COBALT

9934-AUD-PRO-DSP • 3G/HD/SD-SDI Advanced Audio Processor
with DSP Audio Options Support and Full Embed/De-Embed

The Cobalt® **9934-AUD-PRO-DSP 3G/HD/SD-SDI Advanced Audio Processor with DSP Audio Options Support and Full Embed/De-Embed** provides a DSP-based platform that supports multiple audio DSP options. When optioned with various diverse audio processing options, the DSP-based processing core (which supports numerous simultaneous processing engines) uses license "credits" which allows flexible tailoring of multiple proc function instances. In this manner, the 9934-AUD-PRO-DSP provides much more flexibility than other audio processors that used fixed processing assets (for example, this flexibility allows "trading" credits for more Dolby encoders while backing out of loudness processors or other engine assets).

Audio proc options include Dolby® Real-Time Loudness Leveling automatic loudness processing, Dolby® encode/decode, and Linear Acoustic® UPMAX™ automatic upmixing. DSP options can be ordered with new-card purchase, or field-installed as software option upgrades without removing the card from its frame. Included as standard features are downmixing, flex mixing, and full AES and balanced analog audio embed/de-embed.

Also included standard is bulk and per-channel audio delay controls that easily address lip-sync issues. Option **+TTS** provides high-quality Text-To-Speech synthesis, directly converting EAS text to digital audio speech with no baseband signal breakouts or add-ons. The 9934-AUD-PRO-DSP is available with numerous options that expand its function well beyond audio DSP and embed/de-embed to maximize frame processing density and system economy.

Quality Check option **+QC** allows failover to alternate inputs or other actions based on user-configurable criteria such as black/frozen frame, audio silence or CC absence. The 9934-AUD-PRO-DSP also provides analog CVBS video inputs and outputs, and analog audio embedding and de-embedding.

Preset save/load allows saving custom card settings while allowing one-button revert to factory settings. Layered presets allow invoking changes related only to a specific area of concern (audio routing, for example) while not changing any other processing settings or aspects. Full user DashBoard™ or Remote Control Panel remote control allows full status and control access locally or across a standard Ethernet network. GPIO allows direct input routing control and status monitoring.

FEATURES

DSP-based platform supports multiple audio DSP options, with multiple instances available using allocatable license "credits"

Dolby encoding/decoding, Dolby Real-Time Loudness Leveling (RTLL) loudness leveling with full parametric control setup, and Linear Acoustic UPMAX™ DSP audio options available

Advanced audio processing allows routing, gain, smooth delay, and flexible mixing as standard features

Full audio crosspoint with 5.1-to-stereo downmix (standard) available for all audio outputs

CVBS analog video I/O and analog/AES embed / de-embed available

Option **+ANC** adds full user VANC/HANC packet insertion/extraction access to DID/SDID ancillary data such as camera PTZ, SCTE 104, closed captioning, and other specialized user payloads

Option **+TTS** provides Text-To-Speech synthesis, directly converting EAS text to high-quality digital audio speech with no baseband signal breakouts or add-on units

High-density design

Remote control/monitoring via Dashboard™ software or OGCP-9000 remote control panels

Five year warranty

OPTIONS

Dolby® Real-Time Loudness Leveling Automatic Loudness Processing Options (**+DSP-RTLL**) – Provides advanced loudness processing with comprehensive parametric controls. Available as surround 5.1 and stereo 2.0. (See Ordering Information for full details)

Dolby® Encoder Options (**+DSP-ENC**) – Available as 5.1 and 2.0 Dolby Digital and Digital Plus Encode. (See Ordering Information for full details.)

Dolby® Decoder Options (**+DSP-DEC**) – Provides Dolby Digital, Digital Plus, and E Decode

Linear Acoustic® UPMAX™ Upmixing (**+DSP-UPMIX-LA**) – Provides automatic 2.0-to-5.1 Linear Acoustic® UPMAX™ upmixing

Quality Check Option (**+QC**) – Provides failover, alert, or user presets action on criteria such as black/frozen frame, audio silence, and CC absence.

Text-To-Speech Option (**+TTS**) – Provides Text-To-Speech synthesis, directly converting EAS text to digital audio speech with no baseband signal breakouts or add-ons. High-quality Text-To-Speech from Acapela Group.

