

C2-7310 2-Channel 11-Input Video-Audio Processor

moves well beyond video processing, switching and HD-SDI Up, Down and Cross Conversion by providing the most powerful audio processing in its category. Two independent video processing and scaling engines and two video mixers provide maximum flexibility in handling SD-SDI, HD-SDI, Composite Video, YC (S-Video), YUV Component, YPbPr HD Component DVI and RGB. At home in both broadcast and presentation environments, the C2-7310 is multiple products in one.

Three operating modes simplify control:

Switcher Mode - Equally powerful Program and Preview channels allow any function (Next Image, PIP, Keying, Logo, etc.) to be set up and previewed, totally independent of the Program output. Transition from Preview to Program is by Cut, Dissolve or Special Effect.

Independent Mode - Provides all the power of two completely independent scalers in one box, each with a full range of features, including PIP, Keying, etc. Each output can deliver different formats and resolutions simultaneously. For example, a presentation being fed to a high resolution display on Output 1 via DVI can be fed to a VCR for recording on Output 2 via Composite Video. Two projectors may be edge blended from one unit.

Dual PIP Mode - Any video input can be squeezed and placed into either of two windows of any size and positioned anywhere on the screen, even overlapping, with user defined layer priority control. The windows can be placed over any other video input as the background. The window's image can then be seamlessly switched, faded or zoomed. Keying can be independently applied to each window.

Powerful Features – The 4:4:4 sampling provides full bandwidth color which allows precise keying, including Transparent (Soft) Keys. The 11 video inputs can accommodate signals (either analog or digital, video or computer) in a variety of formats and resolutions. It handles most HDTV and RGB resolutions and formats and new resolutions can be easily added. Each of the two independent outputs delivers a wide range of digital and analog video signals.

In addition to SD and HD television formats, the C2-7310 output signal format flexibility assures that the Native Resolution of most digital displays can be matched. Using the software based resolution calculator, new or unusual resolutions can be instantly added to the menu. Signal parameter adjustments can be made for each video input and are stored in individual non-volatile memories. Integral Test Signals are user defined. A logo memory is provided, so the unit can easily be used as a Logo Inserter. Motion compensation, diagonal interpolation and a 3:2 Pulldown feature for NTSC greatly improve the image quality. Pixel Level Motion Adaptive Diagonal Interpolation insures high quality de-interlacing of PAL and NTSC signals



C2-7310

Key Video Features of the C2-7310

- Analog to HD-SDI Up, Down, Cross Conversion
- SD-SDI to HD-SDI Cross Conversion
- Seamless Switching with Cuts, Fades or Effects
- Dual Independent Scaling Engines
- 4:4:4 Sampling for full bandwidth color
- 11 Multi-format Inputs: 3x CV, 3x YC, 3x DVI-I (RGB, YUV & YPbPr), 2x SD/HD-SDI
- 2 Independent Output Channels, each with: SD/HD-SDI, Composite Video, YC (S-Video), DVI-I (RGB, YUV & YPbPr)
- Analog RGB to 2048x2048, HD to 1080p
- DVI to 1280x1024/60, HD to 1080p/30
- Genlock any Video Input to any other
- Pixel Level Motion Adaptive Diagonal Interpolation
- Unrestricted Dual PIP - Any Input over any other
- Multiple Layering and Windowing Capability
- Flexible Key Layering - Background Lock Source can be moved to the Foreground
- RS-232 & IP Interfaces & Windows Control Panel
- External Control by Third Party Control Systems
- External Hardware Control by Optional CC-300
- CORIO2® Technology Conversion Engines
- Zoom up to 1000% with full Positioning
- Image Shrink to 10% with full Positioning
- Multiple Conversion & Scaling products in one

