

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 scalars 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.

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 each other with user defined layer priority control. The windows can be placed over any other video input or a static image from memory as the background. The image in the window can then be seamlessly switched, faded or even zoomed. Keying can be applied to each window independently.

Powerful Features - 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 all known HDTV formats plus any analog RGB resolution up to 2048x2048 - 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 virtually any Digital Display 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 fast Logo memory is provided, so the unit can easily be used as a Logo Inserter. Advanced motion compensation (NTSC and PAL) is employed to smooth out fast moving images and its automatic 3:2 Pull-down detection efficiently de-interlaces video from 24 fps film (NTSC).

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



C2-7310

Multiple Products in One

- 11-Input Multi-format Seamless Switcher
- 32 Channel Stereo Audio Processing (16 in, 16 out)
- 2x Analog ◀-▶ SD/HD-SDI
- 2x SD-SDI ◀-▶ HD-SDI
- 2x DVI ◀-▶ SD/HD-SDI
- 2x HDTV ◀-▶ HDTV
- 2x Universal Scalars
- 2x Logo Inserters
- 2x Single Window PIP
- 1x Dual Window PIP
- 2x Standards Converters
- 2x Up Converters
- 2x Frame Sync/TBC's
- 2x Down Converters
- 2x Aspect Ratio Converters
- 2x Cross Converters
- 2x Chroma/Lumakeyers
- 2x Video Transcoders
- 2x 8 Stereo Channel SD/HD-SDI Audio Embedders
- 2x 8 Stereo Channel SD/HD-SDI Audio Extractors

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 provides 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

CC-300



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 units, there is no limit to the number of blended images. 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.

Integral Audio Processing of the C2-7310 allows the user to embed, de-embed, delay, mix, route and sample rate convert an astonishing 48 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 of any frequency 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 96KHz, 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 2 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 user 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. Control data, when included in an incoming audio signal can be extracted and displayed to the user. Each Stereo Audio output can also be processed by down-mixing up to 3 uniquely delayed and scaled Stereo Audio inputs and routed to any audio output required. The C2-7310 also employs many automatic features including audio follow video and automatic audio delay to match the video processing delay.

Up to 16 AES Stereo Audio channels can be output at a frequency of 24, 32, 48, 96 KHz 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 channels (16 in and 16 out) are not restricted for use within the HD-SDI signal, but can be assigned to 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.

A2-7311 for 16 AES3-id (8-in, 8-out) on BNC's.



A2-7302 for 16 AES (8-in, 8-out) on XLR's.



A2-7342 for 8 Analog Stereo (4-in, 4-out) on XLR's

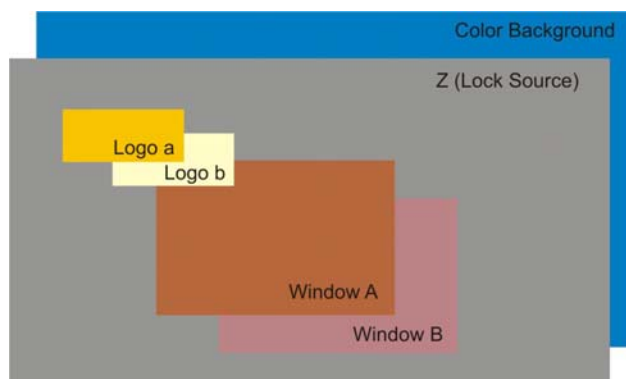


A2-7322 for 16 Analog Stereo (8-in, 8-out) on Terminals



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 or still image 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.

