SCPI Command Reference

VERSION 2.3

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1. SCPI Basics

1.1 Introduction

The Standard Commands for Programmable Instruments (SCPI) defines a set of standard programming commands for use by all SCPI compatible instruments. This section describes the general use of the SCPI language for the Micran instruments.

For additional information refer to the SCPI Consortium or IEEE (IEEE Standard 488.2).

1.2 Command Structure

All SCPI commands, except the common commands, are organized in a hierarchical structure similar to the inverted tree file structure used in most computers. The command keywords that correspond to the major instrument control functions are located at the top of the command tree. All SCPI commands, except the ABORt command, have one or more subcommands (keywords) associated with them to further define the instrument function to be controlled. The subcommand keywords may in turn also have one or more associated subcommands (keywords). Each subcommand level adds another layer to the command tree. The command keyword and its associated subcommand keywords form a portion of the command tree called a command subsystem. The :INITiate command subsystem is shown below.

```
:INITiate
        :CONTinuous
                <bool>
        :[:IMMediate]
```

1.3 Subsystems

Subsystem commands are distinguished by the colon (:). The colon is used at the beginning of a command statement and between keywords. For example:

```
:SYSTem:ERRor:COUNt?
```

"COUNt" is the query of the "ERRor" subsystem contained in the "SYSTem" top command tree.

1.4 Mnemonic Generation Rules

Each instrument-control header or keyword has both a long and a short form. A SCPI instrument shall accept only the exact short and the exact long forms. Sending a header that is not the short form, nor the complete long form to a SCPI instrument shall cause it to generate an error. For example:

:INPut:ATTenuation

command can be typed as:

:INP:ATT

Incorrect command notation listed below:

:INPU:ATTenuation

1.5 Letter case

Lowercase and uppercase letters are considered equivalent:

:INP:ATTenuation and :inP:AtT

1.6 Parameters

A typical command is made up of keywords prefixed with colons (:). The keywords are followed by parameters. There is a separating space (white space) between the command and its parameter. Few parameters should be separated using commas (','). Example:

:FREQ:LIST 1000 MHz, 2000 MHz, 3000 MHz, 4000 MHz

1.6.1 Numeric formats (<numeric>)

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

The following syntax conventions are used for numeric data parameters:

- <NR1> - a signed integer without a decimal point (implied radix point), e.g.: 12, +23, -656;
- <NR2> - a signed number with an explicit radix point, e.g.: 12.571;
- <NR3> - a scaled explicit decimal point numeric value with radix and exponent

(e.g., floating point number), such as 12.451E4 (equals 124510).

Extended numeric parameters also include the following special parameters:

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

1.6.2 Unit Suffixes

Numeric parameters may be followed by an optional suffix:

Suffix	Multiplier
A	1e-18
F	1e-15
P	1e-12
N	1e-9
U	1e-6
M*	1e-3
K	1e3
MA	1e6
G	1e9
T	1e12
PE	1e15
EX	1e18

* - suffix M relates to 1e6 instead of 1e–3 when using MHZ or OHM units.

If the suffix is omitted, default units are used. Various frequency parameters may contain following suffixes:

Suffix	Multiplier
Hz	1e
KHz	1e3
MHz	1e6

GHz	1e9

1.6.3 Boolean Parameters (<boolean>)

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

- ON or 1 – boolean true;
- OFF or 0 – boolean false.

Boolean parameters are always returned as 1 or 0 by query commands, e.g.:

[SENSe]:AVERage[:STATe] ON|1|OFF|0

will respond with 0 or 1.

1.6.4 Discrete Parameters (<character_data>)

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

TRIGger:SOURce {BUS|INTernal|IMMediate|EXTernal}

"BUS", "INTernal", "IMMediate", "EXTernal" are allowed values.

Discrete parameters are always returned in short upper case form.

1.6.5 String Parameters (<string>)

String parameters allow ASCII strings to be sent as parameters. Single or double quotes are used as delimiters, e.g.:

MEMory:ADC:SELect "table_1"

1.7 Queries

All commands, unless otherwise noted, have an additional query form. As defined in IEEE 488.2, a query is a command header with a question mark symbol appended. When a query form of a command is received, the current setting associated with the command is placed in the output buffer. The command and associated query are listed below:

:INP:ATT 20
:INP:ATT?