Emergency Alert System Text Crawl Generation Option (**+EAS**) – Provides a single-card solution for keying Emergency Alert System (EAS) text crawls in the active video and inserting station identification logos. Compatible with Sage™, Dasdec™, and other EAS crawl generators, with automated control insertion via presence of crawl data or GPI.

Clean and Quiet Switching Option (**+CQS**) – Provides silence between input switches from one SDI input source to another

Add Frame Sync Option (**+FS**)

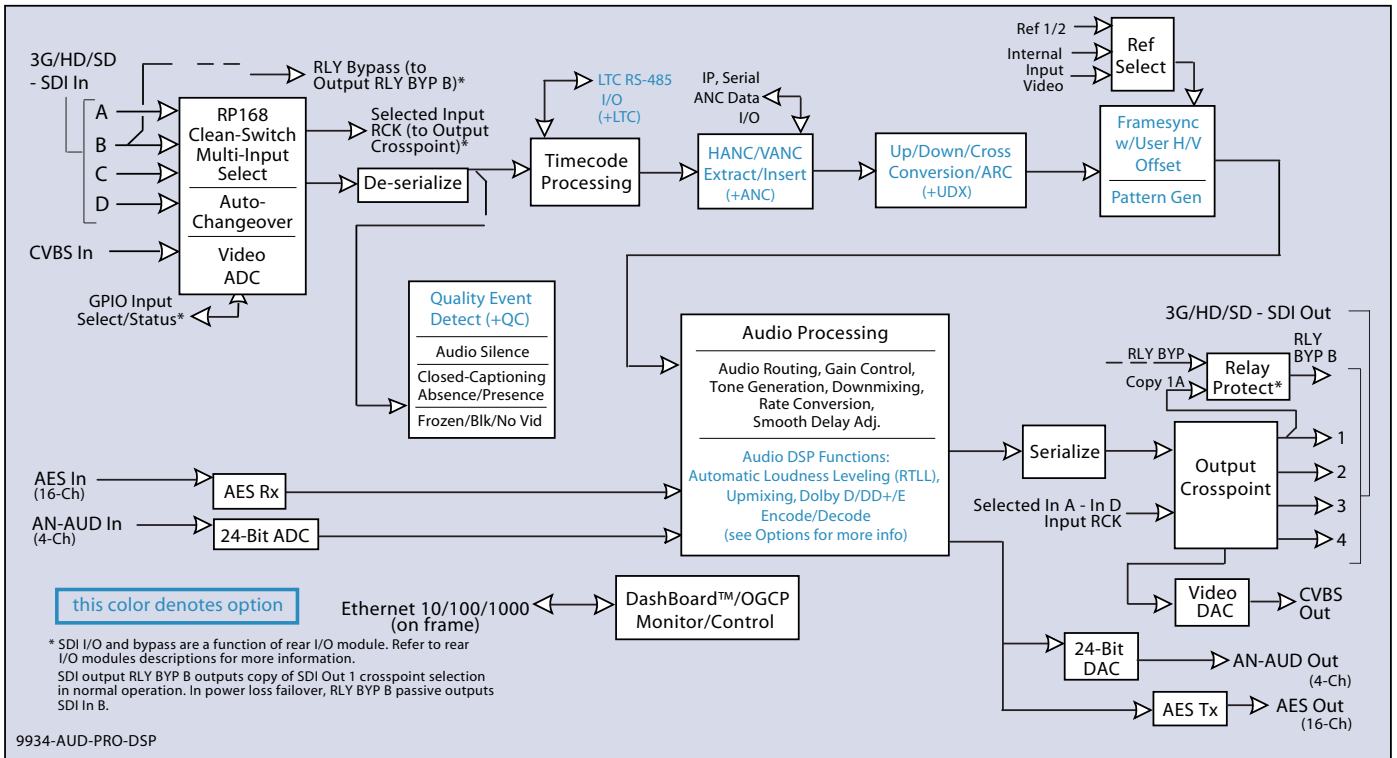Add Extended Delay Option (**+DLY**) (Available only in conjunction with option +FS)

Add Up/Down/Cross Converter Option (**+UDX**)

