <NRf> value.

Examples FGEN:CHANNEL1:FREQUENCY 1.25E6 sets the function generator frequency for channel 1 to 1.25 MHz.
FGEN:CHANNEL1:FREQUENCY? might return 1.2000000000E+6, indicating that the function generator frequency for channel 1 is set to 1.2 MHz.

FGEN[:CHANnel[n]]:HIGH

This command sets or returns the function generator's waveform high voltage value for the specified channel.

Group Function generator

Syntax FGEN[:CHANnel[n]]:HIGH <NRf>
FGEN[:CHANnel[n]]:HIGH?

Related Commands [INSTRument:MODE](#),
[FGEN\[:CHANnel\[n\]\]:AMPLitude\[:VOLTage\]](#),
[FGEN\[:CHANnel\[n\]\]:LOW](#),
[FGEN\[:CHANnel\[n\]\]:OFFSet](#)

Arguments A single <NRf> value.
Range: –250 mV to 250 mV.
[n] determines the channel number. If omitted, interpreted as 1.
*RST sets this to 250 mV.

Returns A single <NRf> value.

Examples FGEN:CHANNEL1:HIGH 0.25 sets the function generator waveform high voltage value for channel 1 to 250 mV.
FGEN:CHANNEL1:HIGH? might return 200.000000000E-3, indicating that the function generator waveform high voltage value for channel 1 is 200 mV.

FGEN[:CHANnel[n]]:LOW

This command sets or returns the function generator's waveform low voltage value for the specified channel.

Group Function generator

Syntax FGEN[:CHANnel[n]]:LOW <NRf>
FGEN[:CHANnel[n]]:LOW?

Related Commands [INSTrument:MODE](#),
[FGEN\[:CHANnel\[n\]\]:AMPLitude\[:VOLTage\]](#),
[FGEN\[:CHANnel\[n\]\]:HIGH](#),
[FGEN\[:CHANnel\[n\]\]:OFFSet](#)

Arguments A single <NRf> value.
Range: -250 mV to 250 mV.
[n] determines the channel number. If omitted, interpreted as 1.
*RST sets this to -250 mV.

Returns A single <NRf> value

Examples FGEN:CHANNEL1:LOW -0.25 sets the function generator waveform low voltage value for channel 1 to -250 mV.
FGEN:CHANNEL1:LOW? might return -200.0000000000E-3, indicating that the function generator waveform low voltage value for channel 1 is -200 mV.

FGEN[:CHANnel[n]]:OFFSet

This command sets or returns the function generator's waveform offset value for the specified channel.

If the offset value is higher than the designated maximum offset or lower than the designated minimum offset, then the respective max/min values are used.

Group Function generator

Syntax FGEN[:CHANnel[n]]:OFFSet <NR3>
FGEN[:CHANnel[n]]:OFFSet?

Related Commands [INSTrument:MODE](#),
[FGEN\[:CHANnel\[n\]\]:AMPLitude\[:VOLTage\]](#),
[FGEN\[:CHANnel\[n\]\]:HIGH](#),
[FGEN\[:CHANnel\[n\]\]:LOW](#)

Arguments A single <NR3> value.
[n] determines the channel number. If omitted, interpreted as 1.
*RST sets this to 0.

Returns A single <NR3> value.

Examples FGEN:CHANNEL1:OFFSET 0.1 sets the function generator offset for channel 1 to 100 mV.
FGEN:CHANNEL1:OFFSET? might return 100.0000000000E-3, indicating that the function generator offset for channel 1 is 100 mV.

FGEN:[CHANnel[n]]:PATH

This command sets or returns the function generator's signal path for the specified channel.

Conditions This is a blocking command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Group Function generator

Syntax FGEN:[CHANnel[n]]:PATH {DIRect|DCAMplified|AC}
FGEN:[CHANnel[n]]:PATH?

Arguments DIRect: Outputs via the Analog + and – differential output connectors, measured in units of volts.

DCAMplified: The analog + and – differential output connectors must be connected to the input connectors of the MDC4500. The channel setup controls the outputs of the MDC4500. The menu choice appears if a connection to an MDC4500 is sensed. This selection provides greater amplitude range via a connection to an MDC4500 instrument.

AC: Outputs via the single-ended AC connector, measured in units of dBm. Option AC is required and is available only with the AWG70001.

[n] determines the channel number. If omitted, interpreted as 1.

Returns DIR
DCAM
AC

Examples FGEN:CHANNEL1:PATH DIRECT sets the function generator output path for channel 1 to Direct.

FGEN:CHANNEL1:PATH? might return DIR, indicating that the function generator output path for channel 1 is set to Direct.

FGEN[:CHANnel[n]]:PERiod? (Query Only)

This command returns the function generator's waveform period for the specified channel.

Group Function generator

Syntax FGEN[:CHANnel[n]]:PERiod?

Related Commands [INSTrument:MODE](#)

Returns A single <NR3> value.

Examples FGEN:CHANNEL1:PERIOD? might return 1.000000000E-6, indicating that the function generator waveform period for channel 1 is set to 1.0 μ s.

FGEN[:CHANnel[n]]:PHASe

This command sets or returns the function generator's waveform phase value for the specified channel.

Conditions If the value is higher than the designated maximum phase or lower than the designated minimum, then the respective max/min values are used.

Group Function generator

Syntax FGEN[:CHANnel[n]]:PHASe <NRf>
FGEN[:CHANnel[n]]:PHASe?

Related Commands [INSTrument:MODE](#)

Arguments A single <NRf> value.
[n] determines the channel number. If omitted, interpreted as 1.
Range: -180.0 degrees to +180.0 degrees.
*RST sets this to 0.

Returns A single <NRf> value.

Examples FGEN:CHANNEL1:PHASE 10 sets the phase of the function generator for channel 1 to 10°.
FGEN:CHANNEL1:PHASE? might return 1.0000000000, indicating the function generator phase is set to 1° for channel 1.

FGEN[:CHANnel[n]]:SYMMetry

This command sets or returns the function generator's triangle waveform symmetry value for the specified channel.

Conditions If the value is higher than the designated maximum symmetry value or lower than the designated minimum, then the respective max/min values are used.

Group Function generator

Syntax FGEN[:CHANnel[n]]:SYMMetry <NR1>
FGEN[:CHANnel[n]]:SYMMetry?

Related Commands [INSTrument:MODE](#)

Arguments A single <NR1> value.
[n] determines the channel number. If omitted, interpreted as 1.
Range: 0 to 100%.
*RST sets this to 100.

Returns A single <NR1> value

Examples FGEN:CHANNEL1:SYMMETRY 10 sets the function generator symmetry for channel 1 to 10%.
FGEN:CHANNEL1:SYMMETRY? might return 100, indicating the function generator symmetry for channel 1 is set to 100%.

FGEN[:CHANnel[n]]:TYPE

This command sets or returns the function generator's waveform type (shape) for the specified channel.

Group Function generator

Syntax FGEN[:CHANnel[n]]:TYPE {SINE|SQUare|TRIangle|NOISe|DC
|GAUSSian|EXPRise|EXPDecay|NONE}
FGEN[:CHANnel[n]]:TYPE?

Arguments SINE, SQUare, TRIangle, NOISe, DC, GAUSSian, EXPRise, EXPDecay, NONE
[n] determines the channel number. If omitted, interpreted as 1.

*RST sets this to SINE.

Returns SINE – Sinewave
SQU – Square wave
TRI – Triangle wave
NOIS – Noise
DC – DC
GAUS – Gaussian
EXPR – Exponential Rise
EXPD – Exponential Decay
NONE

Examples FGEN:CHANNEL1:TYPE "SINE" sets the function generator waveform type for channel 1 to a Sinewave.

FGEN:CHANNEL1:TYPE? might return "SINE", indicating that the function generator waveform type for channel 1 is set to Sinewave.

***IDN? (Query Only)**

This command returns identification information for the AWG. Refer to Std IEEE 488.2 for additional information.

Group IEEE mandated and optional

Syntax *IDN?

Returns <Manufacturer>, <Model>, <Serial number>, <Firmware version>
<Manufacturer>:: = TEKTRONIX
<Model>:: = XXXXXXXX (indicates the actual instrument model number)
<Serial number>:: = XXXXXXXX (indicates the actual serial number)
<Firmware version>:: = SCPI:99.0 FW:x.x.x.x (x.x.x.x is software version)

Examples *IDN? returns <Manufacturer>, <Model>, <Serial number>, <Firmware version>.

INSTrument:COUPle:SOURce

This command sets or returns the coupled state of the channel's Analog and Marker output controls of multi channel instruments.

The set form of this command forces channel 2 to match channel 1.

After the initial coupling of the settings, changes made to either channel 1 or channel 2 amplitude settings affect both channels.

NOTE. *Output Skew and Delay settings are not coupled between channels.*

Group	Instrument
Syntax	INSTrument:COUPle:SOURce {0 1 OFF ON} INSTrument:COUPle:SOURce?
Arguments	0 or OFF disables channel coupling. 1 or ON enables channel coupling. *RST sets this to 0.
Returns	A single <Boolean> value.
Examples	INSTrument:COUPLE:SOURCE 1 couples the CH1 parameters and CH2 parameters. INSTrument:COUPLE:SOURCE? might return 0.

INSTRument:MODE

This command sets or returns the AWG mode, either the AWG mode or the Function generator mode.

Group	Instrument
Syntax	<code>INSTRument:MODE {AWG FGEN}</code> <code>INSTRument:MODE?</code>
Arguments	<p>AWG sets the instrument to the Arbitrary Waveform Generator mode.</p> <p>FGEN sets the instrument to the Function generator mode.</p> <p>*RST sets this to AWG.</p>
Returns	{AWG FGEN}
Examples	<p><code>INSTRUMENT:MODE FGEN</code> sets the AWG to the function generator mode.</p> <p><code>INSTRUMENT:MODE?</code> might return FGEN, indicating the AWG is in the function generator mode.</p>

MMEMory:CATalog? (Query Only)

This command returns the current contents and state of the mass storage media.

Conditions Directories will not have their size determined. Directory's <file size> will always be 0.

Group Mass memory

Syntax MMEMory:CATalog? [**<msus>**]

Related Commands [MMEMory:CDIRectory](#), [MMEMory:MSIS](#)

Arguments <msus> (mass storage unit specifier) ::= <string>.

Returns <NR1>,<NR1> [,<file_entry>]

The first <NR1> indicates the total amount of storage currently used in bytes.
The second <NR1> indicates the free space of the mass storage in bytes.

<file_entry> ::= "<file_name>,<file_type>,<file_size>"

<file_name> ::= the exact name of the file

<file_type> ::= is DIR for an entry that is a directory, empty/blank otherwise

<file_size> ::= <NR1> is the size of the file in bytes. For <file_type> marked DIR, the file size will always be 0.

Examples MMEMORY:CATALOG? might return
484672,3878652,"SAMPLE1.AWG,,2948","aaa.txt,,1024",
"ddd,DIR,0","zzz.awg,,2948".

MMEMory:CDIRectory

This command sets or returns the current directory of the file system on the AWG. The current directory for the programmatic interface is different from the currently selected directory in the Windows Explorer on the AWG.

Conditions The <msus> cannot be specified in the CDIR action.

Group Mass memory

Syntax MMEMory:CDIRectory [<directory_name>]
MMEMory:CDIRectory?

Arguments <directory_name> ::= <string>

Returns <directory_name>

Examples Assuming the current <msus> is "C:"
MMEMORY:CDIRECTORY "\\Users" changes the current directory to C:\Users.
If the current directory is C:\Program Files
MMEMORY:CDIRECTORY "..\Program Files" changes the current directory to C:\Program Files
MMEMORY:CDIRECTORY? returns "\\Program Files" if the current directory is C:\Program Files.
MMEMORY:CDIRECTORY "\\windows" changes the current directory to C:\Windows.

MMEMory:DATA

This command sets or returns block data to/from a file in the current mass storage device.

NOTE. *The file path may contain a full file path. However, if the file path only contains a file name, the current directory is assumed.*

Conditions As the IEEE 488.2 is a limitation that the largest read or write that may occur in a single command is 999,999,999 bytes as the structure is defined as a '#' followed by a byte to determine the number of bytes to read '9'. '9' indicates that we need to read 9 bytes to determine the length of the following data block: 999,999,999 (separated by commas to help separate - they will not be present normally).

Because of the size limitation, it is suggested that the user make use of the starting index (and size for querying) to append data in multiple commands/queries.

NOTE. *If querying a size that is larger than the remaining data on the file (according to the size of the file and/or the starting index) the returned size will be all of the remaining data (size will be truncated to the size of the remaining number of bytes left in the file).*

Group Mass memory

Syntax MMEMory:DATA <file_path>[,<start_index>],<block_data>
MMEMory:DATA? <file_path>[,<start_index>[,<size>]]

Related Commands [MMEMory:CDIRectory](#), [MMEMory:MSIS](#)

Arguments <file_path> ::= <string>
<start_index> ::= <NR1> is the byte index where writing/reading will commence in the desired <file_path>.
<size> ::= <NR1> is the size, in bytes, to read.
<block_data> ::= IEEE 488.2 data block.

Returns <block_data>

Examples MMEMORY:DATA "123.TXT",#13ABC loads "ABC" into 123.TXT in the current directory.

Assuming C:\123.txt already contains "ABC":

MMEMORY:DATA "C:\123.txt",3,#223DEFGHIJKLMNOPQRSTUVWXYZ starts loading (appends) the data at byte index 3 of C:\123.txt. The file will now contain: "ABCDEFGHIJKLMNOPQRSTUVWXYZ"

Assuming C:\123.txt contains the final text in the example above:

MMEMORY:DATA? "C:\123.txt" Return is:
"#226ABCDEFGHIJKLMNOPQRSTUVWXYZ"

Assuming C:\123.txt contains the final text in the example above:

MMEMORY:DATA? "C:\123.txt",3,15 returns, starting at index 3 for 15 bytes, "#215DEFGHIJKLMNOPQR".

Following these principles, you can edit or append large or small segments in existing files and alternatively read smaller or large sections in a currently existing file.

MMEMory:DATA:SIZE? (Query Only)

This command returns the size in bytes of a selected file.

Group Mass memory

Syntax MMEMory:DATA:SIZE? <file_path>

Related Commands [MMEMory:CDIRectory](#), [MMEMory:MSIS](#)

Arguments <file_path> ::= <string>

Returns <NR1> is the size, in bytes, of the selected file

Examples Assuming that the current file is in the current directory:
 MMEMORY:DATA:SIZE? "waveform1.wfm" might return 1024.
 MMEMORY:DATA:SIZE? "C:\Tektronix\waveforms\myFile.wfm" might return 65535.

MMEMory:DELeTe (No Query Form)

This command deletes a file or directory from the AWG's hard disk. When used on a directory, this command succeeds only if the directory is empty.

Group Mass memory

Syntax MMEMory:DELeTe <file_name>[,<msus>]

Related Commands [MMEMory:CDIRectory](#), [MMEMory:MSIS](#)

Arguments <file_name> ::= <string>
 <msus> (mass storage unit specifier) ::= <string>

Examples MMEMORY:DELETE "SETUP1.AWG" deletes SETUP1.AWG in the current directory.

 MMEMORY:DELETE "\\my\\proj\\awg\\test.awg","D:" deletes D:\\my\\proj\\awg\\test.awg, regardless of the current directory and msus.

MMEMory:IMPort (No Query Form)

NOTE. *This command exists for backwards compatibility. Use the command [MMEMory:OPEN](#).*

This command imports a file into the AWG's waveform list.

NOTE. *If the waveform name already exists, it is overwritten without warning. The file name must contain a path and drive letter.*

File formats supported:

ISF - TDS3000 and DPO4000 waveform format
TDS - TDS5000/TDS6000/TDS7000, DPO7000/DPO70000/DSA70000 Series waveform
TXT - Text file with analog data
TXT8 - Text file with 8 bit DAC resolution
TXT9 - Text file with 9 bit DAC resolution
TXT10 - Text file with 10 bit DAC resolution
TXT14 - Text file with 14 bit DAC resolution
WFM - AWG400/AWG500/AWG600/AWG700 Series waveform
PAT - AWG400/AWG500/AWG600/AWG700 Series pattern file
TFW - AFG3000 Series waveform file format
IQT - RSA3000 Series waveform file format
TIQ - RSA6000 Series waveform file format

Conditions IQT and TIQ files produce separate `_I` and `_Q` waveforms unless otherwise specified by the [MMEMory:OPEN\[:PARAMeter\]:SIQ](#) command.

This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Group Mass memory

Syntax `MMEMory:IMPort <wfm_name>,<filepath>,<type>`

Related Commands [MMEMory:OPEN](#),
[MMEMory:OPEN\[:PARAMeter\]:SIQ](#)

Arguments <wfm_name> ::= <string>
 <filepath> ::= <string>
 <type>
 ::= {ISF|TDS|TXT|TXT8|TXT9|TXT10|TXT14|WFM|PAT|TFW|IQT|TIQ}

Examples To import the waveform file named "MyWaveform":
 MMEMORY:IMPORT "Mywaveform", "C:\TestFiles\WFM#001.wfm", WFM
 *OPC?
 The overlapping command is followed with an Operation Complete query.

 To import a TXT file:
 MMEMORY:IMPORT "Mywaveform", "C:\TestFiles\my8bit.txt", TXT8
 *OPC?
 The overlapping command is followed with an Operation Complete query.

MMEMory:IMPort[:PARAmeter]:NORMalize

NOTE. This command exists for backwards compatibility. Use the command [MMEMory:OPEN\[:PARAmeter\]:NORMalize](#).

This command sets or queries if the imported data is normalized during select file format import operations. The imported waveform data (for select file formats) is normalized based on the option set in this command.

File Formats supported:

.WFM - AWG400/AWG500/AWG600/AWG700 Series waveform
.AWG - AWG5000,AWG7000 Series waveforms
.TXT - Analog text files from AWG
.RFD - RFXpress AWG Series waveforms

Conditions Normalization will not be carried out on file formats which are not supported.

Group Mass memory

Syntax MMEMory:IMPort[:PARAmeter]:NORMalize <Type>
MMEMory:IMPort[:PARAmeter]:NORMalize?

Related Commands [MMEMory:OPEN\[:PARAmeter\]:NORMalize](#)

Arguments <type> ::= {NONE|FSCale|ZREFerence}

NONE will not normalize the imported data. The data may contain points outside of the AWG's amplitude range.
FSCale normalizes the imported data to the full amplitude range.
ZREFerence normalizes the imported data while preserving the offset.

Returns NONE
FSC – Full Scale
ZREF – Preserve Offset

Examples MMEMORY:IMP:NORM NONE imports the waveform with no normalization.

MMEMORY:IMP:NORM? might return ZREF, indicating that imported data is normalized while preserving the offset.

MMEMory:MDIRectory (No Query Form)

This command creates a new directory in the current path on the mass storage system.

Group Mass memory

Syntax MMEMory:MDIRectory <directory_name>

Related Commands [MMEMory:CDIRectory](#), [MMEMory:MSIS](#)

Arguments <directory_name> ::= <string>

Examples MMEMORY:MDIRECTORY "waveform" makes the directory "Waveform" in the current directory.

MMEMory:MSIS

This command selects or returns a mass storage device used by all MMEMory commands. <msus> specifies a drive using a drive letter. The drive letter can represent hard disk drives, network drives, external DVD/CD-RW drives, or USB memory.

Group Mass memory

Syntax MMEMory:MSIS [<msus>]
MMEMory:MSIS?

Arguments <msus> (mass storage unit specifier) ::= <string>

Returns <msus>

NOTE. If the mass storage device has not been defined, the returned <msus> value is the system's default drive which is typically the :C drive.

Examples MMEMORY:MSIS? might return "X:", assuming the current MSUS is the X: drive.
MMEMORY:MSIS "D:" changes the MSUS to the D: drive.

MMEMory:OPEN (No Query Form)

This command loads a file into the AWG waveform list.

File formats supported:

.WFMX - AWG70000 Series waveform file format
 .ISF - TDS3000 and DPO4000 waveform file format
 .TDS - TDS5000/TDS6000/TDS7000, DPO7000/DPO70000/DSA70000 Series waveform file format
 .WFM - AWG400/AWG500/AWG600/AWG700/AWG5000/AWG7000 Series waveform file format
 .PAT - AWG400/AWG500/AWG600/AWG700 Series pattern file
 .TFW - AFG3000 Series waveform file format
 .IQT - RSA3000 Series waveform file format
 .TIQ - RFXpress waveform file format
 .TIQ - RSA6000 Series waveform file format
 .WFM - MDO waveform file format
 .SEQX - AWG70000 Series sequence file format
 .SEQ - AWG400/AWG500/AWG600 sequence format
 .TMP – Midas BLUE file format
 .PRM – Midas BLUE file format

NOTE. *If the waveform name already exists, it will be overwritten without warning. The file name must contain a path and drive letter.*

Conditions IQT, TIQ, and Complex MIDAS files produce separate `_I` and `_Q` waveforms unless otherwise specified by the `MMEMory:OPEN[:PARameter]:SIQ` command.

AWG5000/7000 setup (*.AWG) will not work using this command. Use the command `MMEMory:OPEN:SASSet:SEQuence`

.TXT will not work using this command. Use the command `MMEMory:OPEN:TXT`.

AWG70000 setup (*.AWGX) files will not work using this command. Use the command `MMEMory:OPEN:SETup`.

This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Group Mass memory

Syntax `MMEMory:OPEN <filepath>`

Related Commands	MMEMory:OPEN:SASSet[:WAVEform] , MMEMory:OPEN[:PARAmeter]:NORMalize , MMEMory:OPEN[:PARAmeter]:SIQ
Arguments	<filepath> ::= <string>
Examples	<pre>MMEMORY:OPEN "C:\TestFiles\WFM#001.wfm" *OPC?</pre> <p>loads the WFM#001 waveform into the AWG waveform list. The overlapping command is followed with an Operation Complete query.</p>

MMEMory:OPEN[:PARAmeter]:NORMAlize

This command sets or queries if the imported data is normalized during select file format import operations. The imported waveform data (for select file formats) is normalized based on the option set in this command.

File formats supported:

.WFM - AWG400/AWG500/AWG600/AWG700 Series waveform
 .AWG - AWG5000, AWG7000 Series waveform
 .TXT - Analog text files from AWG
 .RFD - RFXpress AWG Series waveforms
 .MAT - Matlab files

Conditions Normalization will not be carried out on file formats which are not supported.

Group Mass memory

Syntax MMEMory:OPEN[:PARAmeter]:NORMAlize <Type>

Arguments <type> ::= {NONE|FSCaLe|ZREFerence}
 NONE will not normalize the imported data. The data may contain points outside of the AWG's amplitude range.
 FSCaLe normalizes the imported data to the full amplitude range.
 ZREFerence normalizes the imported data while preserving the offset.
 *RST sets the arguments to NONE.

Returns NONE
 FSC – Full Scale
 ZREF – Preserve Offset

Examples MMEMORY:OPEN:NORM NONE imports the waveform with no normalization.
 MMEMORY:OPEN:NORM? might return ZREF, indicating that imported data is normalized while preserving the offset.

MMEMory:OPEN[:PARAmeter]:SIQ

This command sets or returns if the IQ waveform (from supported formats) is separated into two separate `_I` and `_Q` waveforms while importing.

File formats supported:

- .TMP - Midas BLUE waveform
- .PRM - Midas BLUE waveform
- .IQT - Tektronix RSA IQ Pair
- .TIQ - IQ Pair
- .MAT - .Matlab files from Tektronix RSA instruments

Conditions Separating I and Q components is not performed on unsupported file format types.

Group Mass memory

Syntax `MMEMory:OPEN[:PARAmeter]:SIQ {0|1|OFF|ON}`
`MMEMory:OPEN[:PARAmeter]:SIQ?`

Arguments 0 or OFF disables separating the IQ data into two separate files.
 1 or ON enables separating the IQ data into two separate files.

Returns single <Boolean> value.

Examples `MMEMORY:OPEN:PARAMETER:SIQ 1` enables the separation of I and Q data, importing as separate I and Q waveforms.

`MMEMORY:OPEN:PARAMETER:SIQ?` might return 0, indicating that I and Q data will not be separated into I and Q waveforms when importing a waveform.

MMEMory:OPEN:SASSet:SEQuence (No Query Form)

This command loads all sequences, or a single sequence if <desired_sequence> is designated, into the Sequences list and all associated (used) sequences and waveforms within the designated file in <filepath>.

File formats supported:

.AWG - AWG7000 Series setup
 .AWGX - AWG70000 Series setup
 .SEQ - AWG400, AWG500, AWG600 Series sequence
 .SEQX - AWG70000 Series sequence

NOTE. *If the sequence, any subsequent sequence, or any associated waveform name already exists, it will be overwritten without warning.*

Conditions	This is an overlapping command. (See page 2-9, <i>Sequential, blocking, and overlapping commands.</i>)
Group	Mass memory
Syntax	MMEMory:OPEN:SASSet:SEQuence <filepath>[,<desired_sequence>]
Arguments	<p><filepath> ::= <string>, must contain the complete path (with drive letter) and file name.</p> <p><desired_sequence> ::= <string></p>
Examples	<p>Assuming the file AWG_w_2seqs.awgx has two sequences named Sequence1 and Sequence2 in it:</p> <pre>MMEMORY:OPEN:SASSET:SEQUENCE "C:\TestFiles\AWG_w_2seqs.awgx", "Sequence1" *OPC?</pre> <p>imports Sequence1 alone and all waveforms used by Sequence1. The overlapping command is followed with an Operation Complete query.</p> <p>Assuming the file AWG_w_2seqs.awgx has waveforms Sequence1 and Sequence2 in it:</p> <pre>MMEMORY:OPEN:SASSET:SEQUENCE "C:\TestFiles\AWG_w_2seqs.awgx" *OPC?</pre> <p>imports both Sequence1 and Sequence2 and all waveforms used by both sequences. The overlapping command is followed with an Operation Complete query.</p> <p>Assuming the file AWG_w_2seqs.awgx has two sequences named SequenceA and SequenceB in it and SequenceA uses SequenceB as a subsequence:</p>

MMEM:OPEN:SASSET:SEQUENCE

"C:\TestFiles\AWG_w_2seqs.awgx", "SequenceA"

*OPC?

imports SequenceA as a separate sequence, SequenceB as separate sequence, and all waveforms used by both sequences. The overlapping command is followed with an Operation Complete query.

MMEMory:OPEN:SASSet:SEQuence:MROPened? (Query Only)

This command returns which sequence was most recently added or replaced from the most recently opened or imported sequence file.

NOTE. *This command does not return sequence names that were part of a restored setup.*

Group	Mass memory
Syntax	MMEMory:OPEN:SASSet:SEQuence:MROPened?
Returns	<sequence_name::= the name of the sequence that was most recently imported.
Examples	<p>MMEMORY:OPEN:SASSET:SEQUENCE:MROPENED? might return "Sequence_1" indicating that the sequence named Sequence_1 was the most recent sequence imported.</p> <p>If no sequences have been imported, "" is returned and an error is entered in the error queue.</p>

MMEMory:OPEN:SASSet[:WAVEform] (No Query Form)

This command loads a single waveform if <desired_waveform> is designated. Otherwise the command imports all waveforms within the designated file in <filepath>.

File formats supported:

.AWG - AWG5000, AWG7000 Series waveforms
 .AWGX - AWG70000 Series waveforms
 .MAT - MATLAB files
 .SEQX - AWG70000 Series sequences

NOTE. *If the waveform name already exists, it is overwritten without warning.*

Conditions	This is an overlapping command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i> .)
Group	Mass memory
Syntax	MMEMory:OPEN:SASSet[:WAVEform] <filepath>[, <desired_waveform>]
Related Commands	MMEMory:OPEN[:PARameter]:NORMalize
Arguments	<filepath> ::= <string>, must contain the complete path (with drive letter) and file name. <desired_waveform> ::= <string>
Examples	Assuming the test file AWG_x000_4CH.awg has waveforms Untitled36 and Untitled37 in it: MMEMORY:OPEN:SASSET:WAVEFORM "C:\TestFiles\AWG_x000_4CH.awg", "Untitled36" *OPC? imports Untitled36 alone. The overlapping command is followed with an Operation Complete query. MMEMORY:OPEN:SASSET:WAVEFORM "C:\TestFiles\AWG_x000_4CH.awg" *OPC? imports both Untitled36 and Untitled37. The overlapping command is followed with an Operation Complete query.

MMEMemory:OPEN:SETup (No Query Form)

This command restores a setup file designated by the <filepath>.

The supported file format is the native setup format (.AWGX).

Conditions	This is a blocking command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i> .)
Group	Mass memory
Syntax	MMEMemory:OPEN:SETup <filepath>
Arguments	<filepath> ::= <string>, must contain the complete path (with drive letter) and file name.
Examples	MMEMemory:OPEN:SETUP "C:\TestFiles\mySetup.awgx" opens the setup file named mySetup.awgx.

MMEMory:OPEN:TXT (No Query Form)

This command loads a waveform from a .TXT file into the AWG's waveform list.

NOTE. *If the waveform name already exists, it is overwritten without warning.*

Conditions Only AWG TXT compatible files can be opened using this method.
This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Group Mass memory

Syntax MMEMory:OPEN:TXT <filepath>,<bitdepth>

Related Commands [MMEMory:OPEN\[:PARAmeter\]:NORMAlize](#)

Arguments <filepath> ::= <string>, must contain the complete path (with drive letter) and file name.
<bitdepth> ::= {ANALog, DIG8, DIG9, DIG10}

Examples MMEMORY:OPEN:TXT "C:\TestFiles\my8bitTXTfile.txt",DIG8
*OPC?
opens the digital eight bit file named my8bitTXTfile. The overlapping command is followed with an Operation Complete query.

MMEMORY:OPEN:TXT "C:\TestFiles\myAnalogTXTfile.txt",ANALOG
*OPC?
opens the analog file named myAnalogTXTfile.txt. The overlapping command is followed with an Operation Complete query.

MMEMory:SAVE:SEQuence (No Query Form)

This command exports a sequence given a unique name to an eligible storage location as the .SEQX file type.

NOTE. *If a file already exists in the selected file path, it is overwritten without warning. If the save fails, the file is deleted.*

NOTE. *The waveform name is renamed to the filename (without extension) if the waveform source is different from the selected file path.*

Conditions	This is an overlapping command. (See page 2-9, <i>Sequential, blocking, and overlapping commands.</i>)
Group	Mass memory
Syntax	MMEMory:SAVE:SEQuence <sequence>,<filepath>
Arguments	<sequence> ::= <string> <filepath> ::= <string>, must contain the complete path (with drive letter) and file name.
Examples	MMEMORY:SAVE:SEQUENCE "mySequence","C:\mySequence.SEQX" *OPC? saves the sequence named mySequence to the filepath and names the sequence to mySequence. The overlapping command is followed with an Operation Complete query.

MMEMory:SAVE:SETup (No Query Form)

This command saves the AWG's setup and optionally includes the assets (waveforms and sequences).

NOTE. *If a file already exists in the selected file path, it is overwritten without warning. If the save fails, the file is deleted.*

This command supports the native setup file format (.AWGX).

Conditions	This is an overlapping command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i> .)
Group	Mass memory
Syntax	MMEMory:SAVE:SETup <filepath>[,<with_assets>]
Arguments	<p><filepath> ::= <string>, must contain the complete path (with drive letter) and file name.</p> <p><with_assets> ::= <Boolean></p> <p>0 indicates that the setup file be saved without waveforms and sequences. 1 indicates that the setup file will be saved with waveforms and sequences.</p>

NOTE. *By default, if <with_assets> is not included, then the setup will be saved with assets.*

Examples	<p>To save the setup with waveforms and sequences, use one of the two following commands:</p> <pre>MMEMORY:SAVE:SETUP "C:\mySetup.awgx" *OPC?</pre> <pre>MMEMORY:SAVE:SETUP "C:\mySetup.awgx",1 *OPC?</pre> <p>The overlapping commands are followed with an Operation Complete query.</p> <p>To save the setup without waveforms and sequences, use the following command:</p> <pre>MMEMORY:SAVE:SETUP "C:\mySetup.awgx",0 *OPC?</pre> <p>The overlapping command is followed with an Operation Complete query.</p>
-----------------	--

MMEMory:SAVE[:WAVEform]:MAT (No Query Form)

This command exports a waveform given a unique waveform name to an eligible storage location from the AWG's waveforms with the AWG Specific MATLAB file format (MAT 5).

NOTE. *If a file already exists in the selected file path, it is overwritten without warning. If the save fails, the file is deleted.*

NOTE. *The waveform name is renamed to the filename (without extension) if the waveform source is different from the selected file path.*

Conditions	This is an overlapping command. (See page 2-9, <i>Sequential, blocking, and overlapping commands.</i>)
Group	Mass memory
Syntax	MMEMory:SAVE[:WAVEform]:MAT <wfm_name>,<filepath>
Arguments	<p><wfm_name> ::= <string></p> <p><filepath> ::= <string>, must contain the complete path (with drive letter) and file name.</p>
Examples	<pre>MMEMORY:SAVE:WAVEFORM:MAT "myWFM","C:\TestFiles\myNewWFM.MAT" *OPC?</pre> <p>saves the waveform named "myWFM" to the filepath and renames the waveform to "myNewWFM". The overlapping command is followed with an Operation Complete query.</p>

MMEMory:SAVE[:WAVEform]:TIQ (No Query Form)

This command exports an IQ waveform given a unique waveform name to an eligible storage location from the arbitrary waveform generator's assets as the .TIQ file type.

