greenMachine® Datasheet

2CUPXD

2 Channel 3G Up/Down/Cross Converter

packages:
GMPC 2CUPXD
licenses:
GMC-2CUPXD

✓ callisto+
✗ titan

2x3G Up/Down/Cross Converter

Description

The greenMachine 2CUPXD is a broadcast-quality video processing unit that has a dual-channel up/down/cross converter with frame synchronizer supporting formats up to 3G-SDI (1920 x 1080) per channel. It includes full audio processing capabilities, scalars for the spatial conversion of the video signals including a versatile region of interest (ROI) selection and high-performance deinterlacers on the two processing channels.

A greenMachine callisto+ with the 2CUPXD constellation deployed also provides two processing channels with independent **audio embedder & de-embedder**, **audio processing**, **Dolby E® decoding**, **color correction** and many more features. It comes with a fully-featured local control interface with LCD which displays image previews and audio level meters of the processed video paths in addition to the graphical user interface called LynxCentraal. It is also supported by the Nova controller which enables the module to be remotely controlled and monitored via third party master control software.

Functions

2x 3G Scaler:	Spatial converter with powerful region of interest (ROI) selection and scaling. The conversion modes supported are: Pillar box/Letterbox, Center cut, 14:9 conversion, Stretch to fill, and Custom ROI.
Deinterlacer:	Deinterlacers on channel 1 and 2 for SD and HD
Motion adaptive filtering:	Allows deinterlacer to create a sequence of output frames at the same rate as the sequence of input fields eliminating feathering or flickering artefacts.
3G level A/B:	Automatic detection of 3G level A/B Dual link conversion 3G level A <> 3G level B (3G level A acc. to SMPTE ST425-1/4:2:2, 10Bit)
Frame Synchronizer:	Dynamic synchronization of SDI sources. Embedded audio matched to the video processing delay
Metadata Management:	Manages embedded metadata: SMPTE 2020, AFD, WSS, SMPTE 2031 Time code, Closed captions, and Teletext
Video Adjustment:	Adjust saturation, gain black and hue, blanking interval deletion and aperture correction. Apply horizontal flip and YCrCb headroom clipping
Color correction:	Adjust gain, offset, lift, and gamma for Red, Green, and Blue (RGB). Adjust gain and offset adjustments for Cyan, Magenta, Yellow, and White (CMYW)
Embedder/ De-embedder:	Multi-format audio embedder and de-embedder provide access to all the channels in the input SDI and allow shuffling and embedding them to the output(s).
Audio Processing:	Gain adjustment, 1kHz test tone, mute, inversion, stereo to mono-mix on each mono audio channel silence and overload monitoring
Dolby E® decoder:	2x Dolby E® decoder for all 8 channels in a stream. Dolby® metadata can be mapped to VANC acc. to SMPTE 2020-3 and SMPTE 2020-2.
Basic Audio & Video Test Generator	Basic audio & video test signal generator with static video test patterns. Can be configured to output a test pattern on TRS errors with Frame Synchronizer
Timing	Individual video and audio (AES and MADI) delay Maximum video delay per channel is 30 frames Maximum audio delay is 1.3 sec per AES audio channel
LynxCentraal	New control software for automation, remote control and status monitoring
Remote Control	Full SNMP v2 and LYNX IP remote control protocol functionality Enables CustomControl features

Technical Specifications

In/Output Conversion Characteristics

Input Resolution Characteristics	**3G Level A/B**	1080p 50 / 59.94 / 60Hz		
Output Resolution Characteristics	**HDTV**	1080p 23.98 / 24 / 25 /29.97 / 30Hz	1080i 50 / 59.94 / 60Hz	1080psf 23.98 / 24 / 25Hz
		720p 23.98 / 24 / 25 / 29.97 / 30 / 50 / 59.94 / 60Hz		
	SDTV	625 / 50Hz	525 / 59.94Hz	

