

EN-210

10-bit MultiCODEC Encoder

Includes modulator version - IF/LB/10M

USER GUIDE

3.00.29

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Trademarks & Copyrights

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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.
- Do not break the warranty seals on the device or open the lid. Only approved service technicians are permitted to service this equipment.
- 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 one 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 Celsius (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.

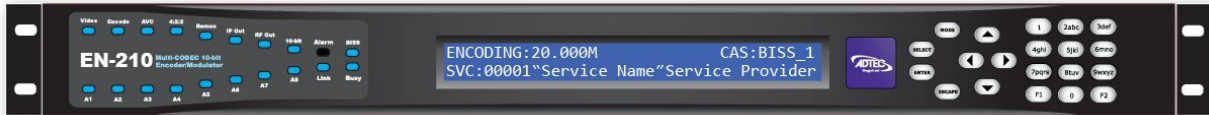
European Union EMC Directive Conformance Statement

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 - Getting Started

Front Panel

The Function Buttons and Directional Keypad of the EN-210 are used to configure and monitor the signal input and output of the device.



Front Panel LCD Quick Views

There are several Quick Views that can be accessed via the front panel LCD by pressing the up and down arrows.

1) **Service Data:** When in normal encoding mode, the LCD will display the following information: TS Mux Rate, Conditional Access Mode, Service ID Number, Service Name, and Service Provider.

```
ENCODING: 20.000M          CAS: OFF
SVC: 00001 "AdtechDTV" Adtec Digital
```

2) **Encoding Status:** This quick view displays the Input and Output Resolution, Frame Rate, Input interface, SDI interface Mode, and Bars/Tones/ID status.

```
I/RES: 1920x1080 29i INP: SDI MODE: AUTO
O/RES: 1920x1080 29i B/T/ID: OFF/OFF/OFF
```

3) **Video Status:** This quick view displays the Video PID, CODEC, Chroma Type, Bit depth, Video Bitrate, Entropy Coding, and Video Autofill status.

```
VID: 481    COD: H.264    CHR: 422    BITD: 10
VRT: 75489000b/s    ENT: AUTO    A/F: ON
```

4) **Audio Status:** This quick view displays the Audio Codec type, Encode or Pass Through Rate, Encode or Passthrough mode.

```
1:MU 384k 3:MU 192k 5:DD 384k 7:DD 384k
2:MU 192k 4:MU 384k 6:DD 384k 8:MU 192k
```

5) **Audio PIDs:** This quick view displays the Audio PIDs for all 8 pairs of audio.

```
Audio 1:0482 3:0485 5:0487 7:0490
PIDS 2:0483 4:0486 6:0488 8:0491
```

6) **TSoIP State:** This quick view displays the status of IP Transport mode, RTP, FEC mode, and Multicast Connector. Up to 4 destination IP addresses can be sent simultaneously.

```
1:SEND ON LLAT GIG 3:SEND ON OFF GIG
2:SEND OFF OFF GIG 4:OFF OFF OFF GIG
```

7) **Modulator State*:** This quick view displays the RF Tx status if the unit is equipped with optional modulator.

```
TX:ENABLED 32APSK_9/10 Pwr:-30dB RO:25%
Freq:1290MHz DUB-S2 Syn:15Ms Pilot:ON
```

8) **ASI Remux State:** This quick view displays the status of ASI Remux status if the feature is enabled.

```
REMUX:ACTIVE PROGRAMS:2
INPUT:058.061Mb/s RESERVED:060.000Mb/s
```


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 - Set to MPEG2 Encoding On - Set to H.264 (Advanced Video Coding) Encoding |
| 4:2:2 | Off - Encoding chroma type 4:2:0. On - Encoding chroma type 4:2:2. |
| Remux | Off - ASI Remux not active On - ASI Remux is enabled and active |
| IP Out | Off - TSoIP is not active On - TSoIP 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. |
| 10-bit | Off - Encoding in 8-bit mode On - Encoding in H.264 10-bit mode |

Audio Encode Indicators

| Indicator | Function |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A1 through 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 - Service is not encrypted "Clear - Free to air" On - Service is Encrypted "Cyphed - Selected BISS mode" |
| 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 Lineup

This feature enables the operator to quickly view and/or configure select modulator RF output parameters. The parameters available in this menu are;

1. Carrier Mode: [PURE_CARRIER or MODULATED]
2. Transmit: [ENABLED or DISABLED]
3. Output Power: [in 0.5dB increments]
4. Output Frequency: [in 1.0MHz increments]

To access the menu, press the F1 and F2 keys simultaneously. The front panel will briefly flash "MODULATOR LINEUP" then display the menu.

Note: To use this feature, the front panel display must be illuminated. If the display is dim, press ANY front panel button to illuminate it.

Note: 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.

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

```
Carrier: PURE_CARRIER Power (dBm): -50.0
Tx: DISABLED Mod. Freq. (MHz): 950.0000
```

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

```
Carrier: ON Power (dBm): -50.0
Tx: ENABLED Mod. Freq. (MHz): 950.0000
```

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

```
Carrier: ON Power (dBm): -40.0
Tx: ENABLED Mod. Freq. (MHz): 950.0000
```

To set the desired output Modulator Frequency, press and hold the front panel ← or → button.

```
Carrier: ON Power (dBm): -40.0
Tx: ENABLED Mod. Freq. (MHz): 1350.0000
```

Note: If the Modulator Frequency is reconfigured when Transmit = ENABLED, then Transmit will be automatically set to DISABLED.

Front Panel Menu Structure

Services Menu

| Item | Function | Options |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1.1 TS Mux Rate | Transport Mux Rate is the total transport stream rate. Use this number to match total circuit throughput | 1000000 - 150000000 note: The actual lower limit is configuration dependent. |
| 1.2 ABR Mode | <p>The Adaptive Bit-rate mode allows the encoder to adjust TMR and Video bit-rate without performing an encoder restart. This mode is useful for dynamic bandwidth based solutions.</p> <p>When this configuration is set to OFF, the default configuration, bit-rate changes to TMR or Video rate will restart the encoder if required. With this configuration set to Instant, bit-rate changes to TMR or Video rate will not restart the encoder.</p> <p>Note: With this mode enabled, a transport stream analyzer will show a PCR accuracy error on TMR changes. This is a type of "false alarm" if the error occurs during a bit-rate transition, the decoder adapts dynamically to the change.</p> | OFF Instant |
| 1.3 Program Number | Sets the program number in the PAT (Program Association Table). This value can be set in hexadecimal and decimal format. | 1 - 65535 0x0001 - 0xFFFF |
| 1.4 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 |
| 1.5 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 |
| 1.6 Tables | Allows the operator to choose which type of Tables the encoder will generate. | DVB ATSC |

| | | |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | 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 SDT ONLY - includes PMT, PAT, and SDT tables | DVB SDT ONLY MPEG |
| 1.7 ASI Receive Mode | Routes a external ASI signal from the HD/SDI input in the place of the internally encoded signal. | ON OFF |
| 1.8 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 ENCODE ONLY |
| 1.9 ASI Reserve | Set the reserve bandwidth for ASI Remux Note: Setting to zero disables ASI Remux | 0-100Mb/s |
| 1.10 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. |
| 1.11 Bars, Tones, ID Menu | Bars, Tones and Service ID information can be overlaid on top of valid video by selecting the desired combination from this menu. Note: When an audio input / channel is configured for Pass through operation Internal tone generation does not function for the pass through channels. | Bars Mode: ON, OFF Bars Type: BARS, Solid color, FLASH Tones Mode: ON, OFF OSD Mode: ON, OFF, BLINK |

RF Tx Menu

Note: This menu is dynamic. It will only appear if you unit has factory installed modulator option.