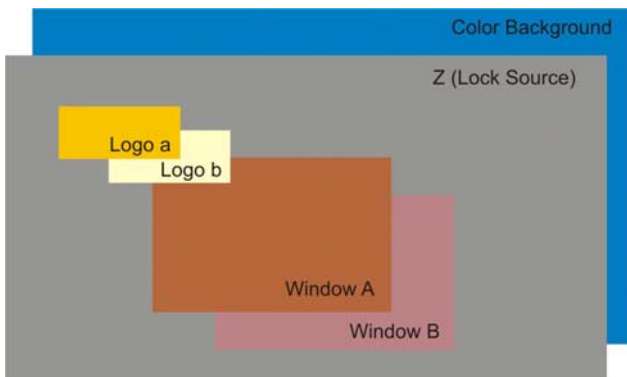
Key Audio Features of the C2-7310

- 32 Channels of Stereo Audio Processing:
 - 16 Input Channels via external connector
 - 16 Input Channels from 2x SD/HD-SDI In
 - 16 Output Channels via external connector
- SD/HD-SDI Stereo Embedding:
 - 8 Channels into each of 2x SD/HD-SDI Out
- SD/HD-SDI De-embedding:
 - 8 Channels from each of 2x SD/HD-SDI In
- Stereo Channels assignable to any Video I/O
- AES Sampling Rates of 24, 32, 48KHz
- DARS Synchronized
- Individual Stereo Channel Processing, including Delay, for all 32 Channels
- Automatic Audio Delay to match Video Delay
- AES3-id directly on 2x HD-44 connectors
- Wide variety of Breakout Units available for AES3, Analog Balanced and Unbalanced Stereo

Setup and Control is extremely flexible. Local control is provided by the 48-button CORIO EXP Front Panel designed expressly for handling live events. These buttons plus the multi-way navigation control and integrated LCD bring all the control needed for quick and easy access right to the front panel. Remote control via RS-232 or Ethernet (IP) is standard. Macros are provided to facilitate complex command sequences. The Windows Control Panel affords complete control of the unit. The CC-300 CORIO console option takes control to the next level by providing the C2-7000 series with the operational feel of a traditional Video Production Switcher. Two rows of 14 buttons, a fader bar, joystick and an integrated LCD touch screen provide access to the powerful C2-7000 series functions with a minimum of keystrokes. Event control directly from the CC-300 is available by the integral interface to Calypso control systems. Virtually any third party device is controllable

Image Layer Processing within the C2-7000 series utilizes a multiple layer video display system whose stacking order can be altered as desired by the user. Using the dual PIP as an example, the layers consist of:

- 1 or 2 image windows (A & B) that can be resized and positioned as desired
- a lock source (the Z layer) which can be an active video background
- 1 or 2 logo images (a & b)
- a color background



Should the user wish, the layers can be re-ordered (example: B in front of A) and the individual layers can also be made opaque, semi-opaque or transparent. Windows A & B can be positioned anywhere on the screen and used as either key sources or key background images. Logos a & b can also be positioned anywhere on the raster and have their appearance set to opaque normal keying or to semi-transparent for channel branding. When keying, the Z Layer may be moved from the background to the foreground.

Multiple Products in One

- 11-Input Multi-format Seamless Switcher
- 32 Channel Stereo Audio Processing
- 2x 8 Stereo Channel SD/HD-SDI Embedders
- 2x 8 Stereo Channel SD/HD-SDI De-Embedders
- 2x Audio Synchronizers (DARS)
- 2x Analog to SD/HD-SDI Up Converters
- 2x SD-SDI to HD-SDI Cross Converters
- 2x DVI to SD/HD-SDI Up Converters
- 2x HDTV to HDTV Cross Converters
- 2x PC/HD Cross Converters
- 2x Video to PC/HD Up Converters
- 2x PC/HD to Video Down Converters
- 2x Video Transcoders
- 2x Universal Video Scalers
- 2x Single Window PIP Devices
- 1x Dual Window PIP Device
- 2x Worldwide TV Standards Converters
- 2x Logo Inserters
- 2x Frame Synchronizer/Timebase Correctors
- 2x Aspect Ratio Converters
- 2x Chroma/Lumakeyers

Edge Blending is a standard feature of the C2-7000 series. Because of the ability to 'feather' any or all of the edges, multiple images can be aligned vertically, horizontally, or both to create unusual displays. Since it is dual channel, only one unit is required to blend two edges. Using multiple C2 units, a large number of images can be blended. Edge Blending is not limited to high resolution RGB computer images, but can be applied to any input. Gamma correction is employed to compensate for many of the problems faced when blending between projectors. Special preparation of the video in advance is not necessary, since all processing is done within the unit.

