



TXS 3600

Multichannel Video/Audio Transcoder

User Manual



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

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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
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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.

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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

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

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

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.

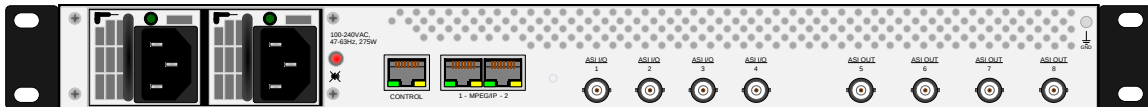


Figure 2: Single TXS platform with ASI output option

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.

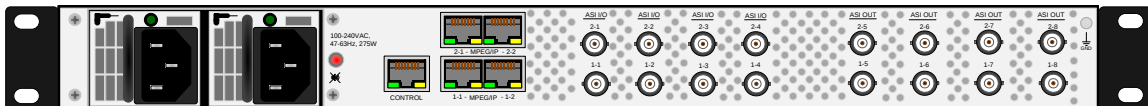


Figure 3: Dual TXS platform with ASI output option

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.

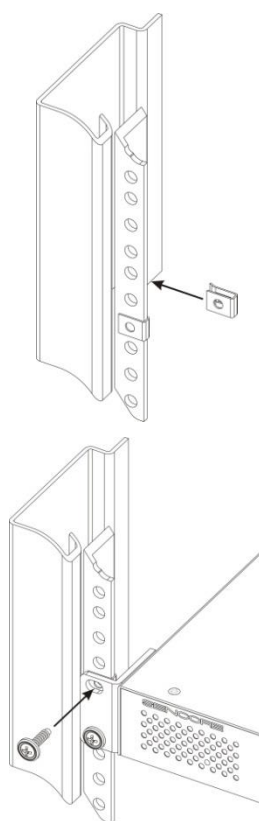


Figure 4: Rack Mounting

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.

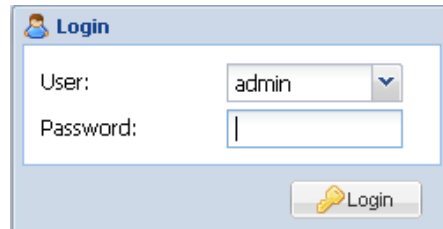


Figure 5: Logon Screen

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 mpeg101. Once logged on, the password can be set in the Admin tab.

Inputs	Transcoders	Outputs
ASI I/O 1-1 [Input] Signal Locked 68.502 Mbps	Transcoder 1 Input: ASI I/O 1 (Primary) H.264 → MPEG2 12.000 Mbps	ASI I/O 1-3 [Output] Source: Transcoder 1 12.000 Mbps
ASI I/O 1-2 [Input] Signal Locked 68.502 Mbps	Transcoder 2 Input: ASI I/O 2 (Primary) H.264 → MPEG2 12.000 Mbps	ASI I/O 1-4 [Output] Source: Transcoder 2 12.000 Mbps
MPEG/IP Receive 1 Signal Locked 2.737 Mbps	Transcoder 3 Input: MPEG/IP 1 (Primary) H.264 → MPEG2 12.000 Mbps	MPEG/IP Transmit 1 Source: MPEG/IP Receive 1 12.000 Mbps
MPEG/IP Receive 2 Signal Locked 8.680 Mbps	Transcoder 4 Input: MPEG/IP 2 (Primary) MPEG2 → MPEG2 12.000 Mbps	MPEG/IP Transmit 2 Source: Transcoder 4 12.000 Mbps
MPEG/IP Receive 3 Signal Locked 2.173 Mbps	Transcoder 5 Input: MPEG/IP 3 (Primary) H.264 → MPEG2 12.000 Mbps	MPEG/IP Transmit 3 Source: Transcoder 5 12.000 Mbps
MPEG/IP Receive 4 Signal Locked 8.541 Mbps	Transcoder 6 Input: MPEG/IP 4 (Primary) MPEG2 → MPEG2 12.000 Mbps	MPEG/IP Transmit 4 Source: Transcoder 6 12.000 Mbps
MPEG/IP Receive 15 Signal Locked 30.404 Mbps	Transcoder 7 Input: MPEG/IP 5 (Primary) H.264 → MPEG2 12.000 Mbps	MPEG/IP Transmit 3 1 Source: Transcoder 7 12.000 Mbps
MPEG/IP Receive 16 Signal Locked 2.847 Mbps	Transcoder 8 Input: MPEG/IP 6 (Primary) H.264 → MPEG2 12.000 Mbps	MPEG/IP Transmit 3 2 Source: Transcoder 8 PIP 2.000 Mbps

Figure 6: Platform 1 Home Screen

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.

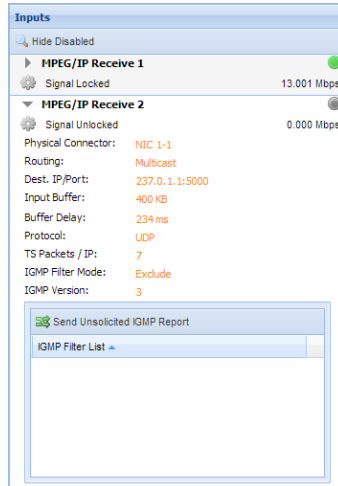


Figure 7: Available Inputs

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.

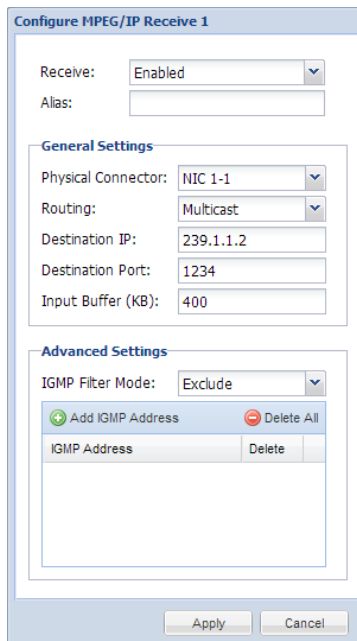


Figure 8: IP Configuration

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.

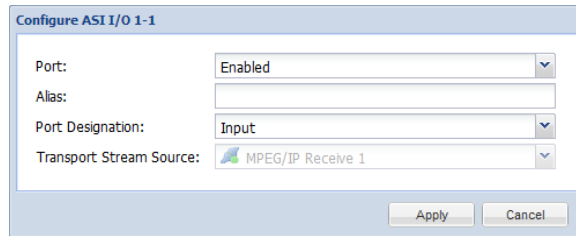


Figure 9: ASI Input Configuration

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.

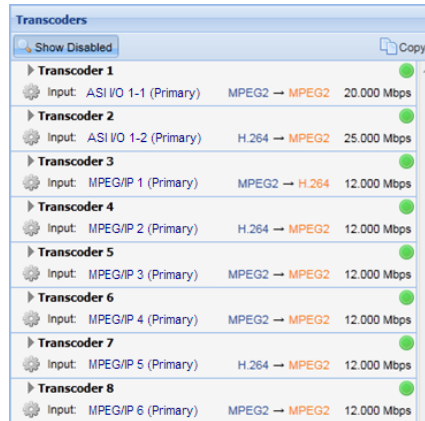


Figure 10: Transcoder Engines

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.

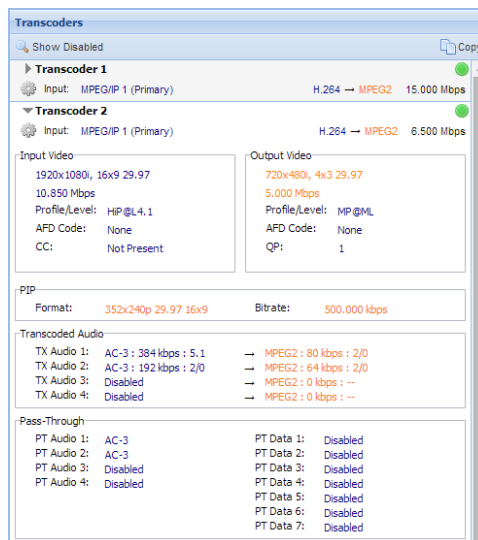


Figure 11: Transcoder Engine Expanded

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.

