

BE8680: BE8600 HD Encoder with companion Advanced Media Processing (AMP) Server for IP Broadcasting



The Telairity BE8600 is a small and powerful 1RU half-width real-time High Definition (HD) video encoder combining leading edge H.264/AVC video encoding for the highest possible picture quality with a low latency of 250ms. Featuring 4:2:0 distribution encoding, “instant on” for immediate availability, SDI loop-out for source redirection and monitoring, and dual ASI output in addition to dual IP output for encoded signals, the cost-effective and reliable BE8600 addresses the critical needs of broadcasters for a platform with low latency, high picture quality, and minimized power consumption. Like all Telairity products, it can be easily maintained and upgraded via a simple firmware download.

The Telairity AMP is a state-of-the-art 1RU half-width Linux server with a Broadcaster re-formatter and re-packager application for IP video distribution. The Telairity Broadcaster can provide either a second PiP copy of the video stream output by the BE8600 or multiple resized copies of the BE8600 video stream, encoded for IP distribution in a variety of streaming client protocols, including UDP/RTP, HLS, HDS, MPEG-DASH, RTMP, and FLV, as well as a custom protocol for lossless transmission over unmanaged IP networks (the “cloud”) to a receiving AMP server.

Designed to meet the needs of broadcasters, sports networks, and video distribution service providers, the Broadcaster provides flexible, redundant, and highly scalable video transport management and distribution services, able to support thousands of destinations over commodity internet connections, for live events, contribution, distribution, or OTT workflows.

In addition to direct front panel control for the encoder, both the encoder and the AMP server can be remotely managed from any IP network using standard web browsers to access their individual graphical user interfaces, or via standard SNMP monitoring and control systems. Equipped with TeamViewer or other remote access solution, the AMP server can also serve as a local controller for the encoder that can be accessed from anywhere on the World Wide Web.

BE8680 BE8600 Real-Time Encoder with Companion AMP Server

Applications

The Telairity BE8680 Real time Encoder Platform offers state-of-the-art H.264/AVC video compression combined with powerful and flexible IP delivery mechanisms in a compact and cost effective full-width 1 RU form factor. It is expressly designed to encompass the widest possible variety of HD real-time encoding and IP distribution needs, as well as all high-performance mobile encoding needs.

BE8680 Benefits

Compact full-width 1RU system for broadcast quality video encoding and flexible IP distribution

Based on the second-generation fully programmable Telairity-2 video architecture for low-latency, low-power, small-footprint; uses a simple control monitor for improved responsiveness, reliability, stability (no Windows, Linux, or other complex OS)

True real-time encode latency

State-of-the-art H.264/AVC encoding to compress HD signals below 5Mbps

4:2:2 input; low bitrate 4:2:0 output

608 SD (line 21 SD 608) & 708 HD closed captions; EBU and DVB subtitles

“Instant on” five-second startup, two-second reset times for encoder; fast flash disk boot time for AMP server

MPEG TS over IP UDP protocol streaming, RTP streaming with SMPTE 2022 FEC RTMP push to CDNs, etc.

Apple HTTP Live Streaming (HLS)
Adobe HTTP Dynamic Streaming (HDS)
FLV over HTTP (HTTP pseudo-streaming)
MPEG-DASH (DASH264 protocol)
Receive custom transport from AMP server
Adaptive Bitrate Streaming (ABS)

Both encoder and Broadcaster field-upgradeable via firmware download

H.264/AVC Video Encoding Features

- H.264/AVC – High (FRExt) Profile @ Level 4; or AVS-P2
- Input Video Formats: 720p and 1080i (auto-detected on input); 1080p to 30fps
- Output Horizontal Resolutions: 720p x 960/1280; 1080i x 1280/1440/1920
- Rate Control
 - Constant Bit Rate (CBR), Variable Bit Rate (VBR)
 - Bit rate : 2 - 20 Mbps 4:2:0
- Scene change detection
- Entropy Coding: CABAC for best video quality at lower bitrates
- GOP mode: selectable fixed length or adaptive
- Spatial Preprocessing, Deblocking (Loop) Filter

Audio Encoding Features

- HD / SD-SDI embedded audio input – per SMPTE 299M
 - Four programs (stereo pairs): Stereo, Dual Mono, Mono
- MPEG-1 Layer 2 or MPEG-2/MPEG-4 AAC LC, HE-AAC, HE-AACv2 encoding
 - Selectable on a per-program basis
 - Bit rates: 384-64Kbps MP2, AAC LC; 128-16Kbps HE; 64-12Kbps HE v2
- Dolby Digital / AC-3 and Dolby E pass-through

