



# WaveStation SCPI Command Reference Manual





# Wave Station SCPI

(Standard Commands for Programmable Instruments)

## Command Reference Manual



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## Introduction to the SCPI Language

### About Commands & Queries

This section lists and describes the remote control Commands and Queries used for accessing the LeCroy WaveStation Series Function/Arbitrary Waveform Generators. All commands and queries can be locally or remotely executed.

This reference manual provides a description for each command or query along with syntax and other information for clarification purposes. The name (header) is given in both long and short form at the top of the page, and the subject is indicated as a command or query or both. Queries perform actions such as obtaining information, and are recognized by the question mark (?) following the header.

Command and Query parameters are typically provided in tabular form alphabetically by their short form.

The Command and Query description provides a brief explanation of the functionality provided. This is followed by a the Command/Query usage in its formal syntax, with the header provided in mixed case to show the derivation of the Command/Query short form (the upper case letters). Where applicable, the syntax of the query is given with the format of its response including a few examples to further illustrate the functionality.

### Command Notation

The following notation is used in the commands:

- `< >` Angular brackets enclose words that are used placeholders for either header path and/or the data parameter for a specific command.
- `:=` A colon followed by an equal sign separates a placeholder from the description of the type and range of possible command values (instead of a placeholder).
- `{ }` Braces enclose a list of choices, one of which one must be made.
- `[ ]` Square brackets enclose optional items.
- `...` An ellipsis indicates that the items both to its left and right may be repeated a number of times.

**Note:** WaveStation requires remote commands NOT contain termination characters of any kind. This includes Null characters.

## Table of Commands & Queries

Short	Long Form	Subsystem	What Command/Query does
*IDN	*IDN	SYSTEM	Retrieves the device ID including manufacturer, model, serial number, software, and firmware version.
*OPC	*OPC	SYSTEM	Sets the Event Status Register (ESR)'s OPC bit to true (1).
ARWV	ARBWAVE	Data SYSTEM	Sets the instrument to an Arbitrary waveform type or retrieves Arbitrary waveform parameters.
BSWV	BASIC_WAVE	SIGNAL	Sets or retrieves basic waveform parameters. Also, turns the channel signal On or Off.
BTWV	BURSTWAVE	SIGNAL	Sets the instrument to a Burst waveform type or retrieves Burst waveform parameters.
BUZZ	BUZZER	SYSTEM	Sets or retrieves the instrument's Buzzer status.
CHDR	COMM_HEADER		Sets the instrument's query return format.
INVT	INVERT	SIGNAL	Sets or retrieves the phase of the instrument's output signal.
MDWV	MODULATEWAVE	SIGNAL	Sets the instrument to a Modulated waveform type or retrieves Modulated waveform parameters.
OUTP	OUTPUT	SIGNAL	Sets or retrieves output state.
PACP	CHANNEL_COPY	SIGNAL	Copies the parameters from one channel to the other.
ROSC	ROSCILLATOR	SIGNAL	Sets or retrieves the instrument's clock source.
SCFG	SYSTEM_CONFIG	SYSTEM	Sets or retrieves the state used (last or default) when powering on the WaveStation.
SCSV	SCREEN_SAVE	SYSTEM	Sets or retrieves the instrument's screen saver setting.
STL	STORE_LIST	SIGNAL	Retrieves the all the waveform names stored in Wave Station's device memory.
SWWV	SWEEP	SIGNAL	Sets the instrument to a Sweep waveform type or retrieves Sweep waveform parameters.
VKEY	SYSTEM_FRONT_PANEL	SYSTEM	Performs a virtual key command on WaveStation.
SYNC	SYNC	SIGNAL	Sets or retrieves an in-phase signal.

**Note:** This table of commands is alphabetized. Some subsequent tables specifically covering command arguments are instead listed in the order in which they are functionally processed for convenience.

**IEEE 488.2 Common Command Introduction**

IEEE standard defines the common commands used for querying the basic information of the instrument or executing basic operations. These commands usually start with “\*” and the keyword command length is usually 3 characters.

**IDN – Identification Command****DESCRIPTION**

The \*IDN? Query returns the instruments identification data. The response includes manufacturer, model, serial number, software, and firmware version.

**QUERY SYNTAX**

\*IDN?

**RESPONSE FORMAT**

\*IDN ,<device id>,<model>,<serial number>,<software version>,<firmware version>

<device id>:= “WST” is used to identify instrument.

<model>:= A model identifier (less than 14 characters).

<serial number>:= A nine- or 10-digit decimal code.

<software version>:= Software version.

<firmware version>:= Two digits giving the major release level followed by a period, then one digit giving the minor release level followed by a period and a single-digit update level (xx.y.z).

