SDI2X
SDI / IP Gateway Platform

User Manual

Copyright

3200 Sencore Drive, Sioux Falls, SD USA
www.sencore.com

About Sencore

Sencore is an engineering leader in the development of high-quality signal transmission solutions for the broadcast, cable, satellite, IPTV, telecommunications, and professional audio/video markets. The company's world-class portfolio includes video delivery products, system monitoring and analysis solutions, and test and measurement equipment, all designed to support system interoperability and backed by best-in-class customer support. Sencore meets the rapidly changing needs of modern media by ensuring the efficient delivery of high-quality video from the source to the home. For more information, visit www.sencore.com.

Revision History

Date	Version	Description	Author
1/25/2018	0.1	First Draft	TDH
09/24/2018	0.2	Document format change	TDH
09/25/2018	1.0	Initial Release	TDH
3/14/2019	1.1	Corrected typo and added Default IP values	TDH

Safety Instructions

- Read these instructions
- Keep these instructions
- Heed all warnings
- Follow all instructions
- Do not use this apparatus near water
- Clean only with dry cloth
- Do not block any ventilation openings. Install in accordance with the manufacturer's instructions
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat
- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer.
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
- Do not expose this apparatus to dripping or splashing and ensure that no objects filled with liquids, such as vases, are placed on the apparatus.
- To completely disconnect this apparatus from the AC Mains, disconnect the power supply cord plug from the AC receptacle.
- The mains plug of the power supply cord shall remain readily operable.
- **Damage Requiring Service**: Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
    - When the power-supply cord or plug is damaged.
    - If liquid has been spilled, or objects have fallen into the product.
    - If the product has been exposed to rain or water.
    - If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions as an improper adjustment of the controls may result in damage and will often require extensive work by a qualified technician to restore the product to its normal operation.
    - If the product has been dropped or damaged in any way.
    - The product exhibits a distinct change in performance.
- **Replacement Parts**: When replacement parts are required, be sure the service technician uses replacement parts specified by Sencore, or parts having the same operating characteristics as the original parts. Unauthorized part substitutions made may result in fire, electric shock or other hazards.

SAFETY PRECAUTIONS

There is always a danger present when using electronic equipment.

Every precaution has been taken in the design of your product to ensure that it is as safe as possible. However, safe operation depends on you the operator.

- Always be sure your equipment is in good working order. Ensure that all points of connection are secure to the chassis and that protective covers are in place and secured with fasteners.
- Never work alone when working in hazardous conditions. Always have another person close by in case of an accident.
- Always refer to the manual for safe operation. If you have a question about the application or operation email ProCare@Sencore.com
- WARNING – To reduce the risk of fire or electrical shock never allow your equipment to be exposed to water, rain or high moisture environments. If exposed to a liquid, remove power safely (at the breaker) and send your equipment to be serviced by a qualified technician.
- To reduce the risk of shock the power supply must be connected to a mains socket outlet with a protective earth ground connection.
- For the mains plug the main disconnect and should remain readily accessible and operable at all times.
- When utilizing DC power supply, the power supply MUST be used in conjunction with an over-current protective device rated at 50 V, 5 A, type: Slow-blo, as part of battery-supply circuit.
- To reduce the risk of shock and damage to equipment, it is recommended to ground the unit to the installation's rack, the vehicle's chassis, the battery's negative terminal, and/or earth ground. Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Package Contents

The following is a list of the items that are included in the shipping carton:

1. SDI2X
2. AC Power Cable

If either of these items were omitted from the packaging please email ProCare@Sencore.com to obtain a replacement.

Table of Contents

Section 1 Overview

Introduction

This section includes the following topics:

1.1 Product Introduction

The new SDI2X is a simple solution to bridge the gap between traditional SDI and IP infrastructure.
The SDI2X maintains the long standing Sencore tradition of coupling ease of use, with a straight-forward web interface to give the user complete control of the unit and signals being processed.

The SDI2X supports both SDI to IP and IP to SDI workflows, and with its powerful processor, chosen with future standards in mind, the SDI2X will be a convenient tool for years to come.
Designed flexibly to support SMPTE 2022-6 and TR-03/SMPTE 2110. The SDI2X is a must have for those considering baseband A/V over IP deployments.

The SDI2X platform supports one or more channels which can be configured to convert SDI video inputs into IP output streams, or IP input streams into SDI video outputs. The user can configure the direction (SDI->IP or IP->SDI) for each channel independently. The platform will encapsulate or de-encapsulate the SDI video according to SMPTE 2022-6 standard.

The platform also supports redundancy using SMPTE 2022-7 seamless switching standard.

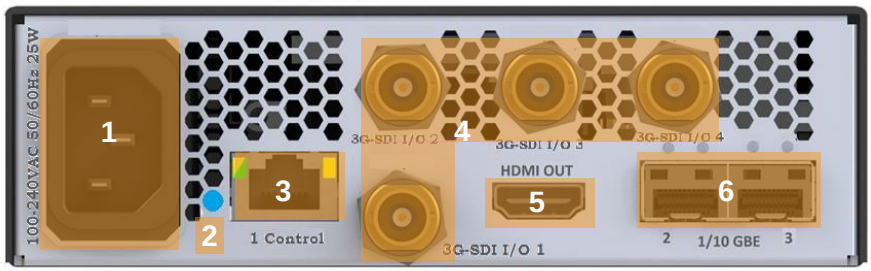
1.2 Front Panel Overview

The SDI2X front panel will provide the user with

1. Input and Error LED's for fast indication of unit, and stream processing status
2. A brightly lit LCD display provides details of configuration and signal processing
3. Up, Down, Left, Right arrow buttons for menu navigation using the front panel
4. Back, OK buttons for menu navigation and selection entry using the front panel
5. Unit Identification LED – for fast indication of specific unit within a system

1.3 Rear Panel Overview

The SDI2X back panel will provide the user with the following connections



1. 120 VAC power outlet
2. Unit Identification LED – for fast indication of specific unit within a system
3. Copper RJ45 network port “1 CONTROL”
4. Four (4) Bi-directional 3G SDI BNC connectors “3G SDI I/O 1-4”
5. HDMI 2.0 monitoring port allows viewing of received IP video streams
6. Two (2) SFP Gigabit Ethernet Ports “1/10 GBE 2” and 1/10 GBE 3”

Sencore offers three (3) optional SFP adaptors that will allow the user the following port configurations

10G Fiber	(Sencore part SDI2X-10G-SFP-FIBER)
1G Fiber	(Sencore part SDI2X-1G-SFP-FIBER)
1G RJ45 Copper	(Sencore part SDI2X-RJ45-COPPER)

1.4 Cooling

The SSDI2X is cooled via forced induction through the front of the unit and exhausted through the vents in the rear. The unit is equipped with a internal temperature sensor. If the internal temperature exceeds 60°C the “Error” LED will illuminate on the front panel and an error message will appear in the “Error List.”

1.5 Rack Information

The SDI2X is versatile and was designed to be deoployed as a ‘throw down’ device for easy installation into locations with limited space. Or, with the optional rack mount kit, the user can deploy three (3) SDI2X in a standard 19” rack and occupy slightly more than 1RU of rack space.

SDI2X-MOUNT (three unit install view)

Section 2 Installation

Introduction

This section includes the following topics:

2.1 Installation

The SDI2X is small enough to be deployed as a standalone device, or placed into a rack system using the optional rack mount (Sencore part number 7C1489) hardware which will allow up to three (3) SDI2X to occupy a space slightly more than 1 rack unit.

2.2 AC Power Connection

The SDI2X is powered by a single connection to a 120V 60Hz source.To hook up the power use the following steps:

1. Locate the AC power cord that was included.
2. Plug the female end (end with no prongs) of power cord into the back of the unit.
3. Locate a protected outlet to plug the male end of the power cable into.

2.3 Maintenance

The SDI2X is a maintenance-free piece of equipment. There are no user serviceable parts on the inside of the unit. To request a copy of the latest SDI2X software or release notes from Sencore, send an email to ProCare@sencore.com .

2.4 Management Network Setup via Front Panel

By default the management IP address will be static, and use the following settings

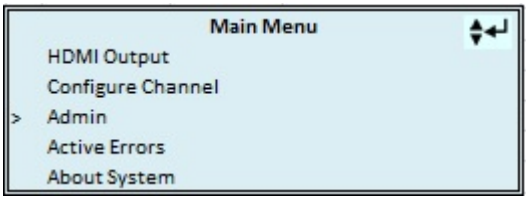
Address = 10.0.0.61; Subnet Mask = 255.255.255.0; Default Gateway = 0.0.0.0

The SDI2X can be setup on a network connection to allow remote management and SNMP configuration. For these features to work, the network settings for the SDI2X must first be configured properly for the network it is connected to.

