PROGRAMMING REFERNCE MANUAL

CPS2000

True-Average Connected Power Sensors

P/N: 98408300A
Rev. 20180720

Table of Contents

1 Introduction

1.1 Scope

This document is intended to serve as a specification and reference for the instrument commands supported by the CPS2000 Series True-Average Connected Power Sensors. It is not intended to fully describe the SCPI language, as that information can be retrieved from the SCPI Consortium and/or IEEE. However, where appropriate, some information specified in the SCPI specification may be repeated in this document for clarification purposes.

1.2 Referenced Documents

Ref	Title	Identification/Revision	Source
[1]	Standard Commands for Programmable Instruments (SCPI)	1999.0	1999 SCPI Consortium
[2]	ANSI/IEEE Standard 488.2-1987	488.2-1987	The Institute of Electrical and Electronics Engineers, Inc.

1.3 Definitions

Term/Abbreviation	Definition
SCPI	Standard Commands for Programmable Instruments
Command	A SCPI instruction consisting of keywords, parameters, and punctuation.
Query	A special type of command used to retrieve data and information from the device.

2 Command Syntax

SCPI Commands and queries are sent as standard ASCII strings through various interfaces. Following standard SCPI '99 syntax, the CPS2000 SCPI commands are made up of keywords, parameters, and various punctuation.

Commands consist of one or more keywords, separated by colon "**:**" characters, with zero or more parameters starting with a `<space>` character. In general, commands are not acknowledged by any sort of response message.

Queries follow the same syntax as general commands, but end with a question mark "?" character. Upon receiving a query command, the device will return data according to the specified query. Queries occasionally also have parameters, located after the "?" character.

2.1 Command Parameters & Response Types

Several commands take one or more parameters as part of the command, while query commands return data in particular formats. SCPI defines different data formats for use in these parameters and responses including numerical values, Boolean values, enumerations, and strings.

Within this document, expected data types are specified along with each command's specification.

For more information on the data types supported by SCPI, refer to the SCPI '99 specification and IEEE 488.2.

2.1.1 Numeric Parameters & Response Types

Numeric parameters and response types are integer or floating point numerical values that can be positive or negative, depending on the command or query. Numerical values follow the formatting specifications of the NR1 format defined in IEEE 488.2. Following SCPI syntax, numerical values are transmitted as ASCII characters.

Denoted as:

```
<numeric_value>
```

For some commands, an additional unit suffix component is supported to denote units for a parameter. Suffix components are always optional, but when supported by a command, are documented with that command. When included, units suffix components are denoted with a numerical value as:

```
<numeric_value><suffix>
```

2.1.2 Boolean Parameters & Response Types

Boolean parameters and response types are binary variables having two possible values. Boolean parameters and response types can be denoted using:

`ON` or `OFF`

-or-

`1` or `0`

Where `ON` is equivalent to `1` and `OFF` is equivalent to `0`.

Either format is accepted. Within this document, Boolean parameters and response types generally use the `ON` or `OFF` formatting to describe the meaning of each option.

Denoted as:

```
<Boolean>
```

2.1.3 Discrete (Enumeration) Parameters & Response Types

Discrete parameters and response types are values that have a specific set of supported options. The possible options for a command is documented with the command, and any options not specified in this document can be assumed as unsupported options.

Denoted as:

```
<Option1|Option2|Option3>
```

2.1.4 ASCII String Parameters & Response Types

The CPS2000 series of devices also supports ASCII string parameters and response types. Some commands return textual information and/or take text as a parameter. In general, ASCII string parameters and response types support the 8-bit ASCII character set. Any other character formatting is not supported.

Denoted as:

```
<string-label>
```

where “label” is a descriptive label for the expected contents of the string

2.2 Message Termination & Maximum Length

SCPI commands and responses are terminated upon receipt of a message terminator. The CPS2000 series of power sensors make use of a new-line (`\n`) character as its message terminator.

Additionally, for the CPS2000 series of devices, the maximum length allowed for a single command is 256 bytes.

2.3 Syntax Conventions

Specific syntax conventions are as follows:

CHARACTERS	DESCRIPTION	EXAMPLE
|	A vertical pipe character between keywords and/or parameters indicates alternate choices.	`UNIT:POWer <DBM|W>` DBM and W are both accepted, but alternate choices.

[ ]	Indicates that the enclosed keywords are optional when composing a command. The enclosed keywords or parameters will be assumed even if omitted.	`INITiate[:IMMediate]`
		`:IMMediate` is optional, and the command is assumed even if instead sent as `INITiate`

:	Separates keywords within a complete command tree. Keywords further to the right within a command represents commands lower in the SCPI command tree, where keywords to the left represent more base, high-level subsystems of a command tree.	`INITiate:CONTinuous` `INITiate` and `CONTinuous` are separate keywords, but are combined to make up a single command using the `:` character.

,	Separates adjacent parameters or responses when more than one parameter or response is expected for a command.	`SYSTem:ERRor[:NEXT]?`
		returns
		`<numeric_value>,<string-description>`
		Corresponding to 2 components of the response – a numerical value and a string value.

< >	Indicates that the enclosed content is not to be used literally in a command, but just represents and describes the necessary content.	`SENSe:FREQuency <numerical_value>` Where `<numerical_value>` corresponds to a user-filled parameter for the `SENSe:FREQuency` command.

CHARACTERS	DESCRIPTION	EXAMPLE

Upper-case keyword characters	Indicates the minimum set of characters for a command.	`SENSe:FREQuency?`
		In this command, only the `SENS` and `FREQ` characters are required. As such, an equivalent command would be:
		`SENS:FREQ?`

Lower-case keyword characters	Additional, optional characters for a command. These characters can be included or omitted from a command string. If any are omitted, all lower-case keyword characters must be omitted.	`INITiate:CONTinuous`
		In this command, only the `INIT` and `CONT` characters are required. As such, an equivalent command would be:
		`INIT:CONT`

Whitespace	Generally ignored as long as they are not included within a command's keywords. A single `<space>` character is required to separate parameters from a command's keywords.	

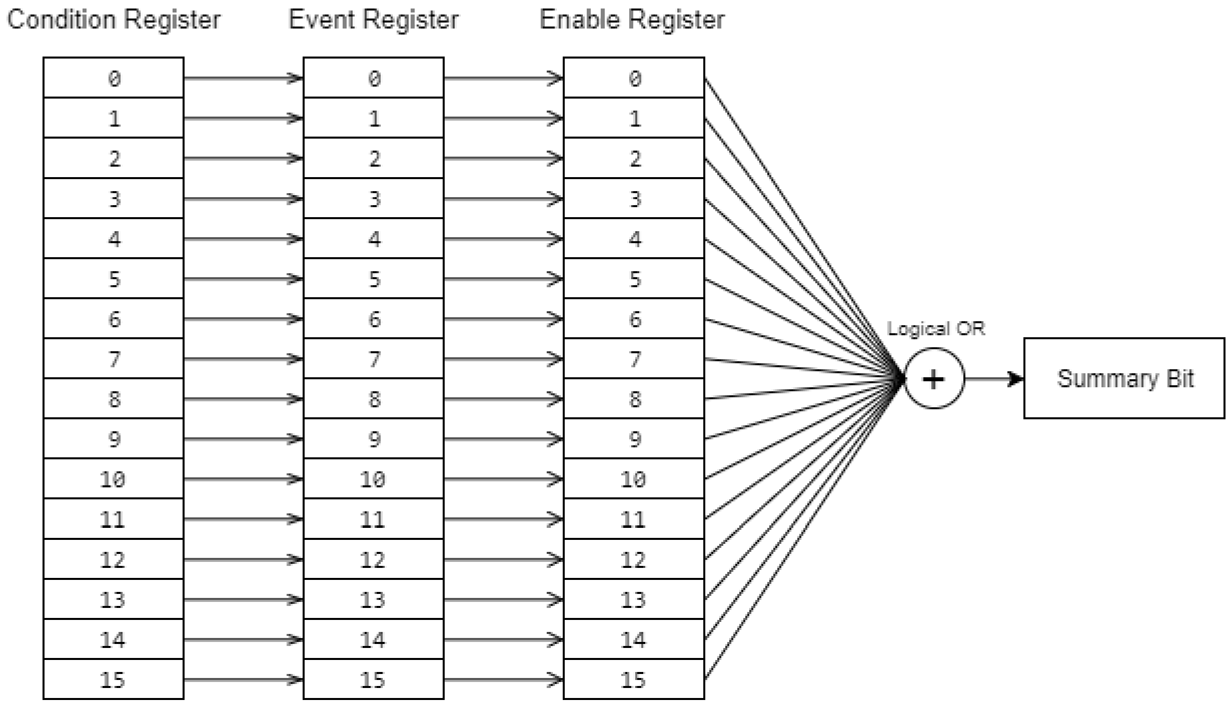
3 Status Reporting

In general, the status registers are always-positive (unsigned) 16-bit registers.