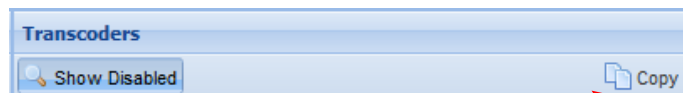


Figure 12: Copy Settings

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.

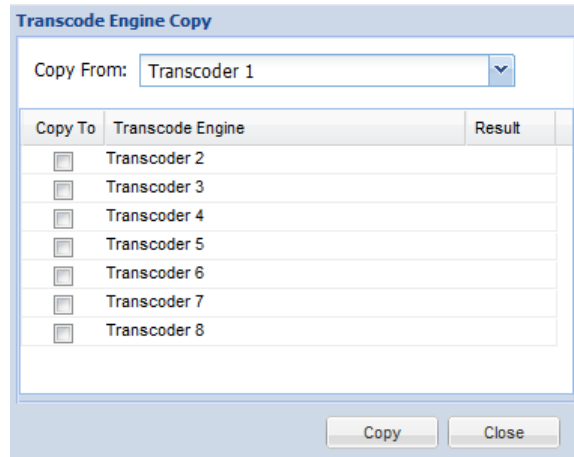


Figure 13: Transcoder Engine Copy

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

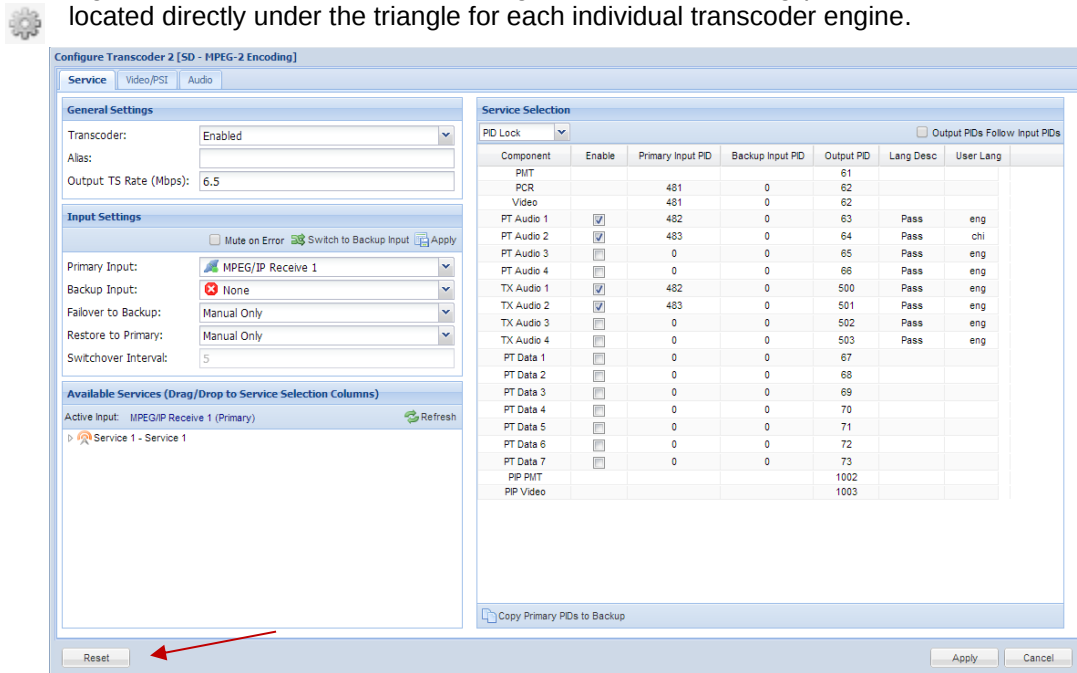


Figure 14: Transcoder Service Settings

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.

General Settings	
Transcoder:	Enabled
Alias:	Service 1
Output TS Rate (Mbps):	10

Figure 15: General Settings

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).

Input Settings	
☐ Mute on Error ☒ Switch to Backup Input Apply	
Primary Input:	ASI I/O 1-1
Backup Input:	ASI I/O 1-2
Failover to Backup:	On Primary TS Loss
Restore to Primary:	On Primary TS Restored
Switchover Interval:	5

Figure 16: Input 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.

Available Services (Drag/Drop to Service Selection Columns)	
Active Input: ASI I/O 1 (Primary) Refresh	
Service 274	49 PCR
	49 MPEG2
	50 AC-3
	2063 SCTE35 (DPI)
Service 289	80 PCR
	80 MPEG2
	81 AC-3
Service 762	144 PCR
	144 MPEG2
	145 AC-3

Figure 17: Available Services

“**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.

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 figure displays two side-by-side screenshots of the 'Service Selection' interface. Both screenshots show a table with columns: Component, Enable, Primary Input PID, Backup Input PID, Output PID, Lang Desc, and User Lang. The left screenshot is in 'PID Lock' mode, showing various components like PMT, PCR, Video, PT Audio 1-4, TX Audio 1-4, PT Data 1-7, PIP PMT, and PIP Video. The right screenshot is in 'Service Lock' mode, showing the same components but with service names instead of PID numbers. Both screenshots include a 'Copy Primary PIDs to Backup' button at the bottom left and a 'Copy Primary Lock Settings to Backup' button at the bottom right.

Figure 18: Service Selection

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

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

The video encoding settings are found on the first pane as shown in Figure 20.

General	
Compressed Video Standard:	H.264
Format Mode:	Manual
Manual Format:	1920x1080 29.97i
Display Mode:	Anamorphic
Auto AFD:	Disabled
Video Bitrate:	Constant
Constant Bitrate (Mbps):	9
Max Bitrate (Mbps):	9
Target Quantization Parameter:	4

Figure 21: General Video Settings

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*

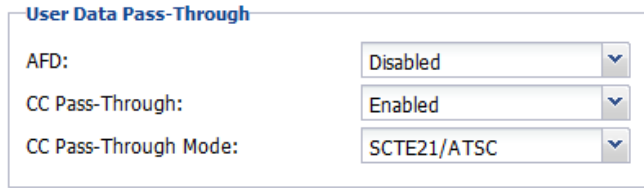
Note: Depending on input resolution, some output resolutions will not be allowed. For example upconverting from SD 720x480 29.97i to HD 1920x1080i 30 is NOT supported, whereas cross-converting from 720p to 1080i IS supported.

- 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

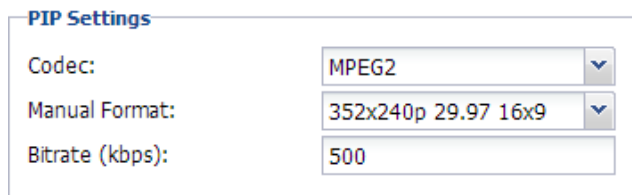


The 'User Data Pass-Through' settings panel contains three configuration items:

- AFD:** A dropdown menu currently set to 'Disabled'.
- CC Pass-Through:** A dropdown menu currently set to 'Enabled'.
- CC Pass-Through Mode:** A dropdown menu currently set to 'SCTE21/ATSC'.

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.



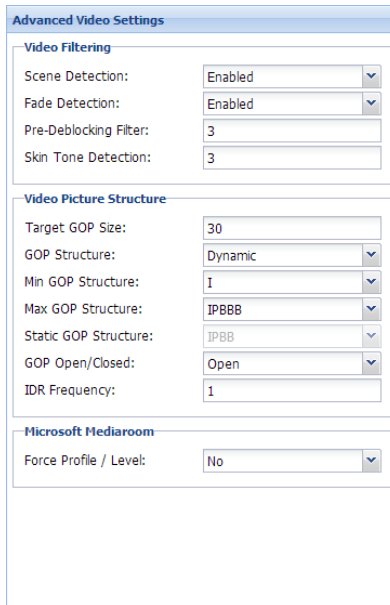
The 'PIP Settings' panel contains three configuration items:

- Codec:** A dropdown menu currently set to 'MPEG2'.
- Manual Format:** A dropdown menu currently set to '352x240p 29.97 16x9'.
- Bitrate (kbps):** A text input field containing the value '500'.

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.

