

SmartScan HTTP API

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1 Introduction

The interrogator settings can be set and read back using an HTTP interface available at the interrogator's IP address on port 80. The interface can be browsed with a web-browser, in which case the settings are presented in HTML with forms and buttons for submitting changed settings. It is also possible to use a custom client written in any language which supports TCP/IP networking. When the client makes a HEAD request, as opposed to the browsers GET request, the settings are provided as HTTP headers in the formats shown under the relevant module details below.

2 Standard HTTP Module details

The output from these modules may be read by directly parsing the HTML output of a GET request or, more simply, parsing the HTTP headers returned from a HEAD request. The inputs are sent using a standard URL encoded POST request.

2.1 HTTP module Index

Resource	URL
Home	http://10.0.0.150/
Network	http://10.0.0.150/network
Settings	http://10.0.0.150/settings
Spectrum	http://10.0.0.150/spectrum
Peaks	http://10.0.0.150/peaks
Storage	http://10.0.0.150/storage
Storage media	http://10.0.0.150/storage_media
Storage sessions	http://10.0.0.150/storage_sessions
Time	http://10.0.0.150/time
Diagnostics	http://10.0.0.150/diagnostics

3 Home page

The HTML home page shows some useful information about the interrogator such as serial number and IP address.

3.1 URLs

The home page is at <http://10.0.0.150/>

3.2 HTTP headers

Header	Description
SSI-Firmware-Version	Firmware version
SSI-Serial-Number	Serial number
SSI-Option-Storage	"Enabled" if unit supports USB storage otherwise header not present
SSI-Option-Trigger	"Enabled" if unit supports hardware storage trigger otherwise header not present
SSI-Option-MODBUS	"Enabled" if unit supports MODBUS otherwise header not present
SSI-Option-CANBUS	"Enabled" if unit supports CANBUS otherwise header not present
SSI-Laser-Count	Number of LASERs
SSI-Board-Count	Number of SmartScanNG PCBs
SSI-Optical-Channels	Number of optical channels
SSI-Channel-Count	Number of LASER frequency channels
SSI-Start-Frequency	Starting frequency of LASER scan in THz
SSI-Channel-Spacing	Channel spacing of LASER frequency scan in GHz
SSI-ADCn-LASERm	ADC channel n of LASER m

4 Network HTTP interface

The network HTML page shows the interrogator's current network settings and the IP address of any connected remote clients.

4.1 Custom client user interface

The settings can be changed by entering new values in the form fields and pressing the submit button.

A client application needs to update the client IP address with its own IP address in order for the interrogator to send data to it.

4.2 URLs

The network page is at <http://10.0.0.150/network>

4.3 HTTP headers

Header	Description
SSI-IP-Address	Interrogator's IP address
SSI-Subnet-Mask	Interrogator's subnet mask
SSI-Gateway	Interrogator's network gateway
SSI-MAC-Address	Interrogator's MAC address

5 Settings HTTP interface

The settings HTML page shows the interrogator's current acquisition rate and DSP settings. The settings can be changed by entering new values in the form fields and pressing the "Submit" button for the relevant form. The interrogator will use the new settings until it is turned off or rebooted. To make the new settings persistent, press the "Save" button to store the new settings.

5.1 Custom client user interface

A custom client can modify the settings by url-encoding the setting names and values and posting to the form URLs. The setting names and URLs can be seen in the returned HTML and are also described below.