Ancillary Data Processor Option (**+ANC**) – Provides full user VANC/HANC packet insertion/extraction access to DID/SDID ancillary data, with insert/extract to and from IP and GPIO external interfaces.
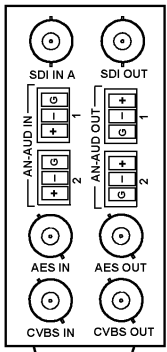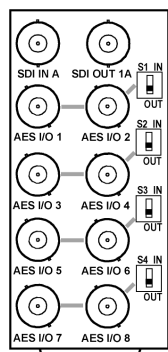
Audio LTC I/O Option (**+LTC**)

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9934-AUD-PRO-DSP • 3G/HD/SD-SDI Advanced Audio Processor
with DSP Audio Options Support and Full Embed/De-Embed

Block diagram showing signal flow:

3G/HD/SD - SDI In → A, B, C, D → RP168 Clean-Switch Multi-Input Select / Auto-Changeover / Video ADC; CVBS In; GPIO Input Select/Status*; RLY Bypass (to Output RLY BYP B)*; Selected Input RCK (to Output Crosspoint)* → De-serialize → Timecode Processing → LTC RS-485 I/O (+LTC); HANC/VANC Extract/Insert (+ANC); IP, Serial ANC Data I/O; Up/Down/Cross Conversion/ARC (+UDX); Ref Select (Ref 1/2, Internal, Input Video); Framesync w/User H/V Offset / Pattern Gen.

Quality Event Detect (+QC): Audio Silence; Closed-Captioning Absence/Presence; Frozen/Blk/No Vid

Audio Processing: Audio Routing, Gain Control, Tone Generation, Downmixing, Rate Conversion, Smooth Delay Adj. Audio DSP Functions: Automatic Loudness Leveling (RTLL), Upmixing, Dolby D/DD+/E Encode/Decode (see Options for more info)

AES In (16-Ch) → AES Rx; AN-AUD In (4-Ch) → 24-Bit ADC → Audio Processing → Serialize → Output Crosspoint → Relay Protect* → RLY BYP / RLY BYP B / Copy 1A → 1, 2, 3, 4 (3G/HD/SD - SDI Out); Selected In A - In D Input RCK; Video DAC → CVBS Out; 24-Bit DAC → AN-AUD Out (4-Ch); AES Tx → AES Out (16-Ch)

this color denotes option

Ethernet 10/100/1000 (on frame) → DashBoard™/OGCP Monitor/Control

* SDI I/O and bypass are a function of rear I/O module. Refer to rear I/O modules descriptions for more information.
SDI output RLY BYP B outputs copy of SDI Out 1 crosspoint selection in normal operation. In power loss failover, RLY BYP B passive outputs SDI In B.

9934-AUD-PRO-DSP

Rear module diagrams:

RM20-9934-B — SDI IN A, SDI OUT, AN-AUD IN, AN-AUD OUT, AES IN, AES OUT, CVBS IN, CVBS OUT

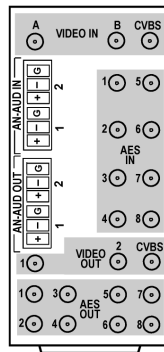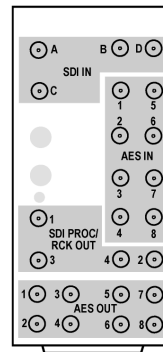**RM20-9934-C** — SDI IN A, SDI OUT 1A, AES I/O 1–8, S1 IN/OUT through S4 IN/OUT. Switches S1 thru S4 set AES BNC pairs (4-ch groups) as Input (embed) or Output (de-embed). S1 - AES BNC 1-2, S2 - AES BNC 3-4, S3 - AES BNC 5-6, S4 - AES BNC 7-8
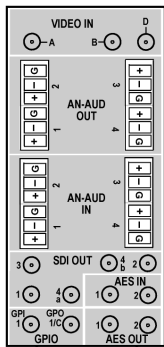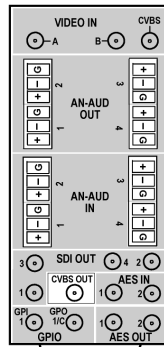
RM20-9934-D-DIN / RM20-9934-D-HDBNC — VIDEO IN A, B, CVBS; AN-AUD IN; AN-AUD OUT; AES IN 1–8; VIDEO OUT; AES OUT 1–8