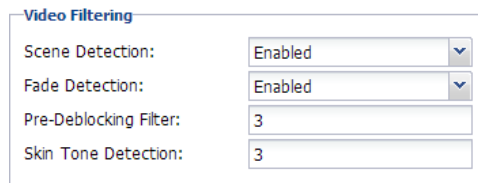
- **Codec:** *the encoded video codec of the PIP service*
 MPEG-2
 H.264
- **Manual Format:** *the output resolution, frame rate, and aspect ratio of the PIP service*
Note: Framerate conversion is not supported for PIP.
- **Bitrate:** *rate in kbps of PIP video service encoded (100 – 1000 kbps)*



Advanced Video Settings	
Video Filtering	
Scene Detection:	Enabled
Fade Detection:	Enabled
Pre-Deblocking Filter:	3
Skin Tone Detection:	3
Video Picture Structure	
Target GOP Size:	30
GOP Structure:	Dynamic
Min GOP Structure:	I
Max GOP Structure:	IPBBB
Static GOP Structure:	IPBB
GOP Open/Closed:	Open
IDR Frequency:	1
Microsoft Mediaroom	
Force Profile / Level:	No

Figure 24: Transcoder Advanced Video Settings

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

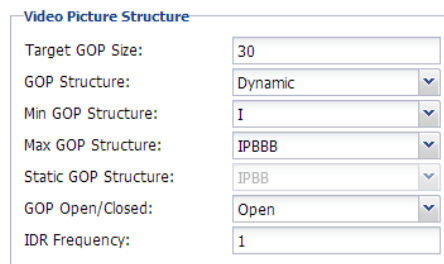


Video Filtering	
Scene Detection:	Enabled
Fade Detection:	Enabled
Pre-Deblocking Filter:	3
Skin Tone Detection:	3

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)



Video Picture Structure	
Target GOP Size:	30
GOP Structure:	Dynamic
Min GOP Structure:	I
Max GOP Structure:	IPBBB
Static GOP Structure:	IPBB
GOP Open/Closed:	Open
IDR Frequency:	1

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
 IPBBB
 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.

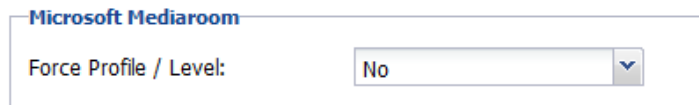


Figure 27: Microsoft Mediaroom

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.

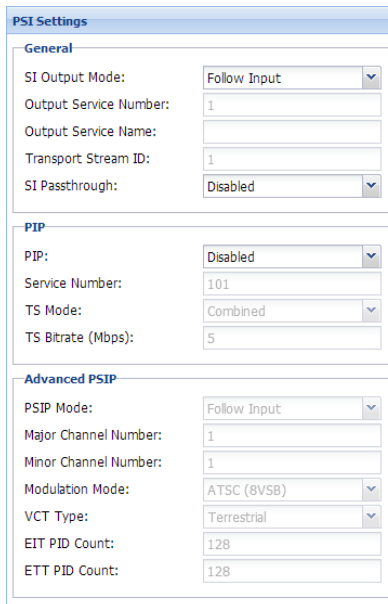


Figure 28: PSI Settings

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.

Figure 29: General Service Information Settings

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)

	Disabled	ATSC PSIP Raw	ATSC PSIP Regenerated	DVB SI
<i>ATSC PSIP Tables</i>				
STT	This table will not be present in the output.	This table will be passed unchanged to the output.	This table will be passed unchanged to the output.	This table will not be present in the output.
RRT	This table will not be present in the output.	This table will be passed unchanged to the output.	This table will be passed unchanged to the output.	This table will not be present in the output.
EIT	This table will not be present in the output.	Transport packets for each EIT PID defined in the MGT of the input transport stream will be identified and passed through unchanged to the output transport stream.	If unlicensed for Advanced PSIP configuration the transport packets for each EIT 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 EIT PIDs are specified by the user, then no EIT packets will be included in the output transport stream. If	Each transport stream packet containing an EIT will be passed through unchanged to the output

			"n" EIT PIDs are specified, then TS packets for EIT-0 through EIT-(n-1), as defined in the MGT, will be passed through unchanged to the output transport stream.	
ETT	This table will not be present in the output.	Transport packets for each channel ETT and event ETT PID defined in the MGT of the input transport stream will be identified and passed through unchanged to the output transport stream.	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. If "n" ETT PIDs are specified, then TS packets for ETT-0 through ETT-(n-1), as defined in the MGT, will be passed through unchanged to the output transport stream.	This table will not be present in the output.
TVCT	This table will not be present in the output.	This table will be passed unchanged to the output.	If licensed for Advanced PSIP configuration and the PSIP Mode is set to "Manual" 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 "1" and carrier_frequency will be set to all zeros.	This table will not be present in the output.
CVCT	This table will not be present in the output.	This table will be passed unchanged to the output.	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 "1" and carrier_frequency will be set to all zeros. If licensed for Advanced PSIP configuration and the PSIP	This table will not be present in the output.

			Mode is set to "Manual" then the major_channel_number, minor_channel_number, and modulation_mode will be user defined.	
MGT	This table will not be present in the output.	This table will be passed unchanged to the output.	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.	This table will not be present in the output.
<i>DVB SI Tables</i>				
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_id, 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

Figure 30: PIP Settings

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”).

Figure 31: Advanced PSIP Settings

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.

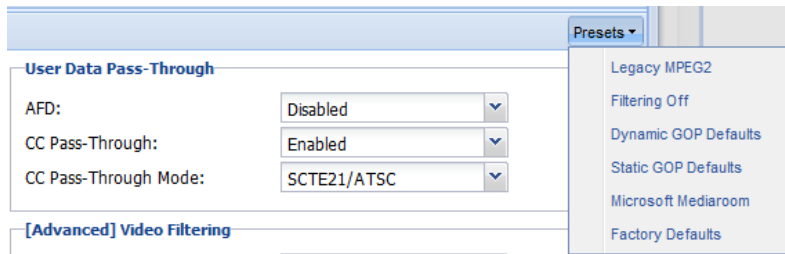


Figure 32: Encoding Presets

The video encode preset options are:

- Legacy MPEG2
- Filtering Off
- Dynamic GOP Defaults
- Static GOP Defaults
- Microsoft Mediaroom
- Factory Defaults

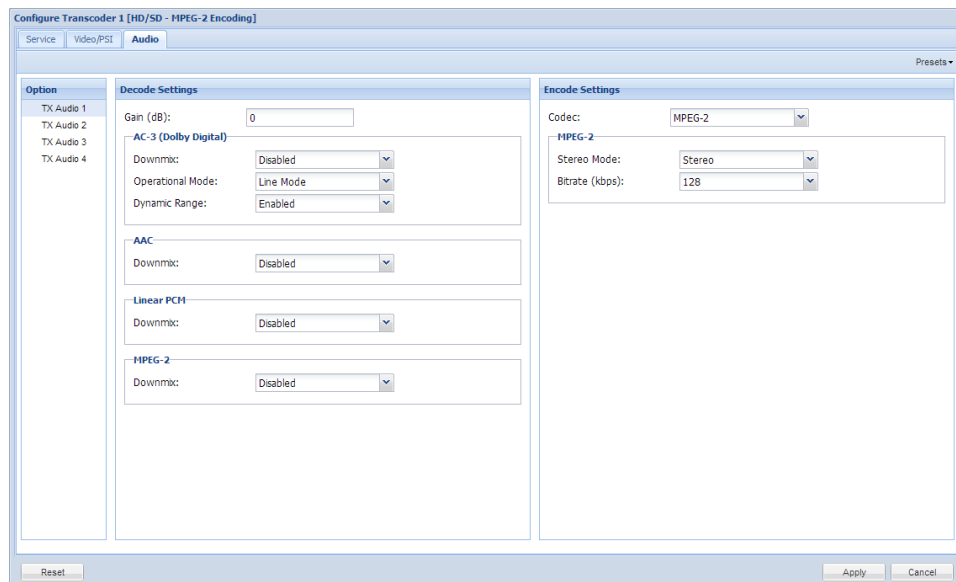


Figure 33: Transcoder Audio Settings

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.

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):
 - o Downmix: Summation of the audio channels to: Mono, 2/0 Lo/Ro, 2/0 Lt/Rt
 - o Operational Mode: Compression mode used for the AC3 downmix
 - o 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.

