mediaHUB-HD 422

Multi-CODEC HD 422 Encoder

User Guide

ADTEC Digital

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Overview

Offering the highest-quality and most flexible encoding features of Adtec's seasoned encoder line-up, the mediaHUB-HD 422 is a High- and Standard- Definition multi-CODEC workhorse. With the ability to encode any combination of HD or SD, MPEG 2 or MPEG 4 AVC with 4:2:0 or 4:2:2 color space, the mediaHUB-HD 422 supports past, present and future requirements. With support for 40 encoding profiles and auto-detection capability for resolution and frame rate, this product can hit the ground running regardless of your application.

Contribution, Distribution or Studio Encoding

Its rugged design and standard LCD front panel for status and configuration makes the mediaHUB-HD 422 ideal for mobile contribution applications while the on-board web-based control application offers ease of use for distribution and studio encoding. This all-in-one rack mountable unit is designed with standards compliance in mind and can easily be integrated with other leading broadcast gear.

Operation And Applications

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  - Table Menu
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- GNU General Public License

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Operations and Applications

Typical Operations

Contribution Applications: The Adtec mediaHUB-HD 422 supports a comprehensive array of video encoding profiles with BISS encryption. A highly-robust, single-channel per carrier (SCPC) DVB compliant MPEG 2 or MPEG 4 Transport Stream is output via ASI and GIGE concurrently. For multiplexing many services or channels per carrier (MCPC), Adtec's DTA-3050 is the perfect companion product. The DTA provides 10 ASI inputs for flexibility and high performance throughput with exceptionally low jitter. It remaps PIDs, adds and drops services, enables DVB-CSA encryption, builds DVB Tables, and adds the ability to operate encoders and DTA's fully redundant.

Distribution Applications:

Distribute the highest quality MPEG 2 and MPEG 4 AVC Digital Television sound and pictures 24 x 7 x 365 with the mediaHUB-HD 422. The mediaHUB-HD 422 supports ATSC, DVB, MPEG, and IPTV platforms delivering a pristine MPEG 2/MPEG 4 transport stream including broadcast quality Video, Audio with excellent lip sync, Closed Captions, Teletext, and static ATSC and DVB service information. Add the DTA-3050 as for multiplexing and fully dynamic ATSC and DVB service information applications.

Studio Applications:

Frame accurately capture video and four pairs of stereo audio with the mediaHUB-HD 422. The standard Sony 9-PIN interface operates in Controller and Recorder mode allowing it to control a tape device or be controlled by a non-linear editor (NLE). Encode in real-time with the Recorder mode directly from an NLE time line directly to file. Create High- and Standard-Definition Cable Labs-compliant MPEG 2/MPEG4 transport streams with the mediaHUB-HD 422; ideal for VOD and DPI content creation.

Connections

Video: the mediaHub-HD 422 supports a wide range of encoding profiles via SDI and composite.

- MPEG 2: MP@ML, 422P@ML, MP@HL, 422P@HL
- MPEG 4: AVC MP@L3.0, MP@L3.1, MP@L3.2, HP@L4.0, HP@L4.1
- SDI Video: Video per SMPTE 292M for High Definiton and SMPTE 259M for Standard Definition.

Audio: Audio Encoding available via AES, Analog and SDI

- Four AES3 digital audio inputs:
    - Inputs 1 - 4 support MPEG 1 Layer 2 encoding.
    - Inputs 1 - 2 support Dolby Digital encoding and passthrough from external Dolby E/5.1.
- SDI Audio: (8 channels) Audio per SMPTE 299M for High Definiton and SMPTE 272M for Standard Definition; Dolby-E.
- Analog Audio: 2 stereo pairs
- Linear PCM

Transport: MPEG2/MPEG4 Transport Stream via ASI and GigE supporting UDP/RTP/SMPTE2022

Features

- **SDI Plug and Encode:** Automatic SDI detection (HD and SD) of standards and frame rate.
- **Configuration and Monitoring:** Rapidly and accurately configure and monitor the mediaHUB-HD 422 via the front panel or
  on-board web application and SNMP.
- **Highest quality HD and SD:** When it comes to the best on-air look, mediaHUB-HD 422 delivers with excellent quality High and Standard Definition video encoding using MPEG 2 and MPEG 4 AVC.
- **Decode While Encode (DWE):** Built-in confidence decoder nearly eliminates the need for external local decoders.
    - Decryption and some encoder profiles not supported in DWE.

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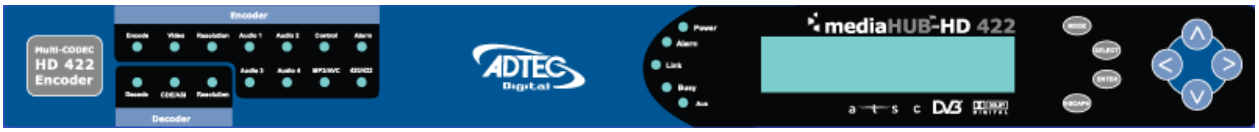
Front Panel

The mediaHUB-HD 422 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.

Front Panel Illustration



Encoder LED Indicators

Indicator	LED Status
Encode	**Off:** Not Active **Green flash:** pre-rolling (studio encode) **Green:** Encoding **Yellow:** Transition (Encoding to Idling
Video	**Off:** no video (audio only) **Green:** video present **Yellow:** wrong format **Red:** no video present
Encoder Resolution	**Off:** Standard Definition (NTSC/PAL) **Green:** 1080i HD **Yellow:** 720p HD
Audio 1 & 4	**Off:** Audio Not Enabled **Green:** Audio Enabled
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
MP2/AVC	**Yellow:** Encoding MPEG2 **Green:** Encoder MPEG 4 AVC
420/422	**Yellow:** Encoding 4:2:0 Chroma **Green:** Encoding 4:2:2 Chroma

Decoder LED Indicators

Indicator	LED Status
Decode	**Off:** not active **Green:** Decoding
Decoder Resolution	**Off:** Standard Definition **Green:** 1080i HD **Yellow:**720p HD
CD/ASI	**Yellow:** Confidence Decoding **Green:** ASI Receiving

System LED Indicators

Indicator	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 network traffic **Yellow:** network traffic present
Aux	**not currently used**

Front Panel Navigation

The mediaHUB-HD 422 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 422 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

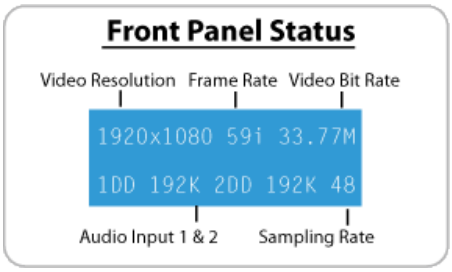
Possible Values:
0 (Zero): The unit will not auto-log-out **1-9:** The number of minutes until log out if no input is received.

The front panel also reports a snapshot of the current source. If you press the **ESCAPE** key until you reach the upmost menu item, you will see something similar to this:

1920X1080 59i 33.77M

1DD 192K 2DD 192K 48

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.

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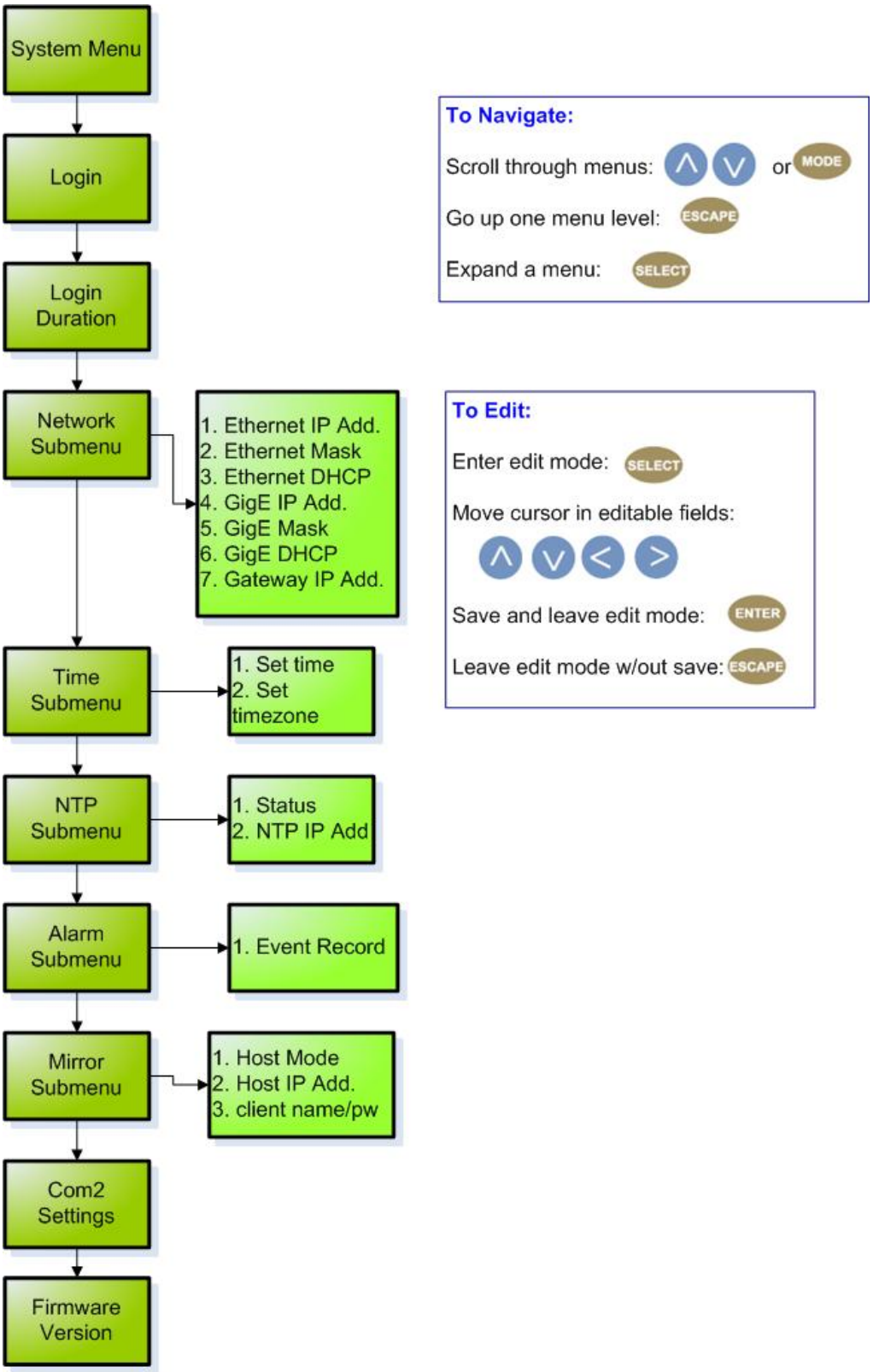
System Menu

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



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 device 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>** buttons	*.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 8 1 None	Decoder command *.sysd com2 Encoder command *.ecmd com2

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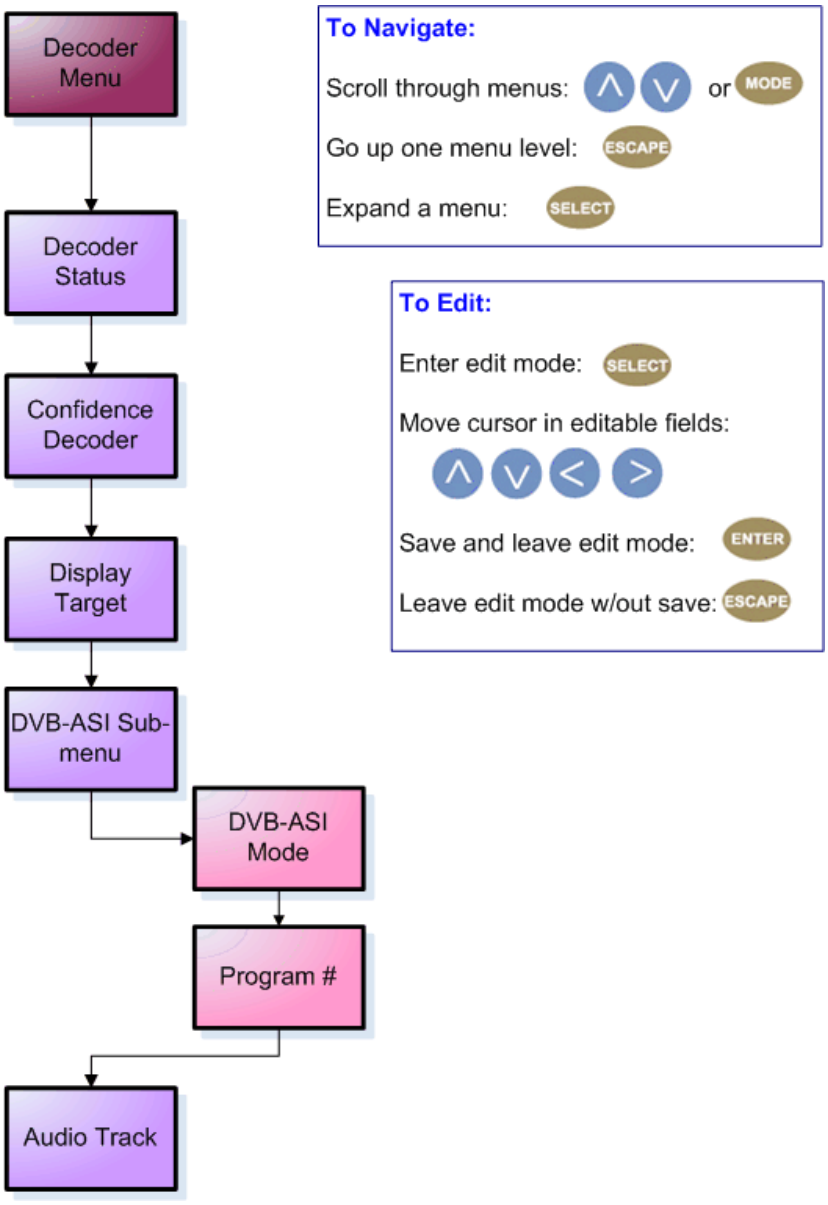
Decoder Menu

The following diagram represents the structure of the **Decoder** Menu of the Adtec mediaHubHD 422:



Definitions

Item	Function	Options	Adtec API Commands
Status	provides information regarding decoder function	Playing, Idling, Multicast Rec., etc	*.DCMD TRA
Confidence Decoder	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
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	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) DER DLT (latency)	*.DCMD DVB
Program Number	Program Number in PAT & PMT packet identifies which program is associated with which Video & Audio PIDs.	0x0001 - 0xFFFF are valid ID assignments	*.DCMD DPN
Audio Track	identifies audio track to be decoded	Track 1 Track 2	*.DCMD TSN

Display Resolutions

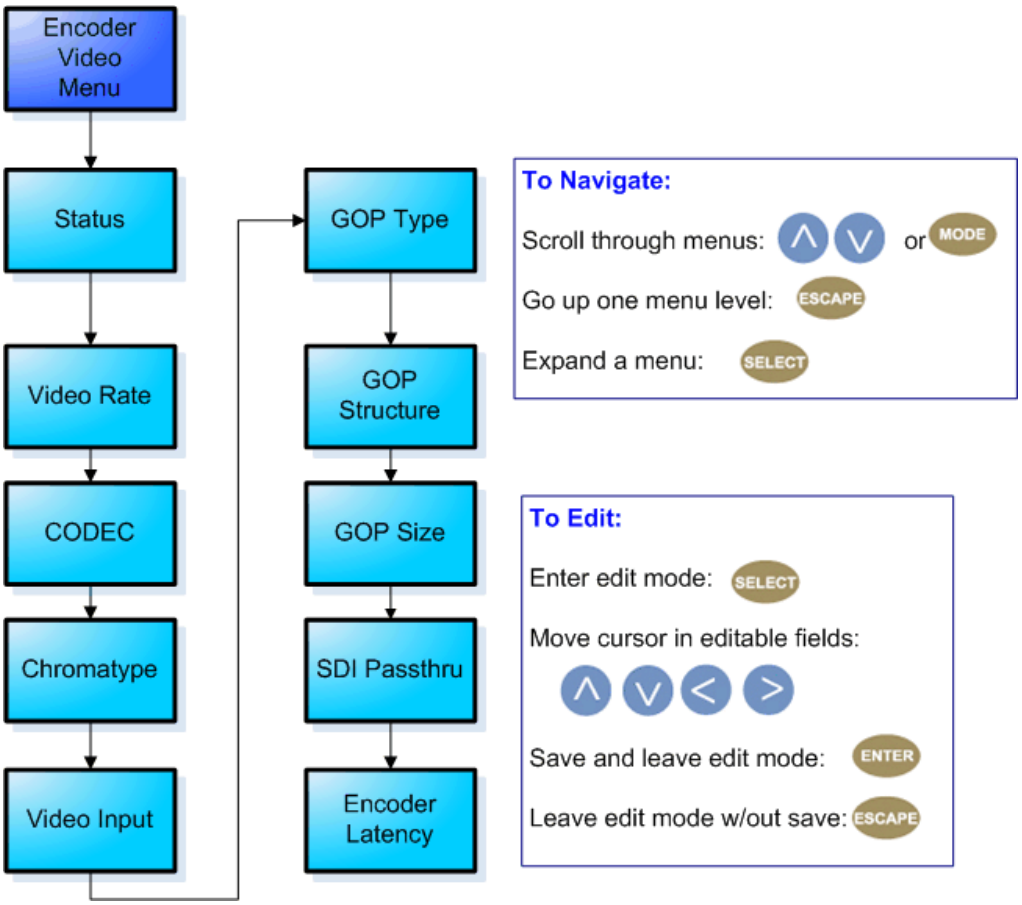
NTSC	1080P60*
NTSC-J	720P59
PAL	1080i59
PAL-M	
720P24	
720P50	
720P60	
1080P24	
1080I50	
1080P50	
1080I60	

* The mediaHub-HD 422'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. A Units support most VESA resolutions.