5.1.1 Rate settings

Form field	Name	Range	Description
Channels	channels	0 to number of optical channels - 1	Number of optical channels to interrogate
Gratings	gratings	0 to 15	Number of gratings per channel to interrogate
Gain slots	slot_mode	0 = Off, 1 = On	Link peaks to gain slots
Frequency steps	steps	0 to LASER channel count - 1	Number of LASER frequency steps per scan
Step time	step_time	0 to 6 (1us, 2us, 5us, 10us, 20us, 50us, 100us)	LASER frequency step period
Start step	start_step	0 to LASER channel count - 1	First LASER frequency step in scan
Data rate	data_rate	0 to 65535	Transmit 1 in N scans

5.1.2 DSP settings

Form field	Name	Range	Description
Gain mode	gain_mode	0 = Auto, 1 = Fixed, 2 = Manual	Auto gain mode
Fixed gain value	gain_fixed	0 to 8	Fixed gain to use in fixed gain mode
Auto gain rate	gain_rate	0 or 1	Auto gain rate
Threshold	threshold_channelNN	0 to 65535	Peak detection threshold (NN = channel)
Slot	slotMM_channelNN	0 to LASER channel count	Gain slot boundaries (NN = channel, MM = slot index)
Gain	gainMM_channelNN	0 to 8	Gain levels (NN = channel, MM = slot index)

5.2 URLs

The settings page is at <http://10.0.0.150/settings>

POST rate settings to http://10.0.0.150/rate_settings

POST DSP settings to http://10.0.0.150/dsp_settings

5.3 HTTP headers

Header	Description
SSI-Channels	Number of optical channels being interrogated
SSI-Gratings	Number of gratings per optical channel being interrogated
SSI-Rate-Max-16	Maximum acquisition rate at 16 gratings per channel
SSI-Rate-Max-8	Maximum acquisition rate at 8 gratings per channel
SSI-Rate-Max-4	Maximum acquisition rate at 4 gratings per channel
SSI-Rate-Max-2	Maximum acquisition rate at 2 gratings per channel
SSI-Rate-Max-1	Maximum acquisition rate at 1 grating per channel
SSI-Slot-Mode	1 if peaks linked to gain slots, 0 if not
SSI-Steps	Number of LASER frequency steps per scan
SSI-Period	LASER frequency step period (0 to 6 (1us, 2us, 5us, 10us, 20us, 50us, 100us))
SSI-Start-Step	First LASER frequency step in scan
SSI-Data-Rate	Transmitting 1 in N scans
SSI-Gain-Mode	Auto gain mode
SSI-Gain-Rate	Auto gain rate
SSI-Fixed-Gain	Fixed gain when in fixed gain mode
SSI-Threshold-ChannelNN	Peak detection threshold (NN = channel)
SSI-SlotMM-ChannelNN	Gain slot boundaries (NN = channel, MM = slot index)
SSI-GainMM-ChannelNN	Gain levels (NN = channel, MM = slot index)
SSI-Channel-Multiplier	LASER channel multiplier.

6 Spectrum HTTP API

The spectrum HTML page shows the spectrum data of the currently selected channel and its channel number.

6.1 Custom client user interface

A custom client can change the channel by url-encoding the setting names and values and posting to the form URLs. The setting names and URLs can be seen in the returned HTML and are also described below.

The client can read the spectrum data either by parsing it from the HTML or by reading from the binary URL which is returned as an HTTP header and is also shown below. Reading from the binary URL returns an array of big-endian 16 bit data words. The array represents a single scan and starts with the lowest frequency value.

The client should check that the channel number returned in the HTTP header matched the requested channel in order to guarantee that the data corresponds to the correct channel.

6.1.1 Spectrum settings

Form field	Name	Range	Description
Channel	channel	0 to optical channel count - 1	The channel to read from
Rate	rate	0 or 1	Enable or disable spectrum transmission

6.2 URLs

The spectrum page is at <http://10.0.0.150/spectrum>

POST spectrum type, channel and rate to http://10.0.0.150/spectrum_settings

Read binary spectrum data from http://10.0.0.150/spectrum_bin

6.3 HTTP headers

Header	Description
SSI-Scan-Type	Type of spectrum data
SSI-Scan-Channel	Spectrum channel
SSI-Scan-Rate	Spectrum transmission rate (0 = off, >0 = on)
SSI-Channel-Count	Number of data points in spectrum
SSI-Spectrum-Binary-URL	URL for reading binary spectrum data

6.4 Spectrum types

Type	Name	Description
0	Optical channel	Optical channel photo-diodes

7 Peaks HTTP interface

The peaks HTML page shows the peak location data for all detected gratings.