RM20-9934-E-DIN / RM20-9934-E-HDBNC — SDI IN A, B, C, D; AES IN 1–8; SDI PROC/RCK OUT; AES OUT 1–8

RM20-9934-F — SDI IN A, SDI IN B, GPI, GPO, SDI OUT 1A, RLY BYP A/B OUT, SDI OUT 3A, SDI OUT 4B
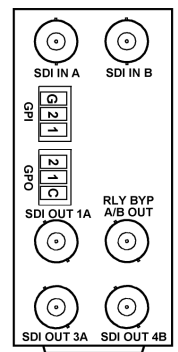
RM20-9934-H-DIN / RM20-9934-H-HDBNC — VIDEO IN A, B, D; AN-AUD OUT; AN-AUD IN; SDI OUT; AES IN; GPI/GPO; AES OUT

RM20-9934-J-DIN / RM20-9934-J-HDBNC — VIDEO IN A, B, CVBS; AN-AUD OUT; AN-AUD IN; SDI OUT; CVBS OUT; AES IN; GPI/GPO; AES OUT
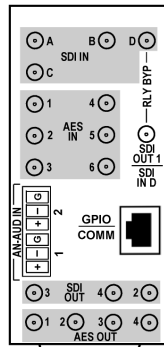
RM20-9934-K-DIN / RM20-9934-K-HDBNC — SDI IN A, B, D; AES IN 1–6; RLY BYP; SDI OUT 1; SDI IN D; AN-AUD IN; GPIO COMM; SDI OUT; AES OUT
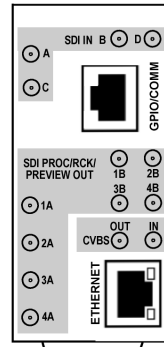
RM20-9934-L-DIN / RM20-9934-L-HDBNC — SDI IN B, D; A, C; GPIO/COMM; SDI PROC/RCK/PREVIEW OUT 1B, 2B, 3B, 4B; OUT/IN CVBS; 1A, 2A, 3A, 4A; ETHERNET
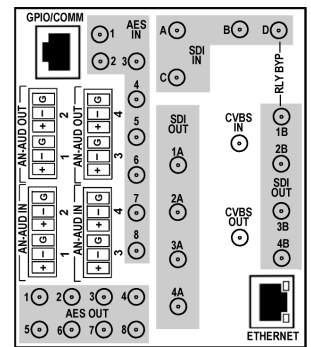
RM20-9934-N-DIN / RM20-9934-N-HDBNC — GPIO/COMM; AES IN; SDI IN A, B, C, D; AN-AUD OUT; AN-AUD IN; RLY BYP; CVBS IN; SDI OUT 1B, 2B, 3B, 4B; CVBS OUT; AES OUT 1–8; ETHERNET

SPECIFICATIONS

Note: Inputs/outputs are a function in some cases of rear I/O module used.

Power
24 Watts (includes +DSP options)

SDI Inputs/Outputs
Up to (4) 75Ω BNC inputs
Up to (4) 75Ω BNC outputs (selectable as processed SDI IN or IN RCK)
SDI Formats Supported: SMPTE 259M, SMPTE 292M, SMPTE 424M
SDI Receive Cable Length: 3G/HD/SD: 120/180/320 m (Belden 1694A)
SDI Return Loss: >15 dB up to 1.485 GHz; >10 dB up to 2.970 GHz
SDI Alignment Jitter: 3G/HD/SD: < 0.3/0.2/0.2 UI
Timing Jitter: 3G/HD/SD: < 2.0/1.0/0.2 UI
Minimum Latency:
SD: 127 pixels; 9.4 us
720p: 330 pixels; 4.45 us
1080i: 271 pixels; 3.65 us
1080p: 361 pixels; 2.43 us
Note: SDI Return loss and receive cable length are affected by rear I/O module used. Specifications represent typical performance.