Encoder-Video Menu

The following diagram represents the structure of the **Video Encoder** Menu of the Adtec mediaHUB HD 422:



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
CODEC	type of video compression used during encode.	MPEG 2 MPEG 4 AVC	*.ECMD VEN
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
SDI Passthru	provides a re-clocked SDI loop for the encoder. If enabled, the decoder will calculate and use the max video bitrate for the current TransMuxRate setting.	On Off	*. ECMD SPT
Encoder Latency	adjusts encoder latency. Affected by video rate, frame size and rate, and GOP structure.	LONG: latency measures close to 1 second NORMAL: latency is approximately 1/2 second. Best option for standard transmission and contribution. LOW: latency approximately three (3) frames less than the NORMAL setting. VERYLOW: latency approximately five (5) frames less than the NORMAL setting.	*.ECMD ELA

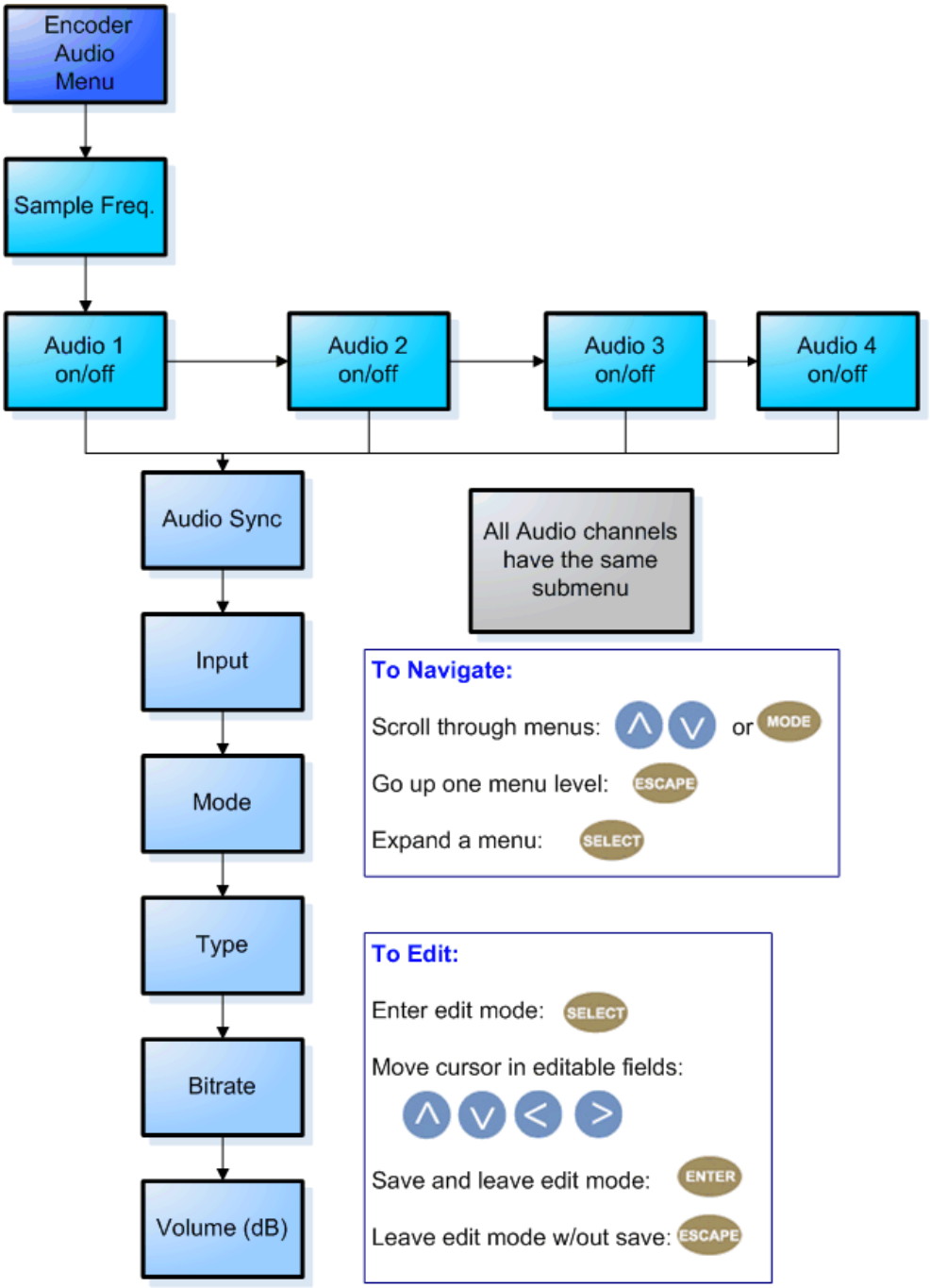
Note: the Adtec mediaHubHD 422 encoder function does not support MPEG1 Layer 3 or MP3.

Latency Notes:

- When encoding PAL video with VERYLOW latency, we recommend using IP GOP Structure if the decoder is TT 1260. Otherwise, the TT 1260 will underflow video.
- Long IBBP GOPs will produce higher latency over short IP GOPs.
- Short IP GOPs at lower bit rates produce lower quality video.

Encoder- Audio Menu

The following diagram represents the structure of the **Audio Encoder** Menu of the Adtec mediaHubHD 422:



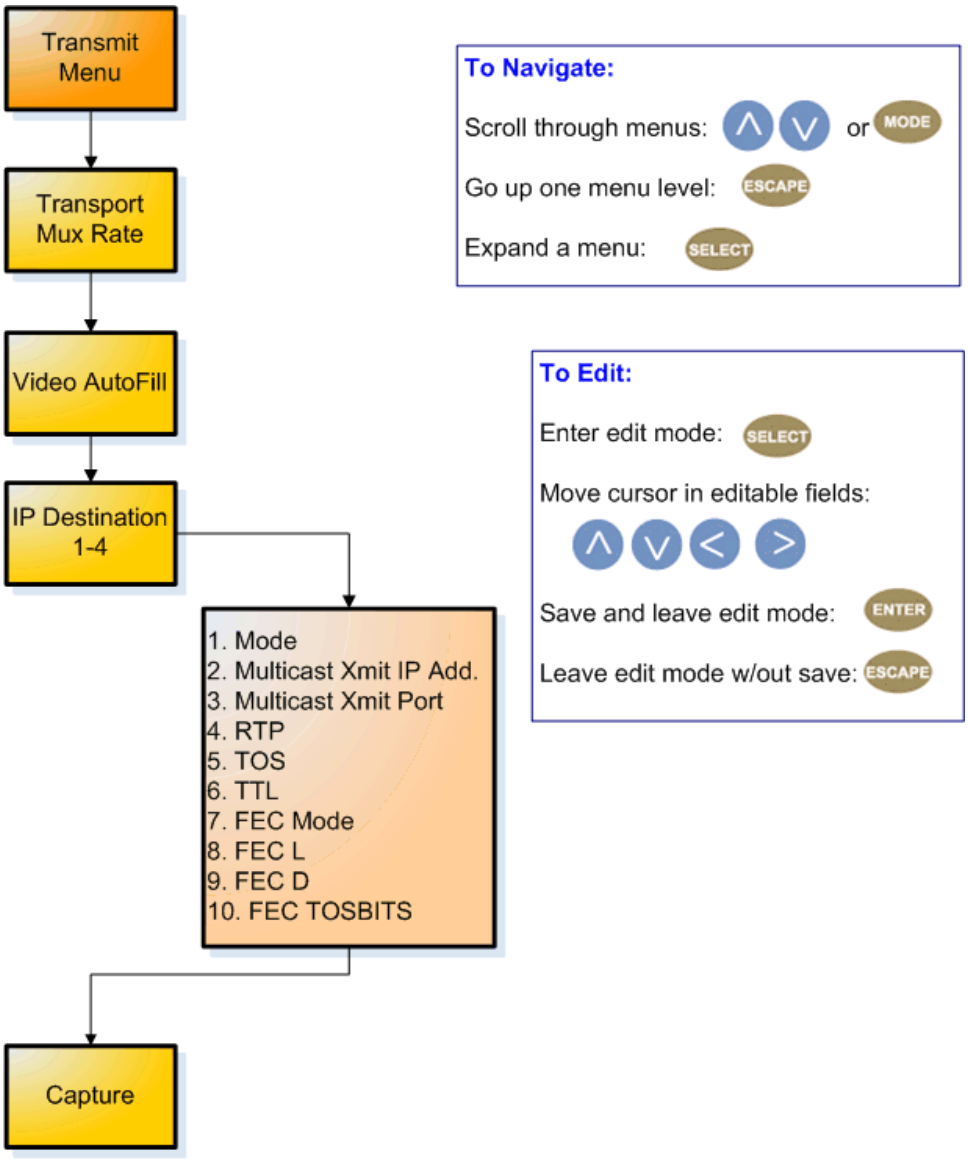
Definitions

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
Input	selects type of audio input menu is identical for Audio 1 through 4	Analog SDI AES	*.ECMD AIN [audio] Audio 1 = 0 Audio 2 = 1
Mode	specifies if the unit is encoding audio or passing it through as received	Encode Passthrough	See AMO in API Only functions
Type	type of audio signal being encoded or passed	Linear PCM Dolby Digital AC3 Musicam Layer II Dolby E	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 422 encoder function does not support MPEG1 Layer 3 or MP3.

Transmit Menu

The following diagram represents the structure of the **Transport** Menu of the Adtec mediaHub HD 422:



Definitions

Item	Function	Options	API Commands
Transport Mux Rate	rate, in bps, that the multiplexed signal is being handed off	max = 100000000	*.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
IP Destination 1-4	sub-label for items below. The sub-menu repeats four (4) times for up to four multicasting IP destinations.	NONE	none
Mode	switches multicast function on and off	Off Send	*.ECMD MMO
Multicast Transmit IP Address	IP Address on which a transport stream is transmitted	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	allows for sequence numbering and timing; editable if Multicast Mode is set to 'Send'	On Off	*.ECMD RTP
TOS	Type of Service; selects the type of multicast that will forward the packet	Normal Minimize Cost Maximize Reliability Maximize Throughput Minimize Delay	*.ECMD TOS
TTL	Time-to-Live; specifies the number of iterations or transmissions the packet can undergo before it is discarded	user-defined using **<left/right arrow>** and **<select>** buttons	*.ECMD TTL
FEC Mode	Forward Edge Correction; selects on/off. When selected, sends two FEC RTP streams in addition to a source RTP stream enabling a receiver to reconstruct missing packets in the source stream.	On Off Available if RTP selected 'on'	*.ECMD ECR
FEC L	affects the maximum burstpacket loss that can be recovered	4-20	*.ECMD ECR
FEC D	defines latency involved in burstrecovery	4-20	*.ECMD ECR
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

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 0x0002 -> 0x001F: reserved 0x0020 - 0x1FFE are valid PID assignments	user-defined 20-character hexadecimal	*. ECMD PPI see reserved PIDs at left
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 PID 2-4 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: All PID API commands can now accept Hex or Decimal values.

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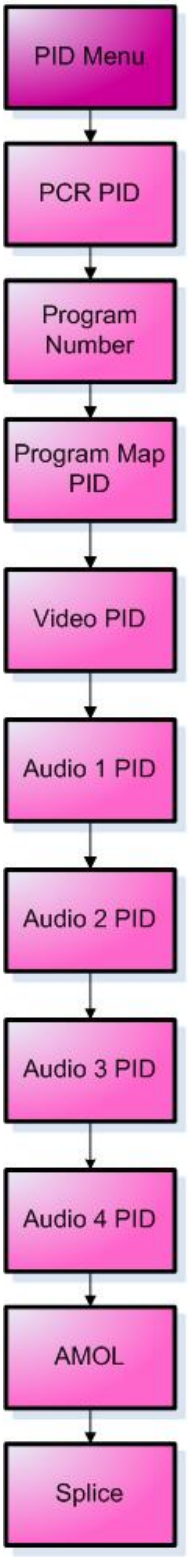
PID Menu

The following diagram represents the structure of the **PID** Menu of the Adtec mediaHUB-HD422:



To Navigate:

Scroll through menus: ^ v or MODE

Go up one menu level: ESCAPE

Expand a menu: SELECT

To Edit:

Enter edit mode: SELECT

Move cursor in editable fields: ^ v < >

Save and leave edit mode: ENTER

Leave edit mode w/out save: ESCAPE

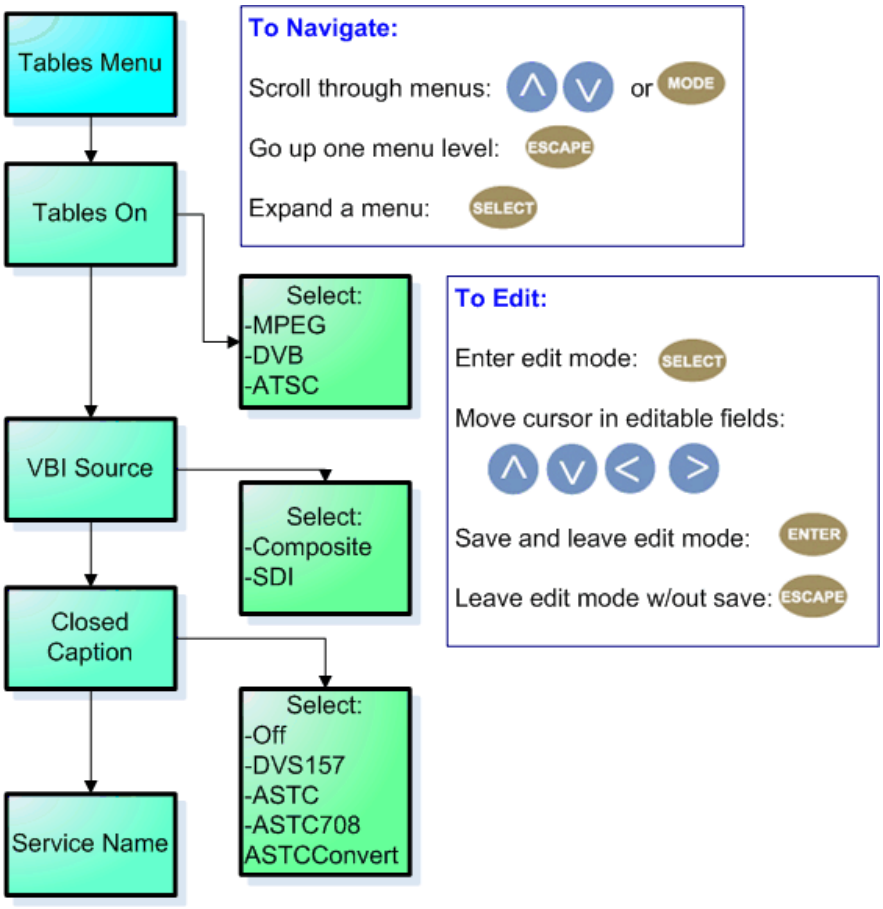
PCR PID Examples: PRP 1E1 (set the PID to 0x1e1 (481 decimal) PRP , 481 (set the PID to 481 (the comma is an empty placeholder) PRP 1E1 500 (set the PID to 500 (assumes 500 is different from the currently configured PID).