Static IP Address

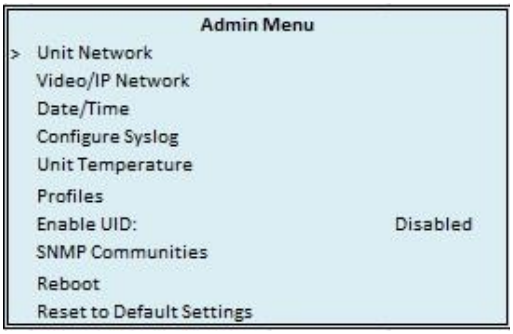
To setup the SDI2X with a static IP address, use the following steps:

1. Press the OK button.

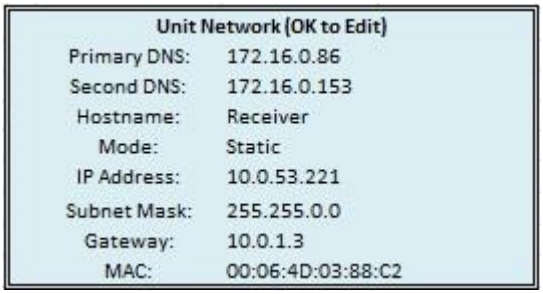


2. Use the ▲ and ▼ buttons to move the cursor to “Admin”, then press the OK button.

3. Use the ▲ and ▼ buttons to move the cursor to “Unit Network”, then press the OK button.

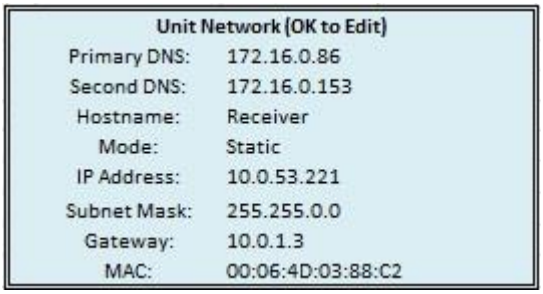


4. Use the ▲ and ▼ buttons to move the cursor to “Mode”, then press the OK button.
5. Use the ▲ and ▼ buttons to change the selection to “Static” then press the OK button.



IP Address/Subnet Mask/Gateway

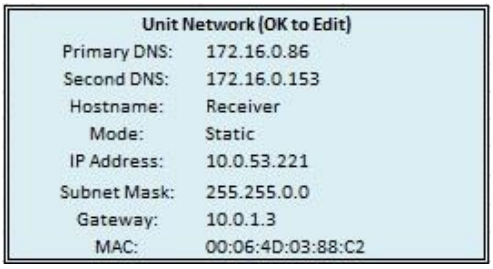
1. Use the ▲ and ▼ buttons to move the cursor to “IP Address”, then press the OK button.
2. Use the ◄ and ► buttons to select the column to edit and use the ▲ and ▼ buttons to change the location value. Press the OK button to save the selection and the ↰ button to return to setting selection.
3. Repeat steps 1 and 2 for “Subnet Mask” and “Gateway” configuration settings.



DHCP

The SDI2X can be configured to use DHCP to obtain an IP address/Subnet Mask/Gateway.

1. Use the ▲ and ▼ buttons to move the cursor to “Mode:” then press the OK button.
2. Use the ▲ and ▼ buttons to change the selection to “DHCP” then press the OK button to save the selection.



Note: It may take up to a minute for the SDI2Xto obtain an IP address. During this time the unit will display a “busy” message next to DHCP.

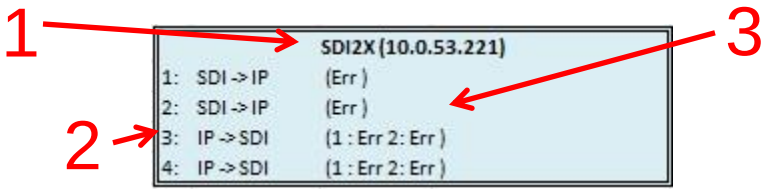
Section 3 Operating the Front Panel

Introduction

This section includes the following topics:

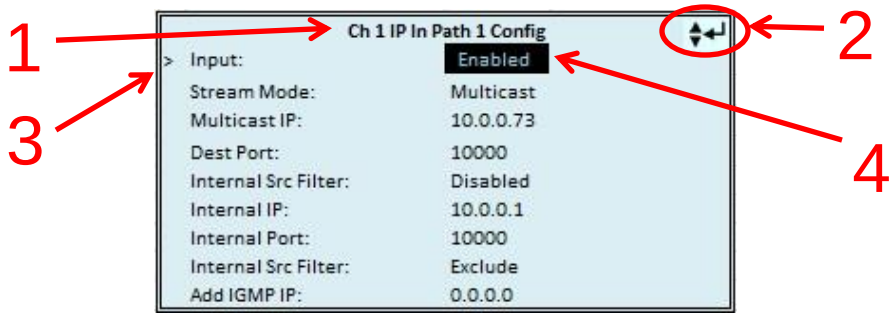
3.1 SDI2X Front Panel Overview

The SDI2X front panel allows the user to configure all settings that are present in the web interface using the buttons located on the front of the unit. The screen below is the idle screen of the SDI2X and provides the user with the following details at a glance



1. IP address of management port
2. Current path configuration of each available channel.
3. Stream processing condition of each path.

When viewing the menu screens, it is important to observe some of the important features that have been noted below. They are common to all screens and provide helpful information. The ↰ button allows the user to return to the home screen, cancel settings and go back a menu. The OK button is used to select and save selections.



1. Screen title.
2. Icons indicate which control buttons are currently valid for entry.
3. Cursor shows which line is active.
4. When editing, active character or item is highlighted.

Section 4 Operating the Web Interface

Introduction

This section includes the following topics:

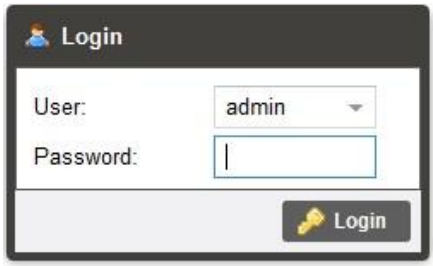
4.1 SDI2X Web Interface Overview

4.1.1 Logging into the SDI2X Web Interface

To open the SDI2X web interface use one of the following supported browsers and navigate to the unit's IP address:

- Internet Explorer 9 & above
- Mozilla Firefox
- Google Chrome, or
- Microsoft Edge

The user will need to login to the web interface. By default the admin user account is available without a password. Press the login button in order to login to the web interface.



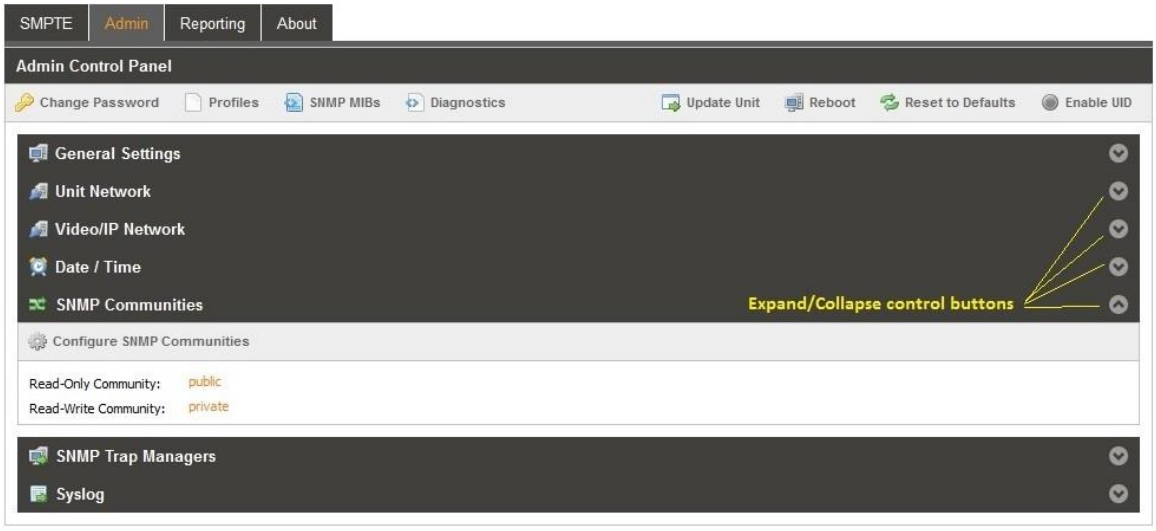
4.1.2 Control Panels

The web interface will provide complete control of unit configuration and process monitoring with four (4) separately defined control panels. Each control panel will be made up of unit features that are similar to each other to help the user easily locate the unit features they seek. The control panels are:

SMPTE	This control panel is where the majority of the video stream processing configuration and monitoring settings are located.
Admin	This control panel is where unit hardware and administrative settings will get configured and monitored.
Reporting	This control panel is where alarms & logs are reported, configured and maintained.
About	This control panel is where unit software and hardware details are found.

4.1.3 Title ribbons

The Admin and About control panels will have similar feature specific settings grouped together under a title ribbon. The title ribbon will have an icon and general description of the settings that are offered beneath the ribbon. The title ribbons can be expanded or collapsed using the control button at the right end of the ribbon.



4.1.4 Buttons and Status Indicators

When the icon is shown user configuration is available. Clicking this button will open menus where settings can be changed by the user.

When the icon is shown additional status information can be viewed. Click this button will expand the menu to display the additional status information. All text in status menus shown in **ORANGE** are **user configurable settings**. Text shown in **BLUE** report **status and details about the stream being processed**. Clicking the collapse icon will close the details viewing window.

Status in the SDI2X web interface is shown with LED status indicators:

Green LED		Status is good. No errors are present and function is operating normally.
Red LED		Status indicates function is affected by active error. To view the errors navigate to Alarms panel to view Active Errors.
Grey LED		Status is inactive. Function is currently disabled or unavailable.