Encode Settings	
Codec:	AC-3 (Dolby Digital)
AC-3 (Dolby Digital)	
Broadcast Mode:	ATSC
Bitrate (kbps):	192
Dolby Info:	Manual
DialNorm (dB):	-31
Bitstream Mode:	Complete Main
Production Info Exists:	No
Mix Level (dB):	25
Room Type:	Small
Copyright:	Protected
Original Bitstream:	Original
Line Mode DRC:	None
RF Mode DRC:	None

Figure 35: AC-3 and Dolby Digital Plus Encode Settings

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.

Encode Settings	
Codec:	AAC
AAC	
Container:	ADTS
Profile:	AAC-LC
TNS:	Disabled
Bitrate (kbps):	112
Codec Version:	MPEG4

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

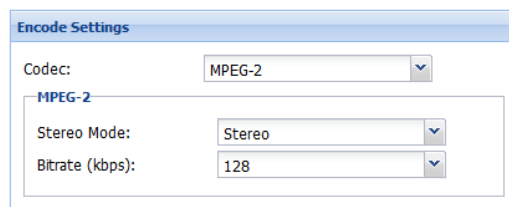


Figure 37: MPEG-2 Encode Settings

MPEG-2 Encode Settings include:

- Stereo Mode: Specify Stereo or Joint Stereo (Dual Mono)
- Bitrate: Output audio data rate

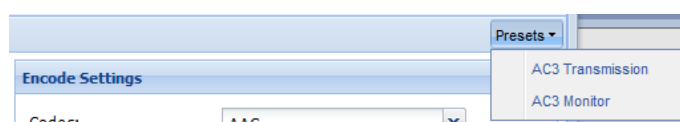


Figure 38: Audio Decode Presets

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).

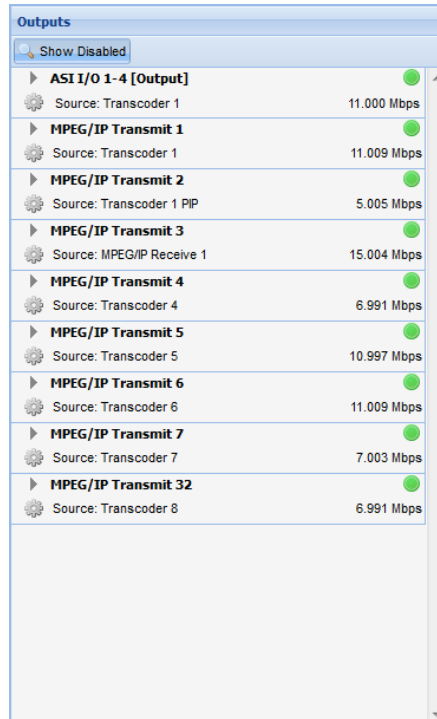


Figure 39: Outputs

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

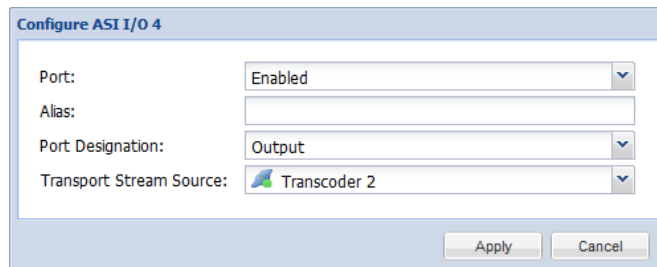
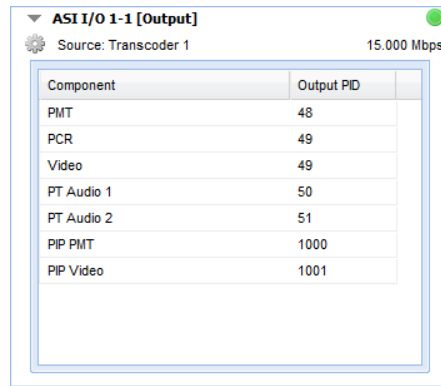


Figure 40: Configure ASI output

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.



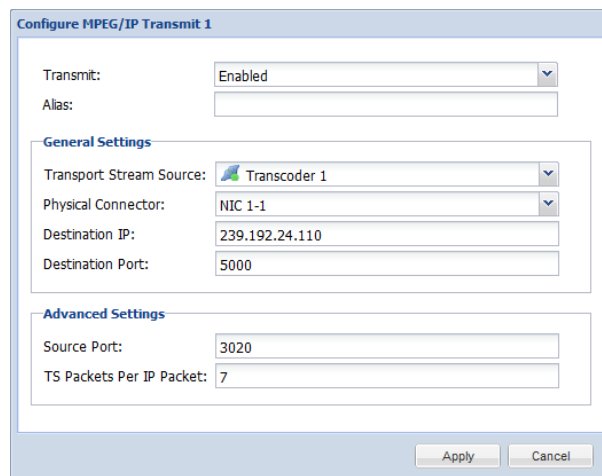
ASI I/O 1-1 [Output] 15.000 Mbps

Source: Transcoder 1

Component	Output PID
PMT	48
PCR	49
Video	49
PT Audio 1	50
PT Audio 2	51
PIP PMT	1000
PIP Video	1001

Figure 41: ASI Output Status Information

The triangle next to the ASI output can be pressed to reveal the PIDs present in the output TS for that particular output.



Configure MPEG/IP Transmit 1

Transmit: ▾

Alias:

General Settings

Transport Stream Source: ▾

Physical Connector: ▾

Destination IP:

Destination Port:

Advanced Settings

Source Port:

TS Packets Per IP Packet:

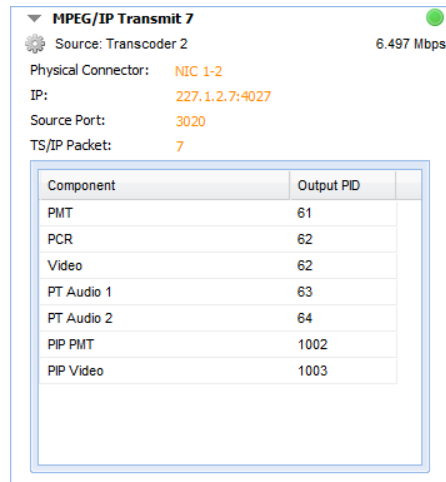
Figure 42: IP Output settings

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.



Component	Output PID
PMT	61
PCR	62
Video	62
PT Audio 1	63
PT Audio 2	64
PIP PMT	1002
PIP Video	1003

Figure 43: MPEG/IP Transmit Status Information

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.

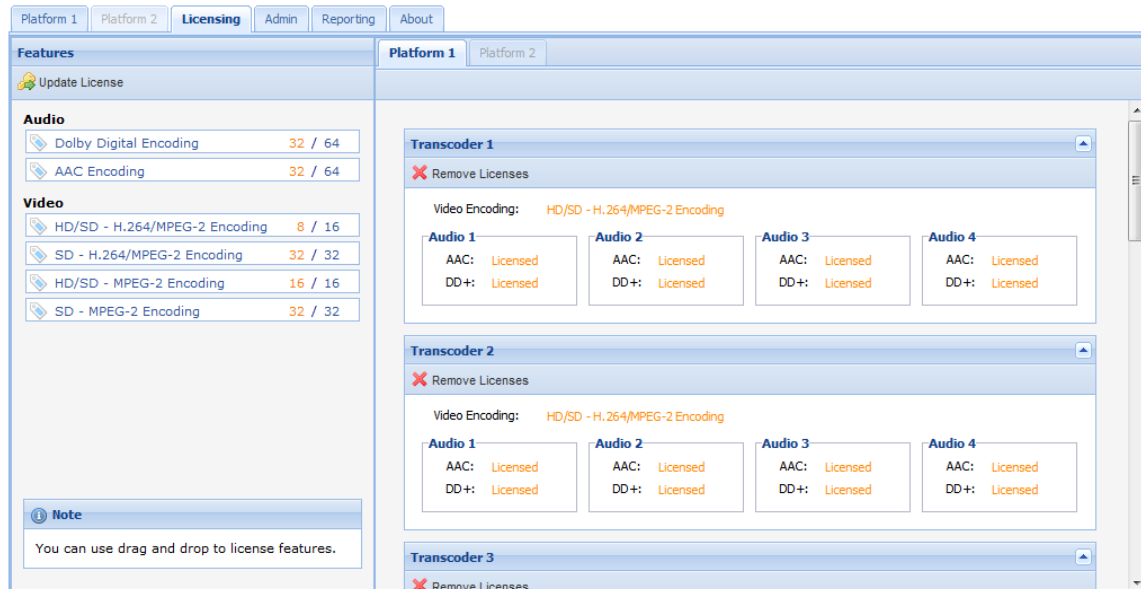


Figure 44: Licensing Tab

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.