PID Ranges

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

Tables Menu

The following diagram represents the structure of the **Tables** Menu of the Adtec mediaHub HD 422:

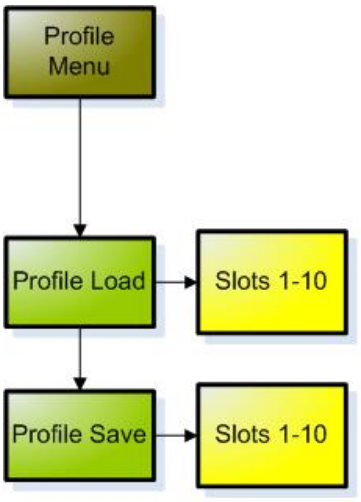


Definitions

Item	Function	Options	Adtec API Command
Tables On	designates type of tables to be used	DVB MPEG ATSC	*.ECMD TON 0 = DVB 1 = MPEG 2= ATSC
VBI Source (VBS)	selects the source of Vertical Blanking Interval spacing	Composite SDI	refer to Help Notes in the web control application
Closed Caption	activates (or deactivates) closed-captioning and specifies closed-captioning standard to be used	Off DVS157 ASTC ASTC708 ASTCConvert	*.ECMD CLC [option] 0 = Off 1 = ASTC mode 2 = ASTC708 mode 4 = ASTCConvert mode note:In std-def, all modes apply. In hi-def, for EIA-708 closed caption insertion, set to ATSC.
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	*.ECMD SNA [name]

Profile Menu

The following diagram represents the structure of the **Profile** Menu of the Adtec mediaHub HD 422:



To Navigate:

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Go up one menu level: ESCAPE

Expand a menu: SELECT

To Edit:

Enter edit mode: SELECT

Move cursor in editable fields:

^ v < >

Save and leave edit mode: ENTER

Leave edit mode w/out save: ESCAPE

Usage

- The Profile Menu can be used to store and access up to ten stored configurations (profiles).
- The meduiaHub HD 422 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 422. They are:

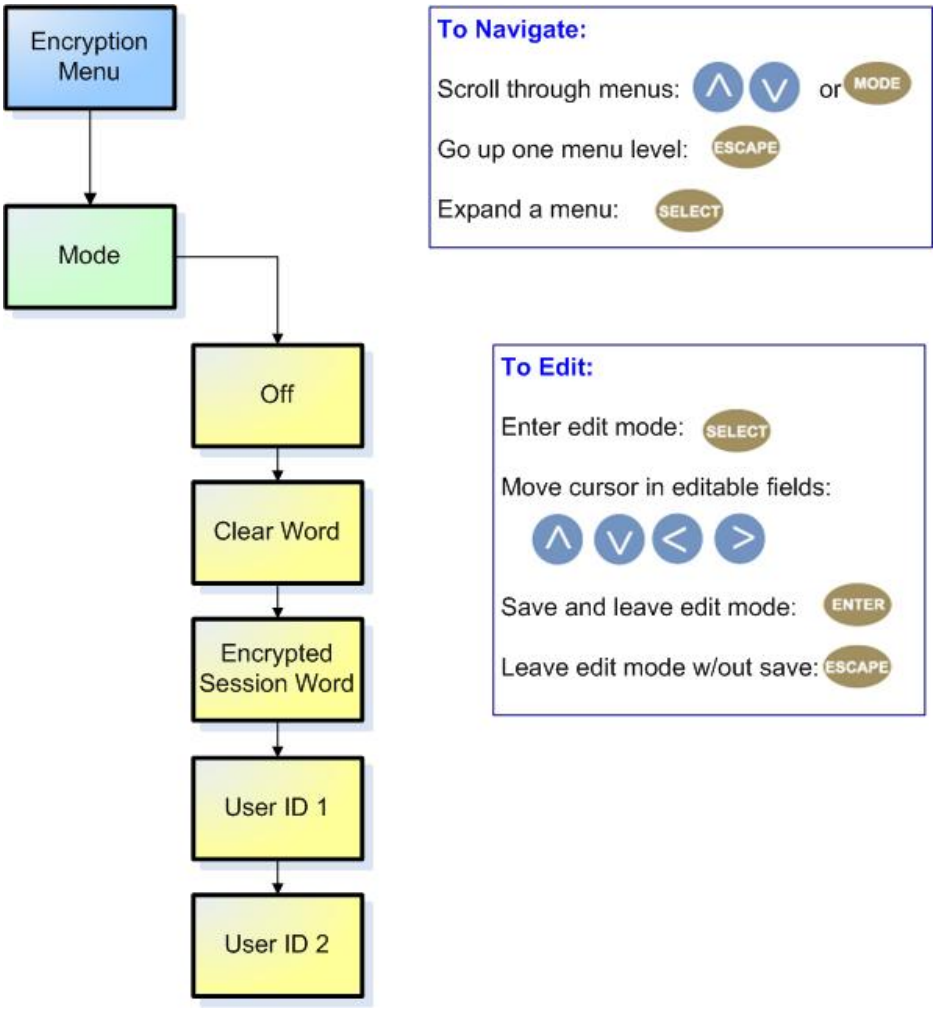
Command Handler	Command	Function
*.ECMD PROFILE	LIST	lists all stored profiles
*.ECMD PROFILE	[slot #] or [name] LOAD	loads stored profile from the designated memory slot
*.ECMD PROFILE	[slot #] SAVE	saves a profile to the designated memory slot
*.ECMD PROFILE	[slot #] DELETE	deletes the profile stored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

The following diagram represents the structure of the **Encryption** Menu of the Adtec mediaHUB HD 422:



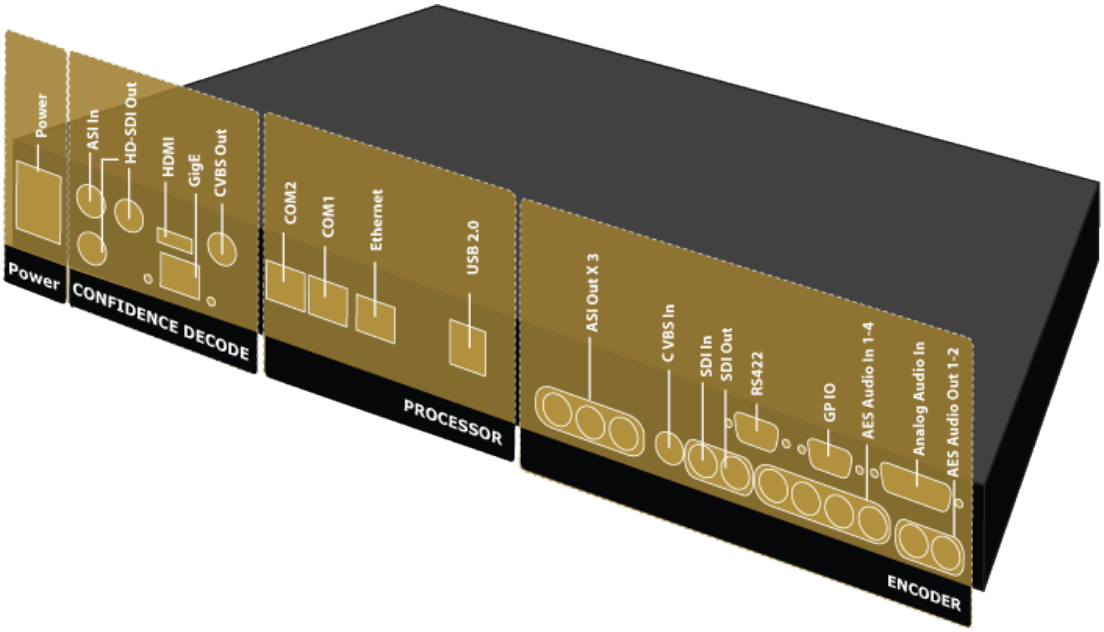
Definitions:

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

Hardware and Communications Connectors



Power	Specification
AC Power	Standard 3 pin computer power plug (Auto range 70-240 VAC Input)
Confidence Decode	**Specification**
ASI Input	188 Byte MPEG2 Transport input
SDI Output	HD and SD User-defined resolutions
HDMI Output	HD and SD User-defined resolutions
Analog Video Output	(Composite) SD only. NTSC and PAL
Gigabit Ethernet	MPEG2 Transport Stream via UDP/RTP or FTP file transfer or SMB mount
Processor	**Specification**
COM2	RS232 Control
COM1	RS232 Terminal
Ethernet	Ethernet 10/100 management
USB 2.0	Not currently supported
Encoder	**Specification**
ASI Outputs 1,2,3	3 mirrored 188 Byte MPEG2 Transport Out up to 211 Mbs
Analog Video	Input SD Only
HD/SDI Input	Auto sensing 270MB/1.4GB/3.0GB
HD/SDI Output	3G-reclocked
Encoder RS422	Connect to media source.9-pin master or slave mode for Sony Protocol control.
AES3 Digital Audio Input 1-4	Compressed or uncompressed terminating (75 Ohm) digital audio inputs.
GPI IO Tally	Parallel IO interface for Start, Stop, Status, Alarm, and general purpose interfacing to control systems.
Analog Audio 1,2	Analog Balanced (600 Ohm) audio input. Stereo pairs (ch1 and ch2)
AES3 Digital Audio Output 1-2	Compressed or uncompressed terminating (75 Ohm) digital audio outputs.
SDI In	75 Ohm terminated Input, Video & Audio (SMPTE-259M for SD and SMPTE-292M for HD) BNC
SDI Out	75 Ohm re-clocked source matched to Input Signal

Connecting to the mediaHUB HD 422

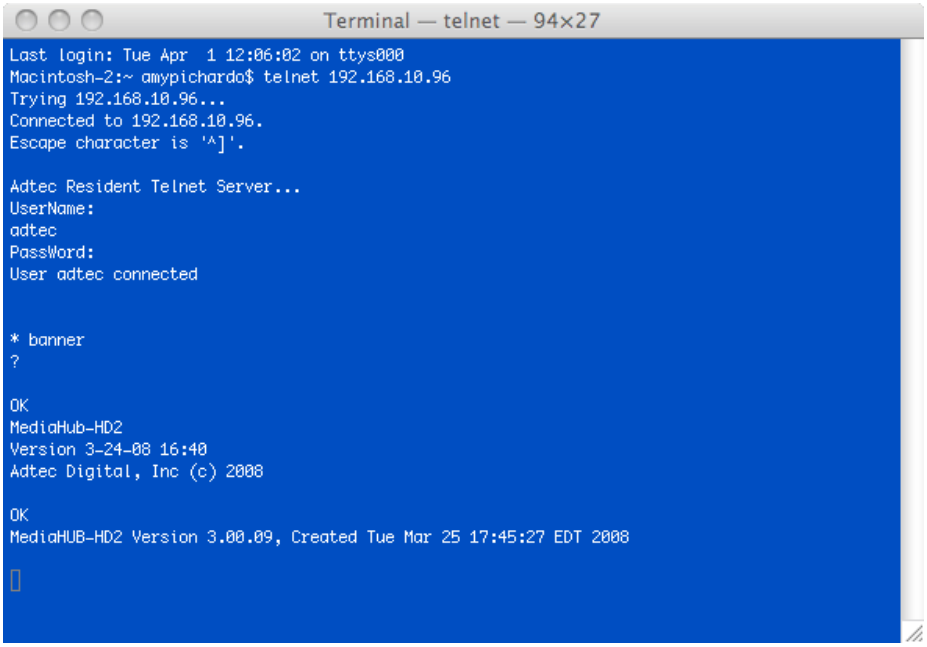
Using Telnet (standard 23 port)

To connect to your mediaHUB-HD 422 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 422 there are specific commands for the encoder as well as specific commands for the decoder. Each has a unique way of accepting commands. If using telnet is your preferred method of communication to the mediaHUB-HD 422, 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 mediaHUB-HD 422.

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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Introduction to the Control Application

A web-based command and control (C&C) software application comes pre-installed on the mediaHub HD 422. Online updates will be available when future versions of this software is released along with product firmware.

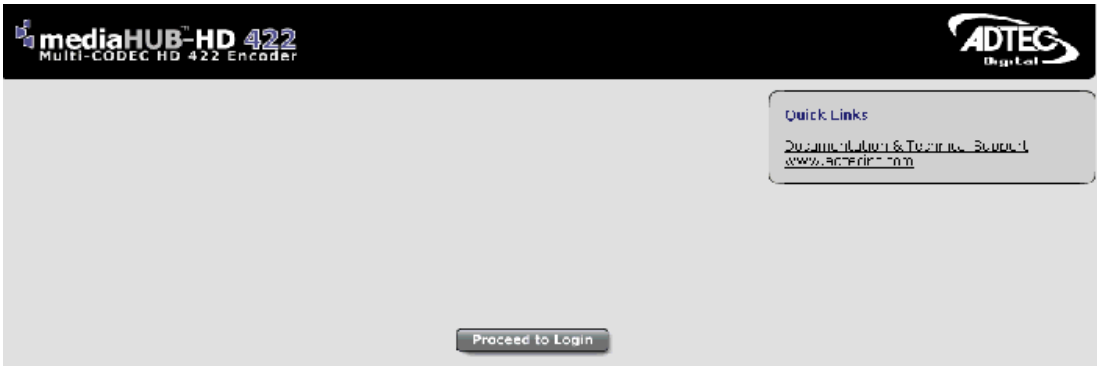
- Firefox: 3.0 (recommended)
- MS Internet Explorer: 7.0 and higher
- Safari: 3.0 and higher
- Opera: 9.0 and higher

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:



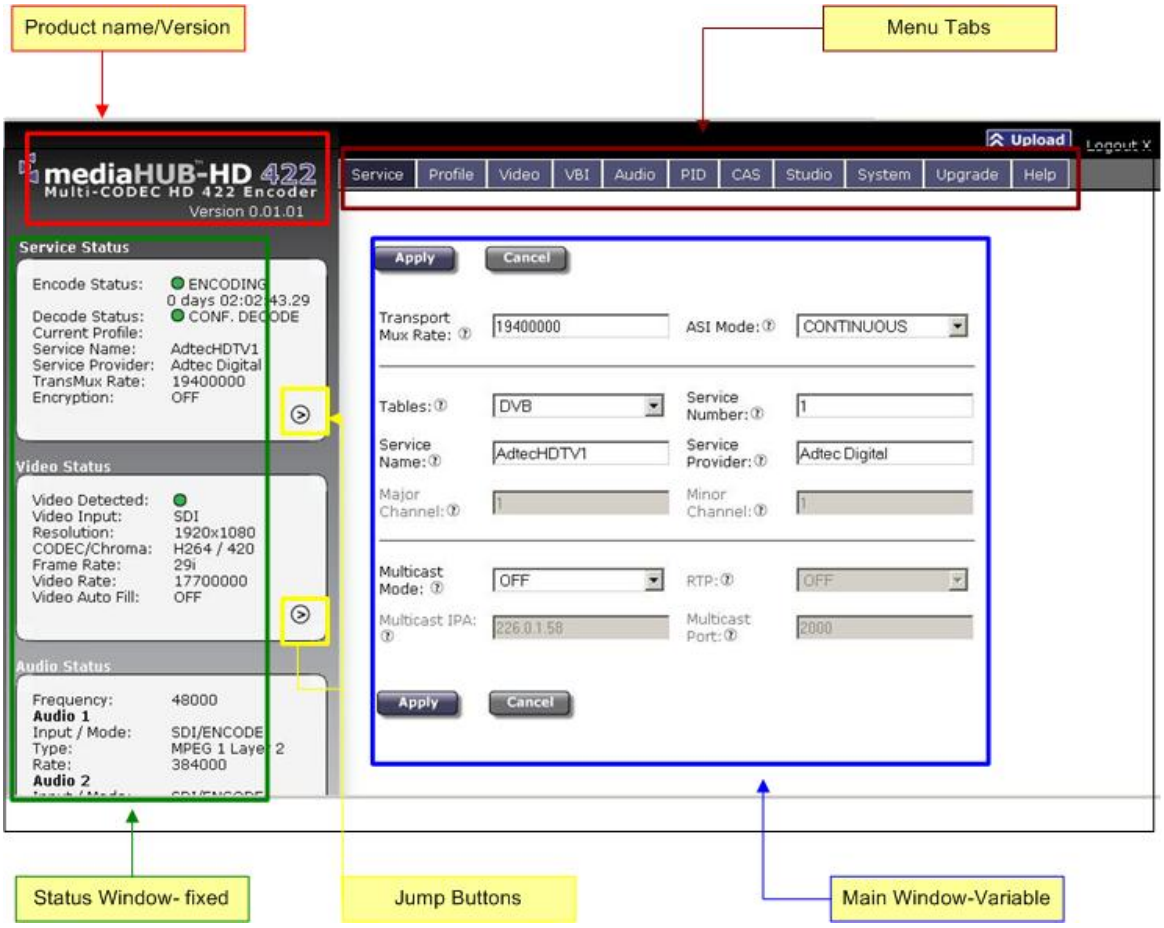
Links to the unit's Release Notes and a link to Adtec's Technical Support contact page are also located on this screen.