Conversion Details

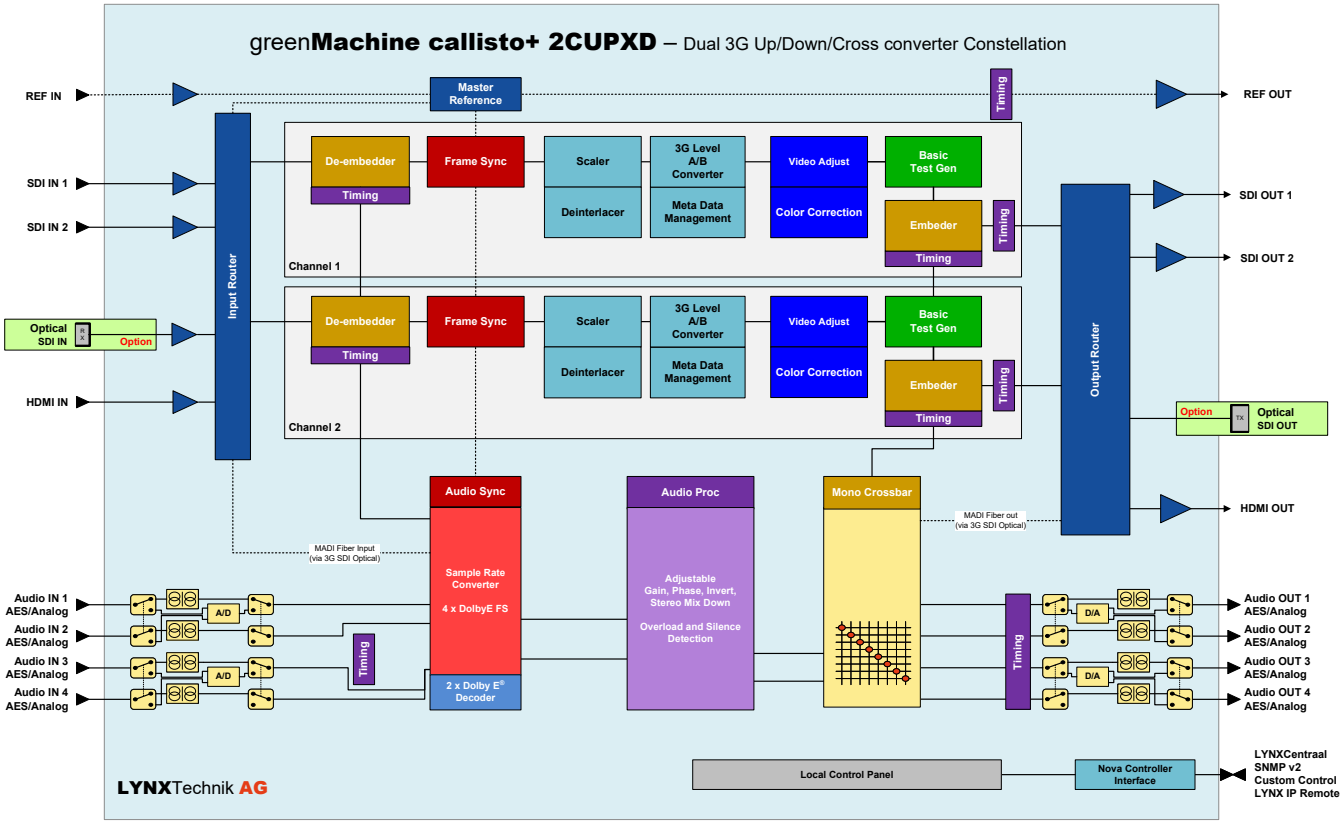
Conversion Modes	• Pill Box / Letter Box • Center Cut • 14:9 Conversion • Stretch to Fill • Custom ROI
Cropping Aspect Ratios	16:9 / 4:3 / custom ROI

Operation Mode

- Dual channel 3G HD configuration (2CUPXD)

