mediaHUB-HD Pro

MPEG 2 High Definition Encoder

User Guide

ADTEC Digital

Overview

The mediaHUB-HD Pro is a real-time Contribution-quality MPEG 2 High Definition encoder. It is designed to support the most demanding Contribution, ATSC, DVB and IPTV Distribution and Cable Labs compliant VOD and DPI studio encoding requirements. The auto-detect HD/SD SDI video input eliminates the need for user resolution and frame rate configuration. It boasts dual stream on-board audio encoding of Dolby Digital and MPEG 1 Layer 2 audio with Dolby E and Dolby 5.1 passthrough support. Standard Adtec features include three ASI outputs as well as a GIGE output, AES3 Digital Audio, SDI and Analog audio inputs and BISS1/E encryption. User interfaces include an easy-to-use front panel interface and an on-board Web application server for configuration and monitoring. Unique features include a built-in confidence decoder with HDSDI, HDMI and D1 outputs and "Constant Capture" hard drive acquisition for studio, contribution and distribution applications.

- Operation And Applications

- System Illustrations

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Getting Started

- Front Panel Diagram

  - System Menu
  - Decoder Menu
  - Encoder Video Menu
  - Encoder Audio Menu
  - Transmit Menu
  - PID Menu
  - Table Menu
  - Profile Menu
  - Encryption Menu

- Back Panel Diagram

- Connections

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Control Application

- Introduction

  - The Status Bar
  - The Service Tab
  - The Profile Tab
  - The Video Tab
  - The VBI Tab
  - The Audio Tab
  - The PID Tab
  - The CAS Tab
  - The Studio Tab
  - The System Tab
  - The Upgrade Tab
  - The Help Tab

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How To Guides

- Encoding FAQ

- Manual Studio Encoding

- Manual Upgrade Procedures

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Appendix

- Contacting Customer Support

- MediaHUB-HD Pro Technical Specifications

- RS422 Communications

- Encoder Glossary

- Contribution with Dolby E pass-through

- GNU General Product License

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Typical Operations

Contribution Applications: Whether you need High Definition or Standard Definition MPEG 2, the Adtec mediaHUB-HD Pro supports SD 422 (422P@ML), SD 420 (MP@ML) and HD 1080i or 720P (MP@HL) video encoding with or without BISS encryption. Audio encoding includes dual stereo pair Dolby Digital and MPEG 1 Layer 2* standard. Dolby E and Dolby 5.1 passthrough are also standard. A highly robust single channel per carrier (SCPC) MPEG2 Transport Stream with DVB Service Name is output via ASI and GIGE, all the while maintaining a live confidence decode and optional "Constant Capture" of your valuable contribution feed. * Possibly known as MUSICAM

External IRDs are optional when employing the mediaHUB-HD Pro and its built-in confidence decoder. It boasts HDSDI, HDMI, and Composite video outputs providing a real time confidence decode of the video and user selected stereo audio pair. Support for MPEG 1 Layer 2 and Dolby Digital audio decoding are standard. * Dolby E decode and passthrough not supported by confidence decoder. * BISS not supported by confidence decoder.

For multiplexing many services or channels per carrier (MCPC), Adtec's DTA-3050 is the perfect companion product. Its 10 ASI inputs provide flexibility and high performance throughput with exceptionally low jitter. The DTA remaps PIDs, adds and drops services, provides BISS and DVB-CSA encryption, builds DVB Tables, and adds the ability to operate encoders and DTA's with full redundancy.

ATSC, DVB and MPEG Distribution Applications: Distribute the highest quality Digital Television sound and pictures 24x7x365 with the mediaHUB-HD Pro. Built to run - the mediaHUB-HD Pro supports ATSC, DVB, MPEG, and IPTV platforms delivering a pristine transport stream including broadcast quality Video, Audio with excellent lip sync, Closed Captions, Teletext, and static ATSC and DVB service information. For multiplexing and fully dynamic ATSC and DVB service information applications, Adtec's DTA-305x is the perfect companion product - it even adds the ability to operate fully redundant.

The mediaHUB-HD Pro includes a built-in confidence decoder which boasts HDSDI, HDMI, and Composite video outputs. It provides a real time confidence decode of the video with captions and selected stereo audio pair. Dolby Digital, MPEG 1 Layer 2 audio decoding and Dolby 5.1 down-mix are standard.

Adtec's exclusive "Constant Capture" feature records the distribution signal on its massive internal hard drive. Constant Capture allows the user to define the segment record duration and maintains all segments until the hard drive is full. When full, the first segment is deleted to make room for new ones (FIFO). Nearly 80 hours of distribution quality HD can be stored for review or transfer to an external storage devices.

Studio Applications: Frame accurately captured HDSDI, SDI or Analog video and two pairs of stereo audio with the mediaHUB-HD Pro. The standard Sony 9-PIN interface operates in Controller and Recorder mode allowing it to control a tape device or be controller by a non-linear editor (NLE). Encode in real-time with the Recorder mode directly from an NLE time line directly to long GOP MPEG 2. Frame accurately encode directly from Apple Final Cut Studio, Adobe Premier and Avid NLEs without rolling tape. Create SD and HD Cable Labs compliant MPEG 2 transport streams with the mediaHUB-HD Pro. The captured files are pristine, transport-stream formatted files, saved directly to disk in real-time, requiring **no** rendering! They include broadcast quality Video, Audio with excellent lip sync, Closed Captions and Teletext. Audio encoding includes dual stereo pair Dolby Digital and MPEG 1 Layer 2* standard. Dolby E and Dolby 5.1 passthrough are also standard. * Possibly known as MUSICAM.

The mediaHUB-HD Pro includes a built-in confidence decoder which boasts HDSDI, HDMI, and Composite video outputs. It provides a real time confidence decode of the video with captions and selected stereo audio pair. Dolby Digital, MPEG 1 Layer 2 audio decoding and Dolby 5.1 down-mix are standard.

Benefits

- **All in one Encode Solution:** Support MPEG 2 SD and HD Contribution, Distribution and Studio encoding applications with mediaHUB-HD Pro.
- **SDI Plug and Encode:** Automatic SDI detection (HD and SD) of standards and frame rates.
- **High and Standard Definition:** One box - both formats.
- **Decode While Encode (DWE):** Built-in confidence decoder nearly eliminates the need for external local decoders.
- **Configure:** Rapidly and accurately configure mediaHUB-HD Pro via the front panel or on-board web application.
- **Get the highest quality MPEG 2 HD and SD:** When it comes to the best on-air look, mediaHUB-HD Pro delivers with excellent quality Standard and High Definition video encoding.
- **Control with accuracy:** mediaHUB-HD Pro can control VTR sources or be controlled by a non linear editor (NLE) via RS-422 for frame accurate mark in/out encoding.
- **Create VOD and DPI-ready files:** Create Cable Labs-compliant Transport streams for use with VOD and DPI.
- **Constant Capture:** Automatically capture encodes in user-defined segmented lengths. Useful for maintaining distribution archives, capture of a contribution stream or general studio use.
- **Monitor:** SNMP, Web Browser, front panel LED and LCD visual alarms, and event logging are standard.

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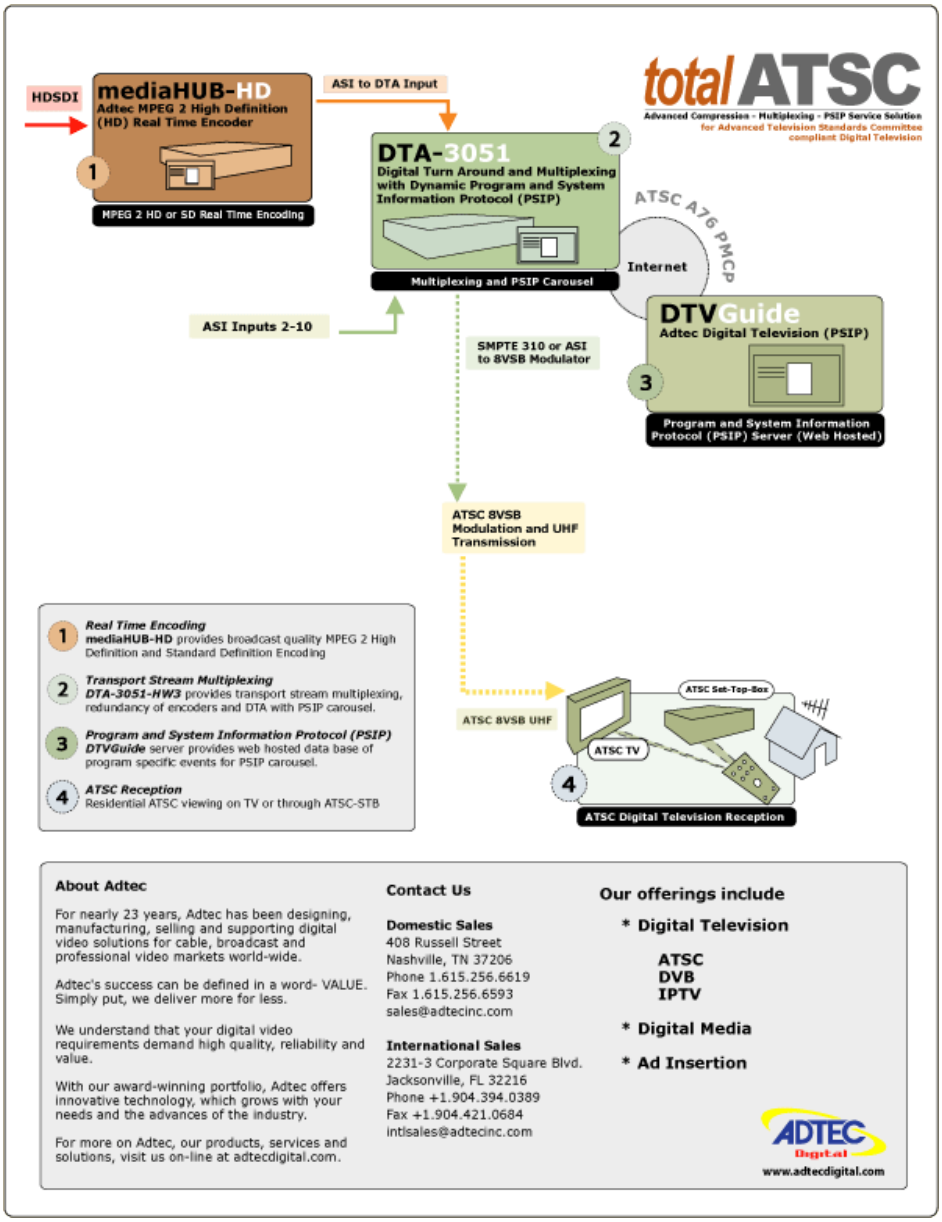
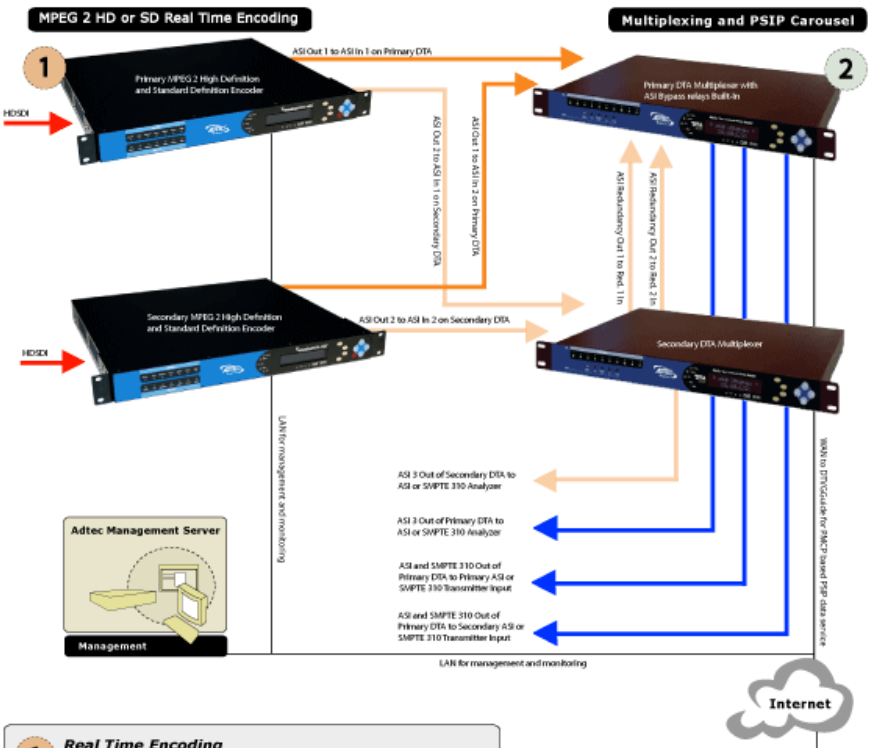
System Illustrations



Redundant

total ATSC

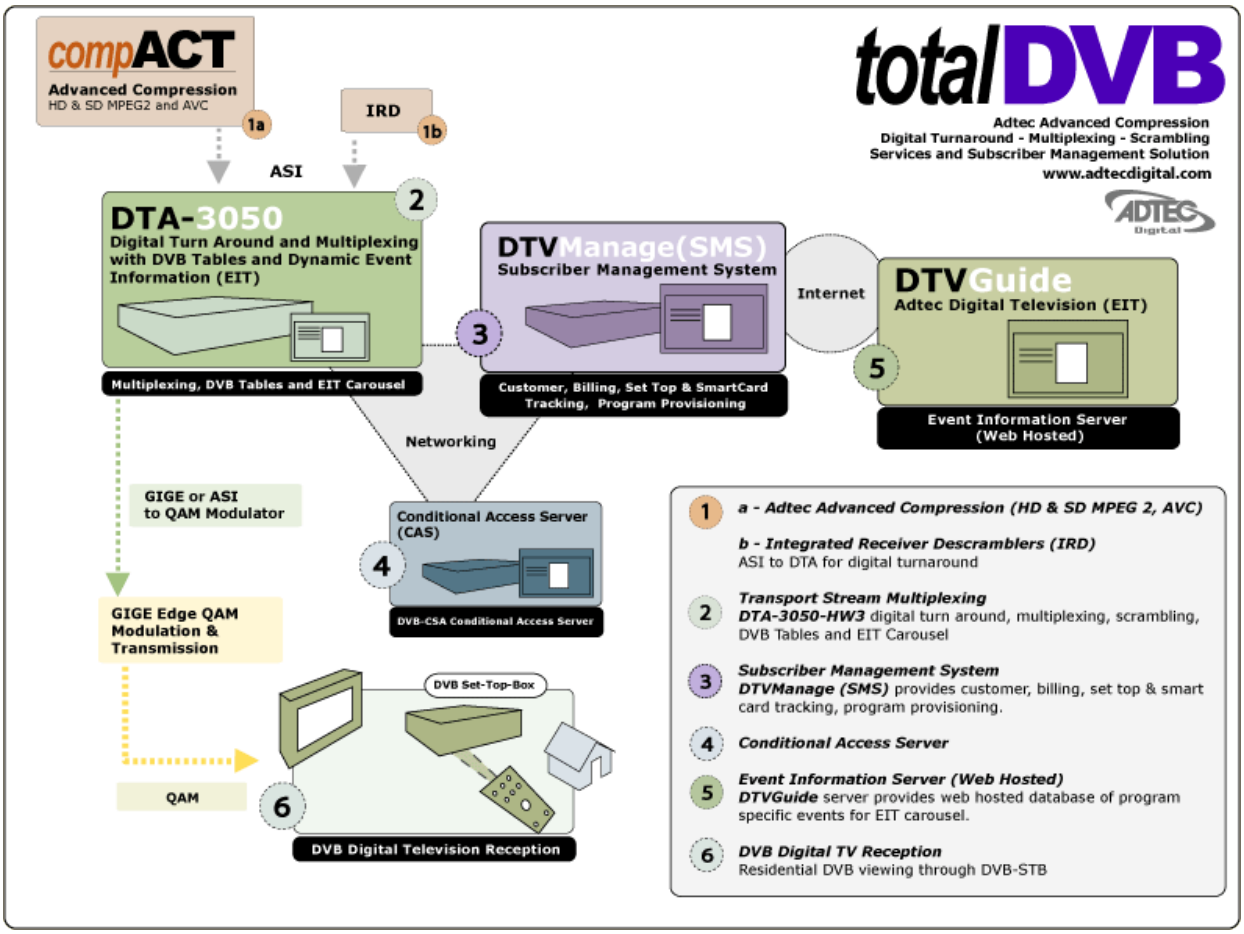
Advanced Compression - Multiplexing - PSIP Service Solution
for Advanced Television Standards Committee compliant Digital Television

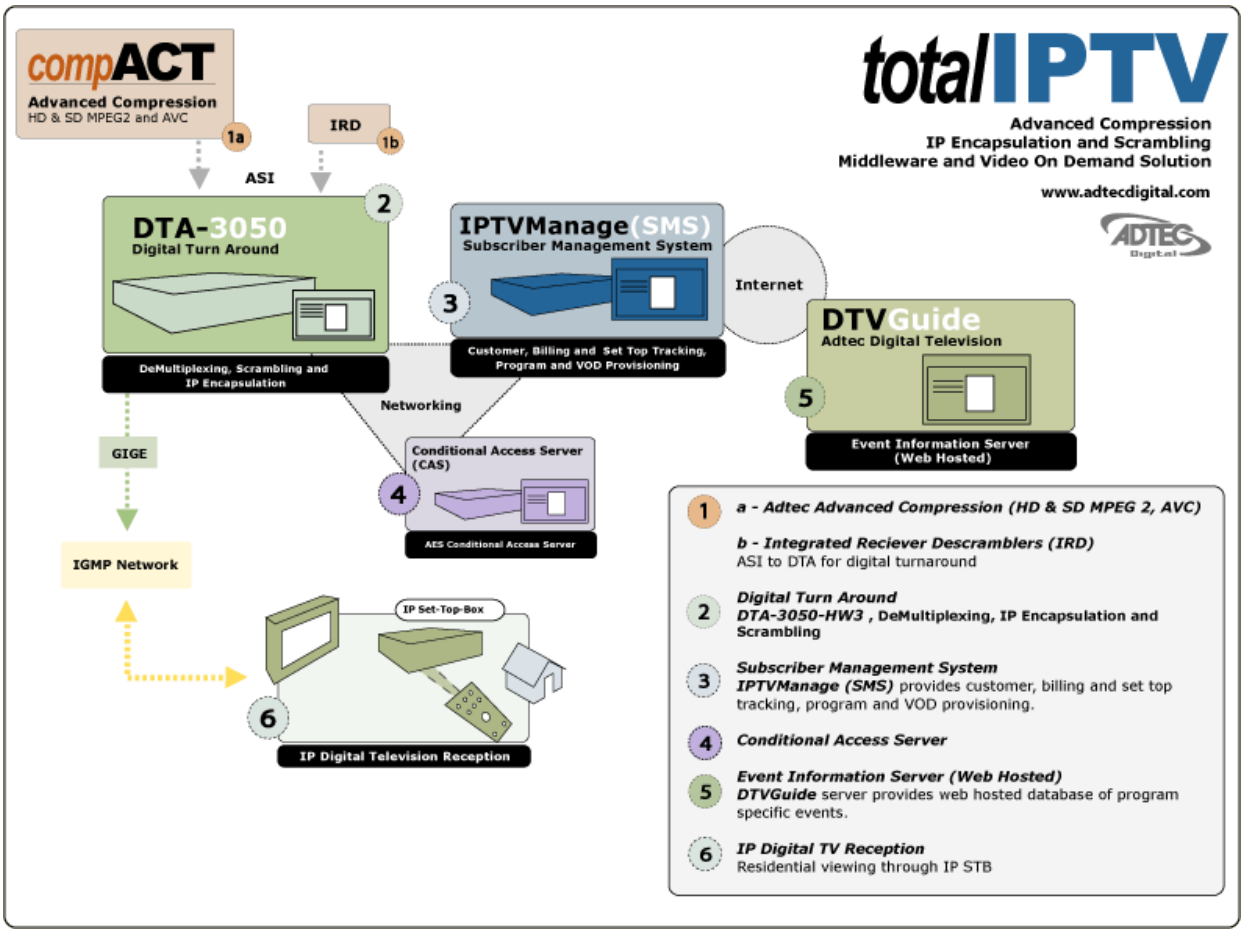


1 ***Real Time Encoding***
mediaHUB-HD provides broadcast quality MPEG 2 High Definition and Standard Definition Encoding

2 ***Transport Stream Multiplexing***
DTA-3051-HW3 provides transport stream multiplexing, redundancy of encoders and DTA with PSIP carousel.

3 ***Program and System Information Protocol (PSIP)***
DTVGuide server provides web hosted data base of program specific events for PSIP carousel.


compACT
Advanced Compression
HD & SD MPEG2 and AVC
1a
IRD
1b
ASI
DTA-3050
Digital Turn Around and Multiplexing with DVB Tables and Dynamic Event Information (EIT)
2
Multiplexing, DVB Tables and EIT Carousel
DTVManage(SMS)
Subscriber Management System
3
Customer, Billing, Set Top & SmartCard Tracking, Program Provisioning
Internet
DTVGuide
Adtec Digital Television (EIT)
5
Event Information Server (Web Hosted)
Networking
GIGE or ASI to QAM Modulator
Conditional Access Server (CAS)
4
DVB-CSA Conditional Access Server
GIGE Edge QAM Modulation & Transmission
QAM
DVB Set-Top-Box
6
DVB Digital Television Reception
totalDVB
Adtec Advanced Compression
Digital Turnaround - Multiplexing - Scrambling
Services and Subscriber Management Solution
www.adtecdigital.com
1 a - Adtec Advanced Compression (HD & SD MPEG 2, AVC)
b - Integrated Receiver Descramblers (IRD)
ASI to DTA for digital turnaround
2 Transport Stream Multiplexing
DTA-3050-HW3 digital turn around, multiplexing, scrambling, DVB Tables and EIT Carousel
3 Subscriber Management System
DTVManage (SMS) provides customer, billing, set top & smart card tracking, program provisioning.
4 Conditional Access Server
5 Event Information Server (Web Hosted)
DTVGuide server provides web hosted database of program specific events for EIT carousel.
6 DVB Digital TV Reception
Residential DVB viewing through DVB-STB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1a
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IGMP Network
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Middleware and Video On Demand Solution
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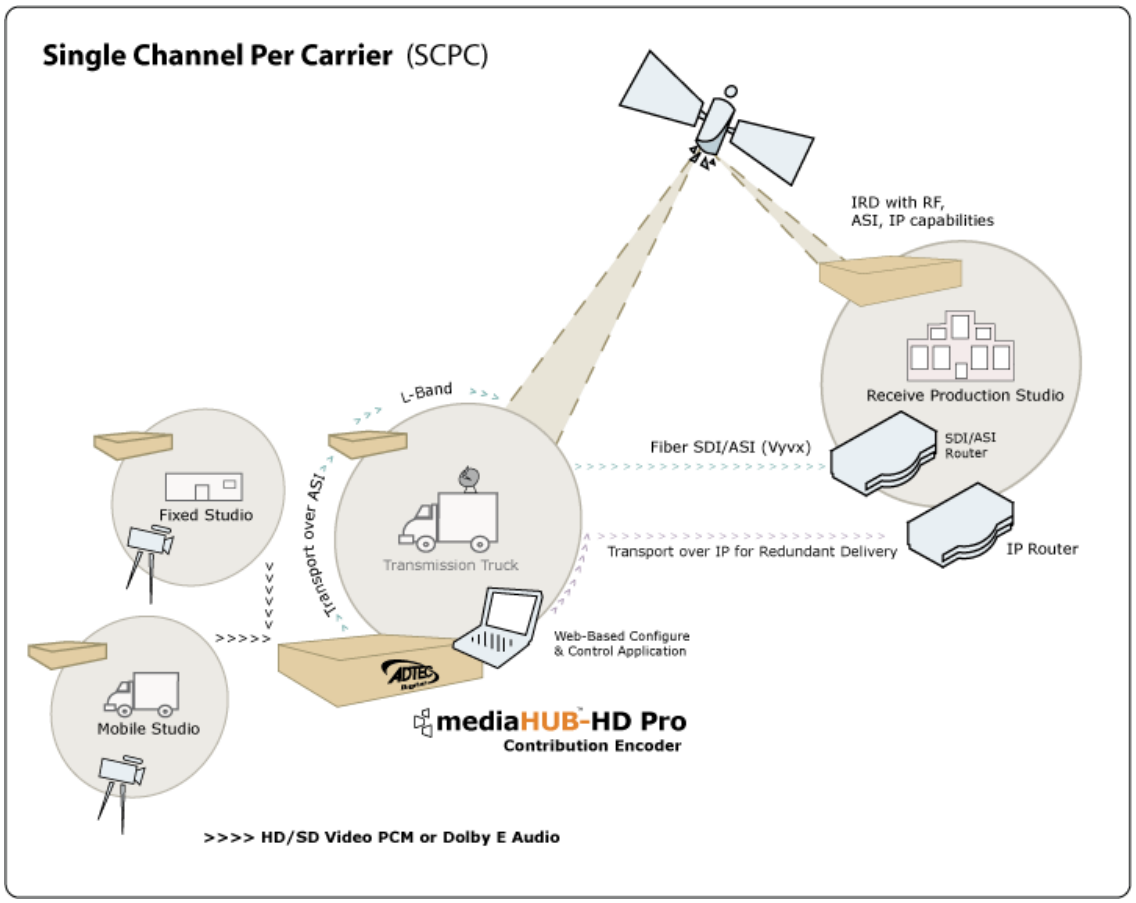
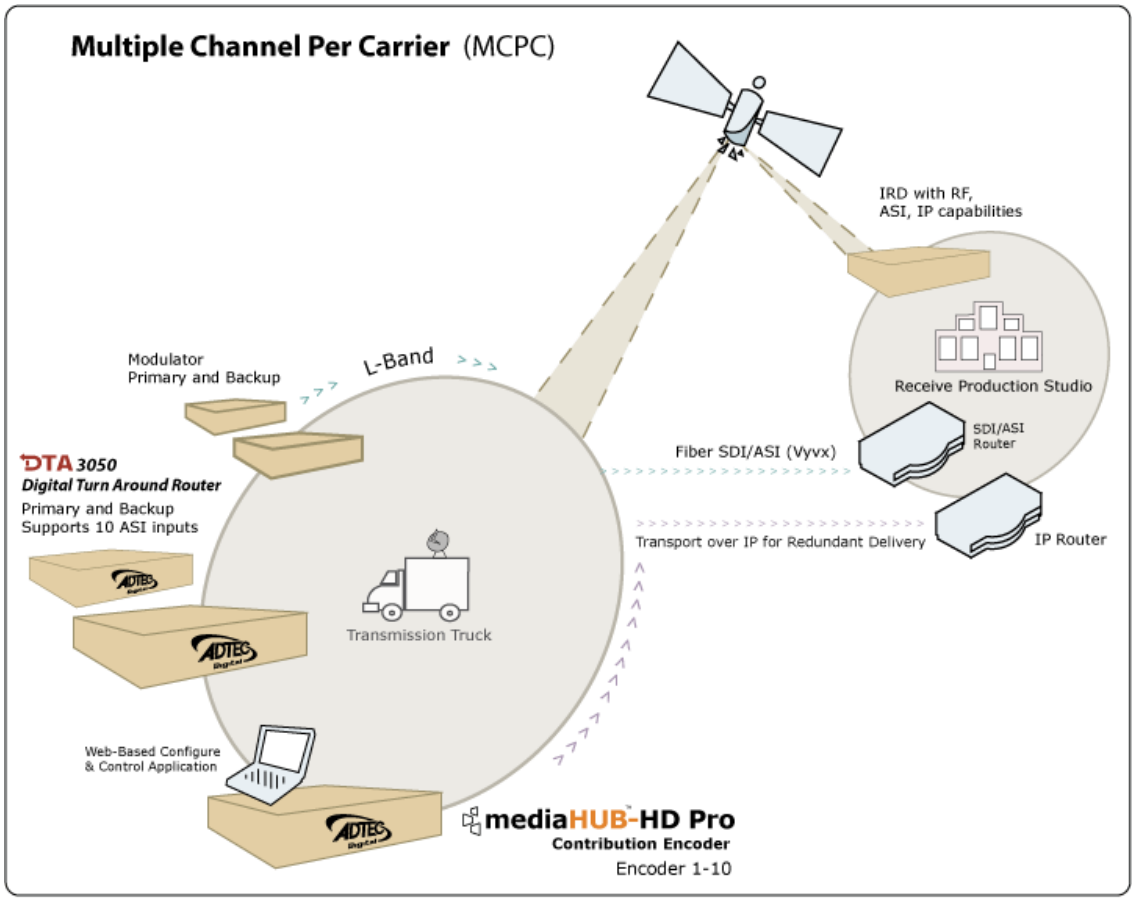
Residential viewing through IP STB