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
S-Video (Y/C)	3x via 4-PIN Mini-DIN Connector
DVI-I (Note 1)	3x via DVI-I Connector
SDI (SD 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
S-Video (Y/C)	1x via 4-PIN Mini-DIN Connector
DVI-I (Note 1)	1x via DVI Connector
SDI (SD or HD-SDI)	1x via BNC

Independent Output 2

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

Input/Output Range

Computer Resolutions	Analog: Up to 2048x2048 DVI: Up to 1280x1024
Max Vert Refresh Rate	250Hz
Max Horiz Frequency	150KHz
HDTV Resolutions	All thru 1080p
Interlace Support	Progressive and Interlaced
Television Standards	NTSC 3.58, 4.43, PAL-B,G,I ,D, H, PAL-M, PAL-N & SECAM (In Only)
SDI	SD-SDI or HD-SDI

Input RGB Sync

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

Output RGB Sync

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

Control Methods

Local Front Panel	10x2 Programmable Buttons +LED, Rotary Selector, and LCD
RS-232 Interface	DB-9 Male Connector
IP Interface	RJ45 Connector

Mechanical

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

Environmental

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

Regulatory Approvals

Video Scaler Unit	FCC, CE, RoHS
Power Supplies	UL, CE, CSA, RoHS

Warranty

Limited Warranty	2 Years Parts and Labor
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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

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	75 Ω
Video Decoder	9-bit Digital
Comb Filter Decoding	Adaptive
De-Interlacing (PAL-NTSC)	Pixel-level Motion Adaptive
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

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

1x C-Video I/O Cable	6' (2m) BNC to BNC
1x S-Video I/O Cable	6' (2m) 4-Pin S-V to 4-Pin S-V
1x DVI I/O Cable	6' (2m) DVI-I to DVI-I
5x RGBHV I/O Adapters	DVI to HD-15 Adapters
2X AES3-id Breakouts	2' HD-44 to BNC Adapters
1x AC Power Cord	6' (2m) US, UK or Euro Type
1x RS-232 Cable	6' (2m) D9F to DB9F
1 DVI-A to 5 BNC	6' (2m) DVI-A to 5 BNC
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

A2-7311	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
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Notes

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

Audio Specifications

C2-7310 Unit

Audio Inputs

Digital Stereo	16x via HD-44 Connectors (Note 1) with direct breakout to BNC's
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, 48, 96 KHz

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	24, 32, 48, 96 KHz
Rise/Fall Time	Between 30 and 44ns
Jitter	TBA
DC Offset	<50mV

SDI Audio Embedding

Format	SD or HD-SDI
Number of Channels	Up to 8 SDI Stereo Channels
Sample Rate	24, 32, 48, 96 KHz

SDI Audio Extraction

Format	SD or HD-SDI
Number of Channels	Up to 8 SDI Stereo Channels
Sample Rate	24, 32, 48, 96 KHz

Audio Control and Routing

Selectable Routing	Each AES3-id can be assigned to any of the 11 video inputs
Adjustable Audio Delay	0-2 Sec for each Stereo Channel
Level Adjustments	0-100% 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.

A2-7311 Breakout Unit

Input

Digital Stereo Audio	16 Channels AES3-id (8-in, 8-out)
Connector	1x HD-44
Voltage Level	TBA
Impedance	110Ω

Output

Digital Stereo Audio	16 Channels AES3-id (8-in, 8-out)
Output Connectors	16x BNC
Voltage Level	TBA
Impedance	110Ω