NOTE. *If a file already exists in the selected file path, it is overwritten without warning. If the save fails, the file is deleted.*

NOTE. *The waveform name is renamed to the filename (without extension) if the waveform source is different from the selected file path.*

Conditions This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands.*)

Group Mass memory

Syntax MMEMory:SAVE[:WAVEform]:TIQ <wfm_name>,<filepath>

Related Commands

Arguments <wfm_name> ::= <string>
<filepath> ::= <string>, must contain the complete path (with drive letter) and file name.

Examples MMEMORY:SAVE:WAVEFORM:TIQ
"myComplexWFM", "C:\TestFiles\myNewTIQ.TIQ"
*OPC?
saves the waveform named "myComplexWFM" to the desired location as "myNewTIQ.TIQ".
The overlapping command is followed with an Operation Complete query.

MMEMory:SAVE[:WAVEform]:TXT (No Query Form)

This command exports a waveform given a unique waveform name to an eligible storage location from the AWG's waveforms as a text file as the .TXT file type.

NOTE. *If a file already exists in the selected file path, it is overwritten without warning. If the save fails, the file is deleted.*

NOTE. *The waveform name is renamed to the filename (without extension) if the waveform source is different from the selected file path.*

Conditions	<p>When Saving an I or Q component of a complex waveform, only the Analog data format can be used for saving text files. This is the only format that can save I or Q components of a complex waveform.</p> <p>IQ waveforms cannot be saved using this command. Use the optional parameter to select an I or Q component if you want to select part of the waveform, or save as a WFMX for full complex waveform storage.</p> <p>This is an overlapping command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i>.)</p>
Group	Mass memory
Syntax	<pre>MMEMory:SAVE[:WAVEform]:TXT <wfm_name>,<filepath>,<bitdepth>[,<IQ Component>]</pre>
Arguments	<pre><wfm_name> ::= <string> <filepath> ::= <string>, must contain the complete path (with drive letter) and file name. <bitdepth> ::= {ANALog DIG8 DIG9 DIG10} <IQ Component> ::= {I Q}</pre>
Examples	<p>Assuming the desired waveform has an asset name of "myWFM" and saving it as an 8 bit digital file:</p> <pre>MMEMORY:SAVE:WAVEFORM:TXT "myWFM","C:\myNewTXTfile.TXT",DIGI8 *OPC?</pre> <p>saves the digital, eight bit waveform file named "myWFM" to the filepath and renames the waveform to "myNewTXTfile". The overlapping command is followed with an Operation Complete query.</p>

Assuming the desired complex waveform has the name of "myIQ_WFM" and saving it as an analog file for the Quadrature component:

```
MMEMORY:SAVE:WAVEFORM:TXT  
"myIQ_WFM","C:\myNewTXTfile.TXT",ANALOG,Q
```

MMEMory:SAVE[:WAVEform]:WFM (No Query Form)

This command exports a waveform given a unique waveform name to an eligible storage location from the AWG's waveforms as the .WFM file type.

The .WFM file type is compatible with the AWG 400/500/600/700/5000/7000 instruments.

NOTE. *If a file already exists in the selected file path, it is overwritten without warning. If the save fails, the file is deleted.*

NOTE. *The waveform name is renamed to the filename (without extension) if the waveform source is different from the selected file path.*

Conditions	<p>IQ waveforms cannot be saved with this command.</p> <p>This is an overlapping command. (See page 2-9, <i>Sequential, blocking, and overlapping commands.</i>)</p>
Group	Mass memory
Syntax	<pre>MMEMory:SAVE[:WAVEform]:WFM <wfm_name>,<filepath>[,<IQ_Component>]</pre>
Arguments	<p><wfm_name> ::= <string></p> <p><filepath> ::= <string>, must contain the complete path (with drive letter) and file name.</p> <p><IQ_Component> ::= {I Q}</p>
Examples	<pre>MMEMORY:SAVE:WAVEFORM:WFM "myWFM","C:\TestFiles\myNewWFM.WFM" *OPC?</pre> <p>saves the waveform named "myWFM" to the filepath and renames the waveform to "myNewWFM". The overlapping command is followed with an Operation Complete query.</p> <pre>MMEMORY:SAVE:WAVEFORM:WFM "my_IQ_WFM","C:\TestFiles\myNew_Q_WFM.WFM,Q" *OPC?</pre> <p>saves the waveform named "my_IQ_WFM" to the filepath and renames the waveform to "myNewQ_WFM". The overlapping command is followed with an Operation Complete query.</p>

MMEMory:SAVE[:WAVEform][:WFMX] (No Query Form)

This command exports a waveform given a unique waveform name to an eligible storage location from the AWG's waveforms as the .WFMX file type.

NOTE. *If a file already exists in the selected file path, it is overwritten without warning. If the save fails, the file is deleted.*

NOTE. *The waveform name is renamed to the filename (without extension) if the waveform source is different from the selected file path.*

Conditions	This is an overlapping command. (See page 2-9, <i>Sequential, blocking, and overlapping commands.</i>)
Group	Mass memory
Syntax	MMEMory:SAVE[:WAVEform][:WFMX] <wfm_name>,<filepath>
Arguments	<p><wfm_name> ::= <string></p> <p><filepath> ::= <string>, must contain the complete path (with drive letter) and file name.</p>
Examples	<pre>MMEMORY:SAVE:WAVEFORM:WFMX "myWFM","C:\TestFiles\myNewWFMX.WFMX" *OPC?</pre> <p>saves the waveform named "myWFM" to the filepath and renames the waveform to "myNewWFMX". The overlapping command is followed with an Operation Complete query.</p>

*OPC

This command causes the AWG to sense the internal flag referred to as the “No-Operation-Pending” flag. The command sets bit 0 in the Standard Event Status Register when pending operations are complete.

The query form returns a “1” when the last overlapping command operation is finished.

Conditions *OPC is limited to one overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Group IEEE mandated and optional

Syntax *OPC
 *OPC?

Related Commands [*WAI](#)

Returns A single <NR1> value.

Examples *OPC? returns 1 to indicate that the last issued overlapping command is finished.

***OPT? (Query Only)**

This command returns the installed options and application licenses for the AWG.
(See page 3-1, *Status and events*.)

Group IEEE mandated and optional

Syntax *OPT?

Returns <opt>[,<opt> [,<opt>]]]
<opt> ::= {0|xx|xx|xx} where xx is the option or application identifier

Examples *OPT? might return "0" to indicate that no options or application licenses are installed in the AWG.

*OPT? might return "150,MTONE", indicating that the instrument contains option 150 (50 GS/s sampling rate) and a Multitone license.

OUTPut[n]:ATTenuator:A1

This command sets or returns the step value setting for the A1 attenuator in (units of dB) in the Band Pass Filter path when the Channel 1 Output Path is set to AC and the Band Pass Range is set to 13 – 18 GHz. Option AC is required.

If Option AC is not installed, sending the command causes an error message.

See a diagram of the AC output path in the instrument's User Interface under Setup>Channel1>Advanced.

NOTE. This command affects the AC output when the Output Path is set to AC. If the Output Path is set to Direct or DC Amplified, this command is cached for use when the Output Path is changed to AC. See the command [OUTPut\[n\]:PATH](#). This is also cached if the Band Pass Range is not set to 13 – 18 GHz. See the command [OUTPut\[n\]:FILTer:BPASs:RANGe](#).

Conditions	This is a blocking command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i> .)
Group	Output
Syntax	OUTPut[n]:ATTenuator:A1 <NR1> OUTPut[n]:ATTenuator:A1?
Related Commands	OUTPut[n]:FILTer OUTPut[n]:FILTer:BPASs:RANGe
Arguments	A single <NR1> value. Range: 0 to 31. Resolution: 1. [n] ::= 1. If omitted, interpreted as 1.
Returns	A single <NRf> value.
Examples	OUTPUT1:ATTENUATOR:A1 8 sets the Channel 1 A1 attenuator to 8 dB. OUTPUT1:ATTENUATOR:A1? might return 7.0000000000, indicating the A1 attenuator for Channel 1 is set to 7 dB.

OUTPut[n]:ATTenuator:A2

This command sets or returns the step value setting for the A2 attenuator (in units of dB) in the Band Pass Filter path when the Channel 1 Output Path is set to AC. Option AC is required.

If Option AC is not installed, sending the command causes an error message.

See a diagram of the AC output path in the instrument's User Interface under Setup>Channel1>Advanced.

NOTE. This command affects the AC output when the Output Path is set to AC. If the Output Path is set to Direct or DC Amplified, this command is cached for use when the Output Path is changed to AC. See the command [OUTPut\[n\]:PATH](#).

Conditions	This is a blocking command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i> .)
Group	Output
Syntax	OUTPut[n]:ATTenuator:A2 <NR1> OUTPut[n]:ATTenuator:A2?
Related Commands	OUTPut[n]:FILTer OUTPut[n]:FILTer:BPASs:RANGe OUTPut[n]:PATH
Arguments	A single <NR1> value. Range: 0 to 31. Resolution: 1. [n] ::= 1. If omitted, interpreted as 1.
Returns	A single <NRf> value.
Examples	OUTPUT1:ATTENUATOR:A2 8 sets the Channel 1 A2 attenuator to 8 dB. OUTPUT1:ATTENUATOR:A2? might return 7.0000000000, indicating the A2 attenuator for Channel 1 is set to 7 dB.

OUTPut[n]:ATTenuator:A3

This command sets or returns the step value setting for the A3 attenuator (in units of dB) in the Band Pass Filter path when the Channel 1 Output Path is set to AC. Option AC is required.

If Option AC is not installed, sending the command causes an error message.

See a diagram of the AC output path in the instrument's User Interface under Setup>Channel1>Advanced.

NOTE. This command affects the AC output when the Output Path is set to AC. If the Output Path is set to Direct or DC Amplified, this command is cached for use when the Output Path is changed to AC. See the command [OUTPut\[n\]:PATH](#).

Conditions	This is a blocking command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i> .)
Group	Output
Syntax	OUTPut[n]:ATTenuator:A3 <NR1> OUTPut[n]:ATTenuator:A3?
Related Commands	OUTPut[n]:FILTer OUTPut[n]:FILTer:BPASs:RANGe OUTPut[n]:PATH
Arguments	A single <NRf> value. Range: 0 to 75. Resolution: 5. [n] ::= 1. If omitted, interpreted as 1.
Returns	A single <NR1> value.
Examples	OUTPUT1:ATTENUATOR:A3 10 sets the Channel 1 A3 attenuator to 10 dB. OUTPUT1:ATTENUATOR:A3? might return 15.0000000000, indicating the A3 attenuator for Channel 1 is set to 15 dB.

OUTPut[n]:ATTenuator:DAC

This command sets or returns the DAC output power level (in units of dBm) when the Channel 1 Output is set to AC. Option AC is required.

If Option AC is not installed, sending the command causes an error message.

See a diagram of the AC output path in the instrument's User Interface under Setup>Channel1>Advanced.

NOTE. *This command affects the AC output when the Output Path is set to AC. If the Output Path is set to Direct or DC Amplified, this command is cached for use when the Output Path is changed to AC. See the command [OUTPut\[n\]:PATH](#).*

Conditions	This is a blocking command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i> .)
Group	Output
Syntax	<pre>OUTPut[n]:ATTenuator:DAC <NRf> OUTPut[n]:ATTenuator:DAC?</pre>
Related Commands	OUTPut[n]:PATH
Arguments	<p>A single <NRf> value. Range: -8.06 to -2.04 Resolution: 0.04</p> <p>[n] ::= 1. If omitted, interpreted as 1.</p>
Returns	A single <NRf> value representing attenuation of DAC in units of dBm with selected filter path.
Examples	<p>OUTPUT[N]:ATTENUATOR:DAC -3 sets the step to -3 dBm on the DAC with the selected physical path</p> <p>OUTPUT[N]:ATTENUATOR:DAC? might return -4.0000000000, indicating the DAC attenuator value is set to -4 dBm.</p>

OUTPut[n]:FILTer

This command sets or returns the filter type for the signal path. Option AC is required.

If Option AC is not installed, sending the command causes an error message.

NOTE. *This command affects the AC output when the Output Path is set to AC. If the Output Path is set to Direct or DC Amplified, this command is cached for use when the Output Path is changed to AC. See the command [OUTPut\[n\]:PATH](#).*

Conditions	This is a blocking command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i> .)
Group	Output
Syntax	<pre>OUTPut[n]:FILTer {NONE BPASS LPASS} OUTPut[n]:FILTer?</pre>
Related Commands	OUTPut[n]:FILTer:BPASSs:RANGe
Arguments	<p>NONE – No filter is selected for the signal path.</p> <p>BPASSs – Selects the band pass filter for the signal path. The band pass filter requires allows you to set the band pass range with the command OUTPut[n]:FILTer:BPASSs:RANGe.</p> <p>LPASSs – Selects the low pass filter for the signal path (default value).</p> <p>[n] ::= 1. If omitted, interpreted as 1.</p>
Returns	<p>NONE</p> <p>BPAS</p> <p>LPAS</p>
Examples	<p>OUTPUT[N]:FILTER NONE sets the signal path to have no filters.</p> <p>OUTPUT[N]:FILTER? might return LPAS, indicating the low pass filter is selected.</p>

OUTPut[n]:FILTer:BPASs:RANGe

This command sets or returns the filter range of the band pass filter for the signal path. Option AC is required.

This command does not change the filter hardware cutoff frequencies, but selects an already available filter range with the specified cutoff frequencies.

If Option AC is not installed, sending the command causes an error message.

NOTE. *This command affects the AC output when the Output Path is set to AC. If the Output Path is set to Direct or DC Amplified, this command is cached for use when the Output Path is changed to AC. See the command [OUTPut\[n\]:PATH](#).*

Conditions	<p>Option AC is required. The output Filter must be set to Band Pass. See the command OUTPut[n]:FILTer.</p> <p>This is a blocking command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i>.)</p>
Group	Output
Syntax	<pre>OUTPut[n]:FILTer:BPASS:RANGE {R10TO14GHZ R13TO18GHZ} OUTPut[n]:FILTer:BPASS:RANGE?</pre>
Related Commands	OUTPut[n]:FILTer
Arguments	<p>R10TO14GHZ – Sets the filter band pass range to 10 to 14.5GHz.</p> <p>R13TO18GHZ – Sets the filter band pass range to 13 to 18GHz.</p> <p>[n] ::= 1. If omitted, interpreted as 1.</p>
Returns	<p>R10TO14GHZ</p> <p>R13TO18GHZ</p>
Examples	<p>OUTPUT1:FILTER:BPASS:RANGE R10TO14GHZ sets the channel 1 filter band pass range with the upper cutoff frequency as 14.5 GHz and a lower cutoff of 10 GHz.</p> <p>OUTPUT1:FILTER:BPASS:RANGE? might return R13TO18GHZ, indicating the channel 1 filter band pass range is set to sets the filter band pass range with the upper cutoff frequency lower cutoff frequency of 13 GHz and an upper cutoff of 18 GHz.</p>

OUTPut:OFF

This command sets or returns the state (enabled or disabled) of the 'All Outputs Off' control.

Enabling All Output Off causes each channel's output and markers to go to an ungrounded (or open) state. Disabling the control causes each channel to go to its currently defined state. A channel's defined state can be changed while the All Outputs Off is in effect, but the actual output remains open until the All Outputs Off is disabled.

Conditions	This is a blocking command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i> .)
Group	Output
Syntax	OUTPut:OFF {0 1 OFF ON} OUTPut:OFF?
Arguments	0 or OFF disables the All Output Off function, allowing the channel and marker outputs to go to their defined state. 1 or ON enables the All Output Off function, disabling all channel outputs and marker outputs. *RST sets all channels to 0.
Returns	A single <Boolean> value.
Examples	OUTPut:OFF ON enables All Outputs Off. OUTPut:OFF? might return 0, indicating the All Outputs Off control is not enabled and each individual channel output will function as set.

OUTPut[n]:PATH

This command sets or returns the output signal path of the specified channel. The command is only valid when Option AC is installed (AWG70001 only) or an MDC4500 is connected to the AWG70000 Series instrument.

Conditions This is a blocking command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

If Option AC is not installed or an MDC4500 instrument is not detected, sending the command causes an error message.

Group Output

Syntax OUTPut[n]:PATH {DIRECT|AC|DCAmplified}
OUTPut[n]:PATH?

Arguments DIRECT sets the signal path to go directly from the DAC to the + and – differential outputs.
AC sets signal path to go through the attenuators and amplifiers, then to the single-ended AC output. Available only for the AWG70001 with Option AC.
DCAmplified sets the signal path to go directly from the DAC to the + and – differential outputs that must be connected to the inputs of an MDC4500. The DCAmplified setting provides additional output range and output offset adjustment from the MDC4500 outputs.

[n] determines the channel number. If omitted, interpreted as 1.

Returns DIR (Direct)
AC
DCA (DC Amplified)

Examples OUTPUT1:PATH DIRECT sets the channel 1 signal path to Direct, using the + and – output connectors directly from the DAC.
OUTPUT1:PATH? might return DIR, indicating the signal path for channel 1 is set to use the + and – output connectors directly from the DAC.

OUTPut[n][:STATE]

This command sets or returns the output state of the specified channel.

Conditions	This is a blocking command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i> .)
Group	Output
Syntax	OUTPut[n][:STATE] {0 1 OFF ON} OUTPut[n][:STATE]?
Arguments	0 or OFF disables the channel's output. 1 or ON enables the channel's output. [n] determines the channel number. If omitted, interpreted as 1. *RST sets all channels to 0.
Returns	A single <Boolean> value.
Examples	OUTPUT1:STATE ON sets the analog output state of channel 1 to on. OUTPUT2:STATE? might return 0, indicating channel 2 output is off.

OUTPut[n]:SVALue[:ANALog][:STATe]

This command sets or returns the output condition of a waveform of the specified channel while the instrument is in the stopped state.

Group Output

Syntax OUTPut[n]:SVALue[:ANALog][:STATe] {OFF|ZERO}
OUTPut[n]:SVALue[:ANALog][:STATe]?

Related Commands [\[SOURce\[n\]:\]RMODE](#)

Arguments OFF sets the stop state output for channel "n" to open (electrically disconnected).
ZERO sets the stop state output value for channel "n" to 0 volts.
[n] determines the channel number. If omitted, interpreted as 1.

*RST sets all channels to ZERO.

Returns OFF
ZERO

Examples OUTPUT1:SVALUE:ANALOG:STATE OFF sets channel 1's output to be disconnected when in the stopped state.

OUTPUT1:SVALUE:ANALOG:STATE? might return ZERO, indicating that when channel 1 is in the stopped state, the output will be 0 volts.

OUTPut[n]:SVALue:MARKer[m]

This command sets or returns the output data position of the specified marker of the specified channel when in the stopped state.

Conditions This command is only valid when the Run Mode is set to Triggered or Gated.

Group Output

Syntax OUTPut[n]:SVALue:MARKer[m] {OFF|LOW}
OUTPut[n]:SVALue:MARKer[m]?

Arguments OFF sets the stop state marker output for channel "n" to open (electrically disconnected).
LOW sets the stop state marker output for channel "n" value to 0 volts.
[n] determines the channel number. If omitted, interpreted as 1.
[m] determines the marker number. If omitted, interpreted as 1.
*RST sets all channel markers to LOW.

Returns OFF
LOW

Examples OUTPUT1:SVALUE:MARKER1 OFF sets the marker 1 for channel 1 to be disconnected when in the stopped state.
OUTPUT2:SVALUE:MARKER1? might return LOW, indicating that marker 1 for channel 2 will be a logic level low when in the stopped state.

OUTPut[n]:WVALue[:ANALog][:STATe]

This command sets or returns the output condition of a waveform of the specified channel while the instrument is in the waiting-for-trigger state or for a brief period after the waveform loads to the DAC and before the first point plays.

Conditions This is valid only when the Run Mode is Triggered.
When synchronization is enabled and playing, this command is not available.

Group Output

Syntax OUTPut[n]:WVALue[:ANALog][:STATe] {FIRST|ZERO}
OUTPut[n]:WVALue[:ANALog][:STATe]?

Related Commands [OUTPut\[n\]:SVALue\[:ANALog\]\[:STATe\]](#)[OUTPut\[n\]:SVALue\[:ANALog\]\[:STATe\]](#)

Arguments FIRST sets the output level for channel "n" to match the first point in the waveform when channel "n" is in the Waiting-for-trigger state.
ZERO sets the output level for channel "n" to 0 volts when channel "n" is in the Waiting-for-trigger state.
[n] determines the channel number. If omitted, interpreted as 1.
*RST sets all channels to ZERO.

Returns FIRST
ZERO

Examples OUTPUT1:WVALUE:ANALOG:STATE FIRST sets the output level for channel 1 to match the first point in the waveform when channel 1 is in the Waiting-for-trigger state.

OUTPUT2:WVALUE:ANALOG:STATE? might return ZERO, indicating that when channel 2 is in the Waiting-for-trigger state, the output will be 0 volts.

OUTPut[n]:WVALue:MARKer[m]

This command sets or returns the output condition of the specified marker of the specified channel while the instrument is in the waiting-for-trigger state or for a brief period after the waveform loads to the DAC and before the first point plays.

Conditions This is valid only when the Run Mode is in a triggered mode.
When synchronization is enabled and playing, this command is not available.

Group Output

Syntax OUTPut[n]:WVALue:MARKer[m] {FIRST|LOW|HIGH}
OUTPut[n]:WVALue:MARKer[m]?

Related Commands [OUTPut\[n\]:WVALue\[:ANALog\]\[:STATe\]](#)

Arguments FIRST sets the marker output level to match the first point in the waveform when the channel is in the waiting-for-trigger state.
LOW sets the marker output to a logic level low for when the channel is in the waiting-for-trigger state.
HIGH sets the marker output to a logic level high when the channel is in the waiting-for-trigger state.
[n] determines the channel number. If omitted, interpreted as 1.
[m] determines the marker number. If omitted, interpreted as 1.

*RST sets all channels to LOW.

Returns FIRST
LOW
HIGH

Examples OUTPUT1:WVALUE:MARKER1 FIRST sets the output state for marker 1 of channel 1 to the first point of the waveform to play while in the waiting-for-trigger state.

OUTPUT1:WVALUE:MARKER2? might return LOW, indicating that marker 2 of channel 1 will be a logic level low while channel 1 is in the waiting-for-trigger state.

*RST (No Query Form)

This command resets the AWG to its default state. Waveform plug-ins are not affected. (See page C-1, *Factory initialization settings*.)

Conditions This is a blocking command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

When synchronization is enabled and playing, this command is not available.

Group IEEE mandated and optional

Syntax *RST

Examples *RST resets the AWG.

SLIST:NAME? (Query Only)

This command returns the name of the sequence at the specified sequence list index.

Group Sequence

Syntax SLIST:NAME? <sequence_list_index>

Related Commands [SLIST:SIZE?](#)

Arguments <sequence_list_index> := <NR1>

Returns <sequence_name> := <string>

NOTE. *If there is not a sequence at the chosen index, an empty string is returned.*

Examples SLIST:NAME? 45 might return "AnotherSequence" which is the name of the 45th sequence in the current sequence list, where SLIST:SIZE? returned a value greater than 45.

SLIST:SEQuence:AMPLitude

The command sets or returns the Recommended Amplitude (peak-to-peak) of the specified sequence.

Conditions If a recommended amplitude is not specified, a query returns the value for Not a Number (9.9100E+037).

Group Sequence

Syntax SLIST:SEQuence:AMPLitude <sequence_name>,<amplitude>
SLIST:SEQuence:AMPLitude? <sequence_name>

Related Commands [SLIST:SEQuence:OFFSet](#)
[SLIST:SEQuence:SRATe](#)

Arguments <sequence_name>::= <string>
<amplitude>::= <NR3>

Returns A single <NR3> value.

Examples SLIST:SEQUENCE:AMPLITUDE "Sequence_1", 500E-3 sets the recommended offset for the sequence named Sequence_1 to 500 mV.

SLIST:SEQUENCE:AMPLITUDE? might return 10.000000000E-3, indicating that the recommended offset for the sequence named Sequence_1 is set to 10 mV.

SLIST:SEQUENCE:DELeTe (No Query Form)

This command deletes a specific sequence or all sequences from the sequence list.

Group	Sequence
Syntax	SLIST:SEQUENCE:DELeTe {<sequence_name> ALL}
Arguments	<sequence_name> := {<string> ALL}
Examples	<p>SLIST:SEQUENCE:DELETE ALL deletes all sequences from the current sequence list.</p> <p>SLIST:SEQUENCE:DELETE "MySequence" deletes the sequence named MySequence.</p>

SLIST:SEQUENCE:EVENT:JTIMing

This command sets or returns the condition of when the sequencer jumps upon a logic event, pattern jump, or software forced jump. The jump can occur immediately or at the end of the current sequence step.

Group Sequence

Syntax SLIST:SEQUENCE:EVENT:JTIMing <sequence_name>,
{END|IMMEDIATE}
SLIST:SEQUENCE:EVENT:JTIMing? <sequence_name>

Arguments END – on receiving an event, wait until the end of current step before jumping to specified event jump step
IMMEDIATE – on receiving an event, immediately jump to specified event jump step

Returns END
IMM

Examples SLIST:SEQUENCE:EVENT:JTIMING "MySequence", END requires all event jumps to wait for the end of current sequence step before jumping to the event jump step.

SLIST:SEQUENCE:EVENT:JTIMING? "MySequence" might return IMM, indicating that all event jumps are to be processed immediately in sequence.

SLIST:SEQuence:EVENT:PJUMp:DEFine

This command associates an event pattern with the jump-to-step for Pattern Jump. The query returns the jump step associated to the specified pattern.

The event pattern is read from the Pattern Jump In connector on the rear panel. Eight bits of data and a strobe are required. When the strobed event pattern is received, an event pattern jump is created, moving the sequence to the step defined in this command.

Conditions The pattern jump feature for the sequence must be set to enabled. See [SLIST:SEQuence:EVENT:PJUMp:ENABle](#).

Group Sequence

Syntax SLIST:SEQuence:EVENT:PJUMp:DEFine <sequence_name>,
<pattern>, <jump_step>
SLIST:SEQuence:EVENT:PJUMp:DEFine? <sequence_name>,
<pattern>

Related Commands [SLIST:SEQuence:EVENT:PJUMp:ENABle](#)

Arguments <sequence_name> := <string>

<pattern>:=<NR1>. The value range is between 0 and 255. This parameter specifies the event pattern to make an event jump. The pattern bits are mapped to the integer value as follows:

	MSB		LSB
Event bits	7	6 5 4 3 2 1 0	

<jump_step>::=<NR1> between 1 and 16383.

Returns <NR1> ::= <jump_step>

Examples SLIST:SEQUENCE:EVENT:PJUMP:DEFINE "MySequence", 15, 3 sets the jump target index to the third sequence step of "MySequence" for the event pattern 00001111.

SLIST:SEQUENCE:EVENT:PJUMP:DEFINE? "MySequence", 84 might return 1200, indicating that at pattern event 84, the sequence will jump to step 1200 of "MySequence".

SLIST:SEQUENCE:EVENT:PJUMP:ENABLE

This command sets or returns the Event Pattern Jump state (enabled or disabled) for the named sequence.

When enabled, the data at the Pattern Jump In connector can be strobed in, causing a sequence to jump to a defined step. The sequence and step are defined with the command [SLIST:SEQUENCE:EVENT:PJUMP:DEFINE](#).

Group Sequence

Syntax SLIST:SEQUENCE:EVENT:PJUMP:ENABLE <sequence_name>,
{0|1|OFF|ON}
SLIST:SEQUENCE:EVENT:PJUMP:ENABLE? <sequence_name>

Related Commands [SLIST:SEQUENCE:EVENT:PJUMP:DEFINE](#)

Arguments <sequence_name> ::= <string>

OFF or 0 disables pattern jump as an event source independent of any values present at the Pattern Jump In connector.

ON or 1 enables pattern jump as an event source.

*RST sets this to 0.

Returns A single <Boolean> value.

Examples SLIST:SEQUENCE:EVENT:PJUMP:ENABLE "MySequence", ON enables the pattern jump.

SLIST:SEQUENCE:EVENT:PJUMP:ENABLE? "MySequence" might return 1, indicating the pattern jump is enabled.

SLIST:SEQUENCE:EVENT:PJUMP:SIZE? (Query Only)

This command returns the maximum number of entries in the pattern jump table.

Group Sequence

Syntax SLIST:SEQUENCE:EVENT:PJUMP:SIZE?

Returns A single <NR1> value of 256.

Examples SLIST:SEQUENCE:EVENT:PJUMP:SIZE? will return 256, indicating the maximum number of entries in the pattern jump table.

SLIST:SEQUENCE:FREQUENCY

The command sets or returns the recommended frequency of the specified sequence when the sequence contains IQ waveforms.

Conditions If a recommended frequency is not specified, a query returns the value for Not a Number (9.9100E+037).

Group Sequence

Syntax SLIST:SEQUENCE:FREQUENCY <seq_name>,<frequency>
SLIST:SEQUENCE:FREQUENCY? <seq_name>

Related Commands

Arguments <sequence_name>::= <string>
<amplitude>::= <NR3>

Returns A single <NR3> value.

Examples SLIST:SEQUENCE:FREQUENCY "Sequence_1",1E-3 sets the recommended frequency for the sequence named Sequence_1 to 1 kHz.
SLIST:SEQUENCE:FREQUENCY? might return 100.0000000000, indicating that the recommended frequency for the sequence named Sequence_1 is set to 100 Hz.

SLIST:SEQUENCE:LENGTH? (Query Only)

This command returns the total number of steps in the named sequence.

Group	Sequence
Syntax	SLIST:SEQUENCE:LENGTH? <sequence_name>
Arguments	<sequence_name> := <string>
Returns	<number_of_steps> := <NR1>
Examples	SLIST:SEQUENCE:LENGTH? "LongSequence" might return 10000, indicating there are 10,000 steps in the sequence named "LongSequence".

SLIST:SEQuence:NEW (No Query Form)

This command creates a new sequence with the selected name, number of steps, and number of tracks.

Group Sequence

Syntax SLIST:SEQuence:NEW <sequence_name>,<number_of_steps>
 [,<number_of_tracks>]

Arguments <sequence_name> := <string>

 <number_of_steps> := <NR1> maximum of 16383 steps and a minimum of 1
 <number_of_tracks> := <NR1> maximum of 8 and minimum of 1 (Defaults to
 number of available channels)

Examples SLIST:SEQUENCE:NEW "LongSequence", 16000, 4 creates a second
 sequence named LongSequence with 16000 steps and four tracks.

SLIST:SEQuence:OFFSet

The command sets or returns the Recommended Offset of the specified sequence.

Conditions If a recommended offset is not specified, a query returns the value for Not a Number (9.9100E+037).

Group Sequence

Syntax SLIST:SEQuence:OFFSet <sequence_name>,<offset>
SLIST:SEQuence:OFFSet? <sequence_name>

Related Commands [SLIST:SEQuence:AMPLitude](#)[SLIST:SEQuence:SRATe](#)

Arguments <sequence_name>::=<string>
<offset>::= <NRf>

Returns A single <NR3> value.

Examples SLIST:SEQUENCE:OFFSET "Sequence_1",100E-3 sets the recommended offset to 100 mV for the sequence named Sequence_1.

SLIST:SEQUENCE:OFFSET? "Sequence_1" might return 10.0000000000E-3, indicating the recommended offset for the sequence named Sequence_1 is set to 10 mV.

SLIST:SEQUENCE:RFLag

This command sets or returns the Enable Flag Repeat value for the sequence. If the value is ON, then the flags will change each time that the step plays out. For example if Wfm1 is at a step in Sequence with repeat 2 and one of the flags is set to Toggle, then the flag state will toggle twice at this step if the Enable Flag Repeat value is ON.

Group Sequence

Syntax SLIST:SEQUENCE:RFLag <sequence_name>, {0|1|OFF|ON}
SLIST:SEQUENCE:RFLag? <sequence_name>

Arguments <sequence_name>::= <string>
0 or OFF disables the Flag Repeat. This is the default value.
1 or ON enables the Flag Repeat.

Returns A single <Boolean> value.

Examples SLIST:SEQUENCE:RFLag "MyTest", ON enables the Repeat Flag.
SLIST:SEQUENCE:RFLag? "MyTest" returns 0 if the Repeat Flag is not set.

SLIST:SEQuence:SRATe

The command sets or returns the Recommended Sampling Rate of the specified sequence.

Conditions If a recommended sampling rate is not specified, a query returns the value for Not a Number (9.9100E+037).

Group Sequence

Syntax SLIST:SEQuence:SRATe <sequence_name>,<sample_rate>
SLIST:SEQuence:SRATe? <sequence_name>

Related Commands [SLIST:SEQuence:AMPLitude](#)[SLIST:SEQuence:OFFSet](#)

Arguments <sequence_name>::=<string>
<sample_rate>::= <NR3>

Returns A single <NR3> value.

Examples SLIST:SEQUENCE:SRATE "Sequence_1",2E9 sets the recommended sampling rate to 2 GS/s for the sequence named Sequence_1.

SLIST:SEQUENCE:SRATE? "Sequence_1" might return 25.0000000000E+9, indicating the recommended sampling rate is set to 25 GS/s for the sequence named Sequence_1 is set to 25 GS/s.

SLIST:SEQUENCE:STEP:ADD (No Query Form)

This command adds steps to the named sequence.

