TXS 3600
Multichannel Video/Audio Transcoder
User Manual
## Revision History

<table>
<thead>
<tr>
<th>Date</th>
<th>Version</th>
<th>Description</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/20/2012</td>
<td>1.0</td>
<td>2.0.0 Release</td>
<td>JKS</td>
</tr>
<tr>
<td>12/26/2012</td>
<td>1.1</td>
<td>Updated with 2.1.0 Features</td>
<td>JKS</td>
</tr>
<tr>
<td>11/12/2013</td>
<td>1.2</td>
<td>Updated with 2.3.0 Features</td>
<td>NDM</td>
</tr>
<tr>
<td>8/15/2014</td>
<td>1.3</td>
<td>Updated with 2.4.0 Features</td>
<td>NDM</td>
</tr>
</tbody>
</table>
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.

Unexpected high voltages can be present at unusual locations in defective equipment and signal distribution systems. Become familiar with the equipment that you are working with and observe the following safety precautions.

- Every precaution has been taken in the design of your Digital Media Streamer to insure 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 call Sencore for assistance.
- **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 TXS 3600 must be connected to a mains socket outlet with a protective earthing connection.
- For the TXS 3600 the mains plug is the main disconnect and should remain readily accessible and operable at all times.
  - The TXS 3600 is equipped with an internal system battery. The TXS must be sent if to Sencore service for replacement
  - **CAUTION** – Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type.
- When installing the TXS 3600 utilizing the DC power supply, the power supply MUST be used in conjunction with an over-current protective device rated at 250V, 15A, type: Slow-blo, as part of battery-supply circuit.

FCC Class A Information

The TXS 3600 has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his or her own expense.

Shielded cables must be used with this unit to ensure compliance with the Class A FCC limits.

⚠️ **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.

Dolby Digital Information

This product has been manufactured under license from Dolby Laboratories.

“Dolby Digital”, “AC-3”, and “Dolby Digital Plus” are licensed trademarks of Dolby Laboratories.
Table of Contents

Table of Contents ..................................................................................................................... 6
Table of Figures .......................................................................................................................... 7
Introduction .................................................................................................................................. 8
Hardware Layout ......................................................................................................................... 10
  TXS 3600 Chassis ...................................................................................................................... 10
Installation ................................................................................................................................... 11
  General Considerations ............................................................................................................ 11
  Rack Installation ....................................................................................................................... 12
Controlling the TXS 3600 Using the Web GUI ........................................................................ 13
  Input Settings ............................................................................................................................ 14
  Transcoder Settings .................................................................................................................. 16
  Output Settings .......................................................................................................................... 33
  Licensing Tab ............................................................................................................................ 36
  Admin Tab ................................................................................................................................ 37
  Reporting Tab ............................................................................................................................ 44
  About Tab ................................................................................................................................ 48
  System Recovery ...................................................................................................................... 48
Using the Front Panel on the TXS 3600 .................................................................................. 49
  FP Options and Settings ........................................................................................................... 49
  FP About .................................................................................................................................. 51
Appendix ...................................................................................................................................... 52
  Warranty .................................................................................................................................... 57
  Support and Contact Information ............................................................................................. 57
Table of Figures

Figure 1: Single TXS platform ................................................................. 10
Figure 2: Single TXS platform with ASI output option .............................. 10
Figure 3: Dual TXS platform with ASI output option ................................ 10
Figure 4: Rack Mounting ...................................................................... 12
Figure 5: Logon Screen ...................................................................... 13
Figure 6: Platform 1 Home Screen .......................................................... 13
Figure 7: Available Inputs .................................................................... 14
Figure 8: IP Configuration .................................................................. 14
Figure 9: ASI Input Configuration .......................................................... 15
Figure 10: Transcoder Engines .............................................................. 16
Figure 11: Transcoder Engine Expanded ................................................. 16
Figure 12: Copy Settings ..................................................................... 16
Figure 13: Transcoder Engine Copy ....................................................... 17
Figure 14: Transcoder Service Settings .................................................. 17
Figure 15: General Settings ................................................................. 18
Figure 16: Input Settings .................................................................... 18
Figure 17: Available Services ............................................................... 18
Figure 18: Service Selection ................................................................ 19
Figure 19: Transcoder Video and Service Information Settings ............... 20
Figure 20: Transcoder Video Settings .................................................... 20
Figure 21: General Video Settings ........................................................ 21
Figure 22: User Data Pass-through ...................................................... 22
Figure 23: PIP Video Settings ............................................................... 22
Figure 24: Transcoder Advanced Video Settings .................................... 23
Figure 25: Video Filtering Settings ....................................................... 23
Figure 26: Video Picture Structure Settings .......................................... 23
Figure 27: Microsoft Mediaream .......................................................... 24
Figure 28: PSI Settings ..................................................................... 24
Figure 29: General Service Information Settings ................................... 25
Figure 30: PIP Settings ...................................................................... 28
Figure 31: Advanced PSIP Settings ...................................................... 28
Figure 32: Encoding Presets ............................................................... 29
Figure 33: Transcoder Audio Settings ................................................... 29
Figure 34: Decode Settings ................................................................ 30
Figure 35: AC-3 and Dolby Digital Plus Encode Settings .................... 31
Figure 36: AAC Encode Settings .......................................................... 31
Figure 37: MPEG-2 Encode Settings .................................................... 32
Figure 38: Audio Decode Presets .......................................................... 32
Figure 39: Outputs .......................................................................... 33
Figure 40: Configure ASI output .......................................................... 33
Figure 41: ASI Output Status Information ............................................. 34
Figure 42: IP Output settings ............................................................... 34
Figure 43: MPEG/IP Transmit Status Information .................................. 35
Figure 44: Licensing Tab ................................................................. 36
Figure 45: License Key Dialog ............................................................ 36
Figure 46: Admin tab ................................................................. 37
Figure 47: Changing unit alias ............................................................ 37
Figure 48: Profile Manager ............................................................... 38
Figure 49: Setting password .............................................................. 38
Figure 50: MIBs ........................................................................ 39
Figure 51: Updating firmware ............................................................. 39
Figure 52: Uploading file ................................................................. 40
Figure 53: Upload successful ............................................................. 40
Figure 54: Update confirmation .......................................................... 40
Introduction

The TXS 3600 is a versatile MPEG-2/h.264 transcoder capable of up to 16 channels of HD/SD transcoding in a single chassis, plus a Picture-In-Picture (PIP) transcode for each of the 16 channels. With the TXS 36480 Audio Transcoding Module installed, the TXS 3600 has the ability to also transcode audio PIDs. The TXS 3600 comes standard with IP and ASI I/O to offer flexibility for future changes in network architecture or sourcing content from two different interfaces.

This manual describes how to install, configure, and operate the TXS 3600 transcoder. It is written for professional operators of video distribution systems and assumes a prerequisite level of technical knowledge.

The TXS 3600 is controllable through the web interface or SNMP to perform tasks such as setup, monitoring, and troubleshooting. The front panel provides simple status and IP information for accessing the unit.