Although SCPI supports the use of transition filters, the CPS2000 series of devices does not make use of any transition filters. Additionally, the SCPI specification includes an optional feature for remapping bits within the Operation and Questionable Status Registers. The CPS2000 series of devices does not support that feature.

3.1 Status Registers Model

Each of the status registers supported by the CPS2000 series of devices follows a particular model according to the SCPI specification. Each Status described in the following sections has a set of 4 associated registers: a Condition register, Transition Filter registers, an Event register, and an Enable register. For the CPS2000 series of devices, the Transition Filter registers are not used.



For an example of using registers, see Section 6.5.

3.1.1 Condition Register

The Condition Register component of a status serves as the source of information for the rest of the Status Registers Model. This register is updated in real-time and is read-only. Bits set within the Condition Register describe conditions that occur in real-time.

3.1.2 Transition Filter Registers

Although the SCPI specification defines a set of Transition Filter Registers, the CPS2000 devices do not include support for any transition filters.

Instead, anytime a bit transitions from 0 to 1 in the Condition Register occcurs, the corresponding bit in the Event Register is set to 1.

3.1.3 Event Register

The Event Register component of a Status consists of bits assigned to events. Bits in the Event Register are latched and only cleared by a query or a `*CLS` command. The Event Register is read-only.

3.1.4 Enable Register

The Enable Register component of a Status contains bits that define what bits in the Event Register generate a ‘1’ for the summary bit in the Status Byte. When a bit in the Enable Register is set to a ‘1’, a ‘1’ for the corresponding Event Register bit will result in a ‘1’ for the summary bit in the Status Byte.

3.2 Operation Status

The Operation Status provides general operational status information for the instrument. It follows the Status Registers Model described in section 3.1 and includes a Condition Register, Event Register, and Enable Register.

Configuration of each of these registers is performed with the `STATus:OPERation` SCPI commands as described in section 7.4 Status Subsystem (STATus Commands).

The Operation Status Condition Register is a 16-bit unsigned register and has the following definition:

BIT	DESCRIPTION
`0`	Calibrating bit Set when the instrument is performing a calibration.
`1`	Settling bit *Not Used*
`2`	Ranging bit *Not Used*
`3`	Sweeping bit *Not Used*
`4`	Measuring bit Set when the instrument is in the `MEASURING` state and is taking an actual power measurement. See Section 5 Measurement Sequence for more details.

BIT	DESCRIPTION
5	Waiting for Trigger bit Set when the instrument is in the `WAITING_FOR_TRIGGER` state. See Section 5 Measurement Sequence for more details.
6	Waiting for ARM bit *Not Used*
7	Correcting bit *Not Used*
8–12	*Not Used*
13	Instrument Summary bit *Not Used*
14	Programming Running bit *Not Used*
15	Always Zero

3.3 Questionable Status

The Questionable Status provides information indicating the quality of various aspects of the device. A bit set within the Questionable Status Condition Register indicates that the associated data is of questionable quality due to some condition affecting that parameter. For example, if the Temperature bit is set, that means the accuracy of the Temperature reading is of questionable quality.

The Questionable Status follows the Status Registers Model described in section 3.1 and includes a Condition Register, Event Register, and Enable Register.

Configuration of each of these registers is performed with the `STATus:QUEStionable` SCPI commands as described in section 7.4 Status Subsystem (STATus Commands).

The Questionable Status Condition Register is a 16-bit unsigned register with the following definition:

BIT	**DESCRIPTION**
0	Questionable Voltage bit *Not Used*
1	Questionable Current bit *Not Used*
2	Questionable Time bit *Not Used*
3	Questionable Power bit Set to a 1 when the latest power measurement is of questionable quality.
4	Questionable Temperature bit Set to a 1 when the latest temperature value is of questionable quality.
5	Questionable Frequency bit *Not Used*
6	Questionable Phase bit *Not Used*
7	Questionable Modulation bit *Not Used*
8	Questionable Calibration bit Set to a 1 when the device calibration is of questionable quality.
9	*Not Used*
10	*Not Used*
11	*Not Used*
12	*Not Used*

BIT	DESCRIPTION
13	Instrument Summary bit *Not Used*
14	Command Warning bit *Not Used*
15	Always Zero

3.4 Standard Event Status

The Standard Event Status is a register described by IEEE 488.2. In general, it contains various error status information and basic operation information. From the full Status Registers Model, the Standard Event Status only consists of 2 registers: one containing the real-time status of standard events, and one to enable bits for generation of the Standard Event Status Summary Bit.

3.4.1 Standard Event Status Register

The Standard Event Status Register is read-only and contains the real-time status of various events.

The Standard Event Status Register's value can be obtained using the `*ESR?` query.

The Standard Event Status Register's value is cleared when:

a. Sending a `*CLS` command or
b. Querying the value using the `*ESR?` query

The Standard Event Status Register is an 8-bit unsigned register with the following definition:

BIT	DESCRIPTION
0	Operation Complete bit When 1, indicates the last requested operation was completed.
1	Request Control bit *Not Used*
2	Query Error bit *Not Used*
3	Device Dependent Error bit When 1, indicates a device error occurred.
4	Execution Error bit When 1, indicates an execution error occurred.
5	Command Error bit When 1, indicates a command syntax error occurred.
6	User Request bit *Not Used*

BIT	DESCRIPTION
7	Power On bit *Not Used*

3.4.2 Standard Event Status Enable Register

The Standard Event Status Enable Register is read/write and configures which bits of the Standard Event Status Register constitute a 1 in the Standard Event Status Summary Bit. If a bit of the Standard Event Status Enable Register is configured as 1 and the corresponding bit of the Standard Event Status Register is also 1, the Standard Event Status Summary Bit will be set to a 1.

The Standard Event Status Enable Register's value can be configured using the `*ESE` command and can be retrieved using the `*ESE?` query.

The Standard Event Status Enable Register's value is cleared when:

a. Power cycling the device or
b. Sending a `*ESE 0` command.

3.5 Status Byte

The Status Byte contains summary information about the state of the device. It contains bits corresponding to the Questionable Status Summary, Standard Event Status Summary and the Operation Status Summary, which are set as configured using the Status Registers Model (see section 3.1 for more details).

The value of the Status Byte is obtained using the `*STB?` query.

The Status Byte definition is as follows:

BIT	DESCRIPTION
0	*Not Used*
1	*Not Used* 1 if an error/event is present in the Error/Event queue, or 0 if no error/event is present.
2	Errors/events are retrievable using the `*ESR?` command.
3	Questionable Status Summary bit
4	Message Available bit (MAV) Set to a 1 when a message is available, such as when a power measurement is complete and ready for retrieval.