Section 5 Web Interface Control Panels

Introduction

This section includes the following topics:

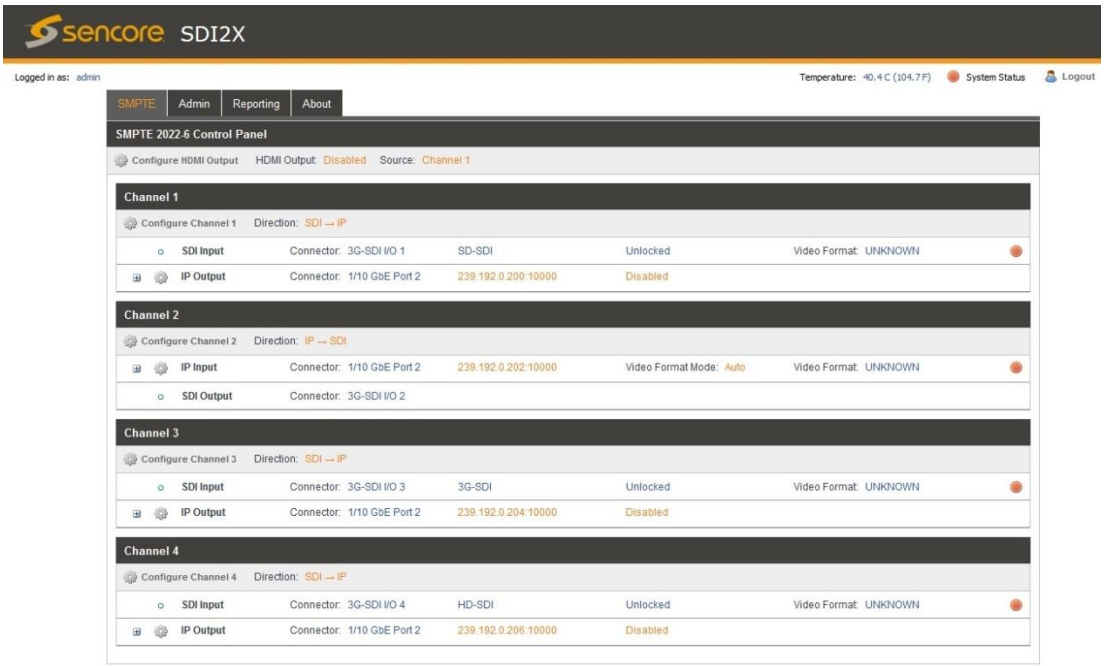
5.1 SMPTE Control Panel

The SMPTE control panel of the SDI2x web interface is used to configure the video processing details. This will include signal flow direction, configuring the Video/IP ports, labeling of the channel and finally, channel monitoring.

The SDI2X offers redundancy that meets the SMPTE 2022-7 seamless switching standard requirements. This setting is found on the Admin Control Panel and has a unit wide coverage. This means that the setting is applied to all stream processing paths. Default value for this option is 'Seamless'.

When the SDI2X operates in 'Seamless' mode, all IP port configuration menus will provide two paths (a primary path and a redundant path) to configure. When the SDI2X operates with this value at 'Disabled', all IP port configuration menus will allow the user to assign the output path to a specific hardware video IP port (see section 3.3.6.1 on page XX for more details.). In the next section, examples of both configuration windows will be addressed.

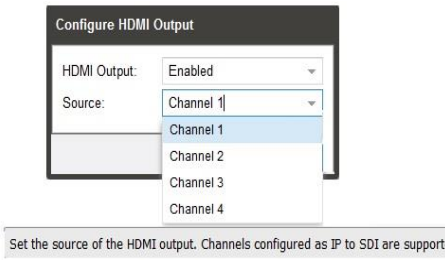
The SDI2X offers four (4) channels that the user can configure for video processing. Each channel will offer the same configuration settings but operate independently from the other channels.



5.1.1 HDMI Monitoring Output

The SDI2X provides the user with an HDMI output port (V2.0b) on the back of the unit that will allow the user to monitor the IP input video stream. This output is able to be assigned to the IP source port of any channels that is configured as IP → SDI. Configuration and status for this feature is found near the top of the SMPTE control panel.

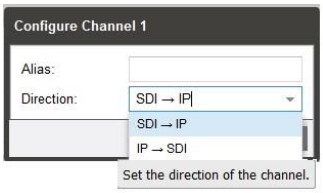
HDMI Output	Possible settings are Enabled and Disabled.
Source	Possible settings are Channel 1, Channel 2, Channel 3, and Channel 4. Only available if channel direction is IP → SDI.



5.1.2 Channel Configuration

Click the configuration cog below the channel title ribbon to open the configuration window. The user has two settings to control, Alias and Direction.

Alias	The user can assign a defining name or title to the stream processing path. This label is only available to the SDI2X interfaces; it will not be incorporated into the video stream data.
Direction	Possible settings are SDI → IP and IP → SDI. This setting represents the video processing path direction. It will always be shown as (Input) → (Output).



5.1.3 Configuring the Video/IP ports (SDI → IP)

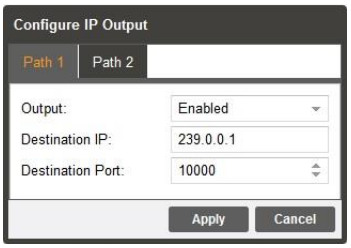
When the signal processing direction is SDI → IP, the IP ports will be configured as outputs.

Seamless Redundancy Enabled

When redundancy is enabled, the SDI2X will provide a primary IP output stream path on one of the gigabit network ports, and a redundant IP output stream path on the other gigabit network port. The output stream on both ports will contain the same content to meet the seamless switching standard (SMPTE 2022-7). Configurable settings will be the same for both paths/ports.

Begin by clicking on the “IP Output” configure cog icon. The IP Output Confirugation window will have a tab for Path 1 and a tab for Path 2. There are three available settings to configure for each path.

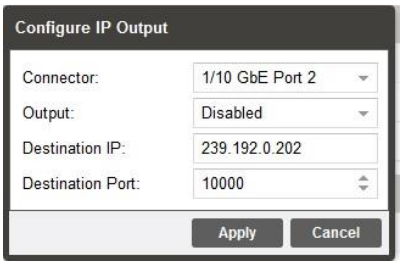
Output	Possible settings are Enable and Disable
Destination IP Address	Assign a four decimal octet number as Destination address. Address will be in form of XXX.XXX.XXX.XXX.
Destination Port	Assign the Destination port number.



Seamless Redundancy Disabled

When redundancy is disabled, the SDI2X will only provide a primary IP output stream path to configure.
The user will need to define which of the gigabit network ports the output will be available on and then configure that port.
Click on the “IP Output” configure cog icon.

Connector	Possible settings are 1/10 GbE Port 2, and 1/10 GbE Port 3. This will define the physical port the stream will be available on.
Output	Possible settings are Enable and Disable.
Destination IP address	Assign a four decimal octet number as Destination address. The address will be in the form of XXX.XXX.XXX.XXX
Destination Port	Assign the Destination port number.



5.1.4 Configuring the Video/IP ports (IP → SDI)

When the signal processing direction is IP →SDI, the IP ports will be configured as Inputs.

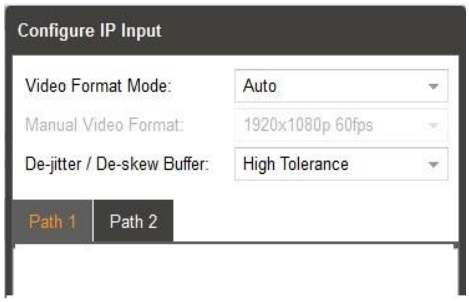
Seamless Redundancy Enabled

When redundancy is enabled, the SDI2X will provide a primary IP input stream path on one of the gigabit network ports, and a redundant IP input stream path on the other gigabit network port. The input stream on both ports must contain the same content to meet the seamless switching standard (SMPTE 2022-7).

Click on the “IP Input” congfiguration cog to opent he IP Input Configuration window. Configuration settings within the top pane will apply to both stream processing paths and are considered ‘global’ because all processing paths receive these settings. Settings in the lower pane are applied to the processing path defined by the selected tab.

Global stream processing settings

Video Format Mode	Possible settings are Auto and Manual.
Auto	The SDI2X will automatically detect the input video format.
Manual	The user will select an input video format
Manual Video Format	This drop down box is only available when the video format mode is set to Manual. It provides the user with a list of 25 pre-defined video formats to choose from.



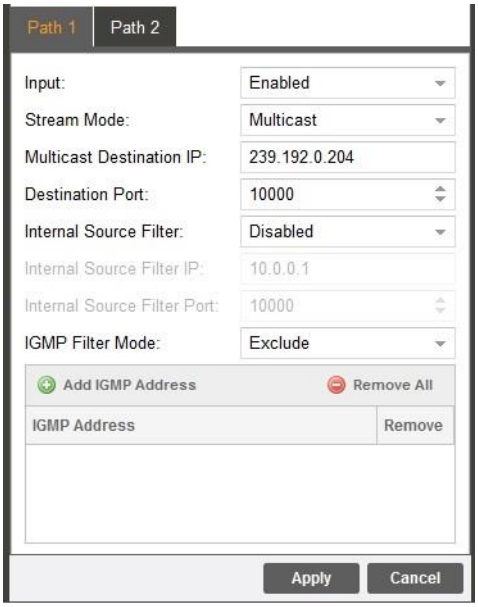
Note

Auto mode should always be used when the input video format is unknown. The SDI2X will report an error if the input video format does not match the manual setting

De-jitter/De-skew Buffer	This setting will control the amount of buffering done to the input stream. Possible settings are Disabled, Low, Medium and High.
Disabled	No buffering will be done, latency is negligible.
Low Tolerance (10ms)	Minimal buffering is done. Latency is <= 10ms.
Medium Tolerance (50ms)	Average buffering is done. Latency is <= 50ms.
High Tolerance (150ms)	Maximum buffering is done. Latency is <= 150ms.