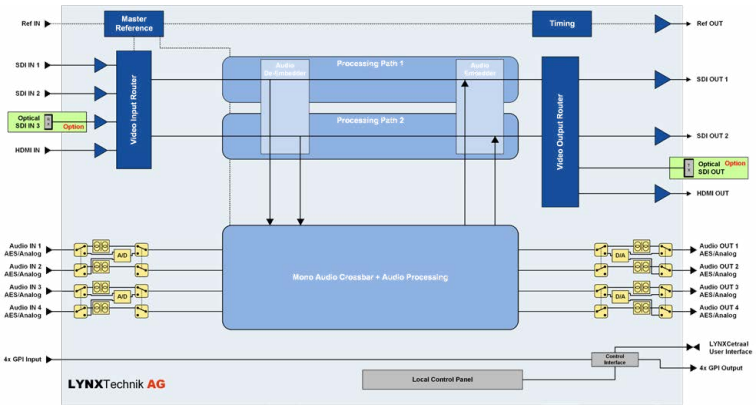
Functional Diagram

3G Dual Channel Mode

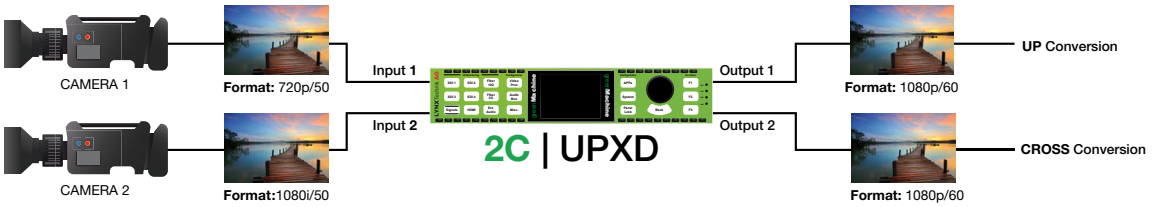


Functional Diagram: callisto+

As the greenMachine callisto+ has two channels for up to 3G video it is capable of processing two independent inputs as two independent outputs. In addition, it has an audio crossbar for embedding / de-embedding SDI audio from and to various sources and destinations. Some of these sources are for example analog audio in form of AES or digital audio as MADI (optional SFP required).
Each audio signal has it's own processing options such as delay, gain and much more.



Example: 2CUPXD Workflow



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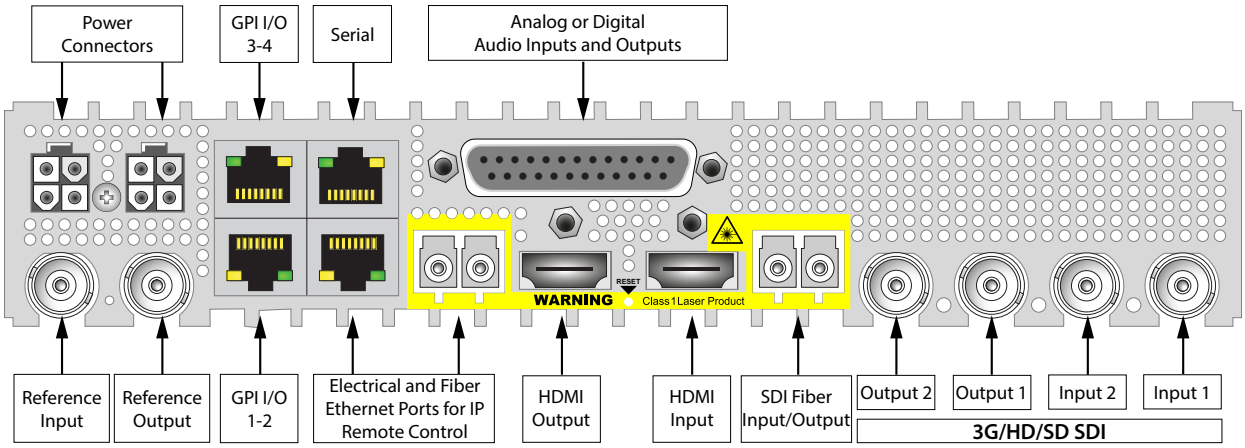
Hardware Specifications