BIT	DESCRIPTION
5	Standard Event Status Summary bit
6	Service Request bit Summary status bit for the Status Byte itself. Configuring the behavior of this bit is performed using the `*SRE` command.
7	Operation Status Summary bit

3.5.1 Service Request Enable Register

The Status Byte also has an Enable Register for configuring the Service Request bit (bit 6 of the Status Byte). This register works similar to the other enable registers, configuring which bits of the Status Byte constitute a 1 in the Service Request bit.

The Service Request Enable Register can be configured using the `*SRE` command.

3.6 Error Codes

The list of SCPI error codes that are reported by the CPS2000 series of devices is as follows:

ERROR CODE	DESCRIPTION
`-100`	General command error
`-101`	Invalid character
`-102`	Syntax error
`-103`	Invalid separator
`-104`	Data type error
`-105`	GET (query) not allowed
`-108`	Parameter not allowed
`-109`	Missing parameter
`-110`	Command header error

ERROR CODE	DESCRIPTION
-115	Unexpected number of parameters
-120	Numeric data error
-130	Suffix error
-140	Character data error
-150	String data error
-160	Block data error
-170	Expression error
-200	General execution error
-220	General parameter error
-222	Data out of range error
-230	Data corrupt or stale error
-240	General hardware error
-241	Hardware missing
-242	Hardware malfunction
-300	Generic, device-specific error
-350	Queue overflow

4 SCPI Conformance Information

The CPS2000 series of devices complies with the specifications of SCPI version 1999.0. You can determine the exact SCPI version that a device implements using the `SYSTem:VERSion?` Query.

The following commands are device-specific for the CPS2000 series of devices, and are not included in the 1999.0 revision of the SCPI standard:

```
SENSe:FILTer:STATe
SENSe:FILTer:STATe?
SENSe:FILTer:TIMe
SENSe:FILTer:TIMe?
SYSTem:COMMunicate[:NETwork]:MAC?
SYSTem:COMMunicate[:NETwork]:DHCP
SYSTem:COMMunicate[:NETwork]:DHCP?
SYSTem:COMMunicate[:NETwork]:IP
SYSTem:COMMunicate[:NETwork]:IP?
SYSTem:COMMunicate[:NETwork]:SUBNet
SYSTem:COMMunicate[:NETwork]:SUBNet?
SYSTem:COMMunicate[:NETwork]:GATeway
SYSTem:COMMunicate[:NETwork]:GATeway?
SYStem:INFO?
SYStem:INFO:EXTended?
```

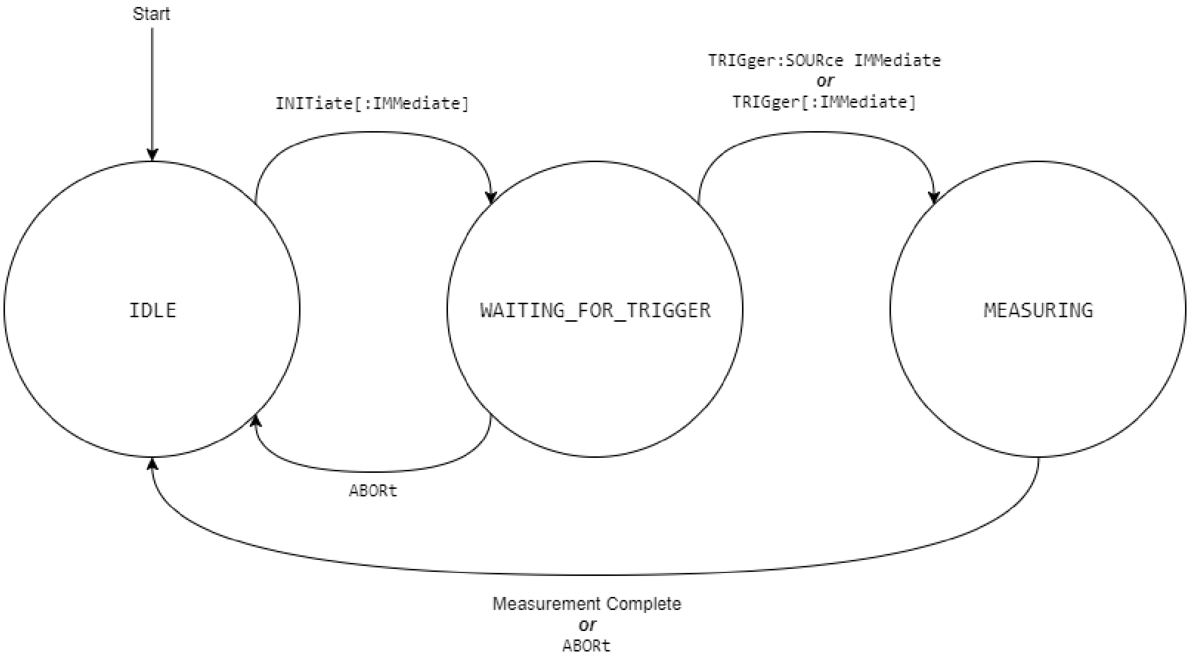
5 Measurement Sequence

The CPS2000 series of devices follows certain sequences when taking power measurements, depending on the configuration. Two different measurement modes are supported: a Single Measurement Mode and a Continuous Measurement Mode. The default measurement mode of the device is Single Measurement Mode.

5.1 Single Measurement Mode

The Single Measurement Mode sequences involve initiation, triggering, and then actual construction of the measurement. The default state in this mode is `IDLE`, and the device only moves to the `WAITING_FOR_TRIGGER` state when an `INITiate[:IMMediate]` command is received. When a measurement is complete, the device moves back into the IDLE state and again waits for an `INITiate[:IMMediate]` command.

If the power measurement filter is enabled (see `SENSE:FILTer`), a measurement is not considered complete as is not returned until the power measurement filter is filled. Once the filter is filled according to the configuration set using the `SENSe:FILTer:TIMe` command, the measurement is treated as complete, and if a `FETCh?` command has been received, the measurement is returned.