**EXAMPLE 1**

This query retrieves the instrument’s current version information.

\*IDN?

Return:

\*IDN WST,WaveStation 2052,00011122,1.01.02.19,00-00-00-17-22

(The exact return values may differ)

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### ***OPC – Operation Complete Command***

#### ***DESCRIPTION***

The \*OPC (Operation Complete) command sets the OPC bit to true in the standard Event Status Register (ESR).

The \*OPC? query always responds with the ASCII character 1 because the device only responds to the query when the previous command executes completely.

#### ***QUERY SYNTAX***

\*OPC?

#### ***RESPONSE FORMAT***

\*OPC 1

**ARWV – Arbitrary Wave Command****DESCRIPTION**

Changes the arbitrary waveform type.

**COMMAND SYNTAX**

<channel>: ARbWaVe <INDEX>, <NAME>

<channel>:= {C1,C2}

<index>: 2 to 60 (The following table provides index number meanings.)

<name>: See the following table.

Index	Name	Index	Name	Index	Name	Index	Name	Index	Name
2	StairUp	13	LogRise	24	Gmonopuls	38	Gausswin	49	Acot
3	StairDn	14	Sqrt	25	Tripuls	39	Triang	50~60	User space
4	StarUD	15	Root3	26	Cardiac	40	Blackman Harris		
5	PPulse	16	X^2	27	Quake	41	Barthannwin		
6	NPulse	17	X^3	28	Chirp	42	Tan		
7	Trapezia	18	Sinc	29	Twotone	43	Cot		
8	UpRamp	19	Gussian	30	Snr	44	Sec		
9	DnRamp	20	Dlorentz	34	Hamming	45	Csc		
10	Exp_Fall	21	Haversine	35	Hanning	46	Asin		
11	Exp_Rise	22	Lorentz	36	Kaiser	47	Acos		
12	LogFall	23	Gauspuls	37	Blackman	48	Atan		

**Note:** When using remote commands, you have the option of using one of the two following ways to set them.

**QUERY SYNTAX**

<channel>: ARbWaVe?

<channel>:= {C1,C2}

**RESPONSE FORMAT**

<channel>: ARbWaVe <index>

**EXAMPLE 1**

Set a StairUp arbitrary waveform output by index.

ARWV INDEX,2

**EXAMPLE 2**

Retrieve the current arbitrary waveform type.

ARWV?

Return:

ARWV INDEX,2,NAME,stairup

**EXAMPLE 3**

Set Atan arbitrary waveform output by name.

ARWV NAME,ATAN

**RELATED COMMANDS**

BSWV

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**BSWV – Basic Wave Command****DESCRIPTION**

This command sets or retrieves basic waveform parameters.

**COMMAND SYNTAX**

<channel>: BaSiCWaVe <parameter>

<channel>:= {C1,C2}

<parameter>:= {A parameter from the following table}

Parameters	Value	Description
WVTP	<type>	Sets the type of waveform.
FRQ	<frequency>	Not applicable to Noise waveforms, this parameter sets a basic waveform's frequency value.
AMP	<amplifier>	Not applicable to Noise waveforms, this parameter sets a basic waveform's amplification value.
OFST	<offset>	Not applicable to Noise waveforms, this parameter sets a basic waveform's offset value.
SYM	<symmetry>	Only applying to Ramp waveforms, this parameter sets the waveform's symmetry value.
DUTY	<duty>	Only applying to Pulse waveforms, this parameter sets the waveform's duty cycle percentage value.
PHSE	<phase>	Not applicable to Noise waveforms, this parameter sets a basic waveform's phase value.
WAR	<variance>	Only applying to Noise waveforms, this parameter sets the waveform's variance value.
MEAN	<mean>	Only applying to Noise waveforms, this parameter sets the waveform's mean value.
DLY	<delay>	Only applying to Pulse waveforms, this parameter sets the waveform's delay value.

**PLEASE NOTE THE FOLLOWING:**

- If the command doesn't set a basic waveform type, the parameters from the command are applied to the waveform type already selected on your WaveStation.
- Tables specifically covering command arguments are listed in the order in which they are functionally processed for convenience.

Where:

<type>:= {SINE,SQUARE,RAMP,PULSE,NOISE,ARB,DC}

<frequency>:= {The default unit is in "HZ". The minimum value is 1xe-6 HZ and the maximum depends on the WaveStation model.}

<amplifier>:= {The default unit is in "V". The C1 minimum value is 0.004V and maximum is 6V. The C2 minimum value is 0.004V and the maximum is 20V.}

<offset>:= {The default unit is in "V". The maximum value depends on your WaveStation model.}

<duty>:= {If the waveform type is Square, the range is from 20 to 80. If the waveform type is Pulse, the range is from 10 to 90}

<symmetry> := {0 to 100}

<phase>:= {0 to 360}

<variance>:= The maximum value is 2.222V and the minimum value is 0.4mV. The default unit is in "V".