- If the specified location is occupied, the step(s) are inserted prior to the specified step.
- If the specified location is the first unoccupied step in the sequence, the step(s) are appended to the sequence.
- If the specified location would result in a gap within the sequence, steps are added to bridge the gap in addition to the number of steps specified to add. For example, if you have a sequence with 25 steps, and you specify to add 5 steps beginning at location 30, steps will be added to fill the gap between steps 25 and 30.

Group	Sequence
Syntax	SLIST:SEQUENCE:STEP:ADD <sequence_name>,<location>[,<steps to add>]
Arguments	<p><sequence_name>:=<string></p> <p><location>:= location to add/insert the step(s)</p> <p><steps to add> := number of steps to add</p>
Examples	SLIST:SEQUENCE:STEP:ADD "MySequence", 2, 1 inserts a single step prior to the existing step 2 of the sequence named "MySequence".

SLIST:SEQUENCE:STEP:MAX? (Query Only)

This command returns the maximum number of steps allowed in a sequence.

Group	Sequence
Syntax	SLIST:SEQUENCE:STEP:MAX?
Returns	A single <NR1> value of 16383.
Examples	SLIST:SEQUENCE:STEP:MAX? will return 16383, indicating the maximum number of steps allowed in a sequence.

SLIST:SEQUENCE:STEP:RCOUNT:MAX? (Query Only)

This command returns the maximum number of repeats allowed for a step in a sequence.

Group	Sequence
Syntax	SLIST:SEQUENCE:STEP:RCOUNT:MAX?
Related Commands	SLIST:SEQUENCE:STEP[n]:RCOUNT
Returns	A single <NR1> value of 1048576.
Examples	SLIST:SEQUENCE:STEP:RCOUNT:MAX? will return 10478576, indicating the maximum number of repeats of a step in a sequence.

SLIST:SEQUENCE:STEP[n]:EJInput

This command sets or returns whether the sequence will jump when it receives Trigger A, Trigger B, Internal Trigger, or no jump at all. This is settable for every step in a sequence.

Group Sequence

Syntax SLIST:SEQUENCE:STEP[n]:EJInput
 <sequence_name>,{ATRigger|BTRigger|OFF|ITRigger}
 SLIST:SEQUENCE:STEP[n]:EJInput? <sequence_name>

Arguments [n]::= <NR1> value specifying a sequence step, not to exceed the number of steps in the sequence. [n] is required.

<sequence_name> := <string>

ATRigger – This enables the sequencer to jump to the event of a ATRIG.

BTRigger – This enables the sequencer to jump to the event of a BTRIG.

ITRigger – This enables the sequencer to jump to the event of an Internal Trigger.

OFF – Ignores all events, even if an event occurs during that step.

*RST sets this to OFF.

Returns ATR
 BTR
 ITR
 OFF

Examples SLIST:SEQUENCE:STEP1:EJInput "MySequence", ATR allows the sequencer to jump to step 1 after receiving a Trigger A event from Force Trig A or a signal on the Trigger A input connector.

SLIST:SEQUENCE:STEP1:EJInput? "MySequence" might return BTR, indicating this step will only jump after receiving a Trigger B event from a Force Trig B or a signal on the Trig B input connector.

SLIST:SEquence:STEP[n]:EJUMP

This command sets or returns the step that the specified sequence will jump to on a trigger event. This setting is only available if the event jump input has been selected as Trigger A or Trigger B for the specified step.

Conditions The Event Input must be set at the same step with the command [SLIST:SEquence:STEP\[n\]:EJINput](#).

Group Sequence

Syntax `SLIST:SEquence:STEP[n]:EJUMP <sequence_name> ,
{<NR1>|NEXT|FIRST|LAST|END}
SLIST:SEquence:STEP[n]:EJUMP? <sequence_name>`

Related Commands [SLIST:SEquence:STEP\[n\]:EJINput](#)

Arguments [n]::= <NR1> value specifying a sequence step, not to exceed the number of steps in the sequence. [n] is required.

<sequence_name> := <string>

<NR1> - This enables the sequencer to jump to the specified step, where the value is between 1 and 16383.

NEXT – This enables the sequencer to jump to the next sequence step.

FIRST – This enables the sequencer to jump to first step in the sequence.

LAST – This enables the sequencer to jump to the last step in the sequence.

END – This enables the sequencer to jump to the end and play 0 V until play is stopped.

Returns A single <NR1> value.

LAST
FIRS
NEXT
END

Examples `SLIST:SEquence:STEP1:EJUMP "MySequence", 6` causes the sequencer to jump to the sixth step after executing the first step after the trigger event.

`SLIST:SEquence:STEP1:EJUMP? "MySequence"` might return 6, indicating that when step 1 completes, the sequence will jump to step 6 after the trigger event.

`SLIST:SEquence:STEP1:EJUMP "MySequence", LAST` allows the sequencer to jump to last step in the sequence after executing step 1.

`SLIST:SEQUENCE:STEP1:EJUMP?` "MySequence" might return NEXT, indicating the sequencer will proceed to the next step after the trigger event.

SLIST:SEQuence:STEP[n]:GOTO

This command sets or returns the target step for the GOTO command of the sequencer at the specified step.

After generating the waveform(s) specified in a sequence step, the sequencer jumps to the step specified as the GOTO step. This is an unconditional jump. If the GOTO step is not specified, the sequencer moves to the next step. If the Repeat Count is Infinite, the specified GOTO step is not used.

Group Sequence

Syntax SLIST:SEQuence:STEP[n]:GOTO <sequence_name>,
{<NR1>|LAST|FIRST|NEXT|END}
SLIST:SEQuence:STEP[n]:GOTO? <sequence_name>

Related Commands [SLIST:SEQuence:STEP\[n\]:RCOunt](#)

Arguments [n]::= <NR1> value specifying a sequence step, not to exceed the number of steps in the sequence. [n] is required.

<sequence_name> := <string>

<NR1> – This enables the sequencer to go to the specified step, where the value is between 1 and 16383.

LAST – This enables the sequencer to go to the last step in the sequence.

FIRST – This enables the sequencer to go to first step in the sequence.

NEXT – This enables the sequencer to go to the next sequence step. (The SLIST:SEQuence:STEP[n]:EJUMP:STEP setting is ignored.)

END – This enables the sequencer to go to the end and play 0 V until play is stopped.

Returns A single <NR1> value.

LAST
FIRS
NEXT
END

Examples SLIST:SEQuence:STEP1:GOTO "MySequence", 6 causes the sequencer to jump to the sixth step after executing the first step.

SLIST:SEQuence:STEP1:GOTO? "MySequence" might return LAST, indicating that after playing this step, it will proceed to the last step of the sequence.

SLIST:SEQuence:STEP[n]:RCOUNT

This command sets or returns the repeat count, which is the number of times the assigned waveform(s) play before proceeding to the next step in the sequence.

Group	Sequence
Syntax	<pre>SLIST:SEQuence:STEP[n]:RCOUNT <sequence_name>, {ONCE INFinite <NR1>} SLIST:SEQuence:STEP[n]:RCOUNT? <sequence_name></pre>
Arguments	<p>[n]::= <NR1> value specifying a sequence step, not to exceed the number of steps in the sequence. [n] is required.</p> <p><sequence_name> := <string></p> <p>ONCE – Plays the waveform one time during this sequence step. INFinite – Plays the waveform continuously during this sequence step. <NR1> - Plays this waveform the selected number of times during this sequence step. The allowed value is between 1 and 2²⁰.</p>
Returns	<p>ONCE INF A single <NR1> value.</p>
Examples	<p>SLIST:SEQUENCE:STEP1:RCOUNT "MySequence", 55 sets the repeat count to 55 for step 1.</p> <p>SLIST:SEQUENCE:STEP1:RCOUNT? "MySequence" might return ONCE, indicating that a waveform(s) in the track(s) will only play once before continuing to the next specified step.</p> <p>SLIST:SEQUENCE:STEP12:RCOUNT "MySequence", INFINITE sets the repeat count to Infinite on step 12, indicating that a waveform(s) in track(s) will play until stopped externally by the AWGControl:STOP command or the SLIST:SEQuence:JUMP:IMMediate command.</p>

SLIST:SEQuence:STEP[n]:TASSet:SEQuence (No Query Form)

This command assigns a subsequence for a specific sequence's step and track.

Group	Sequence
Syntax	SLIST:SEQuence:STEP[n]:TASSet:SEQuence <sequence_name>, <subsequence_name>
Arguments	<p><sequence_name> ::= <string> <subsequence_name> ::= <string></p> <p>[n] ::= <NR1> value specifying a sequence step, not to exceed the number of steps in the sequence. [n] is required.</p>
Examples	SLIST:SEQuence:STEP5:TASSet:SEQuence "MyTest", "Seq360" sets the subsequence "Seq360" to the fifth step of all tracks in the sequence named "MyTest".

SLIST:SEQUENCE:STEP[n]:TASSET[m]? (Query Only)

This command returns the name of the waveform or subsequence at the specified sequence's step number and track asset value.

Waveform or subsequence can be distinguished by the [SLIST:SEQUENCE:STEP\[n\]:TASSET\[m\]:TYPE?](#) query.

Group Sequence

Syntax SLIST:SEQUENCE:STEP[n]:TASSET[m]? <sequence_name>

Related Commands [SLIST:SEQUENCE:STEP\[n\]:TASSET\[m\]:TYPE?](#)

Arguments <sequence_name> ::= <string>

[n] ::= <NR1> value specifying a sequence step, not to exceed the number of steps in the sequence. [n] is required.

[m] ::= <NR1> value specifying a track in a sequence, not to exceed the number of tracks in the sequence. [m] is required.

Returns <asset_name> ::= <string>

An empty string is returned if no waveform has been assigned to this track and step.

Examples SLIST:SEQUENCE:STEP5:TASSET2? "MyTest" might return "Sin360" which is the waveform assigned to the fifth step of track 2 of the sequence named "MyTest".

SLIST:SEQUENCE:STEP5:TASSET? "MyTest" might return "Seq1", which is a subsequence set at the fifth step of all tracks of the sequence named "MyTest".

SLIST:SEQuence:STEP[n]:TASSet[m]:TYPE? (Query Only)

This command returns the type of asset assigned at the step and track for a specified sequence. The types of assets are waveform and subsequence.

Group Sequence

Syntax SLIST:SEQuence:STEP[n]:TASSet[m]:TYPE? <sequence_name>

Arguments <sequence_name> ::= <string>

[n]::= <NR1> value specifying a sequence step, not to exceed the number of steps in the sequence. [n] is required.

[m]::= <NR1> value specifying a track in a sequence, not to exceed the number of tracks in the sequence. [m] is required.

[n] and [m] values are required.

Returns WAV – signifies a waveform loaded at the step and track for the sequence.
SEQ – signifies a subsequence is loaded at the step and track for the sequence.

Examples SLIST:SEQuence:STEP5:TASSet2:TYPE? “MyTest” might return WAV because “Sin360” was the waveform set at the fifth step of Track 2 to the sequence named “MyTest”.

SLIST:SEQuence:STEP10:TASSet1:TYPE? “MyTest” might return SEQ because “Seq6” was the waveform set at the tenth step of Track 1 to the sequence named “MyTest”.

SLIST:SEQUENCE:STEP[n]:TASSET[m]:WAVEform (No Query Form)

This command assigns a waveform for a specific sequence's step and track. This waveform is played whenever the playing sequence reaches this step. A track in a sequence is assigned to a channel with the command [SOURCE[n]]:CASSET:SEQ.

Group Sequence

Syntax SLIST:SEQUENCE:STEP[n]:TASSET[m]:WAVEform <sequence_name>,
<waveform_name>

Related Commands [\[SOURCE\[n\]\]:CASSET:SEQUENCE](#)

Arguments <sequence_name> ::= <string>
<waveform_name> ::= <string>

[n] ::= <NR1> value specifying a sequence step, not to exceed the number of steps in the sequence. [n] is required.

[m] ::= <NR1> value specifying a track in a sequence, not to exceed the number of tracks in the sequence. [m] is required.

[n] and [m] values are required.

Examples SLIST:SEQUENCE:STEP5:TASSET2:WAVEFORM "MyTest","Sine360"
assigns the waveform "Sine360" to the step 5 of track 2 of the sequence named "MyTest".

SLIST:SEQUENCE:STEP[n]:TFLag[m]:AFLag

This command sets or returns the Flag A value of the track in a sequence step.

Conditions	Flags are not allowed in sequence steps containing a subsequence.
Group	Sequence
Syntax	<p>SLIST:SEQUENCE:STEP[n]:TFLag[m]:AFLag <sequence_name>, {NCHange HIGH LOW TOGGle PULSe} SLIST:SEQUENCE:STEP[n]:TFLag[m]:AFLag? <sequence_name></p>
Arguments	<p>[n]::= <NR1> value specifying a sequence step, not to exceed the number of steps in the sequence. [n] is required. [m]::= <NR1> value specifying a track in a sequence, not to exceed the number of tracks in the sequence. [m] is required.</p> <p><sequence_name> ::= <string></p> <p>NCHange – The flag state continues to be in the state is defined in the previous step Default value. HIGH – The flag signal transitions to the high state. LOW – The flag signal transitions to the low state. TOGGle – The flag signal transitions to the high state if the previous step defined the flag to be in the low state and vice versa. PULSe – The flag signal outputs a pulse signal of a fixed width.</p>
Returns	<p>NCH HIGH LOW TOGG PULS</p>
Examples	<p>SLIST:SEQUENCE:STEP5:TFLAG1:AFLag "MyTest",HIGH sets the Flag output of Flag A to high when the instrument is playing out the fifth step of the first track of sequence "MyTest".</p> <p>SLIST:SEQUENCE:STEP2:TFLAG3:AFLag? "MyTest" might return "LOW" when Flag A of sequence "MyTest" is set to "LOW" in the second step of track 3.</p>

SLIST:SEQUENCE:STEP[n]:TFLag[m]:BFLag

This command sets or returns the Flag B value of the track in a sequence step.

Conditions	Flags are not allowed in sequence steps containing a subsequence.
Group	Sequence
Syntax	<pre>SLIST:SEQUENCE:STEP[n]:TFLag[m]:BFLag <sequence_name>, {NCHange HIGH LOW TOGGLE PULSE} SLIST:SEQUENCE:STEP[n]:TFLag[m]:BFLag? <sequence_name></pre>
Arguments	<p>[n]::= <NR1> value specifying a sequence step, not to exceed the number of steps in the sequence. [n] is required.</p> <p>[m]::= <NR1> value specifying a track in a sequence, not to exceed the number of tracks in the sequence. [m] is required.</p> <p><sequence_name> ::= <string></p> <p>NCHange – The flag state continues to be in the state is defined in the previous step Default value.</p> <p>HIGH – The flag signal transitions to the high state.</p> <p>LOW – The flag signal transitions to the low state.</p> <p>TOGGLE – The flag signal transitions to the high state if the previous step defined the flag to be in the low state and vice versa.</p> <p>PULSE – The flag signal outputs a pulse signal of a fixed width.</p>
Returns	<pre>NCH HIGH LOW TOGG PULS</pre>
Examples	<p>SLIST:SEQUENCE:STEP5:TFLAG1:BFLag "MyTest",HIGH sets the Flag output of Flag B to high when the instrument is playing out the fifth step of the first track of sequence "MyTest".</p> <p>SLIST:SEQUENCE:STEP2:TFLAG3:BFLag? "MyTest" might return "LOW" when Flag B of sequence "MyTest" is set to "LOW" in the second step of track 3.</p>

SLIST:SEQUENCE:STEP[n]:TFLag[m]:CFLag

This command sets or returns the Flag C value of the track in a sequence step.

Conditions	Flags are not allowed in sequence steps containing a subsequence.
Group	Sequence
Syntax	<p>SLIST:SEQUENCE:STEP[n]:TFLag[m]:CFLag <sequence_name>, {NCHange HIGH LOW TOGGle PULSe} SLIST:SEQUENCE:STEP[n]:TFLag[m]:CFLag? <sequence_name></p>
Arguments	<p>[n]::= <NR1> value specifying a sequence step, not to exceed the number of steps in the sequence. [n] is required. [m]::= <NR1> value specifying a track in a sequence, not to exceed the number of tracks in the sequence. [m] is required.</p> <p><sequence_name> ::= <string></p> <p>NCHange – The flag state continues to be in the state is defined in the previous step Default value. HIGH – The flag signal transitions to the high state. LOW – The flag signal transitions to the low state. TOGGle – The flag signal transitions to the high state if the previous step defined the flag to be in the low state and vice versa. PULSe – The flag signal outputs a pulse signal of a fixed width.</p>
Returns	<p>NCH HIGH LOW TOGG PULS</p>
Examples	<p>SLIST:SEQUENCE:STEP5:TFLAG1:CFLag "MyTest",HIGH sets the Flag output of Flag C to high when the instrument is playing out the fifth step of the first track of sequence "MyTest".</p> <p>SLIST:SEQUENCE:STEP2:TFLAG3:CFLag? "MyTest" might return "LOW" when Flag C of sequence "MyTest" is set to "LOW" in the second step of track 3.</p>

SLIST:SEQUENCE:STEP[n]:TFLag[m]:DFLag

This command sets or returns the Flag D value of the track in a sequence step.

Conditions	Flags are not allowed in sequence steps containing a subsequence.
Group	Sequence
Syntax	<pre>SLIST:SEQUENCE:STEP[n]:TFLag[m]:DFLag <sequence_name>, {NCHange HIGH LOW TOGGle PULSe} SLIST:SEQUENCE:STEP[n]:TFLag[m]:DFLag? <sequence_name></pre>
Arguments	<p>[n]::= <NR1> value specifying a sequence step, not to exceed the number of steps in the sequence. [n] is required.</p> <p>[m]::= <NR1> value specifying a track in a sequence, not to exceed the number of tracks in the sequence. [m] is required.</p> <p><sequence_name> ::= <string></p> <p>NCHange – The flag state continues to be in the state is defined in the previous step Default value.</p> <p>HIGH – The flag signal transitions to the high state.</p> <p>LOW – The flag signal transitions to the low state.</p> <p>TOGGle – The flag signal transitions to the high state if the previous step defined the flag to be in the low state and vice versa.</p> <p>PULSe – The flag signal outputs a pulse signal of a fixed width.</p>
Returns	<p>NCH</p> <p>HIGH</p> <p>LOW</p> <p>TOGG</p> <p>PULS</p>
Examples	<p>SLIST:SEQUENCE:STEP5:TFLAG1:DFLag "MyTest",HIGH sets the Flag output of Flag D to high when the instrument is playing out the fifth step of the first track of sequence "MyTest".</p> <p>SLIST:SEQUENCE:STEP2:TFLAG3:DFLag? "MyTest" might return "LOW" when Flag D of sequence "MyTest" is set to "LOW" in the second step of track 3.</p>

SLIST:SEQuence:STEP[n]:WINPut

This command sets or returns the trigger source for the wait input state for a step.

Send a trigger signal in one of the following ways:

- Use an external trigger signal.
- Push the Force Trigger button on the front panel.
- Send the ***TRG** or **TRIGger[:IMMediate]** remote commands.
- Use the Internal Trigger.

Group Sequence

Syntax SLIST:SEQuence:STEP[n]:WINPut <sequence_name> ,
{ATRigger|BTRigger|ITRigger|OFF}
SLIST:SEQuence:STEP[n]:WINPut? <sequence_name>

Related Commands [TRIGger\[:IMMediate\]](#)
[*TRG](#)

Arguments [n]::= <NR1> value specifying a sequence step, not to exceed the number of steps in the sequence. [n] is required.

<sequence_name> ::= <string>

ATRigger – This enables the sequencer to move due to a trigger event from the A Trigger Input connector or the A Force Trigger front panel button.

BTRigger – This enables the sequencer to move due to a trigger event from the B Trigger Input connector or the B Force Trigger front panel button.

ITRigger – This enables the sequencer to move due to an Internal Trigger event.

OFF – Disables the wait for trigger event, allowing the waveforms(s) of this step to be played immediately.

Returns ATR
BTR
ITR
OFF

Examples SLIST:SEQUENCE:STEP1:WINPUT "MYSEQUENCE", ATR allows the sequencer play the waveform(s) specified in this step after receiving a trigger event from the Trigger A Input connector or a Force A Trigger.

`SLIST:SEQUENCE:STEP1:WINPUT?` "MySequence" might return `BTR`, indicating this step will only play the waveform(s) specified after receiving a trigger event from the Trigger B Input connector or a Force B Trigger.

SLIST:SEQUENCE:TRACK? (Query Only)

This command returns the number of tracks defined in the specified sequence.

Group Sequence

Syntax SLIST:SEQUENCE:TRACK? <sequence_name>

Related Commands [SLIST:SEQUENCE:NEW](#)

Arguments <sequence_name> ::= <string>

Returns A single <NR1> value.

Examples SLIST:SEQUENCE:TRACK? "MySequence" might return 4, indicating the number of tracks defined in this sequence.

SLIST:SEQUence:TRACk:MAX? (Query Only)

This command returns the maximum number of tracks allowed in a sequence

Group Sequence

Syntax SLIST:SEQUence:TRACk:MAX?

Returns A single <NR1> value of 8.

Examples SLIST:SEQUENCE:TRACK:MAX? will return 8, indicating the maximum number of tracks allowed in a sequence.

SLIST:SEQUENCE:TSTAMP? (Query Only)

This command returns the timestamp of the named sequence. Every sequence has a timestamp that indicates when the sequence was created or last modified.

Group	Sequence
Syntax	SLIST:SEQUENCE:TSTAMP? <sequence_name>
Arguments	<sequence_name> ::= <string>
Returns	<p>String with "yyyy/mm/dd hh:mm:ss" as the sequence timestamp.</p> <p>Where:</p> <ul style="list-style-type: none">yyyy refers to a four-digit year number.mm refers to two-digit month number from 01 to 12.dd refers to two-digit day number in the month.hh refers to two-digit hour number.mm refers to two-digit minute number.ss refers to two-digit second number.
Examples	SLIST:SEQUENCE:TSTAMP? "MySequence" might return "2012/07/25 9:05:21" which is the date and time the sequence named "MySequence" was created or last modified.

SLIST:SEQUENCE:WMUSage? (Query Only)

This command returns the total waveform memory usage (in sample points) for the specified sequence track for the named sequence.

Group	Sequence
Syntax	SLIST:SEQUENCE:WMUSage? <sequence_name>,<track_number>
Arguments	<sequence_name> := <string> <track number> := <NR1>
Returns	A single <NR1> value.
Examples	SLIST:SEQUENCE:WMUSAGE? "MySequence",1 might return 84000, indicating that the total waveform memory used by track 1 in the sequence named MySequence is 84 kb.

SLIST:SIZE? (Query Only)

This command returns the number sequences in sequence list.

Group	Sequence
Syntax	SLIST:SIZE?
Returns	A single <NR1> value.
Examples	SLIST:SIZE? might return 4500, which is the number of existing sequences in the sequence list.

[SOURce:]FREQuency[:CW][:FIXed]

NOTE. This command exists for backwards compatibility. Use the command [CLOCK:SRATe](#).

This command sets or returns the clock sample rate of the AWG.

[[:CW]] and [[:FIXed]] are optional to provide legacy support but provide no added functionality.

Conditions This command is not valid when [CLOCK:SOURce](#) is set to EXternal.
This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

When synchronization is enabled and the instrument is not the master, this command is not available.

Group Source

Syntax [SOURce:]FREQuency[:CW] | [[:FIXed]] <frequency>
[SOURce:]FREQuency[:CW] | [[:FIXed]]?

Related Commands [CLOCK:SOURce](#)

Arguments <frequency>::= <NR3> value.

Range:	AWG70001	1.49 kS/s to 50 GS.
	AWG70002	1.49 kS/s to 25 GS.

*RST sets the frequency to 25 GHz.

Returns A single <NR3> value.

Examples SOURCE:FREQUENCY 10E6
*OPC?
sets the clock sample rate to 10 MS/s. The overlapping command is followed with an Operation Complete query.

SOURCE:FREQUENCY? might return 8.0000000000+E9, indicating that the clock sample rate is set to 8 GS/s.

[SOURce[n]:]POWer[:LEVel][:IMMediate][:AMPLitude]

This command sets or returns the amplitude for the waveform associated with the specified channel in units of dBm for the filtered path. This command is only valid when the output path is set to AC. Option AC is required.

If Option AC is not installed, sending the command causes an error message.

NOTE. *This command affects the AC output when the Output Path is set to AC. If the Output Path is set to Direct or DC Amplified, this command is cached for use when the Output Path is changed to AC. See the command [OUTPut\[n\]:PATH](#).*

Conditions	This is a blocking command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i> .)
Group	Source
Syntax	[SOURce[n]:]POWer[:LEVel][:IMMediate][:AMPLitude] <NRf> [SOURce[n]:]POWer[:LEVel][:IMMediate][:AMPLitude]?
Related Commands	OUTPut[n]:PATH
Arguments	A single <NRf> value. [n] determines the channel number. If omitted, interpreted as 1.
Returns	A single <NRf> value representing power ratio in dBm.
Examples	SOURCE1:POWER:LEVEL:IMMEDIATE:AMPLITUDE 44 sets the amplitude of channel 1 to 44 dBm. SOURCE1:POWER:LEVEL:IMMEDIATE:AMPLITUDE? might return 7.0000000000, indicating that the channel 1 amplitude level is set to 7 dBm.

[SOURce:]RCCouple

This command sets or returns the Coupled state (enabled or disabled) of the Run Mode control of a multi-channel instrument. The Run controls consist of the Run Mode and Trigger Input.

The set form of the command forces all channels to match channel 1.

After the initial coupling of the settings, changes made to the Run Mode of any channel affects all channels.

Group	Source
Syntax	[SOURce:]RCCouple {0 1 ON OFF}
Arguments	0 or OFF 1 or ON *RST sets this to 0.
Returns	A single <Boolean> value.
Examples	SOURCE:RCCOUPLE 1 sets the Run Control Coupled state to On. SOURCE:RCCOUPLE? might return 0, indicating that the Run Control Coupled state is Off.

[SOURce:]ROSCillator:MULTiplier

NOTE. This command exists for backwards compatibility. Use the command [CLOCK:EREFerence:MULTiplier](#).

This command sets or returns the multiplier of the external reference signal when the external reference is variable.

Conditions Setting the external reference multiplier rate forces the external reference divider rate to a value of 1.

This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

When synchronization is enabled and the instrument is not the master, this command is not available.

Group Source

Syntax [SOURce:]ROSCillator:MULTiplier <NR1>
[SOURce:]ROSCillator:MULTiplier?

Related Commands [CLOCK:EREFerence:MULTiplier](#)

Arguments A single <NR1> value.
Range: 1 to 1000 (limited by the maximum sample rate).

Returns A single <NR1> value.

Examples SOURCE:ROSCILLATOR:MULTIPLIER 50
*OPC?
sets the multiplier to 50. The overlapping command is followed with an Operation Complete query.

SOURCE:ROSCILLATOR:MULTIPLIER? might return 100.

[SOURce[n]:]CASSet? (Query Only)

This command returns the asset (waveform or sequence) assigned to the specified channel.

Group Source

Syntax [SOURce[n]:]CASSet?

Arguments [n] determines the channel number. If omitted, interpreted as 1.

Returns If a waveform is assigned to the channel, a single <string> value representing a waveform name is returned. If an I or Q component of an IQ waveform is assigned, then the returned <string> value includes an I or Q, separated by a comma. If a sequence is assigned to the channel, a single <string> value is returned representing the sequence name and the track number separated by a comma ("sequence_name,track_number"). If an I or Q component of an IQ sequence is assigned, the returned <string> value includes an I or Q, separated by a comma.

Examples SOURCE1:CASSET? might return "SINE100" if waveform "SINE100" is assigned to channel 1.

SOURCE1:CASSET? might return "SEQ100,1" if track 1 of SEQ100 is assigned to channel 1.

SOURCE1:CASSET? might return "IQ_Sequence,1,Q" if track 1 of IQ_Sequence is assigned to channel 1 and it is the Q component of the IQ sequence.

[SOURce[n]:]CASSet:SEQuence (No Query Form)

This command assigns a track of a sequence (from the sequence list) to the specified channel.

Conditions A sequence cannot mix real waveforms and IQ waveforms within the same track.
When synchronization is enabled and playing, this command is not available.

Group Source

Syntax [SOURce[n]:]CASSet:SEQuence <sequence_name>,
<track_number>[,<component_type>]

Arguments [n] determines the channel number. If omitted, interpreted as 1.
<sequence_name> ::= <string>
<track_number> ::= <NR1>

<component_type> ::= {I|Q} Use the component type to select either the I components or the Q components if the track contains IQ waveforms.

Examples SOURCE1:CASSET:SEQUENCE "Sequence10", 1 assigns track 1 of "Sequence10" to Channel 1.

SOURCE1:CASSET:SEQUENCE "My_IQ_seq", 1, Q assigns the Q waveforms in track 1 of "My_IQ_seq" to Channel 1.

[SOURce[n]:]CASSet:TYPE? (Query Only)

This command returns the type of the asset (waveform or sequence) assigned to a channel.

Group Source

Syntax [SOURce[n]:]CASSet:TYPE?

Arguments [n] determines the channel number. If omitted, interpreted as 1.

Returns WAV – a waveform is assigned to the specified channel.
 SEQ – a sequence is assigned to the specified channel.
 NONE – nothing is assigned to the specified channel.

Examples SOURCE1:CASSET:TYPE? might return WAV, indicating that a waveform is assigned to Channel 1.

[SOURce[n]:]CASSet:WAVEform (No Query Form)

This command assigns a waveform (from the waveform list) to the specified channel.

Conditions If the waveform is an IQ waveform, you can only assign either the I component or the Q component of the waveform to a channel. Trying to assign an IQ waveform directly to a channel results in an error.

When synchronization is enabled and playing, this command is not available.

Group Source

Syntax [SOURce[n]:]CASSet:WAVEform <wfm_name>[, <component_type>]

Arguments [n] determines the channel number. If omitted, interpreted as 1.
 <wfm_name>::=<string>
 <component_type> ::= {I|Q} Use the component type to select either the I component or the Q component of an IQ waveform.

Examples SOURCE1:CASSET:WAVEFORM "SINE100" assigns waveform "SINE100" to Channel 1.

SOURCE1:CASSET:WAVEFORM "My_IQ_waveform",Q assigns the Q component of the waveform named "My_IQ_waveform" to Channel 1.

[SOURce[n]:]DAC:RESolution

This command sets or returns the DAC resolution.

Conditions This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

When synchronization is enabled and playing, this command is not available.

Group Source

Syntax [SOURce[n]:]DAC:RESolution {8|9|10}
[SOURce[n]:]DAC:RESolution?

Arguments 8 indicates 8 bit DAC Resolution + 2 marker bits.
9 indicates 9 bit DAC Resolution + 1 marker bit.
10 indicates 10 bit DAC Resolution + 0 marker bits.
[n] determines the channel number. If omitted, interpreted as 1.
*RST sets this to 10.

Returns A single <NR1> value.

Examples SOURCE1:DAC:RESOLUTION 10
*OPC?
sets the Channel 1 DAC resolution to 10 bits + 0 marker bits. The overlapping command is followed with an Operation Complete query.

SOURCE1:DAC:RESOLUTION? might return 8, indicating that Channel 1 is set to 8 bit DAC resolution + 2 marker bits.

[SOURce[n]]:JUMP:FORCE (No Query Form)

This command forces the sequencer to jump to a specific sequence step for the specified channel. A force jump does not require a trigger event to execute the jump.

Conditions	<p>For multi-channel instruments, all channels playing the same sequence jump simultaneously to the same sequence step.</p> <p>This is a blocking command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i>.)</p>
Group	Source
Syntax	[SOURce[n]]:JUMP:FORCE {FIRSt CURRent LAST END <NR1>}
Arguments	<p>[n] determines the channel number. If omitted, interpreted as 1.</p> <p>FIRSt - This enables the sequencer to jump to first step in the sequence.</p> <p>CURRent - This enables the sequencer to jump to the current sequence step, essentially starting the current step over.</p> <p>LAST - This enables the sequencer to jump to the last step in the sequence.</p> <p>END - This enables the sequencer to go to the end and play 0 V until play is stopped.</p> <p><NR1> - This enables the sequencer to jump to the specified step, where the value is between 1 and 16383.</p>
Examples	<p>SOURCE1:JUMP:FORCE 240 specifies that Channel 1 will jump to step 240 at the end of the current sequence step or immediately, depending on the state of SLIST:SEquence:EVENT:JTIMing.</p> <p>SOURCE2:JUMP:FORCE CURRENT starts playing the current step on Channel 2 based on the SLIST:SEquence:EVENT:JTIMing value.</p>

[SOURce[n]]:JUMP:PATtern:FORCe (No Query Form)

This command generates an event, forcing the sequencer to the step specified by the pattern in the pattern jump table. If the sequence is playing on both channels, the force jump is applied to both channels simultaneously.

Group Source

Syntax [SOURce[n]]:JUMP:PATtern:FORCe <pattern>

Arguments <pattern>:=<NR1>. The values ranges between 0 and 255. This parameter specifies the event pattern to make an event jump. The pattern bits are mapped to the integer value as follows:

	MSB	LSB
Event bits	7 6 5 4 3 2 1 0	

Examples SOURCE2:JUMP:PATTERN:FORCE 15 jumps to the location chosen in the definition of event pattern 00001111 for channel 2.

If SLIST:SEQUENCE:EVENT:PJUMP:DEFINE "MySequence", 255, 4 and "MySequence" is playing, then SOURCE1:JUMP:PATtern:FORCe 255 the sequence will jump to step 4 for channel 1.