1.8 Program Message Terminator

LF (0x0A, new line, «\n») symbol (ASCII) is using as program message terminator. «\r\n» (0x0D, 0x0A - new line + carriage return) may be used too, but LF is always returned in query commands.

1.9 The Syntax Conventions

The syntax conventions that are used for all SCPI command keywords and data parameter descriptions in this manual are described below:

- Angle brackets (< >) around a word (or words) indicate they are not to be used literally in the command. They represent the needed item.
- A vertical stroke (|) between keywords or parameters indicates alterative choices. For parameters, the effect of the command varies depending on the choice.
- Square brackets ([ ]) indicate that the enclosed keywords or parameters are optional when composing the command. These implied keywords or parameters will be executed even if they are omitted.
- Braces ({ }) indicate that parameters can optionally be used in the command once, several times, or not at all.

2. IEEE 488 Common Commands

2.1. *CLS

(Write-only) Clears the instrument status byte by emptying the error queue and clearing all event registers.

2.2. *ESR?

(Read-only) Reads and clears event status enable register. Returns decimal value with status bits:

Bit Number	Bit Title	Bit Description
0	Operation Complete	'1' appears as result of the *OPC command and signalizes all operations are finished, byte is reset after reading.
1	Request Control	Always equals '0'.
2	Query Error	'1' indicates error with code from -500 to -400.
3	Device Dependent Error	'1' indicates error with code from -399 to -300 or code from 1 to 32767.
4	Execution Error	'1' indicates error with code from -299 to -200.
5	Command Error	'1' indicates error with code from -199 to -100.
6		Not used.
7	Power On	'1' indicates that RF output is ON.

2.3. *IDN?

(Read-only) Returns a string that uniquely identifies the instrument. The string is of the form: *<Manufacturer>,<Device type>,<Serial number>,<Firmware revision>*.

2.4. *OPC?

(Read-only) Returns an ASCII "+1" when all pending overlapped operations have been

completed.

2.5. *RST

(Write-only) Executes a device reset to default settings (see "Default value" string).

2.6. *TRG

(Write-only) Triggers the device if BUS is the selected trigger source (see TRIGger[:SEQuence]:SOURce), otherwise, *TRG is ignored. If *TRG is not pending, error *<-211,"Trigger ignored">* is raised.

3. ABORt commands

(Write-only) This command stops all sweeps. ABORt causes the trigger subsystem to return to the idle state. If INITiate:CONTinuous is ON, the instrument will then immediately proceed to the wait-for-trigger state.

4. INITiate commands

4.1.1. INITiate:CONTinuous[:ALL] <bool>

(Write or Read) These commands control whether the specified trigger system always returns to the "wait-for-trigger" state (ON) or remains in the "idle" state (OFF) waiting for an INITiate:IMMediate command.

Parameters

<bool> Allowed values:

- **ON|1** - enabled
- **OFF|0** - disabled

Value range: **0 ÷ 1**

Default value: **OFF|0**

Examples

The following program segment shows how to use the INITiate:CONTinuous command with the TRIGger:SOURce command. The TRIG:SOUR EXT command configures channel for external triggering. The INITiate:IMMediate command places the instrument in the "wait-for-trigger" state. The trigger will occur when the rear-panel Ext. Trig In line is pulsed (high by default). The channel will return to idle after all sweep points has been loaded. Number of points set by command SWEep:POINTs to 3.

```
INIT:CONT OFF
TRIG:SOUR:EXT
LIST:MODE MAN
SWE:POIN 3
INIT:IMM
```

4.2. INITiate:IMMediate

(Write-only) These commands change the state of the triggering system from the "idle" state to the "wait-for-trigger" state. The action-in-progress state can be lengthy, and during this state triggers will be ignored.

Examples

The following program segment shows how to use the INITiate:CONTinuous command

with the TRIGger:SOURce command. The TRIG:SOUR EXT command configures channel for external triggering. The INITiate:IMMediate command places the instrument in the "wait-for-trigger" state. The trigger will occur when the rear-panel Ext. Trig In line is pulsed (high by default). The channel will return to idle after all sweep points has been loaded. Number of points set by command SWEep:POINTs to 3.

```
INIT:CONT OFF
TRIG:SOUR:EXT
LIST:MODE MAN
SWE:POIN 3
INIT:IMM
```

5. MEMory commands

The memory commands control saving and loading instrument states and measurement trace data to the hard drive.

5.1. MEMory:MSC <bool>

(Write or Read) This command control internal data storage state. For more accurate sweep it is recomended to set data storage off.

