EN-81/80

Multi-CODEC Encoder
Includes modulator versions - LB and IF

USER GUIDE

02.19.15 - v2.02.28

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Trademarks & Copyrights

Electrical Device Compliance Notices

Safety Warnings and Cautions

For your safety and the proper operation of the device:
- This unit must be installed and serviced by suitably qualified personnel only.
- Disconnect all power before servicing the unit.
- Do not expose this device to rain or other moisture. Clean only with a dry cloth.
- If not installed in an equipment rack, install the product securely on a stable surface.
- Install the product in a protected location where no on can step or trip over the supply cord, and where the supply cord will not be damaged.
- If a system is installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than the room ambient temperature.
- Consideration should be given to installing the unit in an environment compatible with the maximum recommended ambient temperature of 50 degrees Celcius (122 degrees Fahrenheit).
- Install the unit in a rack so that the amount of airflow required for safe operation is not compromised.
    - The recommended clearance on the top and sides of the unit is at least ½ " (one half inch/one centimeter).
- Mounting of the unit in a rack should be such that no hazardous condition is achieved due to uneven mechanical loading.
- Use only a grounded electrical outlet when connecting the unit to a power source.
- Reliable earth grounding of rack-mount equipment should be maintained.
    - Particular attention should be given to supply connection other than direct connections to the branch circuit (e.g., use of power strips).

Compliance Notices

FCC

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. 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. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Warning: Changes or modifications to this device not expressly approved by Adtec Digital could void the user's authority to operate the equipment.

Industry Canada

This Class B digital apparatus meets all requirements of the Canadian Interference Causing Equipment Regulations. Operation is subject to the following two conditions:(1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Cet appareillage numérique de la classe B répond à toutes les exigences de l'interférence canadienne causant des règlements d'équipement. L'opération est sujette aux deux conditions suivantes: (1) ce dispositif peut ne pas causer l'interférence nocive, et (2) ce dispositif doit accepter n'importe quelle interférence reçue, y compris l'interférence qui peut causer l'opération peu désirée.

European Union EMC Directive Conformance Statement

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. Adtec Digital cannot accept responsibility for any failure to satisfy the protection requirements resulting from a user modification of the product. This product has been tested and found to comply with the limits for Class B Information Technology Equipment according to CISPR 22 / EN 55022.

Chapter 1 - Product Introduction

Covered Equipment

EN-81: HD & SD -MPEG2 and MPEG4 capable. Standard audio encode includes four (4) stereo pairs (8 mono) of MPEG 1 Layer 2 with an optional upper 4 stereo pairs (8 stereo pairs or 16 mono channels), two (2) Dolby E Passthru. via AES or SDI embedded. Standard VBI support includes Captions, Teletext, AFD, VITC (608 waveform, H/VANC for 708, OP47, SMPTE 2016/2031 with built in VBI analyzer). BISS 1 / E encryption included. Transport via 3X mirrored ASI and GigE with SMPTE-2022 FEC. Hardware configuration I/O includes Composite and SDI video, Analog (x2), AES (x4) and SDI (x16) audio inputs. Includes redundant AC power supplies.

EN-81 w/ IF Modulator: EN81 (as configured above) + IF Modulator – Adds Newtec OEM IF Modulator. Supports DVB-S, QPSK to 15 Ms. Additional Modulation options available. See below. IF is user definable between 50-180 MHz. Power range of -35/+5dBm.

EN-81 w/ L-Band Modulator: EN81 (as configured above) + L-Band Modulator – Adds Newtec OEM L-band Modulator. Supports DVB-S, QPSK to 15 Ms. Additional Modulation options available. See below. L-band is user definable between 950-1750 MHz. Newer models (*7139*) support up to 2150MHz.

EN-81 w/ L-Band Modulator +10 Mhz: EN81 (as configured above) + L-Band Modulator – Adds Newtec OEM L-band Modulator. Supports DVB-S, QPSK to 15 Ms. Additional Modulation options available. See below. L-band is user definable between 950-1750 MHz. Newer models (*7139*) support up to 2150MHz. . Adds 10 Mhz reference as option.

EN-80: HD & SD -MPEG2 and MPEG4 capable. Standard audio features include support for four (4) stereo MPEG 1 Layer 2 encode with Dolby E Passthru via AES or SDI standard. Two optional stereo Dolby AC3 encodes. Standard VBI support includes Captions, Teletext, AFD, VITC (608 waveform, H/VANC for 708, OP47, SMPTE 2016/2031 with built in VBI analyzer). BISS 1 / E encryption included. Transport via 3X mirrored ASI and GigE with SMPTE-2022 FEC. Hardware configuration I/O includes Composite and SDI video, Analog (x2), AES (x4) and SDI (x16 - ONLY encodes 4 pairs) audio inputs. Includes redundant AC power supplies.

EN-80 w/ IF Modulator: EN80 (as configured above) + IF Modulator – Adds Newtec OEM IF Modulator. Supports DVB-S, QPSK to 15 Ms. Additional Modulation options available. See below. IF is user definable between 50-180 MHz. Power range of -35/+5dBm.

EN-80 w/ L-Band Modulator: EN80 (as configured above) + L-Band Modulator – Adds Newtec OEM L-band Modulator. Supports DVB-S, QPSK to 15 Ms. Additional Modulation options available. See below. L-band is user definable between 950-1750 MHz. Newer models (*7139*) support up to 2150MHz.

Front Panel

Transport LED Indicators

Indicator	Function
Video	Off - If modulator is installed, an off led indicates that no video is detected on the selected input or that ASI Receive mode is enabled. On - Video is detected on the selected input. Blink - No video is detected and fault mode is active.
Encode	Off - Device is not encoding. Idle State On - Device is encoding.
AVC	Off - MPEG 2 is selected for encode. On - MPEG 4 (H264) is selected for encode.
4:2:2	Off - Encoding chroma type 4:2:0. On - Encoding chroma type 4:2:2.
HD	Off - Encoding standard definition. On - Encoding high definition. **Note:** This product offers optional HD encoding. Check to make sure HD key is enabled if you experience issues with HD encoding.
IP Out	Off - Transport of IP via Ethernet or GigE is idle. On - Transport of IP via Ethernet or GigE is active.
RF Out	Off - Modulator is not transmitting. On - Modulator is transmitting. Blink - Modulator is running in test mode. **Note:** Making changes to specific modulator parameters can cause the modulator to stop transmitting and you will need to re-enable it. This is by design to prevent transmission with an incorrect power setting.
Bars	Off - B/T/ID options are disabled. On - B/T/ID are enabled. **Note:** This product comes with the ability to generate bars/tones and service ID via OSD on video loss. This can be configured only via the web UI on the Video Tab.

Audio Encode Indicators

Indicator	Function
EN80 A1 -A4 EN81 A1 - A8	Off - Audio encoder configuration is set to off. On - Audio encoder configuration is set to encode or passthru. **Note:** This product offers optional extended audio encoding of the upper four pairs. If you experience issues engaging the upper pairs, check your feature keys first.

System Indicators

Indicator	Function
Alarm	Off - No system alarms. On - System alarm. (Typically NTP alarm)
BISS	Off - No encryption set On - Encryption active
Link	Off - No network detected On - Network communication active
Busy	Off - No network activity On - Network traffic present

Controls

Using the **Mode**, **Select**, **Enter**, **Escape**, and directional buttons, the user can control the unit via the front panel.

Control	Function
Mode button	Mode will cycle you through top layer menus.
Select	Select will enter you into edit mode.
Enter	Enter submits any edits.
Escape	Escape returns you to the previous menu layer.
Cursor Arrows	Arrows will navigate you within submenus
Programming Keypad	For value entry. F2 functions as a "." decimal or period.

Modulator Uplink Lineup

This feature enables the operator to quickly view and/or configure select modulator RF output parameters. To access the menu, press the F1 and F2 keys simultaneously. The front panel will briefly flash "MODULATOR UPLINK FREQUENCY LINEUP" then display the menu.

The parameters available in this menu are:

1. Carrier Mode: [PURE_CARRIER or ON]   adjusted by SELECT
2. Transmit: [ENABLED or DISABLED]   adjusted by ENTER
3. Output Power: [in 0.5dB increments]   adjusted by ↑ or ↓ button
4. Output Frequency: [readonly if Tx ENABLED] adjusted by number pad

Notes:

- To use this feature, the front panel display must be illuminated. If the display is dim, press ANY front panel button to illuminate it.
- If the unit has been previously configured by the operator and powered OFF and ON, then the display will read the last valid configuration, however, Tx will read DISABLED.
- Any Frequency (LO, UPLINK, FREQUENCY) may only be adjusted if Tx is set to DISABLED. Otherwise, the frequency will be rejected.
- The legacy "Modulator Frequency Lineup" (IF and L-Band) with described behavior is still available by visiting the RF Tx MENU -> "Modulator Frequency Lineup" Menu.
- F2 is used as the decimal point for Frequency Input
- Frequency entries are "HOT", IE, user does not need to press enter
- If Frequency entered is out of range (Calculation pushes IF/L-Band out of range), the value will be rejected.
- Always review the LO setting before entering the Uplink Lineup menu.