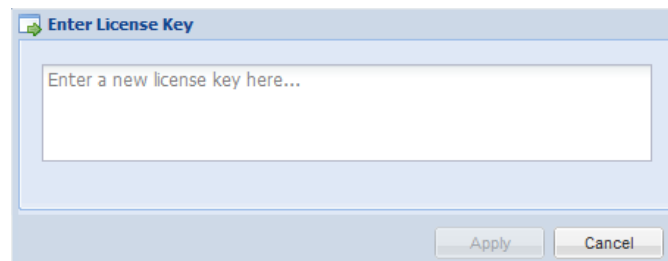


Figure 45: License Key Dialog

Admin Tab

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

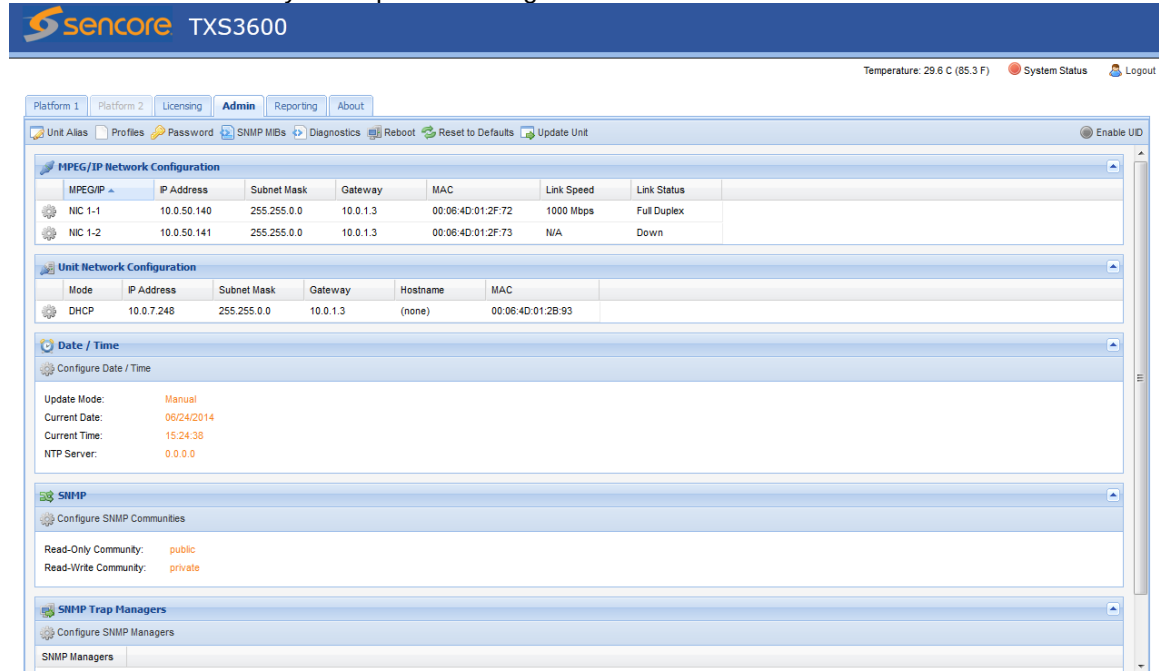


Figure 46: Admin tab

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.

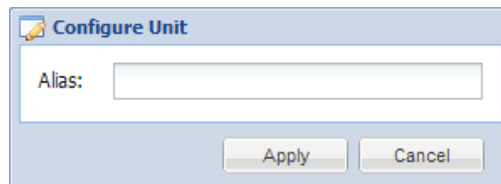


Figure 47: Changing unit alias

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.

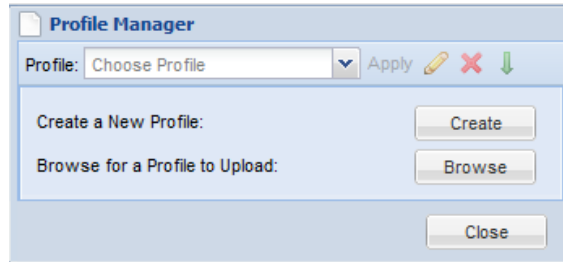


Figure 48: Profile Manager

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.

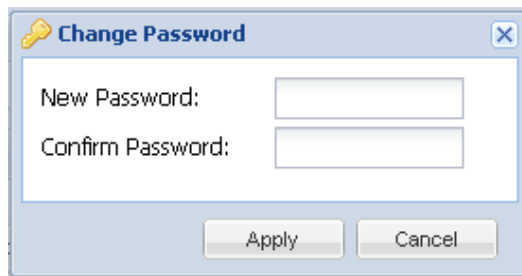


Figure 49: Setting password

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.

Index of /mibs/

Name	Last Modified	Size	Type
Parent Directory/		-	Directory
INET-ADDRESS-MIB.MIB	2012-Jul-13 17:54:52	16.3K	application/octet-stream
SENCORE-CSP-MIB.MIB	2012-Jul-16 15:38:04	50.3K	application/octet-stream
SENCORE-GLOBAL-REG.MIB	2012-Jul-16 15:38:04	2.3K	application/octet-stream
SENCORE-TXS3600-MIB.mib	2012-Jul-13 19:34:42	125.1K	application/octet-stream
SNMP-COMMUNITY-MIB.MIB	2012-Jul-13 17:54:53	15.1K	application/octet-stream
SNMP-FRAMEWORK-MIB.MIB	2012-Jul-13 17:54:53	21.8K	application/octet-stream
SNMP-MPD-MIB.MIB	2012-Jul-13 17:54:53	5.3K	application/octet-stream
SNMP-TARGET-MIB.MIB	2012-Jul-13 17:54:52	22.2K	application/octet-stream
SNMP-USER-BASED-SM-MIB.MIB	2012-Jul-13 17:54:53	38.2K	application/octet-stream
SNMP-VIEW-BASED-ACM-MIB.MIB	2012-Jul-13 17:54:53	33.3K	application/octet-stream
SNMPv2-MIB.MIB	2012-Jul-13 17:54:53	28.6K	application/octet-stream
SNMPv2-SMI.MIB	2012-Jul-13 17:54:52	8.7K	application/octet-stream
SNMPv2-TC.MIB	2012-Jul-13 17:54:52	37.1K	application/octet-stream

To Download: Right-Click, Save Link As or Save Target As

Figure 50: MIBs

Diagnostics

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.

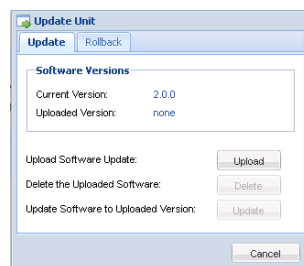


Figure 51: Updating firmware

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.

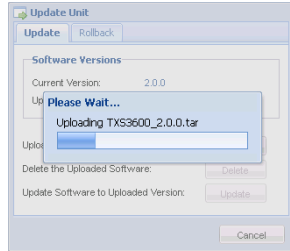


Figure 52: Uploading file

Once uploaded successfully, the uploaded version will appear on the Update Unit dialog screen.

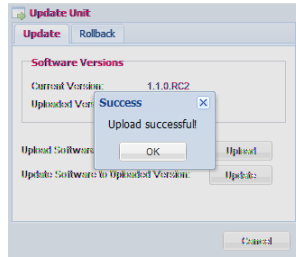


Figure 53: Upload successful

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

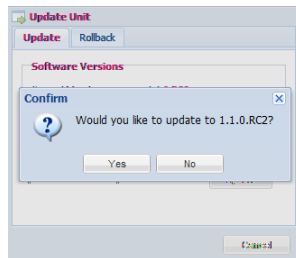


Figure 54: Update confirmation

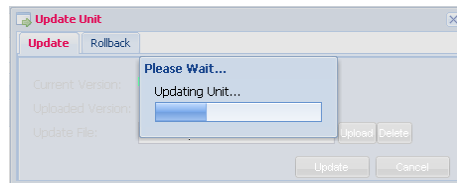


Figure 55: Updating unit

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.