Technical Information

SDI Inputs	2x 3G SDI video on 75 Ohm BNC connector - SMPTE, 292M, 424M, 259M with automatic video format and standard detection	
	Return Loss:	>15dB from 5MHz to 1.5GHz, >10dB from 1.5GHz to 3GHz
	Automatic cable EQ (Belden 1694A):	340m@270Mbit/s, 150m@1.5Gbit/s, 110m@2.97Gbit/s
SDI Output	Analog bi-level (SDTV) or ri-level (HDTV), cross lock capability	
	Timing jitter:	< 0.2 UI @ 270Mbit/s, < 1.0 UI @ 1.5Gbit/s, < 2.0 UI @ 2.97Gbit/s
	Alignment jitter:	< 0.2 UI @ 270Mbit/s, < 0.2 UI @ 1.5Gbit/s, < 0.3 UI @ 2.97Gbit/s
	Return Loss:	>15dB from 5MHz to 1.5GHz, >10dB from 1.5GHz to 3GHz
HDMI	• 1x Input 10 bit HDMI 1.4b (up to 3G) • 1x Output 10 bit HDMI 1.4b (up to 3G)	
Optical I/O (Optional)	• 1x 3G SDI SFP Transceiver (SMPTE 297M - 2006)	
Ethernet (LAN)	1x 10/100/1000 BaseT RJ45 Connector	
Optical Ethernet (Optional)	IEEE 802.3z 1000Base-X Gbit/s Ethernet over Fiber at 1 Gbit/s (125 MB/s)	
GPI I/O	• 4x general purpose inputs (RJ45 Connector) • 4x general purpose outputs (RJ45 Connector)	
Reference Input	• 1x analog video reference on 75 Ohm BNC connector • Analog bi-level (SDTV) or tri-level (HDTV) auto detect	
Reference Output	• 1x analog video reference on 75 Ohm BNC connector	

Serial Data	EIA/ETA RS232C / RS422 /RS 485 (selectable through LynxCentraal) - RJ45 connector ESD protection for up to 16kV	
Audio I/O	4x input and 4x output on Sub-D 25 female connector	
	Analog: input impedance >10k Ohm, Output Impedance 150 Ohm	
	Analog I/O full scale level: selectable 12, 15, 18, 20, 22, 24 dBu	
	Digital: AES3 balanced transformer isolated; Digital output level: 4V peak to peak nom	
	64 channel MADI supported on selected constellations (optional MADI SFP reqired for this)	
Power	12VDC @ 45W nominal (supports 7 - 24VDC input range)	
	2x power connections for redundant power supply	
Mechanical	W: 218mm (1/2 19"), H: 44mm (1.75"), D: 225mm (8.86") - including connectors.	
	Weight: 1.28kg (2.82lb)	
Ambient	Temperature: 5°C to 40°C (41°F to 104°F) maintaining specification	
	Humidity: 90% maximum, non-condensing	

Supported SDI Formats

SDTV Formats	525 / 59.94Hz 625 / 50Hz		
HDTV Formats	1080i / 50Hz 1080i / 59.94Hz 1080i / 60Hz 1080p / 23.98Hz 1080p / 24Hz 1080p / 25Hz 1080p / 29.97Hz	1080p / 30Hz 1080psf / 23.98Hz 1080psf / 24Hz 1080psf / 25Hz 720p / 23.98Hz 720p / 24Hz 720p / 25Hz	720p / 29.97Hz 720p / 30Hz 720p / 50Hz 720p / 59.94Hz 720p / 60Hz
3GBit/s Formats Level A	1080p / 50Hz 1080p / 59.94Hz 1080p / 60Hz		

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Options

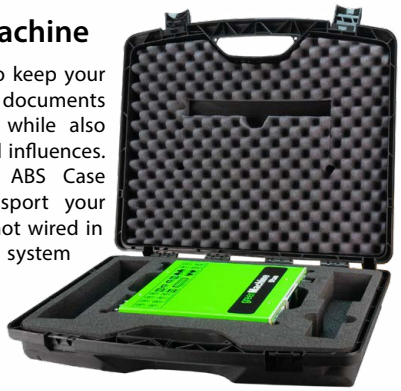
RXT 6001 19" Rack Extension for RFR 6000

The RXT 6001 is a compact and flexible rack extension for RFR 6000. It can be setup to hold up to four RPS A100 power supplies with optimized airflow surfaces.

RXT 6001 installed in RFR 6000

ABS Case for greenMachine

The transport case is perfect to keep your greenMachine®, cables and documents organized and in one place, while also protecting it from enviromental influences. With it's study design, our ABS Case is the ideal partner to transport your greenMachine® whenever it is not wired in a rack, standalone or any other system you can think of.



