

Hardkernel SmartPower3 SCPI manual

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July 18, 2023

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1 Introduction

SmartPower3 is a small power supply designed to provide power supply to up to two connected devices and measure and log the connected devices power consumption. The first firmware versions allowed control of the SmartPower3 via devices buttons, rotary encoder and display. As the system became more mature, some users showed interest in remote control of the power supply. New versions added more refined functionality and SCPI (Standard Commands for Programmable Instruments) capability - effectively enabling (at least partial) remote control of the SmartPower3. This manual tries to describe the commands available in SCPI device mode.

For more information regarding SCPI and its usage please see the online specification and description available at:

<http://www.ivifoundation.org/docs/scpi-99.pdf>
and other online resources.

2 Device modes

The SmartPower3 device can basically be used in two modes - the default original "buttons and screen" mode and SCPI mode. The default (original) mode tries to be compatible in function with the previous firmware version, while SCPI mode allows programming of the device via serial using SCPI commands and (like the default mode) optionally output logging information to WiFi connected UDP target.

The mode is changed via screen and encoder, on the second device screen, near the bottom. The option is (surprisingly) called **Mode** and allows setting two options:

1. Default - provides re-worked two level serial menu that enables setting SmartPower3 functionality.
2. SCPI - reserves serial connection for SCPI control of the device.

3 Commands

1. IEEE Mandated Commands

These commands are required in any SCPI implementation (SCPI std V1999.0 4.1.1).

1.1 *CLS

Command clears all registers and error queues.

1.2 *ESE

1.3 *ESE?

1.4 *ESR?

1.5 *IDN?

1.6 *OPC

1.7 *OPC?

1.8 *RST

Device reset - return device to defined known state. Turns output voltage off and stops logging output.

1.9 *SRE

1.10 *SRE?

1.11 *STB?

1.12 *TST?

1.13 *WAI"

2. Required SCPI Commands

Commands required by Required SCPI commands (SCPI std V1999.0 4.2.1)

2.1 **SYSTem:ERRor[:NEXT]?**

Query removes the last error from error buffer and reports it. Repeatedly calling this query eventually causes the error buffer to become empty.

2.2 **SYSTem:ERRor:COUNT?**

Query reports number of errors since device start-up or last device clear (Please see *CLS command).

2.3 **SYSTem:VERSion?**

Query that reports SCPI standard version this device should adhere to.

3. Non-Required SCPI Commands

This section contains commands specific to the device and query or control its main functionality.

3.1 **SYSTem:CAPability?**

Some desc.

3.2 **SYSTem:COMMunicate:NETwork:MAC?**

This query returns the MAC address of the power supply. MAC address consist of two number groups: the first three bytes are known as the Organizationally Unique Identifier (OUI), which is distributed by the IEEE, and the last three bytes are the device's unique serial number. The six bytes are separated by hyphens. The MAC address is unique to the instrument and cannot be altered by the user.

Return Param <XX-XX-XX-YY-YY-YY>

3.3 **SYSTem:COMMunicate:NETwork:ADDRess**

This command sets the static address of the power supply.

3.4 **SYSTem:COMMunicate:NETwork:ADDRess?**

Queries the static IP address of the power supply.

3.5 **SYSTem:COMMunicate:NETwork:GATE**

This command sets the Gateway IP address of the power supply. Gateway IP address is represented with 4 bytes each having a range of 0-255 separated by dots.

3.6 **SYSTem:COMMunicate:NETwork:GATE?**

Queries the Gateway IP address of the power supply.

3.7 **SYSTem:COMMunicate:NETwork:SUBNet <string>**

This command sets the subnet IP Mask of the power supply.

3.8 **SYSTem:COMMunicate:NETwork:SUBNet?**

Queries the value of manually set network subnet mask.