Path specific stream processing settings

Input	Possible settings are Enabled and Disabled.
Stream Mode	Possible settings are Multicast and Unicast.
Destination IP address	Assign a four decimal octet number as Destination address. The address will be in the form of XXX.XXX.XXX.XXX
Destination Port	Assign the Destination port number
Internal Source Filter	Possible settings are Enabled and Disabled.
Internal Source Filter IP	Assign a four decimal octet number as the Internal Source Filter IP address.
Internal Source Filter Port	Assign the Internal Source Filter port number
IGMP Filter Mode	Possible settings are Include and Exclude. Defines filter management of IGMP Addresses in list window at bottom of window.
IGMP Filter Address list	User entered IGMP addresses are displayed and managed (added, removed) within this section of the configuration window.

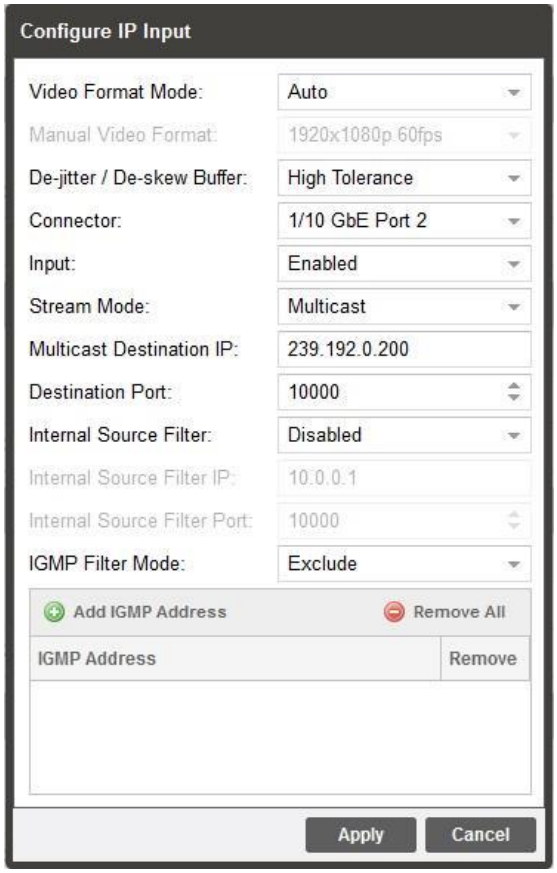


Seamless Redundancy disabled

When redundancy is disabled, the SDI2X will only provide a primary IP input stream path to configure, and the user will need to define which of the gigabit network ports the stream will be received on. Click on the “IP Input” configure cog icon.

Some path configuration settings will be the same whether seamless redundancy is enabled or disabled and the extended description for these will be left out of the table below.

Video Format Mode	Possible settings are Auto and Manual.
Manual Video Format	User selects from drop down list of 25 pre-defined formats.
Note: Use auto mode if input format is unknown to prevent format mismatch error.	
De-jitter/De-skew Buffer	User selects from these settings: Disabled, Low, Medium and High.
Connector	Possible settings are 1/10 GbE Port 2 and 1/10 GbE Port 3.
Input	Possible settings are Enable and Disable.
Stream Mode	Possible settings are Multicast and Unicast.
Destination IP address	Assign a four decimal octet number as Destination address. The address will be in the form of XXX.XXX.XXX.XXX
Destination Port	Assign the Destination port number
Internal Source Filter	Enable/Disable the tab defined internal source filter.
Internal Source Filter IP	Assign a four decimal octet number as the Internal Source Filter IP address.
Internal Source Filter Port	Assign the Internal Source Filter port number
IGMP Filter Mode	Possible settings are Include and Exclude. Defines filter management of IGMP Addresses in list window at bottom of window.
IGMP Filter Address list	User entered IGMP addresses are displayed and managed (added, removed) within this section of the configuration window.



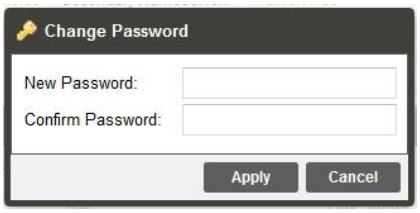
5.2 Admin Control Panel

To access the Admin Control Panel, click on the Admin tab. This page will offer the user to control many global settings and maintenance tasks on the SDI2X.

5.2.1 Changing Unit Password

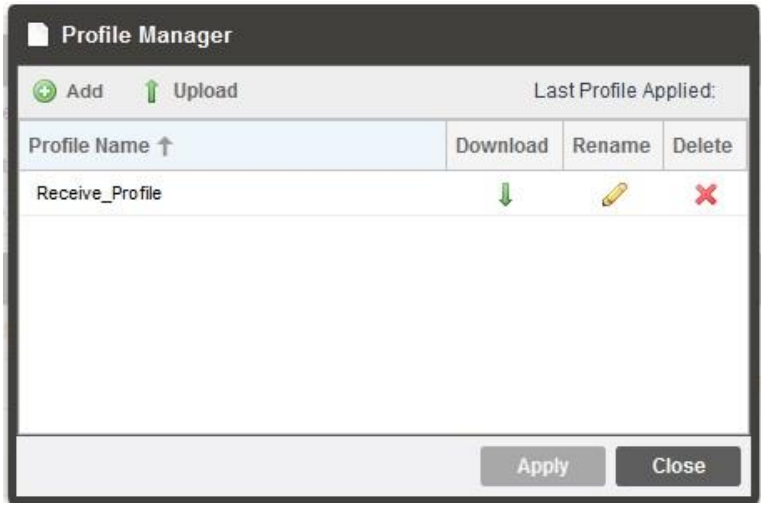
The configuration button for this feature will be found under the Admin Control Panel title ribbon.

This feature provides the SDI2X user management control of the web interface access password.
In order to make changes to passwords, click the change password button.
A window will appear to enter the current password and new password. Click “Apply” to save and exit.



5.2.2 Profiles

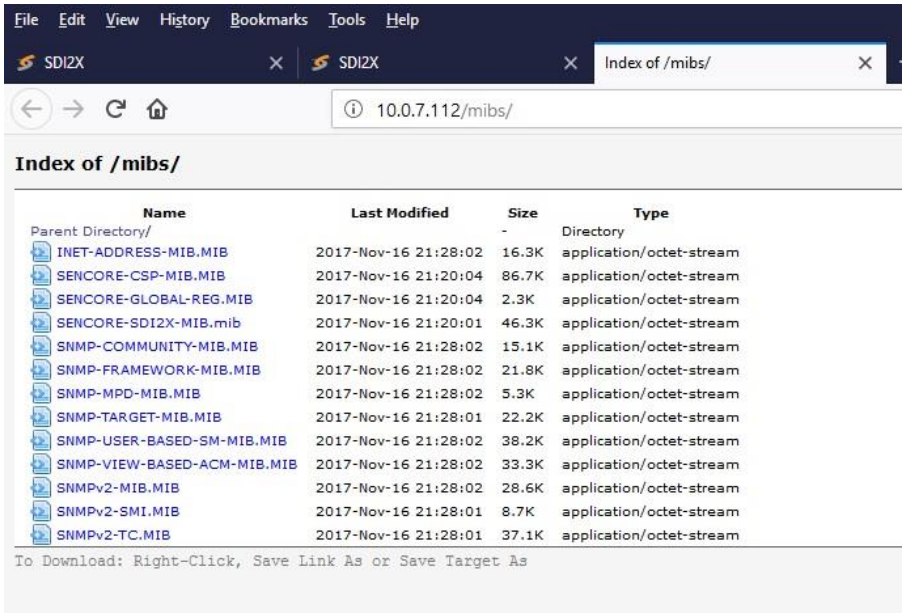
The SDI2X has the ability to save all configured settings to multiple profiles. Profiles can be saved locally, renamed and saved to external storage to be used on other SDI2X. Profiles can be used to quickly and easily change the configuration of an SDI2X to suit different inputs and decoding requirements.



Add New Profile	Add	Adds a new profile from current settings. User must name profile before creation is complete.
Upload Profile	Upload	Allows the user to browse to external storage or workstation to upload profile to SDI2X.
Apply Profile	Apply	Select a profile from the drop down menu and click this button. The SDI2X will apply all settings contained in the profile selected.
Rename Profile		Select a profile from the drop down menu and click this button. The user will be prompted for a new name for the profile.
Delete Profile		Select a profile from the drop down menu and click this button. The user will be prompted to confirm deletion of the profile.
Download Profile		Select a profile from the drop down menu and click this button. The user will be prompted to select a directory to download the profile.

5.2.3 SNMP MIB files

The SNMP MIB files for the SDI2X can be obtained by clicking on the SNMP MIBs button at the top of the page.
This will open a new tab within the current web browser and give the user a list of all available MIB files.
Directions on how to save them to an external storage location are provided at the bottom of the list.