[SOURce[n]:]MARKer[m]:DELay

This command sets or returns the delay for the specified marker of the specified channel. Marker delay is independent for each channel.

Conditions This is a blocking command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Group Source

Syntax [SOURce[n]:]MARKer[m]:DELay <NR3>
[SOURce[n]:]MARKer[m]:DELay?

Related Commands [\[SOURce\[n\]:\]DAC:RESolution](#)

Arguments A single <NR3> value.
[n] determines the channel number. If omitted, interpreted as 1.
[m] determines the marker number. If omitted, interpreted as 1.
*RST sets all channel marker delays to 0.

Returns A single <NR3> value.

Examples SOURCE1:MARKER1:DELAY 20PS
sets the marker 1 delay for channel 1 to 20 picoseconds.
SOURCE1:MARKER1:DELAY? might return 10.0000000000E-12, indicating that marker 1 delay for channel 1 is set to 10 ps.

[SOURce[n]:]MARKer[m]:VOLTage[:LEVel][:IMMediate][:AMPLitude]

This command sets or returns the marker voltage amplitude of the specified marker of the specified channel.

NOTE. *The following commands may overwrite the values set with this command:*

[\[SOURce\[n\]:\]MARKer\[m\]:VOLTage\[:LEVel\]\[:IMMediate\]:HIGH,](#)
[\[SOURce\[n\]:\]MARKer\[m\]:VOLTage\[:LEVel\]\[:IMMediate\]:LOW,](#)
[\[SOURce\[n\]:\]MARKer\[m\]:VOLTage\[:LEVel\]\[:IMMediate\]:OFFSet](#)

Conditions This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands.*)

Group Source

Syntax [SOURce[n]:]MARKer[m]:VOLTage[:LEVel][:IMMediate][:
AMPLitude] <NRf>
[SOURce[n]:]MARKer[m]:VOLTage[:LEVel][:IMMediate][:
AMPLitude]?

Related Commands [\[SOURce\[n\]:\]DAC:RESolution,](#)
[\[SOURce\[n\]:\]MARKer\[m\]:VOLTage\[:LEVel\]\[:IMMediate\]:HIGH,](#)
[\[SOURce\[n\]:\]MARKer\[m\]:VOLTage\[:LEVel\]\[:IMMediate\]:LOW,](#)
[\[SOURce\[n\]:\]MARKer\[m\]:VOLTage\[:LEVel\]\[:IMMediate\]:OFFSet](#)

Arguments A single <NRf> value.

[n] determines the channel number. If omitted, interpreted as 1.
[m] determines the marker number. If omitted, interpreted as 1.

*RST sets this to 1 V for all markers.

Returns A single <NR3> value.

Examples SOURCE1:MARKER1:VOLTAGE:LEVel:IMMediate:AMPLITUDE 0.5V
*OPC?
sets the marker 1 amplitude to 500 mV for channel 1. The overlapping command is followed with an Operation Complete query.

SOURCE1:MARKER1:VOLTAGE:LEVel:IMMediate:AMPLITUDE? might return 500.0000000000E-3, indicating that the amplitude for marker 1 of channel 1 is set to 500 mV.

[SOURce[n]:]MARKer[m]:VOLTage[:LEVel][:IMMediate]:HIGH

This command sets or returns the marker high voltage level of the specified marker of the specified channel.

NOTE. *The following command may overwrite the values set with this command:*

[\[SOURce\[n\]:\]MARKer\[m\]:VOLTage\[:LEVel\]\[:IMMediate\]\[:AMPLitude\]](#)

Conditions	This is a blocking command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i> .)
Group	Source
Syntax	<pre>[SOURce[n]:]MARKer[m]:VOLTage[:LEVel][:IMMediate]:HIGH <NRf> [SOURce[n]:]MARKer[m]:VOLTage[:LEVel][:IMMediate]:HIGH?</pre>
Related Commands	[SOURce[n]:]DAC:RESolution , [SOURce[n]:]MARKer[m]:VOLTage[:LEVel][:IMMediate]:LOW , [SOURce[n]:]MARKer[m]:VOLTage[:LEVel][:IMMediate][:AMPLitude]
Arguments	<p>A single <NRf> value.</p> <p>Range: -1.4 V to 1.4 V.</p> <p>[n] determines the channel number. If omitted, interpreted as 1.</p> <p>[m] determines the marker number. If omitted, interpreted as 1.</p> <p>*RST sets all markers to 1 V.</p>
Returns	A single <NR3> value.
Examples	<p>SOURCE1:MARKER1:VOLTAGE:LEVel:IMMediate:HIGH 0.75 sets the channel 1, marker 1, high level to 750 mV.</p> <p>SOURCE1:MARKER1:VOLTAGE:LEVel:IMMediate:HIGH? might return 500.0000000000E-3, indicating the channel 1, marker 1, high level is set to 500 mV.</p>

[SOURce[n]:]MARKer[m]:VOLTage[:LEVel][:IMMediate]:LOW

This command sets or returns the marker low voltage level of the specified marker of the specified channel.

NOTE. *The following command may overwrite the values set with this command:*

[\[SOURce\[n\]:\]MARKer\[m\]:VOLTage\[:LEVel\]\[:IMMediate\]\[:AMPLitude\]](#)

Conditions	This is a blocking command. (See page 2-9, <i>Sequential, blocking, and overlapping commands.</i>)
Group	Source
Syntax	[SOURce[n]:]MARKer[m]:VOLTage[:LEVel][:IMMediate]:LOW <NRf> [SOURce[n]:]MARKer[m]:VOLTage[:LEVel][:IMMediate]:LOW?
Related Commands	[SOURce[n]:]DAC:RESolution , [SOURce[n]:]MARKer[m]:VOLTage[:LEVel][:IMMediate]:HIGH , [SOURce[n]:]MARKer[m]:VOLTage[:LEVel][:IMMediate][:AMPLitude]
Arguments	A single <NRf> value. Range: -1.4 V to 1.4 V. [n] determines the channel number. If omitted, interpreted as 1. [m] determines the marker number. If omitted, interpreted as 1. *RST sets this to 0 V.
Returns	A single <NR3> value.
Examples	SOURCE1:MARKER1:VOLTAGE:LEVel:IMMediate:LOW 0.5 sets the channel 1, marker 1, low level to 500 mV. SOURCE1:MARKER1:VOLTAGE:LEVel:IMMediate:LOW? might return 500.0000000000E-3, indicating that the channel 1, marker 1, low level is set to 500 mV.

[SOURce[n]:]MARKer[m]:VOLTage[:LEVel][:IMMediate]:OFFSet

This command sets or returns the offset voltage of the selected marker of the selected channel.

NOTE. The following command may overwrite the values set with this command:

[\[SOURce\[n\]:\]MARKer\[m\]:VOLTage\[:LEVel\]\[:IMMediate\]\[:AMPLitude\]](#)

Group Source

Syntax [SOURce[n]:]MARKer[m]:VOLTage[:LEVel][:IMMediate]:OFFSet
<NR3>
[SOURce[n]:]MARKer[m]:VOLTage[:LEVel][:IMMediate]:OFFSet?

Related Commands [\[SOURce\[n\]:\]DAC:RESolution](#),
[\[SOURce\[n\]:\]MARKer\[m\]:VOLTage\[:LEVel\]\[:IMMediate\]:HIGH](#),
[\[SOURce\[n\]:\]MARKer\[m\]:VOLTage\[:LEVel\]\[:IMMediate\]:LOW](#)

Arguments A single <NR3> value.

Range: –1.15 V to 1.15 V.
[n] determines the channel number. If omitted, interpreted as 1.
[m] determines the marker number. If omitted, interpreted as 1.

*RST sets this to 500 mV.

Returns A single <NR3> value.

Examples SOURCE1:MARKER1:VOLTAGE:LEVel:IMMediate:OFFSet 0.005 sets the channel 1, marker 1, offset to 5 mV.

SOURCE1:MARKER1:VOLTAGE:LEVel:IMMediate:OFFSet? might return 50.0000000000E-3, indicating that the channel 1, marker 1, offset is set to 50 mV.

[SOURce[n]:]RMODe

This command sets or returns the run mode of the specified channel.

Group Source

Syntax [SOURce[n]:]RMODe {CONTinuous|TRIGgered|TCONTinuous}
[SOURce[n]:]RMODe?

Related Commands [\[SOURce\[n\]:\]TINPut](#),
[*TRG](#)

Arguments CONTinuous sets the Run Mode to Continuous (not waiting for trigger).
TRIGgered sets the Run Mode to Triggered, waiting for a trigger event. One waveform play out cycle completes, then play out stops, waiting for the next trigger event.
TCONTinuous sets the Run Mode to Triggered Continuous, waiting for a trigger. Once a trigger is received, the waveform plays out continuously.
[n] determines the channel number. If omitted, interpreted as 1.

*RST sets this to CONT.

Returns CONT
TRIG
TCON

Examples SOURCE1:RMODe TRIG sets the AWG Run mode for channel 1 to wait for a trigger.

SOURCE1:RMODe? might return CONT, indicating that the Run mode for channel 1 is set to continuous.

[SOURce[n]:]SCSTep? (Query Only)

This command allows you to read the current step of the sequence while the system is running.

Conditions The return value is between 0 and 16383 or END. A 0 indicates that the sequence is not playing or is waiting for a trigger.

Group Source

Syntax [SOURce[n]:]SCSTep?

Arguments [n] determines the channel number. If omitted, interpreted as 1.

Returns <string>
END indicates the sequence has reached the end of the sequence and the outputs are defined by the Output Options for Sequence End.

Examples

- :SCST? might return 4, indicating that channel 1 is currently at step 4 of the sequencer.
- SOURCE2:SCSTEP? might return 12, indicating that channel 2 is currently at step 12 of the sequencer.
- SOURCE2:SCSTEP? might return Sequence_1, 2, indicating that channel 2 is currently at step 2 of the subsequence named Sequence_1.
- SOURCE1:SCSTEP? might return END, indicating that channel 1 is playing 0 V until the play ends.
- SOURCE1:SCSTEP? might return <Subsequence_Name>, <Step_Index> when playing out step <Step_Index> of subsequence <Sequence_Name>.

[SOURce[n]:]SKEW

This command sets or returns the skew (relative timing of the analog output) for the waveform associated with the specified channel.

Group	Source
Syntax	[SOURce[n]:]SKEW <skew> [SOURce[n]:]SKEW?
Arguments	<p><skew>::= <NR3> value.</p> <p>Range: -100 ps to +100 ps. Minimum increments is 0.5 ps. [n] determines the channel number. If omitted, interpreted as 1.</p> <p>*RST sets this to 0.</p>
Returns	A single <NR3> value.
Examples	<p>SOURCE2:SKEW 75PS sets the skew for channel 2 to 75 ps.</p> <p>SOURCE2:SKEW? might return 75.0000000000E-12, indicating that the skew for channel 2 is set to 75 ps.</p>

[SOURce[n]:]TINPut

This command sets or returns the trigger input source of the specified channel.

Group Source

Syntax [SOURce[n]:]TINPut {ITRigger|ATRigger|BTRigger}
[SOURce[n]:]TINPut?

Arguments ITRigger selects the internal trigger signal as the trigger source. (The A and B Force Trigger buttons are not active.)
ATRigger selects trigger input A.
BTRigger selects trigger input B.
[n] determines the channel number. If omitted, interpreted as 1.
*RST sets this to ATR.

Returns ATR
BTR

Examples SOURce1:TINPut BTRIGGER selects Trigger B as the external trigger input source for channel 1.

SOURce1:TINPut? might return BTR, indicating that Trigger B is the external trigger input source for channel 1.

[SOURce[n]:]VOLTage[:LEVel][:IMMediate][:AMPLitude]

This command sets or returns the amplitude for the waveform associated with a channel.

Conditions This command is only valid when the output path is set to DC Amplified or Direct. This is a blocking command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Group Source

Syntax [SOURce[n]:]VOLTage[:LEVel][:IMMediate][:AMPLitude] <NR3>
[SOURce[n]:]VOLTage[:LEVel][:IMMediate][:AMPLitude]?

Related Commands [OUTPut\[n\]:PATH](#)

Arguments A single <NR3> value.
[n] determines the channel number. If omitted, interpreted as 1.

Returns A single <NR3> value.

Examples SOURCE1:VOLTAGE:LEVel:IMMediate:AMPLITUDE 0.25
sets the output amplitude of channel 1 to 250 mV_{pp}.

SOURCE1:VOLTAGE:LEVel:IMMediate:AMPLITUDE? might return
350.0000000000E-3, indicating that the amplitude output for channel 1 is set
to 350 mV_{pp}.

[SOURce[n]:]VOLTage[:LEVel][:IMMediate]:HIGH

This command sets or returns the high voltage level for the waveform associated with the specified channel.

Conditions This command is only valid when the output path is set to Direct or DC Amplified. This is a blocking command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Group Source

Syntax [SOURce[n]:]VOLTage[:LEVel][:IMMediate]:HIGH <NRf>
[SOURce[n]:]VOLTage[:LEVel][:IMMediate]:HIGH?

Related Commands [\[SOURce\[n\]:\]VOLTage\[:LEVel\]\[:IMMediate\]:LOW](#)
[OUTPut\[n\]:PATH](#)

Arguments A single <NRf> value.
[n] determines the channel number. If omitted, interpreted as 1.
*RST sets this to 250 mV.

Returns A single <NR3> value.

Examples SOURCE1:VOLTAGE:LEVEL:IMMEDIATE:HIGH 0.125
sets the amplitude high of channel 1 to 125 mV.

SOURCE2:VOLTAGE:LEVEL:IMMEDIATE:HIGH? might return
250.0000000000E-3, indicating that the high voltage output voltage level for
channel 2 is set to 250 mV.

[SOURce[n]:]VOLTage[:LEVel][:IMMediate]:LOW

This command sets or returns the low voltage level for the waveform associated with a channel. This command is only valid when the output path is set to Direct.

Conditions This is a blocking command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Group Source

Syntax [SOURce[n]:]VOLTage[:LEVel][:IMMediate]:LOW <NRf>
[SOURce[n]:]VOLTage[:LEVel][:IMMediate]:LOW?

Related Commands [\[SOURce\[n\]:\]VOLTage\[:LEVel\]\[:IMMediate\]:HIGH](#)
[OUTPut\[n\]:PATH](#)

Arguments A single <NRf> value.
[n] determines the channel number. If omitted, interpreted as 1.
*RST sets this to -250 mV.

Returns A single <NR3> value.

Examples SOURCE1:VOLTage:LEVEL:IMMEDIATE:LOW -0.125
sets the amplitude low of Channel 1 to -125 mV.

SOURCE1:VOLTage:LEVEL:IMMEDIATE:LOW? might return
-250.000000000E-3, indicating that the low voltage output voltage level for
channel 1 is set to -250 mV.

[SOURce[n]:]VOLTage[:LEVel][:IMMediate]:OFFSet

This command sets or returns the offset for the waveform associated with the specified channel.

This command is only valid when the output path is set to DC Amplified.

Conditions This is a blocking command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Group Source

Syntax [SOURce[n]:]VOLTage[:LEVel][:IMMediate]:OFFSet <NRf>
[SOURce[n]:]VOLTage[:LEVel][:IMMediate]:OFFSet?

Related Commands [OUTPut\[n\]:PATH](#)

Arguments A single <NRf> value.
[n] determines the channel number. If omitted, interpreted as 1.)
Range: -400 mV to 800 mV. Reset sets it to 0 V.

Returns A single <NR3> value representing volts of offset.

Examples SOURCE1:VOLTAGE:LEVEL:IMMEDIATE:OFFSET 4.E-3 sets the offset for channel 1 to 4 mV.
SOURCE1:VOLTAGE:LEVEL:IMMEDIATE:OFFSET? might return 4.000000000E-3, indicating that the offset for channel 1 is set to 4 mV.

[SOURce[n]:]WAVEform

NOTE. This command exists for backwards compatibility. Use these commands to work with channel assignments:

*[SOURce[n]:]CASSet:WAVEform,
[SOURce[n]:]CASSet:SEQuence,
[SOURce[n]:]CASSet?*

This command sets or returns the name of the waveform assigned to the specified channel.

Conditions When synchronization is enabled and playing, this command is not available.

Group Source

Syntax [SOURce[n]:]WAVEform <wfm_name>
[SOURce[n]:]WAVEform?

Arguments <wfm_name> ::= <string>
[n] determines the channel number. If omitted, interpreted as 1.

Returns A single <string> value representing a waveform name.

Examples SOURCE1:WAVEFORM "SINE100" assigns waveform "Sine100" to channel 1.
SOURCE1:WAVEFORM? might return "Sine100".

***SRE**

This command sets or returns the bits in the Service Request Enable register. (See page 3-1, *Status and events*.)

Group IEEE mandated and optional

Syntax *SRE <NR1>
*SRE?

Related Commands [*CLS](#), [*ESE](#), [*ESR?](#), [*STB?](#)

Arguments A single <NR1> value.

Returns A single <NR1> value.

Examples *SRE 48 sets the bits in the SRER to the binary value 00110000.
*SRE? might return a value of 32, showing that the bits in the SRER have the binary value 00100000.

STATus:OPERation:CONDition? (Query Only)

This command returns the contents of the Operation Condition Register (OCR).

Group Status

Syntax STATus:OPERation:CONDition?

Returns A single <NR1> value showing the contents of the OCR.

Examples STATUS:OPERATION:CONDITION? might return 0, showing that the bits in the OCR have the binary value 0000000000000000.

STATus:OPERation:ENABLE

This command sets or returns the mask for the Operation Enable Register.

Conditions The most-significant bit cannot be set true.

Group Status

Syntax STATus:OPERation:ENABLE <NR1>
STATus:OPERation:ENABLE?

Arguments A single <NR1> value.
Range: 0 to 65535

Returns A single <NR1> value.

Examples STATUS:OPERATION:ENABLE 1 enables the Calibrating bit.

STATUS:OPERATION:ENABLE? might return 1, showing that the bits in the OENR have the binary value 00000000 00000001, which means that the Calibrating bit is valid.

STATus:OPERation[:EVENT]? (Query Only)

This command returns the contents of the Operation Event Register (OEVr). Reading the OEVr clears it.

Group Status

Syntax STATus:OPERation[:EVENT]?

Returns A single <NR1> value showing the contents of the OEVr.

Examples STATUS:OPERATION:EVENT? might return 1, showing that the bits in the OEVr have the binary value 00000000 00000001, which means that the CALibrating bit is set.

STATus:OPERation:NTRansition

This command sets or returns the negative transition filter value of the Operation Transition Register (OTR).

Conditions The most-significant bit cannot be set true.

Group Status

Syntax STATus:OPERation:NTRansition <bit_value>
STATus:OPERation:NTRansition?

Arguments <bit_value> ::= <NR1> is the negative transition filter value.
Range: 0 to 65535

Returns A single <NR1> value showing the contents of the OTR.

Examples STATUS:OPERATION:NTRANSITION 17 sets the negative transition filter value to 17.
STATUS:OPERATION:NTRANSITION? might return 17.

STATus:OPERation:PTRansition

This command sets or returns the positive transition filter value of the Operation Transition Register (OTR).

Conditions	The most-significant bit cannot be set true.
Group	Status
Syntax	STATus:OPERation:PTRansition <bit_value> STATus:OPERation:PTRansition?
Arguments	<bit_value> ::= <NR1> is the positive transition filter value. Range: 0 to 65535.
Returns	A single <NR1> value showing the contents of the OTR.
Examples	STATUS:OPERATION:PTRANSITION 0 sets the positive transition filter value to 17. STATUS:OPERATION:PTRANSITION? might return 0.

STATus:PRESet (No Query Form)

This command sets the Operation Enable Register (OENR) and Questionable Enable Register (QENR).

Group	Status
Syntax	STATus:PRESet
Examples	STATUS:PRESET resets the SCPI enable registers.

STATus:QUESTionable:CONDition? (Query Only)

This command returns the status of the Questionable Condition Register.

Group Status

Syntax STATus:QUESTionable:CONDition?

Related Commands [STATus:QUESTionable:ENABle](#), [STATus:QUESTionable\[:EVENT\]?](#)

Returns A single <NR1> value.

Examples STATus:QUESTIONABLE:CONDITION? might return 0.

STATus:QUEStionable:ENABle

This command sets or returns the enable mask of the Questionable Enable Register (QENR) which allows true conditions in the Questionable Event Register to be reported in the summary bit.

Refer to the Status and event reporting system section for additional information.

Group	Status
Syntax	<code>STATus:QUEStionable:ENABle <bit_value></code> <code>STATus:QUEStionable:ENABle?</code>
Arguments	<code><bit_value></code> ::= <code><NR1></code> is the enable mask of the QENR. Range: 0 to 65535.
Returns	A single <code><NR1></code> value showing the contents of the QENR.
Examples	<code>STATUS:QUESTIONABLE:ENABLE 64</code> enables the FREQuency bit. <code>STATUS:QUESTIONABLE:ENABLE?</code> might return 64, showing that the bits in the QENR have the binary value 00000000 00100000, which means that the FREQuency bit is valid.

STATus:QUESTionable[:EVENT]? (Query Only)

This command returns the contents of the Questionable Event Register (QEVr). Reading the QEVr clears it.

Refer to the Status and event reporting system section for additional information.

Group	Status
Syntax	STATus:QUESTionable[:EVENT]?
Returns	A single <NR1> value showing the contents of the QEVr.
Examples	STATus:QUESTIONABLE:EVENT? might return 64, showing that the bits in the QEVr have the binary value 00000000 00100000, which means that the FREQuency bit is set.

STATus:QUEStionable:NTRansition

This command sets or returns the negative transition filter value of the Questionable Transition Register (QTR).

Refer to the Status and event reporting system section for additional information.

Group Status

Syntax STATus:QUEStionable:NTRansition <bit_value>
STATus:QUEStionable:NTRansition?

Arguments <bit_value> ::= <NR1> is the negative transition filter value.
Range: 0 to 65535.

Returns A single <NR1> value showing the contents of the QTR.

Examples STATus:QUESTIONABLE:NTRANSITION 32 sets the negative transition filter value to 32.

STATus:QUESTIONABLE:NTRANSITION? might return 32, indicating the negative transition filter value is 32.

STATus:QUEStionable:PTRansition

This command sets or queries the positive transition filter value of the Questionable Transition Register (QTR).

Refer to the Status and event reporting system section for additional information.

Group	Status
Syntax	STATUS:QUEStionable:PTRansition <bit_value> STATUS:QUEStionable:PTRansition?
Arguments	<bit_value> ::= <NR1> is the positive transition filter value. Range: 0 to 65535.
Returns	A single <NR1> value showing the contents of the QTR.
Examples	STATUS:QUESTIONABLE:PTRANSITION 0 sets the positive transition filter value to 0. STATUS:QUESTIONABLE:PTRANSITION? might return 0, indicating that the positive transition filter value is 0.

***STB? (Query Only)**

This command returns the contents of Status Byte Register. (See page 3-1, *Status and events*.)

Group IEEE mandated and optional

Syntax *STB?

Related Commands [*CLS](#), [*ESE](#), [*ESR?](#), [*SRE](#)

Returns A single <NR1> value.

Examples *STB? might return 96, which indicates that the SBR contains the binary number 0110 0000.

SYNChronize:ADJust:[START] (No Query Form)

This command only performs a system sample rate calibration on the synchronized system. This command may take up to 3 minutes to complete.

Conditions This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

When synchronization is not enabled, this command is not available.

When synchronization is enabled and the instrument is not the master, this command is not available.

Group Synchronization

Syntax SYNChronize:ADJust:[START]

Examples SYNCHRONIZE:ADJUST:START starts the calibration on the synchronized system.

SYNChronize:CONFigure

This command configures the ports in a synchronized system and forces an initialization within the selected configuration.

Conditions	<p>This is an overlapping command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i>.)</p> <p>When synchronization is not enabled, this command is not available.</p> <p>When synchronization is enabled and the instrument is not the master, this command is not available.</p>
Group	Synchronization
Syntax	<p>SYNChronize:CONFigure <port_configuration> SYNChronize:CONFigure?</p>
Arguments	<p><port_configuration> ::= <NR1> (NR1 = Sum of Port 1, Port 2, Port 3 and Port 4)</p> <p>Where:</p> <p>Port 1 = 1 (shall always be on as Master of synchronized system) Port 2 = 2 if enabled, otherwise 0 Port 3 = 4 if enabled, otherwise 0 Port 4 = 8 if enabled, otherwise 0</p>
Returns	<NR1> ::= <port_configuration>
Examples	<p>SYNCHRONIZE:CONFIGURE 3 *OPC?</p> <p>enables Ports 1 and 2 in this synchronized system. The overlapping command is followed with an Operation Complete query.</p> <p>SYNCHRONIZE:CONFIGURE? might return 15, indicating that Ports 1, 2, 3, and 4 are enabled in this synchronized system.</p>

SYNChronize:DESKew:ABORt (No Query Form)

This command cancels a system deskew calibration.

Conditions This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

The command might take up to 10 minutes to cancel.

When synchronization is not enabled, this command is not available.

When synchronization is enabled and the instrument is not the master, this command is not available.

Group Synchronization

Syntax SYNChronize:DESKew:ABORt

Examples SYNCHRONIZE:DESKEW:ABORT
*OPC?
returns when deskew calibration is cancelled. The overlapping command is followed with an Operation Complete query.

SYNChronize:DESKew:[START] (No Query Form)

This command only performs a system deskew calibration.

Conditions This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

The command might take up to 30 minutes to complete.

When synchronization is not enabled, this command is not available.

When synchronization is enabled and the instrument is not the master, this command is not available.

Group Synchronization

Syntax SYNChronize:DESKew:[START]

Examples SYNCHRONIZE:DESKEW:START
*OPC?
returns when the deskew calibration is complete. The overlapping command is followed with an Operation Complete query.

SYNChronize:DESKew:STATe? (Query Only)

This command returns the state of the system deskew condition.

Conditions	<p>The command is only valid when synchronization is enabled and the instrument is the master.</p> <p>When synchronization is enabled and the instrument is not the master, the command returns 0.</p>
Group	Synchronization
Syntax	SYNChronize:DESKew:STATe?
Returns	<p>1, the deskew calibration is running.</p> <p>0, the deskew calibration is stopped, cancelled, complete, or when synchronization is disabled.</p>
Examples	SYNCHRONIZE:DESKEW:STATE? returns 0 when the deskew calibration is cancelled or complete.

SYNChronize:ENABle

This command enables or disables synchronization in the instrument.

Conditions	This is an overlapping command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i> .)
Group	Synchronization
Syntax	SYNChronize:ENABle {OFF ON 0 1} SYNChronize:ENABle?
Arguments	OFF or 0 disables synchronization. OFF or 0 is the default value. ON or 1 enables synchronization.
Returns	A single <Boolean> value.
Examples	<pre>SYNCHRONIZE:ENABLE ON *OPC?</pre> enables synchronization in the instrument to be part of a synchronized system. The overlapping command is followed with an Operation Complete query. SYNCHRONIZE:ENABLE? might return 0, indicating that synchronization is not enabled.

SYNChronize:TYPE? (Query Only)

This command returns the instrument type (master or slave) in the synchronized system.

Conditions This command is not active until synchronization enable has completed.

Group Synchronization

Syntax SYNChronize:TYPE?

Returns MAST when synchronization is enabled and the instrument is the master of the synchronized system.
SLAV when synchronization is enabled and the instrument is a slave in the synchronized system.
UNKN when the instrument is unknown in the synchronized system. This indicates synchronization has not been enabled or a possible cable connection problem.

Examples SYNCHRONIZE:TYPE? returns MAST indicating synchronization is enabled and the instrument is the master.

SYSTem:DATE

This command sets or returns the system date. When the values are nonintegers, they are rounded off to nearest integral values.

Group	System
Syntax	SYSTem:DATE <year>,<month>,<day>
Arguments	<year>::=<NR1> (Four digit number) <month>::=<NR1> from 1 to 12 <day>::=<NR1> from 1 to 31
Returns	<year>,<month>,<day>
Examples	SYSTEM:DATE 2012,11,20 sets the date to November 20, 2012.

SYSTem:ERRor:ALL? (Query Only)

This command returns the error and event queue for all the unread items and removes them from the queue.

Group	System
Syntax	SYSTem:ERRor:ALL?
Returns	<ecode>,"<edesc>[;<einfo>]" {,<ecode>,"<edesc>[;<einfo>"]}
	Where: <ecode> ::= <NR1> is the error/event code. <edesc> ::= <string> is the description on the error/event. <einfo> ::= <string> is the detail of the error/event. If the queue is empty, the response is 0, "No error".
Examples	SYSTEM:ERROR:ALL? might return -113, "Undefined header", indicating the command was not a recognized command.

SYSTem:ERRor:CODE:ALL? (Query Only)

This command returns the error and event queue for the codes of all the unread items and removes them from the queue.

Group	System
Syntax	SYSTem:ERRor:CODE:ALL?
Returns	<ecode>{,<ecode>} Where: <div style="margin-left: 40px;"> <ecode> ::= <NR1> is the error/event code. If the queue is empty, the response is 0. </div>
Examples	SYSTEM:ERROR:CODE:ALL? might return -101,-108.

SYSTem:ERRor:CODE[:NEXT]? (Query Only)

This command returns the error and event queue for the next item and removes it from the queue.

Group	System
Syntax	SYSTem:ERRor:CODE[:NEXT]?
Returns	<ecode> ::= <NR1> is the error and event code.
Examples	SYSTEM:ERROR:CODE:NEXT? might return -101.

SYSTem:ERRor:COUNT? (Query Only)

This command returns the error and event queue for the number of unread items.

Group	System
Syntax	SYSTem:ERRor:COUNT?
Returns	<enum> ::= <NR1> is the number of errors/events. If the queue is empty, the response is 0.
Examples	SYSTEM:ERROR:COUNT? might return 3.

SYSTem:ERRor:DIALog

This command enables or disables error dialogs from displaying on the UI when an error condition occurs on the AWG.

Group	System
Syntax	SYSTem:ERRor:DIALog <show_dialog> SYSTem:ERRor:DIALog?
Arguments	<show_dialog> ::= <Boolean> 0 hides the error dialogs. 1 displays the error dialogs. *RST sets this value to 1.
Returns	A single <NR1> value.
Examples	SYSTEM:ERROR:DIALOG 0 hides the error dialogs from display. SYSTEM:ERROR:DIALOG? might return 1, indicating that error messages will be displayed on the AWG.

SYSTem:ERRor[:NEXT]? (Query Only)

This command returns data from the error and event queues.

Group	System
Syntax	SYSTem:ERRor[:NEXT]?
Returns	<Error number>, <error description> Error number <NR1>. error description <string>.
Examples	SYSTEM:ERROR:NEXT? might return 0, "No error", indicating there are not errors.

SYSTem:SID:GATeway

This command sets or returns the gateway address of the Streaming ID Ethernet port.

Conditions The Streaming license (STRID) must be installed.

Group System

Syntax SYSTem:SID:GATeway <address>
SYSTem:SID:GATeway?

Arguments <address>::= A single <string> value in IPv4 format.

Returns A single <string> value.

Examples SYSTem:SID:GATeway "123.45.6.77" to set gateway address of the Streaming ID port.

SYSTem:SID:GATeway? might return "129.45.22.131" as the Streaming ID Ethernet port gateway address.

SYSTem:SID:IP

This command sets or returns the IP address of the Streaming ID Ethernet port.

Conditions The Streaming license (STRID) must be installed.

Group System

Syntax SYSTem:SID:IP <address>
SYSTem:SID:IP?

Arguments <address>::= A single <string> value in IPv4 format.

Returns A single <string> value.

Examples SYSTem:SID:IP "123.45.6.7" to set IP address of the Streaming ID port.
SYSTem:SID:IP? might return "129.45.2.31" as the Streaming ID Ethernet port IP address.

SYSTem:SID:MAC? (Query Only)

This command returns the MAC address of the Streaming ID port.

Group System

Syntax SYSTem:SID:MAC?

Returns A single <string> value.

Examples SYSTem:SID:MAC? might return "08:00:11:FF:02:E6" as the Streaming ID port MAC address.

SYSTem:TIME

This command sets or returns the system time (hours, minutes and seconds). This command is equivalent to the time setting through the Windows Control Panel.

Group System

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

Arguments <hour>,<minute>,<second>

 <hour> ::= <NR1> specifies the hours. Range: 0 to 23.
 <minute> ::= <NR1> specifies the minutes. Range: 0 to 59.
 <second> ::= <NR1> specifies the seconds. Range: 0 to 59.

Returns <hour>,<minute>,<second>

 <hour> ::= <NR1> specifies the hours.
 <minute> ::= <NR1> specifies the minutes.
 <second> ::= <NR1> specifies the seconds.
 These values are rounded to the nearest integer.

Examples SYSTem:TIME 10,15,30 sets the time to 10:15:30.
 SYSTem:TIME? might return 12,20,32, indicating the system time is 12:20:32.

SYSTem:VERSion? (Query Only)

This command returns the SCPI version number to which the command conforms.

Group	System
Syntax	SYSTem:VERSion?
Returns	A single <NR2> value. <NR2> ::= YYYY.V where YYYY is the year version and V is revision number for that year.
Examples	SYSTEM:VERSION? might return 1999.0.

*TRG (No Query Form)

This command generates a trigger event for Trigger A only. This is equivalent to pressing the Trig A button on front panel.

Conditions	This is a blocking command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i> .) When synchronization is enabled and the instrument is not the master, this command is not available.
Group	IEEE mandated and optional
Syntax	*TRG
Related Commands	TRIGger[:IMMediate]
Examples	*TRG generates a trigger event.