Supported WEB interface browsers include:
- Internet Explorer 7 & above
- Mozilla Firefox 3.5 & above
- Chrome
## Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAC</td>
<td>Advanced Audio Coding</td>
</tr>
<tr>
<td>AC-3</td>
<td>Dolby Digital Plus</td>
</tr>
<tr>
<td>AFD</td>
<td>Auto Format Descriptor</td>
</tr>
<tr>
<td>ASI</td>
<td>Asynchronous Serial Interface</td>
</tr>
<tr>
<td>BNC</td>
<td>Bayonet Neil-Concelman Connector</td>
</tr>
<tr>
<td>BPS</td>
<td>Bits per second</td>
</tr>
<tr>
<td>CAM</td>
<td>Conditional Access Module</td>
</tr>
<tr>
<td>CAT</td>
<td>Conditional Access Table</td>
</tr>
<tr>
<td>CC</td>
<td>Closed Captioning</td>
</tr>
<tr>
<td>CI</td>
<td>Common Interface</td>
</tr>
<tr>
<td>dB</td>
<td>Decibel</td>
</tr>
<tr>
<td>DD+</td>
<td>Dolby Digital Plus</td>
</tr>
<tr>
<td>DHCP</td>
<td>Dynamic Host Configuration Protocol</td>
</tr>
<tr>
<td>DPI</td>
<td>Digital Program Insertion</td>
</tr>
<tr>
<td>DVB</td>
<td>Digital Video Broadcasting</td>
</tr>
<tr>
<td>FCC</td>
<td>Federal Communications Commission</td>
</tr>
<tr>
<td>GOP</td>
<td>Group of Pictures</td>
</tr>
<tr>
<td>HD</td>
<td>High Definition</td>
</tr>
<tr>
<td>IDR</td>
<td>Instantaneous Decoder Refresh</td>
</tr>
<tr>
<td>I/O</td>
<td>Input/Output</td>
</tr>
<tr>
<td>IP</td>
<td>Internet Protocol</td>
</tr>
<tr>
<td>kbps</td>
<td>1,000 bits per second</td>
</tr>
<tr>
<td>LED</td>
<td>Light Emitting Diode</td>
</tr>
<tr>
<td>MAC</td>
<td>Media Access Control</td>
</tr>
<tr>
<td>Mbps</td>
<td>1,000,000 bits per second</td>
</tr>
<tr>
<td>MPEG</td>
<td>Refers to standards developed by the ISO/IEC JTC1/SC29</td>
</tr>
<tr>
<td>WG11 MPEG-2</td>
<td>Refers to ISO/IEC standards 13818-1 (Systems), 13818-2 (Video), 13818-3 (Audio), 13818-4 (Conformance)</td>
</tr>
<tr>
<td>MPTS</td>
<td>Multiple Program Transport Stream</td>
</tr>
<tr>
<td>NTP</td>
<td>Network Time Protocol</td>
</tr>
<tr>
<td>PAT</td>
<td>Program Association Table</td>
</tr>
<tr>
<td>PCR</td>
<td>Program Clock Reference</td>
</tr>
<tr>
<td>PCM</td>
<td>Pulse-code Modulation</td>
</tr>
<tr>
<td>PID</td>
<td>Packet Identifier</td>
</tr>
<tr>
<td>PIP</td>
<td>Picture-In-Picture</td>
</tr>
<tr>
<td>PMT</td>
<td>Program Map Table</td>
</tr>
<tr>
<td>PT</td>
<td>Pass-through</td>
</tr>
<tr>
<td>QP</td>
<td>Quantization Parameter</td>
</tr>
<tr>
<td>RF</td>
<td>Radio Frequency</td>
</tr>
<tr>
<td>RU</td>
<td>Rack Unit</td>
</tr>
<tr>
<td>RW</td>
<td>Read/Write</td>
</tr>
<tr>
<td>SD</td>
<td>Standard Definition</td>
</tr>
<tr>
<td>SI</td>
<td>Service Information</td>
</tr>
<tr>
<td>SNMP</td>
<td>Simple Network Management Protocol</td>
</tr>
<tr>
<td>SPTS</td>
<td>Single Program Transport Stream</td>
</tr>
<tr>
<td>TS</td>
<td>Transport Stream</td>
</tr>
<tr>
<td>TX</td>
<td>Transcode</td>
</tr>
<tr>
<td>VBI</td>
<td>Video Blanking Interval</td>
</tr>
</tbody>
</table>
Hardware Layout

The TXS 3600 platform is designed to offer operators reliability and flexibility. The unit consists of a chassis in which up to two platforms can be installed. To cater to specific system requirements, the chassis can be configured to host optional modules best suited for a given scenario.

TXS 3600 Chassis

The Sencore TXS 3600 platform can be delivered in various combinations. The basic single TXS platform includes redundant power supplies, Ethernet control port, 2 MPEG/IP I/O NICs, and 4 bi-directional ASI ports. The chassis shown in Figure 1 is a basic single TXS platform.

![Figure 1: Single TXS platform](image)

A single TXS platform has 3 options for adding additional ASI input/outputs:

1. Additional 4 ASI Inputs
2. Additional 4 ASI Outputs
3. Additional 4 ASI Inputs and 4 ASI Outputs

The chassis shown in Error! Not a valid bookmark self-reference. is a single TXS platform with (4) additional ASI outputs.

![Figure 2: Single TXS platform with ASI output option](image)

A dual TXS platform has 2 options for adding additional ASI inputs/outputs:

1. Additional 4 ASI inputs (for one or both platforms)
2. Additional 4 ASI outputs (for one or both platforms)

The chassis shown in Figure 3 has dual platforms with (8) additional ASI outputs. Platform 1 is on the bottom and Platform 2 is on top. Each platform is independent from one another for stream routing. Each program needs to be routed to the correct platform to have availability for transcoding.

![Figure 3: Dual TXS platform with ASI output option](image)

Control Ethernet Connection

A standard RJ-45 connector provides connection to the SNMP and web interface of the TXS 3600. The connection is a 10/100 BaseT connection. A user can view the IP address of the unit from the front panel or once known can access the web interface through any supported web browser by typing the IP address of the unit. The control port is capable of both DHCP and static IP addressing. By default the IP address of the TXS 3600 is dynamically set to DHCP.
Installation

General Considerations
This chapter describes the installation procedure for the unit.

**Rack size**

The chassis is designed to be installed in a standard 19-inch rack. The TXS 3600 occupies 1RU of rack space. All of the cable connections are located on the rear of the unit.

**Ventilation**

The TXS 3600 is cooled via forced induction through the front of the unit and exhausted through the vents in the rear. The TXS 3600 is equipped with temperature sensors to ensure operating temperature is maintained.

**Power Connection**

Using the proper power connections is vital to the safe operation of the TXS 3600. Only use the supplied power cables or one with equal specifications. The TXS 3600 can be ordered with AC or DC Power supplies.

**AC Power Connection**

The TXS 3600 is capable of either operating on 120/240V 50/60Hz systems. The power supply will automatically detect the system it is connected to. To hook up the power use the following steps:

1. Locate the AC power cord that was included with the TXS 3600.
2. Plug the female end of the power cord (end with no prongs) into the back of the unit.
3. Locate a protected outlet (usually inside of the rack) to plug the male end of the power cable into.

**DC Power Connection**

Using the proper connections is vital to the safe operation of the TXS 3600. The TXS 3600 is intended for use in 40-70 VDC systems. The power supply will automatically detect the system it is connected to. **When installing the TXS 3600, the power supply MUST be used in conjunction with an over-current protective device rated at 250V, 15A, type: Slow-blo, as part of battery-supply circuit.** Failure to include an over-current protective device could cause damage to the TXS 3600, personnel, or property.
Rack Installation

To install the TXS 3600 into a rack use the following steps:

1. Determine the desired position in the rack for the TXS making sure that the air intake on the front of the unit and the exhausts on the rear of the unit will not be obstructed.
2. Insert the rack mount clips into place over the mounting holes in the rack.
3. Slide the TXS into position in the rack.
4. Secure the TXS to the rack by installing the four screws through the front mounting holes and tightening.

WARNING To prevent injury, the apparatus must be securely attached to the floor/wall in accordance with the installation instructions.

Figure 4: Rack Mounting
Controlling the TXS 3600 Using the Web GUI

From the web browser that is connected to the same network as the TXS 3600, type the IP address of the unit to access the web interface. By default the IP address of the unit is set to DHCP and can be found on the front panel. The TXS 3600 is also capable of static addressing and accessing via host name.

Upon correctly connecting to the unit, a dialog box similar to Figure 5 should appear asking the user to login. By default the password is left blank. Once logged on, the password can be set in the Admin tab.

A page will load similar in appearance to Figure 6 once a user is successfully logged on. Depending on the options of modules/features installed, small variations might be seen.

The main screen for each platform is displayed in a left-to-right fashion. This means the inputs are shown on the left, processing in the middle section and outputs are shown on the right. The user is capable of configuring all parameters of the transcoder from this page by clicking on the cog which represents a settings configuration.
Input Settings

All inputs for the platform are shown on the left column of the home screen. The inputs are a collection of ASI and IP both supplied in the standard configuration. All ports can be enabled or disabled by configuring the settings for each port. If the port is disabled, it will be hidden when the “Hide/Show Disabled” button is clicked.

![Available Inputs](image)

**Figure 7: Available Inputs**

Clicking on the triangle by each IP port allows the advanced details to be shown for the port. All of the advanced settings are shown for the IP port in Figure 7. If changes are needed, click on the cog to receive the settings dialog box as shown in Figure 8.

![IP Configuration](image)

**Figure 8: IP Configuration**

Each input port allows the user to set a local alias for the specific port. This is a friendly name that can be used to name the input for easy reference in the future.

The general IP settings section allows a user to enter the unicast/multicast address along with destination port.
The input buffer size is settable at a range from 1 to 4,000 KB. With a larger buffer size, more latency will be created on the input. The tradeoff with a larger buffer is possible prevention of IP jitter and dropped packets.

The advanced settings allow source specific multicasting using IGMP v3 joins. The filter can be set to exclude or include. IGMP addresses can be added and removed by clicking the appropriate heading in the table. There can be up to 64 addresses entered with the highest address taking priority over the addresses below it.

If the port is enabled and no sync is detected, an error will be indicated by a red light. Errors can be user enabled/disabled if desired. Please see Reporting section for error details.

![Configure ASI I/O 1-1](image)

**Figure 9: ASI Input Configuration**

Figure 9 presents the ASI settings dialog for the ASI bidirectional ports. The port can be enabled or disabled from being shown in the active list. Each ASI port allows the user to set a local alias. This is a friendly name that can be used to identify the input for easy reference in the future.