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 Window: the Status Window 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 Window is covered in a later section of this manual. The Status Window also features "Jump Buttons" that serve as a second way to access associated Menu Tabs.

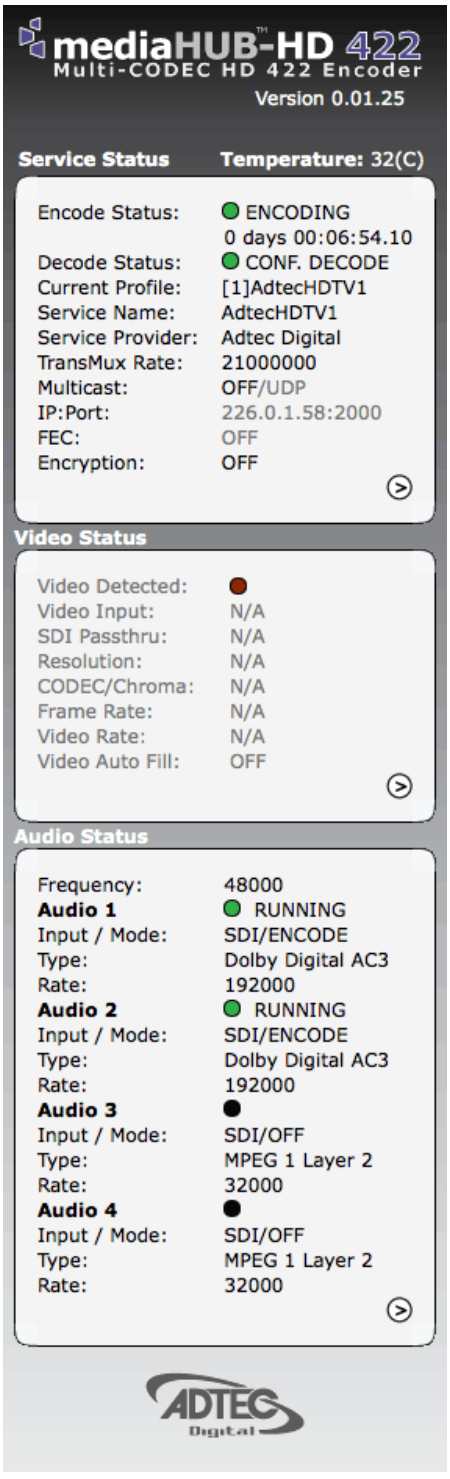
Main Window: the Main Window is used to access the device's controls and operating settings. The **Main Menu Tabs** determine which function is being controlled in the Main Window. Each Main Menu Tab is covered in more detail in further sections of this manual.

Important Note for mediaControl Users

Adtec's mediaControl software interface is **not supported** on the mediaHub HD 422's firmware and will not interface with the unit at all.

The Status Window

The Status Window is a fixed component of the Command and Control interface- it constantly displays a summary of the mediaHUB-HD 422's current activity level regardless of which tab is selected in the Main Window.



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").
- The small buttons in the lower right corner of each Status Display are a quick-jump feature.

API Cross-Reference

The Status indicators displayed on the Status Window 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 TR
Decode Status	*.DCMD TR
Service Name	*.ECMD SNA
Service Provider	*.ECMD SPR
TransMux Rate	*.ECMD TMR
Multicast	*.ECMD MMO
IP:Port:	*.ECMD MSI and *.ECMD MSP
FEC	*.ECMD FEP
Encryption	*.ECMD ECR

Video Status

Indicator	API Command
Video Detected	*.ECMD VDE
Video Input	*.DCMD VID
SDI Passthru	*.ECMD SPT
Resolution	*.ECMD QV1
Codec/Chroma	*.ECMD CHT
Frame Rate	Part of *.ECMD QV1
Video Rate	*.ECMD VRT

Audio Status

Indicator	API Command
Frequency	*.ECMD ASF
Audio 1 Input	*.ECMD AIN 0
Audio 1 Mode	*.ECMD AMO 0
Audio 1 Type	*.ECMD AMO 0
Audio 1 Rate	*.ECMD AMO 0
Audio 2 Input	*.ECMD AIN 1
Audio 2 Mode	*.ECMD AMO 1
Audio 2 Type	*.ECMD AMO 1
Audio 2 Rate	*.ECMD AMO 1
Audio 3 Input	*.ECMD AIN 2
Audio 3 Mode	*.ECMD AMO 2

Audio 3 Type	*.ECMD AMO 2
Audio 3 Rate	*.ECMD AMO 2
Audio 4 Input	*.ECMD AIN 3
Audio 4 Mode	*.ECMD AMO 3
Audio 4 Type	*.ECMD AMO 3
Audio 4 Rate	*.ECMD AMO 3

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The Service Tab

The **Service Tab** is used to set and view configuration options related to transmitting and capture rules. The Service tab is divided into 3 sub-tabs:

- ASI Transport
- IP Transport
- Bars, Tones, and ID

ASI Transport

Screenshot

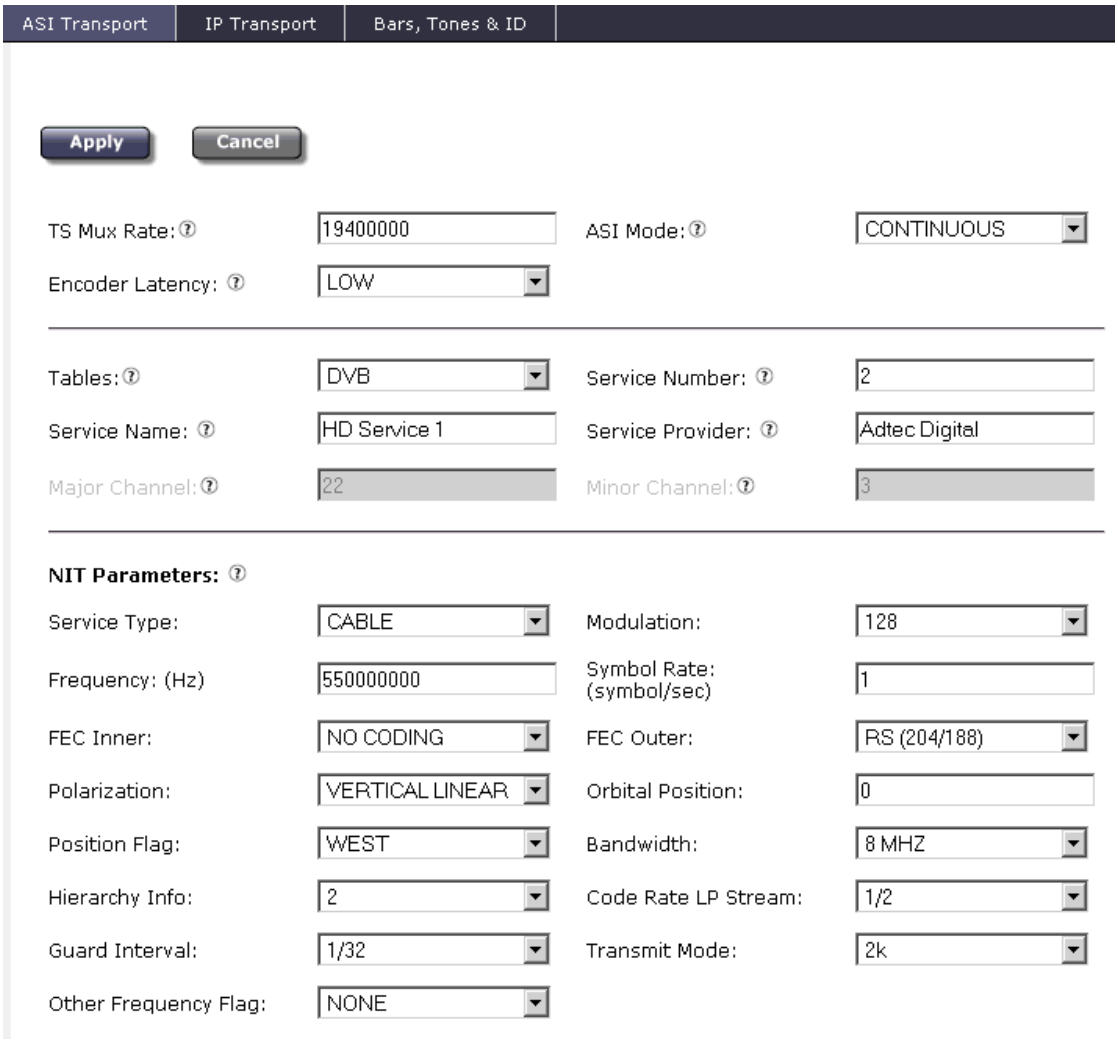

Image reduced for clarity

Controls

Control	Function	Options	API Command
TS Mux Rate	desired egress rate of the bitstream in bits per second max is 100,000,000 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]
Encoder Latency	Encoder Latency offers the capability to adjust the latency. It is dependent upon the video rate, frame size/rate (NTSC,PAL,HIGH-DEF) and GOP structure. Options are: NORMAL: Should be used for distribution and standard contribution transmissions. Latency is approximately 1/2 second. LOW: Latency is approximately 3 frames less than NORMAL. VERYLOW: Latency is approximately 5 frames less than NORMAL. Use IP GOP Structure with TT 1260.	Normal Low Very Low Long	*.ECMD ELA
Tables	table format for the stream	DVB = [0] MPEG =[1] ATSC = [2]	*.ECMD TON [var]
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; 20-character limit (incl. spaces)	*.ECMD PNU
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
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
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; 0-999	*.ECMD MAJ
Minor Channel	Minor 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; 0-999	*. ECMD MIN

NIT Parameters- specify options for the Network Information Table.

Control	Function	Options	API Command
Service Type	type of network carrier	Cable Satelllite Terrestrial	*.ECMD NPR
Modulation	type of modulation being applied Service Type is **cable**: 16, 32, 64, 128, 256 Service Type is **satellite**: QPSK Service Type is **terrestrial**: QPSK, 16QAM, 64QAM	see at left	*.ECMD NPR
Frequency	frequency of the signal measured in Hertz (Hz.)	text field	*.ECMD NPR
Symbol Rate	gross bit rate of the signal measured in Symbols per Second (symbols/sec.)	text field	*.ECMD NPR
FEC Inner	Forward Error Correction; extra data added to the inner 'edge' of the packet that can be used to detect errors on the receiving end	1/2 3/4 5/6 7/8 8/9 No Coding	*.ECMD NPR
FEC Outer	Forward Error Correction; extra data added to the outer 'edge' of the packet that can be used to detect errors on the receiving end	1/2 3/4 5/6 7/8 8/9 No Coding	*.ECMD NPR
Polarization	orientation of the transmitter that will send the encoded packet	Horizontal Linear Vertical Linear Left Circular Right Circular	*.ECMD NPR
Orbital Position	orbital position of a receiving satellite	text field	*.ECMD NPR
Position Flag	designates if the receiving satellite is in the eastern or western phase of its orbit	East West	*.ECMD NPR
Bandwidth	measure of the volume of information contained in the packet in megaHertz	8 MHZ 7 MHZ 6 MHZ	*.ECMD NPR
Hierarchy Info	specifies if the transmission is hierarchical	None 1 2 3 4	*.ECMD NPR
Code Rate LP Stream	Low Priority Code Rate	1/2 3/4 5/6 7/8	*.ECMD NPR
Guard Interval	time intervals used to maintain the "distinctness" of transmissions such as packets in a bitstream. Expressed as fractions of a symbol period. 1/32 = lowest protection/highest data rate; 1/4 = highest protection/lowest data rate.	1/32 1/16 1/8 1/4	*.ECMD NPR
Transmit Mode	specifies number of carriers in an OFDM frame	2k 8k	*.ECMD NPR
	indicates whether other frequencies are in use		

Other Frequency Flag		None 1 or more	*.ECMD NPR

Screenshot

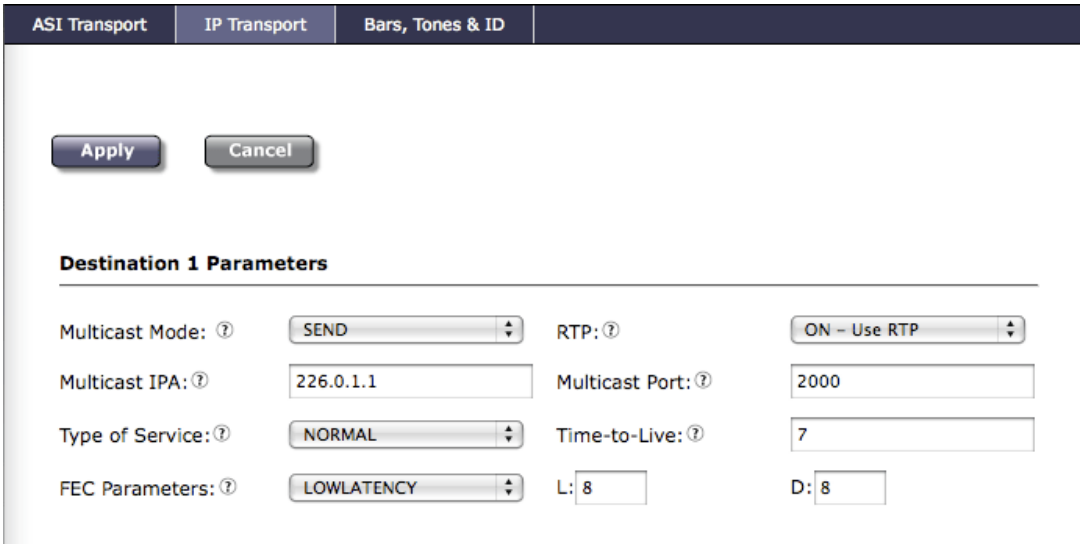

Image reduced for clarity

The IP Transport sub-tab has four (4) menus (labelled Destination 1 through 4) to allow for the configuration of the four possible multicast or unicast streams. All four menus feature the same controls.

Controls

Control	Function	Options	API Command
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]
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 IPA	set the multicast send group Internet Protocol Address Control is editable if Multicast Mode is set to 'Send'.	text field (hexadecimal)	*.ECMD MSI
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
Type of Service	used to select the type of multicast that will forward the packet	Normal Minimize Cost Maximize Reliability Maximize Throughput Minimize Delay	*.ECMD TOS
Time-to-Live	specify the number of iterations or transmissions the packet can undergo before it is discarded	text field	*.ECMD TTL
FEC Parameters	Forward Error 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

Note: this IP configuration menu repeats for the other three possible multicast or unicast streams.

Screenshot

Image reduced for clarity

Controls

Radio buttons select the type of display desired (see illustrations).

Note: A valid video input must be present in order to use Bars, Tones, and ID. At a glance, the "Video Detected" indicator on the Status Panel will alert you to the presence of a valid video input.