Single Channel Per Carrier (SCPC)
IRD with RF,
ASI, IP capabilities
Receive Production Studio
SDI/ASI
Router
Fiber SDI/ASI (Vyvx)
IP Router
Transport over IP for Redundant Delivery
L-Band
Transport over ASI
Fixed Studio
Transmission Truck
Web-Based Configure
& Control Application
Mobile Studio
mediaHUB-HD Pro
Contribution Encoder
>>>> HD/SD Video PCM or Dolby E Audio


Multiple Channel Per Carrier (MCPC)
IRD with RF,
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Receive Production Studio
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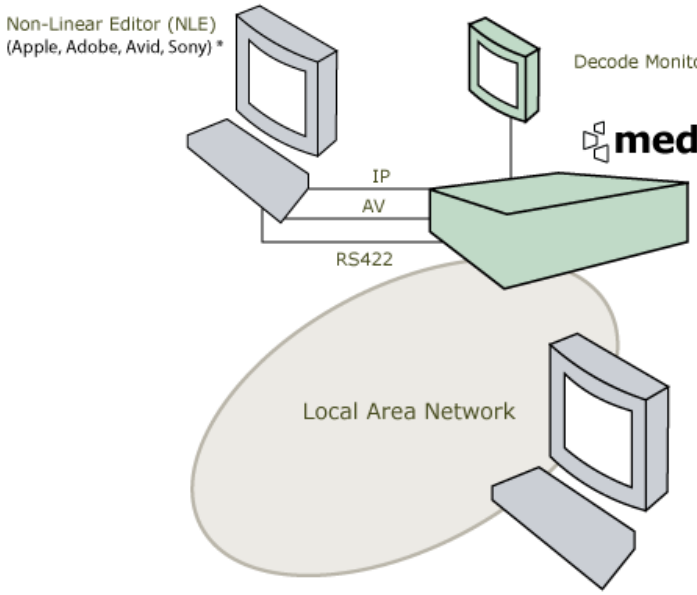
Transport over IP for Redundant Delivery
Modulator
Primary and Backup
L-Band
DTA 3050
Digital Turn Around Router
Primary and Backup
Supports 10 ASI inputs
Transmission Truck
Web-Based Configure
& Control Application
mediaHUB-HD Pro
Contribution Encoder
Encoder 1-10

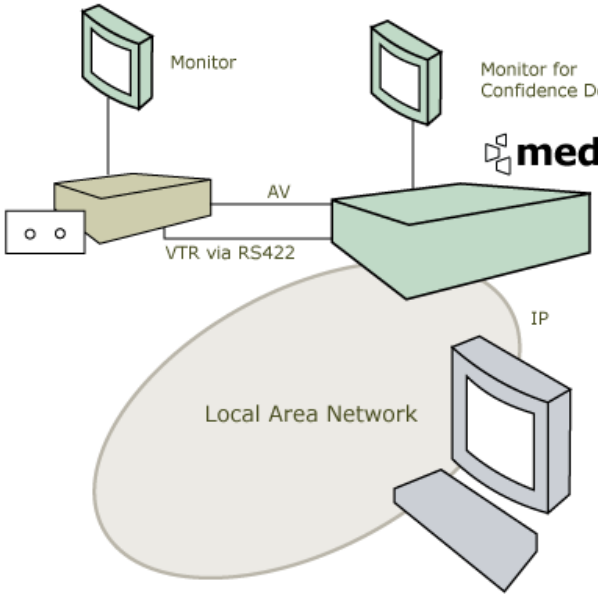
Slave Mode
Serves as the Recorder



mediaHUB-HD Pro
Studio Encoder
- Encode with less work
- Direct from NLE

** Some versions or models may not be frame accurate.*

Master Mode
Serves as the Controller



mediaHUB-HD Pro
Studio Encoder
- Encode with less work
- Confidence Decode

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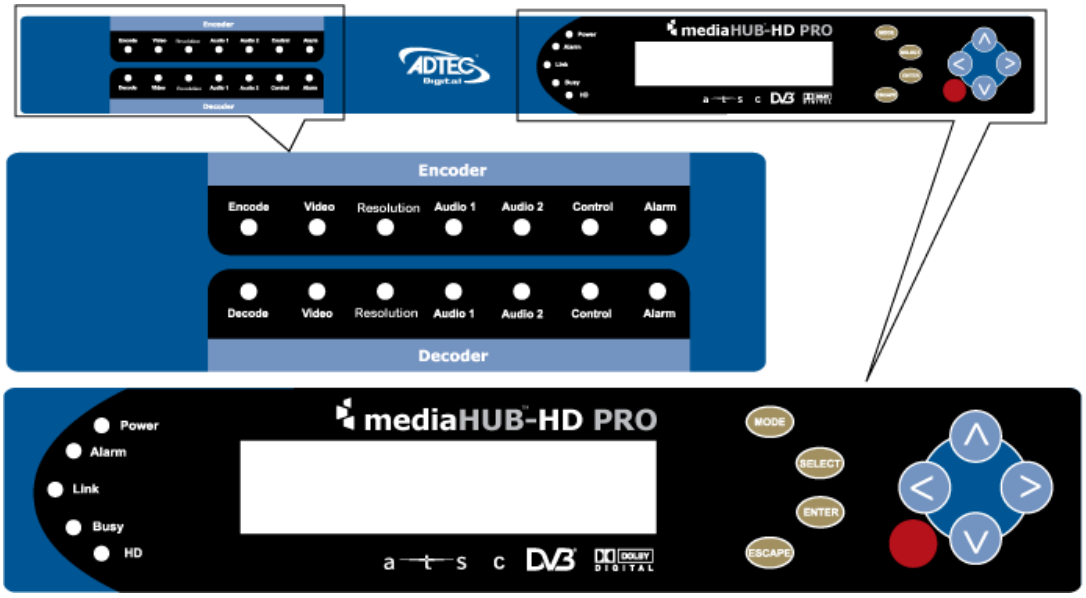
Front Panel Illustration

The mediaHUB-HD should be installed into a one-rack unit 19” rack slot. Power should be applied to the unit and configured with a valid IP address via the front panel. Once the IP is configured, you can use Telnet or a web browser to configure and control the unit.



Encoder	LED Status
Encode	**Off:** not encoding **Green flash:** pre-roll **Green:** encoding **Yellow:** transition from encode to idle **Red:** no video
Video	**Off:** no video/not enabled (audio only) **Green:** video present **Yellow:** wrong format **Red:** no video present
Resolution	**Green:** 1080i HD **Yellow:** 720p HD **Off:** Standard Def.
Audio 1 & 2	**Off:** no audio present **Green:** audio present
Control	**Off:** mode not enabled **Green:** Control Detected/Remote Mode **Yellow:** Control Detected/Local Mode **Red:** Control not responding.
Alarm	**Off:** no Encoder alarm **Red:** Encoder alarm
Decoder	**LED Status**
Decode	**Off:** not decoding **Green flash:** pre-roll **Green:** decoding
Video	**Off:** no video (audio only) **Green:** decoding video **Yellow:** decode errors **Red:** decoder fail
Resolution	**Green:** 1080i HD, Yellow: 720p HD, Off: Standard Def.
Audio 1 & 2	

	Off: not decoding **Green:** decoding
Control	**Off:** not implemented
Alarm	**Off:** no alarm **Red:** decoder alarm
System	**LED Status**
Power	**Green:** Power is on. **Off:** Power is off
Alarm	**Off:** no alarm **Yellow:** minor alarm **Red:** major alarm
Link	**Off:** no link detected **Green:** link active
Busy	**Off:** no traffic **Green Flashing:** traffic
HD	**Green:** High Def Feaure is enabled. **Off:** High Def Feature is disabled.

Front Panel Navigation

The mediaHUB-HD Pro has an LCD display on the front panel. Using the **Mode**, **Select**, **Enter**, **Escape** buttons and directional buttons, you can navigate the front panel menu and control the unit.

- The mediaHub-HD Pro is always logged in on startup
- If the device has logged out due to accident or a login duration timer being set (see below), you will need to log back in.

To log in from a logged-out status:

Step	Action
1	Press **<Select>**
2	Press **<Up>** arrow
3	Press **<Select>**
4	Press **<Enter>**
5	Press **<Right arrow>**
6	Press **<Enter>**

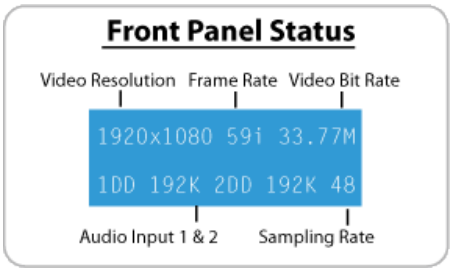
The front panel also has a login duration capability. This setting allows you to specify a time frame in which the unit will automatically log itself out if it receives no control inputs via the front panel or API session.

To set the duration:

Step	Action
1	Press mode until you see the System Menu.
2	Press **<Select>**
3	Press the **<Down>** arrow
4	Press **<Select>**
5	Using the **<Up>** and **<Down>** arrows, select the value you wish.
6	Press **<Enter>** to save your selection

Possible Values:
0 (Zero): The unit will not auto-log-out **1-9:** The number of minutes until log out if no input is received.

This snapshot tells you the current encode variables as shown in this diagram:.



There are 9 menu trees accessible from the front panel. Using the **MODE** button, you can scan through the System, Decoder, Encoder, Transport, PID, Table, Profile, and Encryption menus. By pressing the **SELECT** button you can enter one of these sub menus. For more information on each of these sub menus, follow the links below.

- System Menu

- Decoder Menu

- Encoder Video Menu

- Encoder Audio Menu

- Transport Menu

- PID Menu

- Table Menu

- Profile Menu

- Encryption Menu

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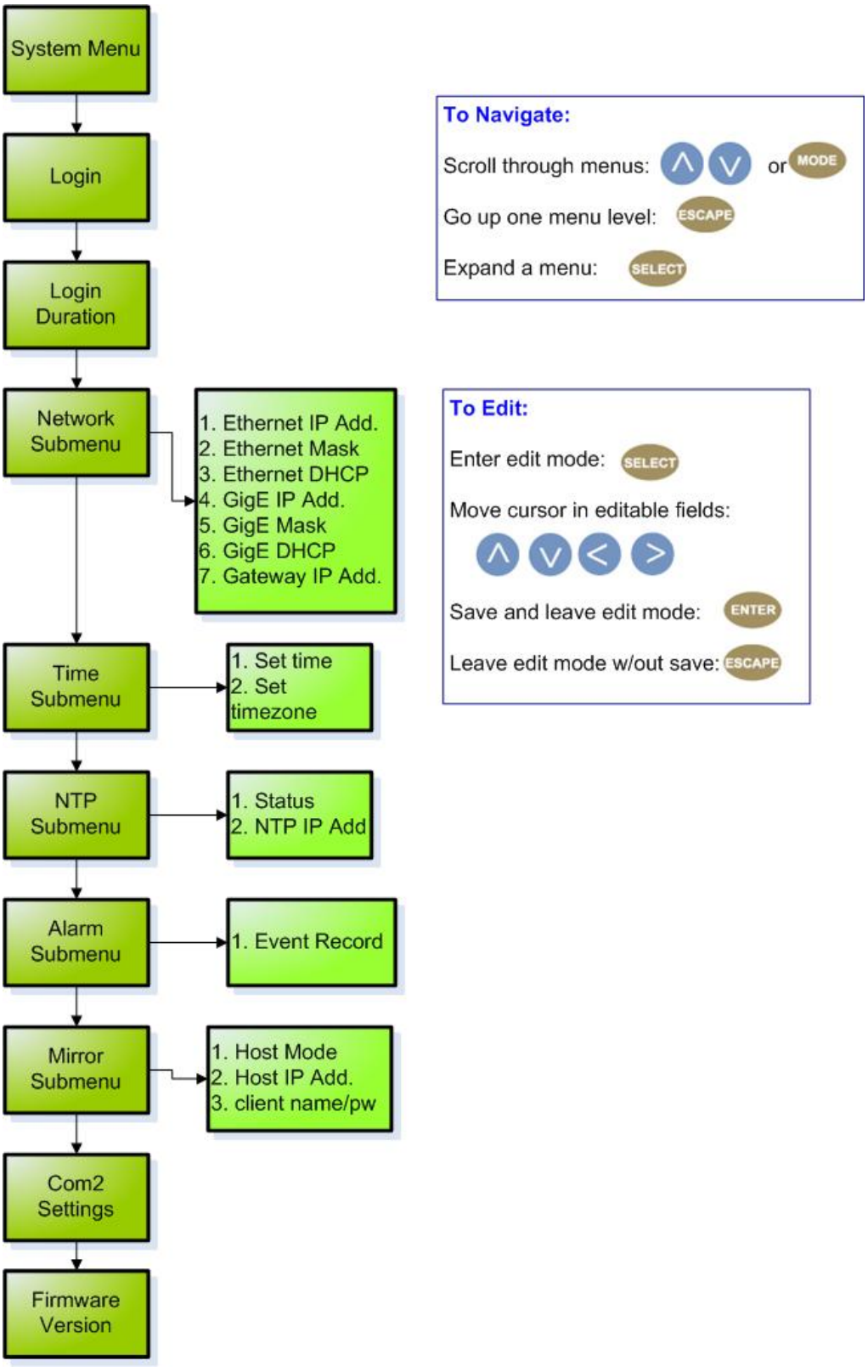
System Menu Tree

The following diagram represents the structure of the **System** Menu of the Adtec mediaHUB-HD Pro:



Definitions

Network Menu

Item	Function	Options	ADTEC API Command
Ethernet IP Address	IP address of unit on your network	user-defined using **<left/right arrow>** and **<select>** buttons default is 192.168.10.48	*.sysd IPA 0
Ethernet Mask	Defines the unit relative to the rest of your network	user-defined using **<left/right arrow>** and **<select>** buttons default is 255.255.255.0	*.sysd IPM 0
Ethernet DHCP	Dynamic Host Configuration Protocol; allows mediaHub to self-locate network Ethernet parameters	**On** (finds own DHCP Address) **Off** (defaults to last entered IP Address) default is OFF	*.sysd DHCP eth0
GigE IP Address	route of traffic in/out on IPTV	user-defined using **<left/right arrow>** and **<select>** buttons default is 192.168.20.48	*.sysd IPA 1
GigE? Mask	defines unit relative to the rest of an IPTV network	user-defined using **<left/right arrow>** and **<select>** buttons default is 255.255.255.0	*.sysd IPM 1
GigE? DHCP	Dynamic Host Configuration Protocol; allows mediaHub to self-locate network GigE? parameters	**On** (finds own DHCP Address) **Off** (defaults to last entered IP Address) default is OFF	*.sysd DHCP eth1
Gateway IP Address	traffic director for off-LAN resources	user-defined using **<left/right arrow>** and **<select>** buttons default is 192.168.10.1	*.sysd GIP

Time Menu

Item	Function	Options	Adtec API Commands
Time	specifies system time	user-defined using **<left/right arrow>** and **<select>** buttons	*.sysd TIM
Timezone	specifies time zone unit operates in	user-defined using **<left/right arrow>** and **<select>** buttons	*.sysd TIZ

NTP Menu

Item	Function	Options	Adtec API Commands
NTP Status	Network Transfer Protocol	Defines whether or not your unit is in sync with the designated NIP server	none
NTP IP Address	IP address designated for Network Transfer Protocol	user-defined using **<left/right arrow>** and **<select>** button s	*.sysd NIP

Alarm Menu

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

Mirror Menu

Item	Function	Options	Adtec API Commands
Host Mode	Designates whether the unit is mirroring another server, or serving as a stand-alone client.	MirrorClient !MirrorList Client	*.sysd HOM

Host IP Address	IP address of the server this unit is attempting to mirror or report to.	user-defined using **<left/right arrow>** and **<select>** buttons	*.sysd HIP
Client Name, Password	unit-level security for FTP connectivity	user-defined using **<left/right arrow>** and **<select>** buttons **Note:** Adtec recommends this **NOT** be changed! Default is "USER"	*.sysd CPW

Com2 Menu

Item	Function	Options	Adtec API Commands
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 * 1 None	Decoder command *.sysd com2 Encoder command *.ecmd com2

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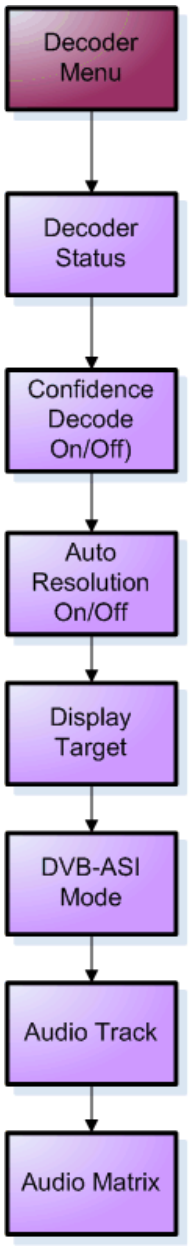
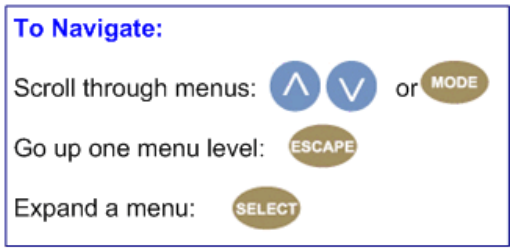
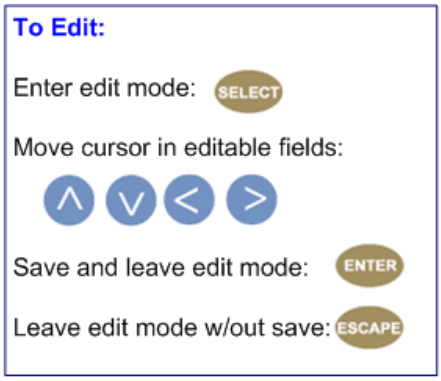
Decoder Menu Tree

The following diagram represents the structure of the **Decoder** Menu of the Adtec mediaHUB HD Pro:







Definitions

Item	Function	Options	Adtec API Commands
Status	provides information regarding decoder function	Playing, Idling, Multicast Rec., etc	*.DCMD TRA
Confidence Decode	turns confidence decode on or off; when active, this feature allows content to be reviewed on a monitor prior to transport	On Off	*.ECMD CDE
Auto Resolution	when selected, the confidence decoder (see above) will detect the resolution of the current encode and match it. If switched off, the user can specify a display target for the desired resolution.	On Off	*.ECMD CDE AUTORES
Display Target	Television resolution; set to match resolution of the intended display; unit will scale up/ down to match.	See Supported Targets below	*.DCMD VID
DVB-ASI Mode			*.DCMD DVB

	Enable or disable the DVB_ASI input port. If receive mode is enabled, and a valid DVB-ASI signal is detected, the unit will play the stream.	Off (disabled) On (enabled)	
Audio Track	identifies associated audio	Track 1 Track 2	*.ECMD API
Audio Matrix	per SMPTE 272/299M SDI supports embedded audio Groups 1, 2, 3, 4.		*.ECMD SMX

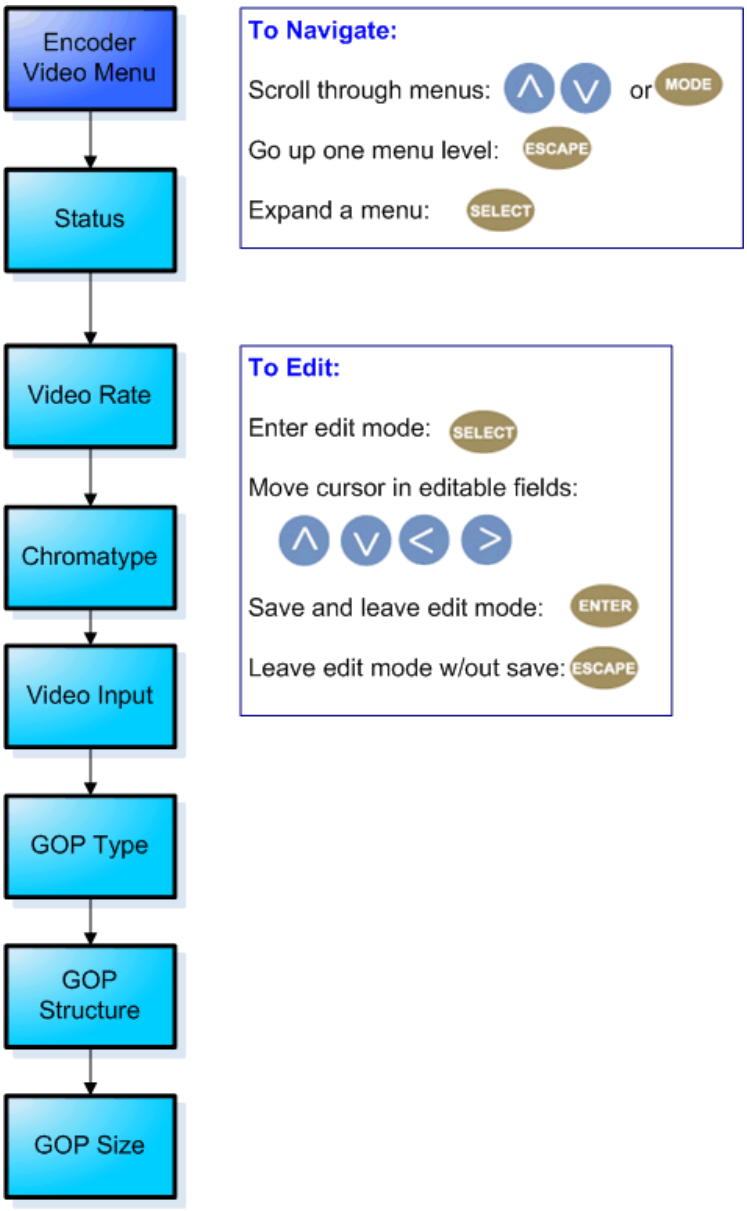
NTSC	1080P60*	VESA800X600X75	VESA1280X768X85
NTSC-J	VESA640X350X85	VESA800X600X85	VESA1280X960X60
PAL	VESA640X400X85	VESA848X480X60	VESA1280X960X85
PAL-M	VESA640X480X60	VESA1024X768X43	VESA1280X1024X60
720P24	VESA640X480X72	VESA1024X768X60	VESA1280X1024X75
720P50	VESA640X480X75	VESA1024X768X70	VESA1280X1024X85
720P60	VESA640X480X85	VESA1024X768X75	VESA1360X768X60
1080P24	VESA720X400X60	VESA1024X768X85	VESA1400X1050X60
1080I50	VESA800X600X56	VESA1152X864X75	VESA1400X1050X75
1080P50	VESA800X600X60	VESA1280X768X60	VESA1600X1200X60
1080I60	VESA800X600X72	VESA1280X768X75	VESA1920X1200X60
XGA1080i50	XGA1080i60	720P59	1080i59

* The mediaHUB-HD Pro's Decoder module only supports this display target for HDMI output. It does not actually decode 1080P60, but will scale and/or de-interlace its decoded video to produce 1080P60 for output on HDMI.