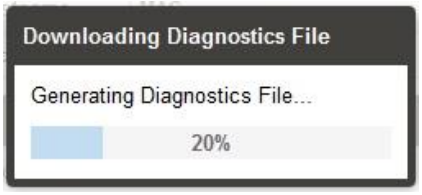


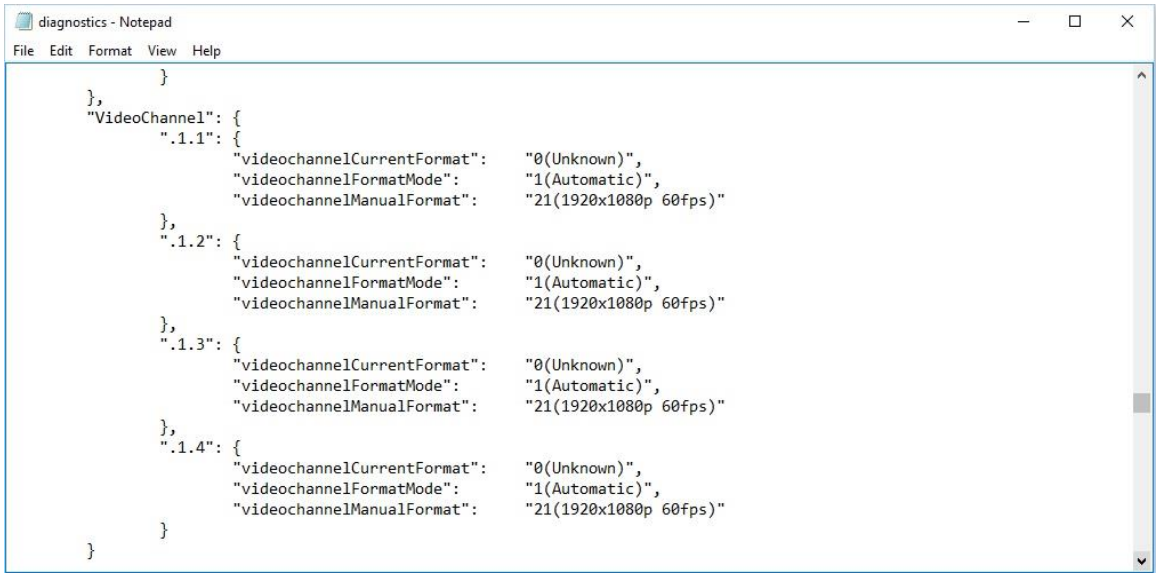
5.2.4 Diagnostics

The SDI2X provides the user the ability to take a snapshot of the ALL current unit settings, reported values, active alarms, and the alarm and log file history. This snapshot will be downloaded as an .XML format file that can be attached in an email or opened for viewing.

Click the 'Diagnostics' button and a window will open showing the diagnostic file creation progress.

This window is replaced with a download file window when file creation is complete.
The user will be asked to 'Open' or 'Save' the file.
Selecting the Save option will download the .XML file to the pc 'downloads' location.
The file can then be opened with a number of different software applications.
An example of the diagnostic file is shown below





5.2.5 Updating the SDI2X software

Updates to the SDI2X are performed through the web interface. A software update file is provided by Sencore and then uploaded to the unit. To request the latest software version or a copy of the release notes please send an email to ProCare@Sencore.com
The 'Update Unit' button is in the top right corner of the Admin control panel. When opened this feature will allow the user to advance the software version the SDI2X operates on, or rollback the software version that the SDI2X operates on.

Applying software updates

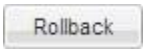
Click on the "Update Unit" button to open the upload window.
Click on the "Upload" button to open a browse window. Navigate to the software file location and double click on the update file.
A progress bar will give details on the file upload to the SDI2X.
The user will be asked to confirm the software update is to be performed.
Another progress bar will give details on the update installation.
The SDI2X will reboot after a software update is complete.

Upload Software Update	Upload	To upload software updates to the SDI2X click this button. The user will be prompted to navigate to an update file. The file will then upload to the SDI2X. When complete the SDI2X with prompt the user to either apply the update or cancel
Delete the Uploaded Software	Delete	Clicking this button prompts the user to confirm the deletion of the software update from the SDI2X. This will also clear the Uploaded Version status of the Software Versions section.
Update Software to Uploaded Version	Update	Clicking the button starts the software update process. The SDI2X will prompt the user to confirm the update. Click Yes to continue or No to cancel.

Rollback software updates

The SDI2X is capable of reverting back to a previous version of software using the Rollback feature. This is accomplished by maintaining two separate software images within memory. One version will be the version that the system is presently operating on. The second version will be the software version that the unit was previously settings.
A rollback will begin by opening the Update Unit window and then select the Rollback tab.
The previous version of installed software will be shown along with a 'Rollback' and a 'Cancel' button.

Rollback Software



Clicking this button starts the Rollback process. The SDI2X will prompt the user to confirm the rollback or click cancel to stop the process.

5.2.6 Reboot the unit

The SDI2X can be rebooted from the web interface Admin page. The 'Reboot' button is located in the top right corner of the Admin Control Panel.

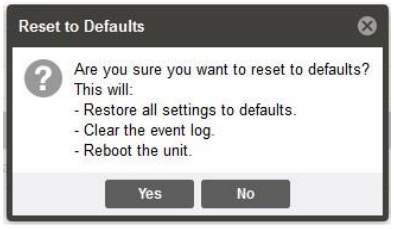
To perform a reboot, the user will click the reboot button.
The system will prompt the user to confirm the reboot request.

If confirmed, a status window with a progress bar will open be visible until the reboot is complete and the login window displayed.

5.2.7 Reset to Defaults

The SDI2X offers the user the ability to reset to unit configuration to factory defaults.
All settings will be returned to the factory defaults **except** the network management ports TCP/IP settings.
All event logs will also be cleared so be sure to save any logged data prior to resetting the unit.
The SDI2X will prompt the user to confirm the action.

Yes	Confirm and execute the reset to default settings action. The unit will reboot following this selection.
No	Deny the request and close the Reset to Defaults request window.



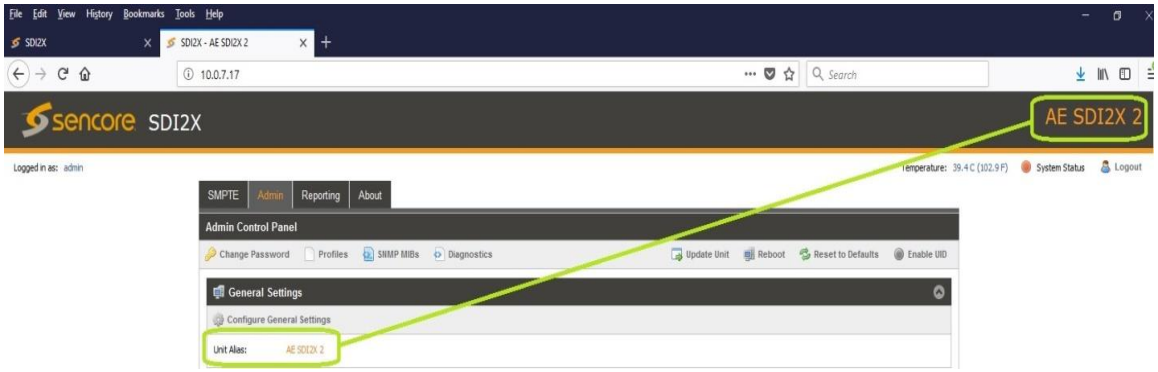
5.2.8 UID Indicator

With the small size of the SDI2X, and the ability to deploy up to four of these in a single RU space it would be nice to have a feature that would allow a single unit, in a densely populated system, be easily identified. The answer to this is the UID indicator. The SDI2X has a blue LED located on the front and rear panels that can be controlled through the web interface to provide easy detection of the units' location.

5.2.9 Unit Alias

The configuration button for this feature is found under the General Settings title ribbon of the Admin control panel.
The Unit Alias is a unique name or description the user can assign to the SDI2X. The 'Alias' will be available on the unit web client and front panel.

When selected, the user will be provided a text entry box to enter the alias. The user will then click the Apply button to save the changes made. The web client and front panel will update immediately.



5.2.10 Configuring the Network Ports

Since the SDI2X has a defined management port that is independent of the video stream processing ports, there are two network configuration sections on the Admin control panel.

Configuring the Management Port

By default the management IP address will be static, and use the following settings

Address = 10.0.0.61; Subnet Mask = 255.255.255.0; Default Gateway = 0.0.0.0

The "Unit Network" title ribbon will address the management port (1 Control) settings and configuration cog icons.

There are two configuration points for the management port; Configure Nameservers in the upper row, and the hardware configuration cog icon on the lower row.

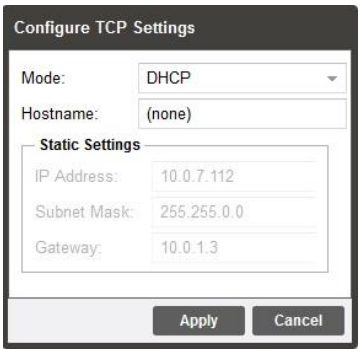
Configure Nameservers:

These addresses define the Primary and Secondary Domain Name Server(s) that are to be used for Hostname resolution. The Hostname is assigned in the hardware configuration window.

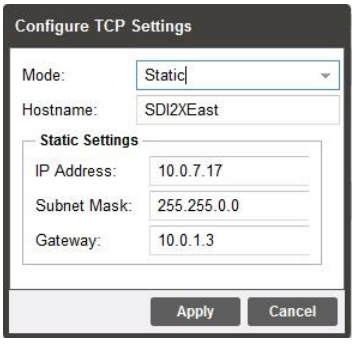
Primary Nameserver	a four decimal octet number in form of XXX.XXX.XXX.XXX
Secondary Nameserver	a four decimal octet number in form of XXX.XXX.XXX.XXX

Hardware configuration:
When the hardware configuration cog is selected, the configuration window that opens will provide the user with five settings. These are used to define the unit's network management port IP Address, Mode and Hostname.