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The Profile Tab

The **Profile Tab** allows you to save specific encoder configurations on your mediaHub HD 422, enabling you to quickly and easily reconfigure the device for different transport and playout requirements. The mediaHub HD 422 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>.**

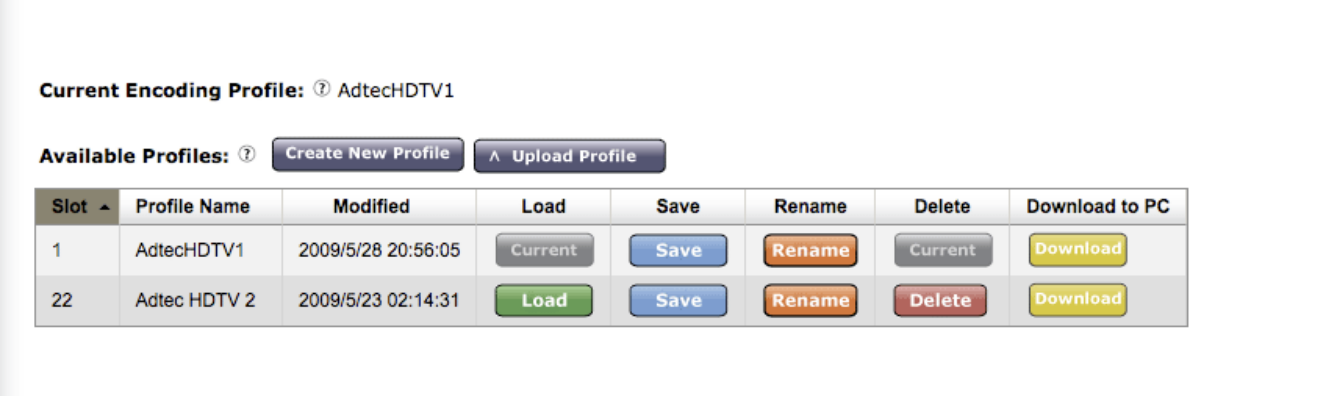

Image reduced for clarity

Control	Function	Options
Create New Profile	defines and saves new Profiles into the selected available memory slot	Virtual button
Upload	moves a valid file from your desktop to the unit; when upload is complete, the uploaded file and all of its configuaration settings become the active profile. It must be saved as a 'New Profile' or overwritten onto an exisitng profile slot in order to be retained.	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
Download 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 unit will apply all the settings associated with that Profile.

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The Video Tab

The Video Tab is used to precisely control the parameters of the video being decoded by the mediaHub HD 422. The controls on this tab are divided into 4 groups: General Settings, Standard Definition Only, AVC Only, and Confidence Decode.

General Settings

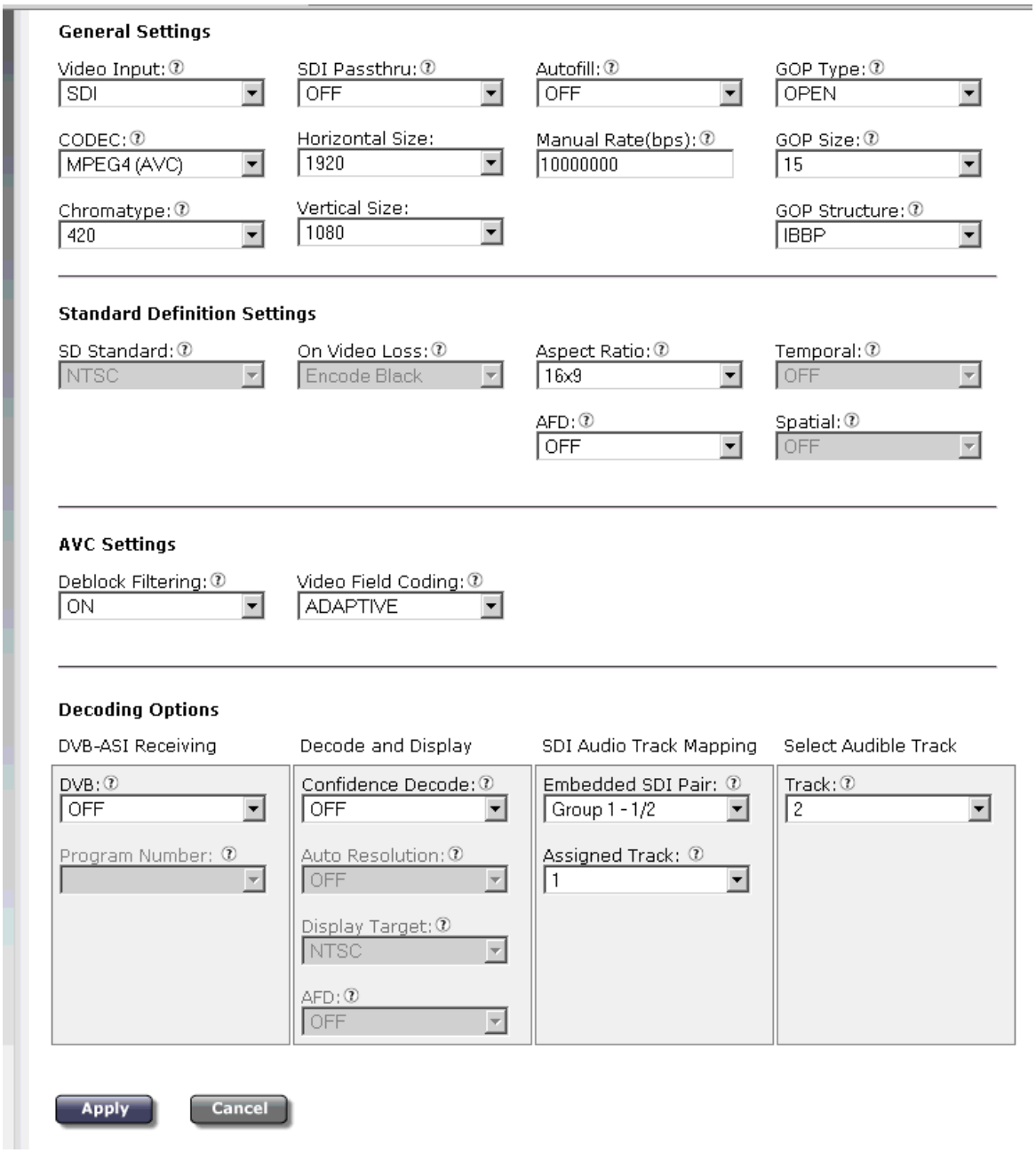

Image reduced for clarity

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]

SDI Passthru	provides a re-clocked SDI loop for the encoder	Off = 0 On = 1	*.ECMD SPT
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]
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]
CODEC	CODEC is the type of video compression used during encode.	MPEG 2 MPEG4/AVC	*.ECMD VEN
Video Size- Horizontal	horizontal pixel resolution. Auto-detected for SDI signals.	varies by encode mode	*.ECMD HSI
Manual Bit Rate (Mbs/sec)	rate at which bits are streamed ; only available if AutoFill is set to 'Off'.	**Standard Definition** encoding mode: (input is composite video, or SDI auto-detected at standard definition)700kb - 100mb bits/sec **High Definition** encoding mode: (SDI input only and auto-detected as 720p or 1080i)7000000 - 60000000 bits/sec	*.ECMD VRT
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]
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 = 0 422 = 1	*.ECMD CHT
Video Size- Vertical	vertical pixel resolution. Auto-detected for SDI signals.	varies by encode mode	*. ECMD VSI
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]

Standard Definition Only Settings

Controls:

Control	Function	Options	API Command
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	*.ECMD VID
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.	Stop = 0 Black = 1	*.ECMD RVD

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
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]
AFD	Active Format Descriptor; data that can be sent in a MPEG video stream that provides information about the aspect ratio and picture characteristics within the stream	see drop-down in UI	*.ECMD AFD
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]

AVC Only Settings

Controls:

Control	Function	Options	API Command
Deblock Filtering	Deblock Filtering aims to improve the appearance of decoded pictures by smoothing the sharp edges and only applies when encoding MPEG 4 / AVC.	Off =0 On=1	*.ECMD DBF
Video Field Coding	Video Field Coding designates the type of interlaced-scan video coding used during encoding.	-Field mode coding (PAFF) -Frame mode coding (MBAFF) -Adaptive field/frame mode coding (PAFF/MBAFF)	*.ECMD VFC

Confidence Decode

Controls:

Control	Function	Options	API Command
DVB	select function for decoder; receive or ignore DVB	Off Receive	*.DCMD DPN
Program Number	program identification of the number of programs embedded in the incoming DVB-ASI stream	none, receives from stream; display only	none
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 Confidence Decode DVB-ASI	**Confidence Decode:** *.ECMD CDE **DVB-ASI:** *.DCMD DVB
Auto Resolution	Auto Resolution refers to the current decoder 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	Decoder Active Format Descriptors can be turned on and off .If ON, the decoder will read the Active Format Description in the encoded stream periodically and modify the format of the output to match the AFD settings. If the output is analog (NTSC, PAL, etc), WSS will be inserted to signal the receiver with the AFD setting. NOTE: Turning this setting on will force the OUTPUTASPECTRATIO OAR for the decoder off.	Off On	*.ECMD AFD

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:

- **Using RVD:** when using RVD, best results will be obtained by using RVD with **Composite** input.
    - ♦ SDI Input results with RVD vary.
- If **Video Autofill** is on, bitrate will be automatically calculated, and is not editable by the user in that case.
- The video rate designated on this panel is **inclusive** of the video payload and 1% (roughly) overhead buffer.
    - ♦ Note that when encoding to file, the file registration system will only report back the video payload rate.
        - ◊ **Example:** if the video rate is set to 15, the video rate detected for the file will be less than 15. (Ex. 14.60)
- **I-Frame Only Encoding:** at any given bitrate (fixed), video quality will be greatly degraded with I-frame only encoding. The table below gives a relative idea of the video quality that can be expected with different GOP types.

GOP Type	Relative Video Quality
IBBP	Highest
IBP	Medium
IP	Low
I	Poor

The VBI Tab

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

The tab's controls are grouped into two sub-tabs: **Captions** and **Teletext**.

Captions

Screenshot:

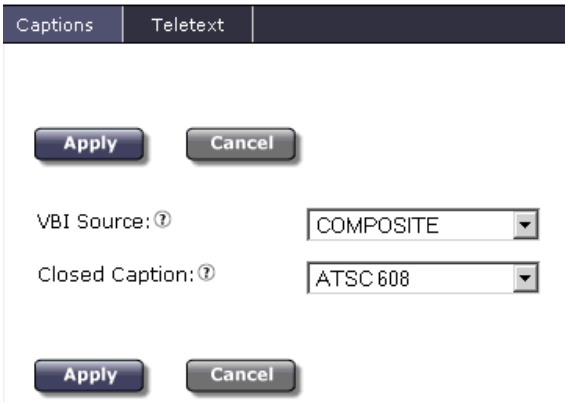

Image reduced for clarity

Controls

Control	Function	Options	API Command
VBI Source	selects input source for VBI data	Composite SDI	*.ECMD VBS
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.	608 708 608->708 DVS157	*.ECMD CLC [selection]

Teletext

Screenshot:

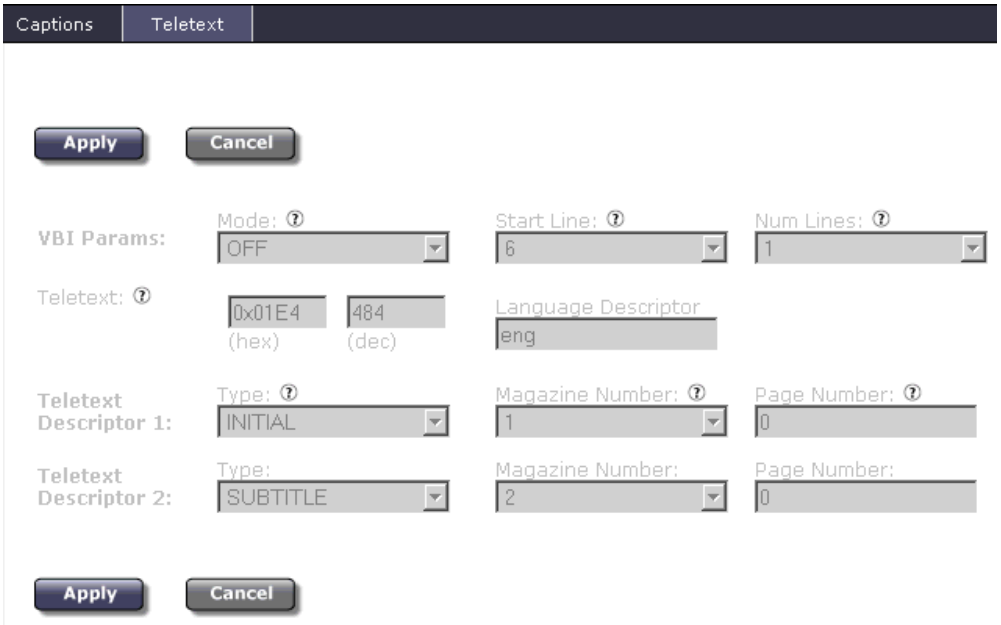

Image reduced for clarity

Controls

Control	Function	Options	API Command
VBI Mode	switches feature off or selects type of service	Off = 0 Eurotext = 1	*.ECMD VBP [mode]
VBI Start Line	designates first line for Teletext content within the Vertical Blanking Interval	6 - 22	*.ECMD VBP
VBNI Num Lines	total number of lines of Teletext	1 - 16	*.ECMD VBP
Teletext	Teletext PID refers to the PID used for defining teletext data and descriptors. It is enabled when standard definition PAL encoding.	user-defined hexadecimal	*.ECMD TXD
Language Descriptor	identifies language Teletext will display in. Auto-populates from PID	Auto-populates	none
Teletext Descriptor-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 TXD
Magazine Number	Teletext reference control repeats for Teletext 2	0-7	*.ECMD TXD
Page Number	Teletext reference control repeats for Teletext 2	0-225	*.ECMD TXD

There are two sets of Teletext Descriptor controls. The function of each is identical.

The Audio Tab

The Audio Tab allows precision control over the Audio performance of the mediaHub HD 422. For ease of reference, the Audio Tab's controls are divided among several sub-tabs. Each will be described in detail.

Audio Global Tab

The Audio Global tab features two settings which apply across the selected audio groups.

Screenshot:

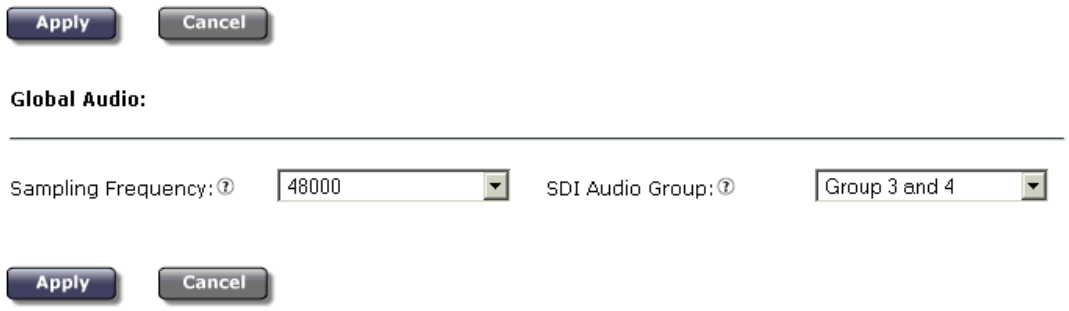

Image reduced for clarity.

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 ; setting selected applies to all audio inputs	32000 44100 48000	*.ECMD ASF [freq]
SDI Audio Group	sets the SDI audio group number (1-4) per SMPTE -272/299M; setting selected applies to all audio inputs. The mediaHub422 can extract two groups at the same time (of four available); each group is comprised of two channels with each channel being a stereo pair. See the reference table below for group and channel assignments.	Group 1 and 2 Group 3 and 4	*.ECMD AGN [group #]

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

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Audio Inputs 1 and 2

Audio Inputs 1 and 2 can encode Dolby Audio and can encode in passthru mode. The control options are the same for both inputs.