Note on VESA Resolutions: Rev. B Units do not support VESA resolutions due to loss of DVI connector. NTSC, PAL, 720P59, and 1080i59 are recommended resolutions. Composite and SDI are active during all display targets. HDMI is not active at SD resolutions.

Encoder Video Menu Tree

The following diagram represents the structure of the **Video Encoder** Menu of the Adtec mediaHUB-HD Pro:



Definitions

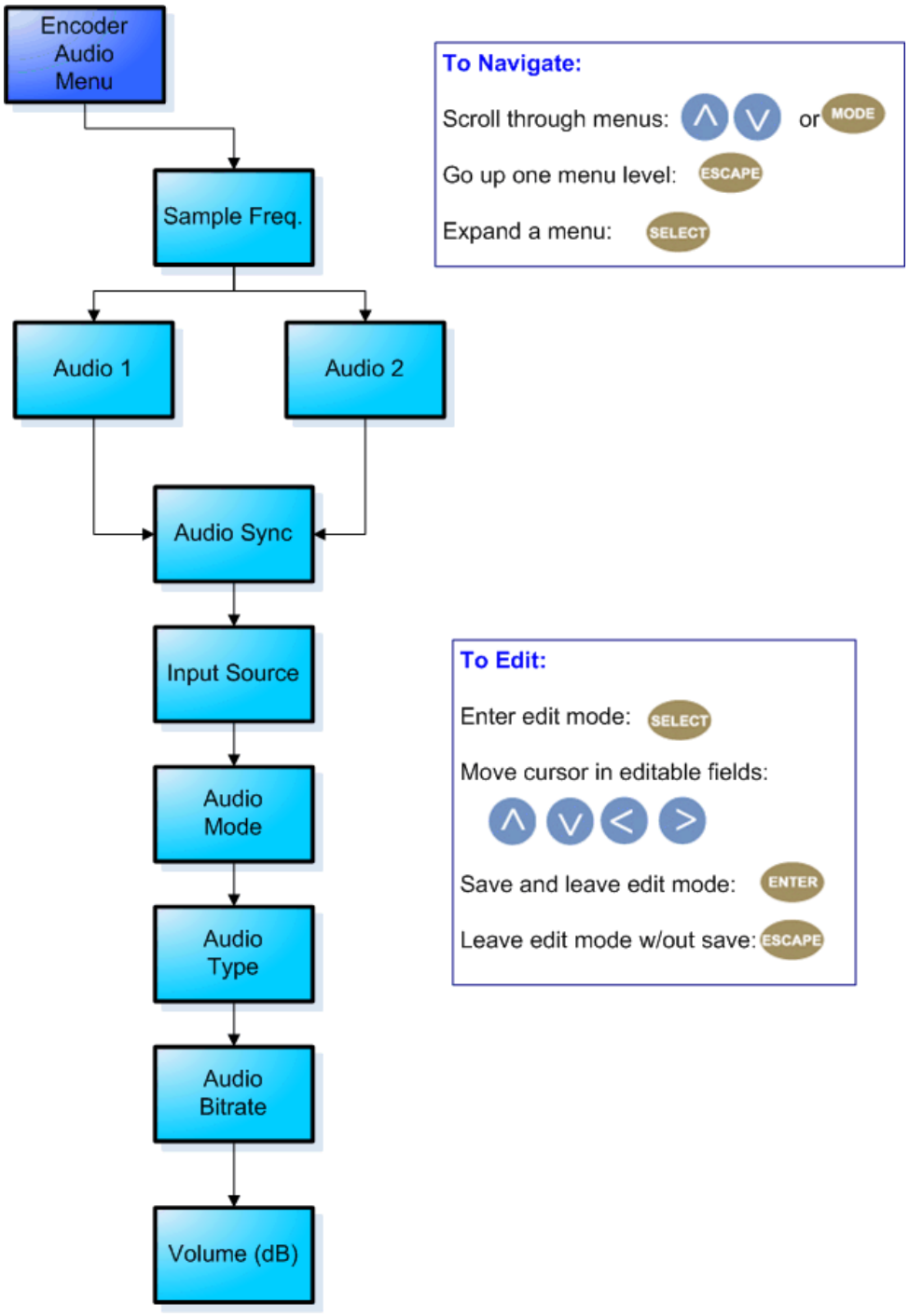
Item	Function	Options	API Commands
Status	Shows current status and provides encoder control.	Encode - begins encoding Stop - stops encoding	**.** ECMD REC - encode .ECMD STP - stop
Video Rate	rate at which video signal is being encoded	user-defined using **<left/right arrow>** and **<select>** buttons. Review Technical Specifications for full details on acceptable ranges.	*.ECMD VRT
Chromatype	chrominance; video color-component	420 422	*.ECMD CHT

Video Input	selects type of video input	Composite SDI	*.ECMD INP
GOP Type	Group of Pictures type as open or closed GOP is expressed as one command, i.e., *.ECMD GOP [type] [structure] [size]	Open Closed	*.ECMD GOP 0 = open 1 = closed
GOP Structure	Group of Pictures structure (format)	I IP IBBP	*.ECMD GOP 3 = I 2 = IP 0 = IBBP
GOP Size	Group of Pictures size	User-defined 1-30 in increments of 1	*.ECMD GOP 1-30

Note: the Adtec mediaHUB HD Pro encoder function does not support MPEG1 Layer 3 or MP3.

Encoder Audio Menu Tree

The following diagram represents the structure of the **Audio Encoder** Menu of the Adtec mediaHUB-HD Pro:



Definitions

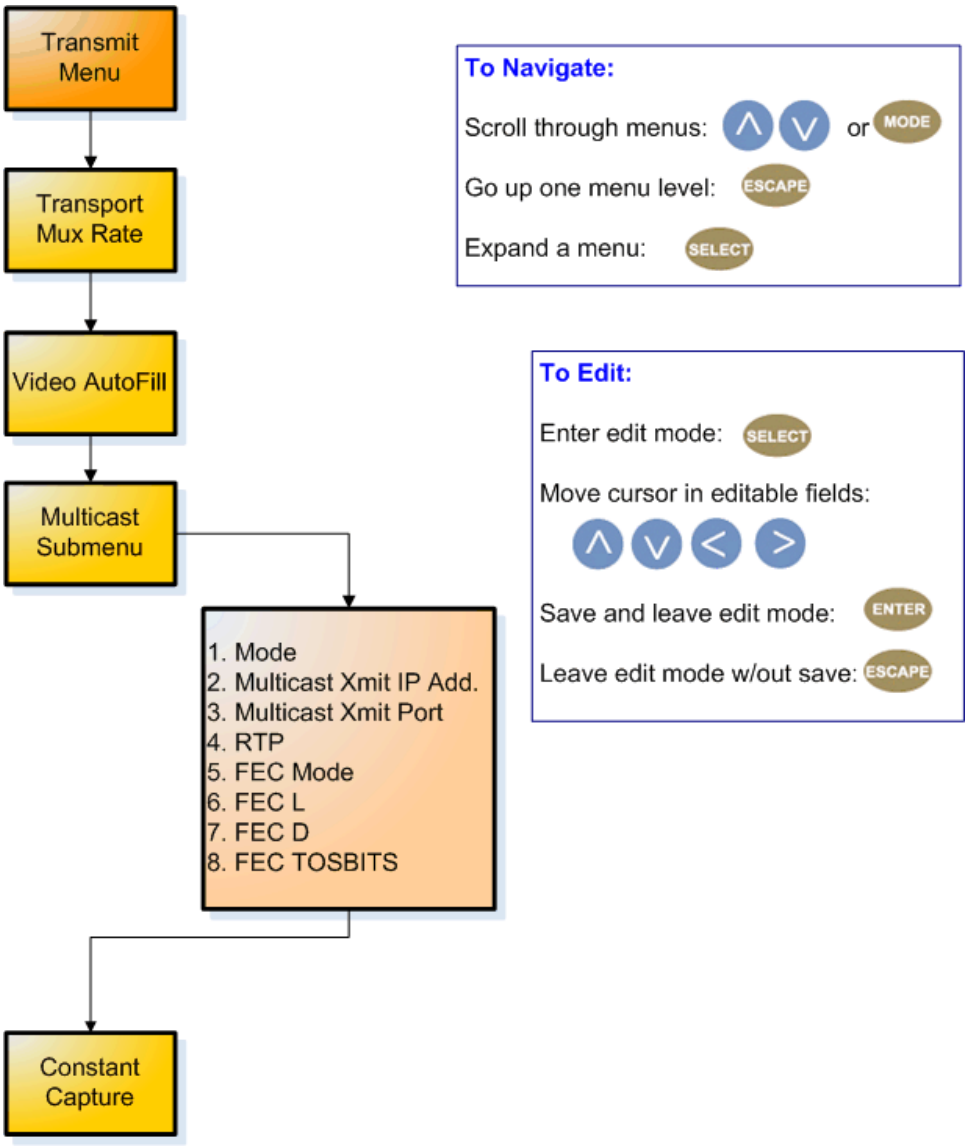
Item	Function	Options	API Commands
Sample Frequency	how often signal is sampled in Hz only one frequency can be selected; will set both Audio 1 and Audio 2	32000 44100 48000	*.ECMD ASF [audio]
Audio Sync	Audio sync offset in milliseconds.	The range is -800 to +800	*.ECMD AUS
Audio Input Source	selects type of audio input menu is identical for Audio 1 and Audio 2	Analog SDI	*.ECMD AIN [audio]

		AES	Audio 1 = 0 Audio 2 = 1
Mode	specifies if the mediaHub HD Pro is encoding audio or passing it through as received	Off Encode Passthrough	See AMO in API Only functions?
Type	type of audio signal being encoded or passed	Dolby Digital AC3 Musicam Layer II Dolby E Linear PCM (LP)	See AMO in API Only functions?
Bitrate	audio codec	64000-384000 kBits/sec (Musicam encode) 64000-640000 kbits/sec (Dolby Digital/passthrough)	See AMO in API Only functions?
Volume Level	volume in dB	user-defined using **<left/right arrow>** and **<select>** buttons range is -18 dBs to 8 dBs in increments of 1	*.ECMD ALV [channel] [level in dB] Audio Channel 1 = 0 Audio Channel 2 = 1

Note: the Adtec mediaHUB-HD Pro encoder function does not support MPEG1 Layer 3 or MP3.

Transmit Menu Tree

The following diagram represents the structure of the **Transmit** Menu of the Adtec mediaHUB-HD Pro:



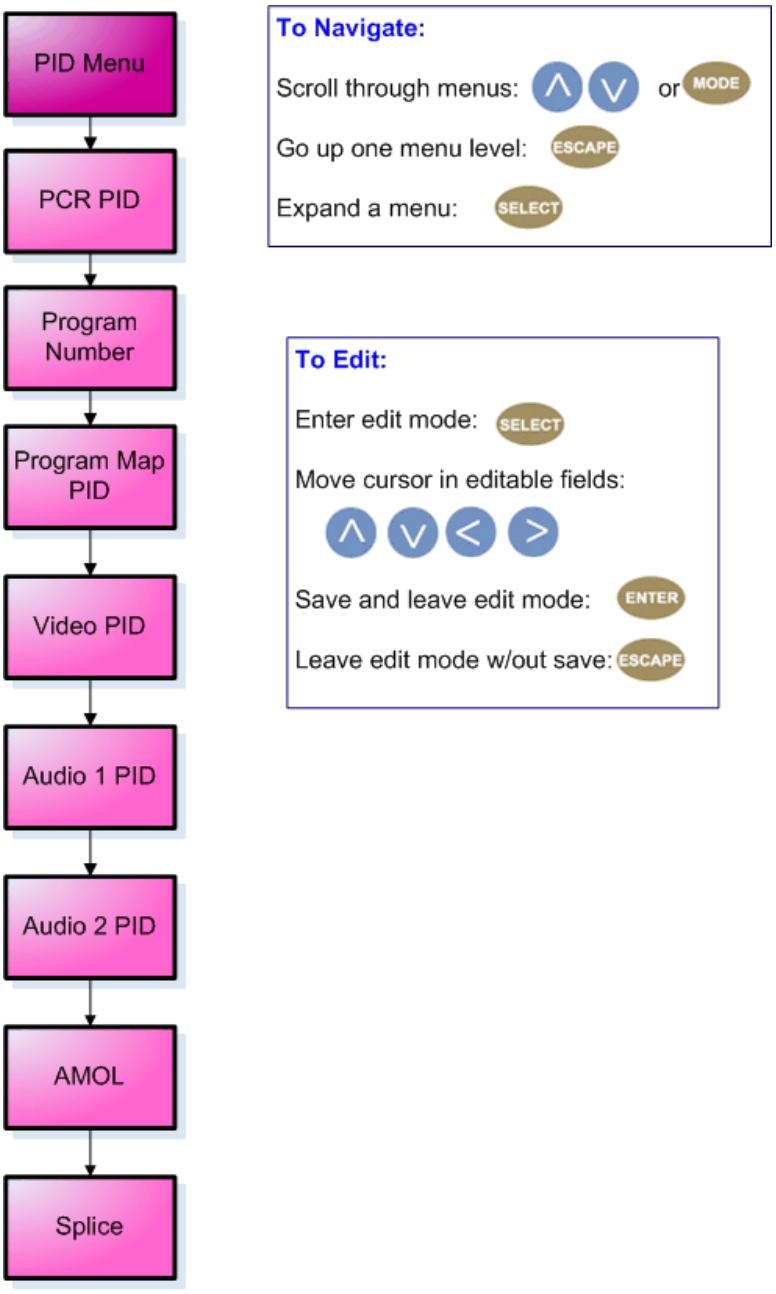
Definitions

Item	Function	Options	API Commands
Transport Mux Rate	rate, in bps, that the multiplexed signal is being handed off	Range 1000000-80000000	*.ECMD TMR
Video Autofill	ties to Transport Mux Rate; uses non-audio packet space for video	On Off	*. ECMD VAF [x] 1 = on 0 = off
Multicast Menu	sub-label for items below	NONE	none
Mode	switches multicast function on and off	Off Send	*.ECMD MMO
Multicast Transmit IP Address	IP Address from which a multicast is being made	user-defined using **<left/right arrow>** and **<select>** buttons	*.ECMD MSI

Multicast Transmit Port	port assignment used for transmitting a multicast	user-defined using **<left/right arrow>** and **<select>** buttons	*.ECMD MSP
RTP	Turns RTP on or off RTP allows for sequence numbering and timing, which are crucial for the accurate playback of an audio or video data stream. Control is editable if Multicast Mode is set to 'Send'.	Off = [0] On = [1]	*.ECMD RTP
FEC Mode	Forward Edge Correction; send2 two FEC RTP streams in addition to a source RTP stream enabling a receiver to reconstruct missing packets in the source stream. Used in conjunction with L and D values; described below.	Off = [0] On = [1] when RTP is also selected 'on')	*.ECMD FEP
FEC L	affects the maximum burstpacket loss that can be recovered	4-20 user-defined using **<left/right arrow>** and **<select>** buttons	*.ECMD FEP
FEC D	defines latency involved in burstrecovery	4-20 user-defined using **<left/right arrow>** and **<select>** buttons	*.ECMD FEP
Capture	Enable or disable encoder capture to file. If enabled, all encoded content will be captured to file. If disabled, file capture is turned off.	On Off	*.ECMD CCA

PID Menu Tree

The following diagram represents the structure of the **PID** Menu of the Adtec mediaHUB-HD Pro:



Definitions:

Item	Function	Options	Adtec API Command
PCR PID	identifies packets which contain PCR adaptation field	user-defined 20-character hexadecimal	*. ECMD PRP
Program Number	identifies which program number in the PAT and PMT packets are associated with which video and audio PIDs 0x0001 - 0xFFFF are valid ID assignments	user-defined 20-character hexadecimal	*. ECMD PNU
Program Map PID	identifies packets containing the program map 0x0000: reserved for Program Association Table (PAT) 0x0001: reserved for conditional Access Table	user-defined 20-character hexadecimal	*. ECMD PPI see reserved PIDs at left

	0x0002 -> 0x001F: reserved 0x0020 - 0x1FFE are valid PID assignments		
Video PID	identifies video packets 0x0000: reserved for Program Association Table (PAT) 0x0001: reserved for conditional Access Table 0x0002 -> 0x001F: reserved 0x0020 - 0x1FFE are valid PID assignments	user-defined 20-character hexadecimal	*. ECMD VPI see reserved PIDs at left
Audio 1 PID	identifies packets containing audio AES stream 0x0000: reserved for Program Association Table (PAT) 0x0001: reserved for conditional Access Table 0x0002 -> 0x001F: reserved 0x0020 - 0x1FFE are valid PID assignments	user-defined 20-character hexadecimal	*. ECMD API [Index] [PID] 0 = channels 1,2 1= channels 3,4 see reserved PIDs at left
Audio encryption2 PID	see above	user-defined 20-character hexadecimal	See above
AMOL	Automated Measurement of Line Ups; identifies packet which contains AMOL (NTSC) information Only applies to 525 line (NTSC) video. 0x0020 - 0x1FFE are valid PID assignments	user-defined 20-character hexadecimal	*.ECMD APQ
Splice	identifies packets which contain DVVS-255 splice information. 0x0010 - 0x1FFE are valid PID assignments	user-defined 20-character hexadecimal	*.ECMD SPI

Note: As of firmware version 3.00.18, all PID API commands can now accept Hex or Decimal values.

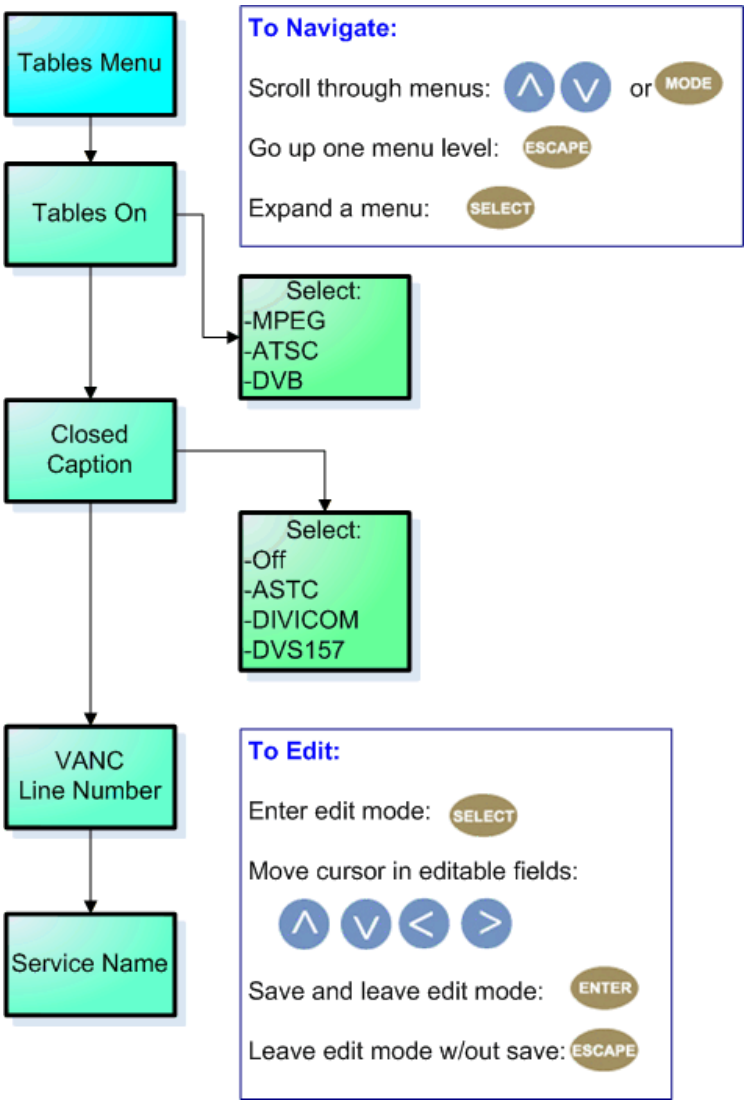
PCR PID Examples: PRP 1E1 (set the PID to 0x1e1 (481 decimal) PRP , 481 (set the PID to 481 (the comma is an empty placeholder) PRP 1E1 500 (set the PID to 500 (assumes 500 is different from the currently configured PID).

PID Ranges

Range	Function
0x0000	Program Association Table
0x0001	Reserved for Conditional Access Table
0x0002->0x001F	Reserved
0x0020 - 0x1FFE	valid PID assignments

Tables Menu Tree

The following diagram represents the structure of the **Tables** Menu of the Adtec mediaHUB HD Pro:



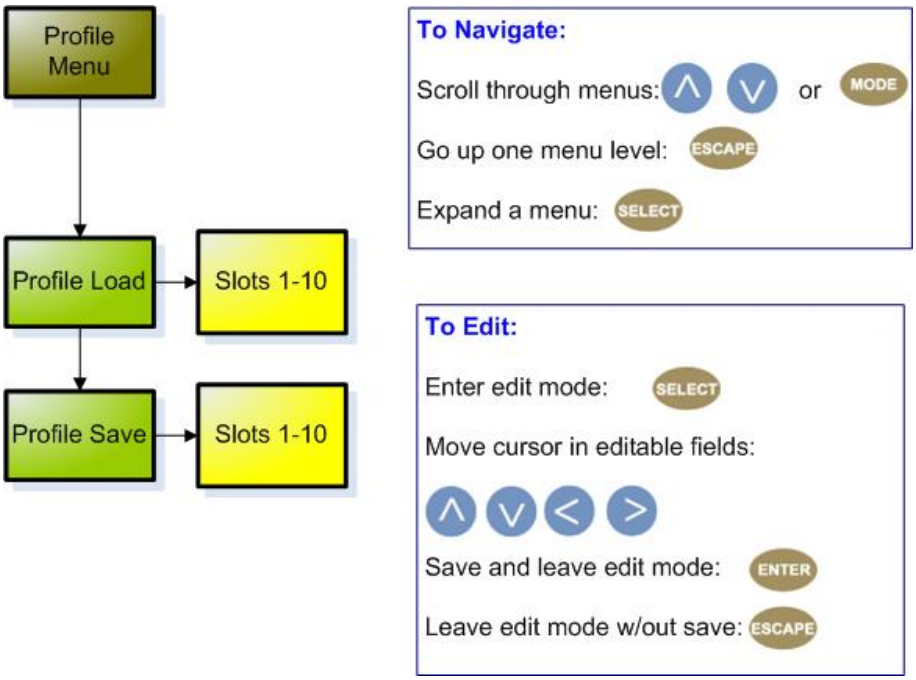
Definitions

Item	Function	Options	Adtec API Command
Tables On	switches feature on and designates type of tables to be used	DVB MPEG ATSC	*.ECMD TON 0 = DVB 1 = MPEG 2= ATSC
Closed Caption	activates (or deactivates) closed-captioning and specifies closed-captioning standard to be used	Off ASTC Divicom DVS157	*.ECMD CLC 0 = Off 1 = ASTC mode 2 = Divicom mode 4 = DVS157 mode note:In std-def, all modes apply. In hi-def, for EIA-708 closed caption insertion, set to ATSC.
Line Number	VANC	user-specified 7-32 in 1 line increments	*.ECMD LNA
			*.ECMD SNA [name]

Service Name	name of program/network or other identifier;carried in the SDT table of a transport stream	user-specified 20-character alphanumeric text string	

Profile Menu Tree

The following diagram represents the structure of the **Profile** Menu of the Adtec mediaHUB HD Pro:



Usage

- The Profile Menu can be used to store and access up to ten stored configurations (profiles).
- The mediaHUB HD Pro can store up to 40 profiles, but only the first ten are accessible through the front panel. The other 30 can be defined and edited using a telnet/API command session.
- The front panel enables users to load one of the top 10 saved profiles or save a profile in one of the first ten memory slots.