CVBS Video Input/Outputs
(1) 75Ω BNC input
(1) 75Ω BNC output. CVBS output functional only when selected processed signal is carrying SD-SDI.
ADC Resolution: 9-bit
Sampling Frequency: 27 MHz (2x over-sampling)
Y/C Separation: 4 line Adaptive Comb Filter
Freq. Response: ± 0.25 dB to 5.5 MHz
SNR: > 50 dB to 5.5 MHz (unweighted)
Differential Phase: < 1 degree
Differential Gain: < 1%
Nonlinearity < 1%

Discrete Audio Input/Outputs
AES-3id 75Ω inputs (8 pair (16-Ch) max)
AES-3id 75Ω outputs (8 pair (16-Ch) max)
Input AES SRC Range: 32 to 96 kHz
Balanced analog audio inputs (4-Ch max)
Balanced analog audio outputs (4-Ch max)
(I/O conforms to 0 dBFS = +24 dBu)
Analog Output Impedance: < 50 Ω
Analog Reference Level: -20 dBFS
Analog Nominal Level: +4 dBu
Analog Max Output Level: +24 dBu (0 dBFS)
Analog Freq. Response: ±0.2 dB (20 Hz to 20 kHz)
Analog SNR: 115 dB (A weighted)
Analog THD+N: -96 dB (20 Hz to 10 kHz)
Analog Crosstalk: -106 dB (20 Hz to 20 kHz)

Frame Sync Audio/Video Delay (option +FS)
Max offset: 20 frames
Latency (min): 1 frame
Option +DLY Delay (3G/HD/SD): >800 msec / >1580 msec / >9000 msec

User Audio Delay Offset from Video
Bulk delay control: -33 msec to +3000 msec.
Per-channel delay controls: -800 msec to +800 msec

GPIO
(2) GPI; (2) GPO

ORDERING INFORMATION

9934-AUD-PRO-DSP 3G/HD/SD-SDI Advanced Audio Processor with DSP Audio Options Support and Full Embed/De-Embed

Note: On this DSP-equipped card, an adjacent card **will not** fit into the immediately adjacent slot to the front-of-frame **right**. (For example, if DSP-equipped card is in slot 8, an adjacent card will not fit in slot 9. This would be the case of an adjacent card that installs into an odd frame slot, or the case where a Split Rear Module serves two cards in the adjacent odd/even slot pairs (in this example slots 9/10)).

RM20-9934-B 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (1) CVBS Video Input BNC, (2) Balanced Analog Audio Inputs, (1) AES Input BNC, (1) 3G/HD/SD-SDI Output BNC, (1) CVBS Output BNC, (1) AES Output BNC, (2) Balanced Analog Audio Outputs

RM20-9934-C 20-Slot Frame Rear I/O Module (Standard Width) (1) 3G/HD/SD-SDI Input BNC, (8) AES I/O BNCs (I/O switch selectable), (1) 3G/HD/SD-SDI Output BNC

RM20-9934-D-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors DIN1.0/2.3.)

RM20-9934-D-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (8) AES Inputs, (2) Balanced Analog Audio Inputs, (2) 3G/HD/SD-SDI Outputs, (1) CVBS Processed Output, (8) AES Outputs, (2) Balanced Analog Audio Outputs (All coaxial connectors HD-BNC.)

RM20-9934-E-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) AES Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors DIN1.0/2.3.)

RM20-9934-E-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) AES Inputs, (4) 3G/HD/SD-SDI Outputs, (8) AES Outputs (All coaxial connectors HD-BNC.)

RM20-9934-F 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Input BNCs, (1) 3G/HD/SD-SDI Processed Out BNC w/ Latching Input Select/Bypass, (3) 3G/HD/SD-SDI Output BNCs (GUI-selectable as Processed or Reclocked of selected input, (2) GPI, (2) GPO

RM20-9934-H-DIN 20-Slot Frame Rear I/O Module (Standard Width) (3) 3G/HD/SD-SDI Inputs, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (5) 3G/HD/SD-SDI Outputs, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors DIN1.0/2.3.)

RM20-9934-H-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (3) 3G/HD/SD-SDI Inputs, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (5) 3G/HD/SD-SDI Outputs, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors HD-BNC.)

RM20-9934-J-DIN 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (4) 3G/HD/SD-SDI Outputs, (1) CVBS Output, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors DIN1.0/2.3.)