<mean>:= The range depends on the variance setting. The default unit is in "V".

<delay>:= The maximum delay value is the Pulse Period and the minimum value is 0. Units are in S.

### **QUERY SYNTAX**

<channel>:BaSicWaVe?

<channel>:= {C1,C2}

### **RESPONSE**

<channel>: BSWV

<type>,<frequency>,<offset>,<type>,<frequency>,<amplifier>,<offset>,<duty>,<offset>,<duty>,<symmetry>,<phase>

### **EXAMPLE 1**

Change the C1 waveform type to Ramp.

C1: BSWV WVTP,RAMP

### **EXAMPLE 2**

Change the signal frequency of C1 to 2000 Hz.

C1: BSWV FRQ,2000HZ

### **EXAMPLE 3**

Set the signal amplifier of C1.

C1: BSWV AMP,3V

### **EXAMPLE 4**

Retrieve basic waveform parameters for the specified channel.

C1:BSWV?

Return:

C1: BSWV TYPE,SINE,FRQ,1000,AMP,3,OFST,3

### **RELATED COMMANDS**

ARWV, BTWV, CFG, CPL, MODWV, SWWV

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**BTWV – Burst Wave Command****DESCRIPTION**

Sets the waveform type to a Burst waveform or sets specific Burst waveform parameters.

**Note:** The carrier waveform cannot be set to Noise when using a Burst waveform set to NCycle.

**COMMAND SYNTAX**

<channel>: BurstWaVe <parameter>

<channel>:= {C1,C2}

<parameter>:= {A parameter from the following table.}

Parameters	Value	Description
STATE	<state>	Sets the instrument to a Burst waveform type or retrieves Burst waveform parameters.
PRD	<period>	This parameter sets the period of the waveform and is only applicable when the trigger source is INT, yet not applicable when the carrier waveform is a Noise or gated Burst waveform.
STPS	<start phase>	Not applicable to Noise or Pulse carrier waveforms, this parameter sets the Burst waveform's start phase value.
GATE_NCYC	<gate ncycle>	Not applicable to Noise carrier waveforms, this parameter allows you to configure the Burst waveform as either Gated or NCycle.
TRSR	<trigger>	Only applicable to a Burst carrier waveform with NCycle selected, this parameter sets the Burst waveform trigger source.
DLAY	<delay>	Only applicable to a Burst carrier waveform with NCycle selected, this parameter sets a Burst waveform's delay value.
PLRT	<polarity>	Only applicable for gated Burst carrier waveforms, this parameter sets the basic waveform's polarity value.
TRMD	<trig mode>	Only applicable to a Burst carrier waveform with NCycle selected, this parameter sets the trigger mode (INT, EXT, MAN) value.
EDGE	<edge>	Only applicable to a Burst carrier waveform with NCycle selected, this parameter sets a Burst waveform's trigger mode (slope; positive, negative, or OFF) value.
TIME	<cycle time>	Only applicable to a Burst carrier waveform with NCycle selected, this parameter sets a Burst waveform's cycle time value.
MTRIG		Only applicable to a Burst carrier waveform, with NCycle selected, and the trigger source set to MAN, this parameter manually triggers the WaveStation.
CARR, WVTP	<wave type>	Sets the carrier waveform type value.
CARR, FRQ	<frequency>	Sets the carrier waveform frequency value.
CARR, AMP	<amplifier>	Sets the carrier waveform amplification value.
CARR, OFST	<offset>	Sets the carrier waveform offset value.
CARR, SYM	<symmetry>	Sets the carrier waveform symmetry value.
CARR, DUTY	<duty>	Only applying to Square carrier waveforms, this parameter sets the duty cycle value.
CARR, PHSE	<phase>	Sets the carrier waveform phase value.
CARR, DLY	<carrier delay>	Only applicable when the carrier waveform is set to Pulse, this parameter sets the delay value.
CARR, VAR	<variance>	Only applicable when the carrier waveform is set to Noise, this parameter sets the variance.

CARR, MEAN	<mean>	Only applicable when the carrier waveform is set to Noise, this parameter sets the mean.
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**Note:** Tables specifically covering command arguments are listed in the order in which they are functionally processed for convenience.