Control Features

- On board Flash memory for fast program upload at boot
- Web browser control via Ethernet, Encoder/Network Management Systems
- Rapid-reset Front Panel with “two-button” selection of 4 programmable profiles

Output

- 1 MPEG-2 Transport Stream over DVB – ASI
- 1 IP Transport Streams over 10/100 Base-T Ethernet



Half-width BE8600 Encoder back panel

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Video Inputs

Formats: High Definition – Serial Digital Interface (HD-SDI SMPTE 292M)

Modes: 4:2:2 for HD (720p/60, 1080i/60, 1080p/30)

Frame Rates: Frames per second in progressive mode:
720p only 23.98, 24, 25, 29.97, 30, 50, 59.94*, 60*
Fields per second in interlaced mode:
50, 59.94, 60

SDI Connectors: 1 BNC In, 1 BNC source Loop Out (for monitoring/redirection)

Audio Inputs

Formats: Embedded per SMPTE 299M (HD-SDI) Dolby Digital / AC-3, or Dolby E pass-through

Compressed A/V Output

Interfaces: 1 Digital Video Broadcast – Asynchronous Serial Interfaces (DVB-ASI), 270Mbps, buffered non-inverting
1 10/100 Base-T Ethernet

Connectors: 1 BNC (ASI out), 1 RJ-45 (IP out)

H.264/AVC	HD
	4:2:0
	2-15Mbps

Packet Structure: MPEG-2 188 byte Transport Stream packets in either TS/UDP/IP or TS/RTP/UDP/IP format with selectable **pro MPEG FEC**

System

Control Application: Web browser Interface over Ethernet; Optional EMS/NMS

Direct Presets: User-programmable front panel control

Status Monitoring: Temperature, Power Supply operation, Input video errors

SNMP: SNMPv1 v2 supported with Telairity MIB

AC power: 100 to 240 VAC (Auto sensing); 47 to 63 Hz; 58W

Dimensions & Weight: 1RU (H) x 8.5” (W) x 12” (D) rack mountable, 5 lbs.

Cooling: Forced air-cooling, front to rear

Temperature / Humidity: -10° to 55° C operation / 20% to 95% non-condensing



Advanced Media Processing (AMP) Server

Flexible Half-Width and Full-Width Server Configurations

- Linux or Windows OS
- i3 dual-core to i7 quad-core CPU
- 4 / 8 / 16 GB DDR-3 Memory
- 500 GB to 4 TB SATA3 HDD or 120 GB to 1 TB SSD (or both)
- WiFi Option

Standard Applications

- Broadcaster / Transcoder – for repackaging/reformatting streams from the encoder for IP distribution
- Receiver -- for receiving IP streams from other broadcasters
- Simple File Capture Utility – for spooling streams from the encoder into either a MPEG-TS or MP4 file
- VLC Media Player – for viewing encoded video streams
- Wireshark – network protocol analyzer
- TeamViewer – for simple remote control and access
- Chrome browser – for Internet access

Inputs / Outputs (will vary with configuration)

- 2 x Gb Ethernet
- 6 USB 2.0 (2 front, 4 rear); 2 USB 3.0
- 2 HDMI
- 1 DVI
- PS2 Mouse / Keyboard connector
- 2 RP-SMA WiFi antenna connectors
- 6 audio sockets
 - line in, line out, microphone, center/subwoofer, rear, S/PDIF out

Broadcaster Capabilities

- Lossless delivery of streams composed of UDP or RTP with SMPTE2022 FEC packets across unmanaged public IP networks using a custom protocol (e.g., to another AMP server for input to a remote IRD)
- Adaptive Bit Rate Streaming – dynamically adjust unicast or multicast streams to meet changing network conditions and specific application requirements
- Transcoding – create multiple H.264/AAC streams at different resolutions and bitrates from a single input MPEG-2 or H.264 stream with MPEG-1 Layer 2 or AAC audio
- Format Conversion – Repackage input UDP or RTP stream as IP stream using popular protocols: HLS, HDS, MPEG-DASH, RTMP, FLV
- Record and store input streams as MPEG-TS file for time-shifted delivery (up to 24 hours delay) or Video On Demand (VOD)
- Transfer Video Files
- Traffic Monitoring – Capture content-specific statistical information in real time
- Transport Stream Analysis – Includes MPEG-TS ETSI TR 101-290 analyzer
- Provides clustering and load balancing for continuous uptime
- Intuitive Web GUI for Broadcaster control and auditing