RM20-9934-J-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (2) 3G/HD/SD-SDI Inputs, (1) CVBS Input, (2) AES Inputs, (4) Balanced Analog Audio Inputs, (4) 3G/HD/SD-SDI Outputs, (1) CVBS Output, (2) AES Outputs, (4) Balanced Analog Audio Outputs, (1) Coaxial GPI/6 Hz, (1) Coaxial GPO w/ Isolated Return (All coaxial connectors HD-BNC.)

RM20-9934-K-DIN 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (4) 3G/HD/SD-SDI Outputs (one 3G/HD/SDI Output with relay bypass failover), (6) AES Inputs, (2) Balanced Analog Audio Inputs, (4) AES Outputs, GPIO RJ-45 connector (All coaxial connectors DIN1.0/2.3)

RM20-9934-K-HDBNC 20-Slot Frame Rear I/O Module (Standard Width) (4) 3G/HD/SD-SDI Inputs, (8) 3G/HD/SD-SDI Outputs (one 3G/HD/SDI Output with relay bypass failover), (6) AES Inputs, (2) Balanced Analog Audio Inputs, (4) AES Outputs, GPIO RJ-45 connector (All coaxial connectors HD-BNC)

RM20-9934-L-DIN 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs, (1) CVBS Input, (8) 3G/HD/SD-SDI Outputs (1x2 DA output of each crosspoint out), (1) CVBS Output, COMM/GPIO RJ-45 connector, Ethernet Port (All coaxial connectors DIN1.0/2.3)

RM20-9934-L-HDBNC 20-Slot Frame Rear I/O Module (Standard-Width) (4) 3G/HD-SD-SDI Inputs, (1) CVBS Input, (8) 3G/HD/SD-SDI Outputs (1x2 DA output of each crosspoint out), (1) CVBS Output, COMM/GPIO RJ-45 connector, Ethernet Port (All coaxial connectors HD-BNC)

RM20-9934-N-DIN 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Inputs, (1) CVBS Analog Video In, (8) AES Inputs, (4) Balanced Analog Audio Inputs, (8) 3G/HD/SD-SDI Outputs (1 with relay bypass protect), (1) CVBS Analog Video Out, (8) AES Outputs, (4) Balanced Analog Audio Outputs, (1) GPIO RJ-45 connector, 100/1000 BaseT Ethernet Port (All coaxial connectors DIN1.0/2.3.)

RM20-9934-N-HDBNC 20-Slot Frame Rear I/O Module (Double Width) (4) 3G/HD/SD-SDI Inputs, (1) CVBS Analog Video In, (8) AES Inputs, (4) Balanced Analog Audio Inputs, (8) 3G/HD/SD-SDI Outputs (1 with relay bypass protect), (1) CVBS Analog Video Out, (8) AES Outputs, (4) Balanced Analog Audio Outputs, (1) GPIO RJ-45 connector, 100/1000 BaseT Ethernet Port (All coaxial connectors HD-BNC.)

ORDERING INFORMATION (cont.)

Options:

+DSP-RTLL-5.1 Dolby® RTLL™ 5.1-Channel Loudness Processor Option

+DSP-RTLL-2.0 Dolby® RTLL™ Stereo Loudness Processor Option

+DSP-ENCD-5.1 Dolby® Digital/Digital Plus 5.1 Encoder

+DSP-ENCD-2.0 Dolby® Digital/Digital Plus 2.0 Encoder

+DSP-DEC Dolby® Decoder

+DSP-UPMIX-LA Linear Acoustic® UPMAX™ 2.0-to-5.1 Upmixer

+ANC Ancillary Data Processor Option

+FS Add Frame Sync Option

+DLY Extended Frame Sync Delay Option (available only in conjunction with option +FS)

+UDX Add Up/Down/Cross Converter Option

+LTC Audio LTC I/O Option

+QC Quality Check Option

+CQS Clean and Quiet Switching Option

+TTS Text-To-Speech Option (Acapela Text-To-Speech from Acapela Group™. Installation requires option upload and installation of speech library SD memory card onto host card. Pre-loaded SD card and instructions provided.)

+2L-SPAN Add Spanish-language upgrade (add-on to option +TTS; option +TTS required)

+EAS Emergency Alert System Text Crawl Generation Option