Where:

<state>:= {ON,OFF}  
 <period>:= {The default unit is in "S". 1 $\mu$ s to 500s}  
 <start phase>:= {0 to 360}  
 <gate ncycle>:= {GATE,NCYC}  
 <trigger>:= {EXT,INT,MAN}  
 <delay>:= {The default unit is in "S". 0s to 500s}  
 <polarity>:= {NEG,POS}  
 <trig mode>:= {RISE,FALL,OFF}  
 <edge>:= {RISE,FALL}  
 <cycle time> := {1 to 50000 cycles}  
 <wave type>:= {SINE,SQUARE,RAMP,PULSE,NOISE,ARB}  
 <frequency>:= {The default unit is in "HZ". The minimum value is 1xe-6 HZ and the maximum depends on the WaveStation model.}  
 <amplifier>:= {The default unit is in "V". The C1 minimum value is 0.004V, maximum is 6V. The C2 minimum value is 0.004V and the maximum is 20V.}  
 <offset>:= {The default unit is in "V". The maximum value depends on your WaveStation model.}  
 <duty>:= {If the waveform type is set to Square, the range is from 20% to 80%. If the waveform type is set to Pulse, the range is from 0.1% to 99.9%}  
 <symmetry>:= {0% to 100%}  
 <carr delay>:= {The maximum delay is the Pulse period, and the minimum value is 0. Units are in S.}

### QUERY SYNTAX

<channel>: BursTWaVe?

### RESPONSE FORMAT

<channel>: BursTWaVe <type>,<state>,<period>

### EXAMPLE 1

Set the C1 Burst waveform period to 1S.

C1: BTWV PRD, 1S

### EXAMPLE 2

Set the C1 Burst waveform delay to 0S.

C1: BTWV DLAY, 0S

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### EXAMPLE 3

Queries the C2 Burst waveform status.

C2: BTWV?

Return:

C2: BURSTWAVE

STATE,ON,PRD,0.01S,STPS,0,TRIG,IN,TRMD,OFF,TIME,1,DLAY,2.4e-07S,GATE\_NCYC,NCYC,PLRT,NEG,CARR,WVTP,SINE,FRQ,1000HZ,AMP,4V,OFST,0V,PHSE,0

### EXAMPLE 4

Retrieves the C2 modulate waveform parameter confirming that the STATE is OFF.

C2: BTWV?

Return:

C2: BTWV STATE,OFF

**BUZZ – Buzzer Command****DESCRIPTION**

Turns the instrument's Buzzer on or off.

**COMMAND SYNTAX**

BUZZer <parameter>  
<parameter>:= {ON,OFF}

**QUERY SYNTAX**

BUZZer?

**RESPONSE FORMAT**

BUZZer <parameter>

**EXAMPLE 1**

Turn on the buzzer.

BUZZ ON

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### **CHDR – Command Header Command**

#### **DESCRIPTION**

This Command is used to change the query command return format. The SHORT parameter retrieves the query data in its short form, while the LONG parameter retrieves the query data in its long form. The OFF parameter retrieves no query results.

#### **COMMAND SYNTAX**

```
Comm_HeaDeR <parameter>  
<parameter>:= {SHORT, LONG, OFF}
```

#### **QUERY SYNTAX**

```
Comm_HeaDeR?
```

#### **RESPONSE FORMAT**

```
SYNC <parameter>
```

#### **EXAMPLE 1**

```
Set the query command format to LONG.  
CHDR LONG
```

#### **EXAMPLE 2**

```
Retrieve the query command format.  
CHDR?
```

Return:

```
COMM_HEADER LONG
```

**INVT – Phase Command****DESCRIPTION**

Sets or retrieves the phase parameter.

**COMMAND SYNTAX**

```
INVerT <parameter>  
<parameter>:= {OFF,ON}
```

**QUERY SYNTAX**

```
INVerT?
```

**RESPONSE FORMAT**

```
INVERT <parameter>
```

**EXAMPLE 1**

Set the signal to inverse value.

```
INVT ON
```

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### MDWV – Modulate Wave Command

#### DESCRIPTION

This command sets the waveform type to a Modulated waveform. The command also can set or retrieve modulated waveform parameters.