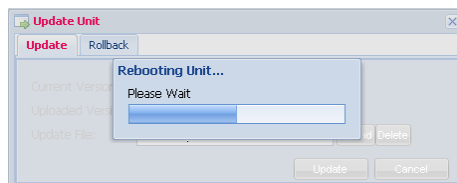


Figure 56: Unit restarting

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.

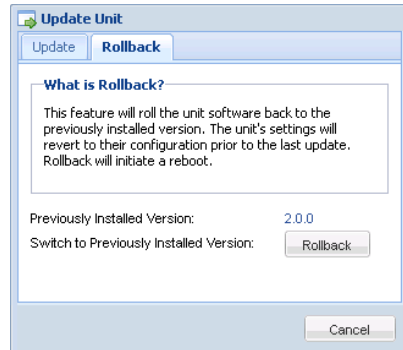


Figure 57: Firmware rollback

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.

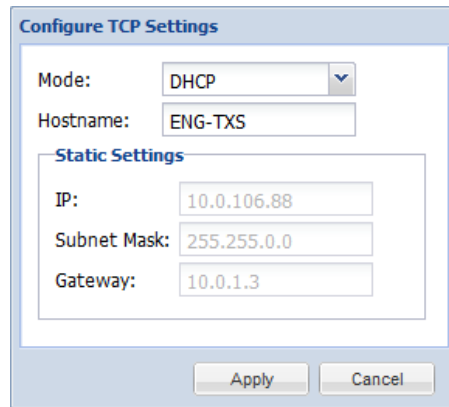
MPEG/IP Network Configuration							
	MPEG/IP	IP Address	Subnet Mask	Gateway	MAC	Link Speed	Link Status
	NIC 1-1	10.0.50.140	255.255.0.0	10.0.1.3	00:06:4D:01:2F:72	1000 Mbps	Full Duplex
	NIC 1-2	10.0.50.141	255.255.0.0	10.0.1.3	00:06:4D:01:2F:73	N/A	Down

Unit Network Configuration						
	Mode	IP Address	Subnet Mask	Gateway	Hostname	MAC
	DHCP	10.0.7.248	255.255.0.0	10.0.1.3	(none)	00:06:4D:01:2B:93

Figure 58: Network configuration

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.

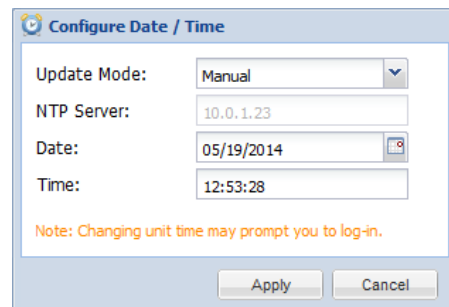


The 'Configure TCP Settings' dialog box has a title bar with the text 'Configure TCP Settings'. Inside, there are two main sections. The first section contains 'Mode:' with a dropdown menu set to 'DHCP' and 'Hostname:' with a text box containing 'ENG-TXS'. The second section, titled 'Static Settings', contains three text boxes: 'IP:' with '10.0.106.88', 'Subnet Mask:' with '255.255.0.0', and 'Gateway:' with '10.0.1.3'. At the bottom are 'Apply' and 'Cancel' buttons.

Figure 59: IP settings

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.



The 'Configure Date / Time' dialog box has a title bar with a clock icon and the text 'Configure Date / Time'. It contains 'Update Mode:' with a dropdown set to 'Manual', 'NTP Server:' with a text box containing '10.0.1.23', 'Date:' with a text box containing '05/19/2014' and a calendar icon, and 'Time:' with a text box containing '12:53:28'. A note at the bottom reads 'Note: Changing unit time may prompt you to log-in.' Below the note are 'Apply' and 'Cancel' buttons.

Figure 60: Date/Time configuration

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.



The 'SNMP Community Strings' dialog box has a title bar with an icon and the text 'SNMP Community Strings'. It contains two text boxes: 'Read-Only Community:' with 'public' and 'Read-Write Community:' with 'private'. At the bottom are 'Apply' and 'Cancel' buttons.

Figure 61: SNMP communities

SNMP Trap Managers

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

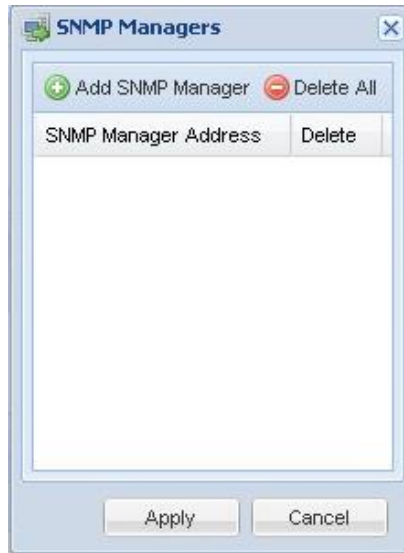


Figure 62: SNMP managers

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.

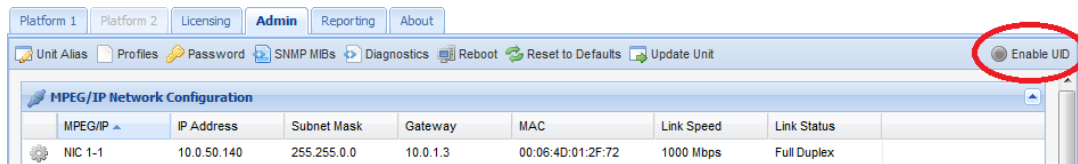
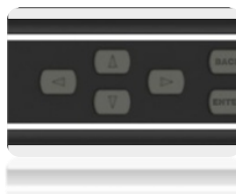


Figure 63: Unit Identifier

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.

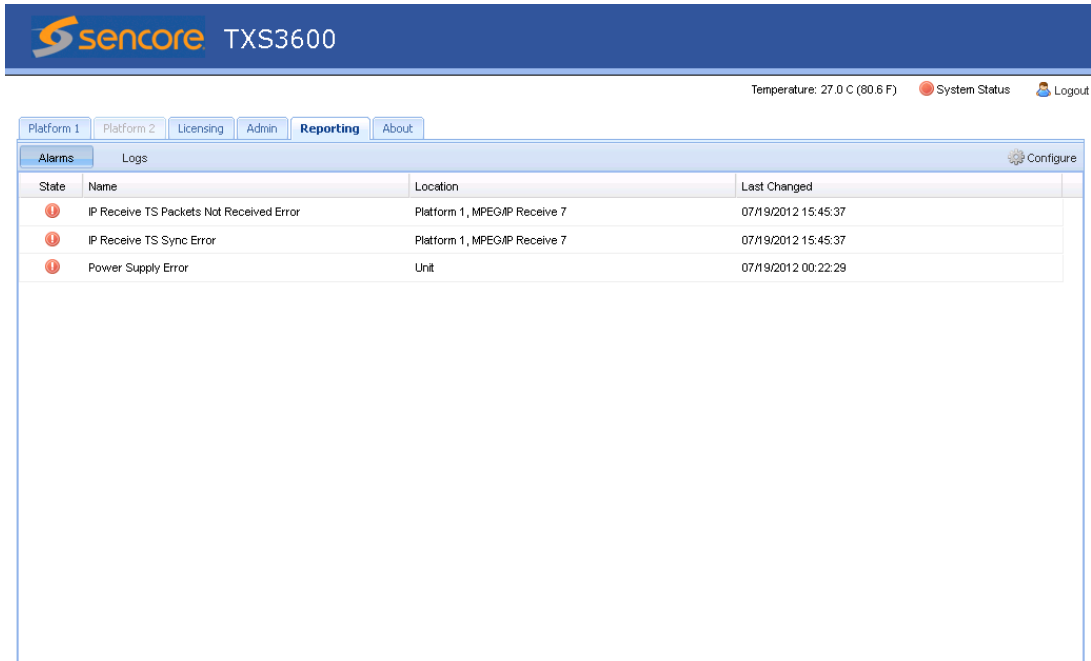


Figure 64: Reporting tab

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.