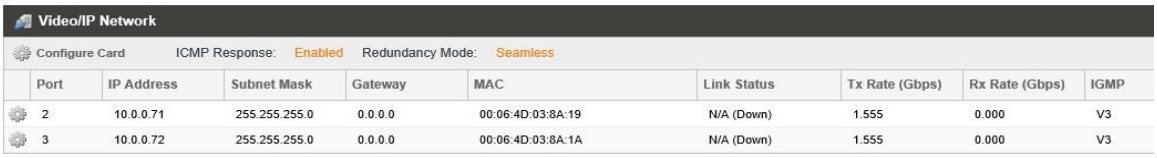
Mode	Possible settings are DHCP and Static.
DHCP	The SDI2X will have its' IP address, Subnet mask, and Gateway assigned by the network server.
Static	The user must define IP address, Subnet mask and Gateway of the SDI2X.



Hostname	The hostname is the user defined name that can be used to reach the unit in place of the IP address.
IP Address	Four decimal octets in the form of XXX.XXX.XXX.XXX
Subnet Mask	Four decimal octets in the form of XXX.XXX.XXX.XXX
Gateway	Four decimal octets in the form of XXX.XXX.XXX.XXX



Configuring the Video/IP Ports



By default the management IP address will be static, and use the following settings

Port 2 Address = 10.0.0.62; Subnet Mask = 255.255.255.0; Gateway = 0.0.0.0

Port 3 Address = 10.0.0.63; Subnet Mask = 255.255.255.0; Gateway = 0.0.0.0

The “Video/IP Network” title ribbon addresses the port settings and configuration cog icons for the two SFP Gigabit Ethernet Ports.
There are three configuration cogs available to the user.

Configure Card settings (global)

ICMP Response Possible settings are Enabled and Disabled.

ICMP - known as ‘Ping response’, is commonly used to test network connection path to a known IP address. This feature can be enabled or disabled for the SFP ports.

Redundancy Mode	Possible settings are Seamless and Disabled.
Seamless	When seamless is selected, the SDI2X will operate within the SMPTE 2022-6 standard mode. This mode will provide primary and redundant paths for configuration in the separate stream processing paths.
Disabled	When disabled the SDI2X will provide a single IP path for input and output streams and the user will determine the appropriate

The settings within the ‘Configure Card’ feature are referred to as ‘global’ settings. This means that the settings here *will be applied to both SFP ports*.

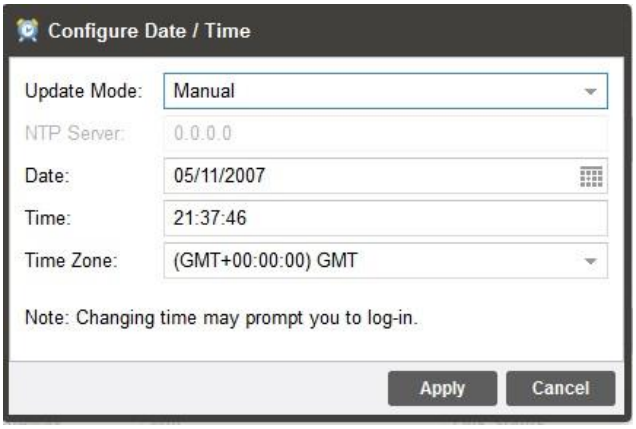
Port 2:	(Port specific settings) These settings will only apply to Port 2.
IP Address	Four decimal octets in form of XXX.XXX.XXX.XXX.
Subnet Mask	Four decimal octets in form of XXX.XXX.XXX.XXX.
Gateway	Four decimal octets in form of XXX.XXX.XXX.XXX.
Port 3:	(Port specific settings) These settings will only apply to Port 3.
IP Address	Four decimal octets in form of XXX.XXX.XXX.XXX.
Subnet Mask	Four decimal octets in form of XXX.XXX.XXX.XXX.
Gateway	Four decimal octets in form of XXX.XXX.XXX.XXX.

Date/Time

The SDI2X can be set to synchronize with an NTP server or a manual data and time can be defined by the user.

Click the “Configure Date/Time” cog icon to begin.

These values are used to timestamp entries in the Alarm and Event logs under the Reporting tab.



Update Mode	NTP Manual	Setting to *NTP* uses the local network’s NTP server to synchronize date and time. *Manual* allows the user to define a date and time.
NTP Server	Four decimal octets: XXX.XXX.XXX.XXX Domain Name	This is the IP Address or Domain Name of the local NTP Server on the network. This setting is only available if Update Mode is set to NTP.
Date	MM/DD/YYYY	This setting is the user defined date. A calendar widget can be used to select the data by clicking the button. This setting is only available if Update Mode is set to Manual.
Time	00:00:00 – 24:00:00	This setting is the user defined time. The time is based on a 24 hour clock. This setting is only available if the Update Mode is set to Manual.

5.2.11 Configuring SNMP

SNMP Communities

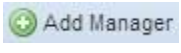
SNMP Communities define whether users have read-only or read-write SNMP rights. These two communities are given unique names. The default names for these communities are:

- Read –Only Community: public
- Read- Write Community: private

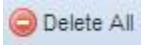
To modify the names of these communities click on the “Configure SNMP Communies” cog icon.

SNMP Trap Managers

The SNMP trap managers are recipients of SNMP traps sent from the SDI2X. The following menu allows the user to configure the recipient’s IP addresses. To add and remove recipients of the SNMP traps click the Configure SNMP Trap Manager cog icon.

Add Manager 

Clicking this button prompts the user for the IP address of the SNMP trap manager.

Delete All 

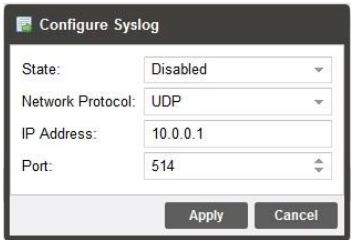
Clicking this button prompts the user to confirm the deletion of all SNMP trap manager IP addresses. If the user confirms deletion all SNMP trap manager IP addresses will be removed.

Delete Single Entry 
Highlight a single SNMP trap manager IP address and click this button to delete the entry. A prompt will appear confirming the deletion of IP address.

5.2.12 Syslog

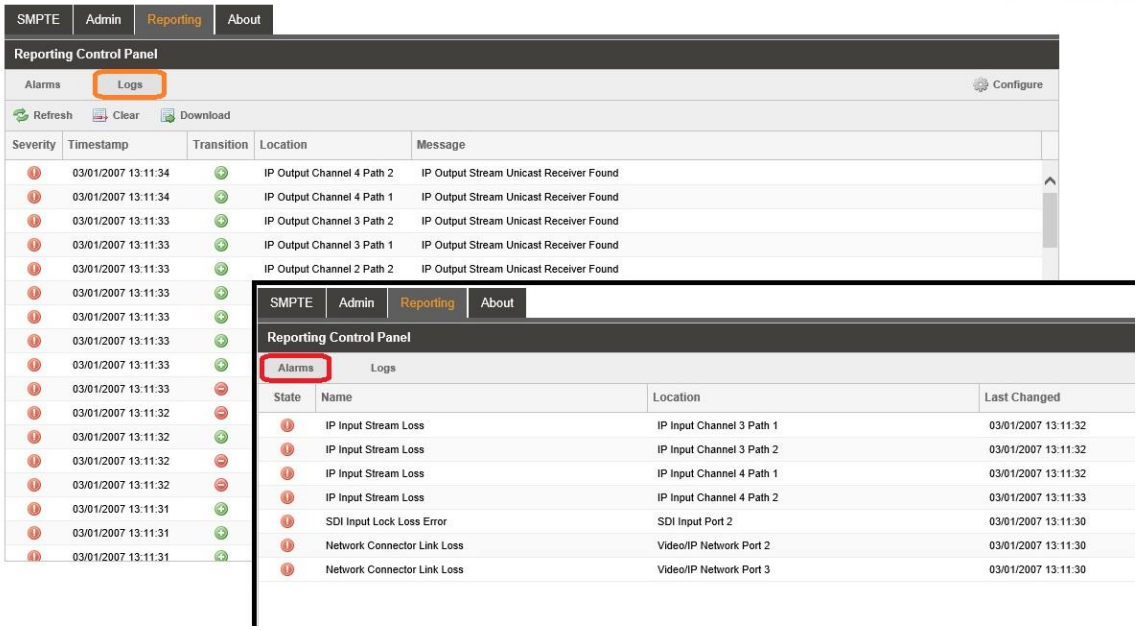
The SDI2X can be configured to send error and event logs formatted in the syslog protocol to a remote user specified Syslog server.

State	Enabled Disabled	Enable or Disable sending messages to Syslog server.
Network Protocol	UDP TCP	Select which network protocol used to transmit to the Syslog server
IP Address	Four decimal octets: XXX.XXX.XXX.XXX	IP of the Syslog server. 0.0.0.0 and 255.255.255.255 are not permitted
Port	0 - 65535	Destination port of the Syslog server



5.3 Reporting Panel

The Reporting control panel in the SDI2X will provide the user with a list of active alarms, as well as a means to log the detected events. Active alarms are constantly updated to reflect the real-time state of the unit.
Once an error is no longer detected, it will be cleared from the active alarms window. The log files can be used to view alarm and event history. Both the active alarm and event logs can be configured for specific behavior based upon the user's needs.



5.3.1 Alarms

Clicking on the Alarms button displays the Active Alarms menu. This list displays all of the *active alarms currently being reported* by the unit. There are four columns in the log that display different types of information.

State
This column displays an icon that will signify the importance of the event
The Info icon means the message is Informational and no error has been detected.
The Error icon means the message is an Alarm and the unit status has been set to 'Error'.

Name
This column displays the description of the detected instance.