#### COMMAND SYNTAX

<channel>: MoDulateWaVe <parameter>

<channel>:= {C1,C2}

<parameter>:= {A parameter from the following table.}

Parameters	Value	Description
STATE	<state>	Sets the waveform type to a Modulated waveform or sets specific Modulated waveform parameters.
AM, SRC	<src>	Sets the Modulated waveform to an AM type.
AM, MDSP	<mod wave shape>	Sets the Modulated waveform to an AM type. Only applicable when the signal source is set to INT.
AM, FRQ	<am frequency>	Sets the frequency of an AM type waveform. Only applicable when the signal source is set to INT.
AM, DEPTH	<depth>	Sets the depth of an AM type waveform. Only applicable when the signal source is set to INT.
DSBAM, SRC	<src>	Sets the signal source of a DSBAM waveform.
DSBAM, MDSP	<mod wave shape>	Sets the wave shape of the DSBAM waveform. Only applicable when the signal source is set to INT.
DSBAM, FRQ	<dsbam frequency>	Sets the frequency of a DSBAM waveform. Only applicable when the signal source is set to INT.
FM, SRC	<src>	Sets the signal source of an FM waveform.
FM, MDSP	<mod wave shape>	Sets the wave shape of a FM waveform. Only applicable when the signal source is set to INT.
FM, FRQ	<fm frequency>	Sets the frequency of an FM waveform. Only applicable when the signal source is set to INT.
FM, DEVI	<fm frequency offset>	Sets the frequency offset of an FM waveform. Only applicable when the signal source is set to INT.
PM, SRC	<src>	Sets the signal source of a PM waveform.
PM, MDSP	<mod wave shape>	Sets the wave shape of a PM waveform. Only applicable when the signal source is set to INT.
PM, FRQ	<pm frequency>	Sets the frequency of a PM waveform. Only applicable when the signal source is set to INT.
PWM, FRQ	<pwm frequency>	Sets the frequency of a PWM waveform. Only applicable when the signal source is set to INT.
PWM, DEVI	<pwm devi>	Sets the duty cycle deviation. Only applicable when the carrier is a Pulse waveform.
PWM, MDSP	<mod wave shape>	Sets the wave shape of a PWM waveform. Only applicable when the carrier is a Pulse waveform.
PWM, SRC	<src>	Sets the signal source of a PWM waveform.
PM, DEVI	<pm phase offset>	Sets the phase offset of a PM waveform. Only applicable when the signal source is set to INT.
ASK, SRC	<src>	Sets the signal source of an ASK waveform.
ASK, KFRQ	<ask key frequency>	Sets the key frequency of an ASK waveform. Only applicable when the signal source is set to INT.
FSK, KFRQ	<fsk frequency>	Sets the frequency of an FSK waveform. Only applicable when the signal source is set to INT.
FSK, HFRQ	<fsk hop frequency>	Sets the jump frequency of an FSK waveform.
FSK, SRC	<src>	Sets the signal source of an FSK waveform.
CARR, WVTP	<wave type>	Sets the carrier waveform type value.
CARR, FRQ	<frequency>	Sets the carrier waveform frequency value.
CARR, AMP	<amplifier>	Sets the carrier waveform amplification value.
CARR, OFST	<offset>	Sets the carrier waveform offset value.
CARR, SYM	<symmetry>	Sets the carrier waveform symmetry value.
CARR, DUTY	<duty>	Only applying to Square carrier waveforms, this parameter sets the duty cycle value.
CARR, PHSE	<phase>	Sets the carrier waveform phase value.

#### PLEASE NOTE THE FOLLOWING:

- The Mod function is disabled when Pulse or Noise waveform types are selected.

- Tables specifically covering command arguments are listed in the order in which they are functionally processed for convenience.

Where:

<state>:= {ON,OFF}  
 <src>:= {INT,EXT}  
 <mod wave shape>:= {SINE,SQUARE,TRIANGLE,UPRAMP,DNRAMP,NOISE,ARB}  
 <am frequency>:= {0.002Hz to 20000Hz}  
 <deep>:= {0 to 120}  
 <fm frequency>:= {0.002Hz to 20000Hz}  
 <fm frequency offset>:= {0 to basic waveform frequency / 2}  
 <pm frequency>:= {0.002Hz to 20000Hz}  
 <pm phase offset>:= {0 to 360}  
 <pwm frequency>:= {0Hz to 4kHz}  
 <pwm devi>:= {Deviation is dependent on the carrier waveform duty cycle}  
 <ask key frequency>:= {0.002Hz to 20000Hz}  
 <fsk frequency>:= {0.002Hz to 50000Hz}  
 <fsk hop frequency>:= {The hop frequency range corresponds to the basic waveform frequency range}  
 <wave type>:= {SINE ,SQUARE, RAMP, ARB, PULSE}  
 <frequency>:= {The default unit is in "HZ". The minimum value is 1xe-6 HZ, maximum value depends on your WaveStation model.}  
 <amplifier>:= {The default unit is in "V". The C1 minimum value is 0.004V, Maximum is 6V. The C2 minimum value is 0.004V, and its maximum value is 20V.}  
 <offset>:= {The default unit is in "V".}  
 <duty>:= {If waveform type is set to Square, the range is from 20% to 80%. If the waveform type is set to Pulse, the range is from 0.1% to 99.9%.}  
 <symmetry>:= {0% to 100%}  
 <delay>:= {The maximum value is 2 Ks}

### QUERY SYNTAX

<channel>: MoDulateWaVe?  
 <channel>:= {C1,C2}

### RESPONSE FORMAT

<channel>: MoDulateWaVe <parameter>  
 <parameter>:= {Return all parameters for the current modulated waveform.}

### EXAMPLE 1

Set the C1 modulation type to AM.  
 C1: MDWV AM

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### EXAMPLE 2

Set the modulation shape to AM, and set the AM type to a Sine wave.