| Item | Function | Options | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------|----------|------------|----------|-------------|----------|-------------|----------|-------------|----------|--------------|----------|--------------|----------|---------------|----------|--------------|----------|--------------|----------|------------|----------|--------------|-----------|--------------|------------|--------------|-----------|--------------|------------|--------------|------------|--------------|-----------|------------|------------|--------------|-----------|------------|-----------|------------|------------|------------|-------------|------------|---------------|-------------|----------|--------------|----------|--------------|
| 2.1 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.2 Type | Allows the selection of the mod type. | DVBS DVB-S2 DVB-S2X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.3 Mode | This control allows the operator to select the desired modulation mode and FEC code rate. | <p>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.</p> <table> <tbody> <tr><td>QPSK-1/2</td><td>16APSK-5/6</td></tr> <tr><td>QPSK-2/3</td><td>16APSK-8/9</td></tr> <tr><td>QPSK-3/4</td><td>16APSK-9/10</td></tr> <tr><td>QPSK-5/6</td><td>16APSK-7/15</td></tr> <tr><td>QPSK-6/7</td><td>16APSK-8/15</td></tr> <tr><td>QPSK-7/8</td><td>16APSK-32/45</td></tr> <tr><td>QPSK-1/4</td><td>16APSK-1/2-L</td></tr> <tr><td>QPSK-1/3</td><td>16APSK-8/15-L</td></tr> <tr><td>QPSK-2/5</td><td>16APSK-5/9-L</td></tr> <tr><td>QPSK-3/5</td><td>16APSK-26/45</td></tr> <tr><td>QPSK-4/5</td><td>16APSK-3/5</td></tr> <tr><td>QPSK-8/9</td><td>16APSK-3/5-L</td></tr> <tr><td>QPSK-9/10</td><td>16APSK-28/45</td></tr> <tr><td>QPSK-13/45</td><td>16APSK-23/36</td></tr> <tr><td>QPSK-9/20</td><td>16APSK-2/3-L</td></tr> <tr><td>QPSK-11/20</td><td>16APSK-25/36</td></tr> <tr><td>QPSK-11/45</td><td>16APSK-13/18</td></tr> <tr><td>QPSK-4/15</td><td>16APSK-7/9</td></tr> <tr><td>QPSK-14/45</td><td>16APSK-77/90</td></tr> <tr><td>QPSK-7/15</td><td>32APSK-3/4</td></tr> <tr><td>QPSK-8/15</td><td>32APSK-4/5</td></tr> <tr><td>QPSK-32/45</td><td>32APSK-5/6</td></tr> <tr><td>8APSK-5/9-L</td><td>32APSK-8/9</td></tr> <tr><td>8APSK-26/45-L</td><td>32APSK-9/10</td></tr> <tr><td>8PSK-3/5</td><td>32APSK-2/3-L</td></tr> <tr><td>8PSK-2/3</td><td>32APSK-32/45</td></tr> </tbody> </table> | QPSK-1/2 | 16APSK-5/6 | QPSK-2/3 | 16APSK-8/9 | QPSK-3/4 | 16APSK-9/10 | QPSK-5/6 | 16APSK-7/15 | QPSK-6/7 | 16APSK-8/15 | QPSK-7/8 | 16APSK-32/45 | QPSK-1/4 | 16APSK-1/2-L | QPSK-1/3 | 16APSK-8/15-L | QPSK-2/5 | 16APSK-5/9-L | QPSK-3/5 | 16APSK-26/45 | QPSK-4/5 | 16APSK-3/5 | QPSK-8/9 | 16APSK-3/5-L | QPSK-9/10 | 16APSK-28/45 | QPSK-13/45 | 16APSK-23/36 | QPSK-9/20 | 16APSK-2/3-L | QPSK-11/20 | 16APSK-25/36 | QPSK-11/45 | 16APSK-13/18 | QPSK-4/15 | 16APSK-7/9 | QPSK-14/45 | 16APSK-77/90 | QPSK-7/15 | 32APSK-3/4 | QPSK-8/15 | 32APSK-4/5 | QPSK-32/45 | 32APSK-5/6 | 8APSK-5/9-L | 32APSK-8/9 | 8APSK-26/45-L | 32APSK-9/10 | 8PSK-3/5 | 32APSK-2/3-L | 8PSK-2/3 | 32APSK-32/45 |
| QPSK-1/2 | 16APSK-5/6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| QPSK-2/3 | 16APSK-8/9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| QPSK-3/4 | 16APSK-9/10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| QPSK-5/6 | 16APSK-7/15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| QPSK-6/7 | 16APSK-8/15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| QPSK-7/8 | 16APSK-32/45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| QPSK-1/4 | 16APSK-1/2-L | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| QPSK-1/3 | 16APSK-8/15-L | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| QPSK-2/5 | 16APSK-5/9-L | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| QPSK-3/5 | 16APSK-26/45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| QPSK-4/5 | 16APSK-3/5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| QPSK-8/9 | 16APSK-3/5-L | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| QPSK-9/10 | 16APSK-28/45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| QPSK-13/45 | 16APSK-23/36 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| QPSK-9/20 | 16APSK-2/3-L | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| QPSK-11/20 | 16APSK-25/36 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| QPSK-11/45 | 16APSK-13/18 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| QPSK-4/15 | 16APSK-7/9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| QPSK-14/45 | 16APSK-77/90 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| QPSK-32/45 | 32APSK-5/6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8APSK-5/9-L | 32APSK-8/9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8APSK-26/45-L | 32APSK-9/10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8PSK-3/5 | 32APSK-2/3-L | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8PSK-2/3 | 32APSK-32/45 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| | | |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | 8PSK-3/4 8PSK-5/6 8PSK-8/9 8PSK-9/10 8PSK-23/36 8PSK-25/36 8PSK-13/18 8PSK-7/15 8PSK-8/15 8PSK-26/45 8PSK-32/45 16QAM-3/4 16QAM-7/8 16APSK-2/3 16APSK-3/4 16APSK-4/5 32APSK-11/15 32APSK-7/9 32APSK 2/3 64APSK-32/45-L 64APSK-11/15 64APSK-7/9 64APSK-4/5 64APSK-5/6 128APSK-3/4 128APSK-7/9 256APSK-29/45-L 256APSK-2/3-L 256APSK-31/45-L 256APSK-32/45 256APSK-11/15-L 256APSK-3/4 |
| 2.4 Local Oscillator | Determines the Local Oscillator Frequency (in Mhz) variable in the embedded Uplink Calculator. For Normal (Non-Inverted) Spectrum Mode: $Freq_{Modulator} = Freq_{Uplink} - Freq_{Local Oscillator}$ For Inverted Spectrum Mode: $Freq_{Modulator} = Freq_{Local Oscillator} - Freq_{Uplink}$ <i>Note: This field is provided for convenience purposes only and to aid in the automatic calculation of the Modulator frequency. The actual setting will depend on your external hardware (Block Upconverter), and may differ from the value set in here.</i> | User defined |
| 2.5 Uplink Frequency | Determines the Uplink Frequency (in Mhz) variable in the embedded Uplink Calculator. <i>Note: This field is provided for convenience purposes only and to aid in the automatic calculation of the Modulator frequency. The actual</i> | User Defined |

| | | |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <i>setting will depend on your external hardware (Block Upconverter), and may differ from the value set in here.</i> | |
| 2.6 Frequency | Read Only - DVB Modulator output frequency | The monitor output frequency for the EN-210 IF is fixed at 1.080GHz. The monitor output frequency for the EN-XX L-Band tracks with the main RF output frequency. |
| 2.7 Power | Allows the operator to configure the output power of the main RF output port. The monitor output power level for the EN-210 IF and L-Band is fixed at -45dBm. Power is defined as the composite power referenced to an un-modulated (Pure Carrier) carrier. | -35 to +5dBm LBAND -30 to +5dBm IF |
| 2.8 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 |
| 2.9 FEC Frame | When operating in DVB-S2, the Frame Type options are either Normal or Short. 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. | Short Normal |
| 2.10 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 | 5 10 15 20 25 30 |

| | | |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| | realized for a given bandwidth. | |
| 2.11 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 |
| 2.12 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 |
| 2.13 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. |
| 2.14 Interface Rate | The Interface Rate is the bit rate at the baseband interface. | Range can be determined by feature key. |
| 2.15 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 option will provide an un-modulated output carrier at the desired frequency and output power. | Pure Carrier Modulated |
| 2.16 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 |
| 2.17 10 Mhz Clock | Allows the operator to choose whether or not to combine the 10Mhz signal with the L-Band | UNCOMBINED COMBINED |

| | | |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Combined | output. *** This is a special order option. If your unit does not have the functionality the setting will read "N/A" | |
| 2.18 PHYSICAL LAYER SCRAMBLER | Scrambles all of the PLFRAMES except for their header. | The PLS signature assumes values in the range 0, 262141 |
| 2.1 MODULATOR LINEUP | This feature enables the operator to quickly view and/or configure select modulator RF output parameters. | Carrier Mode: PURE_CARRIER or MODULATED Transmit: ENABLED or DISABLED Output Power: User defined in 0.5dB incr. Output Frequency: User defined in 1.0MHz incr. |