Parameters

<bool> Allowed values:

- **ON|1** - enabled
- **OFF|0** - disabled

6. OUTPut commands

6.1. OUTPut[:STATe] <bool>

(Write or Read) This command enables or disables the RF output.

Parameters

<bool> Allowed values:

- **ON|1** - enabled
- **OFF|0** - disabled

Default value: **OFF|0**

7. SOURce commands

Configures RF output parameters.

7.1. [SOURce]:AM

Amplitude modulation (AM) parameters.

7.1.1. [SOURce]:AM[:DEPTh] <num>

(Write or Read) Sets the amplitude modulation depth in percent.

Parameters

<num> Allowed values:

- **DEFault** - default value
- **MINimum** - minimum value
- **MAXimum** - maximum value

Value range: **0.096** ÷ **96.0**

Default value: **50.0**

7.1.2.1.1. [SOURce]:AM:INTernal:FUNCtion:FREQuency <num>

(Write or Read) This command sets the internal modulating signal frequency. Range limits depends on modulating signal shape. This parameter re-calculate in the device, so it is possible to query truly frequency value of modulating signal.

Parameters

<num> Supported units: Hz(default), kHz, MHz, GHz

Allowed values:

- **DEFault** - default value
- **MINimum** - minimum value
- **MAXimum** - maximum value

Default value: **50000**

7.1.2.1.2. [SOURce]:AM:INTernal:FUNCtion:SHAPe <char>

(Write or Read) Defines the modulating signal shape.

Parameters

<char> Allowed values:

- **SINusoid** - sine wave
- **TRIangle** - triangle
- **RAMP** - saw (ramp) wave
- **SQUare** - pulse signal
- **NOISe** - white noise

Default value: **SIN**

7.1.2.1.2.1. [SOURce]:AM:INTernal:FUNCtion:SHAPe:RAMP <char>

(Write or Read) Selects positive or negative slope for a saw (RAMP) modulating signal shape.

Parameters

<char> Allowed values:

- **NEGative** - negative polarity
- **POSitive** - positive polarity

Default value: **POSitive**

7.1.2.1.2.2.1. [SOURce]:AM:INTernal:FUNCtion:SHAPe:SQUare:DUTY <num>

(Write or Read) This command sets the duty cycle of the pulse (SQUare) modulating signal shape.

Parameters

<num> Value range: **1.0** ÷ **99.0**

Default value: **50.0**

7.1.3. [SOURce]:AM:SOURce

This command sets the source of amplitude modulation.

7.1.4. [SOURce]:AM:STATe <bool>

(Write or Read) Enables or disables the amplitude modulation.

Parameters

<bool> Allowed values:

- **ON|1** - enabled
- **OFF|0** - disabled

7.2. [SOURce]:FM

Frequency modulation (FM) parameters.

7.2.1. [SOURce]:FM:DEViation <num>

(Write or Read) Sets the frequency modulation deviation in Hertz. Range limits depends on carrier frequency.

Parameters

<num> Allowed values:

- **DEFault** - default value
- **MINimum** - minimum value
- **MAXimum** - maximum value

7.2.2.1.1. [SOURce]:FM:INTernal:FUNCtion:FREQuency <num>

(Write or Read) This command sets the modulating signal frequency. Range limits depends on modulating signal shape. This parameter re-calculate in the device, so it is possible to query truly frequency value of modulating signal.

Parameters

<num> Supported units: Hz(default), kHz, MHz, GHz

Allowed values:

- **DEFault** - default value
- **MINimum** - minimum value
- **MAXimum** - maximum value

7.2.2.1.2. [SOURce]:FM:INTernal:FUNCtion:SHAPe <char>

(Write or Read) Defines the modulating signal shape.

Parameters

<char> Allowed values:

- **SINusoid** - sine wave
- **TRIangle** - triangle
- **RAMP** - saw (ramp) wave
- **SQUare** - pulse signal
- **NOISe** - white noise

Default value: **SIN**

7.2.2.1.2.1. [SOURce]:FM:INTernal:FUNCtion:SHAPe:RAMP <char>

(Write or Read) Selects positive or negative slope for a saw (RAMP) modulating signal shape.

Parameters

<char> Allowed values:

- **NEGative** - negative polarity
- **POSitive** - positive polarity

Default value: **POSitive**

7.2.2.1.2.2.1. [SOURce]:FM:INTernal:FUNCtion:SHAPe:SQUare:DUTY <num>

(Write or Read) This command sets the duty cycle of the pulse (SQUare) modulating signal shape.