To set the desired output Modulator Frequency, use the number pad to type desired frequency. 1, 2, 3, 4, 6, F2, 6, 7, 8, 9. for example will submit 12346.6789MHz.

```
Carrier: ON              Power (dBm):  -40.0
Tx: DISABLED      UPLINK (MHz):  12346.6789
```

To select the desired Carrier Mode, press the front panel "SELECT" button.

```
Carrier: PURE_CARRIER Power (dBm):  -50.0
Tx: DISABLED      UPLINK (MHz):  12345.6789
```

To set Transmit to ENABLED or DISABLED, press the front panel "ENTER" button.

```
Carrier: ON              Power (dBm):  -50.0
Tx: ENABLED       UPLINK (MHz):  12345.6789
```

To set the desired output Power Level, press and hold the front panel ↑ or ↓ button.

```
Carrier: ON              Power (dBm):  -40.0
Tx: ENABLED       UPLINK (MHz):  12345.6789
```

Front Panel Menu Structure

Services Menu

Item	Function	Options
TS Mux Rate	Transport Mux Rate is the total transport stream rate. Use this number to match total circuit throughput	7000 - 100000000
Program Number	Sets the program number in the PAT (Program Association Table). This value is in decimal format.	1 - 8190
Service Name	Identifies the service by name. This value is used to populate either the DVB SDT table, or ATSC VCT table. You are limited to 20 characters in DVB mode and 7 in ATSC mode. When using Bars, Tones and ID overlays, this field is displayed as part of the service information.	1- 20 ascii characters in DVB mode 1-7 ascii characters in ATSC mode
Service Provider	Identified the services provider. This value is used to populate either the DVB SDT table, or ATSC VCT. When using Bars, Tones and ID overlays, this field is displayed as part of the service information.	1-20 ascii characters in DVB mode 1-20 ascii characters in ATSC mode
Tables	Allows the operator to choose which type of Tables the encoder will generate. DVB - includes PMT, PAT, NIT and SDT tables MPEG - includes PAT and PMT tables ATSC - includes PAT, PMT, VCT, RRT, MGT, and STT tables	DVB ATSC MPEG
Splice PID Active	Adds PID (configured in PID menu) to transport stream for carriage of SCTE 35 messages. This option is used in combination with DVC files or the GPIO port for SCTE 35 payload generation.	NO YES
ASI Receive Mode	Routes a external ASI signal from the HD/SDI input in the place of the	ON OFF

	internally encoded signal.	
ASI Mode	Configures the ASI output ports transmit mode. When set to Continuous, Data is transmitted at the configured TMR rate continuously regardless of whether or not there is a valid video source. When set to Encode only, data will only be transmitted if there is a valid video source. Data will not be transmitted if the encoder is idling.	CONTINUOUS ENCODEONLY
Carrier ID Menu	Carrier ID contains unique information within the transport stream to aid in identifying and troubleshooting satellite sources. Specified by SUIRG and endorsed by the WBU-ISOG, the user will need to complete some fields. The Encoder Manufacturer and Encoder Serial Number fields will automatically be filled.	Provider ID: 5 characters. Phone: 17 Character number (typically operator MCR/POC number. '+','(', and ')'. Longitude: 9 Characters ('+000.0000' to '+/-180.0000') Latitude: 8 Characters ('+00.0000' to '+/-90.0000') User Information: 15 characters.
Bars, Tones, ID Menu	Bars, Tones and Service ID information can be overlayed on top of valid video by selecting the desired combination from this menu.	Bars Mode: ON, OFF Bars Type: BARS, Solid color, FLASH Tones Mode: ON, OFF OSD Mode: ON, OFF, BLINK

RF Tx Menu

Item	Function	Options
Transmit	Allows the operator to enable or disable the Main RF output. If Transmit is enabled and any value for Type, Frequency, Rolloff, Symbol Rate, or Interface Rate is changed, then Transmit will be automatically disabled. However, the monitor output will remain active.	Disable Enable
Type	Allows the selection of the mod type.	DVBS DVBS-2
Mode	This control allows the operator to select the desired modulation mode and FEC code rate.	We display all possible ranges available via our device in the Front Panel. This list will differ from the list found in the web UI as it only shows those options available based on the feature keys found. QPSK-1/2 8PSK-5/6 QPSK-2/3 8PSK-8/9 QPSK-3/4 8PSK-9/10 QPSK-5/6 16QAM-3/4 QPSK-6/7 16QAM-7/8 QPSK-7/8 16APSK-2/3 QPSK-1/4 16APSK-3/4 QPSK-1/3 16APSK-4/5 QPSK-2/5 16APSK-5/6 QPSK-3/5 16APSK-8/9 QPSK-4/5 16APSK-9/10 QPSK-8/9 32APSK-3/4 QPSK-9/10 32APSK-4/5 8PSK-3/5 32APSK-5/6 8PSK-2/3 32APSK-8/9 8PSK-3/4 32APSK-9/10
Local Oscillator	This field should contain the frequency of your external BUC. It is provided for convenience purposes only and to aid in the automatic calculation of the Modulator frequency.	This field may only be changed if Tx is DISABLED.

	The actual required setting will depend on your external hardware (Block Upconverter), and may differ from the value set here. If so, please update. Alternatively, this value may be set to 0 to disable auto-calculation.	
Uplink Frequency	This field should contain the frequency of the satellite uplink paperwork. It is provided for convenience purposes only and to aid in the automatic calculation of the Modulator frequency. Always verify other Frequency settings.	This field may only be changed if Tx is DISABLED.
Frequency	Allows the operator to enter the desired output frequency of the main RF output port.	7039: 950MHz - 1.75GHz LBAND 7139: 950MHz - 2.15GHz LBAND 50MHz - 180MHz IF ** The monitor output frequency for the EN-XX IF is fixed at 1.080GHz. The monitor output frequency for the EN-XX L-Band tracks with the main RF output frequency. This field may only be changed if Tx is DISABLED.
Power	Allows the operator to configure the output power of the main RF output port. The monitor output power level for the EN-XX IF and L-Band is fixed at -45dBm. Power is defined as the composite power referenced to an un-modulated (Pure Carrier) carrier.	7039: -50 to -7dBm LBAND 7139: -35 to +5dBm LBAND -30 to +5dBm IF
Spectrum Inversion	The Spectrum Inversion options are either Normal or Invert. If Normal is selected, then spectrum inversion does not occur. Spectral inversion can occur when either the baseband signal is up-converted to an IF frequency or when the IF is upconverted to the desired RF output frequency.	Invert Normal
FEC Frame	When operating in DVB-S2, the Frame Type options are either Normal or Short.	Short Normal

	The Normal 64,800-bit FEC frame provides better protection but introduces more latency compared to the Short 16,200-bit FEC frame. Therefore, the Short FEC frame type should be selected in applications where latency is critical and the longer frame type should be used to optimize protection.	
Rolloff	The Rolloff selection will determine the shape of the output filter. The occupied bandwidth of the modulated signal is the symbol rate multiplied by (1+α) where alpha (α) is the rolloff factor. By using a lower alpha, carriers can be spaced closer together on a given transponder or an increased symbol rate can be realized for a given bandwidth.	20 25 30
Pilot	When operating in DVB-S2, the Pilot options are either ON or OFF. When pilots are enabled, the total data throughput is reduced by approximately 3.0%.	On Off
Rate Priority	The Rate Priority control allows the operator to designate which rate will be kept constant. When the Symbol Rate is entered and Rate Priority is Symbol, the symbol rate is held constant and the Interface rate is calculated. When the Interface Rate is entered and Rate Priority is Interface, the interface rate is held constant and the symbol rate is calculated.	Symbol Interface
Symbol Rate	The number of symbols transmitted per second. The amount of data per symbol is dependant upon the modulation type, e.g. QPSK, 8PSK, etc.	Range can be determined by feature key.
Interface Rate	The Interface Rate is the bit rate at the baseband interface.	Range can be determined by feature key.
Carrier Mode	The Carrier Mode control allows the operator to select ON for normal operations or select one of four unmodulated carriers. The Pure Carrier	Pure Carrier On Clock/8 Clock/4

	option will provide an un-modulated output carrier at the desired frequency and output power. Other Carrier Mode options include Clock 4/8/16.	Clock/16
10Mhz Clock	Allows operator to generate or pass a 10Mhz signal. The signal can be generated internally or sourced externally. *** This is a special order option. If your unit does not have the functionality the setting will read "N/A"	OFF ON EXTERNAL
10 Mhz Clock Combined	Allows the operator to choose whether or not to combine the 10Mhz signal with the L-Band output. *** This is a special order option. If your unit does not have the functionality the setting will read "N/A"	UNCOMBINED COMBINED
Modulator Uplink Lineup	Menu that allows user to modify 4 RF parameters. Carrier Mode, Power, Transmit, Uplink Frequency	See Modulator Lineup section on usage
Modulator Frequency Lineup	Allows user to modify 4 RF parameters. Carrier Mode, Power, Transmit, Modulator Frequency	See Modulator Lineup section on usage

IP Tx Menu

Note: this is a parallel menu. It has four index. Use the left or right arrows to navigate to desired index.