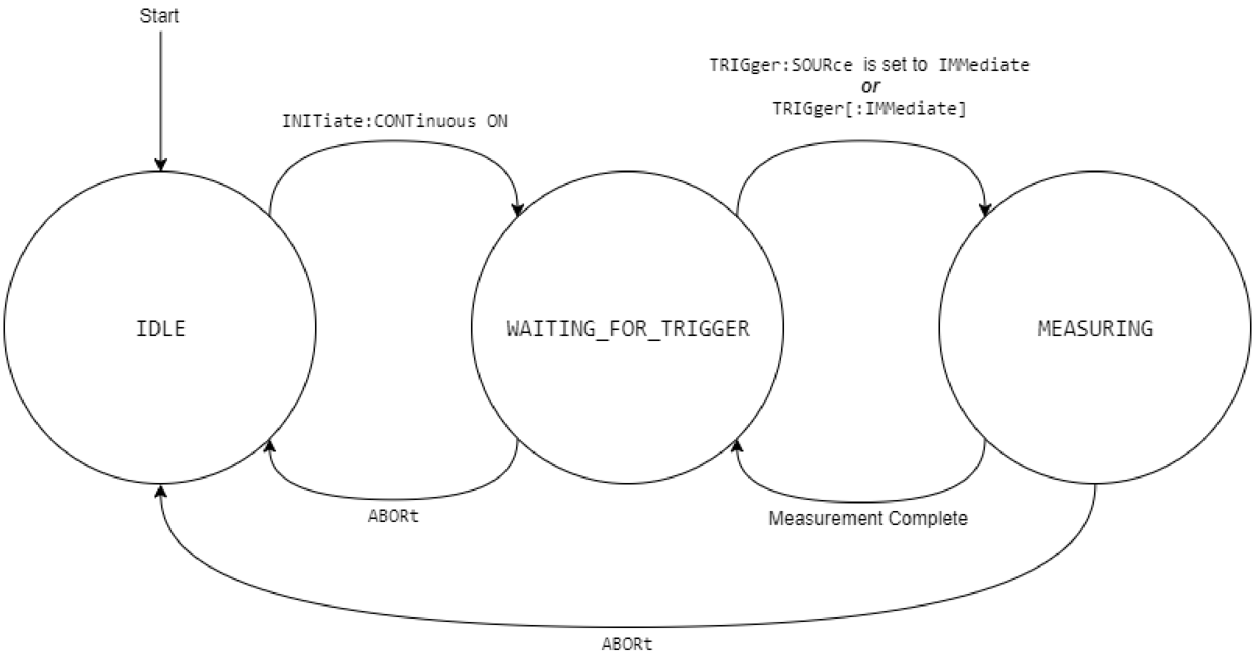


STATE	DESCRIPTION
IDLE	Device is idle, and no power measurement has been started or initiated.
WAITING_FOR_TRIGGER	A power measurement is initiated, but waiting for a trigger event.
MEASURING	The power measurement is in-progress. If a FETCh? command is received while the device is in this state, the resulting power measurement will be returned to the caller after the measurement is complete.

5.2 Continuous Measurement Mode

Continuous Measurement Mode follows a sequence similar to the Single Measurement Mode, except that the IDLE state is skipped after Continuous Measurement Mode is enabled. Instead of returning to IDLE after the MEASURING state, the device automatically initiates another measurement and moves into the WAITING_FOR_TRIGGER state.

If the device is in this state, the ABORt command will immediately move the device back into the IDLE state and automatically disable Continuous Measurement Mode.



5.3 Power Measurements

Internally to the device, power measurements are retrieved at a rate of 1000 Hz, or 1 sample per millisecond. Once obtained, power measurement samples are processed using either the Power Measurement Boxcar Filter (termed Power Measurement Aperture) or using Power Measurement Averaging. These methods are mutually exclusive – Filtering cannot be applied at the same time as Averaging. While similar, these two different methods of smoothing data also have subtle differences as described in the following sections.

5.3.1 Power Measurement Filtering

The CPS2000 series of devices support filtering of power measurements using an aperture, controllable with the `SENSe:FILTer:STATe` and `SENSe:FILTer:TIMe` commands. When enabled, power measurements will go through the power measurement filtering process before being made available for retrieval.

Due to the nature of the aperture filter, when first enabled, the filter must be filled with data before data measurements become available. For example, if the Filter is set to `ON` with a Filter Time of 50ms, valid power measurements will not be available until 50ms after the filter is first enabled. Following this initial delay, power measurements are then immediately available with no additional impact to the rate at which data can be retrieved.

When using the Power Measurement Filter, it is recommended that the device be placed into Continuous Measurement Mode using the `INITiate:CONTinuous` command.

5.3.2 Power Measurement Averaging

As an alternative to the Power Measurement Aperture, the CPS2000 series of devices also support basic averaging of data. Averaging of power measurements is controllable with the `SENSe:AVERage:COUNt:AUTO` and `SENSe:AVERage:COUNt` commands. Generally, when `SENSe:AVERage:COUNt:AUTO` (auto averaging) is set to `OFF`, averaging, according to the sample-count set with `SENSe:AVERage:COUNt`, is enabled. When `SENSe:AVERage:COUNt:AUTO` (auto averaging) is set to `ON`, averaging is generally not used by the device, and Filtering is used instead.

Unlike the Power Measurement Aperture, Power Measurement Averaging averages a new set of power measurements together for each new measurement sequence, and therefore continuously affects the rate at which data is available. The higher the value set using `SENSe:AVERage:COUNt`, the slower the measurement rate.

5.3.3 Interaction with FETCh[:SCALar][:POWer:AC]?

Filtering and averaging have implications on the behavior of the `FETch?` command that may not be immediately obvious. They are explained below:

Filtering

If Filtering is enabled, the first time FETCh? is sent (assuming the device is in the MEASURING state) the power measurement will be returned after a delay approximately equivalent to the filter time (aperture) window. Subsequence requests using FETCh? will incur no delay, but will instead immediately return with the latest power measurement.

Averaging

If the manual averaging count is enabled, every `FETCh?` request made while the device is in the MEASURING state will be responded to after a delay approximately equal the averaging count, in milliseconds.

Frequency Changes

Additionally, a delay is incurred when frequency is changed using the `SENSe:FREQuency` command. Whenever the frequency is changed, the active measurement is cancelled, the filter and averaging buffers are reset, and a slight delay occurs due to internal calibration adjustments.

Note!

Due to the delays described above, care must be taken when setting large filter times or averaging counts to ensure timeouts do not occur while waiting on a `FETCh?` response. If a filter time or averaging count is set to the maximum value of 2000 and a frequency change occurs, `FETCh?` may wait to return the power measurement for as long as 2 to 2.5 seconds.

6 Example Command Sequences

6.1 Taking a Power Measurement with Software Triggering

The following command sequence sets the trigger source for software triggering, initiates a power measurement, triggers the measurement, waits for the device to take the measurement, and then retrieves the actual power measurement.

TRIGger:SOURce BUS	Set the Trigger Source to Software Trigger mode
INITiate:IMMediate	Initiate a measurement
TRIGger:IMMediate	Send the software trigger
*STB? 0	Check the MAV bit of the status byte
*STB? 16	
FETCh:SCALar:POWer:AC? -3.554235e+01	Fetch the power measurement

6.2 Continuous Power Measurements

The following command sequence sets up continuous triggering mode with a trigger source of immediate and then retrieves actual power measurements.

TRIGger:SOURce IMMediate	Set the Trigger Source to Immediate
INITiate:CONTinuous ON	Enable Continuous Mode
*STB? 16	Check the MAV bit of the status byte
FETCh:SCALar:POWer:AC? -2.389993e+01	Fetch the power measurement
*STB? 16	
FETCh:SCALar:POWer:AC? -2.389983e+01	

`*STB? 16`	

`FETCh:SCALar:POWer:AC?`
`-2.389981e+01`	

6.3 Setting Units, Offset, and Correction Frequency

This command sequence configures Power Units, power measurements Offset, and the device's Correction Frequency.

`UNIT:POWer DBM`	Set Power units to dBm
`SENSe:CORRection:OFFset:MAGNitude 12.3`	Set Offset to 12.3 dBm
`SENSe:FREQuency 1500000000`	Set Frequency to 1.5 GHz

6.4 Retrieving Device Information

This command sequence retrieves general device information.

`*IDN? Boonton,CPS2008,000025,1.0.0`	Query basic information

`SYSTem:INFO:EXTended? 0`
`cal_date=2017-11-18;`
	Request first group of extended information

6.5 Enabling Operation Status Information & Detecting Status Changes

The following command sequence configures the Operation Status Register to enable bit 4 (measuring status bit) as a bit that sets the Operation Status Summary bit of the Status Byte, and then polls the register values until the Operation Status Summary bit is set. This sequence assumes the device has been configured for continuous triggering mode with an immediate trigger source.

`STATus:OPERation:ENABle 16`	Enable the Measuring bit in the Operation Status Enable Register
`STATus:OPERation:CONDition? 16`	Query the Operation Status Condition Register – Device indicates MEASURING state
`STATus:OPERation:EVENt? 16`	Query the Operation Status Event Register – Device indicates Measuring event
`*STB? 128`	Request the Status Byte, which now has bit 7 set since the Measuring bit in the Operation Status Event Register was set to 1.
`STATus:OPERation:EVENt? 0`	Query the Operation Status Event Register – Event Register is cleared due to previous command

6.6 Retrieving and Setting Network Configuration

The following command sequence retrieves the active network configuration from the device and then sets a static IP network configuration.