Mechanical

Size (HWD)	1RU
Weight	TBA

Power Requirement

None

A2-7302 Breakout Unit

Interface to C2-7310 via HD-44 Connector

Audio Inputs

Digital Stereo 8 Channels AES3 on 8x XLR

Audio Output

Digital Stereo 8 Channels AES3 on 8x XLR

Signal

Voltage Level	TBA
Impedance	110Ω

Mechanical

Size (HWD)	1RU
Weight	TBA

Power Requirement

External Power Supply 12VDC @ 1A

Regulatory Approvals

Breakout Unit	FCC, CE, RoHS
Power Supply	UL, CE, CSA, RoHS

A2-7342 Breakout Unit

Interface to C2-7310 via HD-44 Connector

Audio Inputs

Analog Stereo 4 Channels Stereo on 8x XLR

Audio Output

Analog Stereo 4 Channels Stereo on 8x XLR

Signal

Voltage Level	TBA
Impedance	600Ω Balanced

Mechanical

Size (HWD)	1RU
Weight	TBA

Power Requirement

External Power Supply 12VDC @ 1A

Regulatory Approvals

Breakout Unit	FCC, CE, RoHS
Power Supply	UL, CE, CSA, RoHS

A2-7322 Breakout Unit

Interface to C2-7310 via HD-44 Connector

Audio Inputs

Analog Stereo 8 Channels Stereo on Terminals

Audio Output

Analog Stereo 8 Channels Stereo on Terminals

Signal

Voltage Level	TBA
Impedance	600Ω Balanced, & 10KΩ Unbal

Mechanical

Size (HWD)	1RU
Weight	TBA

Power Requirement

External Power Supply 12VDC @ 1A

Regulatory Approvals

Breakout Unit	FCC, CE, RoHS
Power Supply	UL, CE, CSA, RoHS

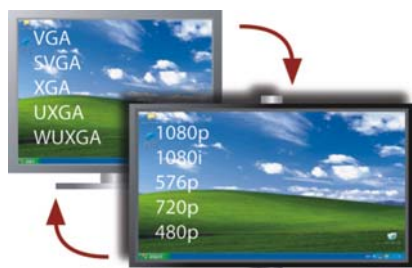
Key Video Features of the C2-7310

- Analog to HD-SDI Up, Down, Cross Conversion
- SD-SDI to HD-SDI Cross Conversion
- Dual Independent Scaling Engines
- Delay free HD-SDI Audio Pass-Thru
- 4:4:4 Sampling for full bandwidth color
- 17 (or 11) Multi-format Inputs
 - 3x Composite Video, 3x S-Video,
 - 8x SD/HD-SDI (2x on C2-7210 & C2-7200),
 - 3x DVI (also handles RGB, YUV & YPbPr)
- 2 Independent Output Channels, each with:
 - SD/HD-SDI, Composite Video, YC (S-Video),
 - DVI-I (also handles RGB, YUV & YPbPr)
- Multiple Conversion & Scaling products in one
- Multi-format Inputs – Digital and Analog
- Analog RGB to 2048x2048, HDTV to 1080p
- Genlock any Video Input to any other
- Seamless Switching with Cuts, Fades or Effects
- 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 Interface Remote Control
- External Control by 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

Key Audio Features of the C2-7310

- 48 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
- Sampling Rates of 24, 32, 48, 96KHz
- DARS Synchronized
- Individual Stereo Channel Processing, including Delay, for all 48 Channels
- Automatic Audio Delay to match Video Delay
- AES3-id directly on 2x HD-44 connectors
- Wide variety of Breakout Units available:
 - AES3-id via BNC connectors
 - AES3 via XLR connectors
 - Balanced Stereo via XLR connectors
 - Balanced/Unbal. Stereo via Terminal Strips

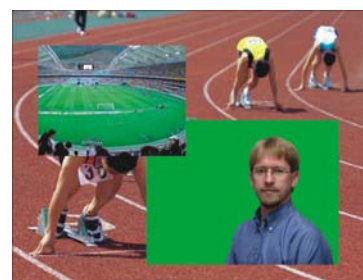
Sample Capabilities



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



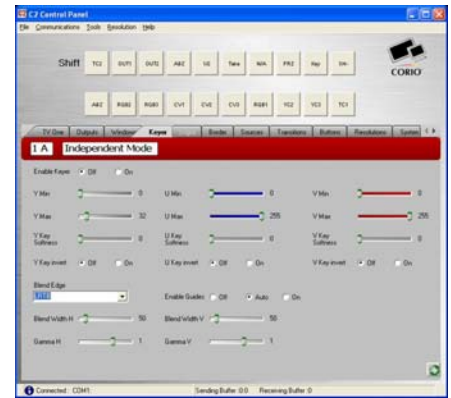
Switcher
Dual PIP
Menu



Outputs Menu



Resolution Editor Menu



Keyer Menu

Panel Drawing

C2-7310