The port can be designated as an input or output. By default, ASI I/O 1 and 2 are set as an input and I/O 3 and 4 are set as outputs. The transport stream source is only used when designated as an output.
Transcoder Settings

The Transcoder Settings section focuses around the transcoding or processing as shown in the middle of the individual platform screen. Depending on the number of channels in the chassis, a different number of channels will be shown in the interface.

![Figure 10: Transcoder Engines](image)

Each transcoder engine can be expanded to have more details about the incoming and outgoing stream similar to Figure 11. Click on the triangle next to the transcoder name to see an expanded view of the engine.

![Figure 11: Transcoder Engine Expanded](image)

Located at the top of the transcoder section is a button labeled "Copy" as shown in Figure 12. Click on the button to copy the settings from one transcoder engine to other engines. All settings except Input Settings will be copied.

![Figure 12: Copy Settings](image)
Figure 13 shows the Transcoder Engine Copy dialog box that allows the user to select which transcoder settings would like to be copied from and which transcoders those settings would like to be copied to.

![Transcoder Engine Copy](image)

**Figure 13: Transcoder Engine Copy**

To configure the transcoder for the incoming stream and encoding parameters click on the Cog located directly under the triangle for each individual transcoder engine.

![Transcoder Service Settings](image)

**Figure 14: Transcoder Service Settings**

Figure 14 is a representation of the settings for a transcoder engine.

On the bottom left of the configuration is a “Reset” button. This will reset (reboot) the individual transcoder for the engine currently open. This will not interrupt any other transcoders in the TXS that are running.
The “**General Settings**” allow a transcoder to be enabled or disabled. The alias is a friendly name that can be used to identify the input for easy reference. The output TS rate is the bitrate for the transport stream being sent to the outgoing ASI and/or IP port(s).

**Figure 15: General Settings**

“**Input Settings**” provides the ability to select the desired input for the transcoder engine. For the selection to take effect, press the “**Apply**” button on the right of the selection box, and the available services will be displayed for the Primary Input. To view the services for the Backup input, press “**Switch to Backup Input**”.

- **Mute on Error** will turn off the output TS if a transcoder error occurs.
- **Failover to Backup** sets which conditions the transcoder will switch from the Primary Input to the Backup Input. These conditions include: **Manual Only**, **On Transcode Error**, and **On Primary TS Loss**.
- **Restore to Primary** sets which conditions the transcoder will switch from the Backup Input to the Primary input. These conditions include: **Manual Only**, **On Primary TS Restored**, **On Transcode Error**, and **On Backup TS Loss**.
- **Switchover Interval** sets the amount of time the transcoder will wait before switching between the Primary and Backup Inputs after the Failover or Restore condition has occurred. The interval can be set between 1 to 20 seconds.

**Figure 16: Input Settings**

“**Available Services**” displays all services within the transport stream for the Active Input. The Active Input is displayed at the top of this selection box. The service list can be updated, by pressing “**Refresh**” on the right.

**Figure 17: Available Services**
Note: It may take a few seconds for the available services to be shown as the TS parsing only begins after an input has been selected and the apply button has been pressed. Pressing the Refresh button will update the service list after switching between inputs.

The “Service Selection” is where the incoming and outgoing PIDs are configured and output PID pass-through is enabled/disabled.

In PID Lock mode, the incoming PIDs can be manually entered for the Primary or Backup Service from the Available Services section, or an Available Service can be drag and dropped into the Primary or Backup column allowing the PIDs to automatically fill in the appropriate column. Copy Primary PIDs to Backup will copy all PID numbers from the Primary column to the Backup column. The left screenshot in Figure 18 is an example of the PID Lock mode settings.

In Service Lock mode, the incoming Service Name or Program number can be manually entered for the Primary or Backup Service from the Available Services section, or an Available Service can be drag and dropped into the Primary or Backup section allowing the Service Name or Program number to automatically fill the appropriate box. If AutoSeek is enabled, the transcoder will choose the first service found in the current active input to lock to, and continue to select the first service if the input’s content changes. Copy Primary Lock Settings to Backup will copy the Primary Service Lock configuration to the Backup Service Lock configuration. The right screenshot in Figure 18 is an example of the Service Lock mode settings.

The output can be configured to have the same or different outgoing PIDs from the incoming stream. If Output PIDs Follow Input PIDs is selected, the output PID configuration will match and follow the PID configuration set for the active input.

Each transcoder engine can support a Pass-through of up to 4 audio PIDs and up to 4 Transcoded Audio PIDs (with TXS 36480 Audio Transcoding Module installed). Each transcoder engine also has the ability to pass up to 7 Data PIDs to the output. These types of data include DVB Subtitles, DVB VBI, North American VBI, and DPI Messages.

Each transcoder engine also supports the creation of a PIP PMT PID and PIP Video PID (the output PIP PCR PID will be the same as the output PIP video PID). The PIP video service will be a simultaneous version of the main video service, rescaled to a smaller output format and encoded separately from the main video service.

The Enabling/Disabling allows the ability to pass or block each PID. The Language descriptor for the incoming audio PID can be set to Pass, Block, or User. The Language descriptor can also be defined by the user.

- **Pass**: The language descriptor on the input will be passed to the output audio PID.
- **Block**: The language descriptor on the input will not be present on the output audio PID.
User: The user will be able to specify a three-character language for the audio channel that will be inserted into the language descriptor on the output audio PID.

![Figure 19: Transcoder Video and Service Information Settings](image)

The Video and Service Information settings are found on the second tab as shown in Figure 19. This tab is broken down into 3 panes:

1) Video Settings
2) Advanced Video Settings
3) PSI Settings

![Figure 20: Transcoder Video Settings](image)

The video encoding settings are found on the first pane as shown in Figure 20.
The “General” section includes overall settings for the encoder side of the main service of the transcoder engine. The settings and options are listed below.

- **Compressed Video Standard:** the encoded video codec of the main service
  
  | MPEG-2 | H.264 (If License Enabled) |
  
- **Format Mode:** the automatic or manual setting of resolution and frame rate of the main service
  
  | Native (output matches input) |
  | Manual (defined in manual format) |

- **Manual Format:** the output resolution, frame rate, and aspect ratio of the main service
  
  Note: Depending on input resolution, some output resolutions will not be allowed. For example upconverting from SD 720x480 29.97i to HD 1920x1080i 30 is NOT supported, whereas cross-converting from 720p to 1080i IS supported.

- **Display Mode:** how the video of the main service will be displayed when outputting SD resolutions
  
  | Center-Cut |
  | Letterbox |
  | Anamorphic |

- **Auto AFD:** if AFD is present on the input, the output video of the main service will be displayed according to the AFD code
  
  | Enabled (the output display mode is selected according to the input AFD code) |
  | Disabled (will disregard the incoming AFD code) |

- **Video Bitrate:** video can be selected to be a constant or variable rate for the main video service
  
  | Constant |
  | Variable (Capped at a maximum rate) |

- **Constant Bitrate:** if constant video bitrate is selected, rate in Mbps of main video service encoded (0.1 – 30 Mbps)
  
- **Max Bitrate:** if variable video bitrate is selected, maximum rate in Mbps of main video service encoded (0.1 – 30 Mbps)

- **Target Quantization Parameter:** is the index used to derive a scaling matrix and quality of the main video service for the targeted variable bitrate. The target QP regulates how much spatial detail is saved. When QP is very small, almost all that
detail is retained. As QP is increased, some of that detail is aggregated so that the bit rate drops, but at the price of some increase in distortion and some loss of quality.

MPEG-2 Range: 2-31
H.264 Range: 2-63

**Figure 22: User Data Pass-through**

The user data pass-through enables/disables the pass-through of the AFD code and Closed Captioning on the main service Video PID. The CC Pass-Through Mode allows the user to output Closed Captioning data in SCTE21/ATSC or SCTE20 for the MPEG-2 output codec. If the output codec is set to H.264, the output captions will be in SCTE21/ATSC regardless of this setting.

**Figure 23: PIP Video Settings**

The “**PIP Settings**” section includes overall settings for the encoder side of the smaller format picture-in-picture service of the transcoder engine. The settings and options are listed below.

- **Codec**: *the encoded video codec of the PIP service*
  
  MPEG-2
  H.264

- **Manual Format**: *the output resolution, frame rate, and aspect ratio of the PIP service*

  Note: Framerate conversion is not supported for PIP.

- **Bitrate**: *rate in kbps of PIP video service encoded (100 – 1000 kbps)*
Figure 24: Transcoder Advanced Video Settings

The advanced video encoding settings are found on the second pane as shown in Figure 24.

Figure 25: Video Filtering Settings

The advanced section of the video encoding allows for setting the video filtering for the main service of the transcoder as shown in Figure 25.