- 3.9 **SYSTem:COMMunicate:NETwork:DHCP**
This command sets the DHCP operating mode of the Ethernet module. If DHCP is set to 1, the module will allow its IP address to be automatically set by the DHCP server on the network. If DHCP is set to 0, the default IP address is set according to .
- 3.10 **SYSTem:COMMunicate:NETwork:DHCP?**
This query reports the DHCP operating mode currently set.
- 3.11 **SYSTem:COMMunicate:SOCKet:ADDReSS**
Command sets logging target IP address (UDP logging server address).
- 3.12 **SYSTem:COMMunicate:SOCKet:ADDReSS?**
Queries logging target IP address (UDP logging server address).
- 3.13 **SYSTem:COMMunicate:SOCKet:PORT**
Command sets logging target port (UDP logging server port).
- 3.14 **SYSTem:COMMunicate:SOCKet:PORT?**
Queries logging target port (UDP logging server port).
- 3.15 **SYSTem:COMMunicate:SOCKet:CONNeCT**
Command connects to the target socket. In case of SmartPower3 and UDP WiFi logging, this basically means connecting to WiFi network, the same way one can connect by moving cursor over WiFi icon when disconnected and pressing encoder button.
- 3.16 **SYSTem:COMMunicate:SOCKet:DISCONNeCT**
Command disconnects to the target socket. In case of SmartPower3 and UDP WiFi logging, this basically means disconnecting from WiFi network, the same way one can disconnect by moving cursor over WiFi icon when connected and pressing encoder button.
- 3.17 **SYSTem:COMMunicate:SOCKet:FEED <data_handle>**
Connect or disconnect the logging output to connected socket - WiFi. The data handle parameter can be one of two values:
LOG - connect the logging output
NONE - disconnect the logging output
- 3.18 **SYSTem:COMMunicate:SOCKet:FEED?**
Report what data source is connected to the logging output. The result can be one of the following values:
LOG
NONE
- 3.19 **SYSTem:COMMunicate:SERIal:FEED <data_handle>**
Connect the logging output to connected serial port. The data handle parameter can be one of two values:
LOG - connect the logging output
NONE - disconnect the logging output
- 3.20 **SYSTem:COMMunicate:SERIal:FEED?**
Report what data source is connected to the logging output. The result can be one of the following values:
LOG
NONE
- 3.21 **FEtCh[:SCALar]:VOLTage[:DC]? [expected_value, [resolution,]] <channel_list>**
Command allows reading voltage on channel specified by <channel_list>. Parameter **expected_value** has no use in this case and is included for reasons of compatibility. Parameter **resolution** allows specifying the resolution of the result. If omitted, the result is returned in Volts. Parameter <channel_list> allows specifying which channel(s) result should be read. The order of the channels is important - results are returned in that order.
If all parameters are omitted, the command will return value for channel 1, in Volts.

Example 1:

FETCH:VOLTage? 1 V, 0.001V, (@1:3)

will return voltage read on all three channels (including the power supply supply channel), in millivolts, in order of channel 1, 2, 3.

Example 2:

FETCH:VOLTage? (@3,1)

will return voltage read on channels 3 and 1 (in that order), in units of Volts.

3.22 FETCH[:SCALar]:CURRent[:DC]? [expected_value, [resolution,]] <channel_list>

Command allows reading of current on channel specified by <channel_list>, averaged over 2 samples. If **resolution** is not specified, the value is returned in Amperes. Parameter <channel_list> allows specifying which channel(s) result should be read. The order of the channels is important - results are returned in that order.

If all parameters are omitted, the command will return value for channel 1, in Amperes.

Example 1:

FETCH:CURRent? 1 A, 0.001A, (@1:3)

will return current read on all three channels (including the power supply supply channel), in milliamperes, in order of channel 1, 2, 3.

Example 2:

FETCH:CURRent? (@3,1)

will return current read on channels 3 and 1 (in that order), in units of Amperes.

3.23 FETCH[:SCALar]:POWer[:DC]? [expected_value, [resolution,]] <channel_list>

Command allows reading power on channel specified by <channel_list>. Parameter **expected_value** has no use in this case and is included for reasons of compatibility. Parameter **resolution** allows specifying the resolution of the result. If omitted, the result is returned in Watts. Parameter <channel_list> allows specifying which channel(s) result should be read. The order of the channels is important - results are returned in that order.

If all parameters are omitted, the command will return value for channel 1, in Watts.

Example 1:

FETCH:POWer? 1 V, 0.001V, (@1:3)

will return power read on all three channels (including the power supply supply channel), in milliwatts, in order of channel 1, 2, 3.

Example 2:

FETCH:POWer? (@3,1)

will return power read on channels 3 and 1 (in that order), in units of Watts.

3.24 [SOURce#]:CURRent <numeric_value>

Sets output current on source #. If # is omitted, the default value is 1.

<numeric_value> is the value that should be set on the device. Default unit is Amperes. Other possible values include MIN|MAX, which set minimum and maximum permissible value, respectively. Another option, if you decide to use A unit is to specify units as fractions, such as mA (milliamperes) or uA (microamperes).

3.25 [SOURce#]:CURRent?

Queries the output current set on channel #. Note that this differs from the FETCH series of commands in that no measurements are taken and value set by [SOURce#]:CURRent is returned.

Returns value in Amperes.

3.26 [SOURce#]:VOLTage <numeric_value>

Sets output voltage on source #. If # is omitted, the default value is 1.

<numeric_value> is the value that should be set on the device. Default unit is Volts. Other possible values include MIN|MAX, which set minimum and maximum permissible value, respectively. Another option, if you decide to use V unit is to specify units as fractions, such as mV (millivolts) or uV (microvolts).

3.27 [SOURce#]:VOLTage?

Queries the output voltage set on channel #. Note that this differs from the FETCh series of commands in that no measurements are taken and value set by [SOURce#]:VOLTage is returned.

Returns value in Amperes.

3.28 OUTPut#[:STATe] <parameter>

This command turns the output channel # on or off. If # is omitted, the command defaults to channel number 1.

Possible parameter value is one of ON|1|OFF|0.

3.29 OUTPut#[:STATe]?

This query returns the output states of channel #. Returns 0 or 1.