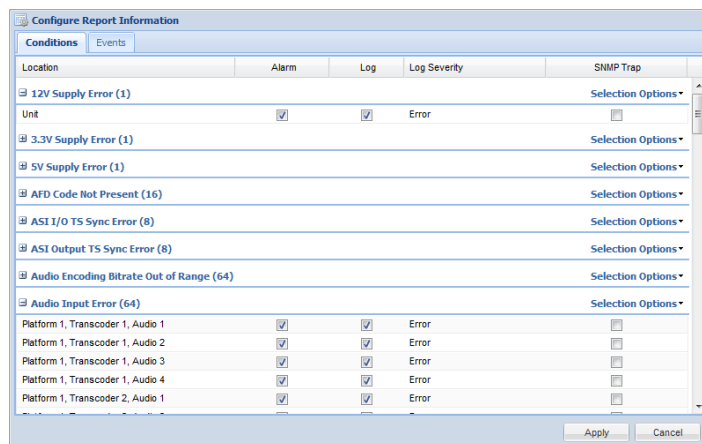


Figure 65: Alarm configuration

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

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.

Temperature: 26.1 C (79.0 F) System Status Logout

Platform 1 Platform 2 Licensing Admin **Reporting** About

Alarms **Logs** Configure

Clear Download

Severity	Timestamp	Transition	Message	Location
Info	07/19/2012 23:15:12	+	IP Transmit TS Present	Platform 1, MPEG/MP Transmit 6
Info	07/19/2012 23:15:12	+	IP Transmit TS Present	Platform 1, MPEG/MP Transmit 3
Info	07/19/2012 23:15:12	+	Input Format Supported	Platform 1, Transcoder 8
Info	07/19/2012 23:15:11	+	Input Format Supported	Platform 1, Transcoder 5
Info	07/19/2012 23:15:09	+	Input TS Present	Platform 1, Transcoder 7
Info	07/19/2012 23:15:09	+	Input TS Present	Platform 1, Transcoder 8
Info	07/19/2012 23:15:08	-	Unsupported Input Format	Platform 1, Transcoder 8
Info	07/19/2012 23:15:08	-	Unsupported Input Format	Platform 1, Transcoder 5
Info	07/19/2012 23:15:05	-	IP Transmit TS Not Present	Platform 1, MPEG/MP Transmit 6
Info	07/19/2012 23:15:05	+	IP Transmit TS Present	Platform 1, MPEG/MP Transmit 5
Info	07/19/2012 23:15:05	+	IP Transmit TS Present	Platform 1, MPEG/MP Transmit 4
Info	07/19/2012 23:15:05	-	IP Transmit TS Not Present	Platform 1, MPEG/MP Transmit 3
Info	07/19/2012 23:15:02	+	Video PID Corrected	Platform 1, Transcoder 5
Info	07/19/2012 23:15:02	+	PCR PID Corrected	Platform 1, Transcoder 5
Info	07/19/2012 23:15:01	-	IP Transmit TS Not Present	Platform 1, MPEG/MP Transmit 4

Page 1 of 4 Severity: Info Error Transition: Event Went Good Went Bad

Figure 67: Logs view

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

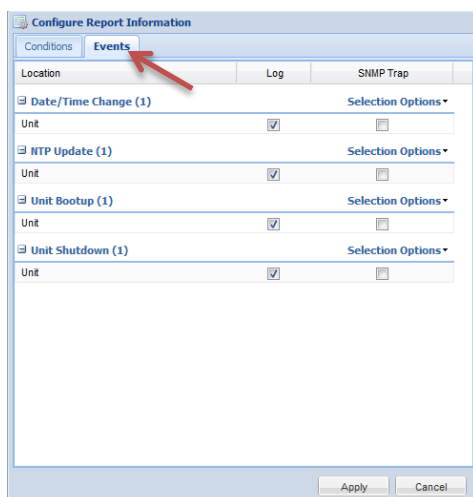


Figure 68: Configure events

Category	Name	Description of Event
Date/Time Change	The unit's date/time has been changed	Date/Time Change
NTP Update	The unit's date/time was updated by the NTP server	NTP Update
Unit Bootup	The unit has been loaded	Unit Bootup
Unit Shutdown	The unit was shutdown	Unit Shutdown

Figure 69: Event descriptions

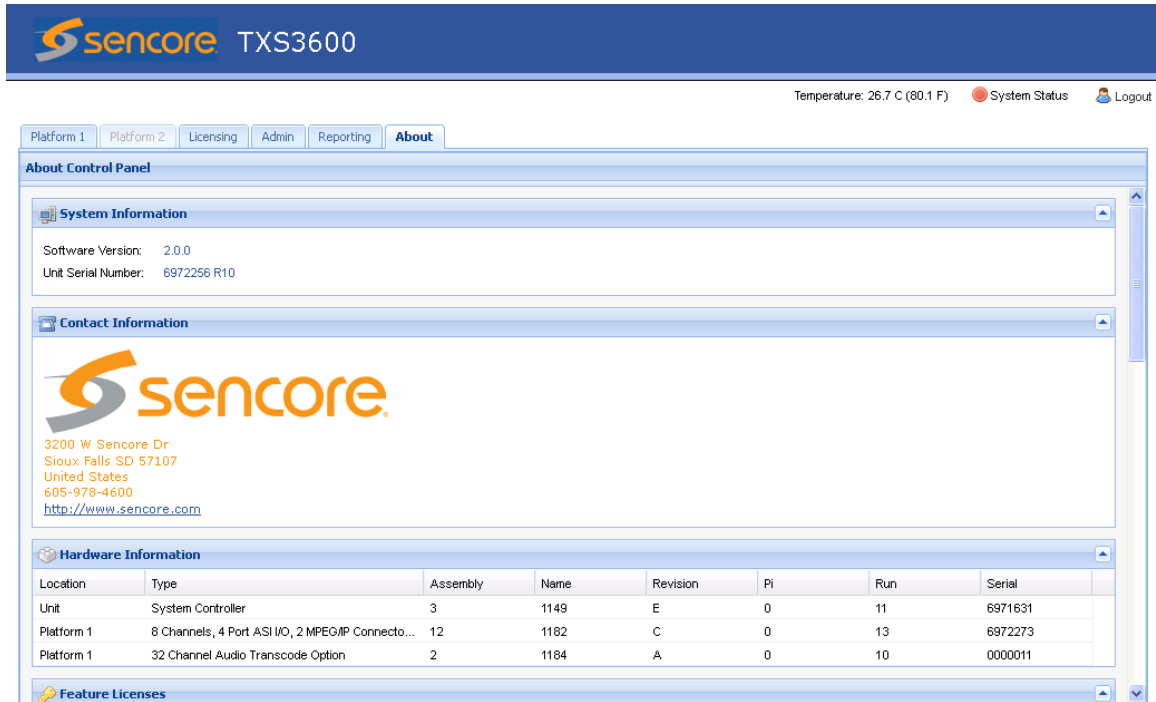
SNMP Trap Configurations

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.



sencore TXS3600

Temperature: 26.7 C (80.1 F) System Status Logout

Platform 1 Platform 2 Licensing Admin Reporting **About**

About Control Panel

System Information

Software Version: 2.0.0
Unit Serial Number: 6972256 R10

Contact Information

sencore
3200 W Sencore Dr
Sioux Falls SD 57107
United States
605-978-4600
<http://www.sencore.com>

Hardware Information

Location	Type	Assembly	Name	Revision	Pi	Run	Serial
Unit	System Controller	3	1149	E	0	11	6971631
Platform 1	8 Channels, 4 Port ASI I/O, 2 MPEG/IP Connecto...	12	1182	C	0	13	6972273
Platform 1	32 Channel Audio Transcode Option	2	1184	A	0	10	0000011

Feature Licenses

Figure 70: About Tab

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.

```
SENCORE TXS3600  ↕↗
ACTIVE: 8          ALIAS
IDLE: 0           192.168.1.111
TX 2-4:  MPEG-2 -> H264
            8 MBPS
```

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.

```
OPTIONS  ↕↗
>ACTIVE ERRORS
NETWORK SETTINGS
TIME
UNIT TEMPERATURE
ABOUT
```

Active Alarms

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

```
ACTIVE ALARMS  ↕↗
>ASI I/O TS SYNC ERROR - LOC: P
UNSUPPORTED INPUT FORMAT - LOC:
CC NOT PRESENT - LOC: PLATFORM
```