Parameters

<num> Value range: **1.0** ÷ **99.0**

Default value: **50.0**

7.2.3. [SOURce]:FM:SOURce

This command sets the frequency modulation source.

7.2.4. [SOURce]:FM:STATe <bool>

(Write or Read) Enables or disables the frequency modulation.

Parameters

<bool> Allowed values:

- **ON|1** - enabled
- **OFF|0** - disabled

7.3.1. [SOURce]:FREQuency[:CW] <num|char>

(Write or Read) This command sets the signal generator output frequency for the CW (FIXed) frequency mode (see [SOURce]:FREQuency:MODE).

Parameters

<num|char> Supported units: Hz(default), kHz, MHz, GHz

Allowed values:

- **DEFault** - default value
- **MINimum** - minimum value
- **MAXimum** - maximum value

Default value: **1GHz**

7.3.2. [SOURce]:FREQuency:MODE <char>

(Write or Read) This command sets the mode of the signal generator to CW or swept or list. List mode require description of every sweep points but sweep mode require just start, stop values, and number of steps.

Parameters

<char> Allowed values:

- **CW** - fixed frequency
- **FIXed** - fixed frequency (same as CW)
- **SWEep** - stepped frequency sweep

LIST - sweep on list

Default value: **CW**

7.3.3. [SOURce]:FREQuency:STARt <num>

(Write or Read) This command sets the start frequency point in a step sweep.

Parameters

<num> Supported units: Hz(default), kHz, MHz, GHz

7.3.4. [SOURce]:FREQuency:STOP <num>

(Write or Read) This command sets the last frequency point in a step sweep.

Parameters

<num> Supported units: Hz(default), kHz, MHz, GHz

7.4. [SOURce]:LFOutput

Commands for the low-frequency (LF) oscillator.

7.4.1. [SOURce]:LFOutput:AMPlitude <num>

(Write or Read) Sets the LF output level.

Parameters

<num> Allowed values:

- **DEFault** - default value
- **MINimum** - minimum value
- **MAXimum** - maximum value

Value range: **0** ÷ **1.0**

Default value: **1.0**

7.4.2.1. [SOURce]:LFOutput:FUNCtion:FREQuency <num>

(Write or Read) This command sets the frequency of LF oscillator. Range limits depends on signal shape.

Parameters

<num> Supported units: Hz(default), kHz, MHz

Allowed values:

- **DEFault** - default value
- **MINimum** - minimum value
- **MAXimum** - maximum value

7.4.2.2. [SOURce]:LFOutput:FUNCtion:SHAPe <char>

(Write or Read) Defines the signal shape of the LF oscillator.

Parameters

<char> Allowed values:

- **SINusoid** - sine wave
- **TRIangle** - triangle
- **RAMP** - saw (ramp) wave
- **SQUare** - pulse signal
- **NOISe** - white noise

Default value: **SIN**

7.4.2.2.1. [SOURce]:LFOutput:FUNCtion:SHAPe:RAMP <char>

(Write or Read) Selects positive or negative slope for a saw (RAMP) LF signal shape.

Parameters

<char> Allowed values:

- **NEGative** - negative polarity
- **POSitive** - positive polarity

Default value: **POSitive**

7.4.2.2.2.1. [SOURce]:LFOutput:FUNCtion:SHAPe:SQUare:DUTY <num>

(Write or Read) This command sets the duty cycle of the pulse (SQUare) LF signal shape.

Parameters

<num> Value range: **1.0 ÷ 99.0**

Default value: **50.0**

7.4.3. [SOURce]:LFOutput:STATe <bool>

(Write or Read) Enables or disables the LF oscillator.

Parameters

<bool> Allowed values:

- **ON|1** - enabled
- **OFF|0** - disabled

Default value: **OFF|0**

7.5. [SOURce]:LIST

Commands for the list sweep configuration.

7.5.1. [SOURce]:LIST:CPOINt?

(Read-only) This is a query that returns current sweep point number.

7.5.2. [SOURce]:LIST:DIRection <char>

(Write or Read) This command sets the direction of a list or step sweep.

