



4K UPXD

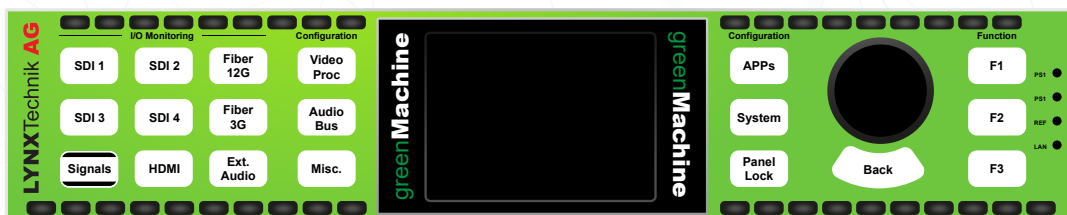
Up/Down/Cross Converter



Description

The greenMachine 4KUPXD is a broadcast-quality video processing unit that has a single channel up/down/cross converter with a frame synchronizer supporting formats up to 4K UHD (3840 x 2160). It includes full audio processing capabilities, scalars for the spatial conversion of the video signals including versatile region of interest (ROI) selection, and high-performance deinterlacer. It also supports 4x3G (2SI Quad link) or 12G SDI (single link) inputs and outputs for 4K UHD signals. With 2SI quad-link <-> single link conversion, signals can be interchanged in between the single link and 2SI quad links.

The greenMachine 4KUPXD system 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 greenGUI. It is also supported by the Nova controller which enables the module to be remotely controlled and monitored via third party master control software.



Features

Processing Channels: One channel supporting format up to 4K UHD with 2SI quad-link <-> single link conversion.

4K/3G-Scaler: A spatial converter with a powerful region of interest (ROI) selection and scaling. Conversion Mode supported: Pillar box/Letterbox, Center cut, 14:9 conversion, stretch to fill, and Custom ROI

Deinterlacer: The de-Interlacer will perform broadcast/quality deinterlacing for incoming interlaced SD and HD video formats and applies motion adaptive filtering resulting in superb image quality.

Motion adaptive filtering: 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: It provides automatic detection of 3G level A/B and allows 3G level A <-> 3G level B dual link conversion. (3G level A acc. to SMPTE ST425-1/4:2:2, 10Bit)

Frame Synchronizer: One of the best synchronizers in the industry utilizing external ref. with a robust "flywheel" function for the synchronization of SDI sources. All embedded audio is extracted and delayed automatically to match the video processing delay, then embedded via a matrix into the SDI output.

Metadata Management: This functionality manages the embedded metadata in the video signals. **Time code**, **Closed captions**, and **Teletext** can be monitored and/or converted.

Video Adjustment: It includes **saturation**, **gain black and hue adjustments**, **blanking interval deletion** and **aperture correction**. It additionally provides a horizontal flip and YCrCb headroom clipping functionality.

Color Correction: It allows adjustments in gain, offset, lift, and gamma for Red, Green, and Blue (RGB). It also provides gain and offset adjustments for Cyan, Magenta, Yellow, and White (CMYW).

Embedder/De-embedder: A multi-format audio embedder and de-embedder provides access to all the channels in the input SDI and allows shuffling and embedding them to the output(s).

Audio Processing: It provides **gain adjustment**, **mute**, **inversion**, and **stereo to mono-mix** on each mono audio channel including **silence** and **overload monitoring**. It has a 1kHz test signal as well.

Dolby E® decoder: Two Dolby E® decoders can be used to decode all 8 channels contain in a Dolby E® stream. The Dolby® metadata can be mapped to VANC acc. to SMPTE 2020-3 and SMPTE 2020-2.

MADI in/out: This provides a MADI input and output. All incoming MADI signals are routed to the internal audio crossbar. The outgoing MADI signal can be completely re-arranged in the internal audio crossbar.