Item	Function	Options
Mode	Enables IP Egress.	Off Send
IP Tx Mode	IP Tx Mode controls the protocol used for transmitting a transport stream over IP. UDP / RTP are 'one way street' types of protocols in which the transmitter sends data and is never informed if data is lost at the receiver. The use of RTP assists with out of order packets and when combined with SMPTE-2022 FEC, assists with lost packets. SMPTE-2022 FEC however comes with the price of bandwidth overhead. TCP, a connection based protocol, can overcome some of the fundamental limitations of UDP and RTP. TCP streams generally have higher latency, but can be more reliable because each packet is accounted for by the receiver. If a packet is lost, the transmitter will re-transmit the packet. The transmitter and receiver continue to communicate about reception quality and attempt to adjust packet delivery accordingly. The TCP mechanism when combined with large IP receive buffers can be more forgiving with packet loss, jitter, and out of order packets (typically used over the public internet). Multicast is not supported with TCP streams. TCP is recommended for point to point applications utilizing unreliable networks where high throughput and low latency are not required. UDP/RTP Tx Mode is the default configuration and recommended for the majority of broadcast applications	UDP/RTP TCP

	(high throughput, reliable networks, low latency, multicast).	
Tx IP Address	IP Address on which a transport stream is transmitted.	user-defined using the numeric keypad
Tx Port	port assignment used for transmitting a multicast	user-defined using the numeric keypad
DVB per IP	Allows the operator to select how many DVB packets to insert into each Ethernet frame.	1 4 7
RTP	allows for sequence numbering and timing; editable if Multicast Mode is set to 'Send'	On Off
FEC Mode	Forward Edge Correction; selects on/off. When selected, sends two FEC RTP streams in addition to a source RTP stream enabling a receiver to reconstruct missing packets in the source stream.	OFF ON MAXBURST BURST LOWLATENCY
FEC L	affects the maximum burstpacket loss that can be recovered	4-20
FEC D	defines latency involved in burstrecovery	4-20
TOS	Allows the operator to sets the TOS bits in the IPv4 header of the TSoIP payload	0 = Normal service 2 = Minimize monetary cost 4 = Maximum reliability 8 = Maximize through put 16 = Minimize delay
TTL	Time-to-Live; specifies the number of iterations or transmissions the packet can undergo before it is discarded	user-defined using the numeric keypad
Tx Connector	sets the physical connector (on the rear of the unit) to use for multicast transmit purposes on the indicated encode channel.	Ethernet GigE

Video Menu

Item	Function	Options
Input	Allows the operator to select which input the video will be sourced from. ** **WARNING** ** If the input is configured for Composite and there is a SDI signal connected with a frame rate that differs from the Composite signal the unit will not detect video and WILL not encode!	SDI COMPOSITE OPTICAL* *only available on newer hardware
SDI Mode	Allows the operator to force the SDI receiver into a specified mode.	AUTO SD HD1.4G
Codec	Allows the operator to choose MPEG2 or MPEG4/AVC/H.264 encoding.	MPEG2 H264
Entropy Coding	Allows the operator to set the entropy coding settings *** H.264 encoding only, Auto mode will use CABAC at video bitrates <= 30Mbits/sec and CAVLC at rates > 30Mbits/sec.	CABAC CAVLC AUTO
Chroma	Allows the operator to set the encoder chroma type.	420 422
Video Rate	The rate at which video is being encoded. Video bitrate changes are not dynamic. They take effect at the start of the next encode session.	user-defined using the numeric keypad If video autofill is enabled, this value will change based on other variables. Review Technical Specifications for full details on acceptable ranges.
Autofill	When Video AutoFill is turned ON, the encoder will calculate and use the max video bitrate for the current	ON OFF

	TransMuxRate setting. This is recommended. If Autofill is set to OFF the encoder will use the manual setting for the video bitrate.	
Latency	It is dependent upon the video rate, frame size/rate (NTSC,PAL,HIGH-DEF) and GOP structure. Long IBBP GOPs will produce higher latency over short IP GOPs. Short IP GOPs at lower bit rates produce lower quality video.	LONG: Latency will measure close to 1 second. NORMAL: Should be used for distribution and standard contribution transmissions. Latency is approximately 1/2 second. LOW: Latency is approximately 3 frames less than NORMAL. VERYLOW: Latency is approximately 5 frames less than NORMAL.
Latency Trim	Use this setting in conjunction with the Latency setting to fine tune the latency in order to match various manufacturers latency settings. The setting is rounded down and applied in video frame multiples (a +50 mSec offset would result in the following.. one additional frame delay with 29.97 frame material and two additional frame delays with 59.94 frame material).	Max range is -400 to +200 and is constrained based on the ENCODELATENCY" setting and current video mode.
Fault Mode	The user can select encoder behavior video loss. The encoder can stop encoding, encode black, or generate a combination of Black, Bars, Tones and Service ID.	OFF BARS BARSTONES BARSOVERLAY BARSTONESOVERLAY
Fault Resolution	Allows the operator to select what resolution to encode at during fault mode.	480I59.94 576I50 720P59.94 720P50 1080I59.94 1080I50
Aspect Ratio	Aspect Ratio is the ratio of horizontal lines to vertical lines in the encoded	4x3 16.9

	image.Options are: - Wide Screen Signaling (WSS) reads incoming WSS flag and adjusts aspect ratio accordingly. - 4 X 3 defaults standard definition to 4 X 3 display. - 16 X 9 defaults standard definition to 16 X 9 display. Aspect Ratio is related to Active Format Descriptor (AFD). It is recommended to set AFD to WSS if Aspect Ratio is WSS.	WSS
AFD	Active Format Descriptor is data that can be sent in a MPEG video stream that provides information about the aspect ratio and picture characteristics within the stream. AFD compatible display or STB/IRD is required. AFD is related to Aspect Ratio. Aspect Ratio defines pixel aspect ratio as encoded. AFD is used by downstream decoding devices to properly display pixel aspect ratio on displays with differing aspect ratios.	OFF WSS BOX16:9_T BOX14:9_T BOX19:9_C AS_CODEDFRAME 4:3_C 16:9_C 14:9_C 4:3_SP_14:9_C 16:9_SP_14:9_C 16:9_SP_4:3_C
GOP Type	GOP Type can be set to open or closed. An OPEN GOP uses referenced pictures from the previous GOP at the current GOP boundary. A CLOSED GOP starts with an I Frame and subsequent B Frames do not rely on I or P frames from the previous GOP.	OPEN CLOSED
GOP Structure	GOP Structure sets the format Group-of-Pictures will use; the order of interframes and the various types of picture frames that will be used.	I IP IBP IBBP
GOP Size	GOP Size is the distance between two full image frames (I-Frames) in a GOP Structure.	user-defined using the numeric keypad range = 1-30
SD Video Mode	Configures the encoder for NTSC or PAL video. ***This is only affects the incoming SDI feed if it is SD or if the input is Composite.	NTSC PAL PALM PALN

3-D Sync Mode	Enables multiple ADTEC Encoders to be synchronized. One unit is designated as 'master' which is tracked synchronously by units that are designated as 'slave'. The synchronization is transmitted over an ethernet connection using broadcast packets.	OFF GENERIC MASTER MASTER GROUP 1 - 9 GENERIC SLAVE SLAVE GROUP 1 - 9

Audio Menu

Item	Function	Options
Sample Frequency	This represents often signal is sampled. This is a global setting for all audios.	32000 44100 48000
SDI Clock Source	The embedded audio clock source configuration determines whether to use the embedded clock phase words or derive from video clock. Default is EMBEDDED. If the SDI source has problem (or non-compliant) embedded audio clock phase words, then choose the video clock as the source. Note that choosing the video clock requires that all audio channels are embedded in a fully synchronous fashion.	EMBEDDED VIDEO
ECC Words	Default is ON. Select OFF if the SDI source has problematic (or non-compliant) ECC words.	OFF ON
	EN80 - A1 -A4 EN81 - A1 - A8	
Input	Selects the audio input to use during encoding.	Analog SDI AES
Mode	Allow you to configure you device to Encode per audio or Passthru	Off Encode Passthru
Type	Defines the type of audio to encode or pass.	DD = Dolby Digital AC3 MU = Musicam Layer II DE = Dolby E LP = Linear PCM DD-06 = Dolby Digital "streamtype 6" MU-04 = Musicam Layer II "streamtype 4"
Rate	The Audio Rate is the bitrate for	user-defined using the numeric

	audio encoding / transport and depends on mode selected.	keypad If MPEG 1 Layer 2, the available rates are 32, 48, 56, 64, 80, 96, 112, 128, 160, 192*, 224, 256, 320, 384 kBits/sec . If Dolby Digital AC3, the available rates are 56, 64, 80, 96, 112, 128, 160, 192*, 224, 256, 320, 384, 448, 512, 576, 640 kBits/sec. Note: * For MPEG 1 Layer 2 and Dolby Digital AC3, the recommended lowest rate for professional applications is 192 kBits/sec. In Dolby-E mode, do not set this value. The bitrate will be auto-detected.
Level	Controls the volume level in dBs	user-defined using the numeric keypad range = -18 dBs to 8 dBs in increments of 1
Sync	Audio Sync sets the audio sync offset. This measurement is in milliseconds, and works only on analog audios.	+/- 800
Musicam Mode	Allows the operator to choose how to encode left and right analog audio inputs.	STEREO MONO DUALMONO
IFB	This is a low latency audio path for communications to a remote van or studio using the same distribution path. It requires a special IFB receiver. Note: There is no PID reference in the PMT for this functionality. It is considered a ghost PID. It is also not lip-sync aligned with video.	OFF ON GHOST

Item	Function	Options
SDI Pair	Allows the operator to route embedded audio from SDI input to the specified audio encoder.	user-defined

PIDs Menu

Item	Function	Options
Transport Stream ID	Sets the Transport Stream ID in PAT and other tables in the egress transport stream. Configure this value in Hex.	0x0001 - 0x1FFE
PMT PID	PMT PID refers to the PID of the Program Map Table (PMT). Program Map Tables are used to describe the properties of a single program.	user-defined using the numeric keypad
PCR PID	Programs periodically provide a Program Clock Reference, or PCR, on one of the PIDs in the program. This is also known as the master clock. The PCR PID identifies the packets which contain PCR adaptation fields.	user-defined using the numeric keypad
Video PID	Video PID identifies packets containing the video Packetized Elementary Stream data.	user-defined using the numeric keypad
Audio PID EN80 A1 -A4 EN81 A1 - A8	Identify packets containing audio content for the specified channels	user-defined using the numeric keypad
Teletext PID	Teletext PID identify packets containing teletext information.	user-defined using the numeric keypad
VITC PID	Sets the Program ID (PID) for the ANC (H & V). ANC Data captured from HD-SDI source is carried per SMPTE-2038. Typically this is used to carry VITC. If VITC and LTC are carried concurrently, LTC is dropped.	user-defined using the numeric keypad
AMOL PID	Automated Measurement of Line Ups; identifies packet which contains AMOL (NTSC) information Only applies to 525 line (NTSC) video.	user-defined using the numeric keypad
Splice PID	Splice PID is used for Cable Labs SCTE 35 Splice Point identification.	user-defined using the numeric keypad