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 |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| 3.1 Mode | Enables IP Egress. | Off Send |
| 3.2 IP Tx Mode | Switches from UDP/RTP, TCP, RTMP, and Zixi Feeder Note: RTMP and Zixi Feeder require purchase of feature key | UDP/RTP TCP RTMP Zixi Feeder |
| 3.3 Tx IP Address | The IP Address of which the Multicast or Unicast is broadcast. Multicast addressing supports the transmission of a single IP datagram to multiple receivers. Valid Multicast addressing range is 224.10.XXX.XXX to 239.XXX.XXX.XXX. Unicast addressing sends a single IP datagram to only one receiver. The Unicast address will be the unique IP of the receiving device. | user-defined; numeric field in format xxx.xxx.xxx.xxx |
| 3.4 Tx Port | port assignment used for transmitting a multicast | user-defined using the numeric keypad |
| 3.5 | The Unicast Gateway | user-defined; numeric field in |

| | | |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Tx Unicast Gateway | automatically handles IP routing for unicast transmissions. This must be configured if the outgoing unicast requires a different gateway from the configured system default gateway. A route is automatically added when the unit is configured for transmit and a Unicast Gateway exists. The route is deleted if set to 0.0.0.0 or Multicast Mode set to OFF. | format xxx.xxx.xxx.xxx |
| 3.6 DVB per IP | Configures the amount of DVB transport stream packets (188 bytes per DVB packet) per IP packet payload | 1 4 7 |
| 3.7 RTP | allows for sequence numbering and timing; editable if Multicast Mode is set to 'Send' | On Off |
| 3.8 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 |
| 3.9 FEC L | affects the maximum burst packet loss that can be recovered Note: The product of FEC L and FEC D cannot exceed a value of 100 | 4-20 |
| 3.10 FEC D | defines latency involved in burst recovery | 4-20 |
| 3.11 TYPE OF SERVICE | 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 throughput 16 = Minimize delay |
| 3.12 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 |
| 3.13 Tx Connector | Sets the physical connector (on the rear of the unit) to use for over IP transmit purposes on the | IP1 IP2 |

| | | |
|--|---------------------------|--|
| | indicated encode channel. | |
|--|---------------------------|--|

Video Menu

| Item | Function | Options |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4.1 Input | Allows the operator to select which input the video will be sourced from. | SDI COMPOSITE OPTICAL |
| 4.2 SDI Mode | Allows the operator to force the SDI receiver into a specified mode. | AUTO SD HD1.4G HD3G SD480i SD576i HD1.4G 720p HD1.4G 720p 50 HD1.4G 720p 59 HD1.4G 1080i HD1.4G 1080i 50 HD1.4G 1080i 59 HD1.4G Any 50 HD1.4G Any 59 Any 50 Any 59 |
| 4.3 CVBS Input Mode | Configures the encoder for NTSC or PAL video. *This is only affects the incoming feed if the input is Composite. | NTSC PAL |
| 4.4 CODEC | Allows the operator to select between available CODECs | MPEG2 H264 H264_10BIT |
| 4.5 Entropy Coding | Allows the operator to set the entropy coding settings *H.264 encoding only, Auto mode will use CABAC at video bitrates \leq 30Mbps/sec and CAVLC at rates $>$ 30Mbps/sec. | CABAC CAVLC AUTO |
| 4.6 Chroma | Allows the operator to set the encoder chroma type. *Chroma is forced to 422 when H264_10BIT is the selected codec. | 420 422 |
| 4.7 Deblock Filtering | Allows the operator to turn deblock filtering on and off *H.264 encoding only | ON OFF |

| | | |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4.8 Video Field Coding | Allows the operator to choose between different types of video field coding *H.264 encoding only | AUTO FIELD FRAME ADAPTIVE |
| 4.9 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. | <p>In standard definition MPEG2 encoding mode. (input is CVBS, SD/SDI, or SD Optical) 420 1000000 - 15000000 bits/sec (1 - 15 Mb/s) 422 1000000 - 50000000 bits/sec (1 - 50 Mb/s)</p> <p>In high definition MPEG2 encoding mode. (input is HD/SDI, or HD Optical) 420 5000000 - 80000000 bits/sec (5 - 80 Mb/s) 422 6000000 - 80000000 bits/sec (6 - 80 Mb/s)</p> <p>In standard definition H.264 encoding mode. (input is CVBS, SD/SDI, or SD Optical) 420 1000000 - 15000000 bits/sec (1 - 15 Mb/s) 422 1000000 - 50000000 bits/sec (1 - 50 Mb/s)</p> <p>In high definition H.264 encoding mode. (input is HD/SDI, or HD Optical) 420 3500000 - 62500000 bits/sec (3.5 - 62.5 Mb/s) 422 4500000 - 80000000 bits/sec (4.5 - 80 Mb/s)</p> <p>*If video autofill is enabled, this value will change based on other variables.</p> |
| 4.10 Autofill | When Video AutoFill is turned ON, the encoder will calculate and use the max video bit rate for the current TransMuxRate setting. This is recommended. If Autofill is set to OFF the encoder will use the manual setting for the video bitrate. | ON OFF |
| 4.11 Latency | It is dependent upon the video rate, frame size/rate (NTSC,PAL,HIGH-DEF) and GOP | LONG: Latency will measure close to 1 second. NORMAL: Should be used for |

| | | |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| | structure. Long IBBP GOPs will produce higher latency over short IP GOPs. Short IP GOPs at lower bit rates produce lower quality video. | distribution and standard contribution transmissions. Latency is approximately 1/2 second. LOW: Latency is approximately 3 frames less than NORMAL. |
| 4.12 Fault Mode | The user can select encoder behavior during 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 |
| 4.13 Fault Resolution | Allows the operator to select what resolution to encode at during fault mode. | 480I59.94 576I50 720P59.94 720P50 1080I59.94 1080I50 |
| 4.14 Aspect Ratio | Aspect Ratio is the ratio of horizontal lines to vertical lines in the encoded 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. | 4x3 16:9 WSS *This is not a scaling option. Output display is completely dependent on input signal |
| 4.15 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 BOX16:9_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 |
| 4.16 GOP Type | GOP Type can be set to OPEN, CLOSED, or AUTO. OPEN GOP uses referenced pictures | Open Closed AUTO |

| | | |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| | from the previous GOP at the current GOP boundary. CLOSED GOP starts with an I Frame and subsequent B Frames do not rely on I or P frames from the previous GOP. AUTO mode is supported on VE2 only, the encoder adjusts the GOP size based on video content in order to maximize picture quality. When the video codec is H264 you MUST use AUTO GOP to yield the best results. The maximum AUTO GOP size is 132 frames for MPEG2, and 300 frames for H264. | |
| 4.17 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 |
| 4.18 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 |