TRIGger[:IMMediate] (No Query Form)

This command generates a trigger A or B event.

If a trigger is not specified, the command is then equivalent to the [*TRG](#) command.

Conditions This is a blocking command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

When synchronization is enabled and the instrument is not the master, this command is not available.

Group Trigger

Syntax TRIGger[:IMMediate] {ATRigger|BTRigger}

Related Commands [*TRG](#)
[\[SOURce\[n\]:\]TINPut](#)

Arguments ATRigger
BTRigger

Defaults to trigger A if not specified.

Examples TRIGGER:IMMEDIATE ATRIGGER generates a trigger A event.

TRIGger:IMPedance

This command sets or returns the external trigger impedance. It applies only to the external trigger.

Conditions	When synchronization is enabled and the instrument is not the master, this command is not available.
Group	Trigger
Syntax	TRIGger:IMPedance <impedance>[,<input_trigger>] TRIGger:IMPedance? [<input_trigger>]
Arguments	<impedance> ::= <NR1> the value will be 50 or 1000. <input_trigger> ::= {ATRigger BTRigger}, Defaults to trigger A if not specified. *RST sets this to 50.
Returns	<NR1>
Examples	TRIGGER:IMPEDANCE 50 selects 50 Ω impedance for the external trigger A input. TRIGGER:IMPEDANCE 50,BTRIGGER selects 50 Ω impedance for the external trigger B input. TRIGGER:IMPEDANCE? BTRIGGER might return 1000, indicating impedance for external trigger B input is set to 1 k Ω .

TRIGger:INTERval

This command sets or returns the internal trigger interval.

Conditions	When synchronization is enabled and the instrument is not the master, this command is not available.
Group	Trigger
Syntax	TRIGger:INTERval <NR3> TRIGger:INTERval?
Arguments	A single <NR3> value. Range: 1 μ s to 10 s.
Returns	A single <NR3> value.
Examples	TRIGGER:INTERVAL 5E-6 sets the internal trigger interval to 5 μ s. TRIGGER:INTERVAL? might return 8.0000000000E-3, indicating 8 μ s.

TRIGger:LEVel

This command sets or returns the external trigger input level (threshold).

Conditions When synchronization is enabled and the instrument is not the master, this command is not available.

Group Trigger

Syntax TRIGger:LEVel <NRf>[,ATRigger|BTRigger]
TRIGger:LEVel? [ATRigger|BTRigger]

Related Commands [TRIGger:SOURce](#)

Arguments A single <NRf> value.
Range: -5 V to 5 V.

ATRigger selects trigger input A.
BTRigger selects trigger input B.
Defaults to ATR if not specified.

*RST sets this to 1.4 V.

Returns A single <NRf> value.

Examples TRIGGER:LEVEL 0.2 sets the trigger A level to 200 mV.

TRIGGER:LEVEL? ATRIGGER might return 200.0000000000E-3, indicating the Trigger A input level is 200 mV.

TRIGger:MODE

This command sets or returns the trigger timing used when an external trigger source is being used.

Conditions	<p>The trigger run mode must be set to Triggered or Trig'd Continuous.</p> <p>When synchronization is enabled and the instrument is the master, the command choice is limited to SYNChronous.</p> <p>When synchronization is enabled and the instrument is not the master, this command is not available.</p>
Group	Trigger
Syntax	<pre>TRIGger:MODE {SYNChronous ASYNchronous}[,<input_trigger>] TRIGger:MODE? <input_trigger></pre>
Arguments	<p>SYNChronous: Synchronous triggering. This is the recommended trigger type when using the Sync Clock Out to synchronize with external devices.</p> <p>ASYNchronous: Asynchronous triggering. This is the fastest triggering type.</p> <p><input_trigger> ::= {ATRigger BTRigger}</p> <p>Defaults to trigger A if not specified.</p> <p>*RST sets this to ASYNchronous.</p>
Returns	ASYN SYNC
Examples	<p>TRIGGER:MODE ASYNCHRONOUS sets the trigger timing to asynchronous type.</p> <p>TRIGGER:MODE? might return ASYN, indicating that the trigger mode is set to Asynchronous triggering.</p>

TRIGger:SLOPe

This command sets or returns the polarity of the external trigger slope. Use this command to set the polarity in modes other than gated mode.

Conditions When synchronization is enabled and the instrument is not the master, this command is not available.

Group Trigger

Syntax TRIGger:SLOPe {POSitive|NEGative}[,<input_trigger>]
TRIGger:SLOPe? [<input_trigger>]

Related Commands [TRIGger:SOURce](#)

Arguments POSitive specifies a trigger on the rising edge of the external trigger signal. NEGative specifies a trigger on the falling edge of the external trigger signal. <input_trigger> ::= {ATRigger|BTRigger}, defaults to ATR if not specified.

*RST sets all external trigger slopes to POSitive.

Returns POS
NEG

Examples TRIGGER:SLOPE NEGATIVE selects the Negative slope for Trigger A.
TRIGGER:SLOPE NEGATIVE,BTRIGGER selects the Negative slope for Trigger B.
TRIGGER:SLOPE? ATRIGGER might return POS for Trigger A.

TRIGger:SOURce

This command sets or returns the trigger source.

NOTE. *This command exists for backwards compatibility. Use the command [\[SOURce\[n\]:\]TINPut](#).*

Conditions	When synchronization is enabled and the instrument is not the master, this command is not available.
Group	Trigger
Syntax	TRIGger:SOURce {EXTeRna1 INTeRna1} TRIGger:SOURce?
Arguments	EXTeRna1 selects external trigger as the trigger source. INTeRna1 select internal interval timing as the trigger source. *RST sets this to EXT.
Returns	EXT INT
Examples	TRIGGER:SOURCE EXTERNAL selects the internal interval timing as the trigger source. TRIGGER:SOURCE? might return EXT, indicating the trigger source is set to external trigger.

TRIGger:WVALue

NOTE. This command exists for backwards compatibility. Use the commands [OUTPut\[n\]:WVALue\[:ANALog\]\[:STATe\]](#) and [OUTPut\[n\]:WVALue:MARKer\[m\]](#).

This command sets or returns the channel's output state when in the Waiting-for-trigger mode.

This value is applied to all channels and markers.

Group	Trigger
Syntax	TRIGger:WVALue {FIRST} TRIGger:WVALue?
Related Commands	OUTPut[n]:WVALue[:ANALog][:STATe] , OUTPut[n]:WVALue:MARKer[m]
Arguments	FIRST specifies the first value of the waveform as the output level. *RST sets this to ZERO.
Returns	FIRS: Output is set to the first value of the waveform ZERO: Output is set to zero volts.
Examples	TRIGGER:WVALUE FIRST selects the first value of the waveform as the output level. TRIGGER:WVALUE? might return FIRS, indicating that the trigger value while in the wait state is set to the first value of the waveform.

*TST? (Query Only)

This command executes the Power On Self Test (POST) and returns the results. Use [DIAGnostic:RESult?](#) to retrieve more detailed error information.

Group IEEE mandated and optional

Syntax *TST?

Related Commands [DIAGnostic\[:IMMediate\]](#), [DIAGnostic:DATA?](#), [DIAGnostic:RESult?](#)

Returns A single <NR1> value.
A returned value of 0 indicates no error.

Examples *TST? might return -330, indicating that the self test failed.

*WAI (No Query Form)

This command is used to ensure that the previous command is complete before the next command is issued.

(See page 2-9, *Sequential, blocking, and overlapping commands*.)

Group IEEE mandated and optional

Syntax *WAI

Related Commands [*OPC](#)

Examples Assuming that you want to use the DIAG:START command, followed by the DIAG:RES? command. To ensure the DIAG:START command finishes before starting the next command, insert the *WAI command between the two commands, such as:

```
DIAG:START
*WAI
DIAG:RES?
```

WLISt:LAST? (Query Only)

This command returns the name of the most recently added waveform in the waveform list.

Group	Waveform
Syntax	WLISt:LAST?
Returns	<string> ::= <wfm_name>
Examples	WLISt:LAST? might return "waveform2", indicating this was the last waveform added to the waveform list..

WLISt:LIST? (Query Only)

This command returns a list of all waveform names in the waveform list.

Group	Waveform
Syntax	WLISt:LIST?
Returns	<string> ::= <wfm_name>,<wfm_name> is the waveform name specified by <index>.
Examples	WLISt:LIST? 21 might return "waveform1,waveform2".

WLIST:NAME? (Query Only)

This command returns the waveform name from the waveform list at the position specified by the index value.

Group Waveform

Syntax WLIST:NAME? <Index>

Arguments <Index> ::= <NR1>

Returns <string> ::= <wfm_name>.

Examples WLIST:NAME? 21 might return "waveform21" as the name of the waveform located at index of the waveform list.

WLIST:SIZE? (Query Only)

This command returns the number of waveforms in the waveform list.

Group Waveform

Syntax WLIST:SIZE?

Returns A single <NR1> value.

Examples WLIST:SIZE? might return 2, indicating there are two waveforms in the waveform list.

WLIS:SPARAmeter:APPLY (No Query Form)

This command applies S-Parameters to a waveform that exists in the waveform list of the current setup.

Conditions This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Requires an S-Parameters license.

Group S-Parameters

Syntax WLIS:SPARAmeter:APPLY <file_path>

Arguments <file_path> ::= <string>

Examples WLIS:SPARAMETER:APPLY "MyWaveform25" applies the S-parameter settings to the waveform named MyWaveform25 in the waveform list.

WLIS:SPARAmeter:BANDwidth

This command sets or returns the S-Parameter bandwidth when setting manually.

Conditions Requires an S-Parameters license.

Group S-Parameters

Syntax WLIS:SPARAmeter:BANDwidth {FULL|<bandwidth>}
WLIS:SPARAmeter:BANDwidth?

Related Commands [WLIS:SPARAmeter:BANDwidth:AUTO](#)

Arguments FULL – The bandwidth is set to $\frac{1}{2}$ of the waveform's sample rate (i.e. Nyquist Frequency).
<bandwidth>::= <NR3>
Range: 1 Hz to $\frac{1}{2}$ of the maximum sample rate of the instrument.
If the set Bandwidth is greater than the Nyquist (Sample rate of the waveform/2), then the software limits the bandwidth to $\frac{1}{2}$ of the waveform's sample rate.

Returns FULL
A single <NR3> value.

Examples WLIS:SPARAMETER:BANDWIDTH 60E6 sets the S-Parameter Bandwidth Value to 60 MHz.
WLIS:SPARAMETER:BANDWIDTH? might return 1.000000000E+9, indicating the S-Parameter Bandwidth is set to 1 GHz.

WLIS:SPARAmeter:BANDwidth:AUTO

This command sets or returns the S-Parameter automatic bandwidth calculation setting. The bandwidth is defined at the point where the signal rolls off to –60 dB. If this results in a bandwidth greater than the instrument supports, the bandwidth is set to ½ of the waveform’s sample rate (i.e. Nyquist Frequency).

Conditions Requires an S-Parameters license.

Group S-Parameters

Syntax WLIS:SPARAmeter:BANDwidth:AUTO {0|1|OFF|ON}
WLIS:SPARAmeter:BANDwidth:AUTO?

Related Commands [WLIS:SPARAmeter:BANDwidth](#)

Arguments ON or 1 enables automatic bandwidth calculation. ON or 1 is the default value.
OFF or 0 disables automatic bandwidth calculation and sets the Bandwidth setting to Manual, requiring a value.

Returns A single <Boolean> value.

Examples WLIS:SPARAMETER:BANDWIDTH:AUTO 0 disables the S-Parameter automatic bandwidth calculation and sets it to use a manual value.
WLIS:SPARAMETER:BANDWIDTH:AUTO? might return 1, indicating the S-Parameter automatic bandwidth calculation is enabled.

WLIS:SPARAmeter:CASCading:AGGRessor2[:ENABle]

This command sets or returns whether the aggressor 2 signal type state (enabled or disabled) in Cascading mode. Aggressor2 signals are available when the number of ports is set to 12.

Conditions S-Parameter Mode must be set to Cascading.
Number of Ports must be set to 12.
Requires an S-Parameters license.

Group S-Parameters

Syntax WLIS:SPARAmeter:CASCading:AGGRessor2[:ENABle] {0|1|ON|OFF}
WLIS:SPARAmeter:CASCading:AGGRessor2[:ENABle]?

Related Commands [WLIS:SPARAmeter:MODE](#)

Arguments OFF or 0 disables the aggressor 2 signal type. OFF or 0 is the default value.
ON or 1 enables the aggressor 2 signal type.

Returns A single <Boolean> value.

Examples WLIS:SPARAMETER:CASCADING:AGGRESSOR2:ENABLE ON enables the aggressor 2 signal type, in Cascading mode.

WLIS:SPARAMETER:CASCADING:AGGRESSOR2:ENABLE? might return 0, indicating that the aggressor 2 signal type is disabled, in Cascading mode.

WLISt:SPARAmeter:CASCading:AGGRessor[n]:AMPLitude

This command sets or returns the specified Aggressor's amplitude, in Cascading mode.

Conditions S-Parameter Mode must be set to Cascading.
 Number of ports must be either 8 or 12.
 Requires an S-Parameters license.

Group S-Parameters

Syntax WLISt:SPARAmeter:CASCading:AGGRessor[n]:AMPLitude
 <amplitude>
 WLISt:SPARAmeter:CASCading:AGGRessor[n]:AMPLitude?

Related Commands [WLISt:SPARAmeter:MODE](#)

Arguments [n] ::= {1|2} ("n" determines the aggressor signal (1 or 2). 2 is only valid if the number of ports is set to 12.)
 If omitted, n is interpreted as 1.
 <amplitude> ::= <NRf>

Returns A single <NR3> value.

Examples WLISt:SPARAMETER:CASCADING:AGGRESSOR1:AMPLITUDE 200E-3 sets the first Aggressor's amplitude to 200 mV, in Cascading mode.
 WLISt:SPARAMETER:CASCADING:AGGRESSOR2:AMPLITUDE? might return 100.0000000000E-3, indicating that the 2nd Aggressor's amplitude is set to 100 mV, in Cascading mode.

WLIS:SPARAmeter:CASCading:AGGRessor[n]:CTALk

This command sets or returns the specified Aggressor's crosstalk type, in Cascading mode.

Conditions S-Parameter Mode must be set to Cascading.
Number of ports must be either 8 or 12.
Requires an S-Parameters license.

Group S-Parameters

Syntax WLIS:SPARAmeter:CASCading:AGGRessor[n]:CTALk
{NEXT|FEXT|BOTH}
WLIS:SPARAmeter:CASCading:AGGRessor[n]:CTALk?

Related Commands [WLIS:SPARAmeter:MODE](#)

Arguments [n] ::= {1|2} ("n" determines the aggressor signal (1 or 2). 2 is only valid if the number of ports is set to 12.)
If omitted, n is interpreted as 1.
NEXT – Near-End Crosstalk
FEXT – Far-End Crosstalk
BOTH – Near and Far-End Crosstalk

Returns NEXT
FEXT
BOTH

Examples WLIS:SPARAMETER:CASCADING:AGGRESSOR1:CTALK FEXT sets the first Aggressor's Crosstalk type to Far End Crosstalk, in Cascading mode.
WLIS:SPARAMETER:CASCADING:AGGRESSOR2:CTALK? might return NEXT, indicating that the 2nd Aggressor crosstalk type is set to Far End Crosstalk, in Cascading mode.

WLIS:SPARAmeter:CASCading:AGGRessor[n]:DRATe

This command sets or returns the specified Aggressor's data rate, in Cascading mode.

Conditions S-Parameter Mode must be set to Cascading.
 Number of ports must be either 8 or 12.
 Requires an S-Parameters license.

Group S-Parameters

Syntax WLIS:SPARAmeter:CASCading:AGGRessor[n]:DRATe <data_rate>
 WLIS:SPARAmeter:CASCading:AGGRessor[n]:DRATe?

Related Commands [WLIS:SPARAmeter:MODE](#)

Arguments [n] ::= {1|2} ("n" determines the aggressor signal (1 or 2). 2 is only valid if the number of ports is set to 12.)

If omitted, n is interpreted as 1.

<data_rate> ::= <NRf>

Returns A single <NR3> value.

Examples WLIS:SPARAMETER:CASCADING:AGGRESSOR1:DRATE 4E9 sets the first Aggressor's data rate to 4 Gbps, in Cascading mode.

WLIS:SPARAMETER:CASCADING:AGGRESSOR2:DRATE? might return 500.0000000000E+3, indicating that the 2nd Aggressor's data rate is set to 500 kbps, in Cascading mode.

WLIS:SPARAmeter:CASCading:AGGRessor[n]:SIGNal

This command sets or returns specified Aggressor's signal type, in Cascading mode.

Conditions S-Parameter Mode must be set to Cascading.
Number of ports must be either 8 or 12.
Requires an S-Parameters license.

Group S-Parameters

Syntax WLIS:SPARAmeter:CASCading:AGGRessor[n]:SIGNal
{CLOCK|PRBS|FILE|SAVictim}
WLIS:SPARAmeter:CASCading:AGGRessor[n]:SIGNal?

Related Commands [WLIS:SPARAmeter:MODE](#)
[WLIS:SPARAmeter:CASCading:AGGRessor\[n\]:SIGNal:FILE](#)

Arguments [n] ::= {1|2} ("n" determines the aggressor signal (1 or 2). 2 is only valid if the number of ports is set to 12.)

If omitted, n is interpreted as 1.

CLOCK – Indicates that the aggressor signal is a clock pattern.

PRBS – Indicates that the aggressor signal is a PRBS pattern. You also must set the PRBS type.

FILE – Aggressor is set to use a file. You must set the file path.

SAVictim – Aggressor is the same as the victim.

Returns CLOC
PRBS
FILE
SAV

Examples WLIS:SPARAMETER:CASCADING:AGGRESSOR1:SIGNAL SAVICTIM sets the aggressor signal to be the same as the victim, in Cascading mode.

WLIS:SPARAMETER:CASCADING:AGGRESSOR2:SIGNAL? might return FILE, indicating that 2nd Aggressor has a signal type set to use a file, in Cascading mode.

WLISt:SPARAmeter:CASCading:AGGRessor[n]:SIGNal:FILE

This command sets or returns the filepath to the aggressor file for the specified Aggressor, in Cascading mode.

Conditions S-Parameter Mode must be set to Cascading.
 Number of ports must be either 8 or 12.
 Aggressor signal type must be File.
 Requires an S-Parameters license.

Group S-Parameters

Syntax WLISt:SPARAmeter:CASCading:AGGRessor[n]:SIGNal:FILE
 <filepath>
 WLISt:SPARAmeter:CASCading:AGGRessor[n]:SIGNal:FILE?

Related Commands [WLISt:SPARAmeter:MODE](#)
[WLISt:SPARAmeter:CASCading:AGGRessor\[n\]:SIGNal](#)

Arguments [n] ::= {1|2} ("n" determines the aggressor signal (1 or 2). 2 is only valid if the number of ports is set to 12.)
 If omitted, n is interpreted as 1.
 <filepath> ::= <string>

Returns <filepath> ::= <string>

Examples WLISt:SPARAMETER:CASCADING:AGGRESSOR1:SIGNAL:FILE
 "C:\temp\myFile.s12p" sets the first Aggressor's file and filepath when the aggressor is set to use a file, in Cascading mode.
 WLISt:SPARAMETER:CASCADING:AGGRESSOR2:SIGNAL:FILE? might return
 "C:\temp\myFile.s12p" indicating that the 2nd Aggressor has a signal type filepath set to "C:\temp\myFile.s12p", in Cascading mode.

WLIS:SPARAmeter:CASCading:AGGRessor[n]:SIGNal:PRBS

This command sets or returns the specified Aggressor's PRBS signal type, in Cascading mode.

Conditions	<p>S-Parameter Mode must be set to Cascading.</p> <p>Number of ports must be either 8 or 12.</p> <p>Aggressor signal type must be PRBS.</p> <p>Requires an S-Parameters license.</p>
Group	S-Parameters
Syntax	<pre>WLIS:SPARAmeter:CASCading:AGGRessor[n]:SIGNal:PRBS {PRBS7 PRBS9 PRBS15 PRBS16 PRBS20 PRBS21 PRBS23 PRBS29 PRBS31} WLIS:SPARAmeter:CASCading:AGGRessor[n]:SIGNal:PRBS?</pre>
Related Commands	<p>WLIS:SPARAmeter:MODE</p> <p>WLIS:SPARAmeter:CASCading:AGGRessor[n]:SIGNal</p>
Arguments	<p>[n] ::= {1 2} (“n” determines the aggressor signal (1 or 2). 2 is only valid if the number of ports is set to 12.)</p> <p>If omitted, n is interpreted as 1.</p> <p>Patterns available include: PRBS7, PRBS9, PRBS15, PRBS16, PRBS20, PRBS21, PRBS23, PRBS29, PRBS31</p>
Returns	PRBS7, PRBS9, PRBS15, PRBS16, PRBS20, PRBS21, PRBS23, PRBS29, PRBS31
Examples	<p>WLIS:SPARAMETER:CASCADING:AGGRESSOR1:SIGNAL:PRBS PRBS31 sets the first Aggressor's Signal type's PRBS value to PRBS31, in Cascading mode.</p> <p>WLIS:SPARAMETER:CASCADING:AGGRESSOR2:SIGNAL:PRBS? might return PRBS15, indicating that the 2nd Aggressor has a signal type PRBS value set to PRBS15, in Cascading mode.</p>

WLIS:SPARAmeter:CASCading:DEEMbed

This command sets or returns whether the Cascading S-Parameters is to de-embed (invert) the S-Parameters, in Cascading mode.

Conditions S-Parameter Mode must be set to Cascading.
Requires an S-Parameters license.

Group S-Parameters

Syntax WLIS:SPARAmeter:CASCading:DEEMbed {0|1|OFF|ON}
WLIS:SPARAmeter:CASCading:DEEMbed?

Related Commands [WLIS:SPARAmeter:MODE](#)

Arguments OFF or 0 disables de-embedding. OFF or 0 is the default value.
ON or 1 enables de-embedding.

Returns A single <Boolean> value.

Examples WLIS:SPARAMETER:CASCADING:DEEMBED 1 will de-embed the S-Parameters for Cascading mode.

WLIS:SPARAMETER:CASCADING:DEEMBED? might return 0, indicating that S-Parameters will not be de-embedded for Cascading mode.

WLIS:SPARAmeter:CASCading:STAGe[m]:DRX[n]

This command sets or returns the S-Parameter port assignment of the specified Stage and the channel's specified receiver port number (Rx-Port) in Cascading mode and Differential Signalling Scheme (where applicable).

Conditions	<p>S-Parameter Mode must be set to Cascading.</p> <p>S-Parameter Signalling Scheme must be set to Differential (where applicable).</p> <p>Requires an S-Parameters license.</p>
Group	S-Parameters
Syntax	<pre>WLIS:SPARAmeter:CASCading:STAGe[m]:DRX[n] <port_number> WLIS:SPARAmeter:CASCading:STAGe[m]:DRX[n]?</pre>
Related Commands	<p>WLIS:SPARAmeter:MODE</p> <p>WLIS:SPARAmeter:CASCading:STYPe</p> <p>WLIS:SPARAmeter:CASCading:TYPE</p> <p>WLIS:SPARAmeter:CASCading:STAGe[m]:DTX[n]</p>
Arguments	<p>[m] ::= {1 2 3 4 5 6}. A variable value to define the Stage.</p> <p>If omitted, interpreted as 1</p> <p>[n] ::= <NR1>. A variable value to define the receiver port number (Rx-Port) of the channel.</p> <p>The actual range is dependent on the Number of Ports (Type).</p> <p>Type = 4, then n = {1}</p> <p>Type = 8 then n = {1 – 2}</p> <p>Type = 12 then n = {1 – 3}</p> <p>If omitted, n is interpreted as 1.</p> <p><port_number> ::= <NR1>. A variable value to define the S-Parameter Port assigned to the specified Rx-Port of the channel.</p> <p>The actual range is dependent on the Number of Ports (Type).</p> <p>Type = 4 then <port number> = {1 – 2}</p> <p>Type = 8 then <port_number> = {1 – 4}</p> <p>Type = 12 then <port_number> = {1 – 6}</p> <p>Returns A single <NR1> value.</p>

Examples `WLIST:SPARAMETER:CASCADING:STAGE2:DRX2 4` assigns S-Parameter port 4 to the channel's receiver port 2 for Stage 2, in the Differential, Cascading mode.

`WLIST:SPARAMETER:CASCADING:STAGE6:RX3?` might return 10, indicating that S-Parameter Port 10 is assigned to the channel's receiver port 3 for Stage 6, in the Differential, Cascading mode.

WLIS:SPARameter:CASCading:STAGe[m]:DTX[n]

This command sets or returns the S-Parameter port assignment of the specified Stage and the channel's specified transmission port number (Tx-Port) in Cascading mode and Differential Signalling Scheme (where applicable).

Conditions	<p>S-Parameter Mode must be set to Cascading.</p> <p>S-Parameter Signalling Scheme must be set to Differential (where applicable).</p> <p>Requires an S-Parameters license.</p>
Group	S-Parameters
Syntax	<p>WLIS:SPARameter:CASCading:STAGe[m]:DTX[n] <port number></p> <p>WLIS:SPARameter:CASCading:STAGe[m]:DTX[n]?</p>
Related Commands	<p>WLIS:SPARameter:MODE</p> <p>WLIS:SPARameter:CASCading:STYPe</p> <p>WLIS:SPARameter:CASCading:TYPE</p> <p>WLIS:SPARameter:CASCading:STAGe[m]:DRX[n]</p>
Arguments	<p>[m] ::= {1 2 3 4 5 6}. A variable value to define the Stage.</p> <p>If omitted, interpreted as 1</p> <p>[n] ::= <NR1>. A variable value to define the transmission port number (Tx-Port) of the channel.</p> <p>The actual range is dependent on the Number of Ports (Type).</p> <p>Type = 4, then n = {1}</p> <p>Type = 8 then n = {1 – 2}</p> <p>Type = 12 then n = {1 – 3}</p> <p>If omitted, n is interpreted as 1.</p> <p><port number> ::= <NR1>. A variable value to define the S-Parameter Port assigned to the specified Tx-Port of the channel.</p> <p>The actual range is dependent on the Number of Ports (Type).</p> <p>Type = 4 then <port number> = {1 – 2}</p> <p>Type = 8 then <port number> = {1 – 4}</p> <p>Type = 12 then <port number> = {1 – 6}</p> <p>Returns A single <NR1> value.</p>

Examples `WLIST:SPARAMETER:CASCADING:STAGE2:DTX2 4` assigns S-Parameter port 4 to the channel's transmission port 2 for Stage 2, in the Differential, Cascading mode.

`WLIST:SPARAMETER:CASCADING:STAGE6:TX3?` might return 10, indicating that S-Parameter Port 10 is assigned to the channel's transmission port 3 for Stage 6, in the Differential, Cascading mode.

WLISt:SPARAmeter:CASCading:STAGe[m]:ENABle

This command sets or returns the state of the specified Cascaded S-Parameter stage (enabled or disabled).

Conditions S-Parameter Mode must be set to Cascading.
Requires an S-Parameters license.

Group S-Parameters

Syntax WLISt:SPARAmeter:CASCading:STAGe[m]:ENABle {0|1|OFF|ON}
WLISt:SPARAmeter:CASCading:STAGe[m]:ENABle?

Related Commands [WLISt:SPARAmeter:MODE](#)
[WLISt:SPARAmeter:NCASCading:FILE](#)

Arguments [m] ::= {1 – 6} ("m" determines the stage number)
If omitted, m is interpreted as 1.
OFF or 0 disables the specified Cascading Stage. OFF or 0 is the default value.
ON or 1 enables the Stage.

Returns A single <Boolean> value.

Examples WLISt:SPARAMETER:CASCADING:STAGE6:ENABLE 1 enables Stage 6 in Cascading mode.
WLISt:SPARAMETER:CASCADING:STAGE6:ENABLE? might return 0, indicating that Stage 6 is not enabled in Cascading mode.

WLIST:SPARAmeter:CASCading:STAGe[m]:FILE

This command sets or returns the Filepath for the specified S-Parameters Cascading Stage, in Cascading mode.

Conditions S-Parameter Mode must be set to Cascading.
Requires an S-Parameters license.

Group S-Parameters

Syntax WLIST:SPARAmeter:CASCading:STAGe[m]:FILE <filepath>
WLIST:SPARAmeter:CASCading:STAGe[m]:FILE

Related Commands [WLIST:SPARAmeter:MODE](#)

Arguments [m] ::= {1 – 6} ("m" determines the stage number)
If omitted, m is interpreted as 1.
<filepath> ::= <string> defines the path to the S-Parameter file.

Returns <filepath> ::= <string>

Examples WLIST:SPARAMETER:CASCADING:STAGE1:FILE "C:\temp\myFile.s12p"
sets the filepath to "C:\temp\myFile.s12p" for use during compilation for Stage 1.

WLIST:SPARAMETER:CASCADING:STAGE1:FILE? might return
"C:\temp\myFile.s12p" indicating the filepath for Stage 1.

WLIS:SPARameter:CASCading:STAGe[m]:RX[n]

This command sets or returns the S-Parameter port assignment of the specified Stage and the channel's specified receiver port number (Rx-Port) in Cascading mode and Single-Ended Signalling Scheme (where applicable).

Conditions S-Parameter Mode must be set to Cascading.
S-Parameter Signalling Scheme must be set to Single-Ended (where applicable).
Requires an S-Parameters license.

Group S-Parameters

Syntax WLIS:SPARameter:CASCading:STAGe[m]:RX[n] <port number>
WLIS:SPARameter:CASCading:STAGe[m]:RX[n]?

Related Commands [WLIS:SPARameter:MODE](#)
[WLIS:SPARameter:CASCading:STYPe](#)
[WLIS:SPARameter:CASCading:TYPE](#)
[WLIS:SPARameter:CASCading:STAGe\[m\]:TX\[n\]](#)

Arguments [m] ::= {1|2|3|4|5|6}. A variable value to define the Stage.
If omitted, interpreted as 1
[n] ::= <NR1>. A variable value to define the receiver port number (Rx-Port) of the channel.

The actual range is dependent on the Number of Ports (Type).

Type = 1, then n = no value
Type = 2, then n = {1}
Type = 4 then n = {1 – 2}
Type = 6 then n = {1 – 3}
Type = 8 then n = {1 – 4}
Type = 12 then n = {1 – 6}

<port number> ::= <NR1>. A variable value to define the S-Parameter Port assigned to the specified Tx-Port of the channel.

The actual range is dependent on the Number of Ports (Type).

Type = 1, then <port number> = no value
Type = 2, then <port number> = {1 – 2}
Type = 4 then <port number> = {1 – 4}
Type = 6 then <port number> = {1 – 6}

Type = 8 then <port number> = {1 – 8}
Type = 12 then <port number> = {1 – 12}

Returns A single <NR1> value.

Examples `WLIST:SPARAMETER:CASCADING:STAGE2:RX2 4` assigns S-Parameter port 4 to the channel's receiver port 2 for Stage 2, in the Single-Ended, Cascading mode.

`WLIST:SPARAMETER:CASCADING:STAGE6:RX3?` might return 10, indicating that S-Parameter Port 10 is assigned to the channel's receiver port 3 for Stage 6, in the Single-Ended, Cascading mode.

WLISt:SPARAmeter:CASCading:STAGe[m]:SSCHeme

This command sets or returns the S-Parameter Signalling Scheme, in Cascading mode. Signalling Scheme is only available when the Number of Ports is set to 4, 8, or 12.

Conditions S-Parameter Mode must be set to Cascading.
Requires an S-Parameters license.

Group S-Parameters

Syntax WLISt:SPARAmeter:CASCading:STAGe[m]:SSCHeme
{SENDEd|DIFFerential}
WLISt:SPARAmeter:CASCading:STAGe[m]:SSCHeme?

Related Commands [WLISt:SPARAmeter:MODE](#)

Arguments [m] ::= {1 – 6} ("m" determines the stage number)
If omitted, m is interpreted as 1.
SENDEd – Single Ended Signal Scheme
DIFFerential – Differential Signal Scheme

Returns SEND
DIFF

Examples WLISt:SPARAMETER:CASCADING:STAGE2:SSCHEME DIFF sets the Stage 2 Signalling Scheme to Differential, in Cascading mode.
WLISt:SPARAMETER:CASCADING:STAGE3:SSCHEME? might return SEND, indicating that the Stage 3 Signalling Scheme is set to Single Ended, in Cascading mode.

WLISt:SPARameter:CASCading:STAGe[m]:TX[n]

This command sets or returns the S-Parameter port assignment of the specified Stage and the channel's specified transmission port number (Tx-Port) in Cascading mode and Single-Ended Signalling Scheme (where applicable).

Conditions S-Parameter Mode must be set to Cascading.

S-Parameter Signalling Scheme must be set to Single-Ended (where applicable).

Requires an S-Parameters license.

Group S-Parameters

Syntax WLISt:SPARameter:CASCading:STAGe[m]:TX[n] <port number>
WLISt:SPARameter:CASCading:STAGe[m]:TX[n]?

Related Commands [WLISt:SPARameter:MODE](#)
[WLISt:SPARameter:CASCading:STYPe](#)
[WLISt:SPARameter:CASCading:TYPE](#)
[WLISt:SPARameter:CASCading:STAGe\[m\]:RX\[n\]](#)

Arguments [m] ::= {1|2|3|4|5|6}. A variable value to define the Stage.