VBI Menu

Item	Function	Options
Source	selects the source of Vertical Blanking Interval spacing	Composite SDI
Closed Caption	activates (or deactivates) closed-captioning and specifies closed-captioning standard to be used	Off DVS157 ASTC ASTC708 ASTCConvert
VITC Mode	Allows the operator to choose to look at Ancillary or waveform data for captions	OFF ON

Profile Menu

Command	Function
SELECT	The select submenu lists all stored profiles and allows loading
SAVE	The save submenu saves a profile with a user designated name
DELETE	The delete submenu deletes a profile from the available list

CAS Menu

Control	Function
Mode	select between off, BISS-1, and BISS-E encryption. options: OFF, BISS_1, BISS_E_USER_ID_ONE, BISS_E_USER_ID_TWO
Clear Session Word	MODE BISS 1 uses a 12-digit hexadecimal Clear Session Word.
Encrypted Session Word	MODE BISS E XXX uses a 16-digit hexadecimal Encrypted Session Word
User ID 1	used in BISS-E Mode only; the 14-digit hexadecimal User ID used for encryption
User ID 2	used in BISS-E Mode only; the 14-digit hexadecimal User ID used for encryption (secondary)

System Menu

Login

Units ship with the front panel logged in by default. If you become logged out and are prompted for a password, use the following key sequence for access.

Action
Press <Select>
Press <Up> arrow
Press <Select>
Press <Enter>
Press <Right> arrow
Press <Enter>

Duration

The front panel also has a login duration feature. This setting Allows the operator to specify a time frame (in minutes) until the unit will automatically log itself out.

Action
Press mode until you see the System Menu.
Press <Select>
Press the <Down> arrow
Press <Select>
Using the <Up> and <Down> arrows, select the value you wish.
Press <Enter> to save your selection

Possible Configurations:
0 (Zero): The unit will not automatically log out.
1-9: The duration of time, in minutes, before the unit logs out, if no input is received.

Backlight Dim Delay

Action
Press <Select>
Using the <Up> and <Down> arrows, select the value you wish.
Press <Enter> to save your selection

Network Sub Menu

Item	Function	Options
Ethernet IP Address	This is the address of your device on your network specific to the Ethernet Port.	user-defined using the numeric keypad Default is 192.168.10.48
Ethernet IP Mask	Defines the unit relative to the rest of your network.	user-defined using the numeric keypad Default is 255.255.255.0
Ethernet DHCP	The Dynamic Host	On (finds own DHCP Address)

	Configuration Protocol allows your device to self-locate network Ethernet parameters.	Off (defaults to last entered IP Address) Default is OFF
GIGE IP Address	This is the address of your device on your network specific to the GigE Port.	user-defined using the numeric keypad Default is 192.168.20.48
GIGE IP Mask	Defines the unit relative to the rest of your network.	user-defined using the numeric keypad Default is 255.255.255.0
GIGE DHCP	The Dynamic Host Configuration Protocol allows your device to self-locate network GigE parameters.	On (finds own DHCP Address) Off (defaults to last entered IP Address) Default is OFF
Gateway IP Address	The gateway is a routing mechanism that passes traffic between different subnets and networks.	user-defined using the numeric keypad Default is 192.168.10.1
Stealth IP Address	This is a security feature that allows only the designated Stealth IP Address to communicate with the unit for FTP and other services. This control allows one-point override access to the Stealth IP Address.	user-defined using the numeric keypad Default is 0.0.0.0. Using all 0s effectively turns this function off.

Time Sub Menu

Item	Function	Options
Time	Defines system time	user-defined using the numeric keypad
Timezone	Defines the time zone the unit operates in	

NTP Sub Menu

Item	Function	Options
NTP Status	Network Transfer Protocol	Read-only
NTP IP Address	IP address designated for Network Transfer Protocol	user-defined using the numeric keypad Default is 0.0.0.0. Using all 0s effectively turns this function off.

Alarm

Item	Function	Options
Event Record	Log of events outside of regular operating parameters	scroll up and down to view log items

SNMP Sub Menu

Item	Function	Options
SNMP	Controls the status (ON/OFF) of the Simple Network Management Protocol (SNMP) feature. We support SNMPv2c version.	OFF ON CLEAR
Read-only community	The Simple Network Management Protocol (SNMP) Read-Only Password. Default Value: "adtec"	user-defined
Read-write community	The Simple Network Management Protocol (SNMP) Read-Write Password. Default Value: "none"	user-defined
Trap community	The Simple Network Management Protocol (SNMP) trap community. Default Value: "public"	user-defined
Trap sink	The Simple Network Management Protocol (SNMP) trap sink. Default Value: "127.0.0.1"	Enter the IP address of your SMNP trap sink server.

Com2

Item	Function	Options
Com2 Settings	RS-232 terminal monitor for communicating with the internal host motherboard for diagnostics.	115200 8 1 NONE 57600 8 1 NONE 38400 8 1 NONE 19200 8 1 NONE 9600 8 1 NONE Default is 38400 8 1 None

Feature Sub Menu

| Item	Function	Options
Permanent ID	This is one of the unique IDs for your unit. This number along with your serial number are used to generate permanent feature keys.	read only value
Temporary ID	This is the other unique ID. It along with the permanente ID, and serial number are used to generate temporary feature keys.	read only value
Key status	Depending on what keys you have and if they are temp or permanent they will be listed here.	read only values with countdown for temp keys.

Name

Item	Function	Options
Name	Displays and allows editing of the units name. This becomes the units host name for networking purposes.	Enter Ascii characters.

Firmware

Item	Function	Options
Firmware	Displays the currently running firmware version of your unit.	Read-Only

Back Panel
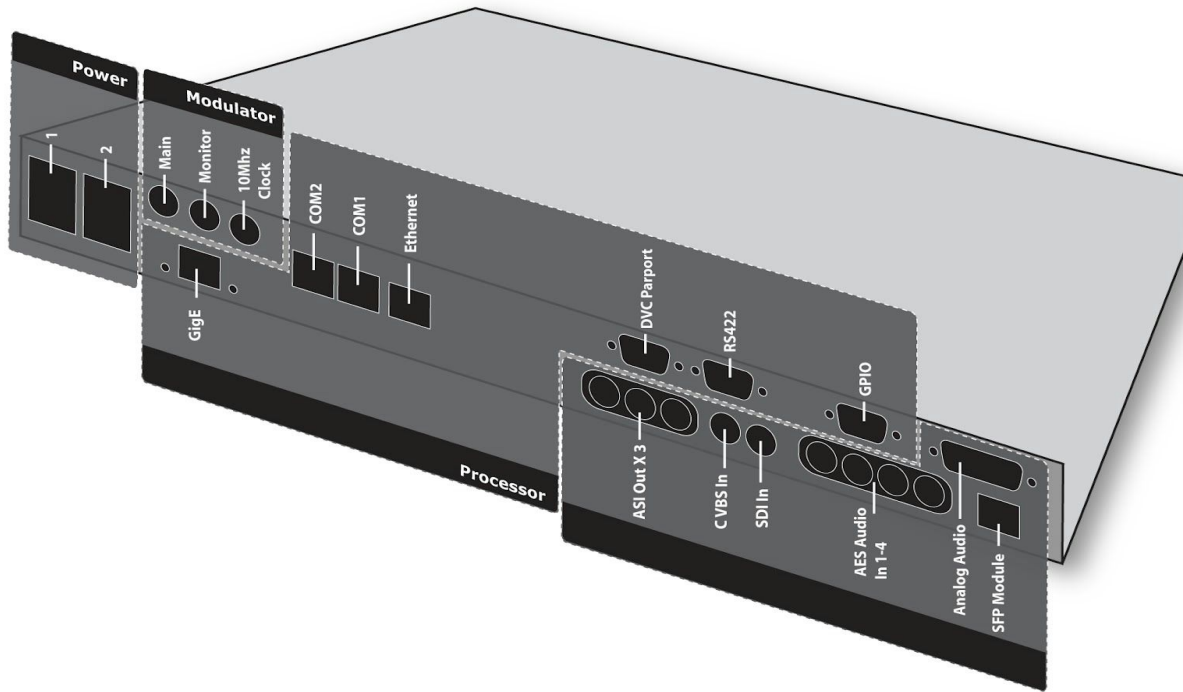
Connector	Description
Power 1 & 2	Redundant AC Power, Standard 3 pin computer power plug (Auto range 70-240 VAC Input)
GigE	MPEG2 or RTP multicast transport egress port (SMPTE 2022)
COM2	API Serial Communication Interface **
COM1	Serial Port Used for Troubleshooting (Terminal)
Ethernet	10/100 base T ethernet interface (Monitoring/Management)
DVC Parport	9-pin parallel I/O interface for control systems **
RS422	Not Currently Supported **
GPIO	Tally and Control Port
ASI OUT	75 Ohm source ASI x3 per EN5000839. Up to 100 Mbps.
CVBS In	75 Ohm terminated Standard Definition Composite Video Input
SDI In / ASI In	75 Ohm terminated Input, Video & Audio (SMPTE 259M for SD &

	SMPTE 292M for HD) BNC
AES Audio In 1-4	75 Ohm AES-3 per AES3-2003
Analog Audio In	Stereo Pairs 1 and 2 (600 Ohm Balanced) **
Main	RF output, 50 Ohm BNC *7039 L-Band Model:* Frequency range 950 MHz to 1.750 GHz, Power Level -50 to -7 dBm *7139 L-Band Model:* Frequency range 950 MHz to 2.150 GHz, Power Level -35 to +5 dBm *IF Model:* Frequency range 50 MHz to 180 MHz, Power Level -30 to +5 dBm
Monitor	RF output, 50 Ohm BNC *L-Band Model:* Fixed power level at -45 dBm *IF Model:* Fixed power level at -45 dBm, fixed frequency at 1.08 GHz
10MHz Clock	BNC 50 Ohm connector for external 10MHz reference input
SFP	Single channel optical receiver module.