`SYSTem:COMMunicate:NETwork:DHCP? ON`	Query DHCP Enabled state
`SYSTem:COMMunicate:NETwork:IP? 192.168.1.45`	Query device IP Address
`SYSTem:COMMunicate:NETwork:SUBNET? 255.255.255.0`	Query device Subnet Address
`SYSTem:COMMunicate:NETwork:GW? 192.168.1.1`	Query device Gateway
`SYSTem:COMMunicate:NETwork:DHCP OFF`	Turn DHCP Off (use static IP configuration)

`SYSTem:COMMunicate:NETwork:IP`
`192.168.1.101`
	Set device’s static IP Address

`SYSTem:COMMunicate:NETwork:SUBNET`
`255.255.255.0`
	Set device’s static Subnet Address

`SYSTem:COMMunicate:NETwork:GW 192.168.1.1`	Set device’s static Gateway Address
`SYSTem:COMMunicate:NETwork:DHCP? OFF`	Query DHCP Enabled state

`SYSTem:COMMunicate:NETwork:IP?`
`192.168.1.101`
	Query device IP Address

`SYSTem:COMMunicate:NETwork:SUBNET?`
`255.255.255.0`
	Query device Subnet Address

`SYSTem:COMMunicate:NETwork:GW?`
`192.168.1.1`
	Query device Gateway

7 Command Reference

7.1 Common Commands (IEE488.2 Commands)

*CLS

Syntax	`*CLS`
Parameters	None
Response	None
Description	Clear Status command. Clears device status data structures. The Questionable Status Event Register, Operation Status Event Register, Standard Event Status Register, and Status Byte, and the Error/Event queue are all cleared by this command.

*ESE

Syntax	`*ESE <numerical_value>`
Parameters	`<numerical_value>` A numerical value serving as a bitmask for the bits that will be enabled.
Range	0 – 255
Response	None
Description	Standard Event Status Enable command. Sets the Standard Event Status Enabled register. See section 3.4 Standard Event Status.

*ESE?

Syntax	`*ESE?`
Parameters	None
Response	`<numerical_value>` The value of the Standard Event Status Enable register
Description	Standard Event Status Enable query. Retrieves the value of the Standard Event Status Enable register. See section 3.4 Standard Event Status.

*ESR?

Syntax `*ESR?`

Parameters None

Response

```
<numerical_value>
```

The value of the Standard Event Status Register.

Description Standard Event Status Register query.

Retrieves the value of the Standard Event Status Register.

NOTE:
After returning the value of the Standard Event Status register, the register value is cleared. The data in the Standard Event Status register is latched until queried using this command, after which the value is reset.

*IDN?

Syntax `*IDN?`

Parameters None

Response

```
<string-manufacturer>,<string-model>,<string-serial
number>,<string-firmware version>
```

Basic identification information, including manufacturer, device model, device serial number, and device firmware version.

Description Identification query.

Retrieves basic identity information for the device.

Example

Request: `*IDN?`

Response:

```
Boonton,CPS2008,000025,1.0.0
```

*OPC

Syntax `*OPC`

Parameters None

Response None

Description Operation Complete command.

Sets bit 0 of the Standard Event Status register after all pending operations have completed.

*OPC?

Syntax `*OPC?`

Parameters None

Response

```
<Boolean>
```

Description Operation Complete query.
Returns the ASCII character 1 when all pending operations have finished.

*RST

Syntax `*RST`

Parameters None

Response None

Description Reset command.

Resets the device to a known state.
Specifically, the following settings and configuration options are reset:

Command / Setting	Reset to Default of
`SENSe:AVERage:COUNt`	`50`
`SENSe:AVERage:COUNt:AUTO`	`ON`
`SENSe:CORRection:OFFset[:MAGNitude]`	`0.0`
`SENSe:FILTer:STATe`	`ON`
`SENSe:FILTer:TIMe`	`50`
`SENSe:FREQuency`	`1GHZ`
`TRIGger:SOURce`	`IMMediate`
`INITiate:CONTinuous`	`OFF`
`UNIT:POWer`	`DBM`

*SRE

Syntax `*SRE`

Parameters `<numerical_value>`

A numerical value serving as a bitmask for the bits that will be enabled.

Range 0 – 255

Response None

Description Service Request Enable command.
Sets the value of the Service Request Enable register.

See section 3.5 Status Byte for more information.

*SRE?

Syntax `*SRE?`

Parameters None

Response `<numerical_value>`

The value of the Service Request Enable register.

Description Service Request Enable query.
Returns the value of the Service Request Enable register.

See section 3.5 Status Byte for more information.

*STB?

Syntax `*STB?`

Parameters None

Response `<numerical_value>`

The device Status byte.

Description Read Status Byte query.
Returns the value of the device Status byte, including the master summary status bit.

See section 3.5 Status Byte for more information.

*TST?

Syntax `*TST?`

Parameters None

Response `<numerical_value>`

`0`	All tests passed
`1`	One or more tests failed

Description Self-Test query.
Initiates an internal self-test and returns the result of that test.

7.2 Measurement Subsystem (MEASurement Commands)

FETCh[:SCALar][:POWer:AC]?

Syntax `FETCh[:SCALar][:POWer:AC]?`

Parameters None

Response `<numerical_value>`

A numerical power measurement in units as configured using the `UNIT:POWer` command.

Description Retrieves a power measurement.

The `FETCh?` query returns data any time the last power measurement reading is valid.

Data becomes valid after completion of a measurement sequence, as described in section 5 (Measurement Sequence).

If the device is in the IDLE state and a measurement has not been initiated, the `FETCh?` query will not return any data and will instead generate an error with code -230.

If a measurement has been initiated, but not triggered, the `FETCh?` query will not return any data and will instead generate an error with code -230.

If a measurement has been initiated and triggered (either by a software trigger or due to a trigger source of `IMMediate`), the `FETCh?` query will return the power measurement when it is ready. If the power measurement is delayed due to a frequency change, averaging time, or filtering, the power measurement will be returned after that delay.

For more details regarding the measurement cycles and when power measurements are available, see section 5 Measurement Sequence.

Example

Request:

```
FETCh:SCALar:POWer:AC?
```

Response:

```
-3.566245e+01
```

READ[:SCALar][:POWer:AC]?

Syntax

```
READ[:SCALar][:POWer:AC]?
```

Parameters None

Response

```
<numerical_value>
```

A numerical power measurement in units as configured using the `UNIT:POWer` command.

Description Initializes a measurement sequence and then retrieves a power measurement.

This command is equivalent to sending the following sequence of commands, with a Trigger Source of `IMMediate`:

```
ABORt
INITiate:IMMediate
FETCh:SCALar:POWer:AC?
```

Since the `READ?` query aborts any existing measurements and then initiates a new measurement, it should not be used for continuous data acquisition (Continuous Measurement Mode) – in this case, use `FETCh?` queries instead.

For more details regarding the measurement cycles, see section 5 Measurement Sequence.

Example

Request:

```
READ:SCALar:POWer:AC?
```

Response:

```
-3.187887e+01
```

FETCh[:SCALar]:TEMPerature?

Syntax

```
FETCh[:SCALar]:TEMPerature?
```

Parameters None

Response

```
<numerical_value>
```

The current temperature reading from the device, in degrees Celsius.

Description Retrieves the latest temperature measurement from the device.

Unlike power measurements, temperature readings are always available and considered valid, with no measurement initiation, triggering, or sequencing required.

Example

Request:

```
FETCh:SCALar:TEMPerature?
```

Response:

```
3.448959e+01
```

READ[:SCALar]:TEMPerature?

Syntax

```
READ[:SCALar]:TEMPerature?
```

Parameters None

Response

```
<numerical_value>
```

The current temperature reading from the device, in degrees Celsius.

Description Retrieves the latest temperature measurement from the device.