Audio Menu

| Item | Function | Options |
|---------------------------|------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| | << 1 - 2 >> Parallel Menus. | |
| 5.1 Surround Sound | Determines the surround sound mode | DD,DD-06,AAC-LC,AAC-HEv1,AAC-6, |
| 5.2 Surround Anchor | Determines the first audio pair for surround encode. Note: surround encode occupies 3 consecutive audio pairs | 0 - Pair 1,2,3 1 - Pair 2,3,4 2 - Pair 3,4,5 3 - Pair 4,5,6 4 - Pair 5,6,7 5 - Pair 6,7,8 |
| | << 1 -8 >> Parallel Menus. | |
| 5.3 Input | Selects the audio input to use during encoding. | Analog SDI AES |
| 5.4 Mode | Allow you to configure your device to Encode per audio or Passthru | Off Encode |

| | | |
|------------------------------|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | Passthru |
| 5.5 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, PMT stream type 0x06 MU-04 = Musicam Layer II, PMT stream type 0x04 |
| 5.6 Rate | The Audio Rate is the bitrate for audio encoding / transport and depends on mode selected. | user-defined using the numeric 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. |
| 5.7 Level | Controls the volume level in dBs | user-defined using the numeric keypad range = -18 dBs to 8 dBs in increments of 1 |
| 5.8 Analog Audio Level | Control the volume level -15 to +15 (dBs) in 1 dB increments for AUDIO 1 and 2 only | This trims the level on the analog audio path (only) to accommodate external audio gear variability. |
| 5.9 Sync | Audio Sync sets the audio sync offset. This measurement is in milliseconds, and works only on analog audios. | +/- 800 |
| 5.10 MPEG Format | Allows the operator to choose how to encode left and right analog audio inputs. | STEREO MONO DUALMONO |
| 5.11 IFB | This is a low latency audio path for communications to a remote | OFF ON |

| | | |
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| | <p>van or studio using the same distribution path. It requires a special IFB receiver or manual PID selection with a standard IRD.</p> <hr/> <p>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.</p> | GHOST |
| 5.12 SDI Pair | Allows the operator to route embedded audio from SDI input to the specified audio encoder. | 1-8 |
| 5.13 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 |
| 5.14 ECC Words | Default is ON. Select OFF if the SDI source has problematic (or non-compliant) ECC words. | OFF ON |

PIDs Menu

| Item | Function | Options |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| 6.1 Transport Stream ID | <p>Sets the Transport Stream ID in PAT and other tables in the egress transport stream.</p> <p>Configure this value in Hex.</p> | 0x0001 - 0x1FFE |
| 6.2 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 |
| 6.3 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 |
| 6.4 | Video PID identifies packets containing the video | user-defined using |

| | | |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| Video PID | Packetized Elementary Stream data. | the numeric keypad |
| 6.5-6.12 Audio PID 1-8 | Identify packets containing audio content for the specified channels | user-defined using the numeric keypad |
| 6.13 Teletext PID | Teletext PID identify packets containing teletext information. | user-defined using the numeric keypad |
| 6.14 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 |
| 6.15 VITC Mode | Enable VITC PID | ON OFF |
| 6.16 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 |
| 6.17 Splice Mode | Enable Splice PID | ON OFF |
| 6.18 Splice PID | Splice PID is used for Cablelabs SCTE 35 Splice Point identification. | user-defined using the numeric keypad |

VBI Menu

| Item | Function | Options |
|-----------------------|--------------------------------------------------------------------------------------------------|--------------------------|
| 7.1 Source | selects the source of Vertical Blanking Interval spacing | Composite SDI |
| 7.2 Closed Caption | activates (or deactivates) closed-captioning and specifies closed-captioning standard to be used | OFF WAVEFORM DTVCC |

Profile Menu

| Command | Function |
|----------------------------|-----------------------------------------------------------------|
| 8.1 Last Loaded Profile | Displays the last profile loaded |
| 8.2 Select | The select submenu lists all stored profiles and allows loading |
| 8.3 Save | The save submenu saves a profile with a user designated name |

| | |
|---------------|--------------------------------------------------------------|
| 8.4 DELETE | The delete submenu deletes a profile from the available list |
|---------------|--------------------------------------------------------------|

CAS Menu

| Control | Function |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| 9.1 Mode | Select between off, BISS-1, and BISS-E encryption. options: OFF, BISS_1, BISS_E_USER_ID_ONE, BISS_E_USER_ID_TWO |
| 9.2 Clear Session Word | MODE BISS 1 uses a 12-digit hexadecimal Clear Session Word. |
| 9.3 Encrypted Session Word | MODE BISS E XXX uses a 16-digit hexadecimal Encrypted Session Word |
| 9.4 User ID 1 | used in BISS-E Mode only; the 14-digit hexadecimal User ID used for encryption |
| 9.5 User ID 2 | used in BISS-E Mode only; the 14-digit hexadecimal User ID used for encryption (secondary) |

System Menu

10.1 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> |

10.2 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.

10.3 Network Sub Menu

| Item | Function | Options |
|------------------------------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| 10.3.1 IP 1 Address | This is the address of your device on your network specific to the IP1 Port. | user-defined using the numeric keypad Default is 192.168.10.48 |
| 10.3.2 IP 1 Mask | Defines the unit relative to the rest of your network. | user-defined using the numeric keypad Default is 255.255.255.0 |
| 10.3.3 ip 1 DHCP | The Dynamic Host Configuration Protocol allows your device to self-locate network Ethernet parameters. | On (finds own DHCP Address) Off (defaults to last entered IP Address) Default is OFF |
| 10.3.4 IP 2 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 |
| 10.3.5 IP 2 Mask | Defines the unit relative to the rest of your network. | user-defined using the numeric keypad Default is 255.255.255.0 |
| 10.3.6 IP 2 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 |
| 10.3.7 Gateway IP Address | The gateway is a routing mechanism that passes traffic | user-defined using the numeric keypad |

| | | |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| | between different subnets and networks. | Default is 192.168.10.1 |
| 10.3.8 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. |

10.4 Time Sub Menu

| Item | Function | Options |
|--------------------|--------------------------------------------|---------------------------------------|
| 10.4.1 Time | Defines system time | user-defined using the numeric keypad |
| 10.4.2 Timezone | Defines the time zone the unit operates in | |

10.5 NTP Sub Menu

| Item | Function | Options |
|--------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| 10.5.1 NTP Status | Network Transfer Protocol | Read-only |
| 10.5.2 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. |

10.6 Alarm Menu

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

10.7 SNMP Sub Menu

| Item | Function | Options |
|----------------|-----------------------------------------------------------------------------------------------------------|--------------------|
| 10.7.1 SNMP | Controls the status (ON/OFF) of the Simple Network Management Protocol (SNMP) feature. We support SNMPv2c | OFF ON CLEAR |

| | | |
|--------------------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------|
| | version. | |
| 10.7.2 Read-only community | The Simple Network Management Protocol (SNMP) Read-Only Password. Default Value: "adtec" | user-defined |
| 10.7.3 Read-write community | The Simple Network Management Protocol (SNMP) Read-Write Password. Default Value: "none" | user-defined |
| 10.7.4 Trap community | The Simple Network Management Protocol (SNMP) trap community. Default Value: "public" | user-defined |
| 10.7.5 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. |

10.8 Com2 Settings

| 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 |

10.9 Feature Sub Menu

| Item | Function | Options |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 10.9.1 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 |
| 10.9.2 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 |

| | | |
|-----------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------|
| 10.9.3 - 10.9.12 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. |
|-----------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------|

10.10 Host Name

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

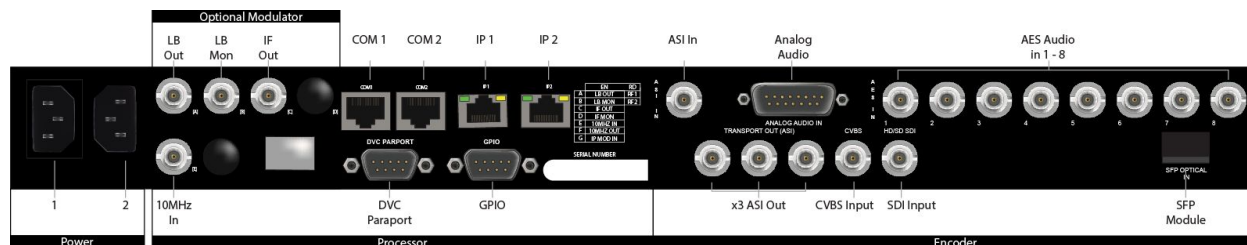
10.11 Firmware

| Item | Function | Options |
|----------|-------------------------------------------------|-----------|
| Firmware | Displays the currently running firmware version | Read-Only |