- Scene Detection: forces changes to the GOP structure if a scene change is detected allowing for clean transitions
- Fade Detection: forces changes to the GOP structure if a fade is detected allowing for smooth transitions
- Pre-Deblocking Filter: detects blocking artifacts in video frames and reduces them by applying a selected filter.
  Range: 0 (Off) – 3 (Maximum)
- Skin Tone Detection: emphasis around the detection of skin tones when encoding
  Range: 0 (Off) – 8 (Lowest Quantization on skin tone)

Figure 26: Video Picture Structure Settings

The video picture structure settings are shown in Figure 26.
- **GOP Size:** Indicates the size of the GOP and how often I frames are inserted into the video stream. The GOP range is 1 to 300 in size.
- **GOP Structure:** The option between Dynamic and Static are selectable allowing the GOP size to fluctuate or maintain with the video being encoded. Note: If Scene Detection and/or Fade Detection are enabled, detection of these scenarios will force a change in the GOP sizes even with static GOPs.
- **Min/Max/Static GOP Structure:** Provides the structure for the GOP.
  
  
  I
  IP
  IPB
  IPBB
  IPBBBB (h.264 only)
  IPBBBBB (h.264 only)

- **GOP Open/Closed:** Open GOPs allow B-Frames to get information from previous or forthcoming I/P Frames. Closed GOPs only need to reference previous frames making each GOP self-contained.
- **IDR Frequency:** Instantaneous decoder refresh frame interval. This setting defines how often I-frames are marked as IDR frames. Input range is 0 to 255. When set to 1, every I-frame is an IDR frame.

![Microsoft Mediaroom](image)

**Figure 27: Microsoft Mediaroom**

The TXS 3600 is Microsoft Mediaroom Ready. By selecting “Yes” to force MM Profile / Level, the Microsoft Mediaroom required Profile and Level will be set for the output Video PID.

![PSI Settings](image)

**Figure 28: PSI Settings**

The PSI encoding settings are found on the third pane as shown in Figure 28. These settings allow the transcoder to pass-through or manually change the Service Information (SI) for the output TS.
The “General” section includes settings to change the Service and PSIP info for the output.

- **Output Mode:**
  - Follow Input – Service and Transport Stream ID remain the same as the input.
  - Manual – Allows for user defined Service info and Transport Stream ID’s.

- **Service Number** – Manually specifies the service number for the output (1 - 65535).
- **Service Name** – Manually specifies the service name for the output (up to 25 char).
- **Transport Stream ID** – Manually specifies the TS ID number (0 – 65535).

**SI Passthrough:**
- **ATSC PSIP Raw** – Passes through all MGTs, TVCTs, CVCTs, STTs, RRTs, EITs, and ETTs to the output as they are received from the active input.
- **Disabled** – Disables the pass-through of all SI tables. In this mode, the only tables present in the output transport stream will be the PAT and PMT.
- **ATSC PSIP Regenerated** – Creates MGTs and TVCT/CVCTs, and passes them through to the output based on the program selected for transcoding. This mode also passes through STTs, RRTs, EITs, and ETTs.
- **DVB SI** – Creates an SDT and passes it to the output based on the program selected for transcoding. This mode also passes through NITs, EITs, TDTs, and TOTs to the output.

(More detail for each Service Information table is provided in Table 1)
<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETT</td>
<td>If unlicensed for Advanced PSIP configuration, the transport packets for each channel ETT and event ETT PID defined in the MGT of the input transport stream shall be identified and passed through unchanged to the output transport stream. If licensed for Advanced PSIP configuration and zero ETT PIDs are specified by the user, then no ETT packets will be included in the output transport stream.</td>
</tr>
<tr>
<td>TVCT</td>
<td>If licensed for Advanced PSIP configuration and the PSIP Mode is set to &quot;Manual&quot; then the major_channel_number, minor_channel_number, and modulation_mode will be user defined. If not licensed for Advanced PSIP configuration the TVCT will be regenerated using the user defined transport_stream_id, short_name, and program number. num_channels_in_section will be set to &quot;1&quot; and carrier_frequency will be set to all zeros.</td>
</tr>
<tr>
<td>CVCT</td>
<td>If not licensed for Advanced PSIP configuration the CVCT will be regenerated using the user defined transport_stream_id, short_name, and program number. num_channels_in_section will be set to &quot;1&quot; and carrier_frequency will be set to all zeros. If licensed for Advanced PSIP configuration and the PSIP</td>
</tr>
</tbody>
</table>
Mode is set to "Manual" then the major_channel_number, minor_channel_number, and modulation_mode will be user defined.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MGT</strong></td>
<td>This table will not be present in the output.</td>
<td>This table will be passed unchanged to the output.</td>
<td>An MGT will be present on the output transport stream and the fields will be defined by the other tables present on the output transport stream.</td>
</tr>
</tbody>
</table>

**DVB SI Tables**

| **SDT** | This table will not be present in the output. | This table will not be present in the output. | This table will not be present in the output. | The SDT will be regenerated using the user defined transport_stream_i_d, short_name, and program number |
| **NIT** | This table will not be present in the output. | This table will not be present in the output. | This table will not be present in the output. | Each transport stream packet containing a NIT will be passed through unchanged to the output. |
| **EIT** | This table will not be present in the output. | This table will not be present in the output. | This table will not be present in the output. | Each transport stream packet containing an EIT will be passed through unchanged to the output. |
| **TDT** | This table will not be present in the output. | This table will not be present in the output. | This table will not be present in the output. | Each transport stream packet containing a TDT will be passed through unchanged to the output. |
| **TOT** | This table will not be present in the output. | This table will not be present in the output. | This table will not be present in the output. | Each transport stream packet containing a TOT will be passed through unchanged to the output. |

*Table 1: SI Passthrough Information*
The "**PIP**" section includes settings to configure PIP on the output. The encoded PIP output may be delivered as a second video program in the main output transport stream, or may be output on its own separate transport stream (please note that audio and data PIDs will not be present on the PIP service, and will only be available with the main video service).

- **PIP:**
  - Disabled – *Disables the secondary smaller format picture-in-picture for use on the output.*
  - Enabled – *Enables the secondary smaller format picture-in-picture for use on the output.*

- **Service Number:**  *Manually defines the service number of the PIP service in the output (1 – 65535). This service number should not be the same as the main service number.*

- **TS Mode:**
  - Combined – *Puts both the main service and PIP service on the same single output transport stream.*
  - Separate – *Puts the main service and PIP service on separate output transport streams.*

- **TS Bitrate:** *Sets the output bitrate of the PIP service (only applicable when TS Mode is set to “Separate”).*

---

The "**Advanced PSIP**" section includes settings to manually change the advanced service tables for the output. To enable the Advanced PSIP settings, the Advanced PSIP Processing License must be applied and a reboot of the unit.

- **PSIP Mode:**
  - Follow Input – *PSIP tables will be regenerated based on the input information (for example, the VCT will be regenerated to include only a single program, but the program number and service name will be the same as the input).*
  - Manual – *Allows for user defined channel numbers and manipulation of the various PSIP tables.*

- **Major Channel Number:**  *Manually defines the major channel number in the output VCT (VCT: 1 – 99, CVCT 1 – 999).*
- Minor Channel Number: *Manually defines the minor channel number in the output VCT (0 – 999).*
- Modulation Mode: *Sets the VCT modulation mode (Analog, SCTE Mode 1 (QAM64), SCTE Mode 2 (QAM256), ATSC (8VSB), or ATSC (16VSB)).*
- VCT Type: *Sets the type of Virtual Channel Table (VCT) for the output TS (Terrestrial or Cable).*
- EIT PID Count: *Sets the maximum number of EITs to pass from the input to output TS (0 – 128).*
- ETT PID Count: *Sets the maximum number of ETTs to pass from the input to output TS (0-128).*

Located on the top right of the video configuration are presets for various encoding parameters. These presets will adjust settings such as filtering and GOP structure of the encoded output.

![Encoding Presets](image)

**Figure 32: Encoding Presets**

The video encode preset options are:
- Legacy MPEG2
- Filtering Off
- Dynamic GOP Defaults
- Static GOP Defaults
- Microsoft Mediaroom
- Factory Defaults

![Transcoder Audio Settings](image)

**Figure 33: Transcoder Audio Settings**

The Audio Transcode settings are found on the next tab as shown in Figure 33. This menu will only be available if the TXS 3600 has the Audio Transcoding Module installed. Each transcoded audio PID has its own Decode/Encode settings. Click on TX Audio 1, 2, 3, or 4 to change the
audio transcode settings for the desired output PID. TX Audio 1 refers to the first TX Audio listed in the Service Selection Tab.