DB15-M Analog audio input pinout

PIN	Function
1	Channel 0 left +
2	No Connection
3	Channel 0 Right -
4	Channel 1 left +
5	No Connection
6	Channel 1 right -
7	Ground
8	No Connection
9	Channel 0 left -
10	Channel 0 right +
11	No Connection
12	Channel 1 left -

13	Channel 1 right +
14	No Connection
15	Ground

COM1/COM2 to DB9 Serial Adapter

DB9 PIN	RJ45 Pin	Function
1	NC	No Connect
2	6	
3	5	
4	1	
5	4	
6	3	
7	7	
8	8	
9	NC / NA	No Connect / Not available on RJ45

GPIO and Parport information

The GPIO port allows encoder stop / start control and TTL voltage output for monitoring systems. TTL pin behavior by default is HI (3V) when encoding and LO (0V) when not encoding. Logic of the TTL pin can be configured based upon video detection, encode status, and manual override with the PP9 API command. Please view API details for further configuration information.

The DVC Parport allows custom events to be programmed upon input pin voltage change. It contains 4 available inputs for custom commands. Please contact technical support for advanced usage in programming the parallel port.

GPIO Pinout

PIN	Designation	Function
1	NC	No Connect
2	D3	reserved for future functionality
3	D2	RECORD (start encoder) (input)
4	D1	STOP (stop encoder) (input)
5	D0	reserved for future functionality
6	NC	No Connect
7	5VDC	+5V DC
8	GND	ground
9	TTL Tally	HI (3V) or LO(0V) based upon PP9 logic (output)

Parport Pinout

PIN	Designation	Function
1	NC	No Connect
2	D3	Data bit 3 (input)
3	D2	Data bit 2 (input)
4	D1	Data bit 1 (input)
5	D0	Data bit 0 (input)

6	NC	No Connect
7	5VDC	+5V DC
8	GND	ground
9	NC	No Connect

Chapter 2 - Getting Connected

Introduction to the Control Application

A web-based control software application comes pre-installed on the EN-XX.

Compatible browsers

Firefox (recommended)
MS Internet Explorer
Safari
Chrome

Ethernet Access

To begin, you will need to connect to your EN-XX via ethernet directly, or by adding the EN-XX to your local area network.The default address for all Adtec devices is 192.168.10.48.

To connect directly to the device, make sure that your computer and the device have IP addresses within the same IP class range (ex. 192.168.10.48 for the device and 192.168.10.49 for your computer).
If you need to change the IP address of the device, this can be done via the front panel, System > Network menu. Using a CAT 5 crossover cable, connect one end to your computer and the other to the Ethernet port found on the processor section of the back panel. (Some computers can auto negotiate the connection and a crossover may not be necessary.)

To add the device to a LAN, connect a standard CAT 5 Ethernet cable to your network router and then to the Ethernet port on the back of the device. If your network is DHCP enabled and you prefer that over a static IP, you can turn on DHCP for the device via the front panel, System > Network menu.

Zero Configuration Access

Adtec Digital has adopted zero-configuration networking technology, streamlining the setup and configuration processes for our products. The use of this technology enables automatic discovery of Adtec devices and services on an IP network. Used in tandem with the web-based control and configuration applications we can now provide 1-click access to any device.

By using the built-in Bonjour locater in Apple's Safari browser or the plug-ins readily available for IE or Firefox browsers, users can locate all of the Adtec devices on a network by referencing the serial number on the back of the device. Clicking on the unit in the Bonjour list will re-route you to a login page. If you do not wish to use Bonjour, you can reach the device's web application by pointing your browser to the IP Address of the
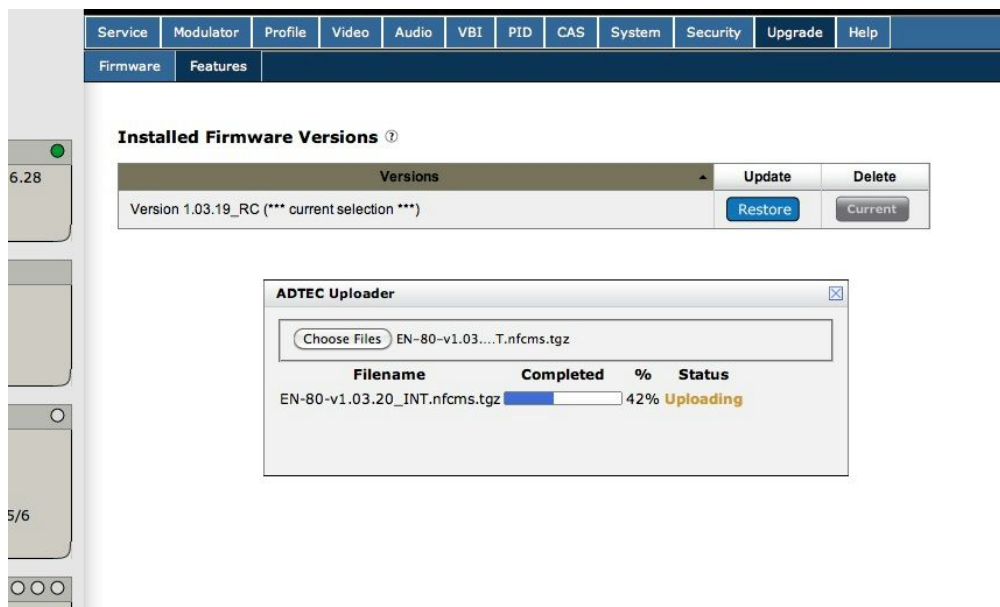
device. Ex. http://192.168.10.48/.

Login

Once you reach the default login page for the web-based application, you will need to login by pressign the login button. You will be prompted for a username and password. The default username is 'adtec'. The default password is 'none'. The left-hand panel of the application will report current status in real-time while the right panel tabs will allow you to configure your device. As you navigate through the web application look for the ? icons associated with each parameter. By clicking on these question marks, you can view additional information about how the parameter is used.

Upgrading Via Web User Interface

Periodically, we will provide firmware updates to our products via our website. (http://www.adtecdigital.com) To upgrade your device, download the firmware file from our website and store it locally. Login to the web-based application and navigate to the Upgrade > Firmware tab. Click on the upload button located at the top right of the application. Select the firmware file from your local machine and wait for it to upload. Once it has finished uploading, it will appear in the Available Versions list. Click on the Install button associated with the new file. Wait for it to completely extract and become available in the Installed Versions List. Once available there, simply click on the Select button associate with the new firmware and wait for your device to reboot.

Upgrading Via FTP & Telnet

For those times when using the web user interface is not convenient, you can upload the firmware file via ftp and then extract and select into it via Telnet.

File Transfer Protocol (FTP)
FTP connections can be made to the Adtec device using any ftp client.
Host: <ipa of the unit>
Default Username: adtec
Default Password: none
Port: 21
You will want to drop the firmware file in the media/hd0/media folder.

Telnet (standard 23 port)
To connect to your unit using a terminal session you will need to set the IP address of the unit. See earlier instructions on setting the IP via the front panel.

Using a terminal window, complete the following:

Step	Action
1	Type 'telnet x.x.x.x' in a terminal window, without quotes, where x.x.x.x is the IP address of the unit.
2	Press <Enter>.
3	When prompted for a username, enter adtec.
4	When prompted for a password, enter none.

Once you see "User 'adtec' connected", the session is open and you may issue API commands to the unit.

To extract and select into the new firmware version you have uploaded, issue the following commands.

*.sysd version search
Copy the line designating the location of the new file.

Then type:
*.sysd version extract "copied path to new file"

Wait for the extraction to complete. Once complete, type the following command:
*.sysd version

Copy the line referencing the firmware version you wish to use and then issue the following command.

*.sysd version select "copied new firmware version"

Once you press enter, this will reboot your device into the new version.

See series of commands as they occur during this process below.


```
----------------------------------------------------------------------
Last login: Wed Sep 14 12:08:53 on ttys000
Macintosh:~user$ telnet 192.168.10.143
Trying 192.168.10.143...
Connected to 192.168.10.143.
Escape character is '^]'.

Adtec Resident Telnet Server...
UserName:
adtec
PassWord:
User adtec connected


*.sysd version search
OK
/media/hd0/media/EN-80-v1.03.09_RC.nfcms.tgz

*.sysd version extract /media/hd0/media/EN-80-v1.03.09_RC.nfcms.tgz
OK
Validating Firmware: EN-80-v1.03.09_RC.nfcms.tgz
Firmware file validated.
Extracting firmware: EN-80-v1.03.09_RC.nfcms.tgz.
------ long series of extraction messages -----
Extraction complete.
Moved usr/adtec/EN-80 to /opt/pkg
Extraction successful.

*.sysd version
OK
adtec/EN-80/1.03.10 (*** current selection ***)
adtec/EN-80/1.02.17
adtec/EN-80/1.03.09_RC

*.sysd version select adtec/EN-80/1.03.09_RC
OK
Found Required GNU for adtec/EN-80/1.03.09_RC: gcc-3.4.4-glibc-2.3.5
Updating OEM version to adtec/EN-80/1.03.09_RC.
Updating GNU to gcc-3.4.4-glibc-2.3.5
Updated GNU to gcc-3.4.4-glibc-2.3.5
```

Set /opt/pkg/var/oem_prev for migrate: /opt/pkg/usr/adtec/EN-80/1.03.10
Current autoboot partition: 2
Updating the primary kernel.
Creating a boot partition using the "primary" directory ...
Flushing /dev/hde device buffer, please wait.