10.12 Backlight Dim Delay

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

Back Panel



| Connector | Description |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Power 1 & 2 | Redundant AC Power, Standard 3 pin computer power plug (Auto range 70-240 VAC Input) |
| (A) L-Band Out | RF output, 50 Ohm BNC L-Band Model: Frequency range 950 MHz to 1.750 GHz, Power Level -35 to +5 dBm |
| (B) Monitor | RF output, 50 Ohm BNC L-Band: Fixed power level at -45 dBm IF: Fixed power level at -45 dBm, fixed frequency at 1.08 GHz |
| (C) IF Out | Frequency range 50 MHz to 180 MHz, Power Level -30 to +5 dBm |
| (E) 10MHz Clock | BNC 50 Ohm connector for external 10MHz reference input |
| COM1 | Serial Port Used for Troubleshooting (Terminal) |
| COM2 | API Serial Communication Interface (telnet) |
| IP 1 | 10/100/1000 base T ethernet interface (Monitoring/Management) |
| IP 2 | 10/100/1000 multicast transport egress port (SMPTE 2022) |
| DVC Parport | 9-pin parallel I/O interface for control systems |
| ASI In | Input for ASI remux feature |
| GPIO | Tally and Control Port |
| Transport Out (ASI) 1-3 | 75 Ohm source ASI x3 per EN5000839. Up to 150 Mbps. |
| CVBS In | 75 Ohm terminated Standard Definition Composite Video Input |
| HD/SD SDI In | 75 Ohm terminated Input, Video & Audio (SMPTE 259M for SD & SMPTE 292M for HD) BNC Note: Use this input for ASI Receive mode |
| AES Audio In 1-8 | 75 Ohm AES-3 per AES3-2003 |

| | |
|-----------------|----------------------------------------------------------|
| Analog Audio In | Stereo Pairs 1 and 2 (600 Ohm Balanced) |
| SFP | SFP slot used for single channel optical receiver module |

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 3 - Getting Connected

Compatible browsers

Firefox (recommended)
MS Internet Explorer
Safari
Chrome

Ethernet Access

To begin, you will need to connect to your EN-210 via ethernet directly, or by adding the EN-210 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 CAT5 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 locator 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 pressing 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.

Chapter 4 - 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 ?

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

VBI Source: ?

SDI

Closed Caption: ?

ATSC 708

To enable VITC passthrough:

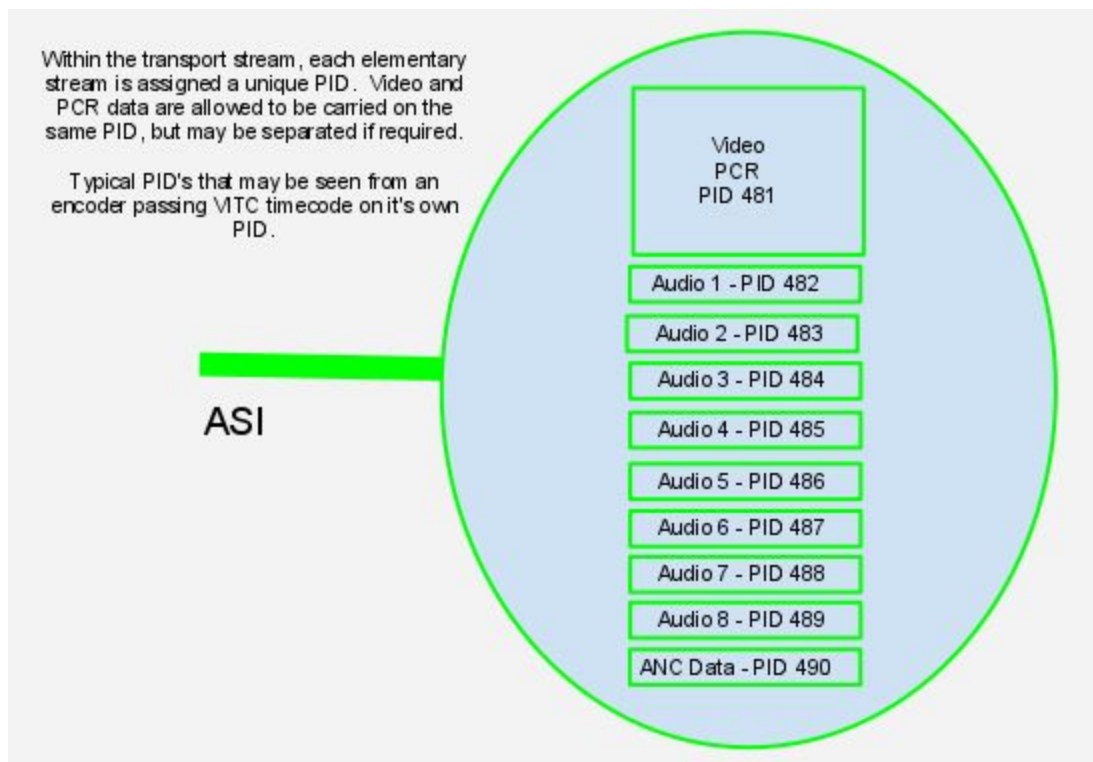
| Step | Action |
|------|------------------------------------------------------------------------------------------------------------------|
| 1 | On the VBI Tab in the Web GUI Control Application, configure the "VBI Source" for <SDI>. |
| 2 | On the PID Tab in the Web GUI Control Application, select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

How to Configure Passthru Audio

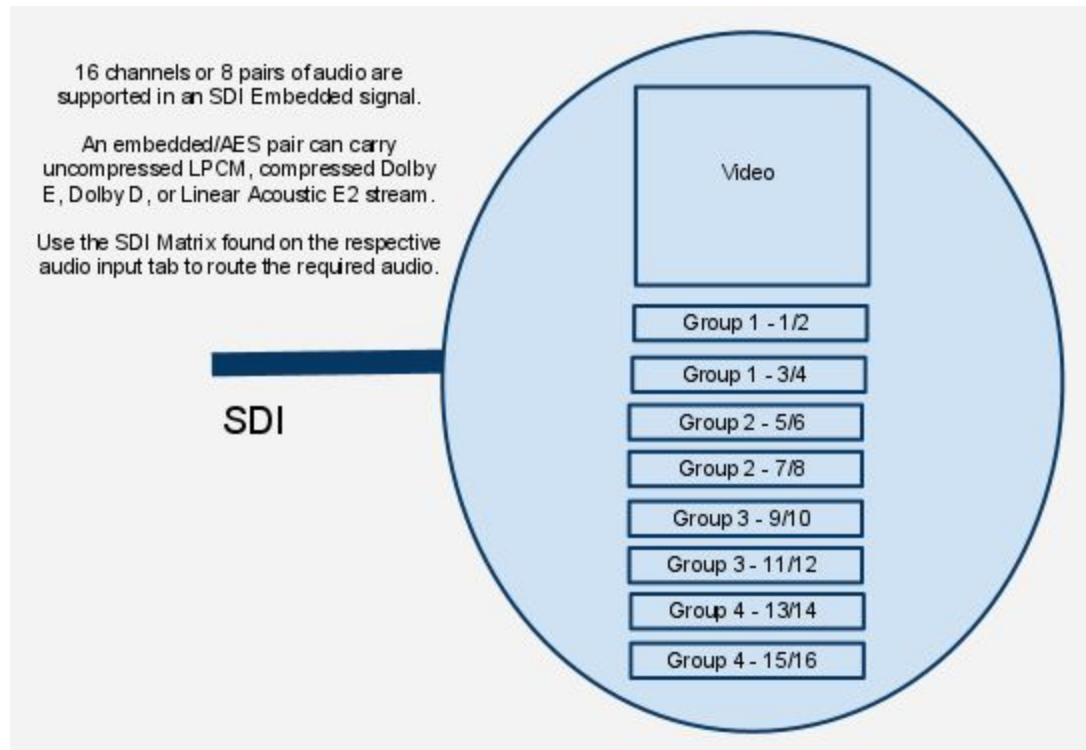
Adtec EN-Series encoders have the flexibility to meet many demanding audio requirements. Each model contains specific encoding options, but every Adtec EN-Series encoder supports two audio passthru. An audio passthru consists of a compressed bitstream (Dolby E 20 Bit / Dolby E 16 Bit / Dolby Digital / 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 EN-210 supports four passthru audios on the first four audio inputs. The SDI Matrix and ASI Transport 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 via embedded SDI, the SDI Audio Matrix may be used in conjunction with the 'PID' tab to manipulate the input and output routing.