![Decode Settings](image)

**Figure 34: Decode Settings**

Figure 34 shows the audio Decode Settings for the transcoded audio PID.
- **Gain**: Amplification or attenuation of the decoded audio

The rest of the decode settings are organized by the input audio codec that is being decoded.
- **AC3 (Dolby Digital):**
  - Downmix: Summation of the audio channels to: Mono, 2/0 Lo/Ro, 2/0 Lt/Rt
  - Operational Mode: Compression mode used for the AC3 downmix
  - Dynamic Range: Limiting the audio level range
- **AAC Downmix**: Summation of the audio channels to: Mono, Stereo, Disabled*
- **Linear PCM Downmix**: Summation of the audio channels to: Mono, Stereo, Disabled*
- **MPEG-2 Downmix**: Summation of the audio channels to: Mono, Disabled*

*When this setting is Disabled, the output defaults to Stereo Downmix mode.

Audio encode settings will have different menus for each output codec: AC-3, Dolby Digital Plus, AAC, and MPEG-2.
AC-3 and Dolby Digital Plus encode settings include:
- **Broadcast Mode**: Follows ATSC or DVB Dolby standard specification.
- **Bitrate**: Output audio data rate
- **Dolby Info**: Enabled passes any audio metadata from the input audio PID. Disabled allows the user to specify audio metadata for the output Audio PID.
- **DialNorm**: Metadata parameter that sets the reference playback level.
- **Bitstream Mode**: Describes the audio program contained within the AC-3 or Dolby Digital Plus bitstream.
- **Production Info Exists**: Flag in the output audio PID specifying additional metadata exists for: Mix level, Room Type, Copyright, and Original bitstream.
- **Mix level**: Specifies the monitor level used to mix the program.
- **Room Type**: Describes the size of the control room where mixing occurred.
- **Copyright**: Specifies if the material is copyrighted.
- **Original Bitstream**: Specifies if the material is the original bitstream.
- **Line Mode DRC**: Specifies playback parameters for the program during decoder Line Mode operation.
- **RF Mode DRC**: Specifies playback parameters for the program during decoder RF Mode operation.

**Note**: The defaults are set to DialNorm = -31dB and Line/RF Mode DRC = None. These are based on recommendations in Dolby’s Broadcast Transcoder Reference Guide to maintain NO attenuation when compared to the passthrough audio. So if the received audio is encoded at -24dB (as required by the FCC “CALM” act) using the default settings will result in the output audio level not changing at all.

### Figure 36: AAC Encode Settings

AAC Encode Settings include:
- **Container**: Utilizes either ADTS or LOAS (also known as LATM)
- Profile: Choice of AAC-LC, HE-AACv1, HE-AACv2
- TNS: Temporal Noise Shaping
- Bitrate: Output audio data rate
- Codec Version: MPEG2 or MPEG4

![Figure 37: MPEG-2 Encode Settings](image)

MPEG-2 Encode Settings include:
- Stereo Mode: Specify Stereo or Joint Stereo (Dual Mono)
- Bitrate: Output audio data rate

![Figure 38: Audio Decode Presets](image)

The audio decode preset options are:
- AC3 Transmission
- AC3 Monitor
Output Settings
This section focuses around the IP and ASI settings found on the right column of the individual platform home screen as shown in Figure 39.

All TXS 3600 platforms will have the ability to output ASI and/or IP. Thirty-two IP streams will be available along with ASI ports (not assigned as inputs).

![Figure 39: Outputs](image)

Each port can be configured by clicking on the cog associated with the connection.

![Figure 40: Configure ASI output](image)

The ASI output configuration is similar to the ASI input if the connector is bidirectional. The ASI output can be enabled/disabled to allow configuration changes without transmitting. The unit alias is a friendly name that can be used to identify the output for easy reference. When designated as an output, the transport stream source or transcoder engine is available to be selected to assign the appropriate output.
The triangle next to the ASI output can be pressed to reveal the PIDs present in the output TS for that particular output.

The IP transmit configuration is shown in Figure 42. The IP output can be enabled/disabled to allow configuration changes without transmitting. The unit alias is a friendly name that can be used to identify the input for easy reference.

The transport stream source or transcoder engine is available to be selected and assigned to the appropriate output.

Two physical IP NICs are available for transmitting on the rear of each platform. The physical connection is selectable. NIC 1 is located on the left and NIC 2 is located on the right when looking at the platform from the rear. The destination IP address and port are settable below the physical connector.

The Advanced Settings give the ability to set the source port and number of transport stream packets per IP packet.
The triangle next to the MPEG/IP Transmit can be pressed to reveal the following status information for that particular transmit:

1) Physical Connector
2) Destination IP and Port
3) Source Port
4) TS/IP Packet
5) The PIDs present in the output TS
Licensing Tab

The license tab is located after the two platforms in the web interface. This page allows the user to license the transcode engines for video and audio encoding.

The left column identifies the available/total licenses available for each type of license. The licenses are assigned by dragging and dropping the appropriate license to the desired transcoder engine. Any license can be removed from a transcode engine and re-assigned to a different transcode engine by clicking the "X Remove Licenses" and drag and dropping the license onto a new transcode engine.

Each transcoder can be licensed for HD/SD h.264 or MPEG-2 video encoding. When the TXS 36480 Audio Transcoding Module is installed, up to 4 Audio PIDs per transcoder can be licensed. Without any audio encoding licensing, the Audio Transcoding Module can output up to 4 MPEG-2 audio PIDs per transcoder. The Dolby Digital Encoding license enables the ability to encode the output audio PID to AC3 or Dolby Digital Plus. The AAC Encoding license enables the ability to encode the output audio PID to AAC or HE-AAC.

The type and number of licenses can be updated and changed with a license key. To find out pricing and how obtain a new license key please contact Sencore. Once a new license key has been obtained, the character string can be copied and pasted into the dialog box as shown in Figure 45 that appears after clicking on the “Update License” button.
Admin Tab

The Admin tab allows system specific settings to be set or modified.

Located directly under the Admin Control Panel are the options for changing Unit Alias, saving Profiles, changing the web GUI Password, downloading the SNMP MIBs, saving Diagnostic file, Rebooting system, Resetting to Factory Defaults, and unit Software Updating.

Unit Alias

Located in the top left corner of the Admin tab is the unit alias. This allows for unique identification of each unit for easy reference.

To change the alias, click on the pencil and paper and a dialog box will appear.
User Profiles

The “Profiles” button opens a dialog box as shown in Figure 48. The user can create a new profile based on the configuration of the complete system. The profile can be saved locally and downloaded to a remote location for backup. The profile can also be uploaded and restored for systems that have the same identical configuration.

![Profile Manager](image)

**Figure 48: Profile Manager**

*Note: The configuration of the unit must be the same from system to system to allow the profile to be applied. If a profile is uploaded onto a different channel platform, the profile will not load.*

Setting Login Password

Clicking on the “Change Password” button located at the top of the Admin Tab a dialog box will appear as shown in Figure 49.

The user will need to type the new password and confirm the password to change it from the previous password.

![Change Password](image)

**Figure 49: Setting password**

Downloading SNMP MIBs

Clicking on the “Download SNMP MIBs” button located at the top of the Admin Tab will open a dialog box as shown in Figure 50.

A new window will appear with the ability to download each MIB.
The “Diagnostics” button will generate a text file for troubleshooting by Sencore support. This file includes the configuration of the system, a log history, and current licensing of the TXS 3600 to provide a complete understanding of the system. The file will be saved to the computer logged into the TXS 3600.

Reboot
The “Reboot” button will force the complete TXS 3600 system to restart. The user will be prompted before the restart occurs.

Reset to Defaults
The “Reset to Defaults” button clears all configurations from the TXS 3600 and restores them to factory defaults. When this function is performed it will restore all settings and clear the event log.

Unit Firmware Updating
To update the unit’s firmware click on the “Update Unit” button located at the top of the Admin tab. This will open a dialog box as shown in Figure 51.

The first step is to select the file to update by clicking on the Upload button and browsing to the location of the file. Locate the file and click open, the file will automatically upload. Once upload is complete a dialog box will confirm successful upload or indicate an error while verifying the file’s contents.
Once uploaded successfully, the uploaded version will appear on the Update Unit dialog screen.

To complete the update click on the update button and the unit will commence with the update process indicating when update is complete.

Once update is complete the system will be restarted. The user will be prompted to log back into the web interface once the unit is updated and operational.
Unit Firmware Rollback

The TXS 3600 offers the ability to roll back to the previous version of software that was installed on the unit. The roll back feature will restore the unit back to the previous state before the latest update was performed.

The rollback option is located in the "Update Unit" dialog box under the Rollback Tab as shown in Figure 57.

Network Configuration

In the middle of the Admin Tab, the IP address configuration for the physical ports is shown. The Unit Network Configuration shows the management port's IP settings. The current status is shown, but can be modified by clicking on the cog located on the left of the status.

When clicking on the configure cog a dialog box to change IP settings similar to Figure 58 will be presented. For the MPEG over IP configuration, only IP, Subnet, and Gateway are allowed to be set. The management port supports DHCP or Static IP addressing.