API Commands

There are five commands in the Profile group in the API command set for the mediaHUB HD Pro. They are:

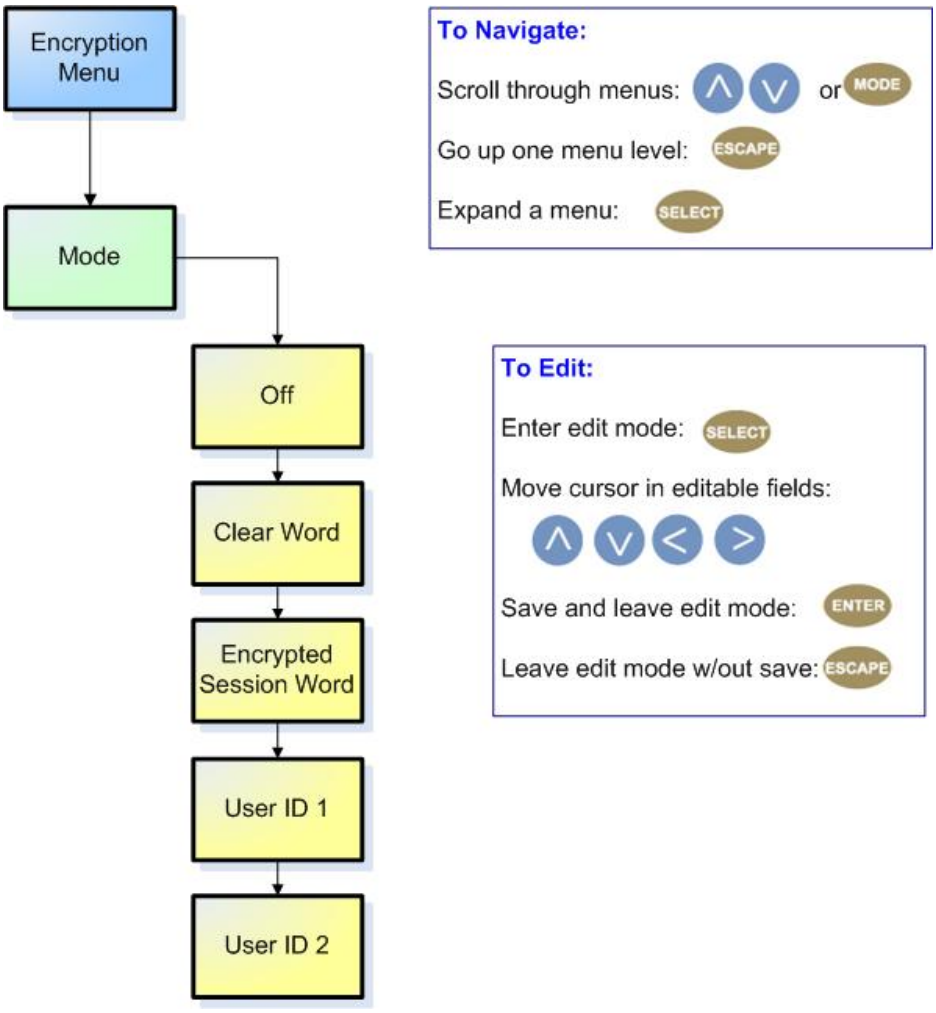
Command Handler	Command	Function
*.ECMD PROFILE	LIST	lists all stored profiles
*.ECMD PROFILE	[slot #] or [name] LOAD	loads stored profile from the designated memory slot
*.ECMD PROFILE	[slot #] SAVE	saves a profile to the designated memory slot
*.ECMD PROFILE	[slot #] DELETE	deletes the profile stored at the designated memory slot
*.ECMD PROFILE	[slot #] RENAME	renames the profile stored at the designated memory slot

Naming

When saving a profile to Slots 1-10 from the front panel, the system will default to the Service Name associated with that configuration. To input a name of the user's choice, use the Profile/Save or Profile/Rename commands in a telnet/API session.

Encryption Menu Tree

The following diagram represents the structure of the **Encryption** Menu of the Adtec mediaHUB-HD Pro:

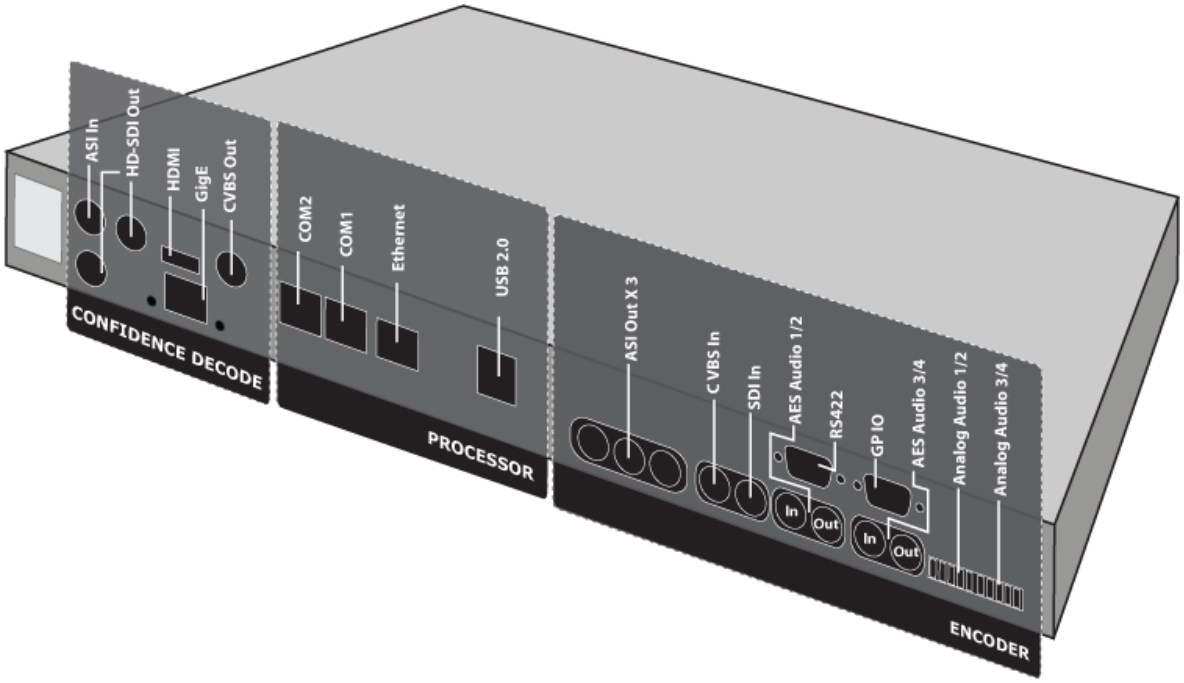


Definitions:

Control	Function	API Command
Mode	select between off, BISS-1, and BISS-E encryption	*.ECMD ECR
Clear Session Word	MODE BISS 1 uses a 12-digit hexadecimal Clear Session Word.	*.ECMD EKY
Encrypted Session Word	MODE BISS E XXX]uses a 16-digit hexadecimal Encrypted Session Word	*.ECMD EKY
User ID 1	used in BISS-E Mode only; the 14-digit hexadecimal User ID used for encryption	*.ECMD EKY
User ID 2	used in BISS-E Mode only; the 14-digit hexadecimal User ID used for encryption (secondary)	*.ECMD EKY

For more information about BISS and its use in Conditional Access, see the CAS Tab article.

Back Panel



Confidence Decode	
ASI In	88 Byte MPEG2 Transport input
HD-SDI Out	HD and SD User-defined resolutions
HDMI	HD and SD User-defined resolutions
GigE	MPEG2 Transport Stream via UDP/RTP or FTP file transfer or SMB mount
CVBS Out	analog video output (Composite); SD only. NTSC and PAL.
Processor	
COM2	RS232 Control
COM1	RS232 Terminal
Ethernet	Ethernet 10/100 management
USB 2.0	not currently supported
Encoder	
ASI OUT (x 3)	3 mirrored 188 Byte MPEG2 Transport Out up to 211 Mbs
CVBS In	analog video input; SD only
SDI In	Auto sensing 270MB/1.4GB/3.0GB
AES Audio 1/2	Compressed or uncompressed terminating (75 Ohm) digital audio outputs.
RS422	Connect to media source.9-pin master or slave mode for Sony Protocol control.
GP IO	Parallel IO interface for Start, Stop, Status, Alarm, and general purpose interfacing to control systems.
AES Audio 3/4	Compressed or uncompressed terminating (75 Ohm) digital audio outputs.
Analog Audio 1/2	Analog Balanced (600 Ohm) audio input. Stereo pairs (ch1 and ch2)
Analog Audio 3/4	Analog Balanced (600 Ohm) audio input. Stereo pairs (ch3 and ch4)

Supported SDI Standards:

Standard	Used For

SMPTE 259M	SD video
SMPTE 272M	SD embedded audio
SMPTE 292M	HD Video
SMPTE 299M	HD embedded audio

Control and Connectivity

Port	Detail
GigE	MPEG2 or RTP multicast transport egress port
Terminal (COM1)	Back end serial port for Adtec service technicians
API (COM2)	API Serial Communication interface
Fast Ethernet	10/100 base T ethernet interface
Encoder RS422	Sony 9-pin electrical and protocol tape deck interface
GP IO	tally and control port
USB 2.0	not currently supported

Video Sources

SDI (HD-SDI)

- SDI Inputs can be in either **Standard Definition** (SD) or **High Definition** (HD).
- SDI inputs are autodetected.
- SDI Input Rules:
    - Input Std-definition (SD)- 720x480 (NTSC) or 720x576 (PAL)
        - can only encode to SD; it is possible to downscale the image to 704H, 640H, 544H, 528H, 480H, or 352H x 480V
        - does not at present support H scaling in PAL mode
    - Input Hi-def (HD)- 1280H x 720p..
        - can only encode to 1280H x720p; no scaling possible
    - Input Hi-def (HD)- 1920H x 1080i.
        - can **only** encode to 1920H x1080i, **or** downscale and encode to 1440H x1080i

Composite

Composite Inputs are in **Standard Definition** only.

Connecting Your mediaHUB HD Pro

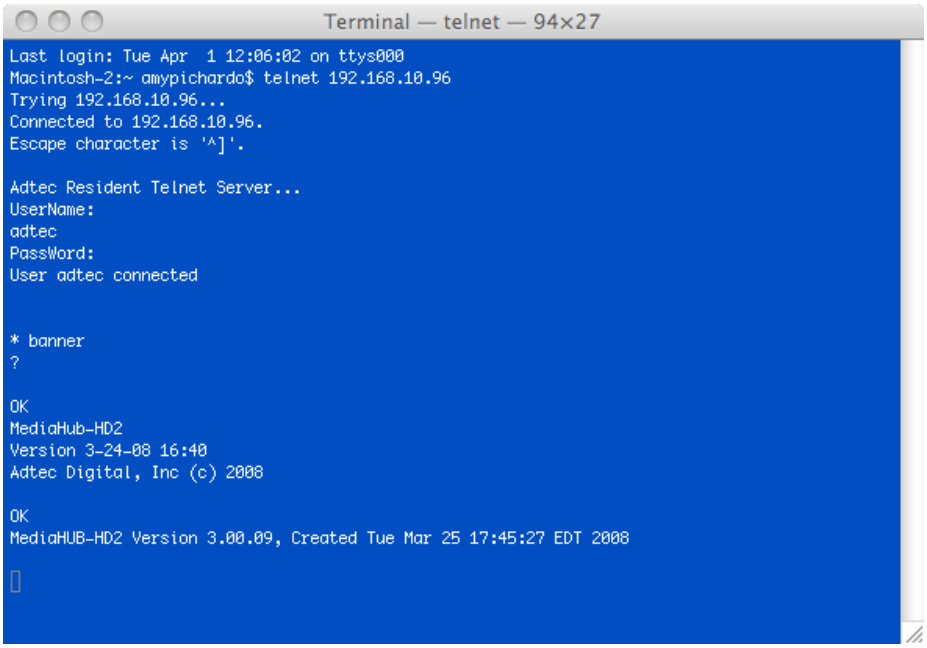
Using Telnet (standard 23 port)

To connect to your device 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.



For the mediaHUB HD Pro, there are specific commands for the encoder and decoder. Each has a unique way of accepting commands. If using telnet is your preferred method of communication to your mediaHUB HD Pro, familiarize yourself with the API commands and their respective command handlers. For more information on this, point your browser to the IPA of your unit and look through the API notes that are described for the device.

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

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Control Application

Adtec Digital is deploying a web-based command and control (C&C) software application for our products. For the mediaHUB-HD Pro, devices with software versions 3.01.22 and up will be able to view portions of this software as it is integrated into each build, and online updates will progressively activate the system's features.

The program is optimized to work with the following browser versions:

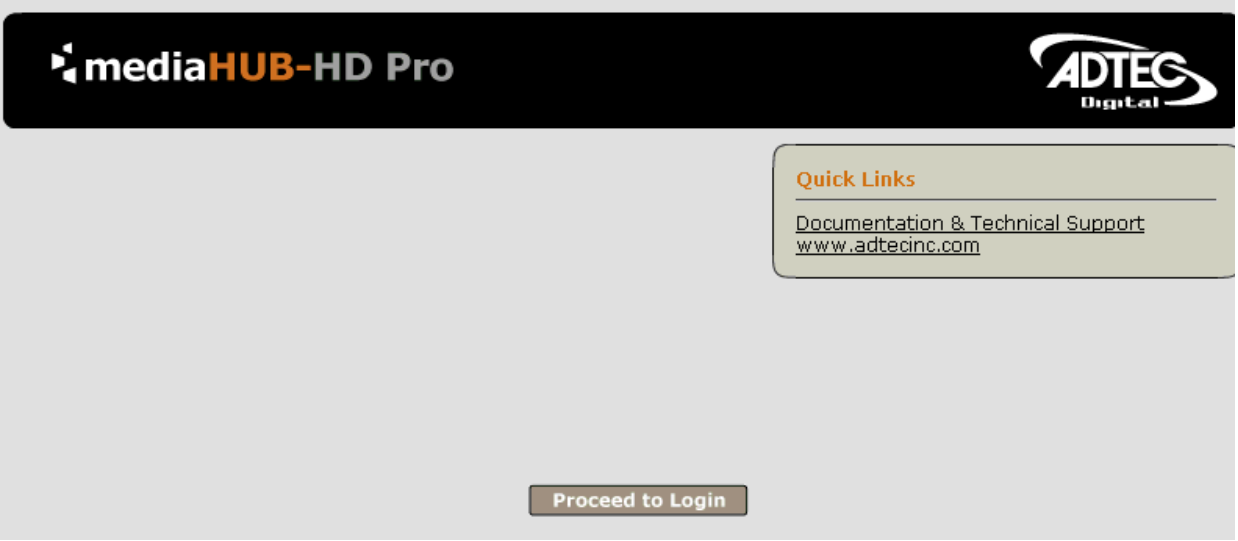
- Firefox ©: 3.0 (recommended)
- MS Internet Explorer ©: 7.0 and higher
- Safari ©: 3.0 and higher
- Opera ©: 9.0 and higher

Note for Safari © users:

- The C&C program is designed to use the Bonjour Zero Configuration Protocol.
    - ♦ When using Safari ©, click on the " ^^ " symbol to open a networked devices list.
    - ♦ Select the device to point the browser to that device's IPA.

Access

Access the C&C application by pointing your web browser to the unit's IP address. The following screen (image reduced for clarity) will appear:



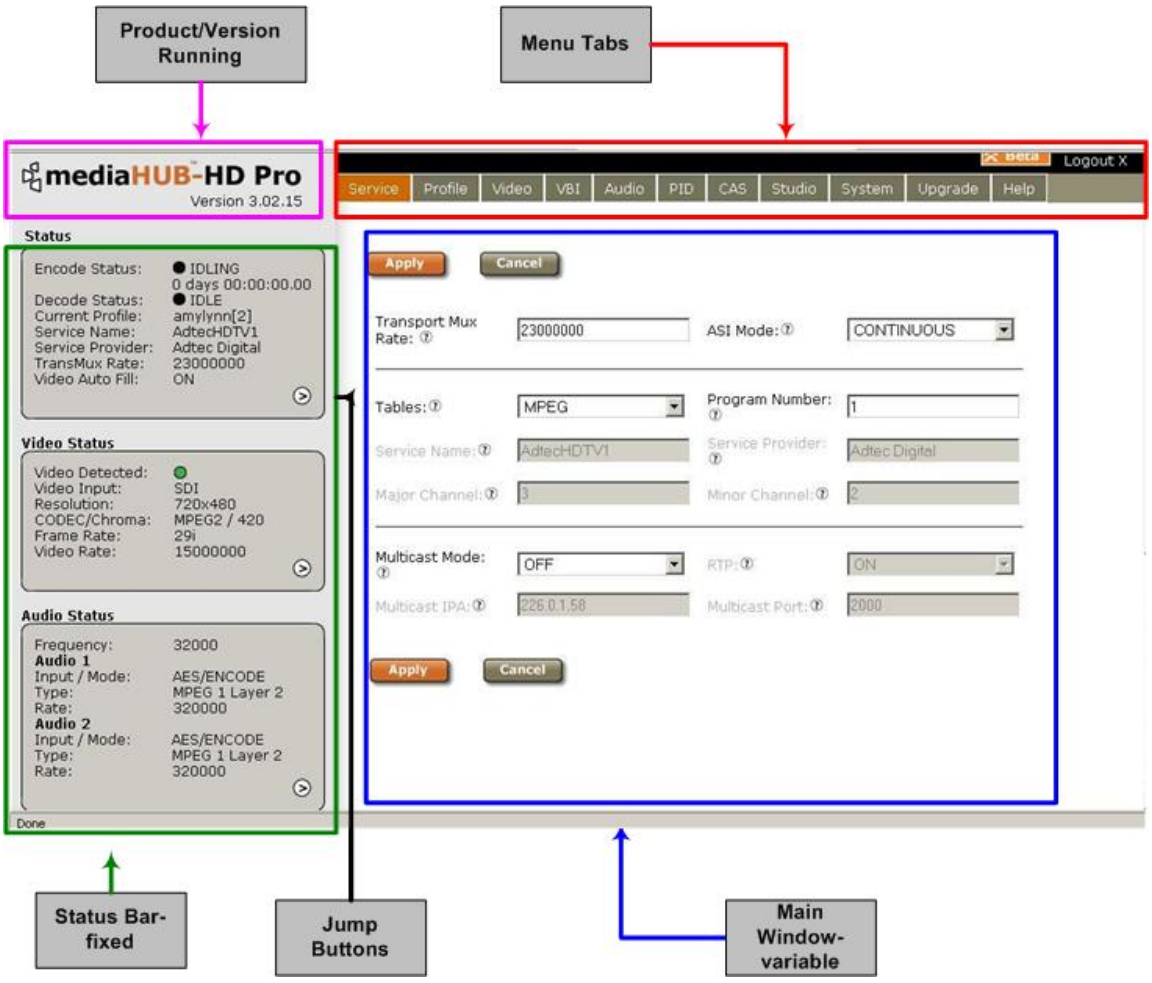
Links to the unit's Release Notes and a link to Adtec's Technical Support contact page are also located on this screen.

Login

Log in to the C&C application by clicking the **"Proceed to Login"** button and typing in the user name **'adtec'** and the password **'none'** in the pop-up box that appears.

C&C Screen

Once you are logged in, the C&C Screen will appear (screenshot reduced for clarity):



The C&C Screen has two operating windows, the **Status Bar** and the **Main Window**:

Status Bar: the Status Bar is fixed- it will display regardless of what function is being displayed in the Main Window. The current parameters of the unit's encode, decode, and transport functions are always in view and are updated in real time. Further detail about the Status Bar is convered in a later section of this manual. The Status Bar aslo features "Jump Buttons" that serve as a second way to access associated Menu Tabs.

Main Window: the Main Window is used to access the device's controls and operating settings. The **Main Menu Tabs** determine which function is being controlled in the Main Window. Each Main Menu Tab is covered in more detail in further sections of this manual.

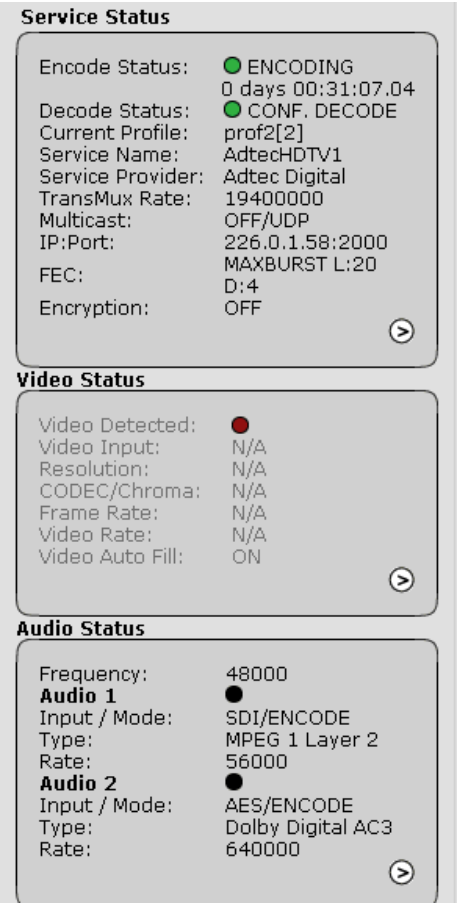
Important Note for mediaControl Users

Adtec's mediaControl software interface is **not supported** as of **Version 13** of the mediaHUB HD Pro's firmware. Do **not** attempt to use mediaControl if you have installed firmware Version 13 or greater.

The Status Bar

The Status Bar is a fixed component of the Command and Control interface- it constantly displays a summary of the mediaHUB HD Pro's current activity level regardless of which tab is selected in the Main Window.

Screenshot (reduced for clarity) **:**



Notes:

- The **Encode Status** indicator includes a time clock showing the elapsed time the unit has been encoding.
- If a pre-defined Profile has been specified (see The Profile Tab), then the Profile's name will be displayed ("Current Profile").
- Note that for the **Codec/Chroma** indicator, **MPEG2** is hard-coded in the display.
- The small buttons in the lower right corner of each Status Display are a quick-jump feature.
    - ♦ The button on the Status Panel jumps to the Service menu, and the buttons on the Video and Audio Panels jump to the Video and Audio menus.

API Cross-Reference

The Status indicators displayed on the Status Bar correspond with API commands that can be used to access the same information during a Telnet session. A cross-reference is provided here.

System Status

Indicator	API Command
Encode Status	*.ECMD TRA
Decode Status	*.DCMD TRA
Service Name	*.ECMD SNA
Service Provider	*.ECMD SPR

TransMux Rate	*.ECMD TMR
Multicast	*.ECMD MMO
IP:Port:	*.ECMD MSP
FEC	*.ECMD FEP
Encryption	*.ECMD ECR

Video Status

Indicator	API Command
Video Detected	*.ECMD VDE
Video Input	*.ECMD INP
Resolution	*.ECMD QV1
Codec/Chroma	*.ECMD CHT
Frame Rate	*.ECMD QV1
Video Rate	*.ECMD VRT

Audio Status

Indicator	API Command
Frequency	*.ECMD ASF
Audio 1 Input/Mode	*.ECMD AMO
Audio 1 Type	*.ECMD AMO
Audio 1 Rate	*.ECMD AMO
Audio 2 Input/Mode	*.ECMD AMO 1
Audio 2 Type	*.ECMD AMO 1
Audio 2 Rate	*.ECMD AMO 1

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The Service Tab

The **Service Tab** is used to set and view configuration options related to transmitting and capture rules.

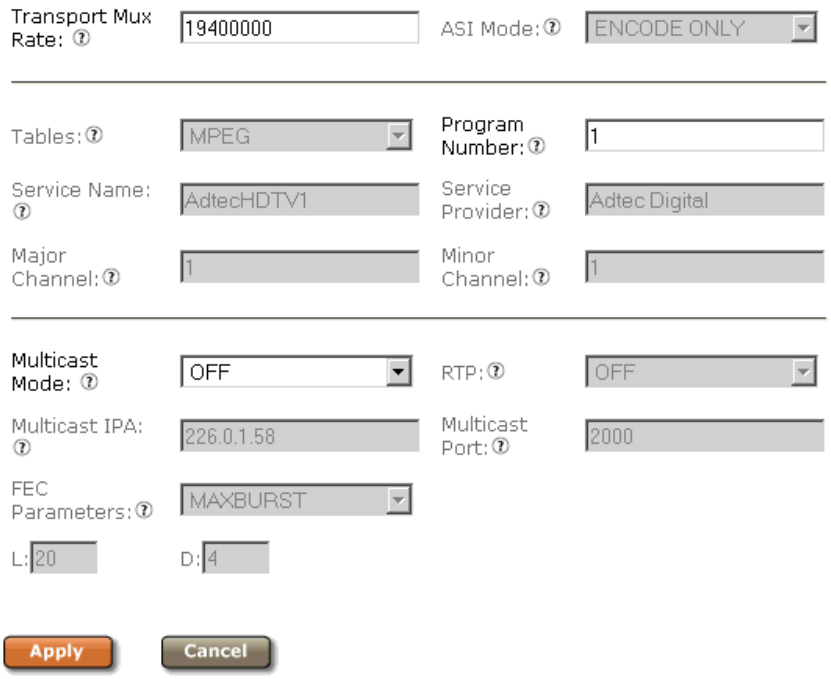


Image reduced for clarity

Controls

Control	Function	Options/Variables	Adtec API
Transport Mux Rate	desired egress rate of the bitstream in bits per second range is 1,000,000 - 80,000,000 bits per second As a shortcut, the value can be entered as Mbps and the application will convert it on the fly. Example: Entering 19.4 in the text field will submit 19400000.	text field	*.ECMD TMR
ASI Mode	tell unit to send data constantly through ASI ports or cut off during periods when unit is idling When using this application for studio encoding, the ASI Mode is forced to Encode Only. Studio encoding is enabled when the Controller Interface is set to RS422 on the Studio Tab.	Continuous = 0 Encode Only = 1	*.ECMD ASM [option]
Tables	table format for the stream	DVB = [0] MPEG =[1] ATSC = [2]	*.ECMD TON [var]
Service Name	name of the program or event, carried in the SDT table of a transport stream	text field; 20-character limit (incl. spaces)	*.ECMD SNA
Major Channel	Major Channel Number is carried in the ATSC Static PSIP table of a transport stream. Field is active when Tables control is set to ATSC.	text field; 1-99	n/a
Service Number	The Service Number or Program Number in PAT & PMT packets identifies which program is associated with which Video & Audio PIDs.This value should be entered in decimal format	text field	*.ECMD PNU
Service Provider	name of the party offering the program or event, carried in the SDT table of a transport stream	text field; 20-character limit (incl. spaces)	*.ECMD SPR
Minor Channel	Minor Channel Number is carried in the ATSC Static PSIP table of a transport stream.	text field; 0-999	n/a

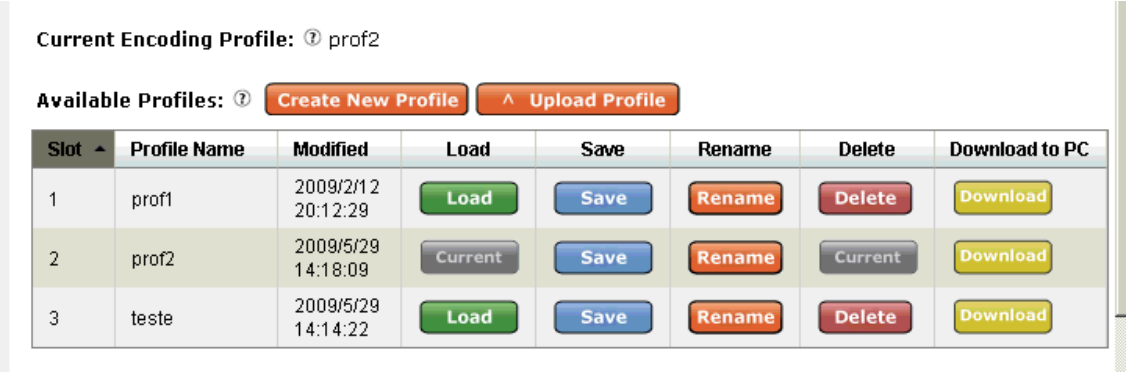
	Field is active when Tables control is set to ATSC.		
Multicast Mode	enables sending of streaming MPEG over properly-configured ports Multicast can be turned OFF or set to SEND mode. SEND Mode transmits the current encode via the GigE port. Multicast group IP and Port addresses must be specified.	Off = 0 Send = 2 note*: Multicast Output via GigE (eth1)	*.ECMD MMO [option]
Multicast IPA	set the multicast send group Internet Protocol Address Control is editable if Multicast Mode is set to 'Send'.	text field (hexadecimal)	*.ECMD MSI
FEC Parameters	Forward Edge Correction; send two FEC RTP streams in addition to a source RTP stream enabling a receiver to reconstruct missing packets in the source stream. Used in conjunction with L and D values; described below.	Off On (when RTP is also selected 'on')	*.ECMD FEP
FEC L Value	affects the maximum burstpacket loss that can be recovered	text field; 4-20	*.ECMD FEP
FEC D Value	defines latency involved in burstrecovery	text field; 4-20	*.ECMD FEP
RTP	Turns RTP on or off RTP allows for sequence numbering and timing, which are crucial for the accurate playback of an audio or video data stream. Control is editable if Multicast Mode is set to 'Send'.	Off = [0] On = [1]	*.ECMD RTP
Multicast Port	Port number are used for sending UDP transfers in conjuction with Multicast IPA. If the port number is set to 0, then no UDP transfers will take place. 0 is default. Control is editable if Multicast Mode is set to 'Send'.	1 - 65535	*.ECMD MSP

The Profile Tab

The **Profile Tab** allows you to save specific encoder configurations on your mediaHUB HD Pro, enabling you to quickly and easily reconfigure the device for different transport and playout requirements. You can download and upload profiles between mediaHUB-HD Pros. The mediaHUB HD Pro has 40 available memory "slots" for Profiles- saved configurations. An in-use profile will be noted by name on the Status Panel and repeated on this screen (**'Current Encoding Profile'**).