If omitted, interpreted as 1

[n] ::= <NR1>. A variable value to define the transmission port number (Tx-Port) of the channel.

The actual range is dependent on the Number of Ports (Type).

Type = 1, then n = no value

Type = 2, then n = {1}

Type = 4 then n = {1 – 2}

Type = 6 then n = {1 – 3}

Type = 8 then n = {1 – 4}

Type = 12 then n = {1 – 6}

<port number> ::= <NR1>. A variable value to define the S-Parameter Port assigned to the specified Tx-Port of the channel.

The actual range is dependent on the Number of Ports (Type).

Type = 1, then <port number> = no value

Type = 2, then <port number> = {1 – 2}

Type = 4 then <port number> = {1 – 4}

Type = 6 then <port number> = {1 – 6}

Type = 8 then <port number> = {1 – 8}
Type = 12 then <port number> = {1 – 12}

Returns A single <NR1> value.

Examples `WLIST:SPARAMETER:CASCADING:STAGE2:TX2 4` assigns S-Parameter port 4 to the channel's transmission port 2 for Stage 2, in the Single-Ended, Cascading mode.

`WLIST:SPARAMETER:CASCADING:STAGE6:TX3?` might return 10, indicating that S-Parameter Port 10 is assigned to the channel's transmission port 3 for Stage 6, in the Single-Ended, Cascading mode.

WLISt:SPARameter:CASCading:STYPe

This command sets or returns S-Parameter signal type (victim or aggressor), in Cascading mode. The number of ports must be either 8 or 12.

Conditions S-Parameter Mode must be set to Cascading.
 Number of Ports must be either 8 or 12.
 Requires an S-Parameters license.

Group S-Parameters

Syntax WLISt:SPARameter:CASCading:STYPe {VICTim|AGGRessor|BOTH}
 WLISt:SPARameter:CASCading:STYPe?

Related Commands [WLISt:SPARameter:MODE](#)

Arguments VICTim – enables the victim signal type.
 AGGRessor – enables the aggressor signal type.
 BOTH – enables the victim and aggressor signal types.

Returns VICT
 AGGR
 BOTH

Examples WLISt:SPARAMETER:CASCADING:STYPe BOTH sets the signal type to include both the Victim and Aggressor signal types, in Cascading mode.
 WLISt:SPARAMETER:CASCADING:STYPe? might return AGGR, indicating that the S-Parameter signal type is currently set to be Aggressor, in Cascading mode.

WLISt:SPARAmeter:CASCading:TYPE

This command sets or returns the S-Parameter number of ports, in Cascading mode.

Conditions Requires an S-Parameters license.

Group S-Parameters

Syntax WLISt:SPARAmeter:CASCading:TYPE {1|2|4|6|8|12}
WLISt:SPARAmeter:CASCading:TYPE?

Arguments {1|2|4|6|8|12} – defines the number of S-Parameter ports.

Returns A single <NR1> value.

Examples WLISt:SPARAMETER:CASCADING:TYPE 12 sets the S-Parameter type to a 12-Port system for the cascading mode.

WLISt:SPARAMETER:CASCADING:TYPE? might return 6, indicating that the S-Parameter type is a 6-Port system for Cascading mode.

WLISt:SPARAmeter:MODE

This command sets or returns the S-Parameter mode (Cascading or Non-Cascading).

Conditions	Requires an S-Parameters license.
Group	S-Parameters
Syntax	WLISt:SPARAmeter:MODE {CASC NCAS} WLISt:SPARAmeter:MODE?
Arguments	<p>CASCading sets the S-Parameter mode to cascading, allowing you to cascade up to six S-parameter files and apply the characteristics on the waveform.</p> <p>NCASCading sets the S-Parameter mode to non-cascading, allowing you to apply S-parameter characteristics on the waveform from only one S-parameter file.</p>
Returns	<p>CASC</p> <p>NCASC</p>
Examples	<p>WLISt:SPARAMETER:MODE CASCADING sets the S-Parameter mode to cascading.</p> <p>WLISt:SPARAMETER:MODE? might return NCAS, indicating that the S-Parameter mode is set to Non-Cascading mode.</p>

WLIS:SPARameter:NCAScading:AGGRessor2[:ENABLe]

This command sets or returns the aggressor 2 signal type state (enabled or disabled) in Non-Cascading mode. Aggressor2 signals are available when the number of ports is set to 12.

Conditions S-Parameter Mode must be set to Non-Cascading.
Number of Ports must be set to 12.
Requires an S-Parameters license.

Group S-Parameters

Syntax WLIS:SPARameter:NCAScading:AGGRessor2[:ENABLe] {0|1|ON|OFF}
WLIS:SPARameter:NCAScading:AGGRessor2[:ENABLe]?

Related Commands [WLIS:SPARameter:MODE](#)

Arguments OFF or 0 disables the aggressor 2 signal type. OFF or 0 is the default value.
ON or 1 enables the aggressor 2 signal type.

Returns A single <Boolean> value.

Examples WLIS:SPARAMETER:NCASCADING:AGGRESSOR2:ENABLE ON enables the aggressor 2 signal type, in Non-Cascading mode.
WLIS:SPARAMETER:NCASCADING:AGGRESSOR2:ENABLE? might return 0, indicating that the aggressor 2 signal type is disabled, in Non-Cascading mode.

WLISt:SPARAmeter:NCAScading:AGGRessor[n]:AMPLitude

This command sets or returns the specified Aggressor's amplitude, in Non-Cascading mode.

Conditions S-Parameter Mode must be set to Non-Cascading.
 Number of ports must be either 8 or 12.
 Requires an S-Parameters license.

Group S-Parameters

Syntax WLISt:SPARAmeter:NCAScading:AGGRessor[n]:AMPLitude
 <amplitude>
 WLISt:SPARAmeter:NCAScading:AGGRessor[n]:AMPLitude?

Related Commands [WLISt:SPARAmeter:MODE](#)

Arguments [n] ::= {1|2} ("n" determines the aggressor signal (1 or 2). 2 is only valid if the number of ports is set to 12.)
 If omitted, n is interpreted as 1.
 <amplitude> ::= <NRf>

Returns A single <NR3> value.

Examples WLISt:SPARAMETER:NCASCADING:AGGRESSOR1:AMPLITUDE 200E-3 sets the 1st Aggressor's amplitude to 200 mV, in Non-Cascading mode.
 WLISt:SPARAMETER:NCASCADING:AGGRESSOR2:AMPLITUDE? might return 100.0000000000E-3, indicating that the 2nd Aggressor's amplitude is set to 100 mV, in Non-Cascading mode.

WLIS:SPARAmeter:NCAScading:AGGRessor[n]:CTALk

This command sets or returns the specified Aggressor's crosstalk type, in Non-Cascading mode.

Conditions S-Parameter Mode must be set to Non-Cascading.
Number of ports must be either 8 or 12.
Requires an S-Parameters license.

Group S-Parameters

Syntax WLIS:SPARAmeter:NCAScading:AGGRessor[n]:CTALk
{NEXT|FEXT|BOTH}
WLIS:SPARAmeter:NCAScading:AGGRessor[n]:CTALk?

Related Commands [WLIS:SPARAmeter:MODE](#)

Arguments [n] ::= {1|2} ("n" determines the aggressor signal (1 or 2). 2 is only valid if the number of ports is set to 12.)
If omitted, n is interpreted as 1.
NEXT – Near-End Crosstalk
FEXT – Far-End Crosstalk
BOTH – Near and Far-End Crosstalk

Returns NEXT
FEXT
BOTH

Examples WLIS:SPARAMETER:NCASCADING:AGGRESSOR1:CTALK FEXT sets the 1st Aggressor's Crosstalk type to Far End Crosstalk, in Non-Cascading mode.
WLIS:SPARAMETER:NCASCADING:AGGRESSOR2:CTALK? might return NEXT, indicating that the 2nd Aggressor crosstalk type is set to Far End Crosstalk, in Non-Cascading mode.

WLIS:SPARAmeter:NCAScading:AGGRessor[n]:DRATe

This command sets or returns the specified Aggressor's data rate, in Non-Cascading mode.

Conditions S-Parameter Mode must be set to Non-Cascading.
 Number of ports must be either 8 or 12.
 Requires an S-Parameters license.

Group S-Parameters

Syntax WLIS:SPARAmeter:NCAScading:AGGRessor[n]:DRATe <data_rate>
 WLIS:SPARAmeter:NCAScading:AGGRessor[n]:DRATe?

Related Commands [WLIS:SPARAmeter:MODE](#)

Arguments [n] ::= {1|2} ("n" determines the aggressor signal (1 or 2). 2 is only valid if the number of ports is set to 12.)

If omitted, n is interpreted as 1.

<data_rate> ::= <NRf>

Returns A single <NR3> value.

Examples WLIS:SPARAMETER:NCASCADING:AGGRESSOR1:DRATE 4E9 sets the 1st Aggressor's data rate to 4 Gbps, in Non-Cascading mode.

WLIS:SPARAMETER:NCASCADING:AGGRESSOR2:DRATE? might return 500.0000000000E+3, indicating that the 2nd Aggressor's data rate is set to 500 kbps, in Non-Cascading mode.

WLISt:SPARAmeter:NCAScading:AGGRessor[n]:SIGNal

This command sets or returns specified Aggressor's signal type, in Non-Cascading mode.

Conditions S-Parameter Mode must be set to Non-Cascading.
Number of ports must be either 8 or 12.
Requires an S-Parameters license.

Group S-Parameters

Syntax WLISt:SPARAmeter:NCAScading:AGGRessor[n]:SIGNal
{CLOCK|PRBS|FILE|SAVictim}
WLISt:SPARAmeter:NCAScading:AGGRessor[n]:SIGNal?

Related Commands [WLISt:SPARAmeter:MODE](#)
[WLISt:SPARAmeter:CASCading:AGGRessor\[n\]:SIGNal:FILE](#)

Arguments [n] ::= {1|2} ("n" determines the aggressor signal (1 or 2). 2 is only valid if the number of ports is set to 12.)

If omitted, n is interpreted as 1.

CLOCK – Indicates that the aggressor signal is a clock pattern.

PRBS – Indicates that the aggressor signal is a PBRS pattern. You also must set the PBRS type.

FILE – Aggressor is set to use a file. You must set the file path.

SAVictim – Aggressor is the same as the victim.

Returns CLOC
PRBS
FILE
SAV

Examples WLISt:SPARAMETER:NCASCADING:AGGRESSOR1:SIGNAL SAVICTIM sets the 1st aggressor signal to be the same as the victim, in Non-Cascading mode

WLISt:SPARAMETER:NCASCADING:AGGRESSOR2:SIGNAL? might return FILE, indicating that 2nd Aggressor has a signal type set to use a file, in Non-Cascading mode.

WLIS:SPARAmeter:NCAScading:AGGRessor[n]:SIGNal:FILE

This command sets or returns the filepath to the aggressor file for the specified Aggressor, in Non-Cascading mode.

Conditions	<p>S-Parameter Mode must be set to Non-Cascading.</p> <p>Number of ports must be either 8 or 12.</p> <p>Aggressor signal type must be File.</p> <p>Requires an S-Parameters license.</p>
Group	S-Parameters
Syntax	<p>WLIS:SPARAmeter:NCAScading:AGGRessor[n]:SIGNal:FILE <filepath> WLIS:SPARAmeter:NCAScading:AGGRessor[n]:SIGNal:FILE?</p>
Related Commands	<p>WLIS:SPARAmeter:MODE WLIS:SPARAmeter:NCAScading:AGGRessor[n]:SIGNal</p>
Arguments	<p>[n] ::= {1 2} ("n" determines the aggressor signal (1 or 2). 2 is only valid if the number of ports is set to 12.)</p> <p>If omitted, n is interpreted as 1.</p> <p><filepath> ::= <string></p>
Returns	<filepath> ::= <string>
Examples	<p>WLIS:SPARAMETER:NCASCADING:AGGRESSOR1:SIGNAL:FILE "C:\temp\myFile.s12p" sets the 1st Aggressor's file and filepath when the aggressor is set to use a file, in Non-Cascading mode.</p> <p>WLIS:SPARAMETER:NCASCADING:AGGRESSOR2:SIGNAL:FILE? might return "C:\temp\myFile.s12p" indicating that the 2nd Aggressor has a signal type filepath set to "C:\temp\myFile.s12p", in Non-Cascading mode.</p>

WLISt:SPARAmeter:NCAScading:AGGRessor[n]:SIGNal:PRBS

This command sets or returns the specified Aggressor's PRBS signal type, in Non-Cascading mode.

Conditions	<p>S-Parameter Mode must be set to Non-Cascading.</p> <p>Number of ports must be either 8 or 12.</p> <p>Aggressor signal type must be PRBS.</p> <p>Requires an S-Parameters license.</p>
Group	S-Parameters
Syntax	<pre>WLISt:SPARAmeter:NCAScading:AGGRessor[n]:SIGNal:PRBS {PRBS7 PRBS9 PRBS15 PRBS16 PRBS20 PRBS21 PRBS23 PRBS29 PRBS31} WLISt:SPARAmeter:NCAScading:AGGRessor[n]:SIGNal:PRBS?</pre>
Related Commands	WLISt:SPARAmeter:MODE WLISt:SPARAmeter:NCAScading:AGGRessor[n]:SIGNal
Arguments	<p>[n] ::= {1 2} (“n” determines the aggressor signal (1 or 2). 2 is only valid if the number of ports is set to 12.)</p> <p>If omitted, n is interpreted as 1.</p> <p>Patterns available include: PRBS7, PRBS9, PRBS15, PRBS16, PRBS20, PRBS21, PRBS23, PRBS29, PRBS31</p>
Returns	PRBS7, PRBS9, PRBS15, PRBS16, PRBS20, PRBS21, PRBS23, PRBS29, PRBS31
Examples	<p>WLISt:SPARAMETER:NCASCADING:AGGRESSOR1:SIGNAL:PRBS PRBS31 sets the 1st Aggressor's Signal type's PRBS value to PRBS31, in Non-Cascading mode.</p> <p>WLISt:SPARAMETER:NCASCADING:AGGRESSOR2:SIGNAL:PRBS? might return PRBS15, indicating that the 2nd Aggressor has a signal type PRBS value set to PRBS15, in Non-Cascading mode.</p>

WLIS:SPARAmeter:NCAScading:DEEMbed

This command sets or returns whether the Non-Cascading S-Parameters is to de-embed (invert) the S-Parameters, in Non-Cascading mode.

Conditions S-Parameter Mode must be set to Non-Cascading.
Requires an S-Parameters license.

Group S-Parameters

Syntax WLIS:SPARAmeter:NCAScading:DEEMbed {0|1|OFF|ON}
WLIS:SPARAmeter:NCAScading:DEEMbed?

Related Commands [WLIS:SPARAmeter:MODE](#)

Arguments OFF or 0 disables de-embedding. OFF or 0 is the default value.
ON or 1 enables de-embedding.

Returns A single <Boolean> value.

Examples WLIS:SPARAMETER:NCASCADING:DEEMBED 1 will de-embed the S-Parameters for Non-Cascading mode.

WLIS:SPARAMETER:NCASCADING:DEEMBED? might return 0, indicating that S-Parameters will not be de-embedded for Non-Cascading mode.

WLISt:SPARAmeter:NCAScading:DRX[n]

This command sets or returns the S-Parameter port assignment of the channel's specified receiver port number (Rx-Port) in Non-Cascading mode and Differential Signalling Scheme (where applicable).

Conditions S-Parameter Mode must be set to Non-Cascading.
S-Parameter Signalling Scheme must be set to Differential.
Requires an S-Parameters license.

Group S-Parameters

Syntax WLISt:SPARAmeter:NCAScading:DRX[n] <port number>
WLISt:SPARAmeter:NCAScading:DRX[n]?

Related Commands [WLISt:SPARAmeter:MODE](#)
[WLISt:SPARAmeter:CASCading:STYPe](#)
[WLISt:SPARAmeter:NCAScading:TYPE](#)
[WLISt:SPARAmeter:NCAScading:RX\[n\]](#)

Arguments [n] ::= <NR1>. A variable value to define the receiver port number (Tx-Port) of the channel.

The actual range is dependent on the Number of Ports (Type).

Type = 4, then n = {1}
Type = 8 then n = {1 – 2}
Type = 12 then n = {1 – 3}

If omitted, n is interpreted as 1.

<port number> ::= <NR1>. A variable value to define the S-Parameter Port assigned to the specified Rx-Port of the channel.

The actual range is dependent on the Number of Ports (Type).

Type = 4, then n = {1 – 2}
Type = 8 then <port number> = {1 – 4}
Type = 12 then <port number> = {1 – 6}

Returns A single <NR1> value.

Examples WLISt:SPARAMETER:NCASCADING:DTX2 4 assigns S-Parameter port 4 to channel's receiver port 2, in the Differential, Non-Cascading mode.

`WLIST:SPARAMETER:NCASCADING:DTX3?` might return 6, indicating that S-Parameter Port 6 is assigned to the channel's receiver port 3, in the Differential, Non-Cascading mode.

WLISt:SPARAmeter:NCAScading:DTX[n]

This command sets or returns the S-Parameter port assignment of the channel's specified transmission port number (Tx-Port) in Non-Cascading mode and Differential Signalling Scheme (where applicable).

Conditions S-Parameter Mode must be set to Non-Cascading.
S-Parameter Signalling Scheme must be set to Differential.
Requires an S-Parameters license.

Group S-Parameters

Syntax WLISt:SPARAmeter:NCAScading:DTX[n] <port number>
WLISt:SPARAmeter:NCAScading:DTX[n]?

Related Commands [WLISt:SPARAmeter:MODE](#)
[WLISt:SPARAmeter:NCAScading:SType](#)
[WLISt:SPARAmeter:NCAScading:Type](#)
[WLISt:SPARAmeter:NCAScading:DRX\[n\]](#)

Arguments [n] ::= <NR1>. A variable value to define the transmission port number (Tx-Port) of the channel.

The actual range is dependent on the Number of Ports (Type).

Type = 4, then n = {1}
Type = 8 then n = {1 – 2}
Type = 12 then n = {1 – 3}

If omitted, n is interpreted as 1.

<port number> ::= <NR1>. A variable value to define the S-Parameter Port assigned to the specified Tx-Port of the channel.

The actual range is dependent on the Number of Ports (Type).

Type = 4 then <port number> = {1 – 2}
Type = 8 then <port number> = {1 – 4}
Type = 12 then <port number> = {1 – 6}

Returns A single <NR1> value.

Examples WLISt:SPARAMETER:NCASCADING:DTX2 4 assigns S-Parameter port 4 to channel's transmission port 2, in the Differential, Non-Cascading mode.

`WLIST:SPARAMETER:NCASCADING:DTX3?` might return 6, indicating that S-Parameter Port 6 is assigned to the channel's transmission port 3, in the Differential, Non-Cascading mode.

WLIS:SPARAmeter:NCAScading:FILE

This command sets or returns the filepath and file name of the S-Parameter file, in Non-Cascading mode.

Conditions S-Parameter Mode must be set to Non-Cascading.
Requires an S-Parameters license.

Group S-Parameters

Syntax WLIS:SPARAmeter:NCAScading:FILE <filepath>

Related Commands [WLIS:SPARAmeter:MODE](#)

Arguments <filepath> ::= <string>

Returns <filepath> ::= <string>

Examples WLIS:SPARAMETER:NCASCADING:FILE "C:\temp\myFile.s12p" sets the filepath to "C:\temp\myFile.s12p" for use during compilation.
WLIS:SPARAMETER:NCASCADING:FILE? might return "C:\temp\myOtherFile.s6p", indicating the current filepath.

WLISt:SPARAmeter:NCAScading:LAYout

This command sets or returns the 4 port S-Parameter Matrix Configuration, in Non-Cascading mode.

Conditions S-Parameter Mode must be set to Non-Cascading.
Number of Ports must be set to 4.
Requires an S-Parameters license.

Group S-Parameters

Syntax WLISt:SPARAmeter:NCAScading:LAYout {TYPical|ALTErnate}
WLISt:SPARAmeter:NCAScading:LAYout?

Related Commands [WLISt:SPARAmeter:MODE](#)

Arguments TYPical or ALTErnate: selects the S-Parameter Matrix.

S-Parmeter Matrix Typical				S-Parmeter Matrix Alternate			
SDD11	SDD12	SDC11	SDC12	SCC11	SCC12	SCD11	SCD12
SDD21	SDD22	SDC21	SDC22	SCC21	SCC22	SCD21	SCD22
SCD11	SCD12	SCC11	SCC12	SDC11	SDC12	SDD11	SDD12
SCD21	SCD22	SCC21	SCC22	SDC21	SDC22	SDD21	SDD22

Returns TYP
ALT

Examples WLISt:SPARAMETER:NCASCADING:LAYOUT TYPICAL sets the 4 port configuration's Layout to Typical, in Non-Cascading mode.

WLISt:SPARAMETER:NCASCADING:LAYOUT? might return TYP, indicating that configuration's Layout for port 4 is set to Typical, in Non-Cascading mode.

WLISt:SPARAmeter:NCAScading:RX[n]

This command sets or returns the S-Parameter port assignment of the channel's specified receiver port number (Rx-Port) in Non-Cascading mode and Single-Ended Signalling Scheme (where applicable).

Conditions S-Parameter Mode must be set to Non-Cascading.
S-Parameter Signalling Scheme must be set to Single-Ended.
Requires an S-Parameters license.

Group S-Parameters

Syntax WLISt:SPARAmeter:NCAScading:RX[n] <port number>
WLISt:SPARAmeter:NCAScading:RX[n]?

Related Commands [WLISt:SPARAmeter:MODE](#)
[WLISt:SPARAmeter:CASCading:STYPe](#)
[WLISt:SPARAmeter:NCAScading:TYPE](#)
[WLISt:SPARAmeter:NCAScading:TX\[n\]](#)

Arguments [n] ::= <NR1>. A variable value to define the receiver port number (Rx-Port) of the channel.

The actual range is dependent on the Number of Ports (Type).

Type = 1, then n = no value
Type = 2, then n = {1}
Type = 4 then n = {1 – 2}
Type = 6 then n = {1 – 3}
Type = 8 then n = {1 – 4}
Type = 12 then n = {1 – 6}

If omitted, n is interpreted as 1.

<port number> ::= <NR1>. A variable value to define the S-Parameter Port assigned to the specified Rx-Port of the channel.

The actual range is dependent on the Number of Ports (Type).

Type = 1, then <port number> = no value
Type = 2, then <port number> = {1 – 2}
Type = 4 then <port number> = {1 – 4}
Type = 6 then <port number> = {1 – 6}
Type = 8 then <port number> = {1 – 8}
Type = 12 then <port number> = {1 – 12}

Returns A single <NR1> value.

Examples `WLIST:SPARAMETER:NCASCADING:RX2 4` assigns S-Parameter port 4 to the channel's receiver port 2, in the Single-Ended, Non-Cascading mode.

`WLIST:SPARAMETER:NCASCADING:RX4?` might return 6, indicating that S-Parameter Port 6 is assigned to the channel's receiver port 4, in the Single-Ended, Non-Cascading mode.

WLIS:SPARAmeter:NCAScading:SSCHeme

This command sets or returns the S-Parameter Signalling Scheme, in Non-Cascading mode. Signalling Scheme is only available when the Number of Ports is set to 4, 8, or 12.

Conditions S-Parameter Mode must be set to Non-Cascading.
Requires an S-Parameters license.

Group S-Parameters

Syntax WLIS:SPARAmeter:NCAScading:SSCHeme {SENDEd|DIFFerential}
WLIS:SPARAmeter:NCAScading:SSCHeme?

Related Commands [WLIS:SPARAmeter:MODE](#)

Arguments SENDEd – Single Ended Signal Scheme
DIFFerential – Differential Signal Scheme

Returns SEND
DIFF

Examples WLIS:SPARAMETER:NCASCADING:SSCHEME DIFF sets the Signalling Scheme to Differential, in Non-Cascading mode.

WLIS:SPARAMETER:NCASCADING:SSCHEME? might return SEND, indicating that the Signalling Scheme is set to Single Ended, in Non-Cascading mode.

WLIS:SPARAmeter:NCAScading:STYPe

This command sets or returns S-Parameter signal type (victim or aggressor), in Non-Cascading mode. The number of ports must be either 8 or 12.

Conditions S-Parameter Mode must be set to Non-Cascading.
Number of Ports must be either 8 or 12.
Requires an S-Parameters license.

Group S-Parameters

Syntax WLIS:SPARAmeter:NCAScading:STYPe {VICTim|AGGRessor|BOTH}
WLIS:SPARAmeter:NCAScading:STYPe?

Related Commands [WLIS:SPARAmeter:MODE](#)

Arguments VICTim – enables the victim signal type.
AGGRessor – enables the aggressor signal type.
BOTH – enables the victim and aggressor signal types.

Returns VICT
AGGR
BOTH

Examples WLIS:SPARAMETER:NCASCADING:STYPe BOTH sets the signal type to include both the Victim and Aggressor signal types, in Non-Cascading mode.

WLIS:SPARAMETER:NCASCADING:STYPe? might return AGGR, indicating that the S-Parameter signal type is currently set to be Aggressor, in Non-Cascading mode.

WLISt:SPARAmeter:NCAScading:TX[n]

This command sets or returns the S-Parameter port assignment of the channel's specified transmission port number (Tx-Port) in Non-Cascading mode and Single-Ended Signalling Scheme (where applicable).

Conditions S-Parameter Mode must be set to Non-Cascading.
S-Parameter Signalling Scheme must be set to Single-Ended (where applicable).
Requires an S-Parameters license.

Group S-Parameters

Syntax WLISt:SPARAmeter:NCAScading:TX[n] <port number>
WLISt:SPARAmeter:NCAScading:TX[n]?

Related Commands [WLISt:SPARAmeter:MODE](#)
[WLISt:SPARAmeter:CASCading:STYPe](#)
[WLISt:SPARAmeter:NCAScading:TYPE](#)
[WLISt:SPARAmeter:NCAScading:RX\[n\]](#)

Arguments [n] ::= <NR1>. A variable value to define the transmission port number (Tx-Port) of the channel.

The actual range is dependent on the Number of Ports (Type).

Type = 1, then n = no value
Type = 2, then n = {1}
Type = 4 then n = {1 – 2}
Type = 6 then n = {1 – 3}
Type = 8 then n = {1 – 4}
Type = 12 then n = {1 – 6}

If omitted, n is interpreted as 1.

<port number> ::= <NR1>. A variable value to define the S-Parameter Port assigned to the specified Tx-Port of the channel.

The actual range is dependent on the Number of Ports (Type).

Type = 1, then <port number> = no value
Type = 2, then <port number> = {1 – 2}
Type = 4 then <port number> = {1 – 4}
Type = 6 then <port number> = {1 – 6}
Type = 8 then <port number> = {1 – 8}
Type = 12 then <port number> = {1 – 12}

Returns A single <NR1> value.

Examples `WLIST:SPARAMETER:NCASCADING:TX2 4` assigns S-Parameter port 4 to the channel's transmission port 2, in the Single-Ended, Non-Cascading mode.

`WLIST:SPARAMETER:NCASCADING:TX4?` might return 6, indicating that S-Parameter Port 6 is assigned to the channel's transmission port 4, in the Single-Ended, Non-Cascading mode.

WLISt:SPARAmeter:NCAScading:TYPE

This command sets or returns the S-Parameter number of ports, in Non-Cascading mode.

Conditions Requires an S-Parameters license.

Group S-Parameters

Syntax WLISt:SPARAmeter:NCAScading:TYPE {1|2|4|6|8|12}

Arguments {1|2|4|6|8|12} – defines the number of S-Parameter ports.

Returns A single <NR1> value.

Examples WLISt:SPARAMETER:NCASCADING:TYPE 12 sets the S-Parameter type to a 12-Port system for Non-Cascading mode.

WLISt:SPARAMETER:NCASCADING:TYPE? might return 6, indicating that the S-Parameter type is a 6-Port system for Non-Cascading mode.

WLIS:SPARAmeter:SFORmat

This command sets or returns the currently used signal format for setting the S-Parameter values.

Conditions Requires an S-Parameters license.

Group S-Parameters

Syntax WLIS:SPARAmeter:SFORmat {REAL|I|Q|IQ}
WLIS:SPARAmeter:SFORmat?

Arguments REAL: RF waveform.
I: I data of an IQ waveform.
Q: Q data of an IQ waveform.
IQ: Waveform combining I and Q data.

Returns REAL
I
Q
IQ

Examples WLIS:SPARAMETER:SFORMAT Q sets the current S-Parameter format to Q so that values are set to the Q S-Parameters.

WLIS:SPARAMETER:SFORMAT? might return IQ, which indicates that current S-Parameter values are applied to both I and Q.

WLIST:WAVEform:ACFile (No Query Form)

This command applies user supplied correction coefficients from an external (precompensation) file to the specified waveform (or waveforms) in the waveform list.

If the waveform is IQ (complex), you can add individual corrections files to the I and Q components of the complex waveform by using the optional syntax component.

Conditions This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Group Waveform

Syntax WLIST:WAVEform:ACFile <file_path>,<wfm_name>[,<Q_file_path>]

Arguments <file_path>::=<string> This is the complete path to the correction file, including the correction file name. If the waveform is IQ (complex), this path can be used to apply an I correction file if applying individual I and Q corrections files.

<wfm_name>::=<string> This is the name of the waveform (in the waveform list) to apply the correction coefficients.

<Q_file_path>::=<string> This is the complete path to the Q correction file, including the correction file name. if applying individual I and Q corrections files to a complex waveform.

Examples WLIST:WAVEFORM:ACFILE
"C:\Corrections\Ch1Corrections.corr","myWaveform" applies the correction coefficients to the waveform named myWaveform.

WLIST:WAVEFORM:ACFILE
"C:\Corrections\I_Corrections.corr","Complex_waveform","C:\Corrections\Q_Corrections.corr" applies the I and Q correction coefficients to the waveform named Complex_Waveform.

WLISt:WAVeform:ACFile:GAUSSian

This command sets or returns whether a gaussian filter will be applied during the application of a precompensation file (correction coefficients file).

Conditions	The precompensation file must have been generated with the Generic Precompensation Type set to RF.
Group	Waveform
Syntax	WLISt:WAVeform:ACFile:GAUSSian {0 1 OFF ON} WLISt:WAVeform:ACFile:GAUSSian?
Arguments	OFF or 0 disables the application of a gaussian filter. OFF or 0 is the default value. ON or 1 enables the application of a gaussian filter.
Returns	A single <Boolean> value.
Examples	WLISt:WAVEFORM:ACFILE:GAUSSIAN 0 sets the system so that during application of a precompensation file, a gaussian filter will not be applied. WLISt:WAVEFORM:ACFILE:GAUSSIAN? might return 1, indicating that the system will apply a gaussian filter when applying a precompensation file.

WLISt:WAVeform:ACFile:GAUSSian:BANDwidth

This command sets or returns the bandwidth of the gaussian filter that is to be applied during application of a precompensation file (correction coefficients file).

Conditions The precompensation file must have been generated with the Generic Precompensation Type set to RF and Apply Gaussian Filter selected.

Group Waveform

Syntax WLISt:WAVeform:ACFile:GAUSSian:BANDwidth <bandwidth>
WLISt:WAVeform:ACFile:GAUSSian:BANDwidth?

Related Commands [WLISt:WAVeform:ACFile:GAUSSian](#)

Arguments <bandwidth>::=<NR3> value.

Returns A single <NRf> value indicating the actual Gaussian Filter Bandwidth.

Examples WLISt:WAVEFORM:ACFILE:GAUSSIAN:BANDWIDTH 2E9 sets the gaussian filter bandwidth to 2 GHz.

WLISt:WAVEFORM:ACFILE:GAUSSIAN:BANDWIDTH? might return 1.0000000000E+9, indicating that the gaussian filter bandwidth is set to 1 GHz.

WLISt:WAVeform:ACFile:RSINc

This command sets or returns whether or not corrections for Sin(x)/x distortions will be removed during application of a correction file.

Conditions	The correction file must have been generated with the Generic Precompensation Type set to RF and the distortions have not already been removed.
Group	Waveform
Syntax	WLISt:WAVeform:ACFiLe:RSINC {0 1 OFF ON} WLISt:WAVeform:ACFiLe:RSINC?
Arguments	OFF or 0 will not remove the Sin(x)/x distortions from the correction file. OFF or 0 is the default value. ON or 1 removes the Sin(x)/x distortions from the correction file.
Returns	A single <Boolean> value.
Examples	WLISt:WAVEFORM:ACFILE:RSINC 1 sets the system to remove corrections for Sin(x)/x distortions from when a precompensation file is applied. WLISt:WAVEFORM:ACFILE:RSINC? might return 0, indicating that the system will not remove corrections for Sin(x)/x distortions.

WLISt:WAVeform:ACFile:SKEW

This command sets or returns whether the measured Skew will be applied during application of a precompensation file (correction coefficients file).

Conditions	The precompensation file must have been generated with the Generic Precompensation Type set to IQ and the skew was measured.
Group	Waveform
Syntax	<code>WLISt:WAVeform:ACFile:SKEW {0 1 OFF ON}</code> <code>WLISt:WAVeform:ACFile:SKEW?</code>
Arguments	OFF or 0 will not apply the measured Skew during the application of a precompensation file. OFF or 0 is the default value. ON or 1 applies the measured Skew during the application of a precompensation file.
Returns	A single <Boolean> value.
Examples	<code>WLISt:WAVEFORM:ACFILE:SKEW 1</code> applies the skew if it is available in the correction file. <code>WLISt:WAVEFORM:ACFILE:SKEW?</code> might return 0, indicating that skew will not be applied.