To enable Audio passthru for Audio 1:

| Step | Action |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | On the Audio -> Audio 1 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 bitrate 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. Typically, SDI video should be run through a frame synchronizer that is utilizing the same reference as the DE encoder.

The Adtec encoder preserves audio and video timing as it is presented. If the audio timing does not match video timing at the inputs, there will be potential 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.

Note: When an audio input / channel is configured for Pass through operation Internal tone generation does not function for the pass through channels.

Understanding 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 Mode

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 front panel), "ASI Receive/Passthru" should be shown. |



How to Use ASI Remux

Terminology:

“ASI Remux” refers to the ability for an Adtec EN to accept a Transport Stream (TS) via ASI input, and multiplex the incoming service or services with it’s locally encoded service.

The results is that the transport stream output becomes a MPTS containing the services from the ASI input in addition to to the locally encoded service.

“ASI Reserve” refers to the bandwidth the user must define to allocate enough space for the incoming services. “ASI Input Reserve” is how the field is displayed in the WebUI and should be set to the same or greater than the aggregate rate of the services from the Input ASI transport stream.

“Downstream Device” refers to a unit that is receiving an ASI transport stream and multiplexing the services.

“Upstream Device” refers to a unit that is supplying the ASI transport stream.

Example:

If my “Upstream Device” is generating a transport stream with 2 services with an aggregate rate of 50 Mb/s then the “ASI Reserve” for my “Downstream Device” should be set to 50 Mb/s.

The TMR of my “Downstream Device” needs to be configured to allow for the incoming services as well as it’s locally encoded service. If the user wanted to receive a 50 Mb/s ASI TS and encode it’s locally service at a rate of 30 Mb/s then the TMR for the “Downstream Device” should be set to greater than 80 Mb/s
 $50 \text{ Mb/s (ASI Reserve)} + 30 \text{ Mb/s (Local Encoding)} = 80 \text{ Mb/s (TMR)}$

Thing to be aware of:

- ASI Remux requires enabling of the ASI Remux Feature Key.
- Setting ASI Input Reserve to zero disables ASI Remux.
- If there is a ASI Input Reserve value set but nothing on the input, then there will be null packets filling the bandwidth allocated for the ASI Input.
- If Upstream and Downstream services have PID or Service Number conflicts (meaning they are the same value) the MPTS of the Downstream EN can and will be corrupt.
- ATSC tables are not supported on the ASI input. DVB and MPEG are.
- The downstream drops all Ingress tables and rebuilds only PAT, SDT and NIT with the upstream services information.
- Users should ensure that the same table 'types' are being used (DVB to DVB, MPEG to MPEG) to reduce SI table packet incompatibility issues.
- If the Upstream Device is supplying more data than is allocated by ASI Input Reserve, then there Upstream services are truncated and packets are lost. Locally

encoded service is not affected by this condition.

- Null packets are stripped from the incoming ASI TS.
- There is no "Table Mapping" functionality with ASI Remux. Ingress tables are copied to the egress.
- If the user attempts to set a TMR and an ASI Input Reserve that does not allow enough bandwidth for the locally encoded service (dependent on resolution and encoding modules) the TMR will be auto calculated to allow for ASI Reserve and minimum value allowed for locally encoded service.
- TMR is currently capped at 150 Mb/s ASI. Input Reserve is currently capped at 100 Mb/s.

TMR and locally encoded services take priority over remuxed services. Therefore if TMR is set to a rate that does not allow enough bandwidth for native encoding, then the ASI Reserve setting will be truncated

EN-XX ASI Remux with Manual PID Mapping

Terminology:

Transport Stream - A stream of 188-byte transport packets that contains audio, video and data belonging to one (SPTS) or several (MPTS) programs.

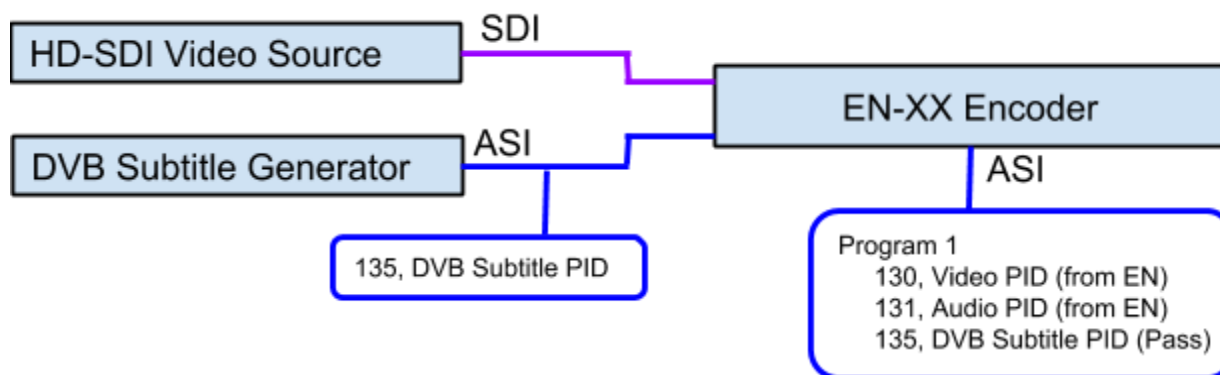
PID - Packet Identifier. This unique integer value identifies elements in the transport stream such as tables, data, or the audio for a specific program

PAT - Program Association Table. This MPEG-2 table lists all the programs contained in the transport stream and shows the PID value for the PMT associated with each program. The PAT is always found on PID 0x0000.

PMT - Program Map Table. This MPEG-2 table specifies PID values for components of programs.

The Adtec EN-3X and EN-100 encoders have an ASI input available for the ASI remux feature. Further information can be read about ASI Remux in the ASI Remux article. In some cases, users may want to add custom PID's from third party generators, such as a DVB Subtitles, into the main video programming. With a custom application, the standard ASI remux feature would not work without additional configuration. To keep the system open-ended and to allow any type of special passthrough application, we have allowed the user to configure *any* type of PID passthrough.

Some DVB Subtitle Generators do not generate MPEG Transport Stream Tables (PAT, PMT). In order to associate DVB Subtitle PIDs with the desired program on the EN output, the encoder PMT must be modified. A wiring diagram and sample PMT view can be seen in the drawing below.



In the example above, a raw PID was sent into the system with no program association. The EN modified the main program PMT, Program 1, to add an additional DVB Subtitle PID entry. As EN encoders do not perform PID conflict resolution at this time, the PID's inserted into the system should not conflict with other PID's utilized by the EN-31.

To configure ASI Passthrough of DVB subtitles, visit the Manual PIDs tab. This tab contains PMT template entries that will be used to insert into the PMT.

The screenshot shows the 'Manual PIDs' configuration window. At the top, there are tabs for 'Service PIDs', 'Manual PIDs', and 'Manual PID Mapping'. Below the tabs are 'Apply' and 'Cancel' buttons. The main area is titled 'Manual PIDs' with a help icon and a 'Clear All PIDs' button. A table-like structure is shown with the following fields:

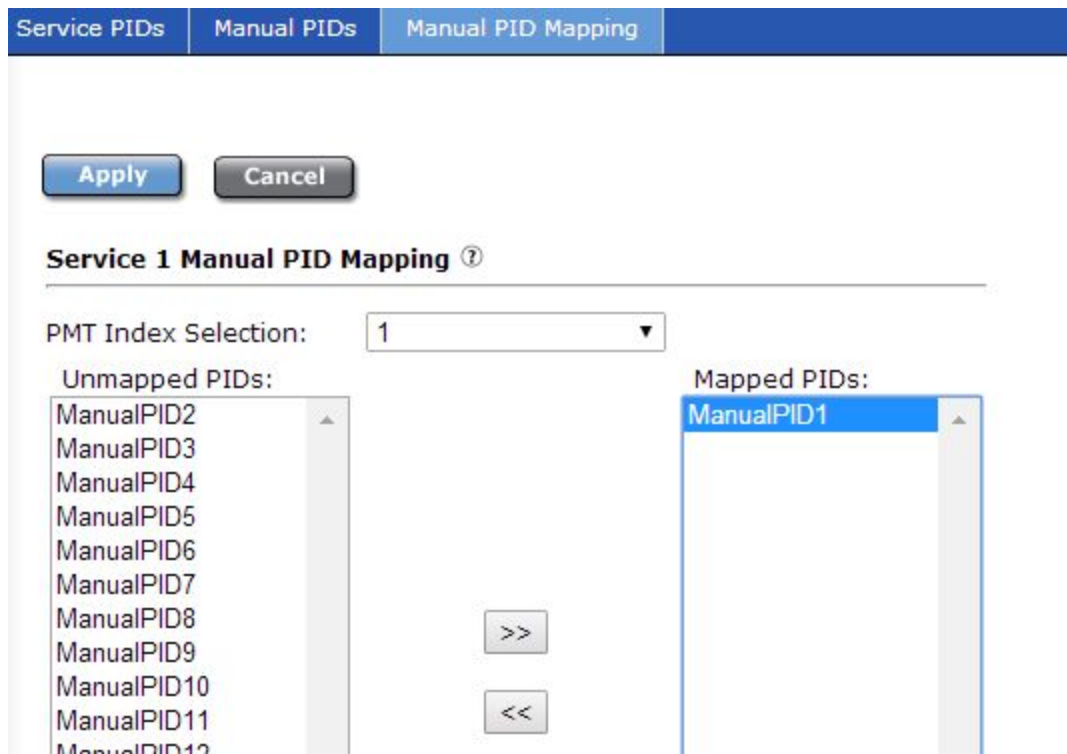
| Manual PID 1: | Hex: | Dec: | Type: | Descriptor: | Clear PID |
|---------------|--------|------|-------|----------------------------|-----------|
| | 0x0087 | 135 | 6 | 52010259086974611000020002 | |

The user will need to know:

- The PID number of which they would like to pass. This can be entered into the Hexadecimal or Decimal fields.
- The Stream Type identifier of the PID that will be written into the PMT. This can be entered in decimal only.
- The Descriptor of the PID that will be written into the PMT. This field is entered as hexadecimal pairs where each pair represents a byte field. Up to 32 pairs (64 characters) can be entered.

In the DVB Subtitle example, the PID is 135, DVB Subtitles use stream type 0x06 and a sample DVB descriptor with Italian language is 52010259086974611000020002.

The user will then need to map the entry into the associated PMT by visiting the Manual PID Mapping tab. The Italian DVB Subtitle PID was entered into the first manual PID configuration. This can be mapped by moving the associated PID from the 'Unmapped PIDs' box into the 'Mapped PIDs' box.



For dual encoder products, the Service 1 heading refers to the first logical encoder. The PMT Index selection refers to the first or second program being generated by the logical encoder. In most applications, this should always be 1.

Once configured, the encoder will have a new PMT with an additional DVB-Subtitle subtitle entry. It will be described as stream type 6 with an Italian language descriptor and referencing PID 135. It is up to the user to verify accuracy of all information entered.

To aid in user configuration a few common stream types are below.

| Stream Description | Stream Type (Decimal) |
|----------------------|-----------------------|
| ISO_IEC_11172_VIDEO1 | 1 |

| | |
|----------------------------|-----|
| ISO_IEC_13818_VIDEO | 2 |
| MPEG1_Layer2 | 3 |
| MPEG2_Part3 | 4 |
| ISO_IEC_13818_PRIVATE | 5 |
| ISO_IEC_13818_PES_PRIVATE | 6 |
| DVB_AC3_AUDIO | 6 |
| ISO_IEC_13522_MHEG | 7 |
| DSM_CC | 8 |
| ITU_T_REC_H222_1 | 9 |
| ISO_IEC_13818_6_Type_A | 10 |
| ISO_IEC_13818_6_Type_B | 11 |
| ISO_IEC_13818_6_Type_C | 12 |
| ISO_IEC_13818_6_Type_D | 13 |
| ISO_IEC_13818_1_Aux | 14 |
| AAC | 15 |
| ISO_IEC_13818_7_AUDIO_ADTS | 15 |
| AAC | 17 |
| H264_VIDEO | 27 |
| AVC_VIDEO | 27 |
| DCII_VIDEO | 128 |
| DOLBY_AC3 | 129 |
| DCII_SUBTITLES | 130 |

DVB Specification for Service Information (SI) in DVB systems. Descriptor information can be reviewed here.

https://www.dvb.org/resources/public/standards/a38_dvb-si_specification.pdf

Chapter 5 - Appendix

Appendix A - GNU General Public License

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c) Accompany it with the information you received as to the offer to distribute corresponding source code. (This alternative is allowed only for noncommercial distribution and only if you received the program in object code or executable form with such an offer, in accord with Subsection b above.)

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Appendix B - Technical Specifications

Base Model (EN210)

Inputs

SD-SDI / HD-SDI

Use: Video & Audio input

Standard: SD - SMPTE 259M-C - 270Mbit/s with embedded audio per SMPTE 272M A, B, and C. HD - SMPTE 292M - 1.485Gbit/s with embedded audio per SMPTE 299M. 3G-SDI Level A and Level B.

Connector: BNC (75 Ohm). Auto Detect SD/HD/3G or manual configuration.

Note: This connector serves as the DVB-ASI input when configured for ASI receive mode. This mode allows for the use of the modulator 'PASSTHROUGH' feature.

SFP Slot

Use: Video & Audio input

Standard: With optional SFP Optical module, supports SD-SDI, HD-SDI, and 3G-SDI (3G-SDI Level A and Level B).

Connector: Open SFP cage for optional SFP optical module.

CVBS

Use: Video input

Standard: SD NTSC or PAL D1 Composite Video Input

Connector: BNC (75 Ohm)

AES Audio

Use: Digital audio input (x8 pairs or x16 channels) for uncompressed LPCM or compressed bit stream processing

Standard: AES3

Connector: Eight BNC (75 Ohm)

SDI Embedded Audio

Use: Digital audio input (x8 pairs or x16 channels) for uncompressed LPCM or compressed bit stream processing

Standard: Digital audio embedded per SMPTE 272M (SD) and SMPTE 299M (HD)

Connector: SFP module or BNC (75 Ohm)

Analog Audio

Use: Analog Balanced Stereo input (x2). Analog audio input via DB15 male connector. Clip level 18dB.

Connector: DB15 (10 kohm)

*** See "DB15-M Analog audio input pinout" in this Appendix.

Outputs

DVB-ASI

Use: Transport Stream output. Physical interface 100Mbit/s. ASI concurrent with TSoIP (GigE) and RF Tx (DVBS/S2).

Standard: ISO13818-1 MPEG 2 Transport Stream per EN 50083-9:1997 (188 byte only)

Connector: Three BNC (75 Ohm)

GigE Transport Over IP (TSoIP)

Use: Transport Stream Output, but may also be used for control. Four (4) unique TCP, UDP, or RTP (RFC 3550) encapsulated routes with SMPTE 2022 (COP3 FEC). TSoIP (GigE) concurrent with ASI and RF Tx (DVBS/S2).

Standard: MPEG 2 RTP v2 transport (RFC 3550)

Output Rates: 1 - 100Mbps (188 byte DVB packet size, 7 per IP packet)*

Standard: MPEG 2 UDP transport

Output Rates: 1 - 100Mbps (188 byte DVB packet size, 7 per IP packet)*

Standard: RTP SMPTE 2022-1 2007 FEC

Output Rates: 1 - 100Mbps (188 byte DVB packet size, 7 per IP packet)*

Standard: TCP Transport

Output Rates: 1 - 25Mbps (188 byte DVB packet size, 7 per IP packet)*

Connection speed: GigE (100/1000BaseT)**

*Overall egress supported bandwidth decreases when using multiple TSoIP streams. The sum of all UDP/RTP streams must fall within the IP supported limit of 200Mb/s. TCP does not support high throughput at this time.

**The user has the ability to transmit IP streams via the GigE or 10/100 management port. When transmitting streams via the 10/100 management port, throughput is limited to the physical interface throughput.