Chapter 3 - Operational How-Tos

How to Use Vertical Interval Time Code

Vertical Interval Time Code (VITC) is typically used in transmissions that require time code from the originating source to be preserved. It was originally developed for analog television recording systems, but has new standards for transmitting in digital systems (SMPTE-12M-1 / SMPTE-12M-2). Preserving time code is beneficial for future editing and playback of captured material.

EN-XX-series devices can pass VITC ancillary data as part of the ANC PID. The ANC PID is a separate PES located in the transport stream. Additionally, time code within the GOP of the video will also be adjusted at encoder start up to match the incoming ancillary VITC.

VITC data packets will contain a DID of 0x60 and an SDID of 0x60. The VBI tab contains an SDI ancillary inspector that allows users to view ANC data present at the input. This tab can be viewed for verification of present ancillary data at the SDI input.

Refresh Stats

Current VBI Stats ⑦

Line	Field ID	Count	Length	DID/SDID
09	1	14254	32	6060

VBI Source: ⑦ | SDI   ▼ |

Closed Caption: ⑦ | ATSC 708 ▼ |

To enable VITC passthrough:

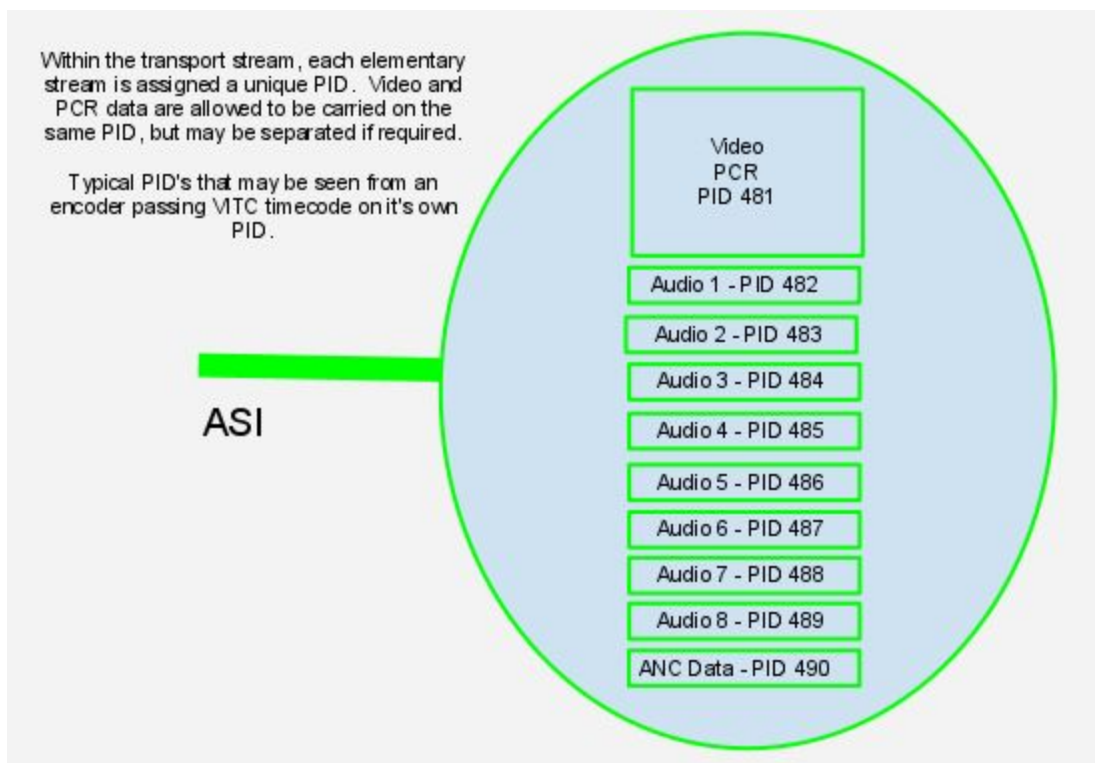| Step	Action
1	On the VBI Tab in the Web GUI Control Application, configure the "VBI Source" for <SDI>.
2	On the PID Tab in the Web GUI Control Application, select the <On> setting for "ANC PID Active".

How to Configure Passthru Audio

Adtec EN-Series encoders have the flexibility to meet many demanding audio requirements. Each model contains specific encoding options, but every Adtec EN-Series encoder supports two audio passthrus. An audio passthru consists of a compressed bitstream (Dolby E 20 Bit / Dolby E 16 Bit / Dolby Digital / Linear Acoustic Stream Stacker 2) or an uncompressed stereo pair (LPCM) from an embedded SDI or AES input passed into the egress transport stream (IP, RF, ASI).
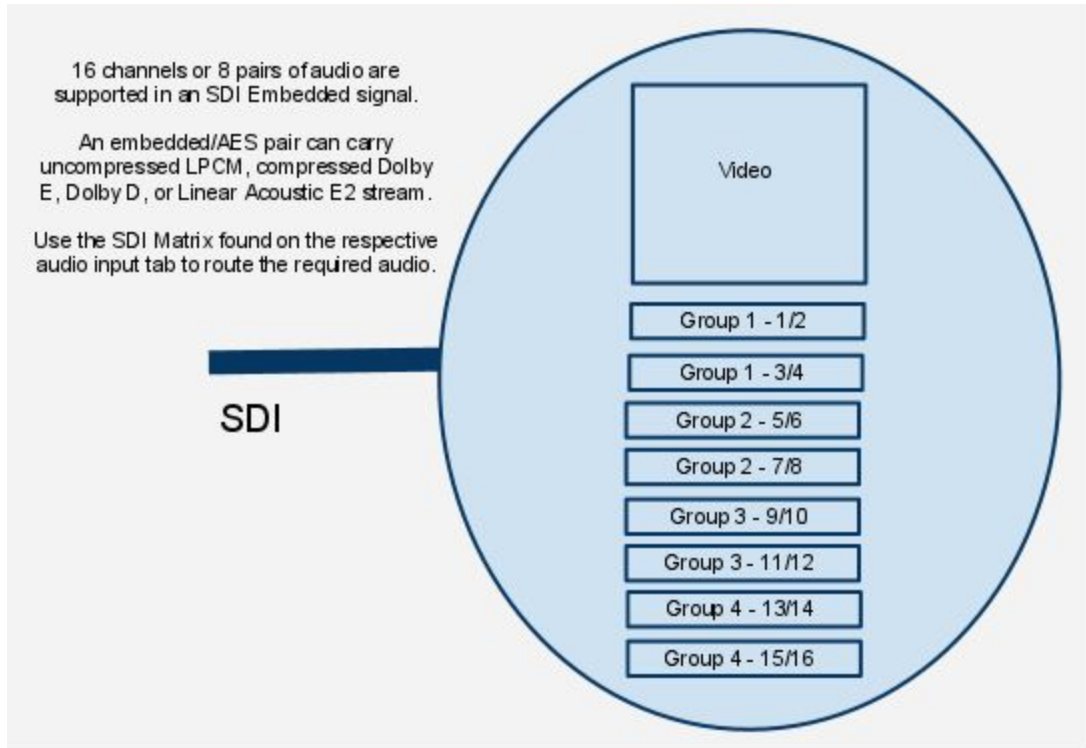
The encoder supports passthru on the first four SDI/AES audio inputs. The SDI Matrix and ASI Tranport Stream PID configurations allow for custom configurations if required.

Every audio input engine has an internal SDI Matrix to route any audio to one or multiple inputs. Each audio engine output can be assigned a user configurable PID in the transport stream to meet any job requirement.

If the passthru audio is coming in on discrete AES inputs, the 'PID' tab may be used to manipulate egress PID's as required.

If the passthru audio is coming in via embedded SDI, the SDI Audio Matrix may be used in conjunction with the 'PID' tab to manipulate the input and output routing.

16 channels or 8 pairs of audio are supported in an SDI Embedded signal.

An embedded/AES pair can carry uncompressed LPCM, compressed Dolby E, Dolby D, or Linear Acoustic E2 stream.

Use the SDI Matrix found on the respective audio input tab to route the required audio.

SDI

Video

Group 1 - 1/2
Group 1 - 3/4
Group 2 - 5/6
Group 2 - 7/8
Group 3 - 9/10
Group 3 - 11/12
Group 4 - 13/14
Group 4 - 15/16

To enable Audio passthru for Audio 1:

Step	Action
1	On the Audio -> Audio 1 subtab in the Web GUI Control Application, configure the **"Audio Mode"** for **<PASSTHRU>.**
2	Configure the **"Audio Input"** for the desired input **<AES>** or **<SDI>**. **note:** If using SDI, select the proper audio pair from the SDI audio matrix.
3	Select the type of audio from the "Type" drop down. <**Dolby Digital**>, <**Dolby E**>, or <**Linear PCM / E2**>. **note:** If Dolby E or Dolby Digital is valid at the input, the bit depth and bit rate are automatically determined after clicking Apply.
4	On the **"PID"** tab, type in the desired Audio PID for **"Audio 1"**.
5	Adjust other audio PID's if necessary.