If set to DHCP, the user can enter a hostname to easily access the box by the name rather than the IP address given by DHCP. When the mode is set to static, the user has to set the IP, Subnet, and Gateway Addresses.
Date/Time

The user has the ability to set the local time for the TXS 3600 transcoder. The time can be configured using an NTP server by entering the address to synchronize the time and date or it can be entered manually as shown in Figure 60.

SNMP Communities

The communities for the SNMP management can be changed from the default of “public” for Read-Only Communities and “private” for Read-Write Communities.

SNMP Trap Managers

The managers for the SNMP management can be entered or removed by clicking on “Configure SNMP Managers”.

Figure 59: IP settings

Figure 60: Date/Time configuration

Figure 61: SNMP communities
Unit Identifier

Each chassis comes with the ability to be easily identified with a blinking blue indicator when enabled. This blue blinking light is visible in both the front and back of the chassis.

To enable the UID in the web interface, it is located on the top right side of the Admin tab as shown in Figure 63.

The UID can be turned on/off from the front panel by using the following sequence:

- UP Arrow
- RIGHT Arrow
- DOWN Arrow
- LEFT Arrow
- UP Arrow
- Enter Button
Reporting Tab

The reporting tab contains the status and alarm indications for the TXS 3600 transcoder. The alarms, logs, and alarm configuration are separated by individual menus and configurable to the exact scenario a user desires to monitor.

**Figure 64: Reporting tab**

### Alarms

The Alarms tab is the first screen shown under the reporting tab. The “Configure” button opens a configuration screen as shown in Figure 65. All of the alarms in the unit are capable of being enabled or disabled from being generated. Each condition can be configured as an error or information situation under log severity.

**Figure 65: Alarm configuration**
<table>
<thead>
<tr>
<th>Category</th>
<th>Name</th>
<th>Description of Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>System</td>
<td>12V Supply Error</td>
<td>Unable to detect 12V from power supply</td>
</tr>
<tr>
<td>System</td>
<td>3.3V Supply Error</td>
<td>Unable to detect 3.3V from power supply</td>
</tr>
<tr>
<td>System</td>
<td>5V Supply Error</td>
<td>Unable to detect 5V from power supply</td>
</tr>
<tr>
<td>Platform</td>
<td>AFD Code Not Present</td>
<td>The system is unable to find any active format display information in the incoming stream.</td>
</tr>
<tr>
<td>Platform</td>
<td>ASI I/O TS Sync Error</td>
<td>No ASI sync with the transport stream</td>
</tr>
<tr>
<td>Platform</td>
<td>Audio Encoding Bitrate Out of Range</td>
<td>Encoding Bitrate is invalid according to the number of output channels</td>
</tr>
<tr>
<td>Platform</td>
<td>Audio Input Error</td>
<td>Unsupported or no audio present on PID</td>
</tr>
<tr>
<td>Platform</td>
<td>Audio Transcoding Error</td>
<td>Audio transcoder has logged 2.5 seconds of no audio data processed</td>
</tr>
<tr>
<td>Platform</td>
<td>Backup Input Active</td>
<td>The backup input is the active input for the transcoder</td>
</tr>
<tr>
<td>Platform</td>
<td>Data PID Error</td>
<td>Data PID not found</td>
</tr>
<tr>
<td>Platform</td>
<td>Duplicate Program Number Error</td>
<td>The output program number is the same for both the main and PIP services for a given transcoder.</td>
</tr>
<tr>
<td>System</td>
<td>Fan Error</td>
<td>A fan failure has been detected</td>
</tr>
<tr>
<td>Platform</td>
<td>IP Receive TS Packets Not Received Error</td>
<td>Indicates MPEG/IP data interface is not receiving any TS Packets</td>
</tr>
<tr>
<td>Platform</td>
<td>IP Receive TS Sync Error</td>
<td>Indicates the MPEG/IP data interface has an error with synchronization</td>
</tr>
<tr>
<td>Platform</td>
<td>IP Transmit TS Packet Lost Error</td>
<td>The MPEG/IP data interface has lost a packet</td>
</tr>
<tr>
<td>Platform</td>
<td>IP Transmit TS Sync Error</td>
<td>The MPEG/IP data interface has lost TS synchronization</td>
</tr>
<tr>
<td>Platform</td>
<td>Input TS Not Present</td>
<td>The presence of a transport stream is not detected</td>
</tr>
<tr>
<td>Platform</td>
<td>No Services Found Error</td>
<td>No Service is found in the input TS</td>
</tr>
<tr>
<td>Platform</td>
<td>Output TS Not Present</td>
<td>No transport stream is present at the output</td>
</tr>
<tr>
<td>Platform</td>
<td>Output TS Rate May Be Set Too Low</td>
<td>Indicates the TS rate is too low to allow all of the video, audio and data to be in the transmitting stream of the main service</td>
</tr>
<tr>
<td>Platform</td>
<td>PCR PID Error</td>
<td>The transcoder engine is unable to synchronize with the video because no PCR is found.</td>
</tr>
<tr>
<td>Platform</td>
<td>PIP Output TS Too Low</td>
<td>Indicates the PIP TS rate is too low to allow all of the PIP video data and table data to be in the transmitting stream</td>
</tr>
<tr>
<td>Platform</td>
<td>PIP Unsupported Format Conversion</td>
<td>The current configuration of transcoding of the PIP service is not supported</td>
</tr>
<tr>
<td>Platform</td>
<td>PIP Video PID Error</td>
<td>The output PIP video PID conflicts with another configured output PID for a given transcode engine</td>
</tr>
<tr>
<td>Platform</td>
<td>Pass-through Audio PID Error</td>
<td>Audio PID set to Pass-through is not found</td>
</tr>
<tr>
<td>System</td>
<td>Power Supply Error</td>
<td>An error with one of the power supplies</td>
</tr>
<tr>
<td>Platform</td>
<td>Service Not Found Error</td>
<td>Service set to transcode is not found within input TS</td>
</tr>
<tr>
<td>System</td>
<td>Temperature Error</td>
<td>Internal temperature is outside the range of 0 to 45 Celsius</td>
</tr>
<tr>
<td>Platform</td>
<td>Transcoded Audio PID Error</td>
<td>Audio PID set to Transcode is not found</td>
</tr>
</tbody>
</table>
Platform Transcoder Reset
A user has initiated a transcoder reset

Platform Unsupported Format Conversion
The current configuration of transcoding of the main service is not supported

Platform Unsupported Input Format
The detected input format is not supported in the TXS platform

Platform Video Input Error
An error relating to the video on the input

Platform Video PID Error
A PID conflict with the video as a presence of the PID is detected but no video is present possible the PID is of another type

Figure 66: Alarm descriptions

Logs & Events

The logs can be viewed under the reporting tab by clicking the “Logs” button at the top of the Report Control Panel. Each error/event can be enabled or disabled to be logged for reference. On the left side of the logs screen the download button is capable of saving the log files for troubleshooting purposes.

Figure 67: Logs view

All events can be enabled/disabled as shown in Figure 68 by clicking on the “Configure” button.
Figure 68: Configure events

<table>
<thead>
<tr>
<th>Category</th>
<th>Name</th>
<th>Description of Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date/Time Change</td>
<td>The unit’s date/time has been changed</td>
<td>Date/Time Change</td>
</tr>
<tr>
<td>NTP Update</td>
<td>The unit’s date/time was updated by the NTP server</td>
<td>NTP Update</td>
</tr>
<tr>
<td>Unit Bootup</td>
<td>The unit has been loaded</td>
<td>Unit Bootup</td>
</tr>
<tr>
<td>Unit Shutdown</td>
<td>The unit was shutdown</td>
<td>Unit Shutdown</td>
</tr>
</tbody>
</table>

Figure 69: Event descriptions

SNMP Trap Configurations

The SNMP trap configurations can be edited under the reporting tab by clicking the “Configurations” at the top-right of the report control panel. All conditions can be enabled/disabled from sending SNMP Traps.

The SNMP trap manager IP addresses can be added under the admin tab.
About Tab

The About page provides the software and hardware details and versions for the equipment found within the TXS 3600 transcoder. This information will be asked when talking to technical support. The contact information is also provided for reaching Sencore.

![Figure 70: About Tab](image)

System Recovery

The TXS 3600 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 buttons (any 2 buttons) when power is applied to the unit for at least 20 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.
Using the Front Panel on the TXS 3600

This section of the user manual overviews the menus and operation of the TXS 3600 transcoder using the front panel for control. All functionality of the front panel is also accessible through the Web User Interface.

Once the TXS 3600 is finished loading, depending on the number of channels, a screen similar to the one on the right will appear. The bottom 2 rows of text will cycle through the transcoders giving status update.

FP Options and Settings

The options settings allow the viewing of active errors, the configuring/viewing of network settings and system time. The About section provides software versioning and serial numbers.