C1: MDWV AM, MDSP, SINE

### EXAMPLE 3

Read the C1 modulate waveform parameters confirming that STATE is ON.

C1: MDWV?

Return:

C1: MDWV  
STATE,ON,AM,MDSP,SINE,SRC,INT,FRQ,100HZ,DEPTH,100,CARR,WVTP,RAMP,FRQ,1000HZ,AMP,4V,OFST,0V,SYM,50

### EXAMPLE 3

Read the C1 modulate waveform parameters confirming that STATE is OFF.

C1: MDWV?

Return:

C1: MDWV STATE,OFF

### EXAMPLE 4

Set the C1 FM frequency to 1000HZ

C1: MDWV FM, FRQ, 1000HZ

### EXAMPLE 5

Set the value of the C1 carrier waveform to SINE.

C1: MDWV CARR,MDSP,SINE

### EXAMPLE 6

Set the value of the C1 carrier waveform frequency to 1000Hz.

C1: MDWV CARR,FRQ,1000HZ

### RELATED COMMANDS

ARWV, BTWV, CFG, CPL, SWWV, BSWV

**OUTP - Output Command****DESCRIPTION**

Enable or disable the output connector on the front panel for a specified channel.

The query returns an On or Off value.

**COMMAND SYNTAX**

<channel>: OUTPut <parameter>

<channel>:= {C1,C2}

<parameter >:= {A parameter from the following table}

Parameters	Value	Description
ON		Turn on channel
OFF		Turn off channel
LOAD	<load>	Value of load

Where: <load>:= {50, HZ}

**QUERY SYNTAX**

<channel>: OUTPut?

**RESPONSE FORMAT**

<channel>: OUTPut <load>

**EXAMPLE 1**

Turn on C1.

C1: OUTP ON

**EXAMPLE 2**

Read the C1 output state.

C1: OUTP?

Return:

C1: OUTP ON,LOAD,HZ

**EXAMPLE 3**

Set the load to 50 Ω.

C1: OUTP LOAD,50

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### **PACP – Channel Parameter Copy Command**

#### **DESCRIPTION**

Copy the channel and all corresponding parameter data to the other channel.

#### **COMMAND SYNTAX**

```
PArCoPy <destinat channel>, <src channel>  
<destinat channel>:= {C1,C2}  
<src channel>:= {C1,C2}
```

**Note:** The source and destination channels must be different.

#### **EXAMPLE 1**

```
Copy channel parameters from C1 to C2.  
PACP C2,C1
```

#### **RELATED COMMANDS**

ARWV, BTWV, CFG, CPL, MDWV, SWWV, CHCT, BSWV

**ROSC – Clock Source Command****DESCRIPTION**

Sets or retrieves the clock source.

**COMMAND SYNTAX**

ROSCillator <parameter>  
<parameter>:= {INT, EXT}

**QUERY SYNTAX**

ROSCillator?

**RESPONSE FORMAT**

ROSC <parameter>

**EXAMPLE 1**

Use the systems internal clock source.

ROSC INT

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### **SCFG – Configuration Command**

#### **DESCRIPTION**

This command determines whether or not to load the default or last settings when powering on the WaveStation.

#### **COMMAND SYNTAX**

```
Sys_CFG <parameter>  
<parameter>:= {DEFAULT, LAST}
```

#### **QUERY SYNTAX**

```
Sys_CFG?
```

#### **RESPONSE FORMAT**

```
Sys_CFG <parameter>
```

#### **EXAMPLE 1**

```
Set the system to recall the last settings used when powering up.  
SCFG LAST
```

**SCSV – Screen Save Command****DESCRIPTION**

Sets the instrument screen saver time or turns it Off. Screen saver time value is in minutes.

**COMMAND SYNTAX**

SCreen\_SaVe <parameter>  
<parameter>:= {OFF,1,5,15,30,60,120,300, The default unit is minutes}

**QUERY SYNTAX**

SCreen\_SaVe?

**RESPONSE FORMAT**

SCreen\_SaVe <parameter>

**EXAMPLE 1**

Set the screen saver time to 5 minutes.