Screenshot:

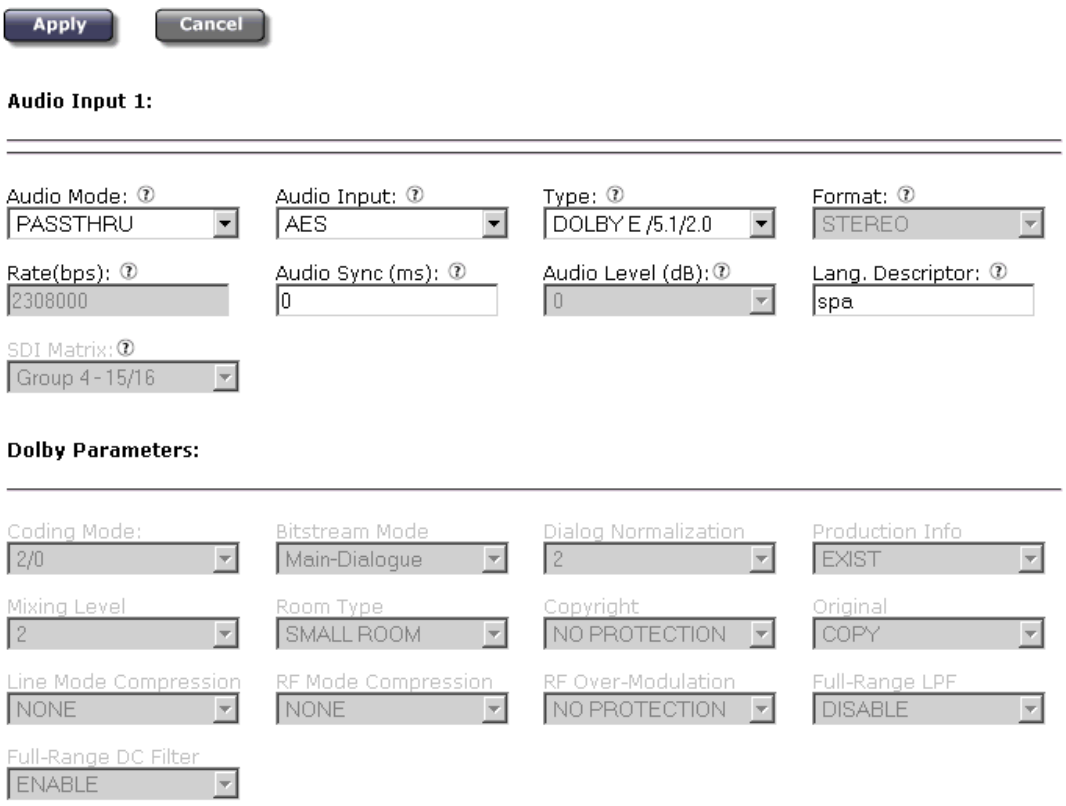

Image reduced for clarity.

Controls:

Control	Function	Options	API Command
Audio 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 (passthru),or the secondary audio can be set to off (*.ecmd SAS)	Encode = 0 Passthru = 1	*.ECMD AMO [mode][type][rate]
Audio Input	selects the type of incoming audio signal to be encoded. Available on in Encode Mode. In Passthru Mode, AES or SDI input can be selected.	Analog = 0 SDI = 1 AES = 3	*ECMD AIN [type]
Type	selects Dolby Digital or MPEG 1 Layer 2 as the audio type in Encode Mode. In Passthru Mode, unit defaults to Dolby E / 5.1 / 2.0 Type. In Passthru Mode, SDI Dolby E can be accepted. Linear PCM/E2 is only available with AES inputs, if selected, all associated specifications will auto-apply.	-Dolby Digital AC3 = 0 -MPEG 1 Layer 2 =2 Linear PCM/E2 = 3	*.ECMD AMO [mode][type][rate]
Format	MPEG mode; can be set for either Mono or Stereo. Available if using Encode Mode and MPEG 1 Layer 2 Type\.	0 = Mono 1= Stereo	*.ECMD MCM
Rate	define the rate in Encode Mode. When in Passthru Mode, the rate is handled by the unit.	text field; user-defined 64-640 kBits/sec avail	*.ECMD AMO [mode][type][rate]

Audio Sync (ms)	audio sync offset in milliseconds (ms) with an available range of -800 ms to +800 ms	text field; user-defined	*.ECMD AUS
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
Language Descriptor	3 characters available for describing language	text field; user-defined	*.ECMD LAO
SDI Audio Matrix	Per SMPTE 272/299M SDI supports embedded audio Groups 1, 2, 3, 4. This device can route channels from 2 Groups concurrently. 1 and 2 or 3 and 4. Each group has 2 channels and each channel is a stereo pair. Fpr example, Group 1 3/4 can be routed to any of the 4 audio encoders.	Group 1 1/2 Group 1 3/4 Group 2 5/6 Group 2 7/8	*ECMD SMX

Dolby Parameters

Control	Function	Options	API Command
Coding Mode	indicates which of the main service channels are in use and controls channel ordering; analog to the 3-bit 'acmod' code.	0 = N/A 1 = 1/0 (C channel) 2 = 2/0 (L and R channels)	*.ECMD DPA [mode]
Bitstream Mode	type of service the bitstream conveys; analog to the 3-bit 'bsmod' code.	0= Main 1 = Main-Dialogue 2 = Assoc-Visually Impaired 3 = Assoc-Hearing Impaired 4 = Assoc-Dialog 5 = Assoc-Commentary 6 = Assoc-Emergency Flash 7 = Assoc-VoiceOver 8 = Main-Karaoke (where "Assoc" is "Associated Service")	*.ECMD DPA [mode]
Dialog Normalization	"levels out" volume (loudness) levels when audio from different sources is combined and reproduced, by using a subjective standard for loudness. Analog to the five-bit 'dialnorm' code. Value available indicates subjective volume in decibels below digital 100% the reproduced audio will exibit.	0-31	*.ECMD DPA [value]
Production Info	identifies if production information exists for the audio content, or does not	0 = does not exist 1 = exists	*.ECMD DPA [value]
Mixing Level	indicates absolute acoustic sound pressure level of an individual channel during the final audio mixing session; analog to the 'mixlevel' 5-bit code.	0-31	*.ECMD DPA [value]
Room Type	indicates the type and calibration of the mixing room used in the final audio mixing session; analog to the 2-bit 'roomtyp' code.	0 = not indicated 1 = large room 2 = small room 3 = rsvd	*.ECMD DPA [option]
Copyright	identifies the audio content as protected by copyright or not protected	0 = not copyright protected 1 = copyright protected	*.ECMD DPA [option]
Original	identifies the audio bitstream as original or a copy	0 = copy of an original bitstream 1 = original bitstream	*.ECMD DPA [option]
Line Mode Compression	designates preset compression for for line-mode decoding	0 = None (custom) 1 = Film Std 2 = Film Light 3 = Music Std	*.ECMD DPA [value]

		4 = Music Light 5 = Speech 6 = Rsvd 7 = Rsvd	
RF Mode Compression	designates preset compression for for RF-mode decoding	0 = None (custom) 1 = Film Std 2 = Film Light 3 = Music Std 4 = Music Light 5 = Speech 6 = Rsvd 7 = Rsvd	*.ECMD DPA [value]
RF Over-Modulation	on/off switch; feature protects against over-modulation when signal is decoded and then modulated onto an RF carrier	0 = disable protection 1 = enable protection	*.ECMD DPA [option]
Full-Range LPF	on/off switch; when selected, this control invokes a 120 Hz. lowpass filter to the LPF channel before beginning Dolby encoding	0 = disable 1 = enable	*.ECMD DPA [option]
Full-Range DC Filter	on/off switch; when selected, this control invokes a DC-blocking 3Hz highpass filter before beginning Dolby encoding	0 = disable 1 = enable	*.ECMD DPA [option]

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Audio Inputs 3 and 4

Audio Inputs 3 and 4 are **not** capable of PASSTHRU MODE; they can only encode MPEG1 Layer 2. They also cannot encode Dolby Audio. The control options are the same for both inputs.

Screenshot:

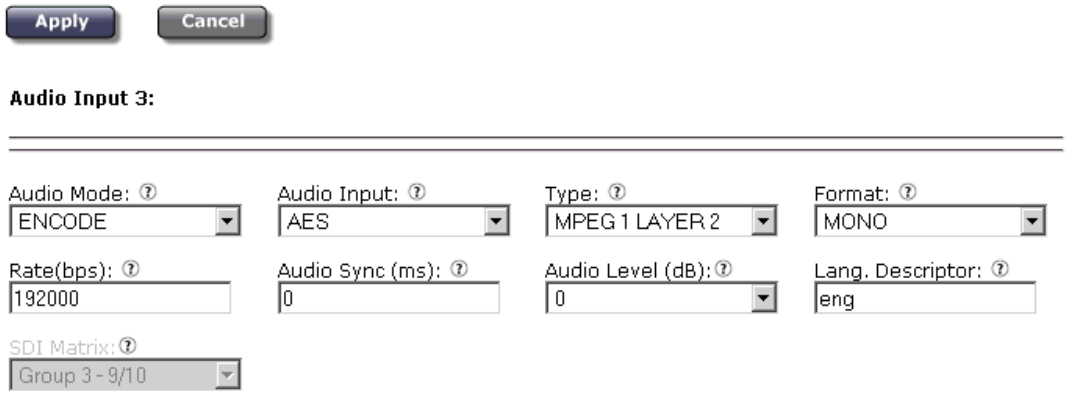

Image reduced for clarity.

Controls:

Control	Function	Options	API Command
Audio Mode	sets the unit to either use the on-board DSP's to perform audio compression (encodeor the secondary audio can be set to off (*.ecmd SAS)	Encode = 0	*.ECMD AMO [mode][type][rate]
Audio Input	selects the type of incoming audio signal to be encoded. Available on in Encode Mode.	Analog = 0 SDI = 1 AES = 3	*ECMD AIN [type]
Type	selects the audio type in Encode Mode. Linear PCM/E2 is only available with AES inputs, if selected, all associated specifications will auto-apply.	MPEG 1 Layer 2 =2 Linear PCM/E2 = 3	*.ECMD AMO [mode][type][rate]
Format	MPEG mode; can be set for either Mono or Stereo. Available if using Encode Mode and MPEG 1 Layer 2 Type\.	0 = Mono 1= Stereo	*.ECMD MCM
Rate	define the rate in Encode Mode.	text field; user-defined 64-640 kBits/sec avail	*.ECMD AMO [mode][type][rate]
Audio Sync (ms)	audio sync offset in milliseconds (ms) with an available range of -800 ms to +800 ms	text field; user-defined	*.ECMD AUS
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
Language Descriptor	3 characters available for describing language	text field; user-defined	*.ECMD LAO
SDI Audio Matrix	Per SMPTE 272/299M SDI supports embedded audio Groups 1, 2, 3, 4. This device can route channels from 2 Groups concurrently. 1 and 2 or 3 and 4. Each group has 2 channels and each channel is a stereo pair. Fpr example, Group 1 3/4 can be routed to any of the 4 audio encoders.	Group 1 1/2 Group 1 3/4 Group 2 5/6 Group 2 7/8	*ECMD SMX

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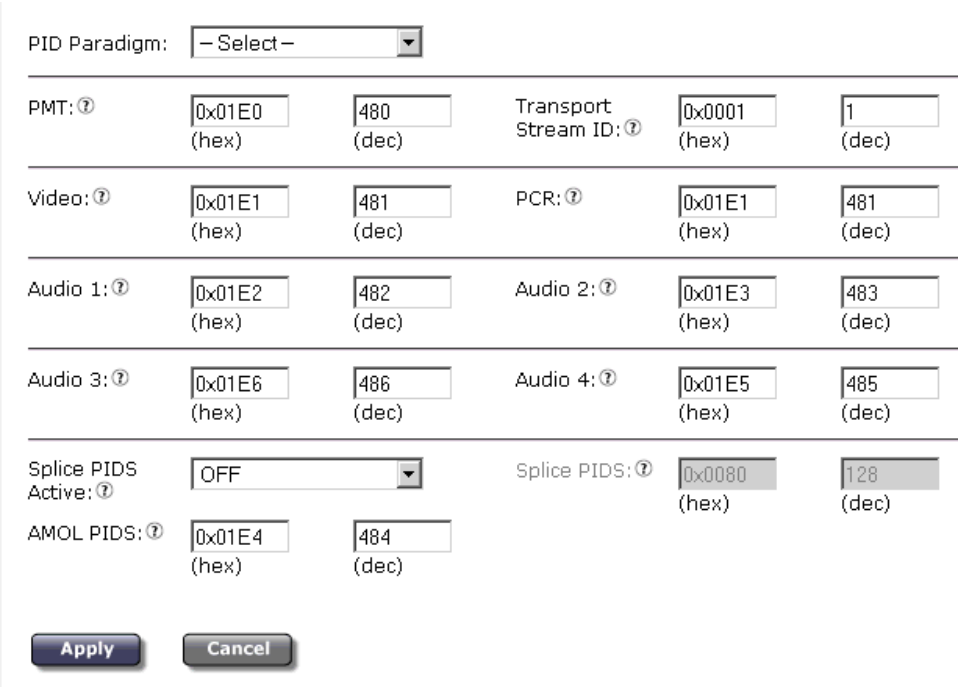
The PID Tab

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



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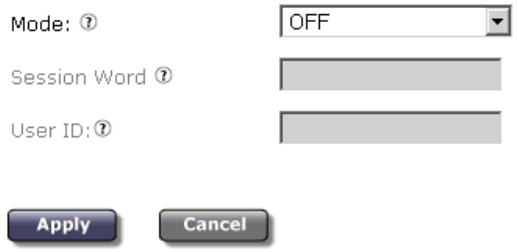
Controls

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 0
Audio 2	identifies packets which contain audio content for Channels 3 and 4	user-defined hexadecimal	*.ECMD API 1
Audio 3	identifies packets which contain audio content for Channels 5 and 6	user-defined hexadecimal	*.ECMD API 2
Audio 4	identifies packets which contain audio content for Channels 7 and 8	user-defined hexadecimal	*.ECMD API 3

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

The CAS Tab

The **CAS Tab** is used to control Conditional Access Services on the mediaHub HD 422.



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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 422).

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

Note: when encryption is **enabled**, Confidence Decode **will not** function.

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The Studio Tab

The Studio Tab will allow you to setup your mediaHUB-HD 422 for straight forward studio encoding, record from non-linear editors, crash recording or simple transmission control.

The Studio Tab has two sub-tabs, **Control** and **Inventory**.

The **Studio Control Tab** is organized into a "wizard" format to provide control flexibility depending on the Controller Interface the mediaHUB-HD 422 is running. The mediaHUB-HD 422 can utilize one of three Controller Interfaces: no interface, an RS422 cable, or an RS422-equipped device, such as a VTR.

API Equivalent: The API command which governs Controller Interface application is ***.ECMD CIF**.