Parameters

<char> Allowed values:

- **UP** - up-direction
- **DOWN** - down-direction

Default value: **UP**

7.5.3. [SOURce]:LIST:DWELl <num>,<...>

(Write or Read) This command sets the dwell time for the current list sweep points in microseconds. Maximum list size is 501, but it's not permitted to send more than 32 points at time (see :[SOURce]:LIST:DWELl:ADD).

Parameters

<num>,<...>

7.5.3.1. [SOURce]:LIST:DWELl:ADD <num>,<...>

(Write-only) Adds points to dwell time list. Maximum block size is 32, maximum list size is 501.

Parameters

<num>,<...> Supported units: s(default), ms, ns, us

7.5.3.2. [SOURce]:LIST:DWELl:POINts?

(Read-only) Returns the number of dwell points in the current list sweep.

7.5.4. [SOURce]:LIST:FREQuency <num>,<...>

(Write or Read) This command sets the frequency values for the current list sweep points. Maximum list size is 501, but it's not allowed to send more than 32 points at time (see : [SOURce]:LIST:FREQuency:ADD)

Parameters

<num>,<...> Supported units: Hz(default), kHz, MHz, GHz

7.5.4.1. [SOURce]:LIST:FREQuency:ADD <num>,<...>

(Write-only) Adds points to frequency list. Maximum block size is 32, maximum list size is 501.

Parameters

<num>,<...> Supported units: Hz(default), kHz, MHz, GHz

7.5.4.2. [SOURce]:LIST:FREQuency:POINts?

(Read-only) Returns the number of frequency points in the current list sweep.

7.5.5. [SOURce]:LIST:MANual <char> ,<num>,<...>

(Write or Read) This command manually set sweep point number with immediate step to it.

Parameters

<char> Allowed values:

- **UP** - up-direction
- **DOWN** - down-direction

<num>,<...>

7.5.6. [SOURce]:LIST:MODE <char>

(Write or Read) This command define device behavior during a sweep processing. When this parameter is set to "AUTO", device steps all over the sweep range when a trigger event accure. When set "MANual" mode, device passes range one step for trigger event.

Parameters

<char> Allowed values:

- **MANual** - manual mode
- **AUTO** - auto mode

7.5.7. [SOURce]:LIST:POWer <num>,<...>

(Write or Read) This command sets the power values for the current list sweep points. Maximum list size is 501, but it's not allowed to send more than 32 points at time (see : [SOURce]:LIST:POWer:ADD)

Parameters

<num>,<...> Supported units: dBm(default)

7.5.7.1. [SOURce]:LIST:POWer:ADD <num>,<...>

(Write-only) Adds points to power list. Maximum block size is 32, maximum list size is 501.

Parameters

<num>,<...> Supported units: dBm(default)

7.5.7.2. [SOURce]:LIST:POWer:POINts?

(Read-only) Returns the number of power points in the current list sweep.

7.6. [SOURce]:PM

Phase modulation (PM) parameters.

7.6.1. [SOURce]:PM[:DEViation] <num>

(Write or Read) Sets the phase modulation deviation in radians. Range limits depends on carrier frequency.

Parameters

<num> Allowed values:

- **DEFault** - default value
- **MINimum** - minimum value
- **MAXimum** - maximum value

7.6.2.1.1. [SOURce]:PM:INTernal:FUNCtion:FREQuency <num>

(Write or Read) This command sets the modulating signal frequency.

Parameters

<num> Supported units: Hz(default), kHz, MHz, GHz

Allowed values:

- **DEFault** - default value
- **MINimum** - minimum value
- **MAXimum** - maximum value

7.6.2.1.2. [SOURce]:PM:INTernal:FUNCtion:SHAPe <char>

(Write or Read) This command defines the modulating signal shape.

Parameters

<char> Allowed values:

- **SINusoid** - sine wave
- **TRIangle** - triangle
- **RAMP** - saw (ramp) wave
- **SQUare** - pulse signal

- **NOISe** - white noise

Default value: **SIN**

7.6.2.1.2.1. [SOURce]:PM:INTernal:FUNCtion:SHAPe:RAMP <char>

(Write or Read) Selects positive or negative slope for a saw (RAMP) modulating signal shape.

Parameters

<char> Allowed values:

- **NEGative** - negative polarity
- **POSitive** - positive polarity

Default value: **POSitive**

7.6.2.1.2.2.1. [SOURce]:PM:INTernal:FUNCtion:SHAPe:SQUare:DUTY <num>

(Write or Read) This command sets the duty cycle of the pulse (SQUare) modulating signal shape.