Other products in the C2-7000 family

C2-7210 provides all the features and functions of the C2-7310 except without the integral audio processing.

C2-7200 provides all the features and functions of the C2-7210 except without the CORIO EXP front panel.

C2-7260 has all the features and functions of the C2-7210 except that it has 8 HD-SDI Inputs for a total of 17.

C2-7110 provides all the features and functions of the C2-7210, except without SDI/HD-SDI Inputs/Outputs.

C2-7100 provides all the features and functions of the C2-7110 except without the CORIO EXP front panel.

Video Specifications

Video Inputs

Composite Video	3x via BNC Connector
YC (S-Video)	3x via 4-PIN Mini-DIN Connector
DVI-I (Note 1)	3x via DVI-I Connector
SD-SDI or HD-SDI	2x via BNC

Genlock Input

Reference Signal	Any of the Video Inputs
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Independent Output 1

Composite Video	1x via BNC Connector
YC (S-Video)	1x via 4-PIN Mini-DIN Connector
DVI-I (Note 1)	1x via DVI Connector
SD-SDI or HD-SDI	1x via BNC

Independent Output 2

Composite Video	1x via BNC Connector
YC (S-Video)	1x via 4-PIN Mini-DIN Connector
DVI-I (Note 1)	1x via DVI Connector
SD-SDI or HD-SDI	1x via BNC

Input/Output Range

Computer Resolutions	Analog: Up to 2048x2048 DVI: Up to 1280x1024 @30Hz
HDTV Resolutions	Analog: Up to 1280x1024 @60Hz DVI: Up to 1080p @30Hz
Max Vert Refresh Rate	250Hz
Max Horiz Frequency	150KHz
Interface Support	Progressive and Interlaced
Television Standards	NTSC 3.58, 4.43, PAL-B,G,I ,D, H, PAL-M, PAL-N

SDI	SECAM (Input Only) SD-SDI or HD-SDI
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Input RGB Sync

Type	RGBHV, RGBS, RGsB
Level / Impedance	TTL, 10KΩ
Polarity	Positive or Negative
Maximum Level	5Vp-p

Output RGB Sync

Type	RGBHV, RGsB
Level / Impedance	5Vp-p, 220Ω
Polarity	Positive or Negative

SDI Jitter

SMPTE259M-C	(270Mbps: 525/625 Line) Jitter 0.070 +/-0.01 UI
SMPTE292M	(1.485/1.4835Gbps: 720p, 1035i, 1080i,1080p) Jitter 0.176 +/-0.02 UI

SD-SDI I/O Vertical Rates - SMPTE259M-C

525i (720x488)	59.94Hz
625i (720x576)	50 Hz

HD-SDI I/O Vertical Rates - SMPTE292M

720p (1280x720)	23.98, 24, 25, 29.97, 30, 50, 59.94, 60Hz
1035i (1920x1035)	29.97, 30Hz
1080i (1920x1080)	25, 29.97, 30Hz
1080p (1920x1080)	23.98, 24, 25, 29.97, 30Hz

Control Methods

Local Front Panel	48 Button EXP front panel +LED and LCD
RS-232 Interface	DB-9 Male Connector
IP Interface	RJ45 Connector

Environmental

Operating Temperature	4° to +45° C (+40° to +113° F)
Operating Humidity	10% to 85%, Non-condensing
Storage Temperature	0° to +60° C (32° to +140° F)
Storage Humidity	10% to 85%, Non-condensing

General

Image Size & Position	AutoSet or Manual
Image Zoom Range	Continuous to 1000%
Image Shrink Range	Continuous to 10%
Image Mirroring	Horizontal and/or Vertical
Image Freeze	Full Frame
Video Sampling Rate	108MHz
Resolution Memory	Approximately 1,000 Definable
Firmware Memory	Flash, Upgradeable via RS-232
Flicker Filter	4-Level Vertical
Picture-in-Picture	2 Windows + Background from any 3 Video Inputs

Number PIP Windows	2 in Dual PIP Mode 1 in Switcher & Ind. Modes
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Video I/O Impedance	75Ω
Video Decoder	9-bit Digital
Comb Filter Decoding	Adaptive