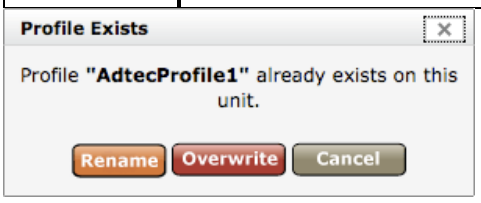
To create a Profile:

Step	Action
1	On **all** Menu Tabs, make the control settings desired for your saved Profile.
2	Click the **<Profile>** Menu Tab.
3	On the Profile Tab, click **<Create New Profile>**.
4	On the pop-up panel that appears, give your Profile a name in the text field, and select the memory slot you want to save it in from the drop-down menu.
5	Click **<Apply>.**



Controls:

Control	Function	Options
Create New Profile	defines and saves new Profiles into the selected available memory slot	Virtual button
Upload profile	moves a valid file from your desktop to the unit; when upload is complete, the uploaded file and all of its configuration settings become the active profile. If you attempt to upload a profile that has the same name, you will be prompted to rename or overwrite the profile. See below	Virtual button
Load	loads the selected Profile	Virtual button
Save	saves changes to existing Profiles	Virtual button
Rename	convenience button allowing the renaming of a Profile without changing the Profile's settings	Virtual button
Delete	convenience button; deletes the selected Profile and makes the slot available for re-use	Virtual button
Dowload to PC	moves the selected profile to your PC desktop	Virtual button



To use a saved Profile, simply click the **<Load>** button for the specific Profile you want. The mediaHUB HD Pro will apply all the settings associated with that Profile.

The Video Tab

The Video Tab is used to precisely control the parameters of the video being decoded by the mediaHUB-HD Pro.

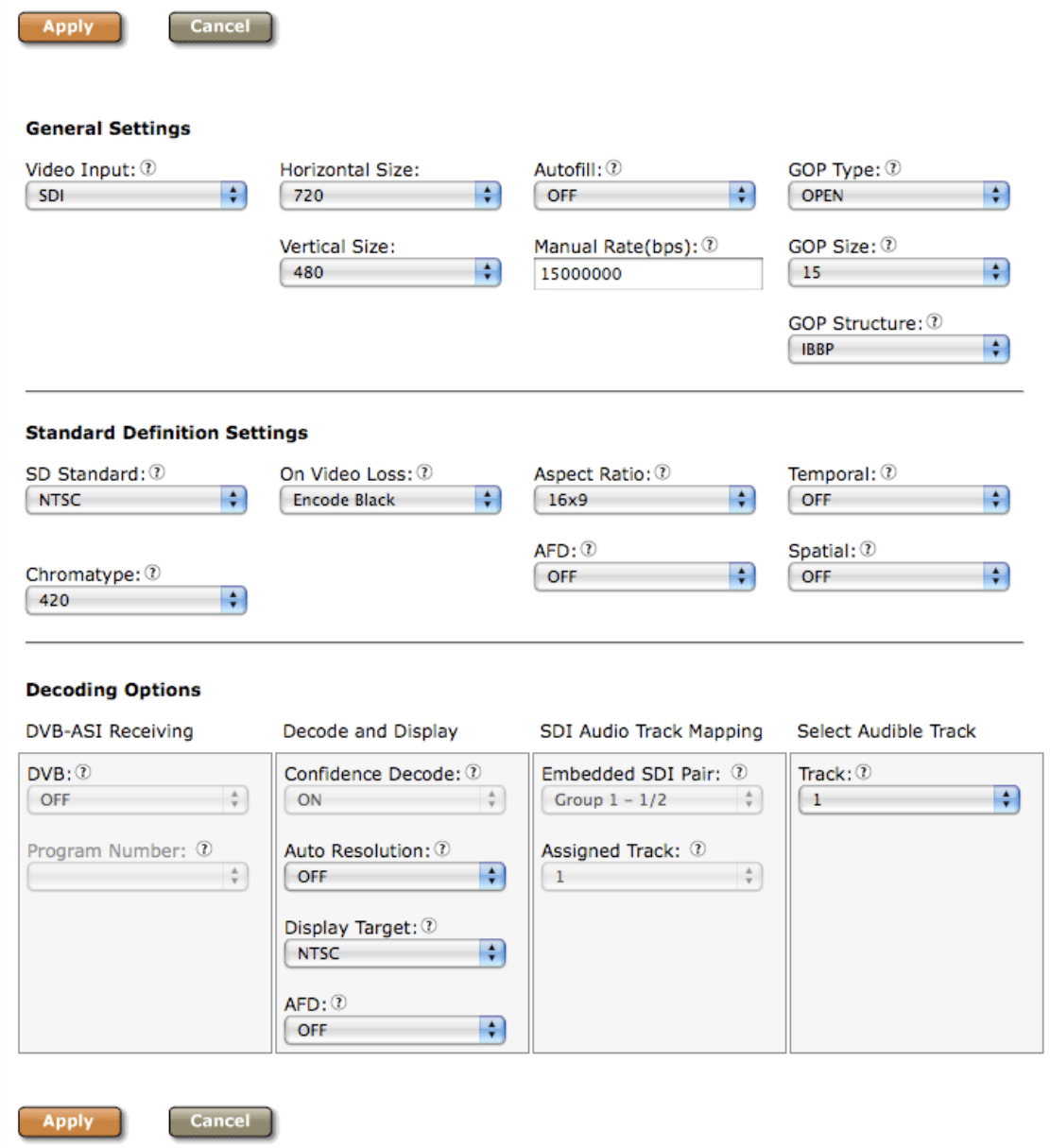


Image reduced for clarity

Controls:

Control	Function	Options	API Command
Video Input	type of video signal format being received,. SDI or Composite. If the input is SDI, the encoder will automatically detect the resolution and frame rate of the incoming video source.	SDI = 3 Composite = 0	*.ECMD INP [type]
Video Size- Horizontal	horizontal pixel resolution. Auto-detected for SDI signals.	varies by encode mode	*.ECMD HSI
Video Size- Vertical	vertical pixel resolution. Auto-detected for SDI signals.	varies by encode mode	*. ECMD VSI
Rate- Auto Fill			

	if enabled, the decoder will calculate and use the max video bitrate for the current TransMuxRate setting. When disabled, the decoder uses the VRT setting for the video bitrate. Please see F.A.Q. for more detail.	On = 1 Off = 0	*.ECMD VAF [state]
Manual Bit Rate (Mbs/sec)	rate at which bits are streamed ; only available if AutoFill is set to 'Off'. Limitations: In **standard definition** encoding mode. (input is composite video, or SDI auto-detected at standard definition) 1000000 - 15000000 bits/sec. In **high definition** encoding mode. (SDI input only and auto-detected as 720p or 1080i)7000000 - 60000000 bits/sec.	per desired setting	*.ECMD VRT
GOP Type	Group of Pictures; GOP type as open or closed An **Open** GOP uses referenced pictures from the previous GOP at the current GOP boundary. A **Closed** GOP starts with an I Frame and subsequent B Frames do not rely on I or P frames from the previous GOP. GOP is expressed as one command, i.e., *.ECMD GOP [type] [structure] [size]	Open = 1 Closed = 0	*.ECMD GOP [type] [structure] [size]
GOP Size	GOP Size is the distance between two full image frames (I-Frames) in a GOP Structure.	1-30	*.ECMD GOP [type] [structure] [size]
GOP Structure	Group of Pictures format; the order of interframes and the various types of picture frames that will be used.	I = 3 IP = 2 IPB = 1 IBBP = 0	*.ECMD GOP [type] [structure] [size]
SD Standard	select television system standards the packet will be encoded for- NTSC or PAL video. This is only available if the incoming SDI feed is standard definition, or if the input is Composite.	NTSC PAL PAL-M PAL-N	
Chromatype	chrominance (color information) of video component 420 mode applies to high definition or standard definition encoding. 422 mode applies only to standard definition encoding.	420 = 0 (high def) 422 = 1 (std def)	*.ECMD CHT
Aspect Ratio	ratio of horizontal to vertical lines in the encoded image	4 x 3 = 0 16 x 9 = 1 WSS (PAL) = 2	*.ECMD ARA
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.	see drop-down list in UI	*.ECMD AFD
Temporal Video Filter	reduces noise in the signal's temporal domain **Note:** composite input only; handled in the video pre-processing section; and only available in standard definition	Off = 0 Weak = 1 Medium = 2 Max = 3	*.ECMD OFT [state]
Spatial Video Filter	reduces noise in the signal's spatial domain **Note:** composite input only; handled in the video pre-processing section; and only available in standard definition	Off = 0 Weak = 1 Medium = 2 Max = 3	*.ECMD OFS [state]
Video Loss	only available in standard definition encoding; sets unit to hold the frame until video returns or drop the frame and stream if incoming video signal is lost.	Drop Frame Hold Frame	*.ECMD RVD
DVB	select function for decoder; receive DVB-ASI signal	Off Receive	*.DCMD DVB
			none

Program Number	program identification of the number of programs embedded in the incoming DVB-ASI stream	none, receives from stream; display only	
Confidence Decode	Confidence Decode can be set turned OFF or you may select the standard to use when confidence decoding. Selecting Confidence Decode will set up decoding on the SDI, HDMI or CVBS interfaces.	Off On	.ECMD CDE
Auto Resolution	Auto Resolution refers to the current deoder display target. If it is set to ON, the confidence decoder will detect the resolution of the current encode and match it. If it is set to OFF, you may select your desired display target.	Off On	*.ECMD CDE AUTORES
Display Target	the targeted video resolution; set to match resolution of the intended display, the decoder scales automatically; HDMI is not active when SD resolutions are used	see Decoder Menu	*.DCMD VID
AFD	If ON, the decoder will read the Active Format Descriptor in the encoded transport stream and modify the display format to match the AFD setting. If the output is analog (NTSC, PAL, etc), WSS will be inserted.	Off On	*.DCMD DAF
Embedded SDI Pair	designate which audio track is routed to the embedder by selecting the embedded track. The decoder only supports one selected track at a time.	Group 1: 1/2 Group 1: 3/4 Group 2: 5/6 Group 2: 7/8	*.DCMD SMX
Assigned Track	identifies the stereo pair embedded into the embedded SDI pair	1-4	*.DCMD SMX
Track	selects audio input to decode with this video component	1 2	*.DCMD TSN

Notes:

- If video input is Standard Definition, and the incoming resolution is High Definition, the Standard Definition options will be appear in grey and will not be selectable.
- If **Video Autofill** is on, bitrate will be automatically calculated, and is not editable by the user in that case.

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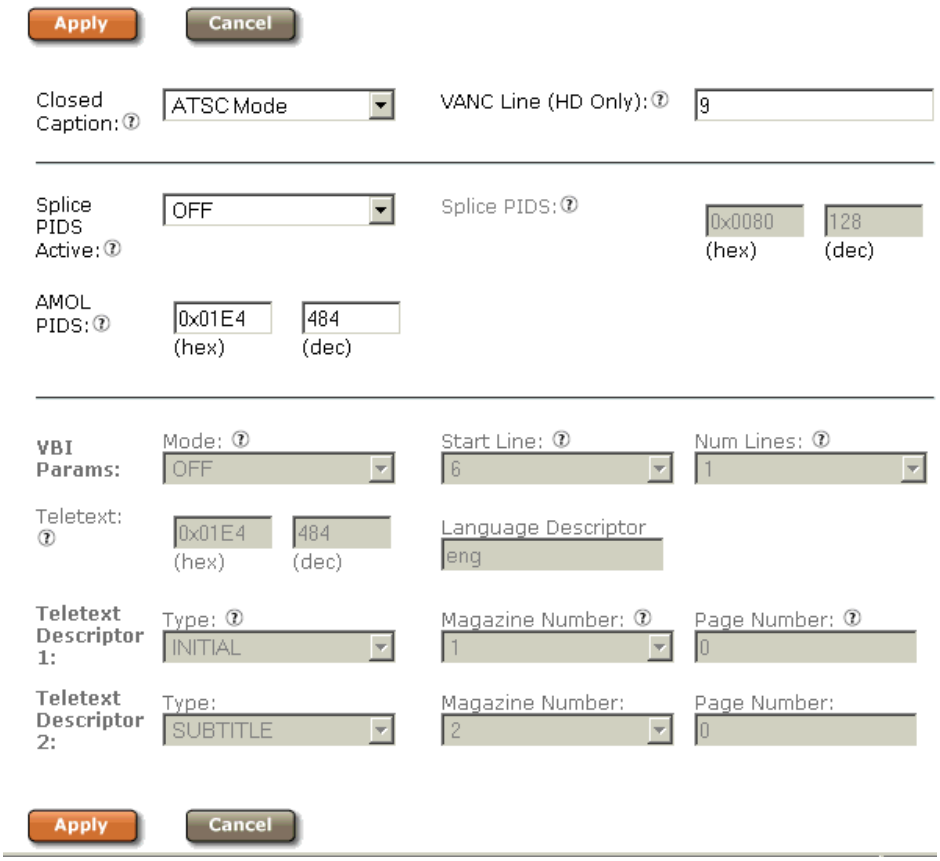
The VBI Tab

The controls on this tab govern video signal components that can be inserted into the Vertical Blanking Interval.

Screenshot (reduced for clarity) **:**



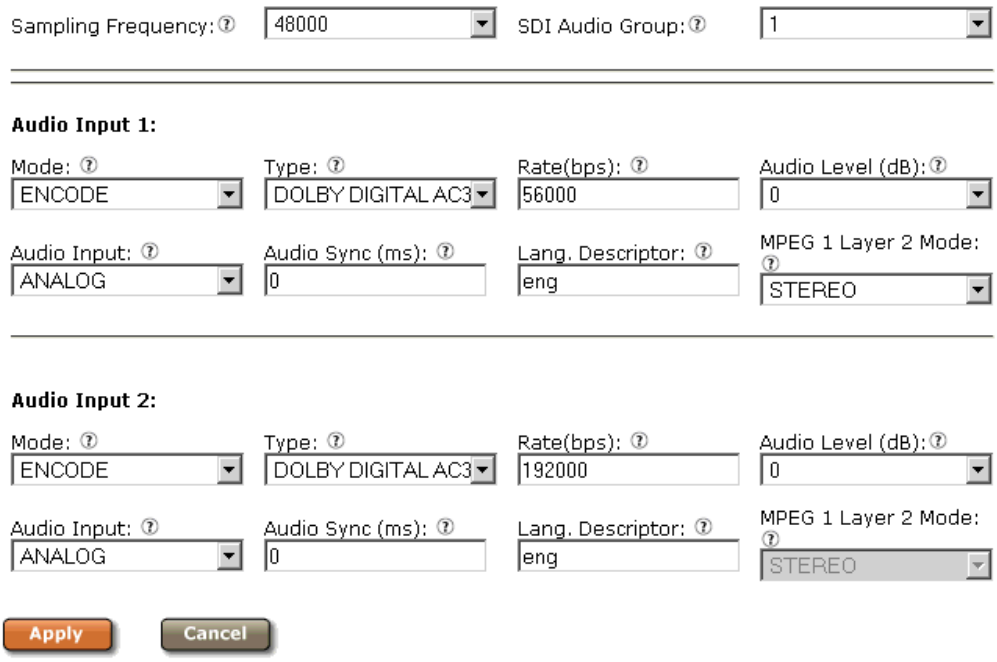
Controls

Control	Function	Options	API Command
Closed Caption	Closed Captions can be turned off for the current stream/encode or set to ATSC Mode for EIA-708 closed caption insertion. This control is available for High Definition only.	Off = 0 ATSC Mode = 1	*.ECMD CLC [selection]
VANC Line	VANC line refers to the line number for EIA-708-B closed caption detection in the SMPTE-292M video signal. This control is available for High Definition only.	text field, #'s 7-32 available	*.ECMD LNA [line]
Splice PIDS Active	if selected, this control allows for the definition and/or modification of the Splice PID	Off = 0 On = 1	*.ECMD RIT [selection]
Splice PIDS	identifies splice packets	user-defined hexadecimal	*.ECMD SPI
AMOL PIDS	Automated Measurement of Lineups; used in capturing viewership data	user-defined hexadecimal	*.ECMD APQ
VBI Params: Mode	switches feature off or selects type of service	Off = 0 Eurotext = 1	*.ECMD VBP [mode]
VBI Params: Start Line	designates first line for Teletext content within the vertical blanking interval	6 - 22	*.ECMD VBP
VBI Params: Num Lines	total number of lines of Teletext	1 - 16	*.ECMD VBP

The Audio Tab

The Audio Tab allows precision control over the Audio performance of the mediaHUB HD Pro.

Screenshot (reduced for clarity) **:**



Controls:

Control	Function	Options	API Command
Sampling Frequency	determines sample frequency for the unit; all audio channels will sample on the same frequency ;defines the number of samples per second taken from a continuous signal to make a discrete signal	32000 44100 48000	*.ECMD ASF [freq]
SDI Audio Group	sets the SDI audio group number (1-4) per SMPTE -272M	1 2 3 4	*.ECMD AGN [group #]
Mode	sets the unit to either use the on-board DSP's to perform audio compression (encode), or accept compressed Dolby-type bitstreams at the AES input and merge them into the transport stream (passthrough),or the secondary audio can be set to off (*.ecmd SAS)	Encode = 0 Passthrough = 1	*.ECMD AMO [mode][type][rate]
Type	selects Dolby Digital or MPEG 1 Layer 2 as the audio type in Encode Mode. In Passthrough Mode, unit defaults to Dolby E / 5.1 / 2.0 Type.	Dolby Digital AC3 = 0 MPEG 1 Layer 2 =2 Linear PCM/E2 = 3	*.ECMD AMO [mode][type][rate]
Rate	define the rate in Encode Mode. When in Passthrough Mode, the rate is handled by the unit.	text field; user-defined 64-640 kBits/sec avail	*.ECMD AMO [mode][type][rate]
Audio Level	volume in decibels (dB); range of -18dB to +8dB in 1dB increments . Available only in Encode Mode	range of -18 through +8	*.ECMD ALV
Audio Input	selects the type of incoming audio signal to be encoded. Available on in Encode Mode. Passthrough Mode uses AES	Analog = 0 SDI = 1 AES = 3	*ECMD AIN [type]

Teletext	identifies packets with Teletext	user-defined hexadecimal	*.ECMD TPI
TT1 Type	classification of the Teletext; implemented per ETSI EN 300 468 , the Specification for Service Information (SI) in DVB systems and includes the following. Initial, Subtitle, Additional Information, Program Information and Subtitle Highlights control repeats for Teletext 2	Initial Subtitle Addlinfo PGM Sched SubtitleHI	*.ECMD TX
TT1 Magazine #	Teletext reference control repeats for Teletext 2	0-7	*.ECMD TX
TT1 Page Number	Teletext reference control repeats for Teletext 2	0-255	*.ECMD TX

Audio Synch (ms)	audio synch offset in milliseconds (ms) with an available range of -800 ms to +800 ms	text field; user-defined	*.ECMD AUS
Language Descriptor	3 characters available for describing language	text field; user-defined	*.ECMD LAO
MPEG 1 Layer 2	Mono or Stereo available if using Encode Mode and MPEG 1 Layer 2 Type\	Mono = [0] Stereo = [1]	*.ECMD MCM

The Audio Menu repeats for Audio Inputs 1 and 2.

SDI Embedded Audio

SDI embedded audio supports up to 4 Groups, each group has 4 stereo channels:

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

The mediaHUB-HDPro can interface with only **one** group at a time from within the Control Interface. Within the selected group it hard routes channel 1 to input 1 and channel 2 to input 2. Each of these inputs can encode Dolby AC3, MPEL 1 layer 2, and can passthrough Dolby 5.1 and Dolby E.

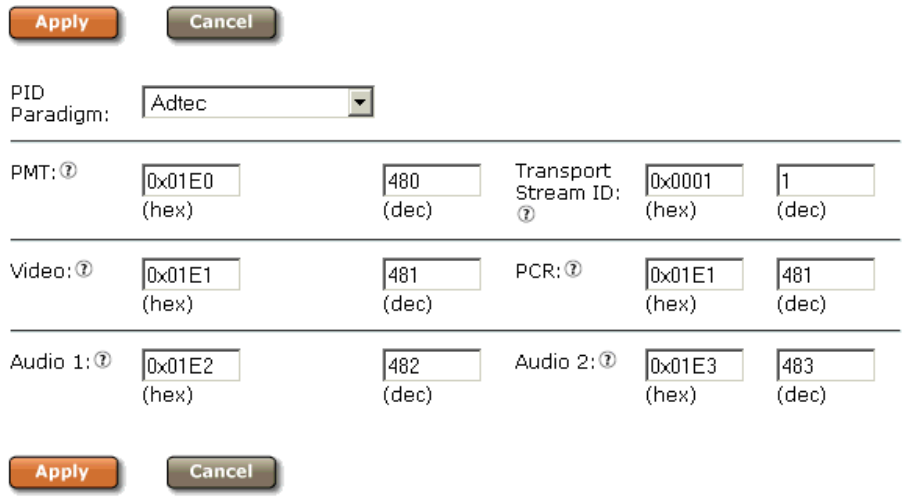
Dolby 5.1

The mediaHub HD Pro cannot encode in Dolby 5.1; it can only encode Dolby 2.0 per audio channel pair.
To encode in Dolby 5.1, an external 5.1 encoder must be plugged into the AES input and that input's mode set to passthrough.

The PID Tab

The PID tab is used to specify PID settings for programming.

Screenshot (reduced for clarity) **:**



Controls

Control	Function	Options	API Command
PID Paradigm	this control allows for preset PID values to be automatically loaded. Once a selection is made from the drop-down menu, all values will populate based on the PID configuration chosen.	Adtec Tandberg ATSC PGM 3 ATSC PGM 4 ATSC PGM 5 ATSC PGM 6 ATSC PGM 7 ATSC PGM 8 ATSC PGM 9 WBU-ISOG	none-GUI only
PMT	identifies packets with the Program Map Table. Program Map Tables are used to describe the properties of a single program.	user-defined hexadecimal	*.ECMD PPI
TS ID	Transport Stream identifier; used in the PAT packet to identify one stream from others within the multiplex.	user-defined hexadecimal	*.ECMD TSI
Video	identifies packets which contain video Packetized Elementary Stream (PES) data.	user-defined hexadecimal	*.ECMD VPI
PCR	identifies packets which contain the Program Clock Reference (PCR; "Master Clock") adaptation field	user-defined hexadecimal	*.ECMD PRP
Audio 1	identifies packets which contain audio content for Channels 1 and 2	user-defined hexadecimal	*.ECMD API
Audio 2	identifies packets which contain audio content for Channels 3 and 4	user-defined hexadecimal	*.ECMD API

The CAS Tab

The **CAS Tab** is used to control Conditional Access Services on the mediaHUB HD Pro.