Parameters

<num> Value range: **1.0 ÷ 99.0**

Default value: **50.0**

7.6.3. [SOURce]:PM:SOURce

This command sets the source of phase modulation.

7.6.4. [SOURce]:PM:STATe <bool>

(Write or Read) Enables or disables the phase modulation.

Parameters

<bool> Allowed values:

- **ON|1** - enabled
- **OFF|0** - disabled

7.7. [SOURce]:POWer

Commands for the output power configuration.

7.7.1. [SOURce]:POWer[:LEVel] <num>

(Write or Read) Sets the RF output power level.

Parameters

<num> Supported units: dBm(default)

Allowed values:

- **DEFault** - default value
- **MINimum** - minimum value
- **MAXimum** - maximum value

Value range: **-40dBm ÷ 10dBm**

Default value: **0dBm**

7.7.2. [SOURce]:POWer:MODE <char>

(Write or Read) Sets power generation mode. Power list should be defined with the frequency list sweep only (see [SOURce]:FREQuency:MODE).

Parameters

<char> Allowed values:

- **FIXed** - fixed power
- **SWEep** - stepped power sweep

Default value: **FIXed**

7.7.3. [SOURce]:POWer:STARt <num>

(Write or Read) This command sets the first power point in a power step sweep.

Parameters

<num> Supported units: dBm(default)

7.7.4. [SOURce]:POWer:STOP <num>

(Write or Read) This command sets the last power point in a power step sweep.

Parameters

<num> Supported units: dBm(default)

7.8. [SOURce]:PULM

Pulse modulation (PulM) parameters.

7.8.1. [SOURce]:PULM:INTernal

Internal pulse modulation parameters.

7.8.1.1. [SOURce]:PULM:INTernal:PERiod <num>

(Write or Read) This command sets the pulse period (in microseconds) for the internally generated pulse modulation (see [:SOURce]:PULM:INTernal).

Parameters

<num> Supported units: U(default)

Allowed values:

- **DEFault** - default value
- **MINimum** - minimum value
- **MAXimum** - maximum value

Value range: **0.1 U ÷ 3200.0 U**

Default value: **2 U**

7.8.1.2. [SOURce]:PULM:INTernal:PWIDth <num>

(Write or Read) This command sets the pulse width (in microseconds) for the internally generated pulse modulation (see [:SOURce]:PULM:INTernal).

Parameters

<num> Supported units: U(default)

Allowed values:

- **DEFault** - default value
- **MINimum** - minimum value
- **MAXimum** - maximum value

Value range: **0.2 U ÷ 3267.8 U**

Default value: **0.2 U**

7.8.2. [SOURce]:PULM:POLarity <char>

(Write or Read) This command selects the output pulse polarity.

Parameters

<char> Allowed values:

- **NORMal** - no inversion
- **INVerted** - do inversion

Default value: **NORMal**

7.8.3. [SOURce]:PULM:SOURce <char>

(Write-only) This command sets the source of pulse modulation.

Parameters

<char> Allowed values:

- **INTernal** - use internal
- **EXTernal** - use external

Default value: **INTernal**

7.8.4. [SOURce]:PULM:STATe <bool>

(Write or Read) Enables or disables the pulse modulation.

Parameters

<bool> Allowed values:

- **ON|1** - enabled
- **OFF|0** - disabled

Default value: **OFF|0**

7.9. [SOURce]:ROSCillator

Commands for the reference oscillator setup.

7.9.1.1. [SOURce]:ROSCillator:EXTernal:FREQuency

(Write or Read) This command sets frequency of the reference source.

7.9.2. [SOURce]:ROSCillator:SOURce <char>

(Write or Read) This command selects the reference source.

Parameters

<char> Allowed values:

- **INTernal** - use internal reference source
- **EXTernal** - use external reference oscillator

Default value: **INTernal**

7.10. [SOURce]:SWEep

7.10.1. [SOURce]:SWEep:DWELl <num>

(Write or Read) Sets the dwell time for a sweep point.

Parameters

<num> Supported units: s(default)

Allowed values:

- **DEFault** - default value
- **MINimum** - minimum value
- **MAXimum** - maximum value

Value range: **100us ÷ 10s**

Default value: **0.0001s**

7.10.2. [SOURce]:SWEep:POINts <num>

(Write or Read) This command defines the number of stepped sweep points.