Connector: 8 pin RJ45

Communications

COM2 Serial Port

Use: API Serial Communication Interface

Default Baud Configuration: 38,400 bps 8 data bits 1 stop bit no parity

Connector: 8 pin RJ45 (supplied with DB9 to RJ45 adapter)

COM1 Serial Port

Use: Serial Port Used for Troubleshooting (Terminal)

Baud Configuration: 115,200 bps 8 data bits 1 stop bit no parity

Connector: 8 pin RJ45 (supplied with DB9 to RJ45 adapter)

IP 1

Use: IP 1 port used for network control, but can be used for TSoIP

Format: IPv4 Ethernet 10/100BaseT

Communication Methods: SNMP, FTP, Telnet, HTTP, TSoIP

Connector: 8 pin RJ45

Parallel Port

Use: GPIO DB9 parallel port used for custom triggering / integration

Connector: DB9 Male

GPIO Port

Use: GPIO DB9 parallel port used for Encode, Stop, Status/Alarms, and SCTE 35 generation

Connector: DB9 Male

Video

H.264 MPEG-4 HD (ITU-T H.264 ISO 14496-10)

Format: 1080i59.94, 720p59.94, 1080i50, 720p50 (Level 4.1)

8 Bit 422 Chroma: High Profile, Level 4.1

10 Bit 422 Chroma: High 10 Profile, Level 4.1

422 Data Rates: 4.5 - 80Mb/s

8 Bit 420 Chroma: High Profile, Level 4.1

420 Data Rates: 3.5 - 62.5Mb/s

H.264 MPEG-4 SD (ITU-T H.264 ISO 14496-10)

Format: Standard Definition D1 NTSC 29.97 fps (480i59.94) and PAL 25 fps video (576i50) Level 3.0 to Level 3.2

4:2:0 Chroma: High Profile, Level 3.0

4:2:2 Chroma: High Profile, Level 3.0

Time Base Correction (TBC) on Analog and SDI inputs

Data rates: 0.7 - 20Mb/s

MPEG-2 SD

Format: Standard Definition D1 NTSC 29.97 fps (480i59.94) and PAL 25 fps video (576i50) Level

420 MP@ML

Data Rates: 1 - 15Mb/s

422 MP@HL

Data Rates: 1 - 50Mb/s

MPEG-2 HD

Format: 1080i59.94, 720p59.94, 1080i50, 720p50

420 MP@HL Data Rates: 5 - 80Mb/s

422 422P@HL Data Rates: 6 - 80Mb/s

Group of Pictures (GOP)

Dynamic 'AUTO' GOP. 1-255. IP, IBP, IBBP, Adaptive GOP

Entropy Coding

CAVLC, CABAC

SD encode Pre-Processing

- Encoder Filters (CVBS Only) : Temporal & Spatial (Median)
- Time Base Corrector (TBC) on Analog and SDI inputs for SD resolutions only

Audio Encode

MPEG 1 Layer 2 audio (4 pairs) encode standard. 4 additional pairs are optional for a total of 16

channels.

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.

Audio Passthrough

- Dolby E 5.1/2.0/1.0, AC-3, LPCM, Linear Acoustic □

Audio Signal Generation

- MPEG 1 Layer 2 audio tones user selectable frequency per pair from 440 hz to 2.5Khz. Group L/R mute or Pair L/R mute. No audio inputs are required to generate audio tones.

Transport 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 A65B (PSIP) static table compliance (Dynamic Option)

MGT (TVCT) – Terrestrial / STT / RRT / EIT 0-3

Ancillary and Waveform Data

(V/H) ANC and WSS Video User Data

- Waveform (Composite or SD SDI):

Closed Captions per CEA-608-C (2005), (Carriage per SCTE DVS-157, ATSC-A_72).

Wide Screen Signaling (WSS) per ETSI EN300_294 V1.4.1 (2003-04), (Carriage per ATSC-A_72 AFD).

Teletext per ITU-R BT.653 (Carriage per ETSI EN 300_472 V1.2.1 (2003-01)

AMOL

- (V/H) ANC per SMPTE 291M (Native via SD/HD SDI):

Closed Captions per CEA-708 (Carriage per ATSC-A_72).

Teletext/Subtitles per OP47 (Carriage per ETSI EN 300_472 V1.3.1 (2003-01).

VITC per SMPTE 12M-2-2008 (Carriage per SMPTE 2038-2008, also inserted in GOP headers).

AFD/Bar Data/Pan Scan per CEA-CEB16 (2006) per SMPTE 2016 (Carriage per ATSC-A_72).

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)

- 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

Encryption

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

System and Host

Alarms

- Front Panel LED, Web UI, SNMP, GPIO

Physical and Operational

Physical / Environmental

1 RU chassis (19" X 18" X 1.65" / 482mm x 457mm x 44mm)

Weight – 9-14lbs. Dependent on installed options

Power

Input Voltage: Redundant auto switching dual 100 - 240 VAC 50/60Hz (Standard)

Power Consumption Start-up: 46 Watts

Operational: 45 Watts

(base consumption, actual consumption depends on installed options)

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

Optional SFP module (purchased separately)

Sensitivity: -22dBm

Overload: 0dBm

Exceeds SMPTE 297-2006 specifications

Robust error free reception of signals from 50Mbps to 3Gbps

Supports SD-SDI, HD-SDI and 3G-SDI

Hot-pluggable

RoHS compliant

IF, L-Band Modulator + 10MHz

Requires factory installation

note*: software keys are required to unlock full hardware support.

Compliant standards supported: DVB-S (EN 300421), DVB-S2 (EN 302307) and DVB-S2X (DVB-S2 Extensions)

Modulation Scheme Support: QPSK / 8PSK / 16APSK / 32APSK

DVB-S QPSK FEC rates: 1/2, 2/3, 3/4, 5/6, 7/8

DVB-S2 QPSK FEC rates: 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10

DVB-S2 8PSK FEC rates: 3/5, 2/3, 3/4, 5/6, 8/9, 9/10

DVB-S2 16APSK FEC rates: 2/3, 3/4, 4/5, 5/6, 8/9, 9/10

DVB-S2 32APSK FEC rates: 3/4, 4/5, 5/6, 8/9, 9/10

DVB-S2X QPSK 13/45, 9/20, 11/20, 11/45, 4/15, 14/45, 7/15, 8/15, 32/45

DVB-S2X 8APSK 5/9-L, 26/45-L

DVB-S2X 8PSK 23/36, 25/36, 13/18, 7/15, 8/15, 26/45, 32/45

DVB-S2X 16APSK 1/2-L, 8/15-L, 5/9-L, 26/45, 3/5, 3/5-L, 28/45, 23/36, 2/3-L, 25/36, 13/18, 7/9, 77/90, 7/15, 8/15, 32/45

DVB-S2X 32APSK 2/3-L, 32/45, 11/15, 7/9, 2/3

DVB-S2X 64APSK 32/45-L, 11/15, 7/9, 4/5, 5/6

DVB-S2X 128APSK 3/4, 7/9

DVB-S2X 256APSK 29/45-L, 2/3-L, 31/45-L, 32/45, 11/15-L, 3/4

Interface Rate: 50 kbit/s- 150 Mb/s (modcod & interface dependent)

Baudrate range: 0.05 - 54 Mbaud. (modcod dependent)

Clean Channel Technology - Roll-off factors: 5%, 10%, 15%, 20%, 25%, 35% for all modulations

RF Carrier ID compliant

IF and L-Band outputs are not active simultaneously

IF Output

Output level: -30 to +5dBm (+/- 2dB)

Frequency: 50 - 180MHz

Connector: BNC (50Ohm)

L-Band Output

Output level: -35 to +5dBm (+/- 2dB)

Frequency: 950 - 2150MHz

Connector: BNC (50Ohm)

L-Band Monitor Output

Output level: -45 dBm (+/- 5 dB)

Frequency: Follows L-Band main output or fixed at 1050 MHz when IF output active.

Connector: BNC (50Ohm)

note*: When IF is selected, monitor will be fixed at 1080MHz in future firmware update.

Reference Input

Level: -3 to +7 dBm

Frequency: 10 MHz

Connector: BNC (50Ohm)

Appendix C - DB15-M Analog audio input pinout:

Adtec sells an analog audio input cable as part of our accessory offerings. If you prefer to make your own cable, below is the pinout.

| Pin | Signal |
|-----|-------------------|
| 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 |

Appendix D - 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

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