Screenshot (reduced for clarity) **:**

Controls:

Control	Function	Options	API Command
Mode	sets the unit to accept BISS-1 or BISS-E encryption keys, or switches Conditional Access off	Off = 0 BISS-1 = 1 BISS E User ID 1 = 2 BISS E USer ID 2 = 3	*.ECMD ECR [option]
Session Word	The session keys used for encryption. [MODE BISS 1] uses a 12-digit hexadecimal Clear Session Word. [MODE BISS E XXX] uses a 16-digit hexadecimal Encrypted Session Word	text field	*.ECMD EKY
User ID	appears in BISS-E Mode only; the 14-digit hexadecimal User ID used for encryption	text field	*.ECMD EKY

About BISS

The Basic Interoperable Scrambling System (BISS) works by inserting a 12-digit encrypted key into a multicast. BISS documentation refers to these encryption keys as "session words".

The Session Word is inserted at the points of transmission and reception (in this case, the mediaHub HD Pro).

A Conditonal Access Table (CAT) will be present in the multiplex, but this table will be empty, as no EMM stream will be present.

The Studio Tab

The Studio Tab will allow you to setup your mediaHUB-HD Pro for straight forward studio encoding. It has two sub-tabs, **Control** and **Inventory**. The Control Tab allows you to set and control recording from tape to non-linear editors, crash recording or simple transmission control. The Inventory Tab allows you to view a list of all files on the unit as well as play or download them.

Control Sub Tab

Inventory Sub Tab

Control Sub Tab

The **Studio Control Tab** is organized into a "wizard" format to provide control flexibility depending on the Controller Interface the mediaHUB-HD Pro is running. The mediaHUB-HD Pro can utilize one of three Controller Interfaces:

- No Controller Interface (None) : Used for transmission control and capture to drive feature.

- RS422 : Used with VTR for spot recording

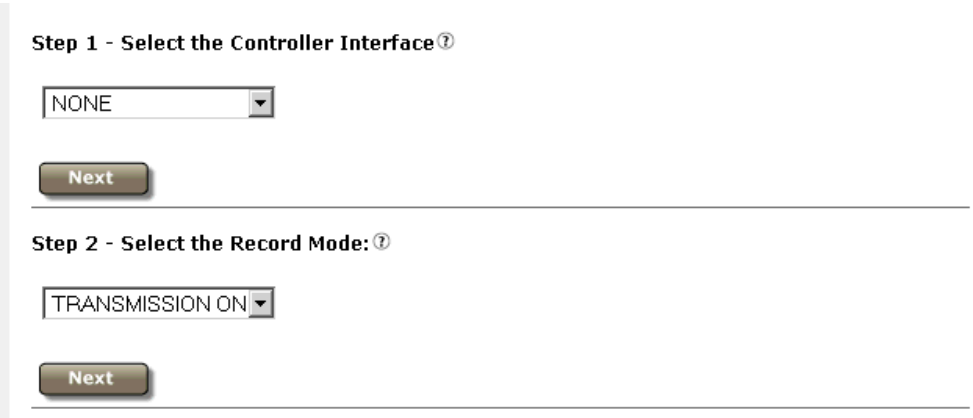
- RS422 Device : Used with non-linear editors

No Controller Interface

On the **"Controller Interface"** pull-down, select **"None",** and click **<Next>**.

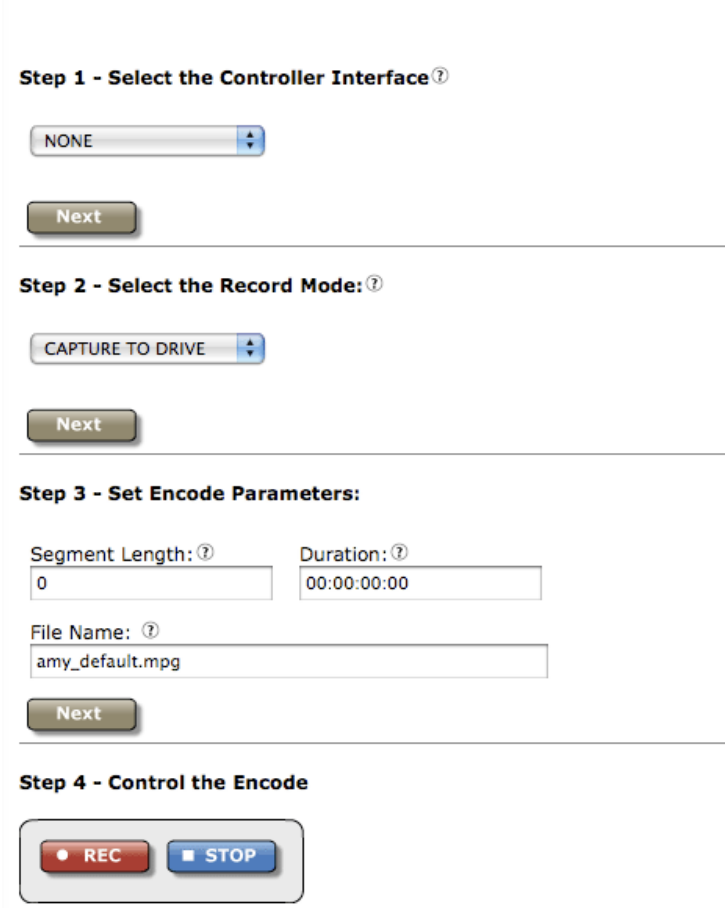
Then, select the **"Record Mode",** either **"Transmission Only"** or **"Capture to Drive"**. Click **<Next>** when done.

Option 1 -- Transmission Only



Selecting Transmission Only and pressing the Next button triggers the encode process.

Option 2 -- Capture to Drive



When capturing to drive, you will need to set the following parameters and then click the Next button to proceed to encoding.

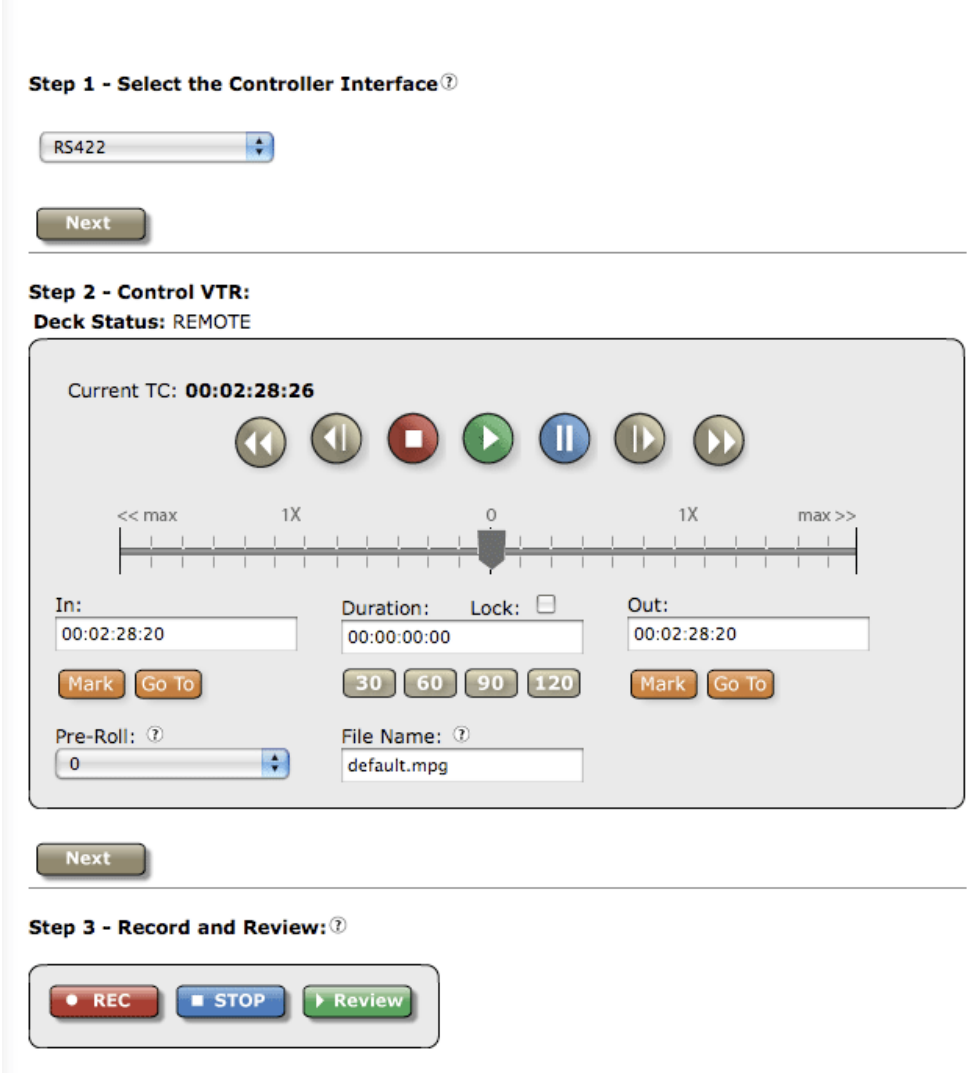
Segment Length: If you wish to capture your content in segments instead of one large file, you will need to set the segment length in seconds. When given a value other than 0, the encoder will automatically stop at the given time limit, and restart seamlessly giving each newly created file a unique file name. (Ex. If your given file name is adtec.mpg, the encoder will create a series of files appending the base name with a date/time stamp.ex. adtec_081027_224457.mpg) A value of 0 will assume that you want one single file and the encoder will look to the record duration for the full length of that file.

Record Duration: Record duration specifies the run time for the encode. Format is HH:MM:SS:FF (hours, minutes, seconds, frames)

File Name: Enter the desired name of your file. Include the full file name and .mpg extension. Do not argue a path for encoding. All encoded files can be found in the media folder of the unit.

RS422

When the Controller Interface is set to **"RS422"** and **<Next>** is clicked, the Studio Control Tab screen will shift to this configuration:



The screen now contains a virtual VTR panel for controlling the slaved device directly from the mediaHUB-HD Pro and videotaped content can be digitally encoded using the following procedure:

Step	Action
1	On the Studio Tab, set the Controller Interface to **'RS422'** and click **<Next>**.
2	Verify that your VTR is set to "Remote"; this will be reflected on the Studio Tab of the mediaHUB-HD Pro (see image below). Position your tape to the correct location and mark your in and out settings. Enter a file name and click the Next button.
3	Control the encoding process with the 3 action buttons. Record, Stop and Review.

VTR Controls

The VTR panel controls are described in this table:

Control	Function	Options	API Command
Status	shows relationship of the mediaHub HD Pro to the VTR	**No deck** - Controller Interface set to none **Remote** - VTR is set to Remote and mediaHub HD Pro can be used to control VTR **Local** - VTR can be used to control mediaHub HD Pro **RSS422Device** - "no deck" displays; non-linear editor device used to control the	n/a

		mediaHub HD Pro	
Current TC	tape counter for locating content on analog video tape	auto-populates; refreshes after every button action	n/a
VTR Controls	control tapedeck functions	virtual pushbuttons mimic standard video device layout virtual slider controls speed of wind/rewind on tape deck when set to RS422; zero (center) is Paused state	see chart below
In	Mark In; timecode (in HH:MM:SS.FF) of the control interface media at which to start the encode session	text field "Mark" button to specify beginning time point for spot insertion "Go To" button to jump to that location on the tape	*.ECMD MIT [HH:MM:SS:FF]
Duration	amount of time the encoder is set to run, in hours, minutes, and seconds.	user-defined in format HH.MM.SS.FF Preset virtual buttons enable you to set duration at 30, 60, 90, and 120 seconds with one mouse click.	*.ECMD RDU [time]
Lock	locks the duration so that the Mark Out value is always the calculation.	checkbox; selected or not selected	n/a
Out	Mark Out; calculation of Mark In plus Duration	value auto-populates "Mark" button to specify time point for spot end "Go To" button to jump to that location on the tape	n/a
File Name	name of a specific spot or other media file File name need not match original filename or spotname on source video tape if no extension specified, .mpg extension will be added	text field; user must provide fiel will store on the mediaHub HD Pro at media/hd0/media	*.ECMD CFN
Pre-roll	time in seconds for the control interface device media to roll prior to encode start	1-9 (seconds)	*.ECMD PRR

Step 3 Record and Review

The RS422 screen also contains a virtual control panel for **Record and Review** functions on the slaved tape deck:

Control	Function	Options	API Command
Record	starts digitally recording and encoding the file specified in "File Name" If a control interface is specified, it must be connected for encoding to begin	virtual pushbutton	*.ECMD REC
Review	plays the file specified in "File Name"	virtual pushbutton	*.ECMD PS [filename]

VTR Button API Equivalents

For quick reference, the chart below gives the API command for each of the VTR controls.

Graphic	Name	API Command
	Rewind	*.ECMD REW
	Back One Frame	*.ECMD FAV 1 1
	Stop	*.ECMD STP
	Play	*.ECMD PLY
	Pause	*.ECMD PAU

	Forward One Frame	*.ECMD FAV 0 1
	Fast Forward	*.ECMD FFD

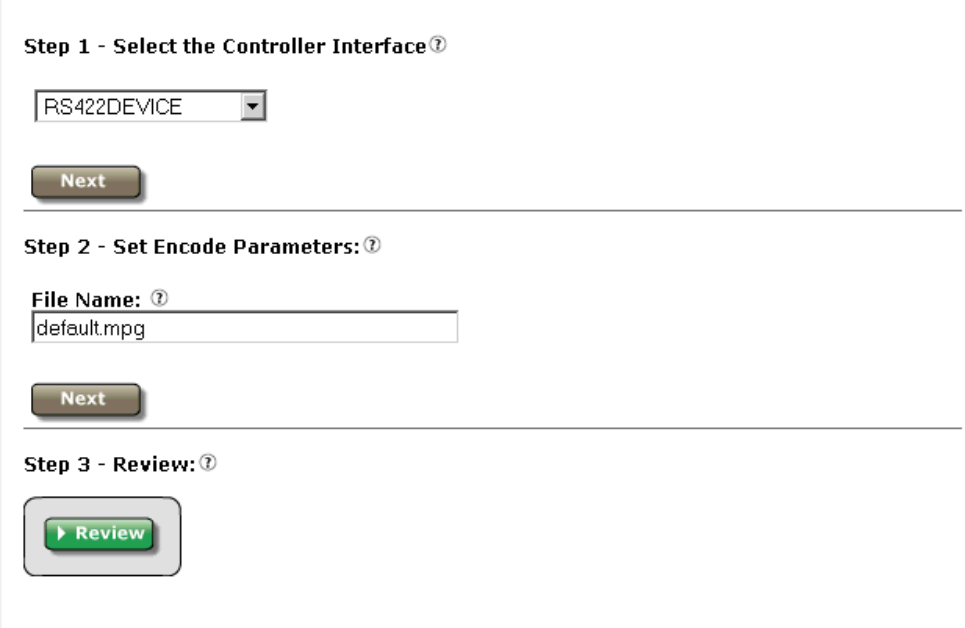
Reviewing Content

You can verify that a file is the one you want (or otherwise review the content) by entering the file name and clicking the **<Review>** button. the file will play on the monitor configured for Confidence Decode.

RS422 Device

To export content from a non-linear editor to the mediaHUB-HD Pro for encoding, you will need to be connected to the control computer via a special RS422 Device cable. See additional information on this cable.

When "RS422Device" is selected as the **Controller Interface** and **<Next>** is clicked, the Studio Control Tab will shift to this configuration:

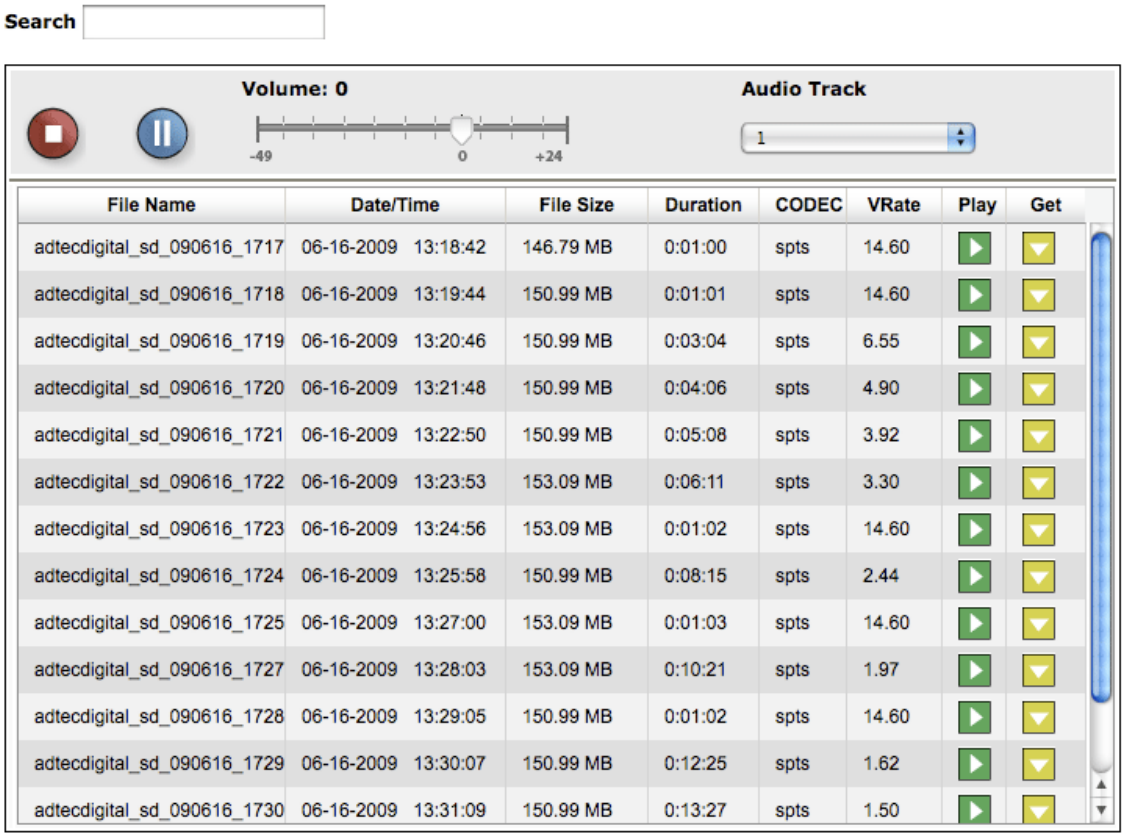


To Export from a Non-Linear Editor :

Step	Action
1	On the Studio Tab, set the Controller Interface to **'RS422Device'** and click **<Apply>**.
2	Enter the file name for the video spot.
3	Click the **<Record>**. The file will be stored on the mediaHub HD Pro at /media/hd0/media.

Studio Inventory Tab

The **Inventory** sub-tab will list any media files stored on the mediaHUB-HD Pro's internal memory.



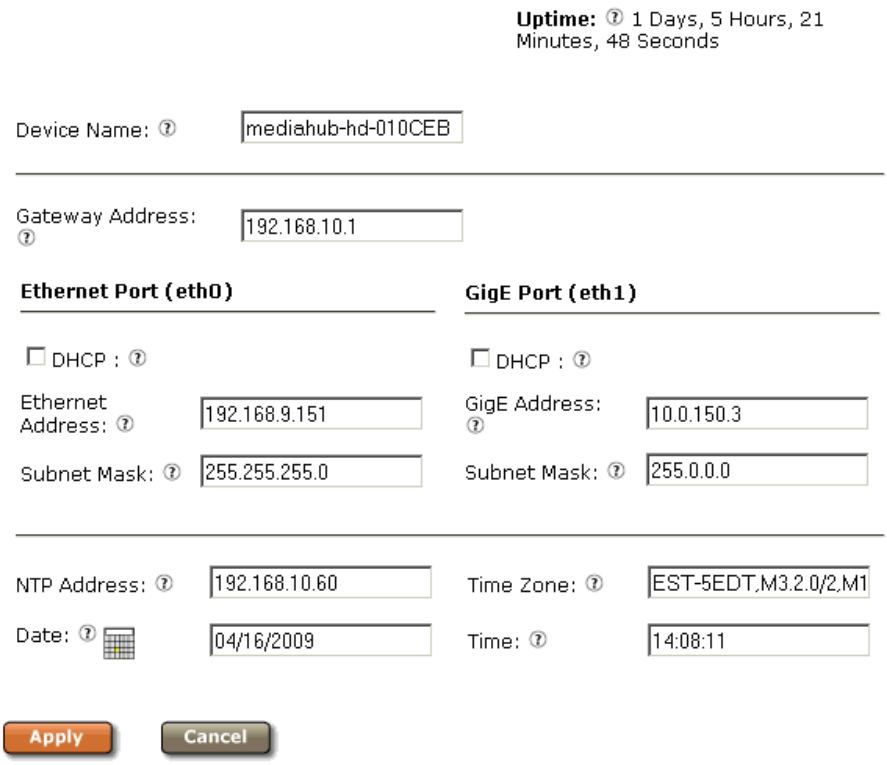
Encoding Times

As a rule of thumb, encoded content should always contain the correct number of encoded video frames. Be aware that measured time may show a slightly different value due to the cumulative effects of video and audio multiplexing.

The System Tab

The **System Tab** is used to define and control the mediaHUB HD Pro's relationship to the rest of your network and to other devices. The System Tab screen also includes a System Uptime counter in the screen's upper-right corner, showing the elapsed time between power-up cycles.

Screenshot (reduced for clarity) **:**



Controls:

Control	Function	Options	API Command
Device Name	ease-of-identification; default is name that combines the product type and the serial number of the unit. For example, "mediaHUB-HD-Pro-012345"	text field; user-defined	*.SYSD NAME
Gateway Address	the IP assignment of the gateway/router on your networ; limited to one IPA on Adtec devices	text field	*.SYSD GIP
eth0 DHCP	check box, allows unit to extract it's own IP address if switched on, from a DHCP server	selected = 1 not selected = 0	*.SYSD DHC eth0
eth0 Ethernet Address	IP address of the unit's Control-Ethernet port 10/100mbps	text field; valid IP address in form xxx.xxx.xxx.xxx	*.SYSD IPA 0
eth0 Subnet Mask	Subnet mask address of the unit's Control-Ethernet port	text field; valid IP address in form xxx.xxx.xxx.xxx	*.SYSD IPM 0
eth1 DHCP	check box, allows unit to extract it's own IP address if switched on, from a DHCP server	selected = 1 not selected = 0	*.SYSD DHC eth1
eth1GigE Address	IP address of the unit's GigE port	text field; valid IP address in form xxx.xxx.xxx.xxx	*.SYSD IPA 1
eth1 Subnet Mask	Subnet mask address of the unit's Control-Ethernet port	text field; valid IP address in form	*.SYSD IPM 1

		xxx.xxx.xxx.xxx	
NTP Address	IP Address of a Network Time Protocol server	On = 1 Off = 0 used in conjunction with the server's IP address	*.SYSD NIP [state][IPA]
Time Zone	designate operating time zone of unit for timekeeping and internal scheduling Will auto-populate if unit is connected to an NTP Server.	text field- will auto-populate from NTP server if NTP enabled	*.SYSD TIZ
Date	set the date for the unit for timekeeping and internal scheduling Will auto-populate if unit is connected to an NTP Server.	text field- will auto-populate from NTP server if NTP enabled	*.SYSD TIM
Time	set system time for unit for timekeeping and internal scheduling Will auto-populate if unit is connected to an NTP Server.	text field- will auto-populate from NTP server if NTP enabled	*.SYSD TIM

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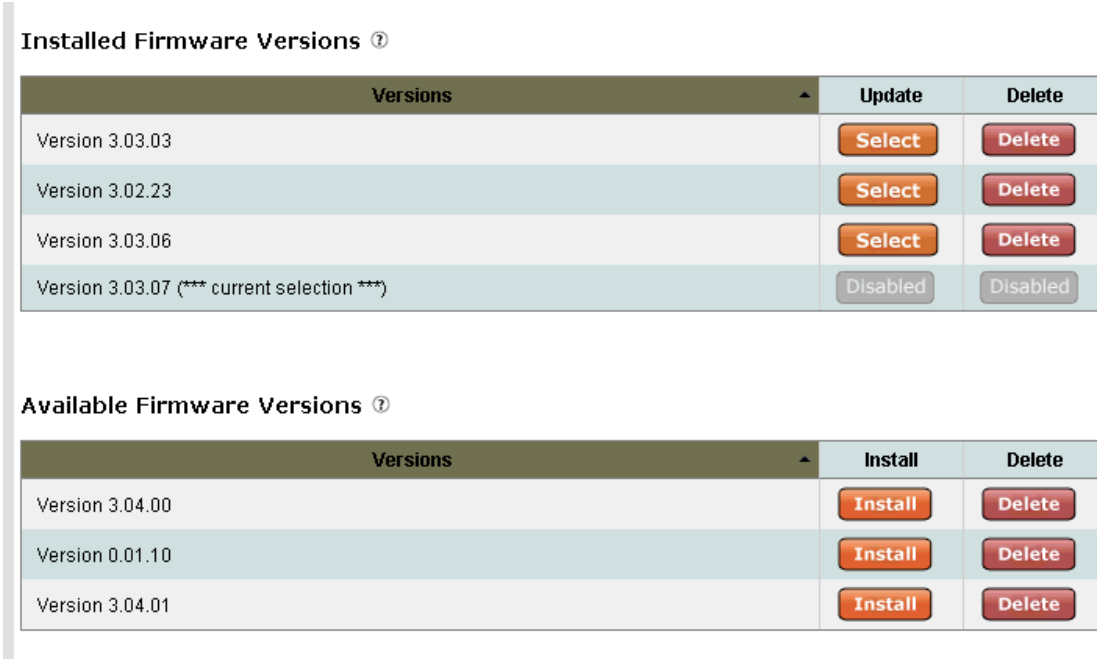
The Upgrade Tab

The Upgrade Tab is used to easily select and upgrade your unit's firmware from the available versions. There are two sub-tabs: Firmware and Features

Firmware Tab

Screenshot (reduced for clarity) **:**



Procedure

Installed Versions are firmware versions that have been installed on your device and can be selected as the current operating version. To select one of these versions, simply click on the **<Select>** button associated with the version. Due to the caching properties of your browser, it is necessary to clear your cache or restart the browser to make sure that the new application pages load. Click the **<Upgrade>** tab a second time to view the currently loaded versions.