Parameters

<num> Value range: **2** ÷ **501**

Default value: **2**

8. SYSTem commands

Parameters for the system configuration.

8.1. SYSTem:ERRor?

(Read-only) This query returns the next error message from the SCPI error queue. If there are no error messages, the query returns the following output: *<+0,"No error">*. When there is more than one error message, the query will need to be sent for each message. See complete error list in SCPI Errors Description section.

8.2. SYSTem:VERSion?

(Read-only) This command returns the SCPI version number with which the generator complies of the form XXXX.Y, where XXXX - year и Y — version number (w/o quotes): “1999.0”.

9. TRIGger commands

9.1.1. TRIGger[:SEQuence]:SLOPe <char>

(Write or Read) This command sets the polarity of an external signal at the TRIG IN connector that will trigger a list or step sweep.

Parameters

<char> Allowed values:

- **NEGative** - negative polarity
- **POSitive** - positive polarity

9.1.2. TRIGger[:SEQuence]:SOURce <char>

(Write or Read) This command sets the sweep trigger source for a list or step sweep.

Parameters

<char> Allowed values:

- **BUS** - enables triggering using the *TRG or TRIGger command
- **IMMediate** - enables immediate triggering of the sweep/list event
- **EXTernal** - enables the triggering of a sweep event by an externally applied signal at the TRIG IN connector.

SCPI Errors Description

FREQuency:MODE state	POWer:MODE state	Support
FIXed|CW	FIXed	+
FIXed|CW	SWEep	+
SWEep	FIXed	+
LIST	LIST	+

Error Code	Error String	Description
(+)0	"No error"	No error
-100	"Command error"	Command tree error or invalid termination char
-101	"Invalid character"	An invalid character was found in the command string. You may have inserted a character such as #, $, or % in the command header or within a parameter
-102	"Syntax error"	Syntax error in the command string
-103	"Invalid separator"	An invalid separator was found in the command string. You may have used a comma instead of a colon, semicolon, or blank space; or you may have used a blank space instead of a comma
-108	"Parameter not allowed"	More parameters were received than expected for the command. You may have entered an extra parameter, or added a parameter to a command that does not accept a parameter
-109	"Missing parameter"	Fewer parameters were received than expected for the command. You may have omitted one or more parameters that are required for this command
-113	"Undefined header"	A command was received that is not valid for the PLG. You may have misspelled the command, it may not be a valid command, or you may have the wrong interface selected. If you are using the short form of the command, remember that it may contain up to four letters
-131	"Invalid suffix"	A suffix was incorrectly specified for a numeric parameter. You may have misspelled the suffix. For example, SENS:FREQ 200KZ
-138	"Suffix not allowed"	A suffix was received following a numeric parameter which does not accept a suffix. For example, INIT:CONT 0Hz

-148	"Character data not allowed"	A discrete parameter was received but a character string or a numeric parameter was expected. Check the list of parameters to verify that you have used a valid parameter type. For example, TRIG:MODE SINGLE_1
-150	"String data error"	An invalid string was received
-211	"Trigger ignored"	Indicates that GET, *TRG or TRIG:IMM was received but was ignored because the device was not in the wait-for-trigger state
-213	"INIT ignored"	Indicates that a request for measurement initiation was ignored as device was already initiated
-221	"Settings conflict"	This message means that command has been received and processed succefully, but will be ignored due to conflicting settings
-222	"Data out of range"	A numeric parameter value is outside the valid range for the command
-224	"Illegal parameter value"	Illegal parameter value. A discrete parameter was received which was not a valid choice for the command. You may have used an invalid parameter choice. For example, TRIG:SOUR EX
-226	"List not same length"	This occurs when frequency and dwell time lists do not correspond in length, for example
-230	"Data corrupt or stale"	This occur when the trace data return is invalid
-310	"System error"	System error
-312	"Memory error"	Memory error
-321	"Out of memory"	Out of memory to run an internal operation
-350	"Queue overflow"	The error queue is full and another error has occurred which could not be recorded
-400	"Query error"	Unknown query error
-410	"Query INTERRUPTED"	A command was received which sends data to the output buffer, but the output buffer contained data from a previous command (the previous data is not overwritten). The output buffer is cleared when power has been turned off, or after the *RST (reset) command has been executed
-420	"Query UNTERMINATED"	Query unterminated
	"Ref lock detect	

328	failed"	Reference lock detection failed
329	"Lock detect failed"	Phase lock detection failed