De-Interlacing (PAL-NTSC)	Pixel-level Motion Adaptive Diagonal Interpolation
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Film Mode (NTSC)	3:2 Pull Down Detection
Video Encoder	10-bit Digital
Digital Sampling	24-bit, 8-bits per R, G and B
Colors	16.7 Million

Video Scaling Engine	Proprietary CORIO2®
Internal Format	4:4:4 YUV

Internal Test Patterns	User Defined
LCD Panel	24x2 Character
Logo Inserter	Flash Programmable
Proc Amp Adjustments	Brightness, Contrast, Saturation, & Hue for CV & SV Inputs, plus Video Level for RGB Input

Proc Amp Memory	Settings for each Video Input
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Warranty

Limited Warranty	2 Years Parts and Labor
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Regulatory Approvals

Video Scaler Unit	FCC, CE, RoHS
Power Supplies	UL, CUL, CE, PSE, GS, RoHS

Mechanical

Desktop Case (HWD)	44x420x200mm (1.75"x17"x7.9")
With Rack Ears (HWD)	44x482x200mm (1.75"x19"x7.9")
Weight (Net)	3.8 kg (8.4 lbs)

Power Requirement

Internal Power Supply	100-240VAC, 47-63Hz, 50W
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Accessories Included

1x AC Power Cord	6' (2m) US, UK or Euro
2x VGA to DVI Adapters	HD-15 Female to DVI-I

1x Operations Manual	
1x Rackmount Kit	2 Ears and 4 Screws
1x Control Software	Downloadable from website

Product Item Number

C2-7310	2-Channel Video-Audio Processor w/HD-SDI I/O
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Optional Audio Breakout Units

A2-7312	16 AES3-id (8-in,8-out) on BNC's
A2-7302	16 AES (8-in,8-out) on XLR's
A2-7342	8 Analog Stereo (4-in, 4-out) on XLR's
A2-7322	16 Analog Stereo (8-in, 8-out) on Terminal Strips

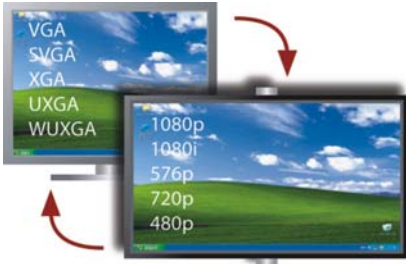
Optional Accessories

CC-300	Hardware Control Panel
RM110	Rear rack rail supports for 24" to 32" deep racks

Notes

(1) DVI-I Input/Output connectors also accommodate RGBHV, RGsB, YUV & YPbPr signal formats.