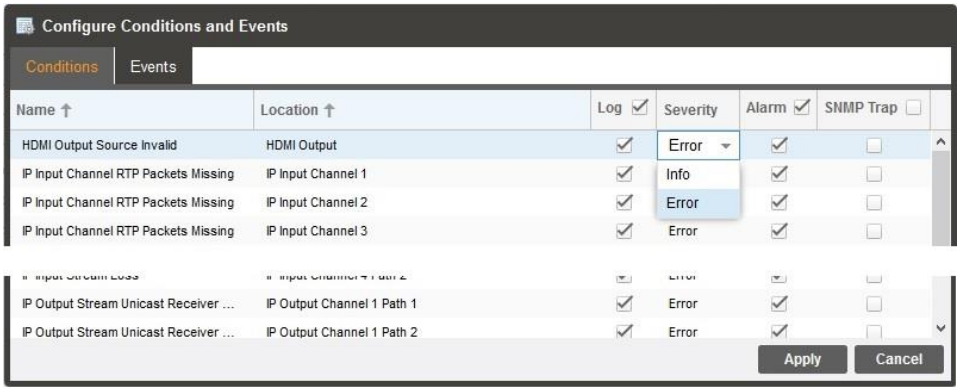
Location
This column displays the hardware or function that is experiencing the active error.

Last Changed
This column displays the data and time the error was raised. Timestamps here are determined with the Date and Time settings configured in Section 4.2.11.

5.3.2 Configuring the Alarms

The SDI2X monitoring points are divided into Conditions and Events. Configuration of how the SDI2X responds to either of these can be done by clicking on the configuration cog in either the Alarms or Logs windows.

Conditions
These instances are monitored within specific hardware and stream processing paths. How the SDI2X responds to the detection of the instance can be configured here. There are six columns in the Conditions tab. Three are 'checkbox' columns. Clicking the checkbox at the top of the column can be used to enable or disable all instances in column in a single action.



Name	This shows the user the error message that will be provided if the instance is detected.
Location	This shows the user the specific hardware or stream processing path where the instance is detected.
Log	The checkboxes allow the user to define which instances will be recorded to the log file.
Severity	A dropdown box within the row allows the user to define the instance as an Error or Information.
Alarm	The checkboxes allow the user to define which instances will signal an Alarm condition on the unit. This will cause the Error LED on the front of the unit and in the web client to illuminate.
SNMP Trap	The checkboxes allow the user to define which instances will trigger the SDI2X to send trap messages.
Apply	This will save all setting changes made and close the Configure Conditions and Events window.
Cancel	This will cancel the request to edit and close the Configure Conditions and Events window.

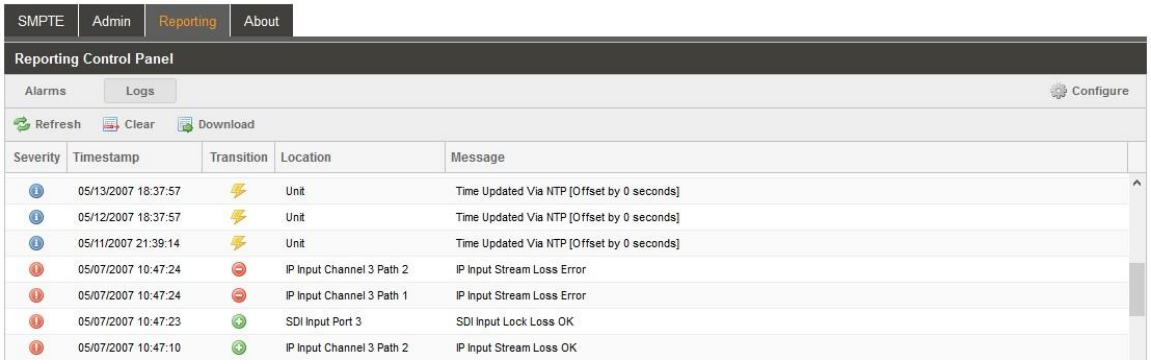
Events

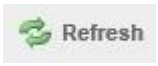
These instances will have an impact on all hardware and stream processing areas of the SDI2X. These instances can only be configured to be recorded in the log file, and send SNMP Trap messages. There are four columns in the Events tab.

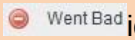
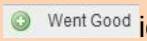
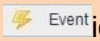
Name	This shows the user the error message that will be provided if the instance is detected.
Location	This shows the user the specific hardware or stream processing path where the instance is detected.
Log	The checkboxes are used user to define which instances will be recorded to the log file.
SNMP Trap	The checkboxes are used to define which instances will trigger the SDI2X to send trap messages.
Apply	This will save all setting changes made and close the Configure Conditions and Events window.
Cancel	This will cancel the request to edit and close the Configure Conditions and Events window.

5.3.3 Event Logs

The Logs window provides the user a display of the log file and management tools to streamline the data returned. If the SDI2X is rebooted or power lost, the Log files are cleared. There are three buttons that will manage the log file.



Refresh		This button allows the user to prompt the SDI2X to update the web page displayed logs.
Clear		The log files can be cleared manually by clicking the Clear button.
Download		The Download button lets the user save the log as a “.csv” extension file on their pc.

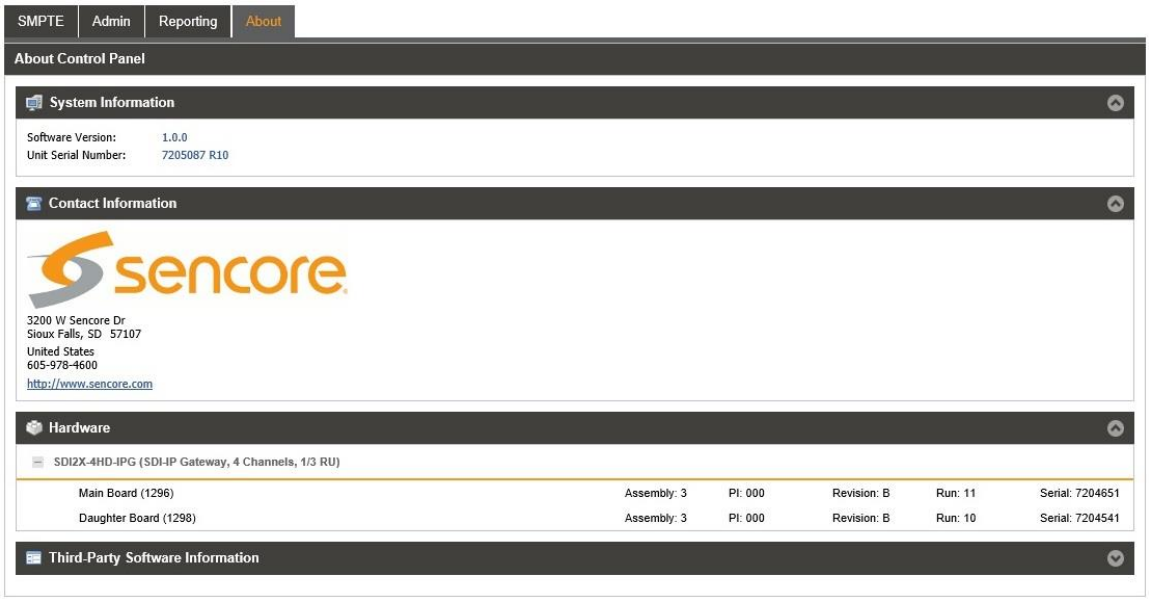
Severity	This displays an icon that will signify the importance of the instance. The  icon means the message is Informational and no error has been detected. The  icon means the message is an Alarm and the unit status has been set to ‘Error’.
Timestamp	This is the SDI2X associated date and time of the instance. See Date/Time settings in Section 4.2.11.
Transition	This displays an icon to indicate the type of log entry being shown. The  icon means that the instance transitioned into an Error state. The  icon means that the instance transitioned into a Clear state. The  icon means a single point instance (such as NTP Time was updated) took place.
Location	This column displays the hardware or function that experienced the alarm or event.
Message	This displays the description of the specific path that experienced the instance.

5.3.4 Configuring the Logs

Configuration of the logs will provide the user with the same configuration options as covered in section 4.3.11.

5.4 About Control Panel

Under the About control panel, there are no user definable parameters but there is information about software versions currently installed, hardware within the unit, how to contact Sencore for questions or assistance, and third party software information.



5.4.1 System Information

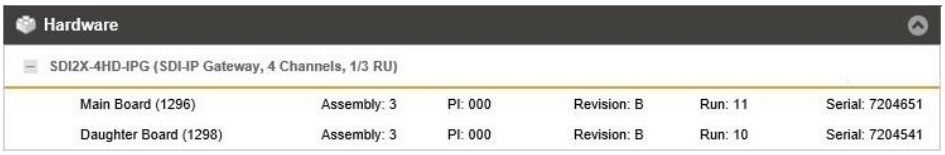
This area of the control panel gives the user the unit serial number and software version installed.

5.4.2 Contact Information

This area of the control panel gives the user the physical address, web address and phone number as methods of contact.

5.4.3 Hardware

This area of the control panel will provide details about the hardware contents of the SDI2X.



5.4.4 Third Party Software Information

This area of the control panel can be expanded to show the third party software used by the SDI2x. For more details see Section 5 – Appendix D for a complete list.

5.4.5 System Recovery

The SDI2X system has the ability to recover from complete image corruption. The system recovery allows a user to start the platform into a prompt where a software update will allow the system to be installed in the event all other images will not work.

To use the system recovery, hold two front panel buttons (any 2 buttons) when power is applied to the unit for at least 10 seconds.

The unit will boot into recovery mode. The user can press the “Enter” button on the front panel to configure the IP address if necessary. A web browser can then be used to connect to the system and apply an update to the unit.

Section 6 Appendices

Introduction

This section includes the following appendices:

Appendix A – Error and Event List

Below are the default settings for Event and System Condition notifications for the SDI2X.