Other Controls

- **Delete:** clicking the **<Delete>** button will delete that stored firmware version from your device.

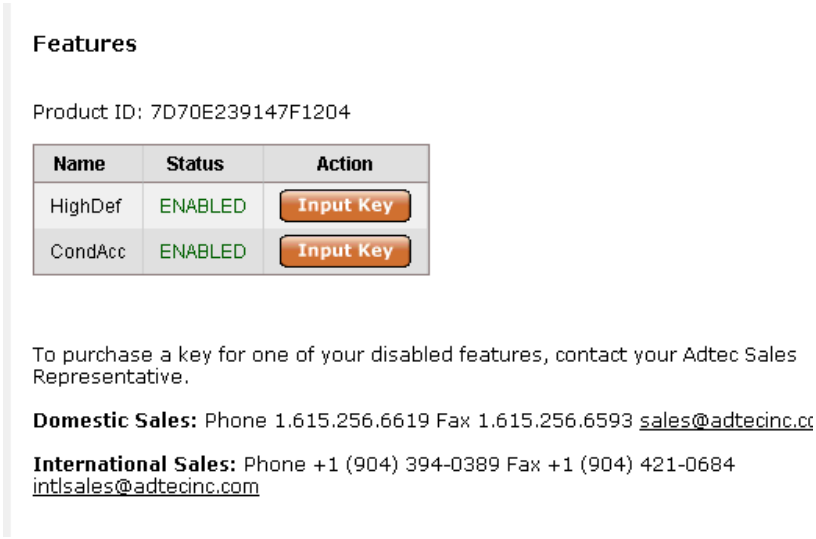
To upload new firmware versions, click on the **<Install>** button next to the desired firmware version.

After the new version is uploaded, a pop-up screen will confirm its availability on the device.

Features Tab

The Features tab shows optional features that you have purchased for use on your mediaHUB HD Pro. To purchase additional feature keys, contact your Adtec sales representative.

Screenshot:



- Two features are currently available for the mediaHUB HD Pro:
    - **High/Standard Definition:** the mediaHUB HD Pro's encoding standard is High Definition; however, for applications not ready for high definition, the device can be shipped with this feature locked, making it a Standard Definition encoder.
        - The unit can later be upgraded to High Def through the purchase of a feature key.
    - **Conditional Access:** a feature key to enable BISS-1 and BISS-E encryption is available for the mediaHUB HD Pro.
- In the screen shot above, both the High Def and Conditional Access features have been unlocked.

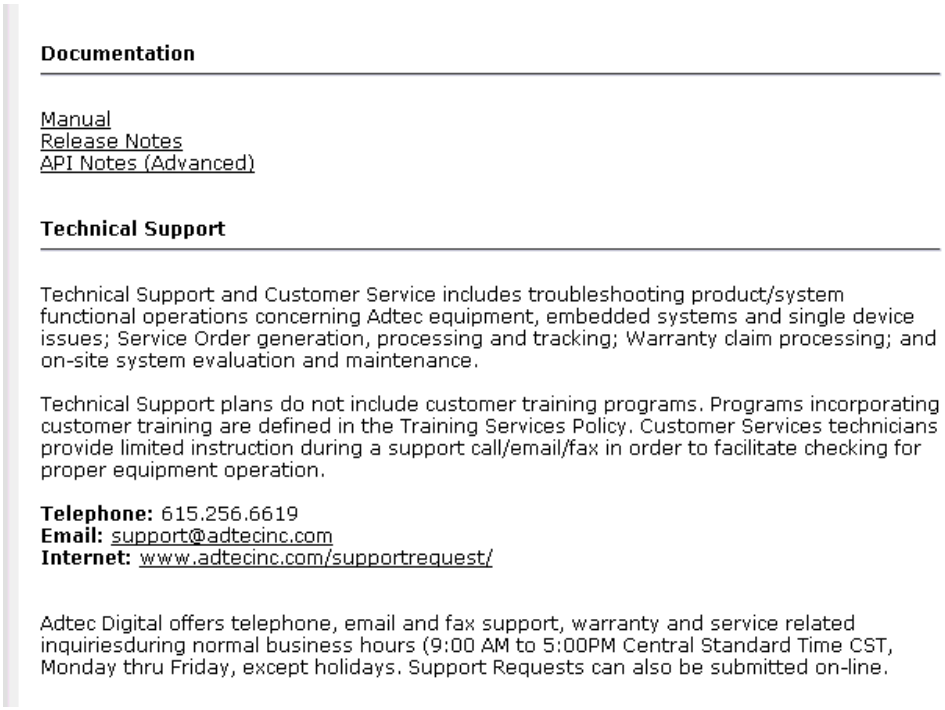
Upgrading from Older Firmware Versions

If your current version is less than v 3.01.22, you will need to use the FTP manual upgrade procedure to upgrade your unit.

The Help Tab

The Help Tab provides another access to Technical Support's contact information, and to a link for the onboard User's Manual, Release Notes, and API information.

Screenshot (reduced for clarity) **:**



Documentation

Manual
Release Notes
API Notes (Advanced)

Technical Support

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: 615.256.6619
Email: support@adtecinc.com
Internet: www.adtecinc.com/supportrequest/

Adtec Digital offers telephone, email and fax support, warranty and service related inquiriesduring normal business hours (9:00 AM to 5:00PM Central Standard Time CST, Monday thru Friday, except holidays. Support Requests can also be submitted on-line.

Contacting Customer Support

Adtec Digital's Support Services

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:** www.adtecinc.com/supportrequest/

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

Information needed 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.

Advanced Support Plans

In addition to our basic Inquiry Response Policy, Adtec offers two advanced levels of priority inquiry support: **Standard-Priority** and **Priority-24**. The Standard-Priority & Priority-24 plans provide guaranteed* response times with the Priority-24 plan offering after hours and holiday support. Standard-Priority support is included with the Adtec Certified Operator (ACO) training. Contact Adtec Sales to upgrade your current support plan.

Standard-Priority Support Plan Description

Customers can improve upon our normal call processing times and can expedite inquiry support responses through our subscription Standard-Priority service plan. Under this plan all telephone inquiries are guaranteed* a telephone response of no more than 4 hours after they are received (within the designated hours of operation). Telephone inquiries received by 4:00 PM

(CST) on weekdays- excluding Adtec holidays- are guaranteed a same-day telephone response. However, inquiry responses may be made after hours until 8:00 PM (CST). Email and fax inquiries are limited in scope to normal business hours, excluding holidays. Standard-Priority customers are entitled to a 10% discount on site visit and training charges after the initial system/product installation and training. Standard-Priority customers also receive a 3-day turnaround time guarantee* on warranty and non-warranty repairs on Adtec manufactured equipment, excluding Studio Encoders.

Priority - 24 Support Plan (24 Hour) Description

In addition to our Standard-Support plan, after hours, weekend and holiday support is available with the **Priority-24** support plan. This plan is a subscription only service available for service inquiries 24 hours a day, 7 days a week. All telephone inquiries are guaranteed* a telephone response time of no more than 2 hours. Email and fax inquiries are limited in scope to normal business hours, excluding holidays. Calls after 5:00 PM will be forwarded to a Customer Services representative on call. **Priority-24** customers are entitled to a 25% discount on site visit and training charges, after the initial system/product installation and training. **Priority-24** customers also receive a 1- day turnaround time guarantee* on warranty and non-warranty repairs on Adtec-manufactured equipment, **excluding** Studio Encoders.

Plan Comparisons

Feature/ Plan Name	Priority-24	Standard Priority	Limited
Hours	24 Hours/Day; 7 Days/Week	9:00 AM – 5:00 PM, (U.S.Central Standard Time), ExcludesWeekends & Holidays	
Call Response Time	Same day- 2 hours (1st in order of call list)	Same Day: 4 Hours (2nd in order of call list)	48 Hours
Discounted Site Visits	25%	10%	None
Discounted Training	25%	10%	None
Repair Service	Guaranteed* 1 Day Turnaround	3 Day Turnaround	None

* A one-month free service extension will be awarded if Adtec fails to meet its service guarantee.

Encoding Frequently Asked Questions

Scenario	Information
What is the max mux rate with audio?	57.6Mbps
What is Video Auto Fill (VAF)?	Video Auto Fill is an Adtec feature to reduce the amount of null packets in the Transport stream by automatically setting the Video Bitrate. The bitrate is automatically configured by the mediaHUB-HD based upon the Transport Mux Rate and the Audio rates (Transport Mux Rate - Audio Rate - minimal fill = Video Rate). VAF is recommended to be turned on for the highest possible video quality. Please note that 15Mbps is the highest possible video rate for Standard Definition Mpeg2.
What is Constant Capture (CCA)?	Constant Capture is an Adtec feature to record encoded content 24/7/365 to the hard drive. To use this feature turn CCA on (*.ecmd cca on). The user may also have the mediaHub-HD automatically segment constant capture into files by setting a Record Time (*.ecmd RCT). When doing continuous 24/7 recording, RCT is the length of each successive file with a range from 60 - 7200 seconds (1 min. - 2 hr.). Set RCT to 1800 to create a new file every 30 minutes (*.ecmd RCT 1800). Each successive file will be named accordingly with the time/date stamp that it was segmented. Setting record time to zero (0) disables file segmentation. Encodes will be captured as a single large file.
My encoder encodes great for a while, then stops. What's wrong?	RDU or Record Duration is a setting that aids in providing studio fashion encoding. Please verify the Record Duration is set to 0 for 24 hour encodes. (*.ecmd RDU 0)
What happens when the hard drive fills up with Constant Capture files?	The unit deletes the oldest file in sequence, and continues to loop through, replacing the next oldest file as each new file is saved.
Does a second Dolby channel have to be present? Do I have to have audio on the 2nd channel or is the Dolby signature in the file sufficient?	No, and the Dolby signature should be sufficient.
How do I determine what bit rates I need to use to encode my spots?	This depends on your system's parameters.
How do I set up a multicast stream?	Set it up on the Transmit -> Multicast Menu from the front panel: MODE: SEND MSP: 2000 MSI: 226.0.0.1
A file larger than 200 Megabytes cannot be uploaded to the unit through eth0 (10/100) without ftp timeout. The error does not occur through eth1 (GIGE).	Change ftp data timeout to 350 seconds: ftpdatatimeout 350 **Note:** The eth0 and eth1 cannot be on the same subnet.

Studio Encoding via Adtec API Commands

To capture a file with a specific duration, you will need set the following API(s).

- Capture File Name: Enter an absolute file name.
  - Example: * CFN /media/hd0/media/TESTFILE.mpg
- Trans Mux Rate: For the file to capture to drive, the TMR must be lower than 40Mbps
  - Example: * TMR 39000000
- Record Time: Set this value to 0. This keeps constant capture from breaking up your file into smaller segments.
  - Example: * RCT 0
- Record Duration: Set this value to the desired record duration time.
  - Example: * RDU 00:00:30:00 (30 secs.)
- Constant Capture: Constant capture must be turned on to record.
  - Example: * CCA 1

Once all settings are complete, save your configuration by issuing a * CF SAVE command.

To constantly capture, you will need set the following API(s).

- Capture File Name: Enter an absolute file name.
  - Example: * CFN /media/hd0/media/TESTFILE.mpg.
  - Note that this file name will be appended with a date/time stamp as is segments the file.
- Trans Mux Rate: For the file to capture to drive, the TMR must be lower than 40Mbps.
  - Example: * TMR 39000000
- Record Time: Set this value between 1800(secs) and 7200 (secs).
  - This is how long the encoder will encode before segmenting to another file.
- Record Duration: Set this value to 0.
  - Example: * RDU 00:00:00:00
- Constant Capture: Constant capture must be turned on to record.
  - Example: * CCA 1

Once all settings are complete, save your configuration by issuing a * CF SAVE command.

Once settings have been saved, you can issue a record from the API (* REC) or the front panel. When your file has been captured, you can FTP to the unit to retrieve it or confidence decode it by issuing a playspot command; for example, (* PS TESTFILE.MPG).

Technical Specifications

Encoder Video Profiles

- MPEG 2 SD Profile 1: Adaptive Field Frame (AFF) ISO13818-2 MP@ML
- MPEG 2 SD Profile 2: AFF ISO13818-2 422P@ML
- MPEG 2 HD Profile 1: ISO13818-2 MP@H-14 (1440 x 1080)
- MPEG 2 HD Profile 2: ISO13818-2 MP@HL (1920 x 1080 or 1280 x 720)

Video Encoding Data Rates

- MPEG 2 MP@ML SD / 1 Mbs-15 Mbs - NTSC and PAL
- MPEG 2 422P@ML SD / 1 Mbs-50 Mbs - NTSC and PAL
- MPEG 2 MP@HL and MP@H-14 HD / 7 Mbs-59.5 Mbs

High Definition Video Frame Formats 720p24, 720p50, 720p60, 1080i50, 1080i60

High Definition Video Encode Resolutions *Horizontal Resolutions*

- 1280, 1440, 1920

Vertical Resolutions

- 720, 1080

*Note: HD scaling includes 1920 x 1080 to 1440 x 1080 only. **Standard Definition Video Frame Formats** 480i, 576i, 480p, 567p

Standard Definition Video Encode Resolutions *Horizontal Resolutions*

- 720, 704, 640, 544, 528, 480, 352

Vertical Resolutions

- 480, 576

Video Processing

- Encoder Filters (SD Only)
    - ♦ Temporal & Spatial (Median)
    - ♦ Time Base Corrector (TBC) on SDI inputs for SD only
    - ♦ Chroma filtering and scaling for NTSC/PAL

Encoder Video Input

- Standard Definition (SD) Video Inputs (Encoder)
    - ♦ Analog NTSC and PAL Composite (BNC)
    - ♦ SDI (SMPTE 259M) with embedded audio (SMPTE 272M)
        - ◊ Auto detect SD 270Mbps for SD
        - ◊ D1 Encoding Only - no internal up-conversion.
- High Definition (HD) Video Inputs (Encoder)
    - ♦ HD-SDI input video, (SMPTE 292M) with embedded audio (SMPTE 299M)
        - ◊ Auto detect HD 1.485 Gbs.

* SDI and HD-SDI are the same connector with auto standard (resolution and frame rate) detection.

Encoder Audio Profiles

- Dolby Digital 2.0 (AC3) dual stream encoders included
- MPEG1 Layer 2 dual stream encoders included
- Dolby E, Dolby 5.1 and Dolby Digital 2.0 (AC3) passthrough

Encoder Audio Input

- Analog Audio 1 Stereo Balanced (5-Pin Removable Screw Terminal)

- Analog Audio 2 Stereo (SAP) Balanced (5-Pin Removable Screw Terminal)
- AES3-1 digital audio input uncompressed (PCM) or compressed bit stream passthrough from external Dolby 2.0, 5.1 or Dolby E encoders (BNC - 75 Ohm). Includes compressed bit stream output.
- AES3-2 digital audio input uncompressed (PCM) or compressed bit stream passthrough from external Dolby 2.0, 5.1 or Dolby E encoders (BNC - 75 Ohm). Includes compressed bitstream output.
- SDI embedded (16 channels) with video per SMPTE 272M for SD and SMPTE 299M for HD. User selectable group.
- User-defined analog and digital level control with sample rate conversion on all inputs

Transport Outputs

- ISO13818-1 MPEG 2 Transport Stream (188 byte only)
    - ♦ (x3 mirrored outputs)
- MPEG 2 Transport via GigE (UDP or RTP)
- MPEG 2 Transport to local storage Constant Capture to storage (local or NAS)
- ASI, IP and Constant Capture operate concurrently

Transport User Data

- SMPTE 334 VANC data extraction for IEEE 708/608. Concurrent
- User defined VANC Line 7-32 data extraction supported
- Teletext: (NABTS) DVS053 Rev 6

Conditional Access

- BISS 1

Table Compliance

- MPEG Program Specific Information (PSI) Table Compliance:
    - ♦ PAT
    - ♦ PMT
- DVB Service Information (SI) Table Compliance (Static)
    - ♦ SDT
    - ♦ NIT
    - ♦ TDT/TOT
- SCTE 35 Splice Point injection
- ATSC A65B (PSIP) Table compliance (Static)
    - ♦ MGT (TVCT, STT, RRT, EIT)

*For dynamic DVB-SI use Adtec's DTA-3050 and DTVmanage SI Server *For dynamic A65B PSIP use Adtec's DTA-3051 and DTVGuide web service

Decoder Output Video Output
- Confidence decode of encode via internal bus, No ASI loop required
- SD/HDSDI SMPTE 259M (SD) and SMPTE 292M (HD) User definable resolution from D1 to 1080i including scaler for Up and Down conversion
- Composite D1 Video (NTSC/PAL) Not concurrent with HD
- HDMI with HDCP and Audio
- DVB-ASI Input

Audio Output
- SDI Embedded audio stereo audio pair SMPTE 272M (SD) SMPTE 299M (HD) User defined PID
- HDMI No analog audio output **Decoder Video Profiles**
- MPEG 2 SD Profile 1: Adaptive Field Frame (AFF) ISO13818-2 MP@ML
- MPEG 2 SD Profile 2: AFF ISO13818-2 422P@ML
- MPEG 2 HD Profile 1: ISO13818-2 MP@H-14 (1440 x 1080)
- MPEG 2 HD Profile 2: ISO13818-2 MP@HL (1920 x 1080 or 1280 x 720)
- MPEG - 4.10 (AVC/H.264) MP@L3.0 and L3.1 (max 10Mbps) (1920X1080 or 1280 x 720)
- MPEG - 4.10 (AVC/H.264) HP@L4.0 and L4.1 (max 20Mbps) (1920X1080 or 1280 x 720) **Decoder Audio Profiles**
- Dolby Digital AC-3: Bit rates up to 640kbps. Sample rates of 32, 44.1 and 48KHz. Multi-channel up to 5.1 on S/PDIF and downmix to 2 channel Dolby Pro Logic on analog.
- MPEG 1 and MPEG 2 Layer I, II and III (MP3) 2.0: Bit rates up to 448kbps (Layer I), 384kbps (Layer II) or 320kbps (Layer III). Sample rates of 16, 22.05, 24, 32, 44.1 and 48KHz. Single channel, dual channel, joint stereo and stereo modes.
- AAC-LC MPEG-2 and MPEG-4:(max 384kbps) Sample rates of 7.35, 8, 11.025, 12, 16, 22.05, 24, 32, 44.1 and 48KHz. **Physical**

- 1 RU chassis (19 x 14 x 1.75)
- 14 pounds

Power

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

User Interface Requirements

- Included Web application server with Bonjour enabled auto find
- Front panel LCD, keypad and LEDs

RS422 Cable Configuration

For RS422 communications, the following pin configuration must be used:

Signal	Controller Pin #	Device Pin #
Frame Ground	1	1
Receive A-	2	8
Transmit B+	3	7
Transmit Common	4	6
Spare	5	5
Receive Common	6	4
Recive B+	7	3
Transmit A-	8	2
Frame Ground	9	9

This cable will work for the Apple Workstation running Final Cut using the Blackmagic PCI capture card connected to our mediaHUB-HD Pro.

Usage

- To encode a project, use the **"Print to Video"** option from the **"File"** pulldown menu in Final Cut.
- Set the following control parameters to start the encode:

Control (API Command)	Set to
CONTROLINTERFACE (CIF)	RS422DEVICE
CONSTANTCAPTURE (CCA)	ON

As a check, the VIDEODETECTED (VDE) readback should state **"Yes"**.

- **Important:** this cable will **not** work for our mediaHUB-HD Pro/422 connected to a **Tape Deck**.
  - The cable needed for a tape deck connection is a regular RS232 serial cable, connected straight through with **no** crossovers in the wiring.

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Media Encoding Parameters for Adtec Decoders

Using Adtec Decoders

If you are using this device to encode content to be used with Adtec Decoders (Soloist, edje-4111, displayMate and signEdje) we recommend the following encoding parameters:

- When creating content for the Soloist and edje 4111HD, you need so ensure that your encoding parameters match the decoder for best results.

MPEG 2 Encoding

When creating MPEG2 files, it is recommended to use the following parameters:

Multiplex Type: MPEG2 Transport Stream

Transport Steam composition:

1. The file should start with a transport sync byte (0x47) and should maintain packet alignment throughout the entire duration.

2. There should be a minimal amount of fill packets at the start of the file.

3. The first non-fill packet should be the PAT packet.

4. The next non-fill packet should be the PMT packet(s).

5. The next non-fill packet should be the first video stream packet.

- The first video stream packet should contain the following:
    - ♦ Adaptation indicator marking the presence of a PCR.
        - ◊ The adaptation flag field should have the discontinuity indicator set.
    - ♦ Valid PES header with PTS and DTS.
    - ♦ Valid video sequence header and GOP header.

6. Use the following recommended PID values:

- PMT: 0x1e0 (480dec)
- PCR: 0x1e1 (481dec, must reference video PID)
- Video: 0x1e1 (481dec)
- Audio1: 0x1e2 (482dec)
- Audio2: 0x1e3 (483dec)

Audio: 192Mbps AC-3 or MPEG Layer 2

HD Content:

- Resolution: up to 1920x1080 (1080i60 or 1080i50)
- Bit Rate: 25Mbps constant bit rate (CBR).

SD Content:

- Resolution: 720x480 NTSC or 720x576 PAL
- Bit Rate: 8Mbps constant bit rate (CBR).

Note: Content should be padded with black frames front and back for improved visual transitions between clips.

MPEG 4.10/AVC/H.264 Encoding

H.264, MPEG-4 Part 10, or AVC, for Advanced Video Coding, is a digital video codec standard which is noted for achieving very high data compression. The ITU-T H.264 standard and the ISO/IEC MPEG-4 Part 10 standard (formally, ISO/IEC 14496-10) are technically identical.

When creating AVC files, it is recommended to use the following parameters:

Multiplex Type: MPEG2 Transport Stream

Transport Steam composition:

1. The file should start with a transport sync byte (0x47) and should maintain packet alignment throughout the entire duration.

2. There should be a minimal amount of fill packets at the start of the file.

3. The first non-fill packet should be the PAT packet.

4. The next non-fill packet should be the PMT packet(s).

5. The next non-fill packet should be the first video stream packet.

- The first video stream packet should contain the following
    - ♦ Adaptation indicator marking the presence of a PCR.
        - ◊ The adaptation flag field should have the discontinuity indicator set.
    - ♦ Valid PES header with PTS and DTS.
    - ♦ Valid video sequence header and GOP header.

6. Use the following recommended PID values:

- PMT: 0x1e0 (480dec)
- PCR: 0x1e1 (481dec, must reference video PID)
- Video: 0x1e1 (481dec)
- Audio1: 0x1e2 (482dec)
- Audio2: 0x1e3 (483dec)

Audio

- 192Mbps AC-3 or MPEG Layer 2

HD Content

- Resolution: High Profile up to 1280x720 (720p50 or 720p60. note that 1080i60 is not supported)
- Bit Rate: 12Mbps constant bit rate (CBR).

SD Content

- Resolution: Main Profile up to 720x480 NTSC or 720x576 PAL
- Bit Rate: 5Mbps constant bit rate (CBR).

Note: Content should be padded with black frames front and back for improved visual transitions between clips.

Encoder Glossary

Term	Definition
AC-3	Audio compression standard adopted by ATSC and owned by Dolby.
ADC	Analog to Digital Converter
ASCII	American Standard Code for information Interchange
ASI	Asynchronous Serial Interface. A standard DVB interface for a transport stream
ATM	Asynchronous Transfer Mode
ATSC	Advanced Television Systems Committee. Digital broadcasting standard developed in North America.
ATV	Advanced television. North American standard for digital Broadcasting
BAT	Bouquet Association Table. This DVB table describes a set of services grouped together by a broadcaster and sold as a single entity. It is always found on PID 0x0011.
BER	BER - Bit Error Rate
B-frames	Bi-directional predicted pictures, o pictures created from referenced to past and future pictures
Bitrate	The rate at which a bit stream arrives at the input of a decoder
Block	A set of 8x8 pixels used during Discrete Cosine Transformation (DCT).
Bouquet	A set of services sold as a single entity
Broadcaster	Someone who provides a sequence of scheduled events or programs to the viewer
CA	Conditional Access. This system allows service providers to control subscriber access to programs and services via encryption.
CAT	Conditional Access Table. This table identifies EMM streams with a unique PID value. The CAT is always found on PID 0x0001
CATV	Community Access Television, otherwise known as Cable TV.
Channel	A digital medium that stores or transports an MPEG-2 transport stream.
COFDM	Coded Orthogonal Frequency-Division Modulation
Compression	Reduction of the number of bits needed to represent an item of data
Conditional Access	A system used to control viewer access to programming based on subscription.
CRC	Cyclic Redundancy Check. This 32-bit field is used to verify the correctness of able data before decoding.
CVCT	Cable Virtual Channel Table. This ATSC table describes a set of one or more channels using a number or name within a cable network. Information in the table includes major and minor numbers, carrier frequency, short channel name, and information for navigation and tuning. This table is located on PID=0x01FFB.
D/A	Digital to Analog Converter
DAVIC	Digital Audio Visual Council
DBS	Direct Broadcasting Satellite or system
DCT	Discrete Cosine Transform. Temporal-to-frequency transform used during spatial encoding of MPEG video.
Decoding Time Stamp	This stamp is found in the PES packet header. It indicates the time at which a piece of audio or video will be decoded
DigiTAG	Digital Television Action Group
Downlink	Communication link from satellite to earth
DTV	Digital Television. A general term used to describe television that has been digitalized. It can refer to Standard-definition TV or High-definition TV.
DTS	See Decoding Time Stamp
DVB	Digital Video Broadcasting. The DVB Project is a European consortium that has standardized digital TV broadcasting in Europe and in other countries.