Active Alarms

All active alarms are shown with the ability to scroll right using the arrow key to view the entire error detail.
Network Settings

The unit network menu provides status for current IP address. If DHCP is enabled, the current IP address is shown. If static is enabled, press enter to manually change the IP Address, Subnet Mask, and Gateway. To enable/disable DHCP press the “Enter” button while in the Unit Network Status menu and “Enter” again while the cursor is on “DHCP Mode” in the Network Configuration menu.

The hostname allows a user to remotely connect to the TXS 3600 transcoder with a Web Browser by simply typing the hostname and not the IP address into the web browser. This is helpful when used on DHCP networks. To edit the hostname press the “Enter” button while cursor is on “Hostname” in the Unit Network Status and “Enter” again on Hostname in the Network Configuration menu.

Unit Time

The time and date for the unit can be set manually or synchronized with an NTP server. The date and time are used for storing the correct time for alarms and logs for accurate representation of when the occurrence took place.
Unit Temperature

Sample Unit Temperature

### FP About

The about screen provides information for software and hardware installed in the TXS 3600 transcoder. This information will be asked when talking to technical support.

#### About Software

Sample Software Versions

#### About Hardware

Sample About Hardware
Appendix

Specifications

**TXS 3600 Base Unit Includes:**

Display, keypad, embedded controller, Chassis/case, Power Supply/line cord

**System –**

- **Display Type:** LCD
- **Display Configuration:** 240 pixels by 64 pixels
- **Keypad:** Snap-domeMembrane
- **Configurations Allowed:** Single Platform, Dual Platform

**Remote Operation/Update Interface –**

- **Type:** Ethernet, 10/100
- **Rear panel indicators:** Link (Green LED), Activity (Amber LED)
- **Connector:** RJ45

**Front Panel Indicators –**

- **UID LED:** Blue indicates the Unit Identifier is turned on
- **Error LED:** Red indicates error is occurring
  - OFF indicates no errors detected

**Monitor and Control Interfaces –**

- **Web server GUI:** HTTP via web browser for Control & Monitoring
- **Front Panel:** Yes IP Configuration & Monitoring
- **SNMP:** Yes Control & Monitoring

**AC Power –**

- **Operating Voltage:** 95-135 VAC or 180-265 VAC
- **Current Draw/Power:** 275 Watts
- **Frequency:** 47-63Hz
- **Line Cord:** Detachable, 3-prong
- **Redundancy:** Dual Hot Swappable, Load Sharing

**DC Power –**

- **Operating Voltage:** -40VDC to -70VDC
- **Max Current Draw/Power:** 10A / 250W
- **Redundancy:** Dual Hot Swappable, Load Sharing

**General –**

- **RoHS Compliant:** Yes
- **Operating Temperature:** 0 to 45 degrees C
- **Operating Humidity:** <95% Non-Condensing
- **Cooling:** Forced air, front intake, rear exhaust
- **Temperature monitor:** Fan failure, internal temperature sensor
- **Height:** 1RU (13/4”), **Width:** 19”, **Depth:** 19”
- **Size:** 19 in. rack mountable, removable ears
- **Rack clips and screws included**
- **Weight:**
  - ~9.5 lbs. (base unit)
  - ~12.75 lbs. (Fully Loaded)
- **Pollution Degree:** 2
- **Installation Category:** II
- **Grounding Post:** On chassis
TXS 3600 Transcoder

General –
RoHS Compliant: Yes

ASI Serial TS (Per Platform) –
Connector: (4) BNC, female
Direction: Software configurable as input or output by port
Impedance: 75 ohms
Standard: ETSI EN 50083-9 DVB ASI
Data Bit Rate: 270 Mbps
Packet Size: 188 or 204 byte support
Transmission Mode: Burst and packet mode support
Min TS Rate Supported: 0.5 Mbps
Max TS Rate Supported: 213 Mbps

IP TS Input/Output (Per Platform) –
Connector: (2) – 10/100/1000 Auto-negotiating Base-T RJ-45 Ethernet Port
Receive –
Input format: UDP, RTP, and RTP with extension headers
Multicast and/or Unicast
CBR
Receiver Capability: 16 simultaneous MPEG over IP transport streams
Buffer Size: 1 – 4,000 KB, user settable
Bitrate Range: 0.5 – 640 Mbps (total I/O)
Packets/IP Frame: 1-7 MPEG Packets/IP Frame
IGMP Compatibility: Version 1, 2, and 3
Transmit –
Output Format: UDP
Bitrate Range: 0.3 – 640 Mbps (total I/O)
Packets/IP Frame: 1-7 MPEG Packets/IP Frame
Number of Outputs: 32 simultaneous Multicast and/or Unicast
IGMP Compatibility: Version 1, 2, and 3
Min TS Rate Supported: 0.3 Mbps
Max TS Rate Supported: 213 Mbps
Network Jitter Buffer: 1 KB to 4MB

Transcode Engine –
Number of Transcodes: 2, 4, 6, 8, or 16
Transport Level: Multiprogram TS (MPTS) Input
Single Program TS (SPTS) Input and Output
Transcode Modes: MPEG-2 to H.264; H.264 to MPEG-2; H.264 to H.264; MPEG-2 to MPEG-2

Video Decode –
Compatibility Standard: MPEG-2 4:2:0 MP@HL & MP@ML
h.264 MP & HP up to level 3.2 (SD) & 4.1 (HD)
Video Bitrate: 1-80 Mbps (dependant on profile)
Video Stream Rate: Variable (VBR) or Constant (CBR)
Primary Video Formats: 1920x1088i @ rates up to 30 fps
1280x720p @ rates up to 60 fps

Main Video Encode –
Compatibility Standard: MPEG-2 4:2:0 MP@HL & MP@ML
H.264 4:2:0 HP@L4.1 & MP@L3.2

Native Resolution/Frame Rates/Aspect Ratio Supported:

<table>
<thead>
<tr>
<th>Resolution/Frame Rate</th>
<th>16x9</th>
<th>16x9/4x3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1920 x 1080i @ 25, 29.97, &amp; 30</td>
<td>16x9</td>
<td></td>
</tr>
<tr>
<td>1920 x 1080i @ 23.97, 24, 25, 29.97, &amp; 30</td>
<td>16x9</td>
<td></td>
</tr>
<tr>
<td>1440 x 1080i @ 25, 29.97, &amp; 30</td>
<td>16x9</td>
<td></td>
</tr>
<tr>
<td>1440x1080p @ 23.97, 24, 25, 29.97, &amp; 30</td>
<td>16x9</td>
<td></td>
</tr>
<tr>
<td>1280 x 1080i @ 25, 29.97, &amp; 30</td>
<td>16x9</td>
<td></td>
</tr>
<tr>
<td>1280 x 1080p @ 23.97, 24, 25, 29.97, &amp; 30</td>
<td>16x9</td>
<td></td>
</tr>
<tr>
<td>1280 x 720p @ 50, 59.94 &amp; 60</td>
<td>16x9</td>
<td></td>
</tr>
<tr>
<td>960x720p @ 50, 59.94 &amp; 60</td>
<td>16x9</td>
<td></td>
</tr>
<tr>
<td>960x720p @ 29.97</td>
<td>4x3</td>
<td></td>
</tr>
<tr>
<td>720 x 576i @ 25</td>
<td>16x9/4x3</td>
<td></td>
</tr>
<tr>
<td>704 x 576i @ 25</td>
<td>16x9/4x3</td>
<td></td>
</tr>
<tr>
<td>640 x 576i @ 25</td>
<td>16x9/4x3</td>
<td></td>
</tr>
<tr>
<td>544 x 576i @ 25</td>
<td>16x9/4x3</td>
<td></td>
</tr>
<tr>
<td>528 x 576i @ 25</td>
<td>16x9/4x3</td>
<td></td>
</tr>
<tr>
<td>480 x 576i @ 25</td>
<td>16x9/4x3</td>
<td></td>
</tr>
<tr>
<td>352 x 576i @ 25</td>
<td>16x9/4x3</td>
<td></td>
</tr>
<tr>
<td>720 x 480i @ 29.97</td>
<td>16x9/4x3</td>
<td></td>
</tr>
<tr>
<td>720 x 480p @ 29.97</td>
<td>4x3</td>
<td></td>
</tr>
<tr>
<td>704 x 480i @ 29.97</td>
<td>16x9/4x3</td>
<td></td>
</tr>
<tr>
<td>640 x 480i @ 29.97</td>
<td>16x9/4x3</td>
<td></td>
</tr>
<tr>
<td>640 x 480p @ 29.97</td>
<td>4x3</td>
<td></td>
</tr>
<tr>
<td>544 x 480i @ 29.97</td>
<td>16x9/4x3</td>
<td></td>
</tr>
<tr>
<td>528 x 480i @ 29.97</td>
<td>16x9/4x3</td>
<td></td>
</tr>
<tr>
<td>480 x 480i @ 29.97</td>
<td>16x9/4x3</td>
<td></td>
</tr>
<tr>
<td>352 x 480i @ 29.97</td>
<td>16x9/4x3</td>
<td></td>
</tr>
<tr>
<td>640x360p @ 29.97</td>
<td>16x9/4x3</td>
<td></td>
</tr>
<tr>
<td>352 x 288p @ 25</td>
<td>16x9/4x3</td>
<td></td>
</tr>
<tr>
<td>416x240p @ 29.97</td>
<td>16x9/4x3</td>
<td></td>
</tr>
<tr>
<td>352x240p @ 29.97</td>
<td>16x9/4x3</td>
<td></td>
</tr>
<tr>
<td>320x240p @ 29.97</td>
<td>16x9/4x3</td>
<td></td>
</tr>
<tr>
<td>320x180p @ 29.97</td>
<td>16x9/4x3</td>
<td></td>
</tr>
<tr>
<td>192x192p @ 25 &amp; 29.97</td>
<td>16x9/4x3</td>
<td></td>
</tr>
<tr>
<td>176x144p @ 25</td>
<td>16x9/4x3</td>
<td></td>
</tr>
<tr>
<td>128x128p @ 25</td>
<td>16x9/4x3</td>
<td></td>
</tr>
<tr>
<td>128x96p @ 25 &amp; 29.97</td>
<td>16x9/4x3</td>
<td></td>
</tr>
<tr>
<td>96x96p @ 25 &amp; 29.97</td>
<td>16x9/4x3</td>
<td></td>
</tr>
</tbody>
</table>