Event Notification Defaults				
Condition	Log Severity	Log Entry	Alarms	SNMP Trap
Unit Booted Event	Info**	Enabled	(n/a)	Disabled**
Unit Shutdown Event	Info**	Enabled	(n/a)	Disabled**
Update Succeeded Event	Info**	Enabled	(n/a)	Disabled**
Update Failed Event	Error**	Enabled	(n/a)	Disabled**
NTP Updated Event	Info	Enabled	(n/a)	Disabled
Date/Time Changed Event	Info	Enabled	(n/a)	Disabled

**Note: these events can be viewed in the Reporting tab of the Web Interface. These events will not trigger SNMP traps or relays.

System Condition Notification Defaults				
Condition	Log Severity	Log Entry	Alarms	SNMP Trap
Fan Failure	Error	Enabled	Enabled	Disabled
Temperature Out-of-Range	Error	Enabled	Enabled	Disabled
Link Loss	Error	Enabled	Enabled	Disabled
Port Transmit Overflow	Error	Enabled	Enabled	Disabled
Output TS Overflow Error	Error	Enabled	Enabled	Disabled
Video Bitrate Out of Range Error	Error	Enabled	Enabled	Disabled
SDI Input Lost Error	Error	Enabled	Enabled	Disabled

Below is a table of Alarm objects that are configurable by the user. See section 4.3.1.1 for configuration details.

Alarm Objects	
Alarm message	Alarm Sent By
HDMI Output Source Invalid	HDMI Output
IP Input Channel RTP Packets Missing	IP Input Channel **w**
IP Input Stream Loss	IP Input Channel **w** Path **xx**
IP Output Stream Unicast Receiver Not Found	IP Output Channel **w** Path **xx**
Network Connector Link Loss	Video/IP Network Connector **yyy**
Network Connector Transmit Overflow	Video/IP Network Connector **yyy**
SDI Input Lock Loss Error	SDI port **zzzz**
Temperature Error	Unit

W = Channel number (range 1 - 4). **XX** = IP Port number (range 1 – 2).
YYY = IP Port number (range 1 – 2). **ZZZZ** = SDI port number (range 1 - 4).

Appendix B – Acronyms and Glossary

Acronym	Interpreted from
AAC	Advanced Audio Coding
AC-3	Also known as Dolby Digital
AES	Audio Engineering Society
ATSC	Advanced Television Systems Committee
Bit Rate	The rate at which the compressed bit stream is delivered from the channel to the input of a decoder.
BNC	British Naval Connector
dB	Decibel
DHCP	Dynamic Host Configuration Protocol
DVB	Digital Video Broadcasting
Event	An event is defined as a collection of elementary streams with a common time base, an associated start time, and an associated end time.
FCC	Federal Communications Commission
HD	High Definition
I/O	Input/Output
IP	Internet Protocol
Kbps	1000 bit per second
LED	Light Emitting Diode
Mbps	1,000,000 bits per second.
MPEG	Refers to standards developed by the ISO/IEC JTC1/SC29 WG11, Moving Picture Experts Group. MPEG may also refer to the Group.
MPEG-2	Refers to ISO/IEC standards 13818-1 (Systems), 13818-2 (Video), 13818-3 (Audio), 1318-4
NTP	Networking Time Protocol
PCM	Pulse-Code Modulation
PID	Packet Identifier. A unique integer value used to associate elementary streams of a program in a single or multi-program transport stream.
Program specific information (PSI)	PSI consists of normative data which is necessary for the mapping of transport streams and the successful regeneration of programs.
Program	A program is a collection of program elements. Program elements may be elementary streams. Program elements need not have any defined time base; those that do have a common time base and are intended for synchronized presentation.
RU	Rack Unit
SD	Standard Definition
SDI	Serial Digital Interface
SI	System Information
SMPTE	Society of Motion Pictures and Television Engineers
SNMP	Simple Network Management Protocol
TS	Transport Stream

Appendix C – Specifications

Input / Output Interfaces	
Video Connections	1 x 3G-SDI BNC 1 x HDMI 2.0 Interface Additional 3 x 3G-SDI BNC Optional *
Ethernet Connections	2x SFP+ Sockets (Data)
Supported SFP's	1 GbE Fiber (MSA-Compliant) 1 GbE Copper (MSA-Compliant 10 GbE Fiber (MSA-Compliant)
Network Management connection	1x RJ-45 1GbE (Control)
Processing	
Standards	SMPTE 2022-6 Encapsulate/De-encapsulate SMPTE 2110 / VSF TR-03 *
Capacity	1x FHD/HD/SD Video Service 8x PCM Audio Pairs Full ANC Data (SMPTE 2038)
Capacity (per 1 RU shelf)	3x 4k UHD/FHD/HD/SD Video Service *
Synchronization	SMPTE 2059 (IEEE 1588 PTP) *****
Correction	Hitless Switching (SMPTE 2022-7) FEC (SMPTE 2022-5)
Management	
Control Interfaces	Front Panel Interface (Four Line Display/Six-Button Keypad) Web Interface HTTP RESTful API SNMP Status/Control/Traps Syslog Alarm Support
Form Factor	
Dimensions	5.7"/145mm W x 6.7"/170mm D x 1RU
Rack Mount	3 Units per 1RU Tray
Environment	
Power Standard	120 VAC / 240 VAC
Power Connector	Standard IEC Line Cord Power over Ethernet *
Operating Temperature	0 to 50 Degrees Celcius

* - Planned Roadmap

Appendix D – Warranty

Sencore One-Year Warranty:

Sencore warrants this instrument against defects from any cause, except acts of God and abusive use, for a period of 1 (one) year from date of purchase. During this warranty period, Sencore will correct any covered defects without charge for parts, labor, or recalibration.

Appendix E – Support and Contact Information

Returning Products for Service or Calibration

The SDI2X server is a delicate piece of equipment and needs to be serviced and repaired by Sencore. Periodically it is necessary to return a product for repair or calibration. In order to expedite this process please carefully read the instructions below.

RMA Number
Before any product can be returned for service or calibration, an RMA number must be obtained. In order to obtain a RMA number, use the following steps.

1. Copy and paste, or enter the following link into a web browser:
    a. http://www.sencore.com/procare-support/service-repair
2. Complete the on-line request form and click the Submit button at the bottom of the page
3. Once the RMA is generated it will be emailed to the address provided on the request. Shipping instructions will also be included.

Shipping the Product
Once an RMA number has been issued, the unit needs to be packaged and shipped back to Sencore. It's best to use the original box and packaging for the product but if this not available, check with the customer service representative for the proper packaging instructions.

Note: DO NOT return any power cables or accessories unless instructed to do so by the customer service representative.

Appendix F – Open Source Software

The SDI2X includes:

Package	Version	License	Copyright
AT32 UC3B Software	1.7.0	BSD	2009, Atmel Corporation
BusyBox	1.20.1	GPL Version 2, June 1991	Erik Anderson, et. al.
dfu-programmer	0.5.2	GPL Version 2, June 1991	Weston Schmidt
Dropbear	2016.74	MIT-like 2002-2015	Matt Johnston, et. al (see license)
E2fsprogs	1.41.9	GPL Version 2, June 1991	Theodore Ts'o
ethtool	2.6.34	GPL Version 2, June 1991	David Miller, et. al.
FamFamFam Silk Icons	13	Creative Commons Attribution 2.5	Mark James
FastDB	3.71	MIT-like	Konstantin Knizhnik
FCGI	2.4.6	FastCGI	Open Market, Inc
Iproute2	3.4.0	GPL Version 2 June 1991	Stephen Hemminger, Alexey Kuznetsov
Libusb	0.1.12	GPL Version 2.1 Feb 1999	Johannes Erdfelt, Thomas Sailer, Brad Hards
Lighttpd	1.4.30	BSD 2004	Jan Kneschke
Linux	2.6.30	GPL Version 2 June 1991	Linus Torvalds, et. Al.
Log4cpp	1	GPL Version 2.1 Feb 1999	Bastiann Bakker
Monit	5.1.1	GPL Version 3 29 June 07 2010	Tildeslash Ltd.
Net-SNMP	5.7.1	BSD 1989, 1991, 1992	by Carnegie Mellon Univsty.
NTP	4.2.4p7	NTP License 1992-2009	David L. Mills
OpenEmbedded	2011.03	MIT 2006-2009	Holger Hans Peter Freyther, et. al
OpenSSL	1.0.1c	BSD-Like 1998-2008	The OpenSSL Project, 1995-1998
OProfile	0.9.7	GPL Version 2, June 1991	John Levon, Philippe Elie, et. al
PCRE	8.3	BSD 1997-2012	University of Cambridge, et. Al
POPT	1.14	MIT 1998	Red Hat Software
qDecoder	12.0.2	BSD 200-2012	Seungyoung Kim
Socket-CAN	1171	BSD-like, June 1991 2002-2007	Volkswagen Group Electronic Research
Spawn-FCGI	1.6.3	BSD	Jan Kneschke, Stefan Bahler
TCLAP	1.2.0	MIT 2003	Michael E Smoot
U-Boot	2009.11.1	GPL Version 2 June 1991	Wolfgane Denk, et. al.
USB-Utils	0.86	GPL Version 2 June 1991	Thomas Sailer, Johannes Erdfelt, David Brownell,
Zlib	1.2.7	Zlib/libpng License 1995-2005	Jean-loup Gailly and Mark Adler

Sencore Inc.
3200 Sencore Drive
Sioux Falls, SD 57107 USA
www.sencore.com
1.605.978.4600