Sample Capabilities



Dual Channel Universal Signal Conversion – Up, Down, Cross



Dual Channel Chromakey with simultaneous PIP Insertion



Multi-Format, Dual PIP over an Active Video Background

Sample Windows Control Panel Screens

Window Setup Menu



Switcher Dual PIP Menu



Outputs Menu



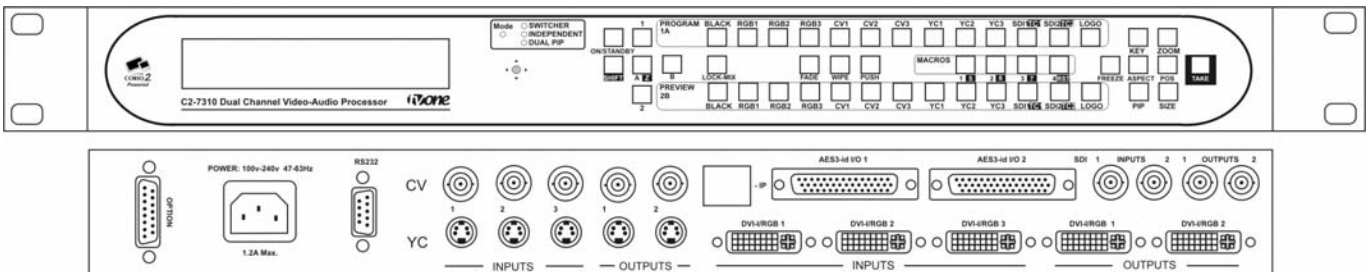
Resolution Editor Menu



Keyer Menu

Panel Drawings

C2-7310



Integral Stereo Audio Processing of the C2-7310 allows the user to embed, de-embed, delay, mix, route and sample rate convert an astonishing 32 channels of Digital Stereo Audio to satisfy even the most challenging requirements. The superior quality of the C2-7310 means that the full 8 channels of Digital Stereo Audio at 48KHz embedded within each of the two SD/HD-SDI inputs can be de-embedded and processed along with a further 16 channels of AES-3id data, frequency between 24 to 48KHz, that can be input via the two rear panel HD-44 connectors, giving a total of 32 Digital Stereo Audio inputs processed simultaneously. Each Stereo Audio channel can be delayed by up to 5 seconds using exceptionally fine delay adjustment and the gain can be altered to anywhere between 0 and 800%.

A supremely high-quality sample rate conversion is also employed by the unit which enables the unit to increase or decrease the sample frequency on each audio channel as required whilst ensuring optimum audio output, alternatively all of the AES audio channels can be synced to a DARS. Each Stereo Audio output can also be processed by down-mixing up to 3 uniquely delayed and sample rate converted Stereo Audio inputs and routed to any audio output required. The C2-7310 also automatically adjusts audio delay to match the video processing delay.

Up to 16 AES Stereo Audio channels can be output at a frequency of 48KHz or DARS synchronized using the two HD-44 connectors on the back of the unit. Each of the two SDI outputs on the C2-7310 can have up to 8 channels of 48KHz Stereo Audio embedded in the video signal that is output via BNC connectors.

Due to the highly flexible internal audio routing, these 32 stereo input channels are not restricted for use within the HD-SDI signal, but can be assigned to and will then follow any of the other Composite, Component, S-Video, RGB or DVI inputs and outputs.

The 2x HD-44 connectors support AES-3id audio format directly and optional breakout units are available to interface to a wide variety of digital and analog audio formats. Each of these optional breakout units connect to a single of the C2-7310's HD-44 connectors, so a total of two units may be simultaneously attached to provide maximum interface flexibility.

A2-7300 Series units are high quality audio format converters designed primarily to provide maximum format flexibility for the C2-7310 HD Audio/Video Processor's audio inputs and outputs. The C2-7310 provides AES3-id audio I/O via two HD-44 Connectors. Any two of the A2-7300 models, or two of the same model, can connect to these connectors to bring the AES3-id signals out to BNC connectors or to change the audio format completely. All of the AES audio channels can be synchronized to a DARS reference when connected to the C2-7310 via any of the A2-7300 units. Additionally, the A2-7300 units may be used in

conjunction with one another, without the C2-7310, to provide bi-directional analog/digital or AES3/AES3-id conversion.

A2-7302 provides an HD-44 interface to 16 AES (8-in/8-out) on XLR connectors and a DARS reference input on a BNC connector. This unit contains eight balanced AES to AES3-id converters, plus eight AES3-id to balanced AES converters to provide AES I/O.



A2-7312 provides an HD-44 interface to 16 AES3-id (8-in/8-out) and a DARS reference input on BNC's mounted on a 1RU panel via a 1.5 meter (4.5') interconnect cable. The connectors may be separated from the panel if system wiring requirements dictate.



A2-7322 provides an HD-44 to 16 Analog Stereo (8-in/8-out), balanced or unbalanced, on terminals and a DARS reference input on a BNC connector. This unit contains eight high quality stereo analog to AES3-id converters, plus eight high quality AES3-id to stereo analog converters. The audio sample rate is user adjustable in stand alone mode using DIP switches or selectable from the C2-7310 menu when connected.



A2-7342 provides an HD-44 to 8 Analog Stereo (4-in/4-out) on XLR's and a DARS reference input on a BNC connector. This unit contains four high quality stereo analog to AES3-id converters, plus four high quality AES3-id to stereo analog. The audio sample rate is user adjustable in stand alone mode using DIP switches or selected from the C2-7310 menu when connected.