Format Scaling: Output Format Selectable
Display Modes: Letterbox, Cropped, & Anamorphic
Video Bitrate: 0.1 – 30 Mbps
Video Stream Rate: Variable (VBR) or Constant (CBR)
Aspect Ratio: 16x9, 4x3 (Selectable – format dependant)
Film Processing: Telecine (MPEG-2)

PIP Video Encode –
Compatibility Standard: MPEG-2 4:2:0 SP@ML
H.264 4:2:0 MP@L1.3 & BP@L2

Native Resolution/Frame Rates/Aspect Ratio Supported:

<table>
<thead>
<tr>
<th>Resolution/Frame Rate</th>
<th>16x9/4x3</th>
</tr>
</thead>
<tbody>
<tr>
<td>416x240p @ 29.97</td>
<td>16x9/4x3</td>
</tr>
</tbody>
</table>
Format Scaling: Output Format Selectable
Display Mode: Anamorphic
Video Bitrate: 0.1 – 1 Mbps
Video Stream Rate: Constant (CBR)
Aspect Ratio: 16x9, 4x3 (Selectable – format dependant)
Film Processing: Telecine (MPEG-2)

Audio –
Processing: Pass-through and Transcode
Pass-through Input Formats: Dolby Digital (AC-3)
Dolby Digital Plus (EAC-3)
AAC-LC
HE-AAC V1/2
MPEG-1 Layer II
MPEG-2 Audio
Transcode Input Formats: Dolby Digital (AC-3)
AAC-LC
HE-AAC V1/2
MPEG-1 Layer II
MPEG-2 Audio
Linear PCM (SMPTE 302M)
Transcode Output Formats: Dolby Digital (AC-3)
Dolby Digital Plus (EAC-3)
AAC-LC
HE-AACv1/2
MPEG-2 Audio
Ancillary Data Processing –
Support for: Closed Captioning
Auto Format Descriptors (AFD)
SCTE 35 Pass-through
DVB Subtitles Pass-through
DVB VBI Pass-through
North American VBI Pass-through
DPI Message Pass-through

Note: Dolby Digital and Dolby Digital Plus are registered trademarks of Dolby Laboratories

Specifications are subject to change without notice.
## Open Source Software

**The TXS 3600 includes:**

<table>
<thead>
<tr>
<th>Package</th>
<th>Version</th>
<th>License</th>
<th>Copyright</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT32 UC3B Software</td>
<td>1.4.0</td>
<td>BSD</td>
<td>2008, Atmel Corporation</td>
</tr>
<tr>
<td>Framework</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BaseX4JIT</td>
<td>4.0</td>
<td>GPL Version 3, 29 June 2007</td>
<td>2007-2009, Active Group, Inc</td>
</tr>
<tr>
<td>BusyBox</td>
<td>1.15.2</td>
<td>GPL Version 2, June 1991</td>
<td>Erik Andersen, et. al.</td>
</tr>
<tr>
<td>Cgicc</td>
<td>3.2.9</td>
<td>LGPL Version 29, June 2007</td>
<td>Stephen F. Booth</td>
</tr>
<tr>
<td>dfu-programmer</td>
<td>0.5.2</td>
<td>GPL Version 2, June 1991</td>
<td>Weston Schmidt</td>
</tr>
<tr>
<td>Dropbear</td>
<td>0.52</td>
<td>MIT-like</td>
<td>2002-2008 Matt Johnston, et. Al (see license)</td>
</tr>
<tr>
<td>E2fsprogs</td>
<td>1.41.9</td>
<td>GPL Version 2, June 1991</td>
<td>Theodore Ts’o</td>
</tr>
<tr>
<td>ethtool</td>
<td>2.6.34</td>
<td>GPL Version 2, June 1991</td>
<td>David Miller, et. al.</td>
</tr>
<tr>
<td>FamFamFam Silk Icons</td>
<td>0.13</td>
<td>Creative Commons Attribution 2.5</td>
<td>Mark James</td>
</tr>
<tr>
<td>FastDB</td>
<td>3.59</td>
<td>MIT-like</td>
<td>Konstantin Knizhnik</td>
</tr>
<tr>
<td>FCGI</td>
<td>2.4.0</td>
<td>FastCGI</td>
<td>Open Market, Inc</td>
</tr>
<tr>
<td>Iproute2</td>
<td>2.6.29</td>
<td>GPL Version 2, June 1991</td>
<td>Stephen Hemminger, Alexey Kuznetsov</td>
</tr>
<tr>
<td>Libusb</td>
<td>0.1.12</td>
<td>GPL Version 2.1, Feb 1999</td>
<td>Johannes Erdfelt, Thomas Sailer, Brad Hards</td>
</tr>
<tr>
<td>Lighttpd</td>
<td>1.4.23</td>
<td>BSD</td>
<td>2004, Jan Kneschke</td>
</tr>
<tr>
<td>Log4cpp</td>
<td>1.0</td>
<td>GPL Version 2.1 Feb 1999</td>
<td>Bastiann Bakker</td>
</tr>
<tr>
<td>Monit</td>
<td>5.1.1</td>
<td>GPL Version 3, 29 June 07</td>
<td>2010 Tildeslash Ltd.</td>
</tr>
<tr>
<td>NTP</td>
<td>4.2.4p7</td>
<td>NTP License</td>
<td>1992-2009 David L. Mills</td>
</tr>
<tr>
<td>OpenSSL</td>
<td>0.9.8m</td>
<td>BSD-Like</td>
<td>1998-2008 The OpenSSL Project, 1995-1998</td>
</tr>
<tr>
<td>OProfile</td>
<td>0.9.6</td>
<td>GPL Version 2, June 1991</td>
<td>John Levon, Philippe Elie, et. Al</td>
</tr>
<tr>
<td>PCRE</td>
<td>8.00</td>
<td>BSD</td>
<td>1997-2009 University of Cambridge, 2007-2008</td>
</tr>
<tr>
<td>POPT</td>
<td>1.14</td>
<td>MIT</td>
<td>1998 Red Hat Software</td>
</tr>
<tr>
<td>Spawn-FCGI</td>
<td>1.6.3</td>
<td>BSD</td>
<td>Jan Kneschke, Stefan Bahler</td>
</tr>
<tr>
<td>TCLAP</td>
<td>1.2.0</td>
<td>MIT</td>
<td>2003 Michael E Smoot</td>
</tr>
<tr>
<td>USB-Utils</td>
<td>0.86</td>
<td>GPL Version 2, June 1991</td>
<td>Thomas Sailer, Johannes Erdfelt, David Brownell,</td>
</tr>
<tr>
<td>Zlib</td>
<td>1.2.3</td>
<td>Zlib/libpng License</td>
<td>1995-2005 Jean-loup Gailly and Mark Adler</td>
</tr>
<tr>
<td>5.1ch Dolby Digital</td>
<td>1.4.9.9</td>
<td>Dolby</td>
<td>2012 Dolby Laboratories, Inc.</td>
</tr>
</tbody>
</table>
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.

Support and Contact Information

Returning Products for Service or Calibration
The TXS 3600 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. Contact the Sencore service department by going online to www.sencore.com and select Support.
2. Select Service and Repair from the options given.
3. Fill in the following required information:
   a. First & Last Name
   b. Company
   c. Email
   d. Phone Number
   e. Ship and Bill to Address
   f. Unit Model and Serial Numbers
4. A RMA number will be emailed you shortly after completing the form with return instructions.

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.