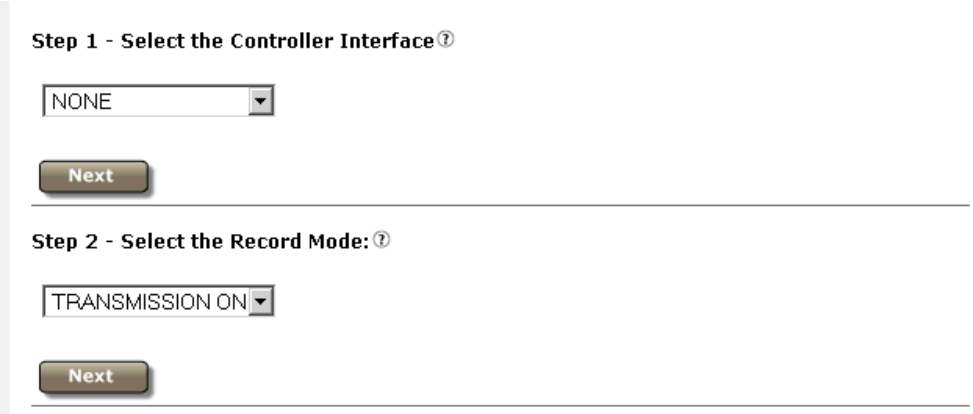
No Interface

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

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

Transmission Only

Screenshot (reduced for clarity) **:**



Capture to Drive

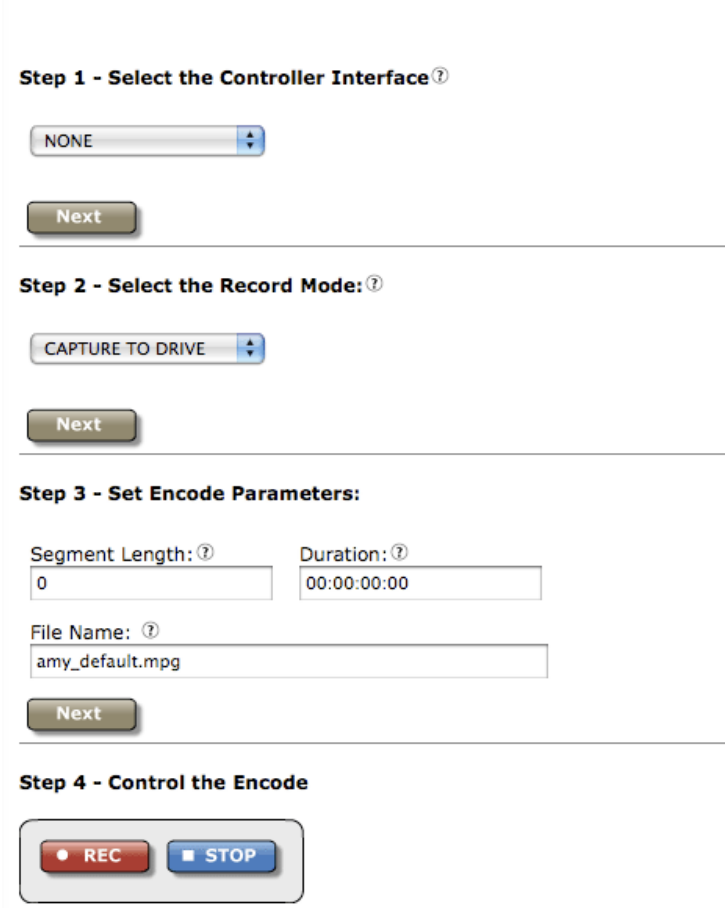
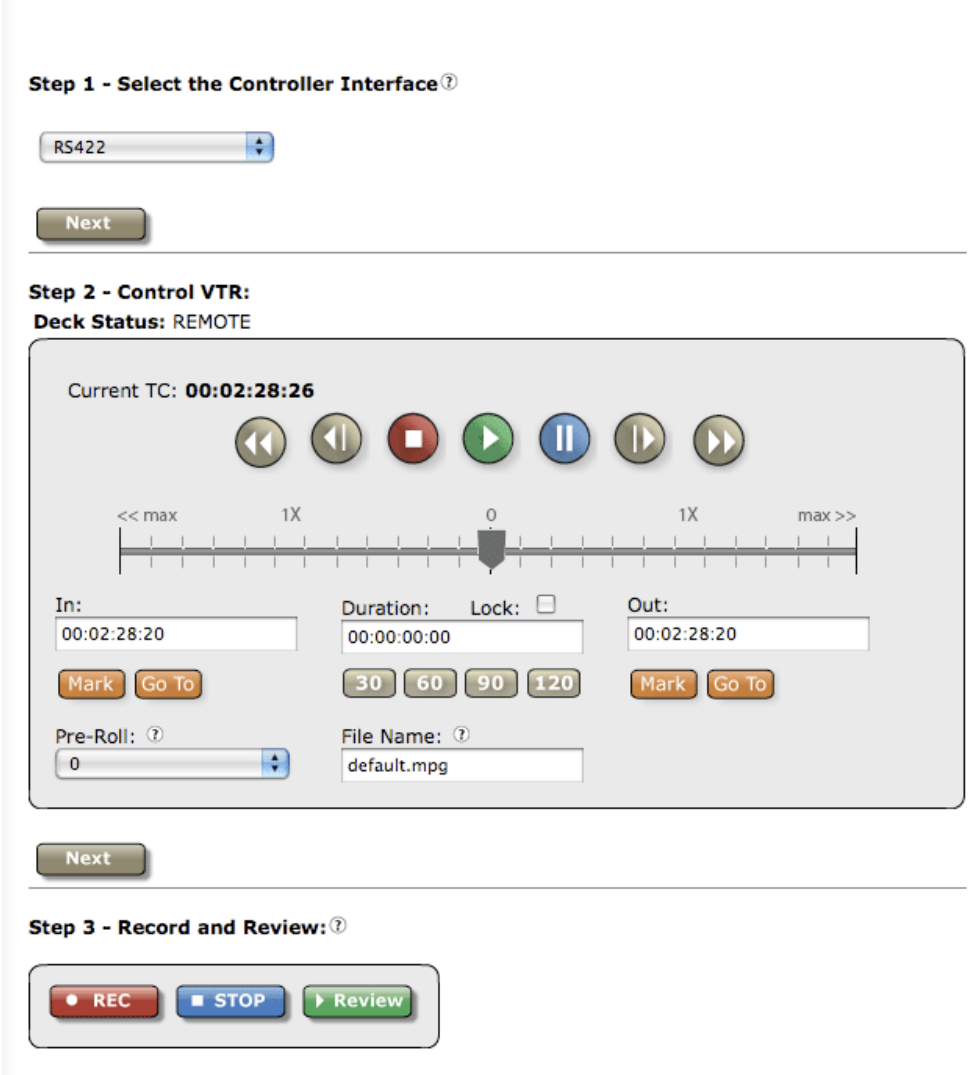


Image reduced for clarity

When **"Capture to Drive"** is selected, Step 3 will contain fields to define the segment length, segment duration, and file name. Step 4 consists of virtual controls for Record (encode) and Stop.

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 422 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 **<Apply>**.
2	Verify that your VTR is set to "Remote"; this will be reflected on the Studio Tab of the mediaHUB-HD 422 (see image below).
3	Set Pre-Roll as desired and click **<Apply>**.
4	Noting the Tape Counter on the Studio tab, locate and mark the Mark In location on the source tape and click **<Mark In>.**
5	Set the Duration for the encode; this can be done manually (type in the desired duration) or by using one of the virtualpresets.
6	Enter the file name for the video spot.
7	Click **<Record>**. The file will be stored on the mediaHUB-HD 422 at /media/hd0/media.

VTR Controls

The VTR panel controls are described in this table:

Control	Function	Options	API Command
Status	shows relationship of the mediaHUB-HD 422 to other devices	**No deck** - Controller Interface set to none **Remote** - VTR is set to Remote and	n/a

		mediaHUB-HD 422 can be used to control VTR **Local** - VTR can be used to control mediaHUB-HD 422 **RSS422Device** - "no deck" displays; non-linear editor device used to control the mediaHUB-HD 422	
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 422 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

The RS422 screen also contains a virtual control panel for **Record, Stop, 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]

Tables: when RS422 mode is selected, MPEG tables are the default tables used. However, other table formats are selectable.

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

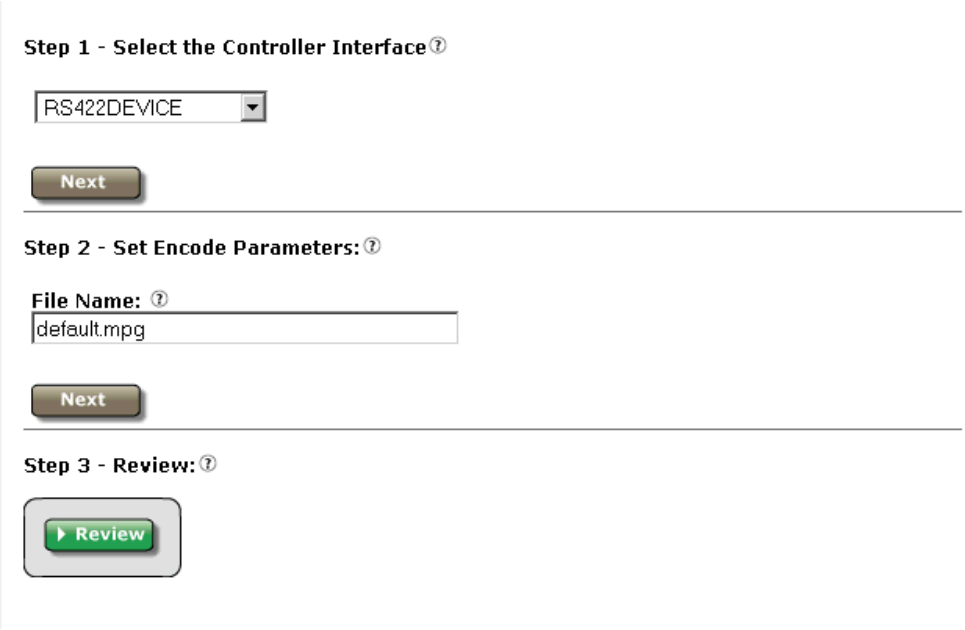
Reviewing Content

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 422 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;

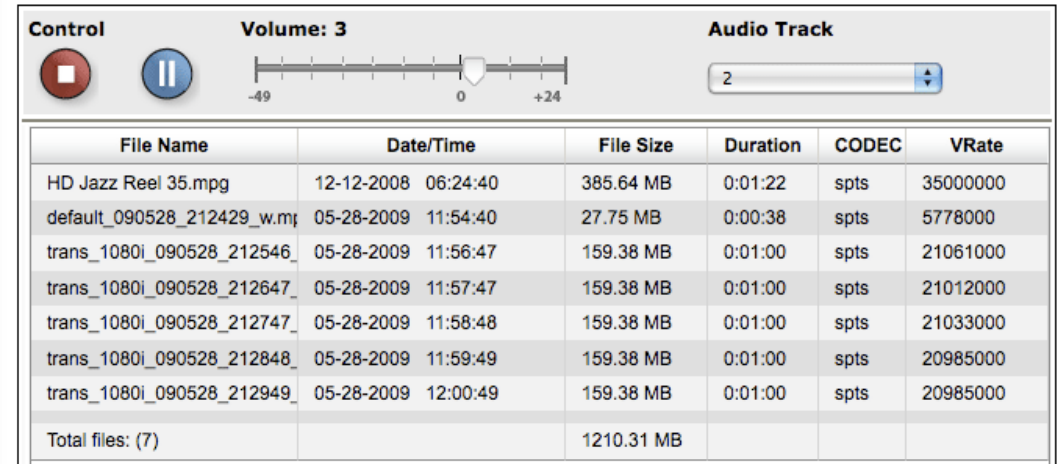


To Export from a Non-Linear Editor :

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 422's internal memory. To play a file, simply double-click it.



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 422'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.

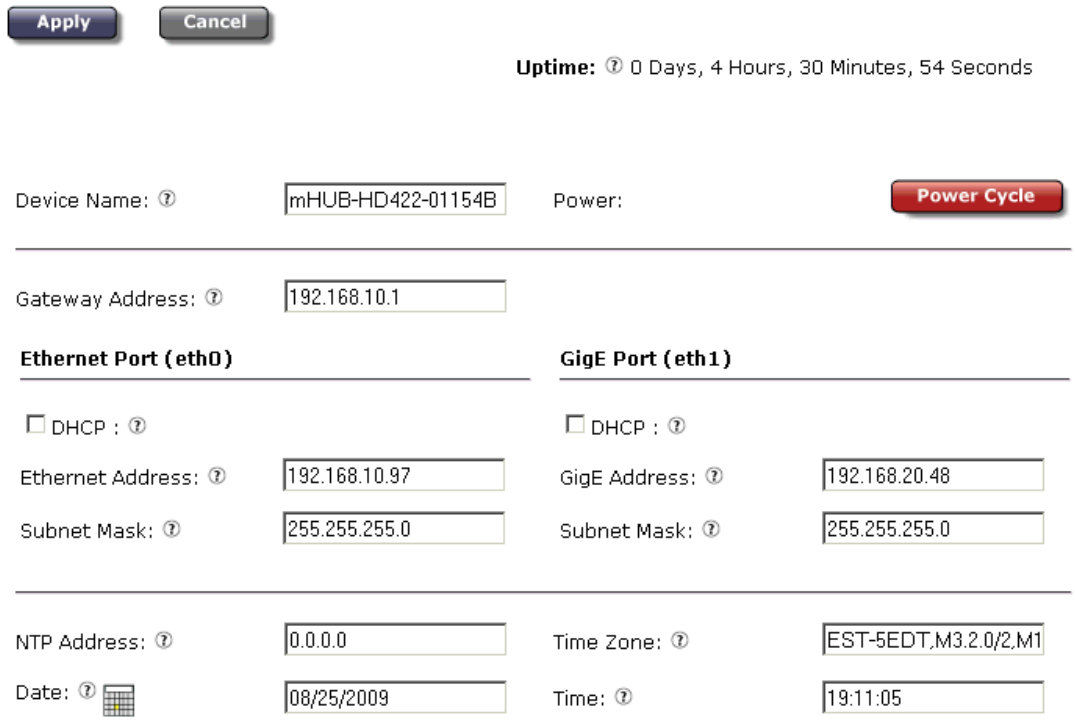


Image reduced for clarity

Power Cycle

Clicking the **Power Cycle** button performs a complete power-down/power-up cycle on the device. A pop-up warning screen gives you the option of continuing or canceling the action. Cycling the power to the device will stop all encoding; the power-down/power-up cycle takes approximately 45 seconds to complete.

Warning screen:

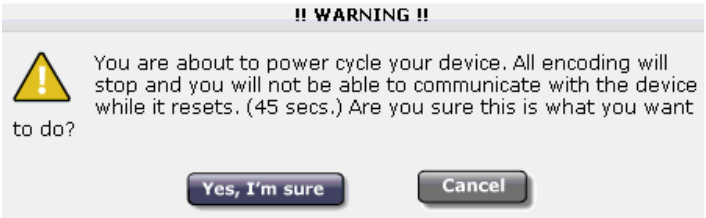


Image reduced for clarity

Controls:

Control	Function	Options	API Command
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 network; 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 xxx.xxx.xxx.xxx	*.SYSD IPM eht1
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

The Upgrade Tab

The Upgrade Tab is used to easily select and upgrade your unit's firmware from the available versions, and to unlock optional features available. The are two sub-tabs on this screen- Firmware and Features.

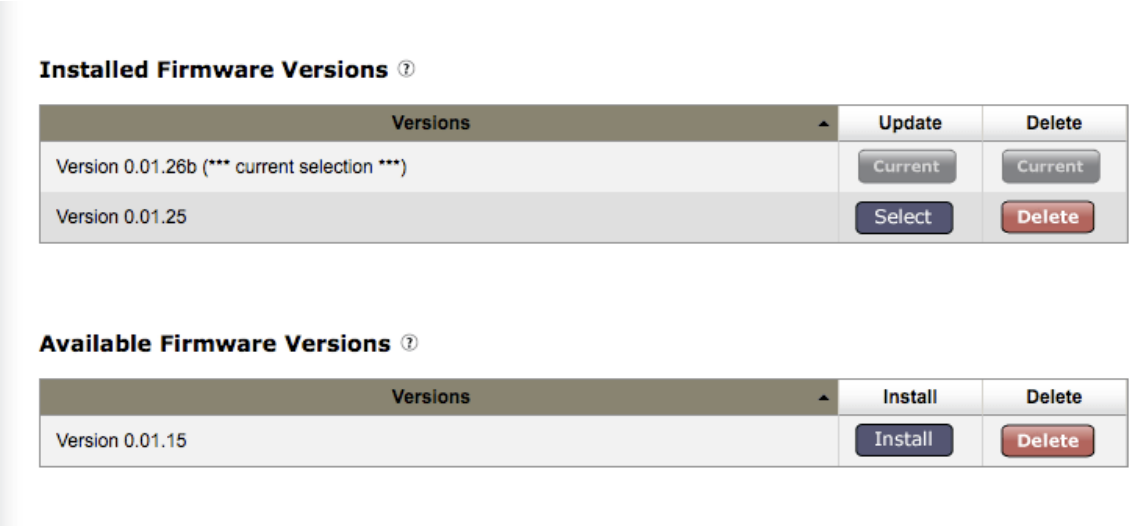


Image reduced for clarity

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.
- **Restore:** the **<Restore>** button only appears next ot the currently installed firmware version. Clicking **<Restore>** will reset all user-definedconfiguaration settings back to the factory defaults.
    - This **includes** the IP Address defined for the unit.
    - If **<Restore>** is selected, the unit will ask for a confirmation before carrying out the reset.
    - If your broswer doesn't re-direct after **<Restore>** is selected, close it and re-open it, directed to the IP Address 192.168.10.48 (the factory default IPA).

To upload new firmware versions, click on the **<Upload>** button, then click on the **<Upload>** button on the "Adtec Uploader" pop-up that appears, and select the desired firmware version by clicking it.