Key Audio Features of the A2-7312

- 8 AES3-id Inputs + 8 Outputs on 75Ω BNC
- DARS AES3-id Input on a BNC Connector

Key Audio Features of the A2-7302

- 8 Balanced AES Inputs + 8 Outputs on XLR
- DARS AES3-id input on a BNC connector

Key Audio Features of the A2-7322

- 8 Balanced/Unbal. Stereo In + 8 Out on Terminals
- DARS AES3-id Input on a BNC connector
- User adjustable sample rates 32, 44.1, 48KHz

Key Audio Features of the A2-7342

- 4 Balanced Stereo Inputs + 4 Outputs on XLR
- DARS AES3-id Input on a BNC Connector
- User adjustable sample rates 32, 44.1, 48KHz

Audio Specifications - C2-7310 Unit

Audio Inputs	
Digital Stereo	16x via HD-44 Connectors (Note 1) with direct breakout to BNC's 16x via SDI De-Embedding
DARs Reference	2x via HD-44 Connectors, AES3-id or word clock
Format	AES3-id
Assignable	to any of the 11 Video Inputs
Input Level	0.8V to 1.2V p-p
Impedance	75Ω
Sample Rate	24, 32, 48KHz
Audio Outputs	
Digital Stereo	16x via HD-44 Connectors (Note 1) with direct breakout to BNC's
Format	AES3-id
Assignable	to any of the 8 Video Outputs
Output Level	1V p-p
Impedance	75Ω
Sample Rate	48KHz
Rise/Fall Time	Between 30 and 44ns
AES Noise (THd+N)	>100db
SDI Noise (THd+N)	>100db
DC Offset	<50mV

SDI Audio Embedding	
Format	SD or HD-SDI
Number of Channels	Up to 8 SDI Stereo Channels
Sample Rate	48KHz
SDI Audio Extraction	
Format	SD or HD-SDI
Number of Channels	Up to 8 SDI Stereo Channels
Sample Rate	48KHz
Audio Control and Routing	
Selectable Routing	Each AES3-id or De-Embedded SDI audio channel can be assigned to any of the 11 Video in
Adjustable Audio Delay	0-5 Sec for each Stereo Channel
Level Adjustments	0-800% for each Stereo Channel
Muting Control	for each Stereo Channel
Balance Adjustments	for each Stereo Channel
Audio Follow Video	Including Mixing and Fading during C2-7310 Switcher Mode
Synchronization	DARS
Notes	
(1) Each HD-44 Connector contains 8 AES3-id Stereo Audio Channels In and 8 AES3-di Stereo Channels Out. 1 or 2 breakout units may be simultaneously connected.	

Audio Specifications – Accessory Units

A2-7302 Format Converter	
Interface to C2-7310	via HD-44 Connector
Digital Audio I/O	
Inputs	8 Channels AES3 via 8x XLR
Outputs	8 Channels AES3 via 8x XLR
DARS Reference	75Ω BNC
Impedance	110Ω (Digital I/O)
Voltage Levels	1Vp-p AES3-id input on HD44 equates to 0.5Vp-p out on XLR (or 1Vp-p differential). 5Vp-p (differential) AES3 input on XLR equates to 2.0 Vp-p output on HD44
Mechanical	
Size (HWD)	44x482x200mm (1.75"x19"x7.9")
Weight	2.5kg (5.5 lbs)
Regulatory Approvals	
Format Converter	FCC, CE, RoHS

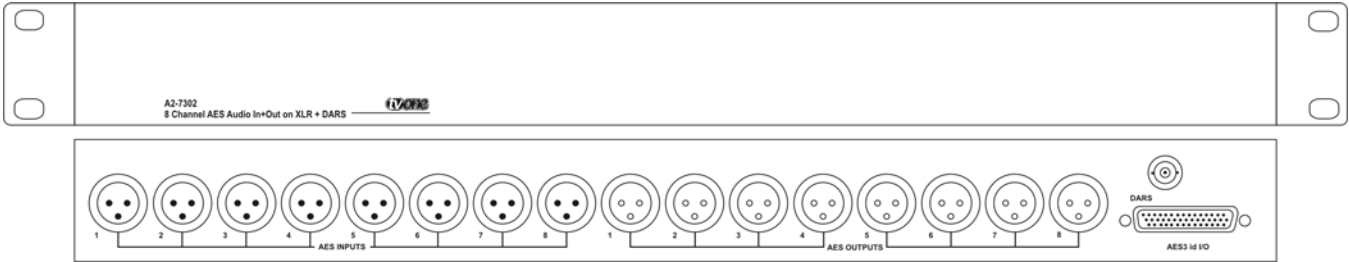
A2-7322 Format Converter	
Interface to C2-7310	via HD-44 Connector
Analog Stereo Audio I/O	
Inputs	8 Channels Stereo via Terminals
Outputs	8 Channels Stereo via Terminals
DARS Reference	75Ω BNC
Impedance	600Ω Balanced (Analog I/O)
Voltage Level	6Vp-p input maximum (8.75dBu). 0dBFS AES3 input equating to 8.75dBu analog output
THD+Noise at 48KHz	100dB (A to D), -97dB (D to A)
Mechanical	
Size (HWD)	44x482x200mm (1.75"x19"x7.9")
Weight	2.8kg (6.2 lbs)
Power Requirement	
External Power	12VDC @ 1A
Regulatory Approvals	
Format Converter	FCC, CE, RoHS