Applications

The BE8680 combines the Telairity half-width 1RU BE8600 encoder with a companion half-width 1RU AMP server to produce a full-width 1RU system uniquely qualified to deliver MPEG transport streams over IP, using an unbeatable combination of software flexibility and adaptability matched with real-time hardware performance, reliability, and quality. It is an ideal product for any type of IP video distribution, including:

- Custom Lossless UDP/RTP Delivery to remote IRDs over unmanaged public networks
- Receivers embedded in websites or other hardware or software clients
- Content Delivery Networks (CDNs)
- PCs, Tablets, and Mobile Devices

AMP Server Benefits

Can be customized to fit into any IT environment at a wide variety of price / performance points, according to specific workload specifications

Designed to meet the requirements of broadcasters, sports networks, and video distribution service providers

Accepts encoded video from Telairity encoders, serving as a central hub for managing, storing, re-formatting and routing IP video for anytime / anywhere / any device delivery to thousands of potential destinations

Can repackage UDP/RTP IP streams out of the encoder with a custom protocol for lossless transmission over unmanaged public IP networks to remote IRDs; or using a variety of popular protocols, including HLS, HDS, MPEG-DASH, RTMP, FLV, etc.

Can reformat UDP/RTP streams out of the encoder to any arbitrary H x W picture size and bitrate, including a companion thumbnail Picture-in-Picture (PiP) version; or at high-medium-low resolutions & bitrates for Adaptive Bitrate Streaming (ABS)

Can store UDP/RTP streams from the encoder in MPEG-TS or MP4 files for time-shifted or Video On Demand (VOD) payout

Provides network monitoring and MPEG-TS ETSI TR 101-290 analyzer functions

Ordering Information

Part Number: **BE8680**

AMP Server is available separately in both half-width and full-width models

Contents

- BE8000-series Encoding Platform integrated with AMP Server
- Power Cable: IEC to USA plug; optional Euro plug
- USB flash drive with backup copy of encoder/modulator firmware and manuals

Requirements

- Web browser control system
- SDI input source video
 - HD SMPTE 292M
- SDI & ASI cables
 - 75 Ohm coaxial with BNC connector
- Ethernet cables
 - Cat5/6 with RJ-45 connector for Encoder and AMP Server management and data connections

About Telairity

Telairity, based in Santa Clara, California designs, manufactures and markets H.264/AVC and other advanced encoding and transcoding solutions for broadcast and professional video applications. Telairity's breakthrough video architecture (Telairity-1™) is the foundation for all its real time encoding products, which combine outstanding video quality with state-of-the-art, video compression based on the AVC (H.264 / MPEG-4.10) standard to achieve the lowest possible bitrates.

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Broadcaster Input Protocols

- Custom-protected transport (from another Broadcaster)
- MPEG-TS over UDP and/or RTP with SMPTE-2022 (from BE860)
- RTMP pull from CDNs and/or other sources
- RTMP push (e.g., from another Broadcaster)
- Transport stream files from local file system

Broadcaster Output Protocols

- Custom-protected transport (to another Broadcaster)
- MPEG-TS over UDP and/or RTP with SMPTE-2022
 - May be straight pass-through from BE8600
- RTMP push to CDNs and/or other media servers
- Apple HTTP Live Streaming (HLS)
- Adobe HTTP Dynamic Streaming (HDS)
- FLV over HTTP (HTTP pseudo-streaming)
- MPEG-DASH (DASH264 profile)
- Transport stream files to local file system
- Re-multiplex streams to strict CBR for compliance with input requirements

Streaming Functions

- Flexible creation of adaptive bitrate groups
 - Specify number of members for each group and bitrate for each member
 - HLS, HDS, or MPEG-DASH outputs
- Specify maximum stream latency; custom protocol minimizes IP latency

Broadcaster Video Profiles

- 1080i60 / 1080i59.94
- 1080p30 / 1080p25
- 720p60 / 720p50 / 720p30
- 576i60 / 576p25
- 480i60 / 480p29.97

System Parameters

- H 1RU x W 8.5 in / 21.6 cm x D 13 in / 33 cm
- 6.5 lbs / 2.95 kg
- Power: 150 Watts Maximum



Half-width AMP Server back panel (example)

In operation, The Ethernet data port from the BE8600 is directly cross-connected to one of the Ethernet connectors of the AMP server, leaving the second Ethernet connector of the AMP server free for a LAN connection. The direct BE8600-AMP Server video data connection avoids any risk of the Encoder flooding the LAN with video packets, even when using a multicast address. All IP video transmission in this setup is relayed through the Broadcaster function of the AMP Server.

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