RFR 6000 - 1RU 19" Rack Mount Chassis

Rack mounting hardware which can accommodate one or two greenMachines in 1RU of rack space which also securely mounts the power supplies.

Note: Two power supplies can be mounted onto one RFR 6000. Please see more information in the RFR 6000 quick reference guide.

SFP Fiber Options

SDI Video Fiber Transmitter		Power
OH-TX-1 LC/SC/ST	3G SDI Fiber TX SFP - LC/SC/ST - 1310nm	-8 ... -3dBm
SDI Video Fiber Receiver		**Sensitivity**
OH-RX-1 LC/SC/ST	3G SDI Fiber RX SFP - LC/SC/ST - 1270-1610nm	-18dBm (SD/1.5G/3G)
OH-RX-8-LC	3G SDI Fiber RX SFP (High Sense) - LC - 1270-1610nm	-26dBm (SD/1.5G/3G)

3G SDI Video Fiber Transceiver		Power	Sensitivity
OH-TR-1-LC	SDI Fiber Transceiver, Singlemode - LC - 1310nm	-8 ... +3 dBm	-16dBm (SD/1.5G/3G)
CWDM SDI Video Transceiver (TR)		**Power**	**Sensitivity**
OH-TR-4-XXXX-LC	3G SDI Fiber Transceiver, Singlemode CWDM capable - 40km* - LC 18 wavelengths acc. to ITU T G692.2: 1270 - 1610nm.	-4 ... +2 dBm	-20dBm (SD/1.5G/3G)
OH-TR-8-XXXX-LC	3G SDI Fiber Transceiver, Singlemode CWDM capable - 80km* - LC 18 wavelengths acc. to ITU T G692.2: 1270 - 1610nm.	+1 ... +5 dBm	-26 ... -28dBm (SD/1.5G/3G)

* **Distance is an approximation.** Actual distances achieved can be longer or shorter depending on the type of fiber cable and accumulated optical losses in the fiber link. Determine link losses and perform optical budget calculations to ensure correct operation.
More SFP options are available.

Ordering Information

greenMachine Package			
Includes	**GM 6825:**	greenMachine callisto+ Processors	
	GMC-2CUPXD:	greenMachine callisto+ - Dual 3G-SDI UPXD converter, FS and Audio processor License	
	RFR 6000	Rack Frame for 1 or 2 greenMachines (without power supplies)	
	2x RPS A100:	Primary and Redundant Power Supplies with Region Specific Power Cord	
GMPC 2CUPXD (N/EU/US/UK)	Dual Channel 3G Up/Down/Cross Converter (Hardware & License) Power plug Variants (please specify when ordering) GMPC 2CUPXD N Power supply without Plug GMPC 2CUPXD EU Power Supply with EU Plug GMPC 2CUPXD US Power Supply with US Plug GMPC 2CUPXD UK Power Supply with UK Plug		**EAN:** 4250479328143
License Only (no hardware included)			
GMC-2CUPXD	greenMachine callisto+ - Dual 3G-SDI UPXD converter, FS and Audio processor (License Only, No Hardware Included)		4250479328136

More broadcast applications:

- *GMC-TESTOR*: Audio & Video Test signal generator in 4K UHD or Quad 3G mode including HDR test patterns
- *GMC-4KUPXD*: 4K Up/down/cross converter
- *GMC-HDREvie+*: Segmented, Dynamic HDR>SDR converter
- *GMC-4FS*: 4x3Gbit/s Frame Synchronizer
- *GMC-BiDi-Transport*: Bi-directional Transport

The greenMachine hardware can be configured for a different broadcast application by re-deploying a different application called "constellation". These perpetual licenses are and application deployment on the greenMachine.

For greenMachine the following regulatory and safety standards apply:

CE: EN 55103-1/1996, EN 55103-2 /1996, EN 60950-1/2006
Following the provisions of 2004/108/EC and 2006/95/EC directives.

FCC: This equipment has been tested and found to comply with the limits for a
Class B digital device, pursuant to Part 15, Subpart B of the FCC Rules.

The RPS A100 power supply (EA11011D-1200) complies with the following safety standards:
UL/cUL 62368-1, TUV EN 62368-1, CB IEC 62368-1, FCC, CE, BSMI, PSE, RCM, IRAM