

# mediaHUB-HD 422

## Multi-CODEC High Definition Encoder MPEG 2 & MPEG 4 AVC



**Winner of STAR Award  
for Superior Technology  
at NAB 2009**

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 work-horse. 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 it 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.

**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 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 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 transport streams with the mediaHUB-HD 422, ideal for VOD and DPI content creation.

### feature highlights

#### 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 Definition 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 Definition and SMPTE 272M for Standard Definition.

#### Analog Audio:

2 stereo pairs

#### Transport:

MPEG 2 Transport Stream via ASI and GigE supporting UDP / RTP / SMPTE 2022.

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**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.

\* Encryption and some encoder profiles not supported.



# mediaHUB-HD 422 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, 1080i50, 1080i59.94, 1080i60

## High Definition Video Resolutions

1920x1080, 1440 x 1080, 1280x720

## Encoder Video Profiles and Levels

MPEG 2  
• MP@ML, 422P@ML, MP@HL, 422P@HL  
• (Supports 420 and 422\* for all resolutions)

## MPEG 2 Data rates:

- Standard Definition 420 - 1 to 15Mbps
- Standard Definition 422 - 1 to 50Mbps
- High Definition 420 / 422 - 6 to 80Mbps

- MPEG 4 Part 10 Advanced Video Coding (AVC) - Commonly referred to as MPEG 4 AVC MP@L3.0, MP@L3.1, MP@L3.2, HP@L4.0, HP@L4.1  
• (Supports 420 and 422\* for all resolutions)

## MPEG 4 Data rates:

- Standard Definition 420 / 422 - 700 to 20Mbps
- High Definition 420 / 422 - 3 to 80Mbps

## Group of Pictures

- MPEG 2: 1 - 30 (I, IP, IBB, IBB)
- MPEG4 AVC: 1-60 (I, IP, IBB, IBBP)

## Interlace Coding

MPEG 2

- Field

## MPEG 4

- Field
- Frame
- Frame with MBAFF
- Frame without MBAFF
- PAFHH.264

## Motion Estimation and Precision

### Search Range

- Horizontal: -169.75 to +155.75 pixel
- Vertical: -87.5 to + 115.75 pixel

### Pixel Precision for Compensation

- MPEG 4 AVC: 1/2, 1/4 Pixel
- MPEG2: 1/2 Pixel

### Block Size for Compensation

- MPEG 4 AVC: 16 X 16, 16 X 8, 8 X 16, 8 X 8
- MPEG2: 16 X 16, 16 X 8 MC

## Encoder Latency (MPEG 2 and MPEG 4 AVC)

- Long (~ 1 second) Distribution Applications
- Normal (~ 400 ms) Contribution Applications
- Low (~ 300 ms) Low Latency Contribution
- Very Low (~ 120 ms) Lowest Latency Applications  
(Most IRDs can not handle Very Low latency even with only MPEG 1 Layer 2 audio)

## SD/HD Signal Generation

SMPTTE Bars (requires valid HD video source for clock on 7712 IO sled)

## OSD

- DVB Information
  - Service Name
  - Service Provider
  - Network Information (Satellite, Terrestrial, Cable)
- ATSC Information
  - Name
  - Long Name

## Audio Tones

- Selectable Frequency from 440 Hz to 6KHz
- Selectable mute for L/R individually for each of the four (4) pairs

## Encoder Video Inputs

Standard Definition Video

- Analog NTSC and PAL Composite (BNC)
- SDI (SMPTTE 259M) with embedded audio (SMPTTE 272M)
  - Auto detect SD 270Mbps for SD
  - D1 Encoding Only - no internal up-conversion.

## Standard Definition Video Pre-Processing

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

## High Definition Video

- SDI (SMPTTE 292M) with embedded audio (SMPTTE 299M) with auto detect for HD 1.485 Gbs.

## Encoder Audio Profiles

- Dolby Digital 2.0 (AC3) Two (2) stereo encoders included
- MPEG1 Layer 2 Four (4) stereo encoders included
- Dolby E, Dolby 5.1 and Dolby Digital 2.0 (AC3) passthrough on AES3 1, 2

## 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
- AES3-4 digital audio input uncompressed LPCM in - MPEG 1 Layer 2 encoding only.
- SDI embedded per SMPTTE 272M for SD and SMPTTE 299M for HD with support for up to 8 pairs 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, Dolby Digital 2.0 (AC3), LPCM (SMPTTE 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 unit)

- Three (3) mirrored outputs via BNC 75 Ohm
- Maximum Transport Rate 100 Mbs

## MPEG 2 Transport over IP (TSolP)

- Configure up to four (4) concurrent TSolP routes
  - Unicast and multicast
  - UDP and RTP
  - SMPTTE 2022 (COP3 FEC) per route
- Maximum Transport Rate via GIGE 100 Mbs

## MPEG 2 Transport to local storage or NAS

(NAS optional, local storage limited to maximum transport rate of 40 Mbs) SI, Multiple TSolP 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 SMPTTE 291M (Native via SD/HD SDI)

- Closed Captions per CEA-708 (SMPTTE 291M)
- OP47
- SMPTTE 2031
  - VITC
  - EBU Teletext/Subtitles

- WSS/Teletext/NABTS/CEA-608/TV2GX/AMOL48/96
- User Defined (2031-2007)

## SMPTTE 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: <br>
- CAT
- PMT
  - SCTE 35 Ad Insertion Cue

## 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 DTGGuide web hosted EIT SI Server. Optionally if subscriber management is required, a local DTVManage server can proxy the DTGGuide data as needed. 2) Configure the mediaHUB-HD422 to directly connect to the DTGGuide 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 (SMPTTE 310) multiplexer and DTGGuide web hosted EIT SI Server. 2) Configure the mediaHUB-HD422 to directly connect to the DTGGuide 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/TSolP
- IPV4 via ETH1 GIGE
- SNMP/FTP/SSH/Telnet/HTTP/TSolP
- 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, 38400-8-1-0
  - 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/HDSDI SMPTTE 259M (SD) and SMPTTE 292M (HD)
- User definable or auto display resolution from D1 to 1080i including scaler for Up and Down conversion to confidence 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 SMPTTE 272M (SD) SMPTTE 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 MPEG 2 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@L4.0, HP@L4.1
- (Supports 420 ONLY)
- Data rates from 784 kbs to 30 Mbs

## 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 or LPCM (SMPTTE 302M) support)

## Physical

- 1 RU chassis (19 x 14 x 1.75 in) (482.6 X 355.6 X 44.45 mm)
- 9 lbs (4kg)

## Power Inputs

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

## Power Usage

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

## Ambient

- Operating less than 110 F (38 C)
- Non Condensing

## User Interface Requirements

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

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\* (8 bit color subsampling)