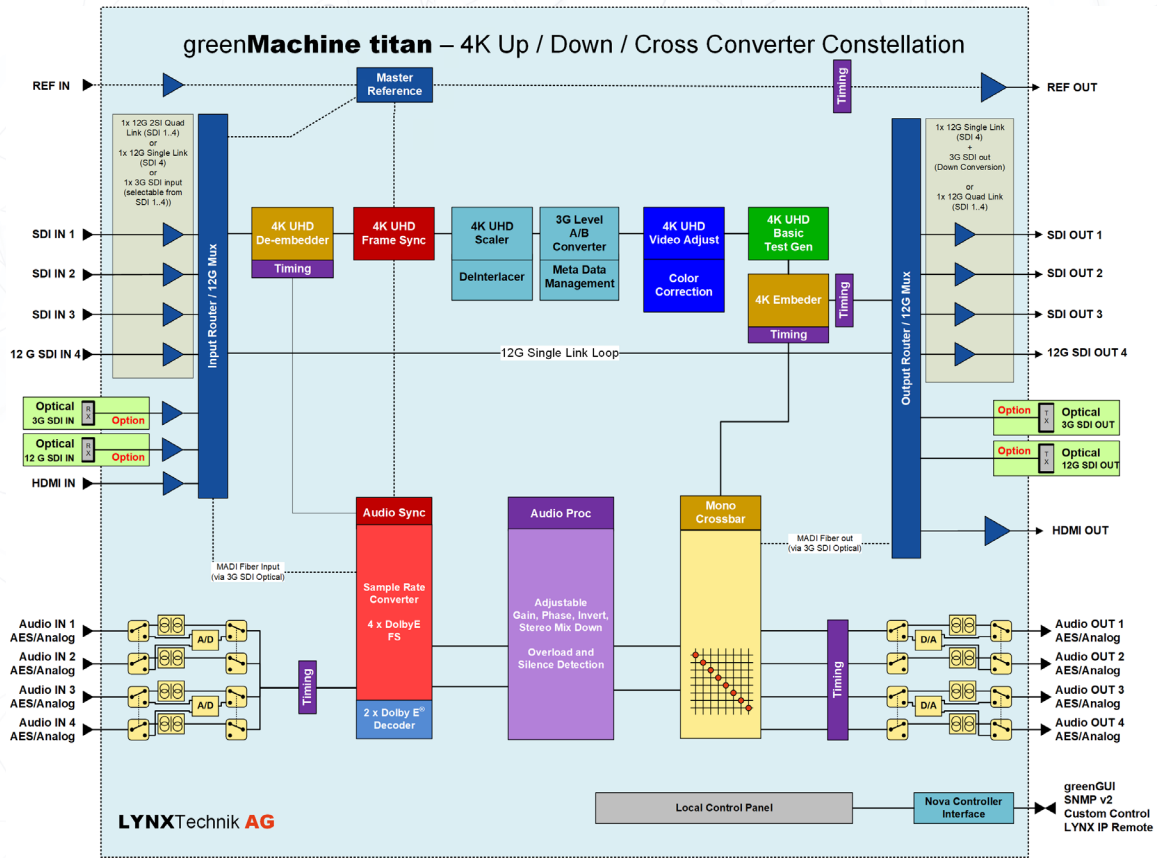
Basic Audio & Video Test Generator: The test generator is a basic audio & video test signal generator with a wide range of still video test patterns. It can be configured to work in conjunction with the frame synchronizer to output a test pattern on TRS errors.

Timing: Each video and AES audio channel can be individually delayed. The available video delay per channel is 30 frames and the audio delay is 1.3 second per AES audio channel.

greenGUI: greenGUI is a control software that provides remote control and status monitoring and event (error) reporting for all the greenMachines installed on a network.

Nova Controller: It adds full SNMP v2 along with LYNX IP remote control protocol functionality to the system. It enables CustomControl feature that allows user to design customized control panels for a computer, giving specific simplified user-specific controls.