A2-7312 Breakout Unit	
Interface to C2-7310	via HD-44 Connector
Digital Audio I/O	
Inputs	8 Channels AES3-id via 8 x BNC
Outputs	8 Channels AES3-id via 8 x BNC
DARS Reference	75Ω BNC
Impedance	75Ω (Digital I/O)
Voltage Level	1V p-p
Mechanical	
Size (HW)	44x482mm (1.75"x19")
Weight	1.1kg (2.4 lbs)
Regulatory Approvals	
Breakout Unit	FCC, CE, RoHS

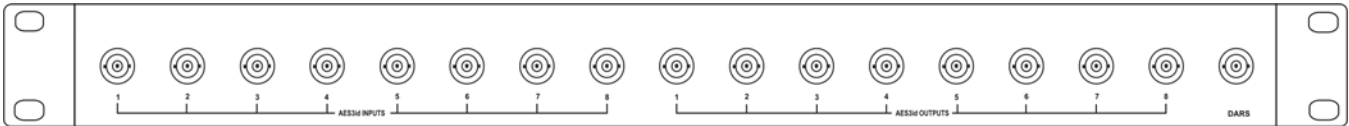
A2-7342 Format Converter	
Interface to C2-7310	via HD-44 Connector
Audio Stereo Audio I/O	
Inputs	4 Channels Stereo via 8x XLR
Outputs	4 Channels Stereo via 8x XLR
DARS Reference	75Ω BNC
Impedance	600Ω Balanced (Analog I/O)
Voltage Level	0dBFS =6Vp-p (8.75 dBu) AES3 input maximum
THD+Noise at 48KHz	100dB (A to D), -97dB (D to A)
Bandwidth	30 Hz to 22.5 kHz (-3dB)
Mechanical	
Size (HWD)	44x482x200mm (1.75"x19"x7.9")
Weight	2.7kg (6.0 lbs)
Power Requirement	
External Power	12VDC @ 1A
Regulatory Approvals	
Format Converter	FCC, CE, RoHS

Panel Drawings

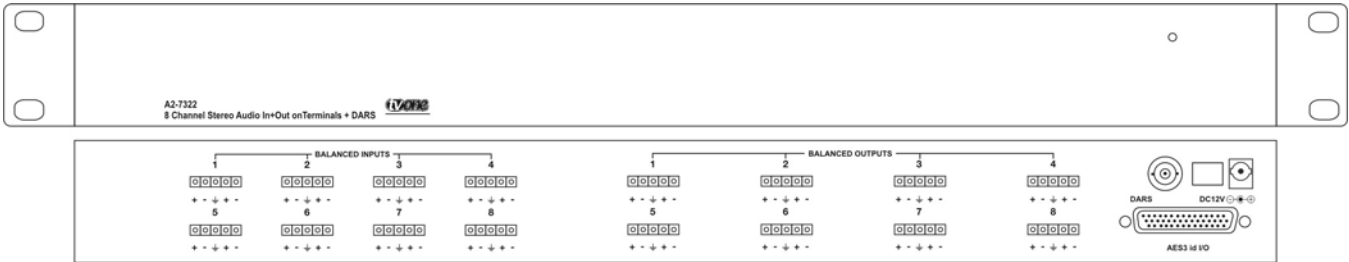
A2-7302



A2-7312



A2-7322



A2-7342