Unlike power measurements, temperature readings are always available and considered valid, with no measurement initiation, triggering, or sequencing required.

Example

Request:

```
READ:SCALar:TEMPerature?
```

Response:

```
3.448959e+01
```

7.3 Sense Subsystem (SENSe Commands)

SENSe:AVERage:COUNt

Syntax

```
SENSe:AVERage:COUNt <numerical_value>
```

Parameters

```
<numerical_value>
```

The averaging count to set. Only supports integer values.

Range

```
1 – 2000
```

Default Value

```
50
```

Response None

Description Sets the averaging count in use by the device for power measurements.

NOTE:
Sending this command automatically disables automatic averaging.

For details regarding the measurement cycles and averaging, see section 5 Measurement Sequence and section 5.3.2 Power Measurement Averaging.

Example

```
SENSe:AVERage:COUNt 10
```

SENSe:AVERage:COUNt?

Syntax

```
SENSe:AVERage:COUNt?
```

Parameters None

Response

```
<numerical_value>
```

The averaging count in use by the device.

Description Retrieves the averaging count in use by the device for power measurements.

Example

Request:

```
SENSe:AVERage:COUNt?
```

Response:

```
5
```

SENSe:AVERage:COUNt:AUTO

Syntax

```
SENSe:AVERage:COUNt:AUTO <Boolean>
```

Parameters

```
<Boolean>
```

`1` to enable automatic averaging by the device.
`0` to disable automatic averaging by the device.

Default Value

```
1
```

Response None

Description Enables or disables automatic averaging for power measurements taken by the device.

When set to `1`, averaging of power measurements is automatically handled by the device and the averaging count is ignored.

When set to `0`, averaging of power measurements is enabled and follows the setting configured using the `SENSe:AVERage:COUNt` command. Additionally, when this command is sent with an `0` parameter, the Filter State is automatically disabled (set to `0`).

For more details regarding the measurement cycles and averaging, see section 5 Measurement Sequence and section 5.3.2 Power Measurement Averaging.

Example `SENSe:AVERage:COUNt:AUTO 1`

SENSe:AVERage:COUNt:AUTO?

Syntax

```
SENSe:AVERage:COUNt:AUTO?
```

Parameters None

Response

```
<Boolean>
```

`1` if automatic averaging is in use by the device.
`0` if automatic averaging is not in use by the device.

Description Retrieves whether or not automatic averaging for power measurements is in use by the device.

Example

Request: `SENSe:AVERage:COUNt:AUTO?`

Response:

```
0
```

SENSe:CORRection:OFFset[:MAGNitude]

Syntax

```
SENSe:CORRection:OFFset[:MAGNitude] <numerical_value>
```

Parameters

```
<numerical_value>
```

The offset to use for power measurements, in dBm.

Range

```
-200.000 to 200.000
```

Default Value

```
0.000
```

Response None

Description Sets an offset to use when the device takes power measurements, in dBm.

Example `SENSe:CORRection:OFFset:MAGNitude 12.510`

SENSe:CORRection:OFFset[:MAGNitude]?

Syntax

```
SENSe:CORRection:OFFset[:MAGNitude]?
```

Parameters None

Response

```
<numerical_value>
```

The offset in use when taking power measurements, in dBm.

Description Retrieves the offset in use by the device when taking power measurements, in units of dBm.

Example

Request: `SENSe:CORRection:OFFset:MAGNitude?`

Response:

```
-5.230
```

SENSe:FILTer:STATe

Syntax

```
SENSe:FILTer:STATe <Boolean>
```

Parameters

```
<Boolean>
```

A string corresponding to the mode to use for the power measurement filter.

`0`	The power measurement filter is disabled and not used
`1`	The power measurement filter is enabled and used according to the time configured with the `SENSe:FILTer:TIMe` command.

Default Value

```
1
```

Response None

Description Configures the state of the power measurement filter.

When set to `1`, the power measurement filter is enabled with a time configured using the `SENSe:FILTer:TIMe` command. When enabled, power measurement sequences do not treat a measurement as complete until the power measurement filter is filled.

Additionally, when set to `1`, automatic averaging mode is set to `1` and averaging counts controlled by the `SENSe:AVERage:COUNt` command are ignored.

For more details regarding the measurement cycles and filtering, see section 5 Measurement Sequence and section 5.3.1 Power Measurement Filtering.

Example `SENSe:FILTer:STATe 0`

SENSe:FILTer:STATe?

Syntax

```
SENSe:FILTer:STATe?
```

Parameters None

Response

```
<Boolean>
```

A string corresponding to the enabled state of the power measurement filter.

`1`	The power measurement filter is disabled and not used
`0`	The power measurement filter is enabled and used according to the time configured with the `SENSe:FILTer:TIMe` command.

Description Retrieves the enabled state of the power measurement filter.

Example Request: `SENSe:FILTer:STATe?`

Response:

```
1
```

SENSe:FILTer:TIMe

Syntax

```
SENSe:FILTer:TIMe <numeric_value>
```

Parameters

```
<numeric_value>
```

The power measurement filter time to set, in milliseconds.

Range

```
1 – 2000
```

Default Value

```
50
```

Response None

Description Configures the time-length of the power measurement filter.

If the power measurement filter is disabled, this command will force the state to ON.

For more details regarding the measurement cycles and filtering, see section 5 Measurement Sequence and section 5.3.1 Power Measurement Filtering.

Example `SENSe:FILTer:TIMe 125`

SENSe:FILTer:TIMe?

Syntax

```
SENSe:FILTer:TIMe?
```

Parameters None

Response

```
<numeric_value>
```

The power measurement filter time in use by the power measurement filter, in milliseconds.

Description Retrieves the time-length of the power measurement filter.

If the power measurement filter is disabled, this query will return the current filter time value.

For more details regarding the measurement cycles and filtering, see section 5 Measurement Sequence and section 5.3.1 Power Measurement Filtering.

Example Request: `SENSe:FILTer:TIMe?`

Response: `50`

SENSe:FREQuency

Syntax

```
SENSe:FREQuency <numerical_value><suffix>
```

Parameters

```
<numerical_value><suffix>
```

The Correction Frequency to use for power measurements.

Range

```
50MHZ - 8GHZ
```

Default Value

```
1GHZ
```

Supported Suffixes

```
HZ, KHZ, MHZ, GHZ
```

Response None

Description Sets the correction frequency in use when taking power measurements.

Note:
Changing the correction frequency of the device will reset any filter or averaging buffers in use and as such, will incur a slight delay before the next measurement is ready.

Example `SENSe:FREQuency 2.1GHZ`

SENSe:FREQuency?

Syntax

```
SENSe:FREQuency?
```

Parameters None

Response

```
<numerical_value>
```

The Correction Frequency to use for power measurements, in Hz.

Description Retrieves the correction frequency in use when taking power measurements.

Example Request: `SENSe:FREQuency?`

Response: `1000000000.0`

7.4 Status Subsystem (STATus Commands)

STATus:OPERation[:EVENt]?

Syntax	`STATus:OPERation[:EVENt]?`
Parameters	None
Response	`<numerical_value>` The contents of the Operation Status Event Register
Description	Retrieves the value of the Operation Status Event Register. For details on the register definition, see section 3.2 Operation Status. NOTE: After returning the value of the Operation Status Event Register, the register value is cleared. The data in the Operation Status Event Register is latched until queried using this command, after which the value is reset.
Example	Request: `STATus:OPERation[:EVENt]?` Response: `0`

STATus:OPERation:CONDition?

Syntax	`STATus:OPERation:CONDition?`
Parameters	None
Response	`<numerical_value>` The contents of the Operation Status Condition Register
Description	Retrieves the value of the Operation Status Condition Register. For details on the register definition, see section 3.2 Operation Status.
Example	Request: `STATus:OPERation:CONDition?` Response: `16`

STATus:OPERation:ENABle

Syntax

```
STATus:OPERation:ENABle
```

Parameters

```
<numerical_value>
```

A bitmask corresponding to the bits that are to be enabled for generating the Operation Status Summary bit.