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.

```

UNIT NETWORK STATUS
>IP ADDRESS: 10.0.15.6
SUBNET MASK: 255.255.0.0
GATEWAY: 10.0.1.3
DHCP MODE: DISABLED
HOSTNAME: TXS1
MAC: 00:AB:CD:EF:GH:I7

```

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.

```

TIME
>TIME: 2010/8/12 03:27:48
SOURCE: NTP SERVER
ADDRESS: 10.0.1.23

```

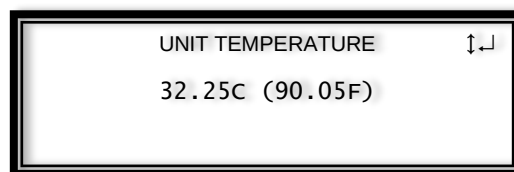
```

TIME
TIME: 2010/8/12 03:27:48
SOURCE: MANUAL
>SET DATE: 2010/8/12
SET TIME: 03:27:48

```

Unit Temperature

Sample Unit Temperature



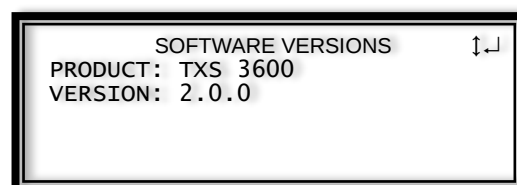
FP About

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.



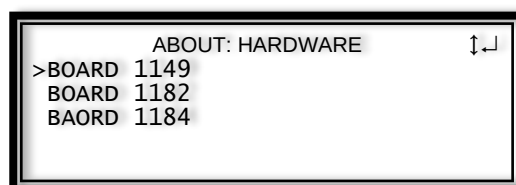
About Software

Sample Software Versions



About Hardware

Sample About Hardware



Appendix



Specifications

TXS 3600 Base Unit Includes:

System –

Display Type:

Display Configuration:

Keypad:

Configurations Allowed:

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

LCD

240 pixels by 64 pixels

Snap-dome Membrane

Single Platform

Dual Platform

Remote Operation/Update Interface –

Type:

Rear panel indicators:

Connector:

Ethernet, 10/100

Link (Green LED), Activity (Amber LED)

RJ45

Front Panel Indicators –

UID LED:

Error LED:

Blue indicates the Unit Identifier is turned on

Red indicates error is occurring

OFF indicates no errors detected

Monitor and Control Interfaces –

Web server GUI

Front Panel

SNMP

HTTP via web browser for Control & Monitoring

Yes IP Configuration & Monitoring

Yes Control & Monitoring

AC Power –

Operating Voltage:

Current Draw/Power:

Frequency:

Line Cord:

Redundancy:

95-135 VAC or 180-265 VAC

275 Watts

47-63Hz

Detachable, 3-prong

Dual Hot Swappable, Load Sharing

DC Power –

Operating Voltage:

Max Current Draw/Power:

Redundancy:

-40VDC to -70VDC

10A / 250W

Dual Hot Swappable, Load Sharing

General –

RoHS Compliant:

Operating Temperature:

Operating Humidity:

Cooling:

Temperature monitor:

Size:

Yes

0 to 45 degrees C

<95% Non-Condensing

Forced air, front intake, rear exhaust

Fan failure, internal temperature sensor

Height = 1RU (13/4"), Width = 19", Depth = 19"

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:

1920 x 1080i	@ 25, 29.97, & 30	16x9
1920 x 1080p	@ 23.97, 24, 25, 29.97, & 30	16x9
1440 x 1080i	@ 25, 29.97, & 30	16x9
1440x1080p	@ 23.97, 24, 25, 29.97, & 30	16x9
1280 x 1080i	@ 25, 29.97, & 30	16x9
1280 x 1080p	@ 23.97, 24, 25, 29.97, & 30	16x9
1280 x 720p	@ 50, 59.94 & 60	16x9
960x720p	@ 50, 59.94 & 60	16x9
960x720p	@ 29.97	4x3
720 x 576i	@ 25	16x9/4x3
704 x 576i	@ 25	16x9/4x3
640 x 576i	@ 25	16x9/4x3
544 x 576i	@ 25	16x9/4x3
528 x 576i	@ 25	16x9/4x3
480 x 576i	@ 25	16x9/4x3
352 x 576i	@ 25	16x9/4x3
720 x 480i	@ 29.97	16x9/4x3
720 x 480p	@ 29.97	4x3
704 x 480i	@ 29.97	16x9/4x3
640 x 480i	@ 29.97	16x9/4x3
640 x 480p	@ 29.97	4x3
544 x 480i	@ 29.97	16x9/4x3
528 x 480i	@ 29.97	16x9/4x3
480 x 480i	@ 29.97	16x9/4x3
352 x 480i	@ 29.97	16x9/4x3
640x360p	@ 29.97	16x9/4x3
352 x 288p	@ 25	16x9/4x3
416x240p	@ 29.97	16x9/4x3
352x240p	@ 29.97	16x9/4x3
320x240p	@ 29.97	16x9/4x3
320x180p	@ 29.97	16x9/4x3
192x192p	@ 25 & 29.97	16x9/4x3
176x144p	@ 25	16x9/4x3
128x128p	@ 25	16x9/4x3
128x96p	@ 25 & 29.97	16x9/4x3
96x96p	@ 25 & 29.97	16x9/4x3

Format Scaling:

Display Modes:

Video Bitrate:

Video Stream Rate:

Aspect Ratio:

Film Processing:

Output Format Selectable

Letterbox, Cropped, & Anamorphic

0.1 – 30 Mbps

Variable (VBR) or Constant (CBR)

16x9, 4x3 (Selectable – format dependant)

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:

416x240p	@ 29.97	16x9/4x3
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352x288p	@ 25	16x9/4x3
352x240p	@ 29.97	16x9/4x3
320x240p	@ 29.97	16x9/4x3
320x180p	@ 29.97	16x9/4x3
192x192p	@ 25 & 29.97	16x9/4x3
176x144p	@ 25	16x9/4x3
128x128p	@ 25	16x9/4x3
128x96p	@ 25 & 29.97	16x9/4x3
96x96p	@ 25 & 29.97	16x9/4x3

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
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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:

Package	Version	License	Copyright
AT32 UC3B Software Framework	1.4.0	BSD	2008, Atmel Corporation
BaseX4JIT	4.0	GPL Version 3, 29 June 2007	2007-2009, Active Group, Inc
BusyBox	1.15.2	GPL Version 2, June 1991	Erik Andersen, et. al.
Cgicc	3.2.9	LGPL Version 2.9, June 2007	Stephen F. Booth
dfu-programmer	0.5.2	GPL Version 2, June 1991	Weston Schmidt
Dropbear	0.52	MIT-like	2002-2008 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	013	Creative Commons Attribution 2.5	Mark James
FastDB	3.59	MIT-like	Konstantin Knizhnik
FCGI	2.4.0	FastCGI	Open Market, Inc
Iproute2	2.6.29	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	1.4.23	BSD	2004, Jan Kneschke
Linux	2.6.30	GPL Version 2, June 1991	Linus Torvalds, et. Al.
Log4cpp	1.0	GPL Version 2.1 Feb 1999	Bastiann Bakker
Monit	5.1.1	GPL Version 3, 29 June 07	2010 Tildeslash Ltd.
Net-SNMP	5.5	BSD	1989, 1991, 1992 by Carnegie Mellon Univsty.
NTP	4.2.4p7	NTP License	1992-2009 David L. Mills
OpenSSL	0.9.8m	BSD-Like	1998-2008 The OpenSSL Project, 1995-1998
OProfile	0.9.6	GPL Version 2, June 1991	John Levon, Philippe Elie, et. Al
PCRE	8.00	BSD	1997-2009 University of Cambridge, 2007-2008
POPT	1.14	MIT	1998 Red Hat Software
Socket-CAN	1171	BSD-like, GPL Version 2, 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	1.2.3	Zlib/libpng License	1995-2005 Jean-loup Gailly and Mark Adler
5.1ch Dolby Digital Plus Professional Encoder TMS3...	1.4.9.9	Dolby	2012 Dolby Laboratories, Inc.

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.