DVB ASI	Asynchronous Serial Interface. This is a standard DVB interface for a transport stream
DVB-C	Digital Video Broadcasting-Cable. The DVB standard for broadcasting digital TV signals by cable. The RF spectrum in digital cable TV networks has a frequency range of (approx) 46MHz to 850MHz
DVB-S	Digital Video Broadcasting-Satellite. The DVB standard for broadcasting digital TV signals via satellite DVB SPI - Synchronous Parallel Interface. This is a standard DVB interface for a transort stream. DVB-T - Digital Video Broadcasting-Terrestrial. The DVB standard for broadcasting digital terrestrial TV signals ECM - Entitlement Control Message. ECMs carry private conditional access information that allows receivers to decode encrypted information
EIT (ATSC)	Event Information Table. This table is part of the ATSC PSIP. It carries the TV guide information including titles and start times for events on all the virtual channels within the transport stream. ATSC requires that each system contain at least 4 EIT table, each representing a different 3-hour time block. The PIDs for these tables are identified in the MGT
EIT Actual (DVB)	Event Information Table. This table is part of the DVB SI. It supplies the list of events corresponding to each service and identifies the characteristics of each of these events. Four types of EITs are defined by DVB : 1) The EIT Actual Present/Following supplies information for the present event and the next or following event of the transport stream currently being accessed. This table is mandatory and can be found on PID=0x0012. 2) The EIT Other Present/Following defines the present event and the next or following events of other transport streams in the system that are not currently being accessed by the viewer. This table is optional. 3)The EIT Actual Event Schedule supplies the detailed list of events in the form of a schedule that goes beyond what is currently or next available. This table supplies a schedule of events for the transport stream currently being accessed by the viewer. 4) The EIT Other Event Schedule supplies the detailed schedule of events that goes beyond what is currently or next available. This table supplies a schedule of events for other transport streams in the system that are not currently being accessed by the viewer. The EIT Schedule tables are optional
EMM	Entitlement Management Message.EMMs specify authorization levels or services of specific decoders. They are used to update the subscription options or pay-per-view rights for an individual subscriber or for a group of subscribers
EPG	Electronic Program Guide. This guide represents a broadcasting data structure that describes all programs and events available to the viewer. It functions like an interactive TV guide that allows users to view a schedule of available programming and select what they want to watch.
Elementary Stream	A bit stream that includes video, audio or data. It represents the preliminary stage of the Packetized Elementary Stream (PES)
ETR	ETR - ETSI Technical Report
ETR 290	ETR 290 - ETSI recommendation regarding measurement of MPEG-2 DVB transport streams
ETSI	ETSI - European Telecommunication Standard Institute
ETT	ETT - Extended Text Table. This table is part of the ATSC PSIP. It carries relatively long text messages for additional descriptions of events and channels. There are two types of ETTs, the Channel ETT, which describes a channel, and the Event ETT, which describes individual events in a channel. The PID for this table is identified in the MGT
Event	A collection of elementary strean\ms with a common time base and an associated start time and end time. An event is equivalent to the common industry usage of “television program”
Frame	Lines of spatial information for a video signal
FEC	Forward Error Correction. This method adds error control bits before RF modulation. With these bits, errors in the transport stream may be detected and corrected prior to decoding
Group of Pictures (GOP)	a set of pictures usually 12-15 frames long used for temporal encoding of MPEG-2 video. HDTV - High Definition Television. HDTV’s resolution is approximately twice as high as that of Standard Definition Television (SDTV) for both horizontal and vertical dimensions. HDTV has an aspect ratio of 16x9 as compared to the 4x3 aspect ratio of SDTV
IEC	International Electrotechnical Commission.
IEEE	Institute of Electrical and Electronics Engineers.
I/F	Interface
I-frame	Intra-coded frame, or a picture encoded without reference to any other picture. I-frames provide a reference for Predicted and Bidirectionally predicted frames in a compressed video stream.

IRD	Integrated Receiver Decoder. This is a receiver with an MPEG-2 decoder, also known as a set-top box.
ISO	International Standardization Organization
ITU	International Telecommunications Union (UTI)
LVDS	Low Voltage Differantial Signal. An electrical specification used by some manufactures, usually on a parallel interface. It is a balanced interface with a low signal voltage swing (about 300mV)
Macroblock	A group of 16x16 pixels used for motion estimation in temporal encoding of MPEG-2 video. MFN - Multiple Frequency Network (DVB-T).
MGT	Master Guide Table. This table is part of the ATSC PSIP. It defines sizes, types, PIDs, and version numbers for all of the relevant tables within the transport stream. The PID value for this table is 0x1FFB.
MHEG	Multimedia and Hypermedia Expert Group. MIP - Megaframe Initialization Packet. This packet is used by DVB-T to synchronize the transmitters in a multi-frequency network.
MP@HL	Main Profile at High Level. MPEG-2 specifies different degrees of compression vs. quality. Of these, Main Profile at High Level is the most commonly used for HDTV.
MP@ML	Main Profile at Main Level. MPEG-2 specifies different degrees of compression vs. quality. Of these, Main Profile at Main Level is the most commonly used. MPEG - Moving Picture Experts Group, also called Motion Picture Experts Group.
MPEG-2	ISO/IEC 13818 standard defining motion video and audio compression. It applies to all layers of transmission (video, audio and system)
MPTS	Multiple Program Transport Stream. An MPEG-2 transport stream containing several programs that have been multiplexed.
Multiplex (n)	A digital stream including one or more services in a single physical channel. (v)-To sequentially incorporate several data streams into a single data stream in such a manner that each may later be recovered intact. Network - The set of MPEG-2 transport streams transmitted via the same delivery system
NIT	Network Information Table (NIT).The DVB table that contains information about a network's orbit, transponder, etc. It is always located on PID 0x0010. DVB specifies two types of NITs, the NIT Actual and the NIT Other. The NIT Actual is a mandatory table containing information about the physical parameters of the network actually being accessed. The NIT Other contains information about the physical parameters of other networks. The NIT Other is optional.
NTSC	Nation TV Standard Committee Colour TV System (USA and 60 Hz countries).
NvoD	Near Video on Demand. This service allows for a single TV program to be broadcast simultaneously with a few minutes of difference in starting time. For example, a movie could be transmitted at 9:00, 9:15 and 9:30.
Packet	Packet - See Transport Packet.
PAL	Phase Alternating Line.
PAT	Program Association Table. This MPEG-2 table lists all the programs contained in the transport stream and shows the PID vale for the PMT associated with each program. The PAT is always found on PID 0x0000. Payload - All the bytes in a packet that follow the packet leader.
PCR	Program Clock Reference. A time stamp in the transport stream that sets the timing in the decoder. The PCR is transmitted at least every 0.1 seconds.
PES	Packetized Elementary Stream. This type of stream contains packets of unidentified length. These packets may be comprised of video or audio data packets and ancillary data.
PES Packet	The structure used to carry elementary stream data (audio and video). It consists of a header and payload.
PES Packet Header	The leading bytes of a PES packet, which contain ancillary data for the elementary stream.
PID	Packet Identifier. This unique integer value identifies elements in the transport stream such as tables, data, or the audio for a specific program. PLL - Phase Lock Loop. This locks the decoder clack to the original system clock through the PCR.
PMT	Program Map Table. This MPEG-2 table specifies PID values for components of programs. It also references the packets that contain PCR.
P-frame	Predicted frame, or a picture coded using references to the nearest previous I- or P- picture.
Program	See Service.

PSI	Program Specific Information. PSI refers to MPEG-2 table data necessary for the demultiplexing of a transport stream and the regeneration of programs within the stream, PSI tables include PAT, CAT, PMT and NIT. PSIP - Program and System Information Protocol. The ATSC protocol for transmission of data tables in the transport stream. Mandatory PSIP tables include MGT, STT, RRT, VCT and EIT.
PTS	Presentation Time Stamp. This stamp indicates the time at which an element in the transport stream must be presented to the viewer. PTSs for audio and video are transmitted at least every 0.7 seconds. The PTS is found in the PES header.
QAM	Quadrature Amplitude Modulation. This type of modulation for digital signals used in CATV transmission (DVB-C). Amplitude and phase of a carrier are modulated in order to carry information.
QPSK	Quadrature Phase Shift Keying. A type of modulation for digital signals used in satellite transmission (DVB-S).
RRT	Rating Region Table. An ATSC PSIP table that defines ratings systems for different regions or countries. The table includes parental guidelines based on Content Advisory descriptors within the transport stream.
RS	Reed-Solomon Protection Code. This refers to the 16 bytes of error control that can be added to every transport packet during modulation.
RST	Running Status Table. A DVB-SI table that indicates a change of scheduling information for one or more events. It saves broadcasters from having to retransmit the corresponding EIT. This table is particularly useful if events are running late. It is located on PID 0x0013.
SDT	Service Description Table. This DVB SI table describes the characteristics of available services. It is located on PID 0x0011. Two types of SDTs are specified by DVB, the SDT Actual and the SDT Other. The SDT Actual is a mandatory table that describes the services within the transport stream currently being accessed. The SDT Other describes the services contained in other transport streams in they system.
SDTV	Standard Definition Television. SDTV refers to television that has a quality equivalent to NTSC or PAL.
Section	A syntactic structure used for mapping PSI/SI/PSIP tables into transport packets of 188 bytes.
Service	A collection of one or more events under the control of a single broadcaster. Also known as a Program.
SFN	Single Frequency Network (DVB-T).
SI	Service Information. This DVB protocol specifies all the data required by the receiver to demultiplex and decode the programs and services in the transport stream. Mandatory DVB SI tables include TDT, NIT, SDT and EIT. SMPTE - Society of Motion Picture and Television Engineers.
SNG	Satellite News Gathering. This refers to the retransmission of events using mobile equipment and satellite transmission. SNMP - Simple Network Management Protocol. This is the standard protocol for system and network administration.
SPI	Synchronous Parallel Interface. This is a standard DVB interface for a transport stream.
SPTS	Single Program Transports Stream. An MPEG-2 transport stream that contains one unique program.
ST	Stuffing Table. An optional DVB-SI table that authorizes the replacement of complete tables due to invalidation at a delivery system boundary such as a cable headend. This table is located on PID 0x0014.
STB	Set-top box. A digital TV receiver (IRD).
STD	See System Target Decoder.
STT	System Time Table. An ATSC PSIP table that carries time information needed for any application requiring schedule synchronization. It provides the current date and time of day and is located on PID 0x1FFB.
System Target Decoder	A hypothetical reference model of the decoding process defined by MPEG-2.
Table	Service Information is transmitted in the form of tables, which are further divided into subtables, then into sections, before being transmitted. Several types of tables are specified by MPEG, DVB and ATSC.
TDT	Time and Date Table. This mandatory DVB SI table supplies the time reference expressed in terms of UTC time/date. This enables joint management of the events corresponding to the services accessible from a single reception point. The PID for this table is 0x0014.
Time-stamp	An indication of the time at which a specific action must occur in order to ensure proper decoding and presentation.
TOT	

	Time Offset Table. This optional DVB SI table supplies the UTC time and date and shows the difference between UTC time and the local time for various geographical regions. The PID for this table is 0x0014. Transponder - Trans(mitter) and (res)ponder. This refers to the equipment inside a satellite that receives and re-sends information.
Transport Packet	188-byte packet of information in a transport stream. Each packet contains a header and a payload
Transport Stream	A stream of 188-byte transport packets that contains audio, video and data belonging to one or several programs
T-STD	See System Target Decoder.
TV	Television.
TVCT	Terrestrial Virtual Channel Table. This ATSC table describes a set of one or more channels or services using a number or name within a terrestrial broadcast. Information in the table includes major and minor numbers, short channel name, and information for navigation and tuning. This table is located on PID=0x1FFB
Uplink	Communication link from earth to a satellite
UTC	Universal Time, Co-ordinated
VTC	Virtual Channel Table. This ATSC table describes a set of one or more channels or services. Information in the table includes major and minor numbers, short channel name, and information for navigation and tuning. There are two types of VTCs, the TVCT for terrestrial systems and the CVCT for cable systems
VLC	Variable Length Coding. This refers to a data compression method (Huffmann)
VoD	Video on Demand
VSB	Vestigial Sideband Modulation. This is the terrestrial modulation method used in the ATSC. It can have either 8 (8VSB) or 16 (16 VSB) discrete amplitude levels.

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Contribution with Dolby E using the Adtec mediaHUB HD Pro

This procedure allows the introduction of Dolby E audio into the mediaHUB HD Pro.

Dolby-E DP571 Audio Encoder Settings:

- Output Data: 20-bit precision
- Program Configuration: 4 x 2

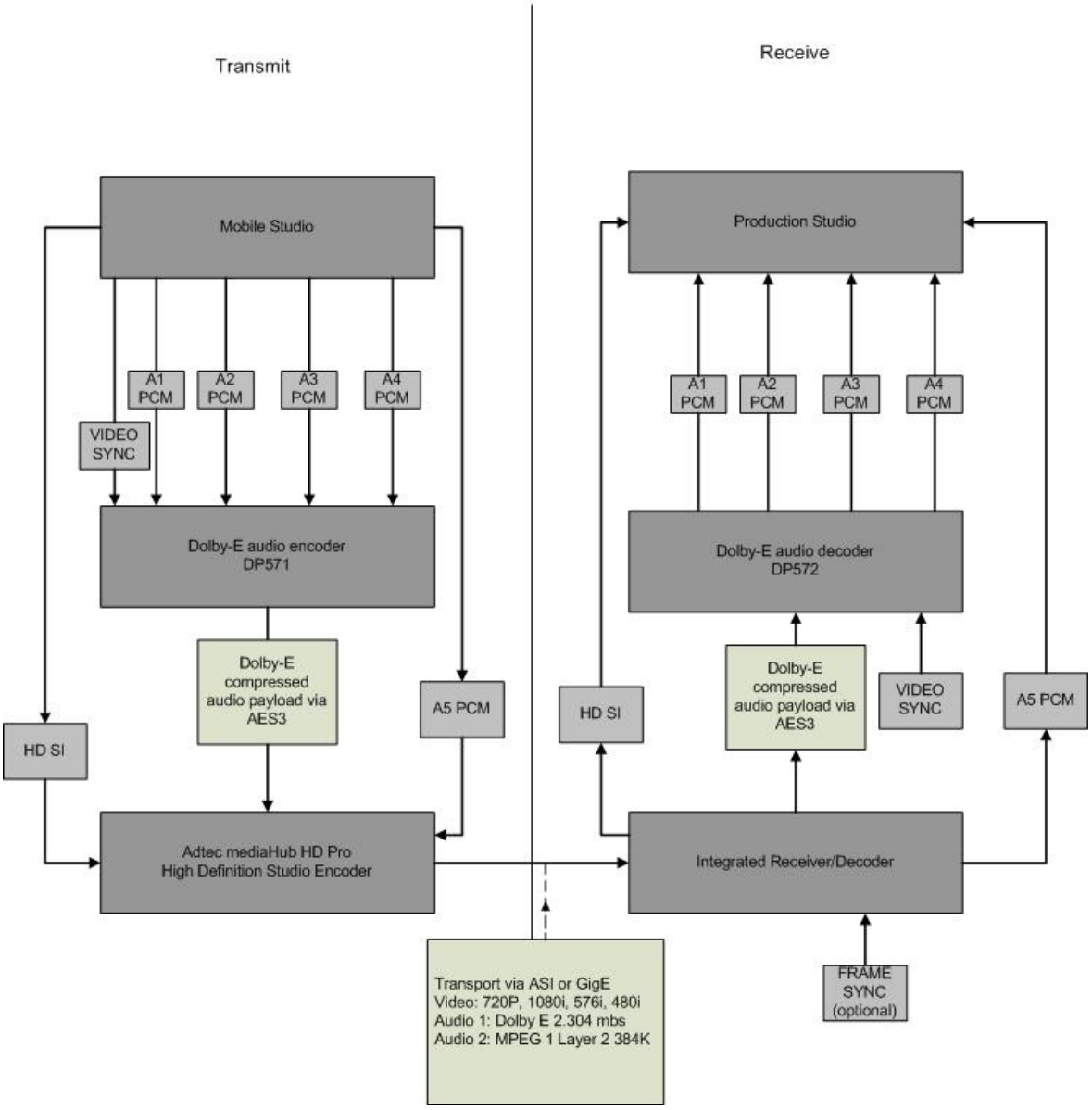
Set AES input (1 or 2) to receive Dolby E:

Step	Action
1	On the mediaHub front panel, select the **Encoder** menu
2	Select either **Audio 1** or **Audio 2**
3	Select type as **AES**
4	Set "Dolby Audio Input" to **Compressed**
5	Set Layer to **"0"** (zero)
6	Ignore "Bitrate"- this will be auto-detected from the Dolby input
7	Assuming Audio 1 is being used for Dolby E, set Audio 2 to have AES input type, Dolby OFF, and a Layer setting of "2"

Adjust audio lip-synch to plus-or-minus 800 milliseconds

Process Flow:

High Definition Contribution with Dolby E and Stereo Audio



Firmware Upgrade

You can upgrade your Adtec device's firmware via built-in web-based application, described in the Upgrade Tab section, or via a Telnet/FTP session, described in this article.

To update your Adtec device 's firmware via a Telnet session, perform the following:

Step	Action
1	Obtain the desired firmware version file from adtecftp.com
2	Using any FTP client upload the firmware file to the device
3	Open a Telnet session and enter the IP address of the unit you are going to update.
4	Enter the username as ' **adtec** ' and the password as ' **none** '.
5	Enter the following in sequence: * ST
6	* version search - from the results, look for the pathname of recently uploaded firmware file
7	* version install [pathname of the .tgz file] ex: * version install /media/hd0/mediahub-hd-v3.02.06.nfcms.tgz

Important Version Considerations

If you have mediaHub HD version...	then you:
3.00.13 or lower and a **read/write** hard drive....	use mediaControl .54 to upgrade the unit. You can also use command line and ftp (adtec / none).
3.00.13 or lower and a **read-only** hard drive....	must use the command line and ftp (admin / 1admin!). **Caution:** if you have to use this method, you may not have enough room to load the upgrade file. If that is the case (failed upgrade), you will have to delete default.mpg before transferring the update file to the unit.
3.00.13 and need to upgrade to version 3.00.14 for testing....	can only do this using command line. If you have a **read/write** hard drive, use ftp (adtec / none). If you have a **read-only** hard drive, use ftp (admin / 1admin!). **Caution:** if you have to use this method, you may not have enough room to load the upgrade file. If that is the case (failed upgrade), you will have to delete default.mpg before transferring the update file to the unit. **Note:** version 3.00 .14 has issues and should not be released beyond testing.
3.00.13 or 3.00.14...	can upgrade it to 3.00.15 (or greater, when available) using the web-based updated http://<ipa of the unit>/update/ or command line. **Important:** mediaControl will **not** work when trying to upgrade these versions.

Manual Upgrade 'Step by Step'

Step	Action
1	Obtain the desired firmware version file from www.adtecftp.com note*: Firmware releases are found in the Public Folders -> Firmware -> Release -> section of the website, in a folder marked with the product name. username: adtecftp password: adtecftp2231 note**: Windows Internet Explorer renames adtec firmware file extensions to .gz . When saving please add a t within the extension to read .tgz if IE has renamed your file.
2	Using your favorite FTP client to upload the firmware file to the device. If you are unfamiliar with FTP you may use a 'My Computer' window and type in the address bar, ftp://adtec:none@192.168.10.48 where 192.168.10.48 should be replaced with the IP Address of YOUR mediaHUBHD. You may then drag and drop the firmware file into the hd0 folder.
3	Open a Telnet session and enter the IP address of the unit you are going to update. note*: If you are unfamiliar with telnet, open a command prompt window (windows: start -> run.., mac: macintosh hd -> applications -> utilities -> terminal) and type: telnet 192.168.10.48

4	Enter the username as ' **adtec** ' and the password as ' **none** '.
5	Enter the following in sequence: *.ecmd stop
6	*.sysd vrn search - from the results, look for the pathname of recently uploaded firmware file

| 7 | *.sysd vrn install [pathname of the .tgz file]
ex: *.sysd version install /media/hd0/mediahub-hd-v3.02.06.nfcms.tgz |

Video Connector Compatibility

Reference

With the wide variety of display targets supported by modern video decoders, and the multitude of video monitors that can be used, it can be challenging to match a display target to compatible type of video input connector. Adtec Digital has created this reference to make it easier to match video monitors and their input connectors to compatible display target settings in our products, in order to get the best performance out of your Adtec Digital device.

Here are some common rules regarding the matching of your video input connector with the display targets it supports:

- Video display targets must be selected based on the **monitor type** that will display them. In this reference, we list out the display targets specific to televisions and PC monitors.
- Display targets must **also** be matched to the **connector type**.
- DVI connections support both television standards and PC monitor standards.
    - ♦ If you are using a DVI connector, match the display target to the monitor type.
- Newer LCD and plasma monitors may support both television standards and PC monitor standards.
    - ♦ If you are using an LCD or plasma monitor, match the display target to the connection type.
        - ◊ Use PC monitor standard display targets for VGA connections
        - ◊ Use TV standard display targets for other connections.
- If you are using a converter/adaptor cable (for example converting HDMI to DVI), the connector to consider is the one that plugs into the monitor- that connector must determine the display target used.

Television Standards

If you are connecting your device to a television or monitor that supports television standards, you should use one of the following connections and display targets.

Compatible Connections

Connector on Adtec Device	Connector on Display	Signal	Colorspace	Image	Notes
Composite (BNC or RCA)	Composite (BNC or RCA)	analog	YCrCb		Provides only video. For audio, use separate SPDIF, RCA (l /r) or unbalanced audio cable depending on the Adtec Device.
7 - PIN Media Port (Soloist 4111 Only)	1.Composite (BNC) 2. S/Video - 4 PIN 3. SPDIF Audio	analog	YCrCb		Provides video on either BNC or S-Video. For audio, use SPDIF or a separate unbalanced audio cable.
DVI Single Link	Component (RGB)	analog	RGB		Provides only video. For audio, use separate SPDIF, RCA (l /r) or unbalanced audio cable depending on the Adtec Device.

DVI Single Link	DVI	digital	YCrCb or RGB		Provides only video. For audio, use separate SPDIF, RCA (l /r) or unbalanced audio cable depending on the Adtec Device.
DVI Single Link	HDMI	digital	YCrCb or RGB		Provides only video. For audio, use separate SPDIF, RCA (l /r) or unblanced audio cable depending on the Adtec Device.
HDMI (Soloist HD Pro, mediaHUB HD Pro and mediaHUB-HD 422 Only)	HDMI	digital	YCrCb or RGB		Provides audio and video

Display Targets

NTSC	NTSC-J	PAL	PAL-M	720P24	720P50			
720P59	720P60	1080P24	1080I50	1080I59	1080I60	1080P50	1080P59	1080P60

PC Monitor Standards

If you are connecting your device to a PC Monitor or to a monitor that supports PC Graphic Standards, you should use one of the following Connections and display targets.

Compatible Connections

Connector on Adtec Device	Connector on Display	Signal	Colorspace	Image	Notes
DVI Single Link	VGA (DB15)	analog	RGB		Provides only video. For audio, use separate SPDIF, RCA (l /r) or unbalanced audio cable depending on the Adtec Device.
DVI Single Link	DVI	digital or analog	RGB		Provides only video. For audio, use separate SPDIF, RCA (l /r) or unbalanced audio cable depending on the Adtec Device.

Display Targets (Video Configurations)

VESA800X600X75	VESA1280X768X85	
VESA640X350X85	VESA800X600X85	VESA1280X960X60
VESA640X400X85	VESA848X480X60	VESA1280X960X85
VESA640X480X60	VESA1024X768X43	VESA1280X1024X60
VESA640X480X72	VESA1024X768X60	VESA1280X1024X75
VESA640X480X75	VESA1024X768X70	VESA1280X1024X85
VESA640X480X85	VESA1024X768X75	VESA1360X768X60
VESA720X400X60	VESA1024X768X85	VESA1400X1050X60
VESA800X600X56	VESA1152X864X75	VESA1400X1050X75
VESA800X600X60	VESA1280X768X60	VESA1600X1200X60
VESA800X600X72	VESA1280X768X75	VESA1920X1200X60
XGA1080i50*	XGA1080i60*	

* **Note:** XGA 1080i 50 and XGA1080i60 are "custom" display targets and are not recognized within the industry. They are also only available on firmware builds 2.02.10 and up on specific Adtec products- the signEdje, edje4111, Soloist HD Pro, and the Soloist4111.

Troubleshooting Guide

Issue	Cause
The video displays but appears shaded in magenta or green.	The colorspace of the selected display target does not match the monitor and/or connection type used. Either switch your video display target or switch your connector.
No video is displayed or the monitor reports that it has 'no sync' or 'out of range'	Possibility 1: The wrong input is selected on your monitor. Possibility 2: A display target has been chosen that is not supported by your monitor.
The video is displayed but does not fill the entire screen, there may be black bars on the top and bottom or on the sides	Possibility 1: The view mode of the monitor is set incorrectly (full-screen, stretch, dot-for-dot, through, etc.) Possibility 2: The monitor input being used is expecting a different resolution (aspect ratio) than the selected display target is providing

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> <one line to give the program's name and a brief idea of what it does.> Copyright (C) <year> <name of author>
>
> This program is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 2 of the License, or (at your option) any later version.

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> Gnomovision version 69, Copyright (C) year name of author Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type `show w'. This is free software, and you are welcome to redistribute it under certain conditions; type `show c' for details.
>
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