WLISt:WAVeform:AMPLitude

This command sets or returns the Recommended Amplitude (peak-to-peak) of the specified waveform in the waveform list.

Conditions If a recommended amplitude is not specified, a query returns the value for Not a Number (9.9100E+037).

Group Waveform

Syntax WLISt:WAVeform:AMPLitude <wfm_name>,<amplitude>
WLISt:WAVeform:AMPLitude? <wfm_name>

Related Commands [WLISt:WAVeform:OFFSet](#)

Arguments <wfm_name>::=<string>
<amplitude>::= <NRf>

Returns A single <NR3> value.

Examples WLISt:WAVEFORM:AMPLITUDE "Ramp1000",500E-3 sets the recommended amplitude to 500 mV_{p-p} for the waveform named Ramp1000.

WLISt:WAVEFORM:AMPLITUDE? "Ramp1000" might return 200.0000000000E-3, indicating that the amplitude for the waveform named Ramp1000 is 200 mV_{p-p}.

WLISt:WAVEform:AOffset (No Query Form)

This command adds a normalized offset factor to the specified waveform.

Conditions The specified waveform must exist in the Waveform List.
This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Group Waveform

Syntax WLISt:WAVEform:AOffset <wfm_name>,<offset_factor>

Arguments <wfm_name>::= <string>
<offset_factor>::= <NR3>
Range: -1 to 1.
Default: 0.

Examples WLISt:WAVEFORM:AOFFSET "Waveform",1 adds a normalized offset factor of 1 to the waveform named "Waveform".

WLISt:WAVeform:DATA[:I]

This command transfers analog waveform data from the external controller into the specified waveform or from a waveform to the external control program.

If the waveform is of the Signal Format type IQ this command writes the data to I. To write to Q data, use the command [WLISt:WAVeform:DATA:Q](#).

NOTE. Before transferring data to the instrument, a waveform must be created using the [WLISt:WAVeform:NEW](#) command.

Using *StartIndex* and *Size*, part of a waveform can be transferred at a time. Very large waveforms can be transferred in chunks.

Waveform data is always transferred in the LSB first format.

The format of the transferred data depends on the waveform type.

If *Size* is omitted, the length of waveform is assumed to be the value of the *Size* parameter.

Transferring large waveforms in chunks allows external programs to cancel the operation before it is completed.

The instrument supports floating point format. Floating point waveform data points occupy four bytes. So the total bytes will be four times the size of the waveform.

The minimum size of the waveform must be 1 and the maximum size depends on the instrument model and configuration.

This command has a limit of 999,999,999 bytes of data.

The IEEE 488.2 limits that the largest read or write that may occur in a single command is 999,999,999 bytes.

Because of the size limitation, it is suggested that the user make use of the starting index (and size for querying) to append data in multiple commands/queries.

To set marker data, use the command [WLISt:WAVeform:MARKer:DATA](#).

Group Waveform

Syntax WLISt:WAVeform:DATA[:I]
 <wfm_name>[, <StartIndex>[, <Size>]], <block_data>
 WLISt:WAVeform:DATA[:I]? <wfm_name>[, <StartIndex>[, <Size>]]

Related Commands [WLISt:WAVEform:NEW](#), [WLISt:WAVEform:MARKer:DATA](#),
[WLISt:WAVEform:DATA:Q](#)

Arguments StartIndex, Size,<block_data>
 <wfm_name> ::= <string>
 <StartIndex> ::= <NR1>
 <Size> ::= <NR1>
 <block_data> ::= <IEEE 488.2 block>

Returns <block_data>

Examples WLISt:WAVEFORM:DATA "Testwfm",0,1024,#44096xxxx... transfers the waveform data to a waveform named "TestWfm". The data size is 1024 points (4096 bytes) and the start index is 0 (the first data point).

WLISt:WAVeform:DATA:Q

This command transfers analog waveform data from the external controller into the specified waveform or from a waveform to the external control program.

This command writes the data to Q. The waveform must be of the Signal Format type IQ. To write to I data, use the command [WLISt:WAVeform:DATA\[:I\]](#).

NOTE. Before transferring data to the instrument, a waveform must be created using the [WLISt:WAVeform:NEW](#) command.

Using StartIndex and Size, part of a waveform can be transferred at a time. Very large waveforms can be transferred in chunks.

Waveform data is always transferred in the LSB first format.

The format of the transferred data depends on the waveform type.

If Size is omitted, the length of waveform is assumed to be the value of the Size parameter.

Transferring large waveforms in chunks allows external programs to cancel the operation before it is completed.

The instrument supports floating point format. Floating point waveform data points occupy four bytes. So the total bytes will be four times the size of the waveform.

The minimum size of the waveform must be 1 and the maximum size depends on the instrument model and configuration.

This command has a limit of 999,999,999 bytes of data.

As the IEEE 488.2 is a limitation that the largest read or write that may occur in a single command is 999,999,999 bytes as the structure is defined as a '#' followed by a byte to determine the number of bytes to read '9'. '9' indicates that we need to read 9 bytes to determine the length of the following data block: 999,999,999 (separated by commas to help separate - they will not be present normally).

Because of the size limitation, it is suggested that the user make use of the starting index (and size for querying) to append data in multiple commands/queries.

To set marker data, use the command [WLISt:WAVeform:MARKer:DATA](#).

Group Waveform

Syntax WLISt:WAVeform:DATA:Q
 <wfm_name>[, <StartIndex>[, <Size>]], <block_data>
 WLISt:WAVeform:DATA:Q? <wfm_name>[, <StartIndex>[, <Size>]]

Related Commands	WLISt:WAVEform:NEW , WLISt:WAVEform:MARKer:DATA , WLISt:WAVEform:DATA[:I]
Arguments	StartIndex, Size,<block_data> <wfm_name> ::= <string> <StartIndex> ::= <NR1> <Size> ::= <NR1> <block_data> ::= <IEEE 488.2 block>
Returns	<block_data>
Examples	<code>WLISt:WAVEFORM:DATA:Q "Testwfm",0,1024,#44096xxxx...</code> transfers the waveform data to a waveform called "TestWfm". The data size is 1024 points (4096 bytes) and the start index is 0 (the first data point).

WLISt:WAVeform:DELeTe (No Query Form)

This command deletes a single waveform from the waveform list or all waveforms.

NOTE. *When ALL is specified, all user-defined waveforms in the list are deleted in a single action. Note that there is no "UNDO" action once the waveforms are deleted. Use caution before issuing this command.*

If the deleted waveform is currently loaded into waveform memory, it is unloaded. If the RUN state of the AWG is ON, the state is turned OFF. If the channel is on, it will be switched off.

Group	Waveform
Syntax	WLISt:WAVeform:DELeTe {<wfm_name> ALL}
Related Commands	WLISt:SIZE? , WLISt:NAME? , WLISt:LAST?
Arguments	<wfm_name> ::= <string>
Examples	<p>WLISt:WAVEFORM:DELETE ALL deletes all waveforms from the waveform list.</p> <p>WLISt:WAVEFORM:DELETE "Test1" deletes the waveform named Test1 from the waveform list.</p>

WLISt:WAVeform:FREQuency

The command sets or returns the Recommended Center Frequency of the named IQ waveform.

Conditions	If the Recommended Frequency is not specified, a query will return the value for Not a Number: 9.91E+37.
Group	Waveform
Syntax	<code>WLISt:WAVeform:FREQuency <wfm_name>,<frequency></code> <code>WLISt:WAVeform:FREQuency?</code>
Arguments	<code><wfm_name>::=<string></code> . <code><frequency>::= <NR3> value</code> .
Returns	A single <NR3> value.
Examples	<code>WLISt:WAVEFORM:FREQUENCY "Ramp1000", 1E9</code> sets the Center Frequency of the IQ waveform "Ramp1000" to 1 GHz. <code>WLISt:WAVEFORM:FREQUENCY? "Ramp1000"</code> might return <code>1.0000000000E+9</code> , indicating the Center Frequency for the IQ waveform "Ramp1000" is set to 1 GHz. <code>WLISt:WAVEFORM:FREQUENCY? "Ramp1000"</code> might return <code>9.91E+37</code> if no Recommended Center Frequency is not defined.

WLISt:WAVeform:GRANularity? (Query Only)

This command returns the granularity of sample points required for the waveform to be valid. The number of sample points of a single channel instrument must be divisible by 2.

Group Waveform

Syntax WLISt:WAVeform:GRANularity?

Related Commands [WLISt:WAVeform:LMINimum?](#), [WLISt:WAVeform:LMAXimum?](#)

Returns A single <NR1> value.

Examples WLISt:WAVEFORM:GRANULARITY? might return 2, indicating that the number of sample points must be divisible by 2.

WLISt:WAVeform:INVert (No Query Form)

This command inverts the named waveform (in the waveform list) and preserves the offset.

Group Waveform

Syntax WLISt:WAVeform:INVert <wfm_name>

Arguments <wfm_name>::= <string>

Examples WLISt:WAVEFORM:INVERT "wave2" inverts the waveform titled "wave2", if it exists in the waveform list,, preserving the offset.

WLISt:WAVeform:LENGth? (Query Only)

This command returns the size of the specified waveform in the waveform list. The returned value represents data points (not bytes).

Group	Waveform
Syntax	WLISt:WAVeform:LENGth? <wfm_name>
Arguments	<wfm_name> ::= <string>
Returns	A single <NR1> value.
Examples	WLISt:WAVEFORM:LENGTH? "waveform2" might return 360, indicating the waveform contains 360 data points.

WLISt:WAVeform:LMAXimum? (Query Only)

This command returns the maximum number of waveform sample points allowed.

Conditions	The returned value is dependent on the instrument model, the installed options, and sampling rate setting.
Group	Waveform
Syntax	WLISt:WAVeform:LMAXimum?
Related Commands	WLISt:WAVeform:LMINimum?
Returns	A single <NR1> value.
Examples	WLISt:WAVEFORM:LMAXIMUM? might return 2000000000, indicating that the maximum number of allowed waveform sample points is 2 G samples.

WLISt:WAVeform:LMINimum? (Query Only)

This command returns the minimum number of waveform sample points required for a valid waveform. The number of required sample points is dependent on the instrument model.

Group Waveform

Syntax WLISt:WAVeform:LMINimum?

Related Commands [WLISt:WAVeform:LMAXimum?](#)

Returns A single <NR1> value.

Examples WLISt:WAVEFORM:LMINIMUM? might return 2400, indicating that the minimum number of waveform sample points required is 2.4 k.

WLISt:WAVeform:MARKer:DATA

This command sets or returns the waveform marker data.

NOTE. *This command returns or sends only marker data for the waveform.*

Each marker data occupies one bit. Two most significant bits of each byte are used for marker 1 and marker 2 (bit 6 for marker 1 and bit 7 for marker 2).

You will have to use bit masks to obtain the actual value.

When used on a waveform with n data points, you get only n bytes, each byte having values for both markers.

Block data can be sent in batches using "Size" and "StartIndex" parameters.

This command has a limit of 999,999,999 bytes of data. If this limit is insufficient, consider the following alternatives:

- Send a more efficient file format using MMEM:DATA.
- Use Ethernet (ftp, http, or file sharing) to transfer the file.

Group Waveform

Syntax WLISt:WAVeform:MARKer:DATA
 <wfm_name>[,<StartIndex>[,<Size>]],<block_data>
 WLISt:WAVeform:MARKer:DATA?
 <wfm_name>[,<StartIndex>[,<Size>]]

Related Commands [WLISt:WAVeform:DATA\[:I\]](#),
[WLISt:WAVeform:DATA:Q](#),
[WLISt:WAVeform:NEW](#)

Arguments <wfm_name> ::= <string>
 <StartIndex> ::= <NR1>
 <Size> ::= <NR1>
 <block_data> ::= <IEEE 488.2 block>

Returns <block_data>

Examples WLISt:WAVEFORM:MARKER:DATA "mywaveform",0,1000,#41000...
 transfers the marker data to the waveform named myWaveform.

`WLIST:WAVEFORM:MARKER:DATA? "myWaveform",0,1000` returns 1000 marker values from myWaveform starting at the first sample.

WLISt:WAVEform:MIQ (No Query Form)

This command creates an IQ waveform from two real waveforms. The name is derived from the I waveform name.

Conditions You cannot make an IQ waveform from existing IQ waveforms.

Group Waveform

Syntax WLISt:WAVEform:MIQ <I_wfm_name>,<Q_wfm_name>

Arguments <I_wfm_name>::=<string>
<Q_wfm_name>::=<string>

Examples WLISt:WAVEFORM:MIQ "Test_I","Test_Q" creates an IQ waveform named "Test_I" using "Test_I" as the I component and "Test_Q" as the Q component.

WLISt:WAVeform:NEW (No Query Form)

This command creates a new empty waveform in the waveform list of the current setup.

Group Waveform

Syntax WLISt:WAVeform:NEW
 <wfm_name>,<Size>[,<format>[,<is_saveable>]]

Related Commands [WLISt:WAVeform:DATA:Q](#)

Arguments <wfm_name> ::= <string>
 <Size> ::= <NR1>
 <format> ::= {REAL|IQ}
 <is_saveable> ::= {0|1|OFF|ON}

Examples WLISt:WAVEFORM:NEW "Test1", 1024 creates a new waveform called Test1 with 1024 points.

WLISt:WAVEFORM:NEW "Test1", 1024,IQ creates a new complex IQ waveform called Test1 with 1024 points.

WLISt:WAVEFORM:NEW "Test1", 1024,IQ,0 creates a new complex IQ waveform called Test1 with 1024 points whose data cannot be saved or queried.

WLISt:WAVeform:NORMAlize (No Query Form)

This command normalizes a waveform in the waveform list.

Conditions This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Group Waveform

Syntax WLISt:WAVeform:NORMAlize <wfm_name>,{FSCale|ZREFerence}

Arguments <wfm_name> ::= <string>
FSCale normalizes the waveform to the full amplitude range.
ZREFerence normalizes the waveform while preserving the offset.

Examples WLISt:WAVEFORM:NORMALIZE "Untitled25",FSCALE
*OPC?
normalizes the waveform titled "Untitled25", if it exists, using full scale. The overlapping command is followed with an Operation Complete query.

WLISt:WAVeform:OFFSet

This command sets or returns the Recommended Offset of the specified waveform in the waveform list.

Conditions If a recommended offset is not specified, a query returns the value for Not a Number (9.9100E+037).

Group Waveform

Syntax WLISt:WAVeform:OFFSet <wfm_name>,<offset>
WLISt:WAVeform:OFFSet? <wfm_name>

Related Commands [WLISt:WAVeform:AMPLitude](#)

Arguments <wfm_name>::=<string>
<offset>::= <NR3>

Returns A single <NR3> value.

Examples WLISt:WAVEFORM:OFFSET "Ramp1000",100E-3 sets the recommended offset to 100 mV for the waveform named Ramp1000.

WLISt:WAVEFORM:OFFSET? "Ramp1000" might return 10.0000000000E-3, indicating that the offset for the waveform named Ramp1000 is 10 mV.

WLISt:WAVEform:RESample (No Query Form)

This command resamples the number of points in a waveform in the waveform list.

Conditions This is an overlapping command. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Group Waveform

Syntax WLISt:WAVEform:RESample <wfm_name>,<size>

Arguments <wfm_name>::= <string>
<size>::= <NR1>

Examples WLISt:WAVEFORM:RESAMPLE "Untitled25", 1024
*OPC?
resamples the waveform titled "Untitled25" to 1024 points. The overlapping command is followed with an Operation Complete query.

WLISt:WAVeform:REVerse (No Query Form)

This command reverses the order of the named waveform (in the waveform list).

Group Waveform

Syntax WLISt:WAVeform:REVerse <wfm_name>

Arguments <wfm_name>::= <string>

Examples WLISt:WAVEFORM:REVERSE "wave2" reverses the order of the waveform titled "wave2".

WLISt:WAVeform:ROTate[:DEGRees] (No Query Form)

This command rotates the specified waveform by the specified number of degrees.

Rotating the waveform takes the end of the waveform (defined by degrees) and moves it to the front of the waveform.

Conditions	<p>The specified waveform must exist in the Waveform List.</p> <p>This is an overlapping command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i>.)</p>
Group	Waveform
Syntax	<code>WLISt:WAVeform:ROTate[:DEGRees] <wfm_name>,<phase></code>
Arguments	<p><code><wfm_name>::= <string></code></p> <p><code><phase>::= <NR3></code></p> <p>Range: -360 to 360.</p> <p>Default: 0.</p>
Examples	<p><code>WLISt:WAVEFORM:ROTATE:DEGREES "waveform",180</code> rotates the waveform named "Waveform" by 180 degrees.</p>

WLISt:WAVeform:ROTate:POINTs (No Query Form)

This command rotates the specified waveform by the specified number of points.

Rotating the waveform takes the end of the waveform (defined by samples) and moves it to the front of the waveform.

Conditions	<p>The specified waveform must exist in the Waveform List.</p> <p>This is an overlapping command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i>.)</p>
Group	Waveform
Syntax	WLISt:WAVeform:ROTate:POINTs <wfm_name>,<points>
Arguments	<p><wfm_name>::= <string></p> <p><points>::= <NR3></p> <p>Range is dependent on the named waveform.</p> <p>Default: 0.</p>
Examples	WLISt:WAVEFORM:ROTATE:POINTS "waveform",2500 rotates the waveform named "Waveform" by 2500 points.

WLISt:WAVEform:SCALE (No Query Form)

This command rescales the amplitude of the specified waveform by the specified multiplication factor.

Conditions	<p>The specified waveform must exist in the Waveform List.</p> <p>This is an overlapping command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i>.)</p>
Group	Waveform
Syntax	<code>WLISt:WAVEform:SCALE <wfm_name>,<multiplier_factor></code>
Arguments	<p><code><wfm_name>::= <string></code></p> <p><code><multiplier_factor>::= <NR3></code> Range: 0.1 to 100. Default: 1.</p>
Examples	<p><code>WLISt:WAVEFORM:SCALE "waveform",2</code> rescales the waveform named "Waveform" by a factor of 2.</p>

WLISt:WAVeform:SDCorrection (No Query Form)

This command applies the Sin(x)/x distortion correction to the specified waveform in the waveform list. Optionally, you can define the end frequency of the Sin(x)/x distortion correction. The specified waveform must be in the waveform list of the current setup.

Conditions	This is an overlapping command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i> .)
Group	Waveform
Syntax	WLISt:WAVeform:SDCorrection <wfm_name>[,<end_frequency>]
Arguments	<p><wfm_name>::=<string> This is the name of the waveform (in the waveform list) to apply the Sin(x)/x correction.</p> <p><end_frequency>::=<NRf> Range: Minimum = ½ system sample rate, Maximum = ½ the recommended waveform sample rate.</p>
Examples	WLISt:WAVEFORM:SDCORRECTION "myWaveform",4E9 applies Sin(x)/x correction to the waveform named myWaveform.

WLISt:WAVeform:SFORmat

This command sets or returns the signal format of the specified waveform in the waveform list.

Group Waveform

Syntax WLISt:WAVeform:SFORmat <wfm_name>,{REAL|I|Q}
WLISt:WAVeform:SFORmat? <wfm_name>

Arguments <wfm_name> ::= <string>

REAL identifies this as a waveform type other than I or Q.

I identifies this as I data.

Q identifies this as Q data.

Returns REAL
I
Q

Examples WLISt:WAVEFORM:SFORMAT "waveform1", REAL sets the signal format properties of the waveform names "Waveform1" to REAL.

WLISt:WAVEFORM:SFORMAT? "WaveformData1" might return Q, indicating the signal format properties of "WaveformData1" is set to Q to identify this as Q data.

WLISt:WAVeform:SHIFt (No Query Form)

This command shifts the phase of a waveform in the waveform list.

Conditions	This is an overlapping command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i> .)
Group	Waveform
Syntax	WLISt:WAVeform:SHIFt <wfm_name>,<phase>
Arguments	<wfm_name ::= <string> <phase> ::= <NR1>
Returns	<wfm_name::=<string> <Size>::=<NR3>
Examples	WLISt:WAVEFORM:SHIFT "Untitled25",180 *OPC? shifts the waveform titled "Untitled25" (if it exists) by 180 degrees. The overlapping command is followed with an Operation Complete query.

WLISt:WAVeform:SRATe

The command sets or returns the Recommended Sampling Rate of the specified waveform in the waveform list

Conditions If the Recommended Sampling Rate is not specified, then the result of a query will return the value for Not a Number: 9.91E+37.

Group Waveform

Syntax WLISt:WAVeform:SRATe <wfm_name>,<sample_rate>
WLISt:WAVeform:SRATe? <wfm_name>

Arguments <wfm_name>::=<string>
<sample_rate>::= <NRf>

Returns A single <NR3> value

Examples WLISt:WAVEFORM:SRATE "Ramp1000", 2E9 sets the Recommended Sampling Rate of waveform "Ramp1000" to 2 GHz.
WLISt:WAVEFORM:SRATE? "Ramp1000" might return 50.000000000E+9, indicating that the Recommended Sampling Rate of waveform "Ramp1000" is 50 GHz.

WLISt:WAVeform:TSTamp? (Query Only)

This command returns the timestamp of the specified waveform in the waveform list.

NOTE. *The timestamp is updated whenever the waveform is created (added) or changed.*

The command returns the date as a string in the form yyyy/mm/dd hh:mm:ss (a blank space between date and time).

Group	Waveform
Syntax	WLISt:WAVeform:TSTamp? <wfm_name>
Arguments	<wfm_name> ::= <string>
Returns	<p>"yyyy/mm/dd hh:mm:ss" is the waveform timestamp.</p> <p>Where</p> <p>yyyy refers to a four-digit year number mm refers to two-digit month number from 01 to 12.</p> <p>dd refers to two-digit day number in the month.</p> <p>hh refers to two-digit hour number mm refers to two-digit minute number.</p> <p>ss refers to two-digit second number.</p>
Examples	WLISt:WAVEFORM:TSTAMP? "Sine" might return "2012/07/25 9:05:21", which is the date and time the "Sine" waveform was added or last modified.

WLIST:WAVEform:TYPE? (Query Only)

This command returns the type of the waveform.

NOTE. *This command exists for backwards compatibility with the AWG5000 and AWG7000 series instruments.*

Group	Waveform
Syntax	WLIST:WAVEform:TYPE? <wfm_name>
Arguments	<wfm_name> ::= <string>
Returns	REAL
Examples	WLIST:WAVEFORM:TYPE? "Ramp1000" returns REAL.

WPLugin:ACTive

This command sets or returns the active waveform creation plug-in.

Conditions	<p>The Sequencing option must be enabled.</p> <p>This is an overlapping command. (See page 2-9, <i>Sequential, blocking, and overlapping commands</i>.)</p>
Group	Waveform plug-in
Syntax	WPLugin:ACTive <plugin_name>
Arguments	<plugin_name>::=<string>
Returns	A single string representing the active waveform creation plug-in.
Examples	<p>WPLUGIN:ACTIVE "Multitone" sets Multitone plug-in as the active plug-in.</p> <p>WPLUGIN:ACTIVE? might return "Multitone", indicating the Multitone plug-in is currently active.</p>

WPLugin:PLUGins? (Query Only)

This command returns all the available waveform creation plug-ins installed. The response returns a comma separated string with all the plug-in names.

Group	Waveform plug-in
Syntax	WPLugin:PLUGins?
Returns	<p><string>::= <plugin_name>,<plugin_name>,</p> <p>Plugin_name is the waveform plug-in name(s).</p>
Examples	<p>WPLUGIN:PLUGINS? might return "Basic waveform,Multitone" indicating that the Basic Waveform and Multitone plug-ins are installed.</p>

Status and Events

Status and events

The SCPI interface in the instrument includes a status and event reporting system that enables the user to monitor crucial events that occur in the instrument. The instrument is equipped with four registers and one queue that conform to IEEE Std 488.2. This section discusses these registers and queues along with status and event processing.

Status and event reporting system

The following figure outlines the status and event reporting mechanism offered in the arbitrary waveform generators. It contains three major blocks

- Standard Event Status
- Operation Status
- Questionable Status (fan-out structure)

The processes performed in these blocks are summarized in the Status Byte. The three blocks contain four types of registers as shown in the following table.

Table 3-1: Register type

Register	Description
Condition register	Records event occurrence in the instrument. Read only.
Transition register (positive/negative)	A positive transition filter allows an event to be reported when a condition changes from false to true. A negative filter allows an event to be reported when a condition changes from true to false. Setting both positive and negative filters true allows an event to be reported anytime the condition changes. Clearing both filters disables event reporting.
Event register	Records events filtered by the transition register. Read only.
Enable register	Masks the event register to report in the summary bit. User-definable.

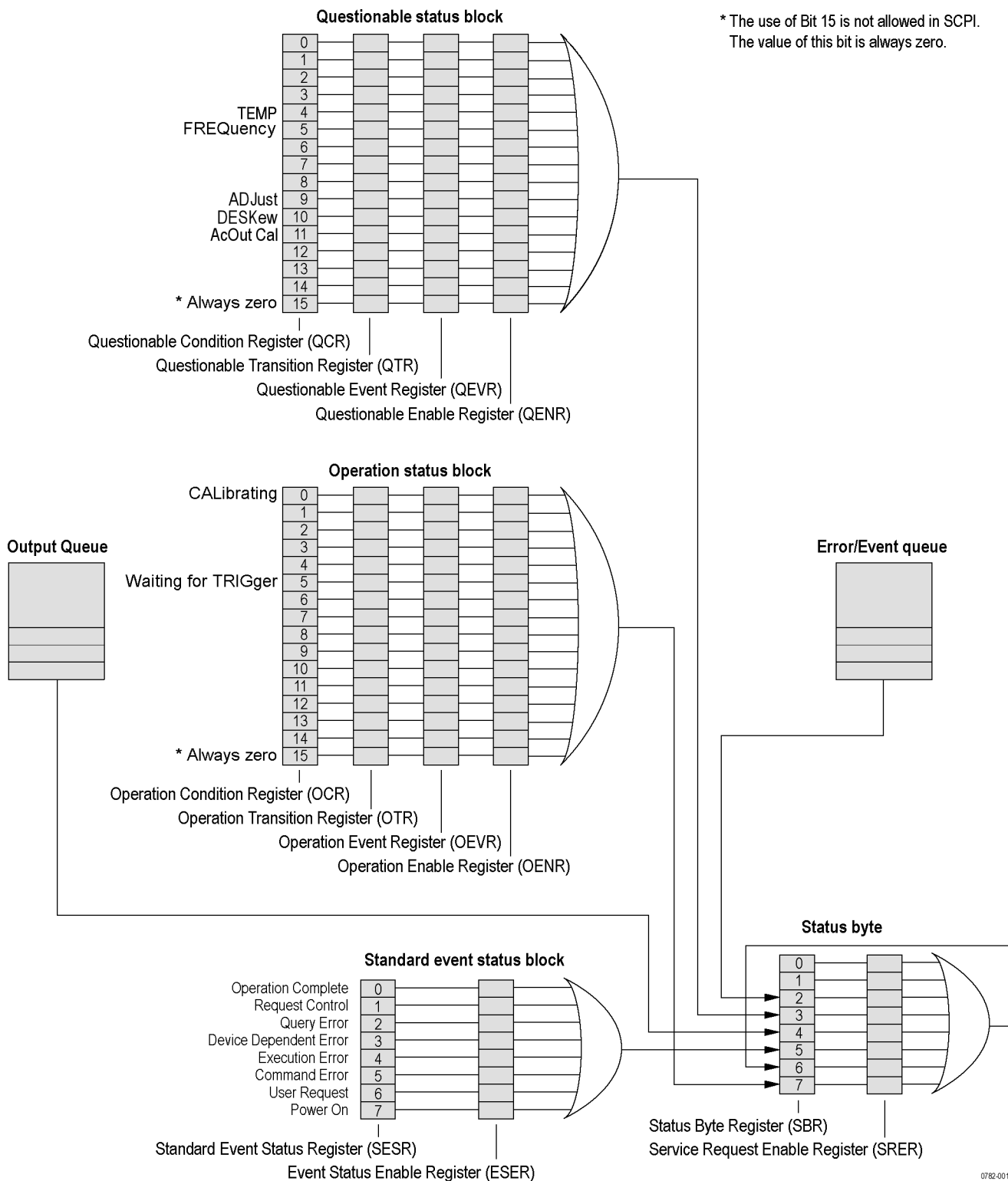


Figure 3-1: Status/Event reporting mechanism

Status byte

The Status Byte contains the following two registers

- Status Byte Register (SBR)
- Service Request Enable Register (SRER)

Status Byte Register (SBR)

The SBR is made up of 8 bits. Bits 4, 5 and 6 are defined in accordance with IEEE Std 488.2. These bits are used to monitor the output queue, SESR and service requests, respectively. The contents of this register are returned when the *STB? query is used.

	6						
	RQS	5	4	3	2	1	0
7		ESB	MAV	QSS	EAV	—	—
OSS	6						
	MSS						

Figure 3-2: Status Byte Register (SBR)

Table 3-2: SBR bit functions

Bit	Description
7	Operation Summary Status (OSS). Summary of the operation status register.
6	Request Service (RQS)/Master Status Summary (MSS). When the instrument is accessed using the serial poll command, this bit is called the Request Service (RQS) bit and indicates to the controller that a service request has occurred. The RQS bit is cleared when serial poll ends. When the instrument is accessed using the *STB? query, this bit is called the Master Status Summary (MSS) bit and indicates that the instrument has issued a service request for one or more reasons. The MSS bit is never cleared to 0 by the *STB? query.
5	Event Status Bit (ESB). This bit indicates whether or not a new event has occurred after the previous Standard Event Status Register (SESR) has been cleared or after an event readout has been performed.
4	Message Available Bit (MAV). This bit indicates that a message has been placed in the output queue and can be retrieved.
3	Questionable Summary Status (QSS). Summary of the Questionable Status Byte register.
2	Event Quantity Available (EAV). Summary of the Error Event Queue.
1-0	Not used

Service Request Enable Register (SRER)

The SRER is made up of bits defined exactly the same as bits 0 through 7 in the SBR as shown in the following figure. This register is used by the user to determine what events will generate service requests.

The SRER bit 6 cannot be set. Also, the RQS is not maskable.

The generation of a service request with the GPIB interface involves changing the SRQ line to LOW and making a service request to the controller. The result is that a status byte for which an RQS has been set is returned in response to serial polling by the controller.

Use the *SRE command to set the bits of the SRER. Use the *SRE? query to read the contents of the SRER. Bit 6 must normally be set to 0.

7	6	5	4	3	2	1	0
OSB	—	ESB	MAV	QSB	—	—	—

Figure 3-3: Service Request Enable Register (SRER)

Standard Event Status Block (SESB)

Reports the power on/off state, command errors, and the running state. It consists of the following registers

- Standard Event Status Register (SESR)
- Event Status Enable Register (ESER)

These registers are made up of the same bits defined in the following figure and table. Use the *ESR? query to read the contents of the SESR. Use the *ESE() command to access the ESER.

7	6	5	4	3	2	1	0
PON	—	CME	EXE	DDE	QYE	—	OPC

Figure 3-4: Standard event status register

Table 3-3: Standard event status register bit definition

Bit	Description
7	Power On (PON). Indicates that the power to the instrument is on.
6	Not used.
5	Command Error (CME). Indicates that a command error has occurred while parsing by the command parser was in progress.
4	Execution Error (EXE). Indicates that an error occurred during the execution of a command. Execution errors occur for one of the following reasons <ul style="list-style-type: none"> ■ When a value designated in the argument is outside the allowable range of the instrument, or is in conflict with the capabilities of the instrument. ■ When the command could not be executed properly because the conditions for execution differed from those essentially required.
3	Device-Dependent Error (DDE). An instrument error has been detected.

Table 3-3: Standard event status register bit definition (cont.)

Bit	Description
2	Query Error (QYE). Indicates that a query error has been detected by the output queue controller. Query errors occur for one of the following reasons <ul style="list-style-type: none"> ■ An attempt was made to retrieve messages from the output queue, despite the fact that the output queue is empty or in pending status. ■ The output queue messages have been cleared despite the fact that they have not been retrieved.
1	Not used.
0	Operation Complete (OPC). This bit is set with the results of the execution of the *OPC command. It indicates that all pending operations have been completed.

When an event occurs, the SESR bit corresponding to the event is set, resulting in the event being stacked in the Error/Event Queue. The SBR OAV bit is also set. If the bit corresponding to the event has also been set in the ESER, the SBR ESB bit is also set. When a message is sent to the Output Queue, the SBR MAV bit is set.

Operation status block

The operation status block contains conditions that are part of the instrument's normal operation. It consists of the following registers

- Operation Condition Register (OCR)
- Operation Positive/ Negative Transition Register (OPTR/ONTR)
- Operation Event Register (OEVR)
- Operation Enable Register (OENR)

These registers are made up of the same bits defined in the following table and figure. Use the STATUS:OPERation commands to access the operation status register set.

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
										WFT					CAL

Figure 3-5: Operation status register

Table 3-4: Operation status register bit definition

Bit	Description
15	Always zero (0).
14 - 6	Not used.
5	Waiting for trigger (WFT). Indicates that the instrument is waiting for a trigger event to occur.

Table 3-4: Operation status register bit definition (cont.)

Bit	Description
4 - 1	Not used.
0	Calibrating (CAL). Indicates that the instrument is currently performing a calibration.