Response

None

Description

Enables bits for generating the Operation Status Summary bit.

If a bit is set to 1 in the Operation Status Enable register using this command, and its associated bit in the Operation Status Event register is also set, then the Operation Status Summary bit in the Status Byte will be set to a 1.

For more details on the Status Registers and Status Registers Model, see section 3.1 Status Registers Model.

STATus:OPERation:ENABle?

Syntax

```
STATus:OPERation:ENABle?
```

Parameters

None

Response

```
<numerical_value>
```

The value of the Operation Status Enable register.

Description

Retrieves the value of the Operation Status Enable register.

If a bit is set to 1 in the Operation Status Enable register using this command, and its associated bit in the Operation Status Event register is also set, then the Operation Status Summary bit in the Status Byte will be set to a 1.

For more details on the Status Registers and Status Registers Model, see section 3.1 Status Registers Model.

Example

Request:	`STATus:OPERation:ENABle?`
Response:	`48`

STATus:QUEStionable[:EVENt]?

Syntax

```
STATus:QUEStionable[:EVENt]?
```

Parameters None

Response

```
<numerical_value>
```

The contents of the Questionable Event Status register

Description Retrieves the value of the Questionable Event Status register.

For details on the register itself, see section 0

Questionable Status.

NOTE:
After returning the value of the Questionable Status Event Register, the register value is cleared. The data in the Questionable Status Event Register is latched until queried using this command, after which the value is reset.

Example

Request:

```
STATus:QUEStionable[:EVENt]?
```

Response:

```
0
```

STATus:QUEStionable:CONDition?

Syntax

```
STATus:QUEStionable:CONDition?
```

Parameters None

Response

```
<numerical_value>
```

The contents of the general Questionable Condition register

Description Retrieves the value of the general Questionable Condition register. For details on the register itself, see section 0

Questionable Status.

Example

Request:

```
STATus:QUEStionable:CONDition?
```

Response:

```
16
```

STATus:QUEStionable:ENABle

Syntax

```
STATus:QUEStionable:ENABle
```

Parameters

```
<numerical_value>
```

A bitmask corresponding to the bits that are to be enabled in the Questionable Event Status register.

Response None

Description Enables true conditions for the Questionable Event Status register. If a bit is set to 1 in the enable register by this command, its associated event bit transitions are enabled.

For more details on the Status Registers and Status Registers Model, see section 3.1 Status Registers Model.

STATus:QUEStionable:ENABle?

Syntax

```
STATus:QUEStionable:ENABle?
```

Parameters None

Response

```
<numerical_value>
```

The value of the Questionable Event Status Enable register.

Description Retrieves the value of the Questionable Event Status Enable register.
If a bit is set to 1 in this register, its associated event bit transitions are enabled.

For more details on the Status Registers and Status Registers Model, see section 3.1 Status Registers Model.

Example

Request:	`STATus:QUEStionable:ENABle?`
Response:	`15`

STATus:PRESet

Syntax

```
STATus:PRESet
```

Parameters None

Response None

Description Resets the device to power-on-reset settings.

Includes resetting the device settings according to the *RST command and clearing the status registers according to the *CLS command, and resets the following status registers:

Register	PRESet Value
`Operation Event Register`	`0`
`Operation Condition Register`	`0`
`Operation Enable Register`	`0`
`Questionable Event Register`	`0`
`Questionable Condition Register`	`0`
`Questionable Enable Register`	`0`

7.5 System Subsystem (SYSTem Commands)

SYSTem:ERRor[:NEXT]?

Syntax

```
SYSTem:ERRor[:NEXT]?
```

Parameters None

Response

```
<numeric_value>,<string-description>
```

```
<numeric_value>
```

An error/event number corresponding to the error/event retrieved from the device's error/event queue.

```
<string-description>
```

A brief textual description of the error/event retrieved from the device's error/event queue.

Description Retrieves the next error/event from the device's error/event queue. Errors and events are queued in a buffer on the device and retrieved using this command.

For a list of possible error codes retrieved using this command, see section 3.6 Error Codes.

Example

Request: `SYSTem:ERRor:NEXT?`

Response:

SYSTem:COMMunicate[:NETwork]:MAC?

Syntax

```
SYSTem:COMMunicate[:NETwork]:MAC?
```

Parameters None

Response

```
<string-MAC>
```

The device's MAC Address.

Description Retrieves the device's MAC Address.

Example

Request: `SYSTem:COMMunicate:NETwork:MAC?`

Response: `1A:2B:3C:4D:5E:6F`

SYSTem:COMMunicate[:NETwork]:DHCP

Syntax

```
SYSTem:COMMunicate[:NETwork]:DHCP <Boolean>
```

Parameters

```
<Boolean>
```

1 to enable use of DHCP and dynamic IP configuration.
0 to disable use of DHCP and dynamic IP configuration.

Default Value

```
1
```

Response None

Description Configures whether or not the device uses DHCP to obtain a dynamic IP address. If disabled, the device will instead use a static IP as configured via the `SYSTem:COMMunicate[:NETwork]:IP` command.

SYSTem:COMMunicate[:NETwork]:DHCP?

Syntax

```
SYSTem:COMMunicate[:NETwork]:DHCP?
```

Parameters None

Response

```
<Boolean>
```

1 if DHCP is enabled.
0 if DHCP is disabled.

Description Retrieves the status of the DHCP configuration.
If DHCP is enabled, the device will automatically obtain a dynamic IP address.
If DHCP is disabled, the device will instead use a static IP as configured via the `SYSTem:COMMunicate[:NETwork]:IP` command.

Example

Request:

```
SYSTem:COMMunicate:NETwork:DHCP?
```

Response:

```
1
```

SYSTem:COMMunicate[:NETwork]:IP

Syntax

```
SYSTem:COMMunicate[:NETwork]:IP <string-IP Address>
```

Parameters

```
<string-IP Address>
```

The IP address to use when DHCP is disabled. Must be a properly formatted IP v4 address formatted as:

```
xx.xx.xx.xx
```

where `xx` is a number in the range of 0 – 255.

Response None

Description Configures the static IP address to use when DHCP is disabled. Has no effect unless DHCP is disabled, as configured using the `SYSTem:COMMunicate[:NETwork]:DHCP` command.

SYSTem:COMMunicate[:NETwork]:IP?

Syntax

```
SYSTem:COMMunicate[:NETwork]:IP?
```

Parameters None

Response

```
<string-IP Address>
```

The IP address of the device, in the form of:

```
xx.xx.xx.xx
```

where `xx` is a number in the range of 0 – 255.

Description Retrieves the current IP address of the device.

If DHCP is enabled, this address corresponds to the dynamic IP address automatically obtained via DHCP.

If DHCP is disabled, this address corresponds to the static IP address set using the `SYSTem:COMMunicate[:NETwork]:IP` command.

SYSTem:COMMunicate[:NETwork]:SUBNet

Syntax

```
SYSTem:COMMunicate[:NETwork]:SUBNet <string-Subnet Mask>
```

Parameters

```
<string-Subnet Mask>
```

The Subnet Mask to use when DHCP is disabled. Must be a properly formatted IP v4 address formatted as:

```
xx.xx.xx.xx
```

where `xx` is a number in the range of 0 – 255.

Response None

Description Configures the Subnet Mask to use when DHCP is disabled. Has no effect unless DHCP is disabled, as configured using the `SYSTem:COMMunicate[:NETwork]:DHCP` command.

SYSTem:COMMunicate[:NETwork]:SUBNet?