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

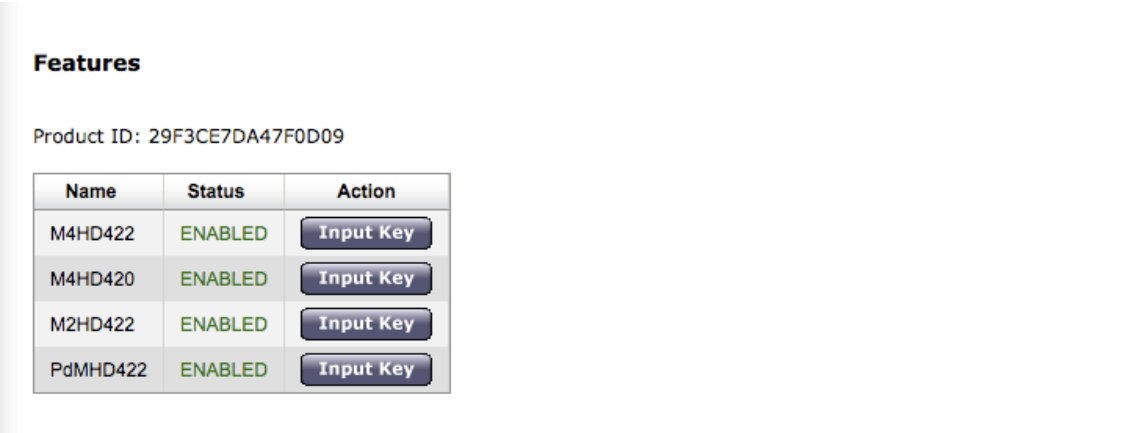


Image reduced for clarity

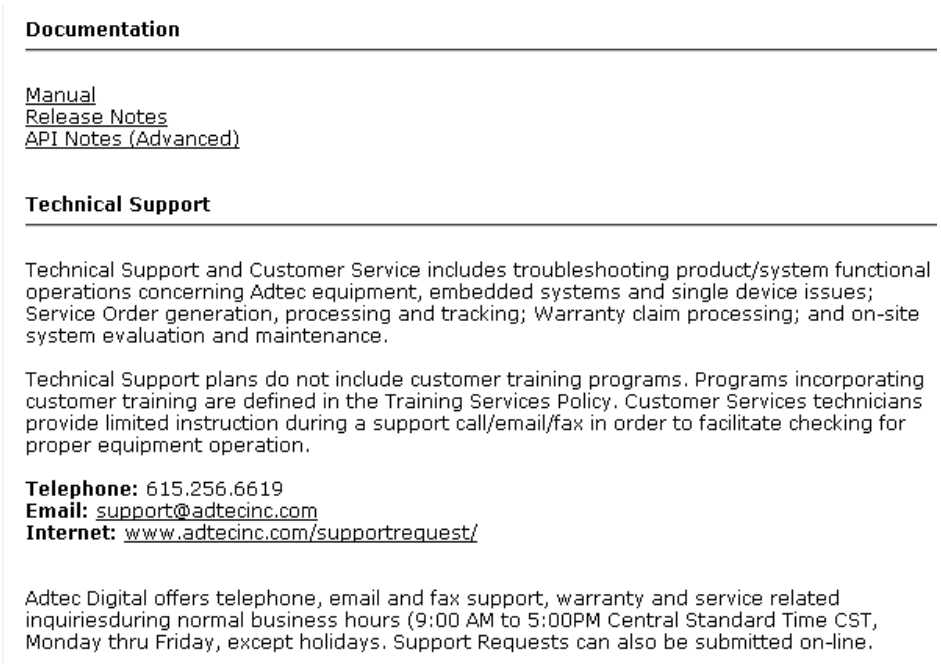
Clicking the **"Input Key"** button will pop-up a screen so that the key sequence can be entered. Note that the feature "PdMHD422" will ship unlocked.

Contact your Adtec sales representative regarding the purchase of feature keys. Check www.adtecinc.com for news regarding new features that may be available for the mediaHub HD422.

The Help Tab

The Help Tab provides access to Technical Support's contact 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.

Encoding Frequently Asked Questions

Scenario	Information
What is the max mux rate with audio?	100,000,000
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 device 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
Why can't I transfer large file to my unit?	Depending on your network structure, an ftp timeout can occur when transferring large files. To correct this, change the ftp data timeout of your unit to 350 seconds. This can be done via telnet using command ftpdatatimeout 350 **Note:** The eth0 and eth1 cannot be on the same subnet.
What is the ideal audio input level for analog audio?	0 (zero) dB is recommended for analog audio.

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).

Manual Upgrade Procedures

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 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]

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 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	Use 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 device. 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]

EIA-608/708 Captions

The new line of Adtec encoders (mediaHub HD Pro, mediaHub HD 422, and edje 5100) supports EIA-608 Captions in standard definition mode and EIA-708 Captions in high definition mode. The 708 captions must be carried as SMPTE-334M payloads with a DID of 0x61 and an SDID of 0x01.

The 608 to 708 conversion is especially useful in ATSC Terrestrial Applications.

In standard definition mode, the encoder automatically looks for 608 captions on line 21 when captions (CLC) are set to ATSC. When encoding 708 captions, the user may enter the Vertical Ancilleray line that the data resides on. We have found that it is common for most networks to put their data on VANC Line 9, the Adtec configured default.

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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.

Technical Specifications

Standard Definition Video Frame Rates

- NTSC 29.97i
- PAL 25i

Standard Definition Video Resolutions

- 720x480
- 640x480
- 352x480 (NTSC)
- 720x576 (PAL)

(Down-scaled video resolutions only supported when encoding MPEG-2)

High Definition Video Frame Rates

- 720p24
- 720p50
- 720p59.94
- 720p60
- 1080i59.94
- 1080i60

High Definition Video Resolutions

- 1920 x 1080
- 1440 x 1080
- 1280 x 720

Video CODEC Profiles and Levels

- MPEG 2
  - ♦ MP@ML
  - ♦ 422P@ML
  - ♦ MP@HL
  - ♦ 422P@HL (Supports 420 and 422 for all resolutions)
  - ♦ Data rates from 1 Mbs to 80 Mbs
- MPEG 4 Part 10 Advanced Video Coding (AVC) Commonly referred to as MPEG 4 AVC
  - ♦ !MP@ML, ! 422p@ML, !MP@L3.2, !HP@L4.0, !HP@L4.1
    - ◊ Supports 420 and 422 for all resolutions
      - · 422 with 8-bit color subsampling
- Data rates from 784 kbs to 80Mbs.
- Group of Pictures
  - ♦ MPEG 2: 1-30 (I, IP, IBP, IBBP)
  - ♦ MPEG 4 AVC: 1-60 (I, IP, IBP, IBBP)
  - ♦ Interlace Coding
    - ◊ MPEG 2: Field, Frame
    - ◊ MPEG 4 AVC: Field, Frame, Frame with MBAFF, Frame without MBAFF, PAFFH.264
  - ♦ Motion Estimation and Precision
    - ◊ Search Range
      - · Horizontal: -169.75 to +155.75 pixels
      - · Vertical: -87.5 to +115.75 pixels
    - ◊ Pixel Precision for Compensation
      - · MPEG 4 AVC: 1/2, 1/4 Pixel
      - · MPEG 2 1/2 Pixel
    - ◊ Block Size for Compensation
      - · MPEG 4 AVC: 16 x 16, 16 x 8, 8 x 16, 8 x 8
      - · MPEG 2: 16 x 16, 16 x 8 (MC)
  - ♦ Encoder Latency
    - ◊ Low (~ 300ms) Low Latency Contribution
    - ◊ Very Low (~ 120ms) Lowest Latency Applications (**Note:** most IRDs cannot handle Very Low Latency even with only6 MPEG 1 Layer 2 audio)

SD/HD Signal Generation

- SMPTE bars (requires valid HDvideo source for clock on 7712 IO sled)
- OSD
    - DVB Information
        - ◊ Service Name
        - ◊ Service Provider
        - ◊ Network Information (Satellite, Terrestrial, Cable)
    - ASTC Information
        - ◊ Name
        - ◊ Long Name
- Audio Tones
    - Selectable Frequency from 440hz to 6Khz
    - Selectable Mute for L/R individually foe each of the four (4) pairs

Encoder Video Input

- Standard Definition Video Inputs (Encoder)
    - Analog NTSC and PAL Composite (BNC)
    - SD-SDI (SMPTE 259M) with embedded audio (SMPTE 272M)
    - Auto detect SD 270Mbps for SD
    - D1 Encoding Only - no internal up-conversion.
- Standard Definition Video Pre-Processing
    - Encoder Filters (SD Only)
    - Temporal and Spatial (Median)
    - Time Base Corrector (TBC) on SDI Inputs for SD Only
    - Chromafiltering and Scaling fo NTSC/PAL
- High Definition Video
    - HD-SDI input video (SMPTE 292M)w/embedded audio (SMPTE 299M) with auto-detect for HD 1.485 Gbs.
- High Definition Video Inputs (Encoder)
    - SDI (SMPTE 292M) with embedded audio (SMPTE 299M) - Auto detect HD 1.485 Gbs.
    - 3G-SDI input video, (SMPTE 424M) w/embedded audio (SMPTE 299M)
    - SDI and HD-SDI are the same connector with auto standard resolution and frame rate detection.

Audio Inputs

- Analog audio input on DB15 male.
    - Two stereo pairs (includes 1/2 meter DB15 to 4 XLR male breakout cable)
- AES3-1 digital audio input uncompressed LPCM or compressed bit stream passthrough from external Dolby E, 5.1, 2.0 (AC3) Linear Acoustic Stream Stacker via BNC - 75 Ohm input.
- AES3-2 digital audio input uncompressed LPCM or compressed bit stream passthrough from external Dolby E, 5.1, 2.0 (AC3) Linear Acoustic Stream Stacker via BNC - 75 Ohm input.
- AES3-3 digital audio input uncompressed LPCM in - MPEG 1 Layer 2 encoding only.
- AES3-4 digital audio input uncompressed LPCM in - MPEG 1 Layer 2 encoding only.
- SDI embedded per SMPTE 272M for SD and SMPTE 299M for HD with support for up to 16 channels based on group selection. User selectable concurrency for Groups 1 and 2 or 3 and 4 (8 channels concurrently).
- SDI Matrix (shuffle) allows selection of any pair within two groups of embedded audio to be routed to the audio encoder or passthrough.
- User-defined analog and digital Audio level control with sample rate conversion on all four AES3, analog and embedded SDI audio inputs.

Audio CODEC Profiles

- Dolby Digital 2.0 (AC3) Two (2) stereo encoders included
- MPEG1 Layer 2 Four (4) stereo encoders included
    - Support for Phase Alignment standard.
- Intelligent Dolby E, Dolby 5.1 and Dolby Digital 2.0 (AC3) LPCM (SMPTE 302M), Linear Acoustic Stream Stacker passthrough on AES3 1, 2 and SDI

Transport Outputs

- ISO13818-1 MPEG 2 Transport Stream per EN 50083-9:1997 (188 byte only)
    - Three (3) mirrored outputs via BNC 75 ohm
    - Maximum Transport Rate: 100 Mbs
- MPEG 2 Transport over IP (TSoIP?)

        - Configure up to four (4) concurrent TSOIP routes
            - Unicast and Multicast
            - UDP and RTP
            - SMPTE 2022 (COP3 FEC) per route
    - MPEG 2 Transport capture to local storage or NAS
        - NAS optional, local storage limited to maximum transport rate of 40 Mbs
    - ASI, Multiple TSoIP? and storage, operate concurrently

Video User Data Inputs

- Waveform (Composite or SD SDI)
    - Closed Captions per CEA-608-C (2005)
    - Closed Captions per DVS-157
    - Wide Screen Signaling (WSS) per ETSI EN300294 V1.4.1 (2003-04)
    - Teletext per ETSI EN 300 472 V1.3.1 (2003-05)
    - AMOL
- VANC per SMPTE 291M (Native via SD/HD SDI)
    - Closed Captions per CEA-708 (SMPTE 291M)
    - OP47
    - SMPTE 2031
        - VITC
        - EBU Teletext/Subtitles
        - WSS/Teletext/NABTS/CEA-608/TV2GX/AMOL48/96
        - User Defined (2031-2007)
- SMPTE 2016
    - AFD/Bar Data/Pan Scan per CEA-CEB16 (2006)
- Waveform Conversion
    - CEA 608 to CEA 708
        - CEA-608 via Composite merged with SD/HD Video via SDI
        - Similar frame rates required
- Teletext Bridging
    - Waveform Teletext via Composite merged with SD/HD Video via SDI
- Wide Screen Signal Bridging
    - Waveform WSS via Composite merged with SD Video via SDI

Transport Stream User Data Carriage

- SCTE 127-2007
- ETSI EN 301 775, v1.2.1 (2003-05)

Conditional Access

- BISS 0 (free to air)
- BISS 1
- BISS E
    - Mode 1/2

Table Compliance

- MPEG Program Specific Information (PSI) Table Compliance:
    - PAT
    - CAT
    - PMT
    - SCTE 35 Ad Insertion Que
- DVB Service Information (SI) Static Table Compliance (dynamic option)
    - SDT
    - NIT
    - EIT
    - TDT/TOT
- For dynamic DVB-SI use, Adtec offers two options:
    - 1) Use the DTA-3050 multiplexer and DTVGuide web hosted EIT SI Server. Optionally if subscriber management is required, a local DTVManage server can proxy the DTVGuide data as needed.
    - 2) Configure the mediaHUB-HD422 to directly connect to the DTVGuide web hosted EIT server (available in Q4 2009).
- ATSC A65B (PSIP) static table compliance (Dynamic Option)

- MGT (TVCT) - Terrestrial or (CVCT) - Cable
- STT
- RRT
- EIT 0-3

- For dynamic A65C PSIP use Adtec offers two options.
  - 1) Use the DTA-3050/3051 (SMPTE 310) multiplexer and DTVGuide web hosted EIT SI Server.
  - 2) Configure the mediaHUB-HD422 to directly connect to the DTVGuide web hosted EIT server (available in Q4 2009).

TCP/IP, Serial, Parallel (GPIO) User Data Interfaces

- IPv4 via ETH0 Fast Ethernet
  - SNMP/FTP/SSH/Telnet/HTTP/TSoIP
- IPv4 via ETH1 GIGE
  - SNMP/FTP/SSH/Telnet/HTTP/TSoIP
- Serial 1 RS232 via RJ45 Terminal, 38400-8-1-N (Full API support)
- Terminal RS232 via RJ45 Terminal, 115000-8-1-N (Full API and Linux Terminal support)
- RS422 via DB9 Female Sony 9 PIN Protocol, 38400-8-1-O
  - Slave, controlled by editor
  - Master, controls deck
- Parallel (GPIO via DB9 Male)
  - Encode, Stop, Status, BCD IO for user defined Tally or control
  - Full Adtec API Par Port mapping via DVC command file

Confidence Decoder Video Output

- Confidence Decode of encode via internal data bus, no ASI loop required
- SD/HD SDI SMPTE 259M (SD) and SMPTE 292M (HD)
  - User-definable or auto resolution from D1 to 1080i including scaler for Up and Down conversion to confiedence-decode monitor resolution
- Composite D1 Video (NTSC/PAL)
  - Not concurrent with HD HDMI
- DVB-ASI Input for external SPTS or MPTS decoding
  - No conditional access support on Confidence Decoder- **no** decryption!
  - No decoding of HD MPEG 2 422 or MPEG 4 AVC 422 video, SD MPEG 2 422 is decoded

Confidence Decoder Audio Output

- SDI Embedded audio stereo audio pair SMPTE 272M (SD), SMPTE 299M (HD)
- HDMI
- No analog audio output

Confidence Decoder Video CODEC Profiles and Levels

- MPEG 2
  - MP@ML , 422P@ML, MP@HL
    - ◊ Supports 420 for all resolutions and 422 for SD **only**
  - Data rates from 1 Mbs to 60 Mbs
- MPEG 4 Part 10 Advanced Video Coding (AVC)
  - MP@L3.0, !MP@L3.1

, !MP@L3.2, HP@L4, !!HP@L4.1
- Supports 420 **only**
- Data rates from 500 kbs to 30 Mbs

<font size="3"> **Confidence Decoder Audio CODEC Profiles**

- Dolby Digital AC-3, Dolby 5.1 down mix to stereo,
- MPEG 1 and MPEG 2 Layer 2,
- **No** Dolby E support

Physical Specifications

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

- ♦ (482.6 X 355.6 X 44.45 mm)
- 9 lbs (4kg) unit weight

Power Inputs

- 70-240 VAC Standard
- -48 VDC Telco (option)
- 12 VDC Mobile (option)

Power Usage

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

Ambient Environment

- Operating less than 100 degrees Fahrenheit (38 degress Celcius)
- Non-Condensing

Safety

- CE

User Interface Requirements

- Rich server side browser enabled application server
- Front panel LCD, keypad and LEDs

RS422 Communications

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 422.

Usage

- To encode a project, use the **"Print to Video"** option from the **"File"** pulldown menu in Final Cut.
- In the mediaHUB-HD Pro 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 Adtec's mediaHUB-HD Pro when 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.

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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