SCSV 5

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### STL – Store list command

#### DESCRIPTION

This command is used to retrieve the names of waveforms saved to WaveStation memory. If a memory bank is empty and does not have a corresponding waveform saved to it, the command returns an EMPTY string.

**Note:** M50~ M59 are available user-defined memory locations on the instrument. The name parameter only returns defined locations. If locations are undefined, the name is returned as "EMPTY".

#### QUERY SYNTAX

SToreList?

#### RESPONSE FORMAT

STL M0, SINE, M1, noise, M2, STAIRUP, M3, STAIRDN, M4, STAIRUD, M5, PPULSE, M6, npulse, M7, TRAPEZIA, M8, UPRAMP, M9, DNRAMP, M10, exp\_fall, M11, exp\_rise, M12, LOGFALL, M13, LOGRISE, M14, SQRT, M15, ROOT3, M16, x^2, M17, x^3, M18, SINC, M19, gaussian, M20, DLORENTZ, M21, haversine, M22, lorentz, M23, gauspuls, M24, gmonopuls, M25, tripuls, M26, cardiac, M27, quake, M28, chirp, M29, twotone, M30, snr, M31, EMPTY, M32, EMPTY, M33, EMPTY, M34, hamming, M35, hanning, M36, kaiser, M37, blackman, M38, gausswin, M39, triang, M40, blackmanharris, M41, barthannwin, M42, tan, M43, cot, M44, sec, M45, csc, M46, asin, M47, acos, M48, atan, M49, acot, M50, EMPTY, M51, EMPTY, M52, EMPTY, M53, EMPTY, M54, EMPTY, M55, EMPTY, M56, EMPTY, M57, EMPTY, M58, EMPTY, M59, EMPTY

#### EXAMPLE 1

Read the arbitrary waveform data saved to your WaveStation device memory.

STL?

Return:

STL M0, SINE, M1, noise, M2, STAIRUP, M3, STAIRDN, M4, STAIRUD, M5, PPULSE, M6, npulse, M7, TRAPEZIA, M8, UPRAMP, M9, DNRAMP, M10, exp\_fall, M11, exp\_rise, M12, LOGFALL, M13, LOGRISE, M14, SQRT, M15, ROOT3, M16, x^2, M17, x^3, M18, SINC, M19, gaussian, M20, DLORENTZ, M21, haversine, M22, lorentz, M23, gauspuls, M24, gmonopuls, M25, tripuls, M26, cardiac, M27, quake, M28, chirp, M29, twotone, M30, snr, M31, EMPTY, M32, EMPTY, M33, EMPTY, M34, hamming, M35, hanning, M36, kaiser, M37, blackman, M38, gausswin, M39, triang, M40, blackmanharris, M41, barthannwin, M42, tan, M43, cot, M44, sec, M45, csc, M46, asin, M47, acos, M48, atan, M49, acot, M50, WAVE4, M51, 44, M52, EMPTY, M53, EMPTY, M54, EMPTY, M55, EMPTY, M56, EMPTY, M57, EMPTY, M58, EMPTY, M59, EMPTY

**SWWV – Sweep Wave Command****DESCRIPTION**

Sets or retrieves Sweep waveform parameters.

**COMMAND SYNTAX**

<channel>: SWEEPWaVe <parameter>

<channel>:= {C1,C2}

<parameter>:= {A parameter from the following table.}

Parameter	Value	Description
STATE	<state>	Sets the waveform type to a Sweep waveform or sets specific Sweep waveform parameters.
TIME	<time>	Sets the time of the Sweep waveform.
STOP	<stop frequency>	Sets the stop frequency of the Sweep waveform.
START	<start frequency>	Sets the start frequency value of the Sweep waveform.
TRSR	<trigger src>	Sets the trigger source of the Sweep waveform.
TRMD	<trigger mode>	Sets the trigger output of the Sweep waveform. This parameter is disabled if the trigger source is EXT.
SWMD	<Sweep mode >	Sets the mode of the Sweep waveform.
DIR	<direction>	Sets the direction of the Sweep waveform.
EDGE	<edge>	Sets the edge value of the Sweep waveform. This parameter is only valid if the trigger source is EXT.
MTRIG	<manual trigger>	Forces the WaveStation to trigger manually. This parameter is only valid if the trigger source is MAN.
CARR, WVTP	<wave type>	Sets the type of Carrier waveform.
CARR, FRQ	<frequency>	Sets the Carrier waveform frequency.
CARR, AMP	<amplifier>	Sets the Carrier waveform amplification.
CARR, OFST	<offset>	Sets the offset value of the Carrier waveform.
CARR, SYM	<symmetry>	Sets the symmetry value of the Carrier waveform.
CARR, DUTY	<duty>	Only applying to Square carrier waveforms, this parameter sets the duty cycle value.
CARR, PHSE	<phase>	Sets the phase value of the Carrier waveform.