When the specified state changes in the OCR, its bit is set or reset. This change is filtered with a transition register, and the corresponding bit of the OEVR is set. If the bit corresponding to the event has also been set in the OENR, the SBR OSS bit is also set.

Questionable status block

The questionable status register set contains bits which give an indication of the quality of various aspects of the signal together with the fanned out registers as described in the next subsections. It consists of the following registers

- Questionable Condition Register (QCR)
- Questionable Positive/Negative Transition Register (QPTR/QNTR)
- Questionable Event Register (QEVN)
- Questionable Enable Register (QENR)

These registers are made up of the same bits defined in the following table and figure. Use the STATUS:QUESTIONable commands to access the questionable status register set.

15	14	13	12	11 AcOut Cal	10 DESK	9 ADJ	8	7	6	5 FREQ	4 TEMP	3	2	1	0
----	----	----	----	--------------------	------------	----------	---	---	---	-----------	-----------	---	---	---	---

Figure 3-6: Questionable status register**Table 3-5: Questionable status register bit definition**

Bit	Description
15	Always zero (0).
14 – 12	Not used.
11	AcOut Calibration (AC) AC output is operating outside of calibrated limits. Adjustments of A1, A2, A3, and Dac may create amplitudes that are above or below calibrated limits.
10	DESKew Deskew calibration required due to temperature out of range.
9	ADJust (ADJ). External clock adjustment required.

Table 3-5: Questionable status register bit definition (cont.)

Bit	Description
8 – 6	Not used
5	FREQuency (FREQ). Using External Reference or frequency is out of range.
4	TEMPerature (TEMP). Calibration required due to instrument temperature change.
3 – 0	Not used.

When the specified state changes in the QCR, its bit is set or reset. This change is filtered with a transition register, and the corresponding bit of the QEVR is set. If the bit corresponding to the event has also been set in the QENR, the SBR QSS bit is also set.

Queues

There are two types of queues in the status reporting system used in the instrument: output queues and event queues.

Output queue The output queue is a FIFO (first in, first out) queue and holds response messages to queries, where they await retrieval. When there are messages in the queue, the SBR MAV bit is set.

The output queue will be emptied each time a command or query is received, so the controller must read the output queue before the next command or query is issued. If this is not done, an error will occur and the output queue will be emptied; however, the operation will proceed even if an error occurs.

Event queue The event queue is a FIFO queue and stores events as they occur in the instrument. If more than 32 events occur, event 32 will be replaced with event code -350 ("Queue Overflow"). The error code and text are retrieved using the SYSTem:ERRor queries.

Status and event processing sequence

The following figure shows an outline of the sequence for status and event processing.

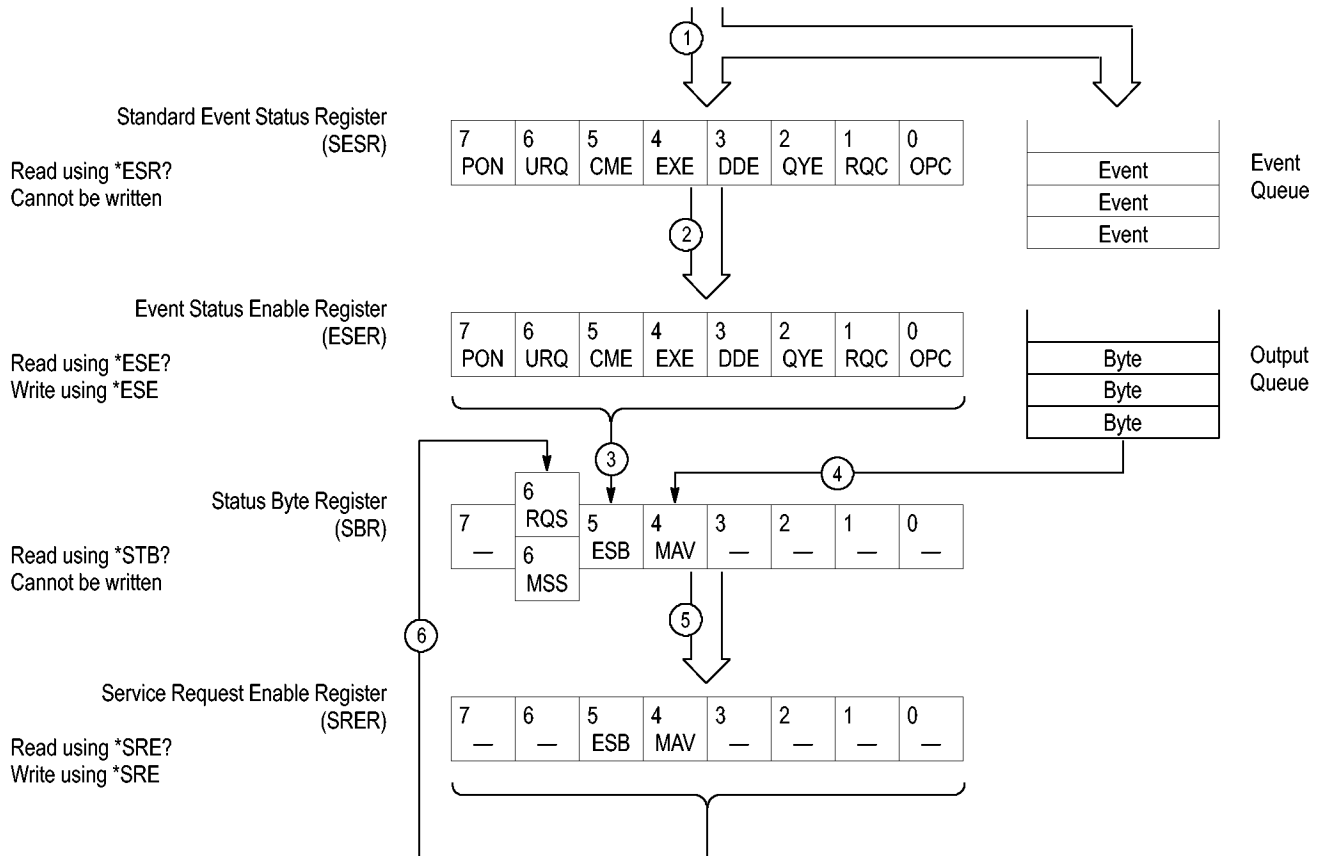


Figure 3-7: Status and event processing sequence

1. If an event has occurred, the SESR bit corresponding to that event is set and the event is placed in the event queue.
2. A bit corresponding to that event in the ESER has is set.
3. The SBR ESB bit is set to reflect the status of the ESER.
4. When a message is sent to the output queue, the SBR MAV bit is set.
5. Setting either the ESB or MAV bits in the SBR sets the respective bit in the SRER.
6. When the SRER bit is set, the SBR MSS bit is set and a service request is generated when using the GPIB interface.

Synchronizing execution

Almost all commands are executed in the order in which they are sent from the controller. However, some commands perform data analysis in another thread, and another command can thus be executed concurrently. These types of commands are called overlapping commands. (See page 2-9, *Sequential, blocking, and overlapping commands*.)

Some examples of these types of commands include the following.

- AWGControl:RUN
- CLOCk:JITter
- MMEMoRY:SAVE:WFMX

You have two options to achieve command synchronization.

- Using the status and event reporting function
- Using synchronizing commands

Using the status and event reporting function

In the following example, the Operation Condition Register (OCR) is being used to provide synchronization.

```
STATUS:OPERation:NTRansiOn 32
// Set the filter of the OCR Waiting for Trigger bit
STATUS:OPERation:ENABle 32
// Enable the filter of the OCR Waiting for Trigger bit
*SRE 128
// Set the SRER OSS bit
```

The command waits for generation of SRQ.

Using synchronizing commands

The IEEE-488.2 common commands include the following synchronizing commands

- *OPC
- *OPC?
- *WAI

Using the *OPC command. The *OPC command causes the AWG to sense the internal flag referred to as the “No-Operation-Pending” flag. (An on-going overlapped command would be an operation that is pending.) When the pending operation has completed, the Operation Complete (OPC) bit in the Event Status Register (ESR) is set. The user can poll the ESR register (*ESR?) or enable the service request process to be notified.

Using the *OPC? query. The *OPC? query causes the AWG to sense the internal flag referred to as the “No-Operation-Pending flag (same as the *OPC command).

When the pending operation has completed, a “1” will be returned to the client. This query does not use the ESR register and the service request process does not work.

Using the *WAI command. The *WAI command causes the AWG to sense the same internal flag, referred to as the No-Operation-Pending” flag. The *WAI command prevents any command or query from executing until any pending operation completes.

Error messages and codes

Error codes with negative values are SCPI standard codes. Error codes with positive values are unique to the AWG70000 Series Arbitrary Waveform Generators.

Event codes and messages can be obtained by using the queries `SYSTEM:ERROR?` and `SYSTEM:ERROR:ALL?` These are returned in the following format

Command errors

Command errors are returned when there is a syntax error in the command.

Table 3-6: Command errors

Error code	Error message
-100	Command
-101	Invalid character
-102	Syntax
-103	Invalid separator
-104	Data type
-105	GET not allowed
-108	Parameter not allowed
-109	Missing parameter
-110	Command header
-111	Header separator
-112	Program mnemonic too long
-113	Undefined header
-114	Header suffix out of range
-120	Numeric data
-121	Invalid character in number
-123	Exponent too large
-124	Too many digits
-128	Numeric data not allowed
-130	Suffix
-131	Invalid suffix
-134	Suffix too long
-138	Suffix not allowed

Table 3-6: Command errors (cont.)

Error code	Error message
-140	Character data
-141	Invalid character data
-144	Character data too long
-148	Character data not allowed
-150	String data
-151	Invalid string data
-158	String data not allowed
-160	Block data
-161	Invalid block data
-168	Block data not allowed
-170	Expression
-171	Invalid expression
-178	Expression data not allowed
-180	Macro
-181	Invalid outside macro definition
-183	Invalid inside macro definition
-184	Macro parameter

Execution errors

These error codes are returned when an error is detected while a command is being executed.

Table 3-7: Execution errors

Error code	Error message
-200	Execution
-201	Invalid while in local
-202	Settings lost due to RTL
-210	Trigger
-211	Trigger ignored
-212	Arm ignored
-213	Init ignored
-214	Trigger deadlock
-215	Arm deadlock

Table 3-7: Execution errors (cont.)

Error code	Error message
-220	Parameter
-221	Settings conflict
-222	Data out of range
-223	Too much data
-224	Illegal parameter value
-225	Out of memory
-226	Lists not same length
-230	Data corrupt or stale
-231	Data questionable
-240	Hardware
-241	Hardware missing
-250	Mass storage
-251	Missing mass storage
-252	Missing media
-253	Corrupt media
-254	Media full
-255	Directory full
-256	Filename not found
-257	Filename
-258	Media protected
-260	Execution expression
-261	Math in expression
-270	Execution macro
-271	Macro syntax
-272	Macro execution
-273	Illegal macro label
-274	Execution macro parameter
-275	Macro definition too long
-276	Macro recursion
-277	Macro redefinition not allowed
-278	Macro header not found
-280	Program
-281	Cannot create program
-282	Illegal program name
-283	Illegal variable name
-284	Program currently running
-285	Program syntax

Table 3-7: Execution errors (cont.)

Error code	Error message
-286	Program runtime
-290	Memory use
-291	Out of memory
-292	Referenced name does not exist
-293	Referenced name already exists
-294	Incompatible type

Device specific errors

These error codes are returned when an internal instrument error is detected. This type of error can indicate a hardware problem or programming error.

Table 3-8: Device specific errors

Error code	Error message
-300	Device specific or sequence step error
-310	System
-311	Memory
-312	PUD memory lost
-313	Calibration memory lost
-314	Save/Recall memory lost
-315	Configuration memory lost
-320	Storage fault
-321	Out of memory
-330	Self test failed
-340	Calibration failed
-350	Queue overflow
-360	Communication
-361	Parity in program message
-362	Framing in program message
-363	Input buffer overrun

Query and system errors

These error codes are returned in response to an unanswered query.

Table 3-9: Query errors

Error code	Error message
-400	Query error
-410	Query interrupted
-420	Query untermiated
-430	Query deadlocked
-440	Query untermiated after indefinite period
-500	Power on
-600	User request
-700	Request control
-800	Operation complete

Instrument specific error codes

These error codes and messages are unique to the AWG70000 Series instruments.

Table 3-10: Device errors

Error code	Error message
500	Calibration in process.
501	Waiting for trigger.
550	Lost frequency lock with External Reference source.
551	External Reference frequency out of range.
552	Calibration recommended, temperature change.
553	Ext Clk adjustment recommended for frequency change.
554	Ext Clk adjustment recommended for temperature change.
555	Deskew Calibration recommended.
556	Synchronization Adjust recommended on master.
557	Sync Clock unlocked. Lost frequency lock with Clock In provided by the system – unable to play.
558	Sync Frequency out of range. Clock In frequency is higher or lower than the specified range or the value specified by the system.
559	Configuration recommended on Master. Configure the system on the Master or adjust if already configured to properly synchronize the system.

Table 3-10: Device errors (cont.)

Error code	Error message
560	AC Out amplitude beyond calibrated range. A1, A2, A3 and Dac are adjusted such that the amplitude/power is above the calibrated limit.
1000	Waveform allocation failed. Not enough memory for waveform – unable to complete the operation.
1001	Registry write failed.
1002	Option 03 (Sequencing) not enabled – unable to complete the operation.
1100	Function generator failed. Unable to generate the defined waveform.
1101	Clock settings changed. Functions mode uses internal clock and no jitter reduction.
1102	Function generator frequency too high; waveform too short.
1103	Function generator frequency too low; waveform too long
1104	Function generator hardware failed.
1200	Load failure, unable to load waveform or sequence.
1201	Waveform load max length error, waveform length exceeds maximum samples - unable to load waveform. Maximum length is based on sample rate and options.
1202	Waveform load min length error, waveform length less than minimum samples - unable to load waveform. Use Modify waveform to increase the number of waveform points by adding points or repeating the waveform.
1203	Waveform load granularity error, length is not divisible by granularity - unable to load waveform. Use Modify waveform to add or subtract one point or repeat the waveform for 2 cycles.
1204	Play failed, no waveform assigned; not all enabled channels have waveforms assigned.
1205	Play failed, no waveform assigned to enabled channel.
1206	Play failed, resampled waveform exceeds maximum. Use Modify waveform to decrease the number of waveform points.
1207	Play failed, resampled waveform too small. Use Modify waveform to increase the number of waveform points.
1208	Play failed, waveform granularity error. Resampled waveform length not divisible by granularity.
1209	Play failed, hardware failure.
1210	Play failed to stop, hardware failure.

Table 3-10: Device errors (cont.)

Error code	Error message
1212	Sample rate not available, requested sample rate is not available; sample rate set to nearest value.
1213	Failed to load sequence, sequence step count exceeds hardware limit.
1214	Failed to load sequence, sequence step has no asset assigned.
1215	Failed to load sequence, repeat count of Sequence step exceeds hardware limit.
1216	Failed to load sequence, sequence step contains invalid Goto step.
1217	Failed to load sequence, sequence step contains invalid Event Jump step.
1218	Failed to load sequence, pattern jump table contains invalid jump target.
1219	Hardware error, unable to load waveform or sequence due to hardware error.
1220	Empty sequence, sequence is empty - unable to load.
1221	Failed to load sequence, sequence step must contain waveforms of equal length.
1222	Failed to load sequence, pattern jump table size exceeds hardware limit.
1223	Failed to load sequence, total waveform(s) length exceeds maximum samples.
1224	Failed to find sequence, no sequence definition was found in the file.
1225	Failed to load sequence, subsequence step has no waveform assigned
1226	Failed to load sequence, repeat count of subsequence exceeds hardware limit.
1227	Failed to load sequence, subsequence step contains invalid Goto step.
1228	Failed to load sequence, subsequence step must contain waveforms of equal length.
1229	Failed to play, sample rate must be set without failure before play may begin.
1230	Failed to play, AWG is in calibration/diagnostic mode.
1231	Failed to play, clock must be locked before play may begin.
1232	Failed to load sequence, subsequence does not contain track.
1300	Unknown exception, unable to save file.
1301	File save error, unknown error - unable to save waveform.
1302	File restore error, unknown error - unable to open asset from setup file.

Table 3-10: Device errors (cont.)

Error code	Error message
1303	Unknown exception, unable to open waveform.
1304	Duplicate waveform name, a waveform with that name is already in the Waveform List.
1307	File access error, cannot access the file because it is being used by another process.
1308	Recall waveform failed, missing parameter.
1309	Recall waveform failed, unsupported number of bits.
1310	Recall waveform failed, invalid marker type. Marker data must be UInt8.
1311	Recall waveform failed, invalid marker data length.
1312	Recall waveform failed, waveform name and/or data not found.
1313	Recall waveform failed, unsupported waveform file type.
1314	Recall waveform failed, invalid sample data.
1315	Recall waveform failed, unable to read sample data.
1316	Recall waveform failed, unable to read Matlab HDF5 data set.
1317	Recall waveform failed, invalid IQ data format.
1318	Recall waveform failed, invalid DPX spectral data format.
1319	Recall waveform failed, invalid RSA header format.
1320	Recall waveform failed, data length error.
1321	Recall waveform failed, invalid data format.
1322	Recall waveform failed, invalid marker data format.
1323	Recall waveform failed, invalid file extension.
1324	Recall waveform failed, invalid file header.
1325	Recall waveform failed, file type unknown.
1326	Recall waveform failed, file version not supported.
1327	Recall waveform failed, no waveform data.
1328	Asset not found, unable to import asset(s).
1329	Recall waveform failed, unable to open waveform from RSA file.
1330	Recall waveform failed, waveform format not supported.
1331	Invalid operation.
1332	Read failed, unable to open file.
1333	Export failed to write file.
1334	Recall waveform failed, unable to read file.
1335	Export failed, out of disk space.
1336	File not found.
1337	File format error, file format not valid - unable to open file.
1338	Failed to delete file.

Table 3-10: Device errors (cont.)

Error code	Error message
1340	Invalid save type, save type not valid - unable to save file.
1341	Asset name error, asset list already has an asset with that name - unable to save file.
1342	Asset not found, item is not in the Asset List - unable to save file.
1343	Recall failed, IQ waveform error.
1344	Restore setup failed, unable to open setup file.
1345	Error in file format or data, unable to restore the sequence and it's assets.
1346	Subsequences not supported, restored subsequences will be added to the Sequence List, but the sequence steps they occupied will be shown as Empty.
1347	Missing asset file(s), waveform or sequence file(s) not found; shown as Empty in the sequence table.
1348	Restore pattern table error, Pattern Jump table has too many rows; Restored the first 256 patterns only.
1349	Failed to open waveform in editor, Waveform was not created by this editor.
1400	Waveform Editor error, unable to start waveform editor.
1500	Capture and Playback, compile failed.
1501	Capture and Playback, failed to add signal.
1502	Capture and Playback, compiled failed. More than one signal selected to compile and assign to channel; Select only one signal to assign to channel.
1503	Capture and Playback, compile failed. Invalid channel ID.
1504	Capture and Playback, compile failed. No signal selected to compile.
1600	Timing error, unable to change clock setting.
1601	Timing error, lost timing lock.
1602	Channel error, unable to change channel parameter.
1603	USB lock/unlock failed. Administrator permissions are required to lock or unlock the USB ports. Check the Windows security settings or contact your network administrator.
1604	Force Jump error, unable to force jump to specified step.
1605	External Clock adjustment failed, check the Clock In signal.
1606	External Clock error, clock In differs from external clock adjustments - Check the Clock In signal or Adjust.
1607	External Clock detection and adjustment failed, check the Clock In signal.

Table 3-10: Device errors (cont.)

Error code	Error message
1608	External Clock detection failed, Clock In signal outside of range.
1609	External Reference detection failed, Reference In signal outside of range.
1700	Waveform Editor failure. Resample failed, sample rate value not found. The waveform did not include the recommended sample rate.
1701	Waveform Editor failure. Failed to resample waveform.
1702	Waveform Editor failure. Resampling ratio too small - unable to resample the waveform.
1703	Waveform Editor failure. Resampling ratio too large - unable to resample the waveform.
1704	Waveform Editor failure. Shift/rotate failed - unable to modify waveform.
1705	Waveform Editor failure. Compile failed - another compile operation already in progress.
1707	Waveform Editor failure. Compile failed - can't modify a waveform that is being played out.
1708	Waveform Editor failure. Compiler warning, clock pattern truncated.
1709	Waveform Editor failure. Compile error - cursor values out of range
1710	Waveform Editor failure. Compile error - number of steps must be a positive number.
1750	Step number exceeds max, exceeds max number of steps - failed to add step(s).
1751	Invalid step, invalid step specified.
1752	Add step(s) failure, failed to add step(s) to sequence.
1753	Insert step(s) failure, failed to insert step(s) to sequence.
1754	Remove step(s) failure, failed to remove step(s) from sequence.
1755	Failed to add track, exceeded maximum number of tracks.
1756	Failed to remove track, sequence must have at least one track.
1757	Invalid track number, invalid track number specified.
1758	Add track error, failed to add track.
1759	Remove track error, failed to remove track.
1760	Sequence name in use, name already used in Sequence List - unable to create sequence.
1761	Sequence creation failed, unable to create sequence.

Table 3-10: Device errors (cont.)

Error code	Error message
1762	Paste error, clipboard values do not match paste area data type(s).
1763	Unable to set subsequence, a waveform cannot be set as a subsequence.
1764	Unable to set subsequence, the sequence already contains a subsequence.
1765	Unable to set subsequence, this sequence is already a subsequence.
1766	Unable to set subsequence, you cannot set a sequence as a subsequence of itself.
1767	Unable to set subsequence, the total number of steps exceeds the maximum number of steps.
1768	Unable to set flag definition, step has a subsequence.
1800	Invalid name, invalid name or handle for asset.
1801	Renaming error, no name given - unable to rename asset.
1802	Asset name in use, name already used in list - unable to rename asset.
1803	Rename failed, linked file missing.
1804	File name in use, unable to rename asset.
1805	Waveform name in use, name already used in list - unable to create waveform.
1806	Waveform creation failed, unable to create waveform.
1900	No tests selected in Diagnostics, select one or more tests and try again.
1902	Diagnostics are still running, abort and try again.
1903	Calibrations are still running. Abort and try again.
2000	AWGSYNC01 Communication failed.
2001	AWGSYNC01 Connection failure.
2003	AWGSYNC01 Configuration failure. AWGSYNC01 Port has not been enabled or is not connected.
2004	AWGSYNC01 Deskew Calibration failure. Retry after verifying calibration, clock and port connections of AWG70000 to AWGSYNC01.
2005	Failed to set sample rate on Port 2.
2006	Failed to set sample rate on Port 3.
2007	Failed to set sample rate on Port 4.
2008	AWGSYNC01 time out failure.
2009	AWGSYNC01 alignment failure, failed to set sample rate in AWGSYNC01 system.

Table 3-10: Device errors (cont.)

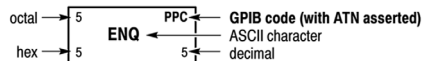
Error code	Error message
2010	AWGSYNC01 Play failure.
2011	AWGSYNC01 Configuration failure, AWGSYNC01 Configuration is not available while playing waveforms.
2012	AWGSYNC01 Adjust failure.
2013	AWGSYNC01 missing configuration failure. AWGSYNC01 system must be configured before Deskew Calibration.
2014	AWGSYNC01 missing configuration failure. AWGSYNC01 system must be configured before Adjust Calibration.
2015	AWGSYNC01 synchronization failure. An asset or setting was modified causing the slave AWG70000 to lose synchronization with the system.
2016	AWGSYNC01 Deskew Calibration failure, change Clock Source to Internal or Clock In, External Variable on Master AWG70000 for Deskew Calibration.
2017	AWGSYNC01 Deskew Calibration failure, Clock In differs from external clock adjustments or is unlocked.
2018	AWGSYNC01 synchronization failure, Run mode was modified causing the slave AWG70000 to lose synchronization with the system.
2019	AWGSYNC01 Deskew Calibration failure, stop playback before proceeding with Deskew Calibration.
2200	Batch Compiler. Compile failed, failed to parse definition file.
2201	Batch Compiler. Compile failed, failed to parse definition file.
2202	Batch Compiler. Compile failed, definition file does not have sample rate information.
2203	Batch Compiler. Compile failed, definition file does not contain sequence track information.
2204	Batch Compiler. Compile failed, failed to parse definition file: tracks must contain same number of steps.
2205	Batch Compiler. Compile failed, failed to compile waveforms.
2207	Batch Compiler. Compile failed, invalid definition file"
2208	Batch Compiler. Compile failed, sequence name in use.

Appendices

Appendix A: Character charts

B7 B6 B5 BITS B4 B3 B2 B1	0 0 0		0 0 1		0 1 0		0 1 1		1 0 0		1 0 1		1 1 0		1 1 1		
	CONTROL				NUMBERS SYMBOLS				UPPER CASE				LOWER CASE				
0 0 0 0	0 0	NUL	20 0	DLE	40 20	LA0 32	60 30	LA16 48	100 40	TA0 64	120 50	TA16 80	140 60	SA0 96	160 70	SA16 112	
0 0 0 1	1 1	GTL SOH	21 1	LL0 DC1	41 21	LA1 33	61 31	LA17 49	101 41	TA1 65	121 51	TA17 81	141 61	SA1 97	161 71	SA17 113	
0 0 1 0	2 2	STX	22 2	DC2	42 22	LA2 34	62 32	LA18 50	102 42	TA2 66	122 52	TA18 82	142 62	SA2 98	162 72	SA18 114	
0 0 1 1	3 3	ETX	23 3	DC3	43 23	LA3 35	63 33	LA19 51	103 43	TA3 67	123 53	TA19 83	143 63	SA3 99	163 73	SA19 115	
0 1 0 0	4 4	SDC EOT	24 4	DC4	44 24	LA4 36	64 34	LA20 52	104 44	TA4 68	124 54	TA20 84	144 64	SA4 100	164 74	SA20 116	
0 1 0 1	5 5	PPC ENQ	25 5	PPU NAK	45 25	LA5 37	65 35	LA21 53	105 45	TA5 69	125 55	TA21 85	145 65	SA5 101	165 75	SA21 117	
0 1 1 0	6 6	ACK	26 6	SYN	46 26	LA6 38	66 36	LA22 54	106 46	TA6 70	126 56	TA22 86	146 66	SA6 102	166 76	SA22 118	
0 1 1 1	7 7	BEL	27 7	ETB	47 27	LA7 39	67 37	LA23 55	107 47	TA7 71	127 57	TA23 87	147 67	SA7 103	167 77	SA23 119	
1 0 0 0	8 8	GET BS	30 8	SPE CAN	50 28	LA8 40	70 38	LA24 56	110 48	TA8 72	130 58	TA24 88	150 68	SA8 104	170 78	SA24 120	
1 0 0 1	9 9	TCT HT	31 9	SPD EM	51 29	LA9 41	71 39	LA25 57	111 49	TA9 73	131 59	TA25 89	151 69	SA9 105	171 79	SA25 121	
1 0 1 0	12 A	LF	32 10	SUB	52 2A	LA10 42	72 3A	LA26 58	112 4A	TA10 74	132 5A	TA26 90	152 6A	SA10 106	172 7A	SA26 122	
1 0 1 1	13 B	VT	33 11	ESC	53 2B	LA11 43	73 3B	LA27 59	113 4B	TA11 75	133 5B	TA27 91	153 6B	SA11 107	173 7B	SA27 123	
1 1 0 0	14 C	FF	34 12	FS	54 2C	LA12 44	74 3C	LA28 60	114 4C	TA12 76	134 5C	TA28 92	154 6C	SA12 108	174 7C	SA28 124	
1 1 0 1	15 D	CR	35 13	GS	55 2D	LA13 45	75 3D	LA29 61	115 4D	TA13 77	135 5D	TA29 93	155 6D	SA13 109	175 7D	SA29 125	
1 1 1 0	16 E	SO	36 14	RS	56 2E	LA14 46	76 3E	LA30 62	116 4E	TA14 78	136 5E	TA30 94	156 6E	SA14 110	176 7E	SA30 126	
1 1 1 1	17 F	SI	37 15	US	57 2F	LA15 47	77 3F	UNL 63	117 4F	TA15 79	137 5F	UNT 95	157 6F	SA15 111	177 7F	RUBOUT (DEL) 127	
	ADDRESSED COMMANDS			UNIVERSAL COMMANDS		LISTEN ADDRESSES				TALK ADDRESSES				SECONDARY ADDRESSES OR COMMANDS			

KEY



Tektronix

REF: ANSI STD X3.4-1977
IEEE STD 488.1-1987
ISO STD 646-2973

Appendix B: Raw socket specification

TCP/IP is used as the network protocol, and the port number is variable. Commands can be sent from the application program through the TCP/IP socket interface, and queries can be received through the interface.

- The Line Feed (LF) code is needed as a terminator at the end of a message.
- The IEEE 488.1 standard (for example, Device Clear or Service Request) is not supported.
- The Message Exchange Control Protocol in the IEEE 488.2 is not supported. However, common commands such as *ESE and the event handling features are supported.
- The Indefinite format (the block start at #0) in the <ARBITRARY BLOCK PROGRAM DATA> of the IEEE 488.2 is not supported.

Appendix C: Factory initialization settings

Commands affected by a factory initialization (*RST command) are listed in the following table and are also noted in their command description.

NOTE. *RST does not affect waveform plug-ins.

Table C-1: Factory initialization settings

Command	Default value
ACTive:MODE	NORMal
AWGControl:RMODE	CONTinuous
CALibration:LOG:FAILuresonly	0 (off)
CLOCK:EClock:DIVider	1
CLOCK:EClock:MULTiplier	1
CLOCK:EREFerence:DIVider	1
CLOCK:EREFerence:FREQuency	35 MHz
CLOCK:EREFerence:MULTiplier	1
CLOCK:JITTer	0 (off)
CLOCK:OUTPut[:STATe]	0 (off)
CLOCK:PHASe[:ADJust[:DEGRees]]	0°
CLOCK:SOURce	INTernal
CLOCK:SOUT[:STATe]	0 (off)
CLOCK:SRATe	AWG70001 50 GS AWG70002 25 GS
DIAGnostic:CONTrol:COUNt	0
DIAGnostic:CONTrol:HALT	0 (off)
DIAGnostic:CONTrol:LOOP	ONCE
DIAGnostic:LOG:FAILuresonly	0 (off)
DIAGnostic:TYPE	NORMal
DISPlay[:PLOT][:STATe]	1 (on)
FGEN[:CHANnel[n]]:AMPLitude[:VOLTage]	500 mV
FGEN[:CHANnel[n]]:FREQuency	1.2 MHz
FGEN[:CHANnel[n]]:DCLevel	0 V
FGEN[:CHANnel[n]]:HIGH	250 mV
FGEN[:CHANnel[n]]:LOW	–250 mV
FGEN[:CHANnel[n]]:OFFSet	0 V
FGEN[:CHANnel[n]]:PHASe	0°
FGEN[:CHANnel[n]]:SYMMetry	100%
FGEN[:CHANnel[n]]:TYPE	SINE

Table C-1: Factory initialization settings (cont.)

Command	Default value
INSTrument:COUPle:SOURce	0 (off)
INSTrument:MODE	AWG
MMEMory:OPEN[:PARAmeter]:NORMAlize	NONE
OUTPut:OFF	0 (off)
OUTPut[n]::STATe]	0 (off)
OUTPut[n]:SVALue[:ANALog][::STATe]	ZERO
OUTPut[n]:SVALue:MARKer[m]	LOW
OUTPut[n]:WVALue[:ANALog][::STATe]	ZERO
OUTPut[n]:WVALue:MARKer[m]	LOW
SLISt:SEquence:EVENT:JTIMing	END
SLISt:SEquence:EVENT:PJUMp:ENABle	0 (off)
SLISt:SEquence:RFLag	1 (on)
SLISt:SEquence:STEP[n]:EJINput	0 (off)
[SOURce:]FREQuency[:CW]][::FIXed]	8 GHz
[SOURce[n]:]DAC:RESolution	10
[SOURce[n]:]MARKer[m]:DELay	0 seconds
[SOURce[n]:]MARKer[m]:VOLTage[:LEVel][::IMMediate][::AMPLitude]	1 V
[SOURce[n]:]MARKer[m]:VOLTage[:LEVel][::IMMediate]:HIGH	1 V
[SOURce[n]:]MARKer[m]:VOLTage[:LEVel][::IMMediate]:LOW	0 V
[SOURce[n]:]MARKer[m]:VOLTage[:LEVel][::IMMediate]:OFFSet	500 mV
[SOURce:]RCCouple	0 (off)
[SOURce[n]:]RMODE	CONTInuous
[SOURce[n]:]SKEW	0 seconds
[SOURce[n]:]TINPut	ATRigger
[SOURce[n]:]VOLTag[:LEVel][::IMMediate][::AMPLitude]	500 mV
[SOURce[n]:]VOLTag[:LEVel][::IMMediate]:HIGH	250 mV
[SOURce[n]:]VOLTag[:LEVel][::IMMediate]:LOW	–250 mV
SYSTem:ERRor:DIALog	1 (enabled)
TRIGger:IMPedance	50 Ω
TRIGger:LEVel	1.4 V
TRIGger:MODE	SYNChronous
TRIGger:SLOPe	POSitive.

Table C-1: Factory initialization settings (cont.)

Command	Default value
TRIGger:SOURce	EXternal
TRIGger:WVALue	ZERO

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