Common Passthru Problems:

Dolby E Line Placement and/or Dolby E Continuity Count Errors:
Dolby E audio compression technology is designed so that 1 Dolby E audio frame corresponds to 1 Video frame. This 1:1 ratio of video and audio timing was designed to assist in Video editing and seamless cuts without losing audio data. Due to the crucial and

sensitive timing, Dolby E encoders *must* have a reference phase locked to the video. In other words, the SDI video timing feeding the encoder must match the same composite reference timing that is connected to the Dolby E encoder. A simple black burst generator that does not share the same SDI video timing **will not** work to source a Dolby E encoder. A composite video reference that shares the same timing as the video source should be used.

The encoder preserves audio and video timing as it is presented. If the audio timing does not match video timing at the inputs of the encoder, there will be line placement errors and/or CRC errors seen on a decoder.

No Detection of Dolby E / Dolby Digital, Front Panel shows "DE ---", "DP ---", "LP ---":
The encoder will automatically detect the bit depth of Dolby E (16 / 20 bit) and the bitrate of Dolby E / Dolby Digital. If Dolby E is selected and Dolby Digital is presented, the encoder will change automatically and vice versa. If Dolby Digital is selected and Dolby E is presented, the encoder will change the configuration automatically. If the front panel shows dashes for the detected bitrate '---', Dolby is not being detected. This is most commonly due to a mis-configured SDI Audio Matrix or Dolby not being present on the specified input pair.

Look at the SDI signal on an SDI analyzer to verify that Dolby is present on the pair intended. If an SDI analyzer is not available, one troubleshooting tip is to set the mode to ENCODE. If silence or regular audio is heard on the decoder, a compressed bitstream is not being presented on the corresponding input. The SDI matrix can be changed to each pair without restarting the encode session. Once hash is heard, then a compressed bitstream should be present. Set the mode back to Passthru for the automatic detection mechanism to configure the Dolby type and bitrate.

How to Use Auto Transport Mux Rate

Auto Transport Mux Rate (TMR) is a feature of Adtec EN-Series built with the optional modulator. This feature will automatically configure the overall data rate of the encoder (its TMR;Transport Mux Rate), based upon its Modulator configuration. In other words, when the modulator Transmit configuration is set to 'ENABLED', the encoder's TMR becomes the Modulator's configured Interface Rate. The TMR is a key configuration for modulator functionality and must match the modulator interface rate.

Please note that the configured video and audio data rates must be lower than the targeted modulation data rate for this feature to work properly. For example, HD Video (3Mbps) + 8 pairs of Mpeg1 Layer2 @ 384Kbps (3.072Mbps) = ~6.2Mbps. The TMR will not fit into a 3MBaud DVB-S QPSK 3/4 modulation configuration (As 3Mbaud with this settings would only support a data rate of 4.14Mbps). In this case, additional audios would need to be turned off or rates adjusted to meet the 4.14Mbps modulation data requirement.

How to Use ASI-Receive

The Adtec EN-Series with optional integrated modulator has been designed with different applications in mind. The encoder / modulator combo supports three different modes of operation.

1) They can be used together.
2) The modulator only can be used as a stand alone device
3) The encoder only can be used as a stand alone device.

The default mode of operation has the 'ASI Receive Mode' configuration turned OFF. In this mode, the SDI input serves as the primary SD/HD-SDI video input into the encoder. The encoder processes the video/audio/ancillary data and places the compressed data into a transport stream. The transport stream is fed concurrently to the ASI output module, IP output module, and internal modulator input. The ASI output will always be enabled, while IP and RF outputs have individual controls.

The second mode of operation has the 'ASI Receive Mode' configuration turned ON. In this mode, the SDI input is changed to an ASI input. This can be useful in situations where the encoder may not meet specific requirements for a job without losing up to 32APSK optional modulation capabilities. The ASI input is routed directly to the ASI output module and to the internal modulator input. All internal paths to and from the encoder module are terminated in this mode with encode functionality disabled. The modulator will be acting as a stand alone device with 3 ASI outputs available for pre-modulation monitoring capability. In this mode, the modulator interface rate must also match the ASI rate coming into the encoder for proper RF modulation. There is no reporting of the ASI input data rate or rate adaptation supported at this time. There is no null packet insertion or null packet dropping support at this time. The ASI input rate must be configured / viewed from the device feeding the EN unit. The third mode can be used by DISABLING modulator transmit.

To enable your Adtec EN-series device for ASI Receive Mode, follow the following steps:

Step	Action
1	On the rear panel of the device, connect your ASI cable to the **"ASI-IN"** BNC connector. This is a shared connector; it also functions as the SDI-In connector.
2	Access the Web UI for your unit.
3	On the **"Video"** tab, select **\<On\>** as the option for **"ASI Receive Mode"**. This routes the ASI signal to the unit's internal modulator.
4	On the Status Display on the LCD Panel (unit frontpanel), "ASI Receive/Passthru" should be shown.

Chapter 4 - Appendix

Appendix A - GNU General Public License

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Appendix B - Technical Specifications EN-81

Video

- **Video Input (Digital)**
  - ○ 3G BNC x1
    - ■ SD-SDI (SMPTE 259M-C - 270 Mbit/s) with embedded audio per SMPTE 272M, A, B, C.
    - ■ HD-SDI (SMPTE 292M - 1.485 Gbit/s) with embedded audio per SMPTE 299M .
    - ■ 3G-SDI (SMPTE 424M - 2.97 Gbit/s) with embedded audio per SMPTE 299M (future capable).
  - ○ Auto detect SD, HD or 3G, or manual configuration. 75 Ohm.
- **Video Input (analog)**
  - ○ BNC x 1
    - ■ Analog Composite NTSC and PAL. 75 Ohm.
- **Video Signal Generation**
  - ○ SMPTE Bars with DVB Service Name and Service Provide OSD.
  - ○ Selectable resolutions from NTSC, PAL, 720P 59.94/50 and 1080i 59.94/50.
  - ○ User definable video fail mode.
  - ○ No video inputs are required to generate video signal.
- **SD Encode**
  - ○ Standard Definition D1 NTSC 29.97 fps and PAL 25 fps video.
- **SD Video encode profile and levels**
  - ○ MPEG 2 - MP@ML
    - ■ Data rates from 1 to 15 Mbps.
  - ○ MPEG 2 - 422P@ML
    - ■ Data rates from 1 to 50 Mbps.
  - ○ H.264 (MPEG 4): MP@L3.0, MP@L3.1, MP@L3.2.
    - ■ Data rates from 0.700-20 Mbs
  - ○ Support for 420 and 422 for both CODECs based on 420/422 Feature Key.
- **HD encode**
  - ○ 1080i 59.94, 720P 59.94, 1080i 50, 720P 50 fps video
- **SD/HD Video encode profile and levels**
  - ○ MPEG 2 - MP@ML & 422P@ML
    - ■ Data rates from 1 to 80 Mbps
  - ○ MPEG 2 - MP@HL & 422P@HL
    - ■ Data rates from 6 to 80 Mbps
  - ○ H.264 (MPEG 4): MP@L3.0, MP@L3.1, MP@L3.2
    - ■ Data rates from .700 to 20 Mbps
  - ○ H.264 (MPEG 4): MP@L4.0, MP@L4.1
    - ■ Data rates from 3 to 80 Mbps
  - ○ Support for 420 and 422 for both CODECs based on 420/422 Feature Key
- **Group of Pictures (GOP)**
  - ○ MPEG 2: 1-30. I, IP, IBP, IBBP. H.264
  - ○ MPEG 4: 1-30. I, IP, IBP, IBBP

- **MPEG 2 420/422 Keys (Software Optional)**
  - Feature keys for MPEG 2 420 and 422 Chroma
  - **H.264 420 Key** (Software Optional)
    - Feature key for H.264 420 Chroma
  - **H.264 422 Key** (Software Optional)
    - Feature key for H.264 422* Chroma
- **SD encode Pre-Processing**
  - Encoder Filters (SD Only) : Temporal & Spatial (Median) with Time Base
  - Corrector (TBC) on Analog and SDI inputs for SD resolutions only
- **Interlaced Encoding**
  - MPEG 2: Field/Frame.
  - H.264 MPEG 4: Field / Frame / MBAFF / PAFF
- **Motion Estimation and Precision**
  - Search Range:
    - Horizontal -169.75 to 155.75
    - Vertical -87.5 to 115.75 Pixels
  - Precision:
    - MPEG 2: 1/2 Pixel
    - H.264 MPEG 4: 1/2, 1/4 Pixel
  - Block Size:
    - MPEG 2: 16 x 16, 16 x 8
    - MC: H.264
    - MPEG 4: 16 X 16, 16 X 8, 8 X 16, 8 X 8
- **Video Latency** (Encode path only and subject to change)
  - Long (~ 1 second) Distribution Applications
  - Normal (~ 400 ms)Contribution Applications
  - Low (~ TBD) Low Latency Contribution
  - Very Low (~ TBD) Lowest Latency Applications

Ancillary and Waveform Data
 (V/H) ANC and WSS Video User Data
- Waveform (Composite or SD SDI):
  - Closed Captions per CEA-608-C (2005)
  - Closed Captions per DVS-157
  - Wide Screen Signaling (WSS) per ETSI EN300294 V1.4.1 (2003-04)
  - Teletext per ETSI EN 300 472 V1.3.1 (2003-05),
- AMOL (V/H) ANC per SMPTE 291M (Native via SD/HD SDI):
  - Closed Captions per CEA-708 (SMPTE 291M),
  - Teletext per OP47 and SMPTE 2031
  - VITC per SMPTE 2038
  - EBU Teletext/Subtitles
  - WSS/Teletext/NABTS/CEA-608/TV2GX/AMOL48/96
  - User Defined (2031-2007) per SMPTE 2031
  - AFD/Bar Data/Pan Scan per
  - CEA-CEB16 (2006) per SMPTE 2016
 Waveform Bridging and Conversion of Video User Data
- CEA 608 to CEA 708 bridging
  - Caption Carriage:

- - - ■ CEA-608 via Composite merged with SD or HD Video via SDI (Similar frame rates required>58
  - ○ Teletext Carriage:
    - ■ Waveform Teletext via Composite merged with SD or HD Video via SDI
  - ○ WSS Carriage:
    - ■ Waveform WSS via Composite merged with SD Video via SDI
  - ○ Transport Stream User Data Carriage:
    - ■ SCTE 127-2007, ETSI EN 301 775, v1.2.1 (2003-05)

Audio

Audio Input (Digital)
- BNC- AES3 x4
  - ○ AES-3 (x4). Digital audio uncompressed LPCM on inputs1/2/3/4 or compressed bit stream on inputs 1/2. 75 Ohm
- BNC-SDI x1
  - ○ SDI (x16). Digital audio embedded per SMPTE 272M (SD) and 299M (HD).
    - ■ Four (4) uncompressed LPCM services user selectable from groups 1/2/3/4 or two (2) compressed bitstreams, selectable from groups 1/2/3/4. 75 Ohm

Audio Input (Analog)
- ○ DB-15 M Analog Balanced Stereo (x2).
  - ■ Analog audio input via DB15 male connector. Clip 18 dB, 10K Ohm
  - ■ *** *** See "DB15-M Analog audio input pinout" in this Appendix.

MPEG 1 Layer 2 Audio encode
- ○ 32/44.1/48 Khz.
- ○ Bit rates include 32, 48, 56, 64, 80, 96, 112, 128, 160, 192, 224, 256, 320, 384 Kbit/s.
- ○ Stereo, Mono, Dual Mono.

Dolby AC 3 Audio encode
- ○ 32/44.1/48 Khz.
- ○ Bit rates include 56, 64, 80, 96, 112, 128, 160, 192, 224, 256, 320, 384, 448, 512, 576, 640 Kbit/s.
- ○ Modes 2.0 Stereo and 1.0 Mono.

Audio Passthrough
- ○ Dolby E 5.1/2.0/1.0
- ○ LPCM
- ○ Linear Acoustic
- ○ Audio Signal Generation

Audio Tones
- ○ user-selectable frequency per pair (8) from 440 hz to 2.5Khz.
- ○ Group L/R mute or Pair L/R mute.

Note: No audio inputs are required to generate audio tones.

Transport

Transport - ASI
- BNC x3
- ISO13818-1 MPEG 2 Transport Stream per EN 50083-9:1997 (188 byte only).
- Physical interface 100 Mbit/s.

- ASI concurrent with TSoIP
- (GIGe) and DVBS/S2.

Transport Over IP (!TSoIP) - RJ45 x1
- ISO13818-1 MPEG 2 Transport Stream per EN 50083-9:1997 (188 byte only).
- Four (4) unique UDP or RTP encapsulated routes with SMPTE 2022 (COP3 FEC).
- TSoIP (GIGe) concurrent with ASI and DVBS/S2.

Transport - DVBS/S2 (Hardware Optional – requires factory installation)
- BNC x2 IF
- BNC x2 L-Band
- ISO13818-1 MPEG 2 Transport Stream per EN 50083-9:1997 (188 byte only).
- DVBS/S2 RF Modulation option. Intermediate Frequency (IF) between 50-180 Mhz or 7139 L-Band between 950-2150 Mhz.
- RF or IF based on model Main and Monitor outputs with user selectable power level.
- DVB-S2 compliant per EN 302307, DVB-S compliant per EN 300421, DVB-DSNG compliant per EN301210

DVBS2-8PSK 8PSK (Software Option)
- Satellite Modulation software key; requires factory installed DVBS/S2 hardware.

DVBS2-16APSK 16 APSK (Software Option)
- Satellite Modulation software key;requires factory installed DVBS/S2 hardware.

DVBS2-32APSK 32 APSK (Software Option)
- Satellite Modulation software key, requires factory installed DVBS/S2 hardware.

Encryption
- DVB Common Scrambling Algorithm Basic Interoperable Scrambling System (BISS).
- Mode 0 Clear (Free To AirFTA), Mode 1 and Mode E.

Table Generation
- MPEG Program Specific Information (PSI) table compliance:
  - PAT / CAT / PMT
- DVB Service Information (SI) static table compliance: (Dynamic Option) SDT / NIT / EIT / TDT/TOT
  - ATSC !(PSIP) static table compliance (Dynamic Option)
- MGT (TVCT)
  - Terrestrial / STT / RRT / EIT 0-3

System and Host

Alarms
- Front Panel LED
- Web UI
- SNMP
- GPIO

Command and Control
- IPv4 via ETH0 Fast Ethernet
  - SNMP/FTP/SSH/Telnet/HTTP/TSoIP
- IPv4 via ETH1 GIGE
  - SNMP/FTP/SSH/Telnet/HTTP/TSoIP
- Serial 1 RS232 via RJ45
  - Terminal, 38400-8-1-N (Full API support)

- Terminal RS232 via RJ45
  - Terminal, 115000-8-1-N (Full API and Linux Terminal support)
- RS422 via DB9 Female
  - Sony 9 PIN Protocol, 38400-8-1-O
- Parallel (GPIO via DB9 Male)
  - Encode, Stop, Status, BCD IO for user defined Tally or control
    - Full Adtec API Par Port mapping via DVC command file

Physical
- 1 RU chassis (19 x 18 x 1.75 / 482 x 44 x 457 mm)
- 9 pounds gross weight

Power Inputs
- Redundant auto switching dual 70-240 VAC (Standard)
- Redundant auto switching dual
- 48 VDC Telco (Option)
- Redundant auto switching 12 VDC Mobile (Option)

Power Usage
- Start-up:72 Watts
- Operational: 60 Watts

Operational
- - Ambient operating temperature: -20 C to 40 C.
- - Ambient storage temperature: -30 C to 80 C.
- - Non-condensing relative humidity range: 30% to 85%

Safety
- CE

Appendix C - Adtec Digital Support & Service

Technical Support and Customer Service includes troubleshooting product/system functional operations concerning Adtec equipment, embedded systems and single device issues; Service Order generation, processing and tracking; Warranty claim processing; and on-site system evaluation and maintenance. Technical Support plans do not include customer training programs. Programs incorporating customer training are defined in the Training Services Policy. Customer Services technicians provide limited instruction during a support call/email/fax in order to facilitate checking for proper equipment operation.

Telephone and Email Support

- **Telephone:** 615-256-6619 ext. 166
- **Email:** support@adtecinc.com
- **Internet:** http://adtecdigital.com/support/support-request

Adtec Digital offers telephone, email and fax support, warranty and service related inquiries during normal business hours: 9:00am to 5:00pm Central Standard Time (CST), Monday through Friday, holidays excepted. Support Requests can also be submitted on-line.
All inquiries will be processed in the order in which they are received and by the criteria outlined in the Call Response Order. Inquiries and inquiry responses made after 5:00 PM (CST) weekdays, Saturday, Sunday or on an Adtec-recognized holiday will be processed the next business day in the order received.

Callers on hold and returned calls will be prioritized by the following criteria:
- Priority-24 Subscription Customers
- Standard-Priority Subscription Customers
- All customers that have purchased Installation & Training, within 90 days of the installation.
- Adtec Certified Operators (ACO)
- Limited Level Support, Warranty & Service Requests
- Multi-device system installations that have purchased Installation & Training from Adtec
- Distributors
- System Integrators
- Multi-device systems
- Single device users

Preparing for Support

To help expedite the troubleshooting process, please be prepared to provide the following information to the support representative:
- **Product(s) affected:** Please provide a list of the Adtec Products involved including the Revision Number for each affected product.
- **Description of the Problem:** Please include a detailed description of the problem. Include the approximate time and day the problem occurred, the spot ID of the material being inserted and what the operator reported about the incident. It is also helpful to note any recent changes to the system. More information is always better than too little information.
- **Your Contact Data:** Please include contact information so we can reach you to discuss how to fix the problem, additional troubleshooting steps that are required or to gather more complete information regarding the problem. Please include your facility name (or call letters), your name, title, email address, telephone number, hours of work, and other contact persons if you

are not available.

SLA Options

Effective January 1, 2014
For questions, please email slaquestions@adtecinc.com

- **SLA STANDARD***
  Services: Includes initial product orientation
  Technical support M-F 8AM-8PM (EST)
  Firmware and software upgrades
  Includes repair expenses**
  Includes ground shipping within US
  International shipping is extra
  Fees: Free for one year after purchase

- **SLA PRIORITY 24***
  Services: SLA Extended Warranty plus…
  Technical support 24x7x365
  Expedited shipping is extra

- **SLA PREMIUM 24***
  Services: SLA Priority 24 plus…
  Next business day advance loaners

- **SLA EXTENDED WARRANTY***
  Services: Extends warranty after year one
  Includes repair expenses
  Expedited shipping is extra

- **SLA LEGACY**
  Services: Includes initial product orientation
  Technical support M-F 8AM - 8PM (EST)
  Firmware and software upgrades
  Includes Duet, Soloist 2/ 2S, Mirage, edje1013/1015/2000/2100/2110.
  Most legacy products cannot be repaired

- **SLA SESSION SUPPORT**
  Services: Technical support M-F 8AM - 8PM (EST)
  Includes support for 5 days after first call

- **SE SUPPORT**
  Services: Event based on-site technical representation

*Available for up to three years after purchase for Adtec manufactured products only
**Excludes equipment that has been subject to misuse, negligence, or accident

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