**PLEASE NOTE THE FOLLOWING:**

- A Carrier waveform of Pulse or Noise cannot be modulated.
- Tables specifically covering command arguments are listed in the order in which they are functionally processed for convenience.

Where:

<state>:= {ON,OFF}

<time>:= {0.001S to 500S}

<stop frequency>:= {May be set to the same value as the corresponding basic waveform frequency}

<start frequency>:= { May be set to the same value as the corresponding basic waveform frequency}

<trigger src>:= {EXT,INT,MAN}

<trigger mode>:= {ON,OFF}

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<Sweep way>:= {LINE,LOG}  
 <direction>:= {UP,DOWN}  
 <edge>:= {ON,OFF}  
 <wave type>:= {SINE,SQUARE,RAMP,ARB}  
 <frequency>:= {The default unit is in "HZ". The minimum value is 1xe-6 HZ, maximum value depends on the model.}  
 <amplifier>:= {The default unit is in "V". The C1 minimum value is 0.004V, maximum is 6V. The C2 minimum value is 0.004V, maximum is 20V.}  
 <offset>:= {The default unit is in "V". The maximum value depends on your WaveStation model.}  
 <duty>:= {The range for Square wave types is from 20 to 80.}  
 <symmetry>:= {0% to 100%}

**QUERY SYNTAX**

<channel>: SWEEPWaVe?  
 <channel>:= {C1,C2}

**RESPONSE FORMAT**

<parameter>:= {Retrieves all of the current Sweep waveform parameters.}

**EXAMPLE 1**

Set the C1 Sweep time to 1S.

C1: SWWV TIME, 1S

**EXAMPLE 2**

Set the C1 Sweep stop frequency to 1000Hz.

C1: SWWV STOP, 1000HZ

**EXAMPLE 3**

Read the C1 modulated waveform parameters and confirm that STATE is ON.

C2: SWWV?

Return:

C2: SWWV  
 STATE,ON,TIME,1S,STOP,100HZ,START,100HZ,TRSR,MAN,TRMD,OFF,SWMD,LIN  
 E,DIR,UP,CARR,WVTP,SQUARE,FRQ,1000HZ,AMP,4V,OFST,0V,DUTY,50

**EXAMPLE 4**

Read the C2 modulate waveform parameters confirming that STATE is OFF.

C2: SWWV?

Return:

C2: SWWV STATE,OFF

**VKEY – Virtual key command****DESCRIPTION**

This command is used to send keystrokes to your device.

**COMMAND SYNTAX**

VirtualKEY VALUE,<value>,STATE,<state>

<value>:= {A parameter from the following table.}

<state>:= <1>

State	Value	State	Value
KB_CHANNEL	33	KB_NUMBER_1	49
KB_FUNC1	28	KB_NUMBER_2	50
KB_FUNC2	23	KB_NUMBER_3	51
KB_FUNC3	18	KB_NUMBER_4	52
KB_FUNC4	13	KB_NUMBER_5	53
KB_FUNC5	8	KB_NUMBER_6	54
KB_SINE	34	KB_NUMBER_7	55
KB_SQUARE	29	KB_NUMBER_8	56
KB_RAMP	24	KB_NUMBER_9	57
KB_PULSE	19	KB_POINT	46
KB_NOISE	14	KB_NEGATIVE	43
KB_ARB	9	KB_LEFT	44
KB_MOD	15	KB_RIGHT	40
KB_SWEEP	16	KB_UP	45
KB_BURST	17	KB_DOWN	39
KB_STORE_RECALL	10	KB_OUTPUT1	153
KB_UTILITY	11	KB_OUTPUT2	152
KB_HELP	12	KB_KNOB_RIGHT	175
KB_NUMBER_0	48	KB_KNOB_LEFT	177

**SYNC – Sync Command****DESCRIPTION**

This command synchronizes the channel output on the rear of the instrument to the channel output on the front of the instrument.

**COMMAND SYNTAX**

<channel>: SYNC <parameter>

<channel>:= {C1,C2}

<parameter>:= {ON,OFF}

**QUERY SYNTAX**

<channel>: SYNC?

**RESPONSE FORMAT**

<channel>: SYNC <parameter>

**EXAMPLE 1**

Set the sync to C1 and ON

C1: SYNC ON

**EXAMPLE 2**

Retrieve the sync state of C1.

C1: SYNC?

Return:

C1: SYNC OFF

**Thank you for purchasing a WaveStation  
Arbitrary Waveform Generator**

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