7.1 Custom client user interface

The client can read the peak location data either by parsing it from the HTML or by reading from the binary URL which is returned as an HTTP header and is also shown below. Reading from the binary URL returns an array of big-endian 16 bit data words. The array represents a single scan and starts with all gratings on channel 1 in low to high frequency order, followed by channel 2, etc. It is not recommended to use this method of peak data retrieval for anything other than test and setup operations. Read the data via UDP port for normal data-logging operations.

7.2 URLs

The peaks page is at <http://10.0.0.150/peaks>

Read binary peak location data from http://10.0.0.150/peaks_bin

7.3 HTTP headers

Header	Description
SSI-Channels	Number of optical channels being interrogated
SSI-Gratings	Number of gratings being interrogated per optical channel
SSI-Peaks-Binary-URL	URL for reading binary peak location data

8 Storage HTTP API

The storage HTML page displays the current storage mode and settings.

8.1 Custom client user interface

A custom client can change the settings by url-encoding the setting names and values and posting to the form URLs. The setting names and URLs can be seen in the returned HTML and are also described below.

8.1.1 Storage settings

Form field	Name	Range	Description
Storage mode	storage_mode	OFF, ON, AUTO	Turn storage on and off (AUTO is reserved for future use)
Storage file size	storage_filesize	1048576 to 4294967295	Size of storage files

8.2 URLs

The storage page is at <http://10.0.0.150/storage>

POST storage mode to http://10.0.0.150/storage_mode

POST storage settings to http://10.0.0.150/storage_settings

8.3 HTTP headers

Header	Description
SSI-Storage-Mode	Storage mode (OFF, ON, AUTO)
SSI-Storage-Enabled	1 if storage is possible or 0 if not (e.g. no storage device attached)
SSI-Storage-Filesize	Size of storage files in bytes

9 Storage media HTTP API

The storage media HTML page shows a list of the currently attached storage devices and shows the currently mounted storage device. The user can select a device to mount/unmount and press the "Submit" button to perform the action.

9.1 URLs

The storage media page is at http://10.0.0.150/storage_media

9.2 HTTP headers

No HTTP headers defined for this module

10 Storage sessions HTTP API

The storage sessions HTML page displays a list of storage sessions on the currently mounted storage media.

10.1 URLs

The storage sessions page is at http://10.0.0.150/storage_sessions

10.2 HTTP headers

No HTTP headers defined for this module

11 Time synchronisation HTTP module

The time synchronisation HTML page displays the instrument's current time and date. It also allows the user to set a new time and date.

11.1 Custom client user interface

A custom client can set the time by url-encoding the setting names and values and posting to the form URLs. The setting names and URLs can be seen in the returned HTML and are also described below.

11.1.1 Time settings

Form field	Name	Range	Description
Time	hour	0 to 23	Hour of day
Time	minute	0 to 59	Minutes past the hour
Time	second	0 to 59	Seconds in the minute
Date	day	1 to 31	Day of month
Date	month	1 to 12	Month
Date	year	1900 to 2038	Year

11.2 URLs

The time synchronisation page is at <http://10.0.0.150/time>

11.3 HTTP headers

No HTTP headers defined for this module.

12 Diagnostics HTTP interface

The diagnostics HTML page shows the interrogator's operational state and any system errors. It also allows a user to apply a remote update to the interrogator's firmware.

12.1 URLs

The diagnostics page is at <http://10.0.0.150/diagnostics>

12.2 HTTP headers

Header	Description
SSI-Operational-State	The interrogator's operational state (STANDBY, OPERATIONAL, MAINTENANCE)