Syntax

```
SYSTem:COMMunicate[:NETwork]:SUBNet?
```

Parameters None

Response

```
<string-Subnet Mask>
```

The Subnet Mask in use by the device, in the form of:

```
xx.xx.xx.xx
```

where `xx` is a number in the range of 0 – 255.

Description Retrieves the current Subnet Mask in use by the device.

If DHCP is enabled, this address corresponds to the Subnet Mask automatically obtained via DHCP.

If DHCP is disabled, this address corresponds to the Subnet Mask set using the `SYSTem:COMMunicate[:NETwork]:SUBNet` command.

SYSTem:COMMunicate[:NETwork]:GATeway

Syntax

```
SYSTem:COMMunicate[:NETwork]:GATeway <string-IP Address>
```

Parameters

```
<string-IP Address>
```

The Default Gateway IP address to use when DHCP is disabled. Must be a properly formatted IP v4 address formatted as:

```
xx.xx.xx.xx
```

where `xx` is a number in the range of 0 – 255.

Response None

Description Configures the Default Gateway IP address to use when DHCP is disabled. Has no effect unless DHCP is disabled, as configured using the `SYSTem:COMMunicate[:NETwork]:DHCP` command.

SYSTem:COMMunicate[:NETwork]:GATeway?

Syntax

```
SYSTem:COMMunicate[:NETwork]:GATeway?
```

Parameters None

Response

```
<string-IP Address>
```

The Default Gateway IP address in use by the device, in the form of:

```
xx.xx.xx.xx
```

where xx is a number in the range of 0 – 255.

Description Retrieves the current Default Gateway IP address in use by the device.

If DHCP is enabled, this address corresponds to the Gateway IP address automatically obtained via DHCP.

If DHCP is disabled, this address corresponds to the Gateway IP address set using the `SYSTem:COMMunicate[:NETwork]:GATeway` command.

SYSTem:VERSion?

Syntax

```
SYSTem:VERSion?
```

Parameters None

Response

```
<string-Version>
```

The SCPI version for which the device complies, in the form of:

```
YYYY.V
```

Where YYYY corresponds to the year-version and V corresponds to the approved version number for that year.

Description Retrieves the SCPI version for which the device complies.

Example

Request: `SYSTem:VERSion?`

Response:

```
1999.0
```

SYSTem:INFO?

Syntax

```
SYSTem:INFO? <string-item>
```

Parameters

```
<string-item>
```

Name of the extended information field to retrieve

Response

```
<string-item-value>
```

Value of the extended information field requested

Description Retrieves a specific field of the extended device information.

Example

Request: `SYSTem:INFO? cal_date`

Response:

```
2017-11-18
```

SYSTem:INFO:EXTended?

Syntax

```
SYSTem:INFO:EXTended? <numeric_value>
```

Parameters

```
<numeric_value>
```

The extended information group number.

Response Key-value pairs of extended information parameters, separated by semicolon characters.

Description Retrieves extended device information. The data returned depends on the group number specified (the `<numeric_value>` parameter).

If an invalid group number is specified, this command will return no data and instead, the Command Error bit of the Standard Event Status Register will be set.

Example

Request: `SYSTem:INFO:EXTended? 0`

Response:

```
cal_date=2017-11-18;
```

7.6 Trigger Subsystem (TRIGger Commands)

`TRIGger:SOURce`

Syntax

```
TRIGger:SOURce <HOLD|IMMediate|BUS>
```

Parameters

```
<HOLD|IMMediate|BUS>
```

A string corresponding to the trigger source used when taking power measurements.

Supported options include:

`HOLD`	Triggering is suspended. Waits to take a power measurement until a trigger event is signaled using the `TRIGger[:IMMediate]` command.
`IMMediate`	Use an immediate trigger, that is, do not wait on a specific triggering event before taking a power measurement.
`BUS`	Use a software-induced trigger. Waits to take a power measurement until a trigger event is signaled using the `TRIGger[:IMMediate]` command or `READ[:SCALar][:POWer:AC]?` command.

Default Value

```
IMMediate
```

Response None

Description Sets the trigger source to use when taking power measurements.

Example `TRIGger:SOURce IMMediate`

`TRIGger:SOURce?`

Syntax

```
TRIGger:SOURce?
```

Parameters None

Response

```
<HOLD|IMMediate|BUS>
```

A string corresponding to the trigger source used when taking power measurements.

Possible options include:

`HOLD`	Triggering is suspended. Waits to take a power measurement until a trigger event is signaled using the `TRIGger[:IMMediate]` command.
`IMMediate`	Use an immediate trigger, that is, do not wait on a specific triggering event before taking a power measurement.
`BUS`	Use a software-induced trigger. Waits to take a power measurement until a trigger event is signaled using the `TRIGger[:IMMediate]` command or `READ[:SCALar][:POWer:AC]?` command.

Description Retrieves the current trigger source configured for use when taking power measurements.

Example

Request: `TRIGger:SOURce?`

Response: `BUS`

TRIGger[:IMMediate]

Syntax

```
TRIGger[:IMMediate]
```

Parameters None

Response None

Description Performs an immediate trigger for the device. Only supported when trigger source is set to `BUS`. If the trigger source is set to `IMMediate`, this command has no effect.

INITiate[:IMMediate]

Syntax

```
INITiate[:IMMediate]
```

Parameters None

Response None

Description Initiates a single cycle of the power measurement trigger sequence, causing the device to leave the `IDLE` state. If the device is not in the `IDLE` state or continuous triggering mode is enabled, this command has no effect.

INITiate:CONTinuous

Syntax

```
INITiate:CONTinuous <Boolean>
```

Parameters

```
<Boolean>
```

`1` to enable continuous triggering mode.
`0` to disable continuous triggering mode.

Response None

Description Selects whether the triggering system is continuously initiated or not. When set to `0`, the triggering system remains idle until Continuous mode is enabled or until an `INITiate:IMMediate` command is received.

INITiate:CONTinuous?

Syntax

```
INITiate:CONTinuous?
```

Parameters None

Response

```
<Boolean>
```

`1` if continuous triggering mode is enabled.
`2` if continuous triggering mode is disabled.

Description Retrieves the enabled or disabled state of the continuous triggering mode.

ABORt

Syntax

```
ABORt
```

Parameters None

Response None

Description Aborts a trigger cycle and resets the trigger system. Any actions related to a triggering cycle are aborted and the device returns to the IDLE state.

If the device is in Continuous Measurement Mode, this command still returns the device to the IDLE state and additionally disables Continuous Measurement Mode, placing the device back into Single Measurement Mode.

7.7 Unit Subsystem (UNIT Commands)

UNIT:POWer

Syntax

```
UNIT:POWer <DBM|W>
```

Parameters

```
<DBM|W>
```

A string corresponding to the units to use when taking power measurements.

Supported options include:

DBM	Power ratio in decibels (dB) in reference to one milliwatt (mW)
W	Power in Watts

Default Value

```
W
```

Response None

Description Sets the unit of measurement used when taking power measurements.

Example `UNIT:POWer DBM`

UNIT:POWer?

Syntax

```
UNIT:POWer?
```

Parameters None

Response

```
<DBM|W>
```

A string corresponding to the units in use when taking power measurements.

Possible options include:

DBM	Power ratio in decibels (dB) in reference to one milliwatt (mW)
W	Power in Watts

Description Retrieves the unit of measurement used when taking power measurements.

Example

Request: `UNIT:POWer?`

Response:

```
DBM
```

8 Revision Notes:

Rev 20180720 – Changed *RST default value for UNIT:POWer to DBM. Added Standard Event Status Summary to the Status Byte description.

Wireless Telecom Group Inc.
25 Eastmans Rd
Parsippany, NJ 07054
United States of America
Tel: +1 973 386 9696
Fax: +1 973 386 9191
www.boonton.com

Note: Specifications, terms and conditions are subject to change without prior notice.

Wireless Telecom Group
Boonton CommAgility Microlab Noisecom