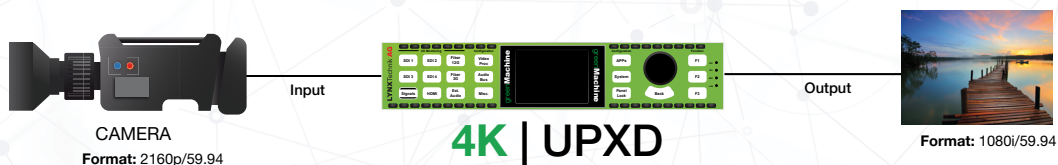
Functional Diagram



Example 1: HD-SDI to 4K-SDI up-conversion

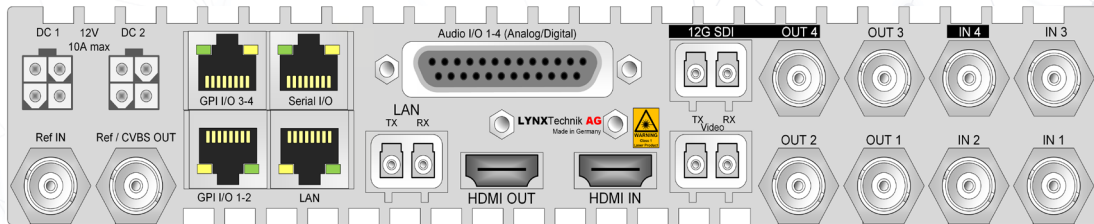


Example 2: 4K-SDI to HD-SDI down-conversion



Hardware Specifications

SDI Inputs	3x 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	12G SDI Output	1x 12G SDI video on 75 Ohm BNC connector - SMPTE 292M, 424M, 259M, 2081, 2082 Return Loss: same as 3G SDI; >7dB to 6GHz; >4dB to 12GHz
12G SDI Input	1x 12G SDI video on 75 Ohm BNC connector - SMPTE 292M, 424M, 259M, 2081, 2082 with automatic video format and standard detection Return Loss: same as 3G SDI; >7dB to 6GHz; >4dB to 12GHz	Serial Data	EIA/ETA RS232C / RS422 /RS 485 (selectable through greenGUI) - RJ45 connector ESD protection for up to 16kV
HDMI Input / Output	1x 10 bit HDMI 4K/UHD 1.4b	Reference Output	1x analog video reference on 75 Ohm BNC connector Analog bi-level (SDTV) or ri-level (HDTV), cross lock capability
Optical I/O (Optional)	1x 3G SDI SFP Transceiver (SMPTE 297M - 2006) 1x 12G SDI SFP Transceiver (SMPTE 292M, 424M , 2081 2082) - no SD SDI (270MBit)	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
Ethernet (LAN)	1x 10/100/1000 BaseT RJ45 Connector	Power	12VDC @ 45W nominal (supports 7 - 24VDC input range) 2x power connections for redundant power supply
Optical Ethernet (Optional)	IEEE 802.3z 1000Base-X Gbit/s Ethernet over Fiber at 1 Gbit/s (125 MB/s)	Mechanical	W: 218mm (1/2 19"), H: 44mm (1.75"), D: 225mm (8.86") - including connectors. Weight: 1.4kg (3.09lb)
GPI I/O	4x general purpose inputs + 4x general purpose outputs - RJ45 Connectors	Ambient	Temperature: 5°C to 40°C (41°F to 104°F) maintaining specification Humidity: 90% maximum, non-condensing
Reference Input	1x analog video reference on 75 Ohm BNC connector Analog bi-level (SDTV) or tri-level (HDTV) auto detect	Model #	<i>GMPT 4KUPXD EU- (EAN# 4250479325784)</i> <i>GMPT 4KUPXD UK- (EAN# 4250479325791)</i> <i>GMPT 4KUPXD US- (EAN# 4250479325807)</i>
SDI Output	3x SDI video on 75 Ohm BNC connector (SMPTE, 292M, 424M, 259M) 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	Includes	greenMachine Titan: GM6840 4K UPXD Constellation: GMC-4KUPXD Primary Power Supply: R PS 6120 with EU/UK/US power cord



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 / 23.98 Hz 720p / 24Hz 720p / 25Hz	720p / 29.97Hz 720p / 30Hz 720p / 50Hz 720p / 59.94Hz 720p / 60Hz
3GBit/s Formats Level A and B	1080p / 50Hz 1080p / 59.94Hz 1080p / 60Hz		
12GBit/s Formats Single Link	3840 x 2160p / 50Hz 3840 x 2160p / 59.94Hz 3840 x 2160p / 60Hz		
12GBit/s Formats Quad Link 2SI Level A and B (4 x 3Gbit/s)	3840 x 2160p / 50Hz 3840 x 2160p / 59.94Hz 3840 x 2160p / 60Hz		

Other Broadcast Applications

- **GMC-HDR-EVIE:** Dynamic HDR > SDR converter
- **GMC-HDR-Static:** Static HDR <> SDR converter
- **GMC-TESTOR:** Audio & Video Test signal generator in 4K UHD or Quad 3G mode including HDR test patterns
- **GMC-3GUPXD:** 3G Up/down/cross converter
- **GMC-Quad3G-FS:** 4x3Gbit/s Frame Synchronizer
- **GMC-BiDi-Transport:** Bi-directional Transport (requires two greenMachine working in Master & slave configuration).

*The greenMachine hardware can be configured for a different broadcast application independent of 4KUPXD via the purchase of perpetual licenses and application deployment on the greenMachine.

Options

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 environmental influences. With its sturdy 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. The hard shell case protects your greenMachine® from most impacts in an average, busy work environment, while the inner foam coating prevents it from being scratched by cables, connectors or other equipment that can also be stored inside the case. The foam pocket inside the top lid of the case is ideal for storing quick reference guide, notes or any documentation.



Fiber Options

Basic 3G SDI Video Fiber Transmitter		Power
OH-TX-1-Y-LC/ST/SC	SDI Fiber TX SFP - LC/SC or ST - 1310nm	-5dBm
Basic 3G SDI Video Fiber Receiver		Sensitivity
OH-RX-1-LC/ST/SC	SDI Fiber RX SFP - LC/SC or ST - 1270-1610nm	-16dBm
Basic 3G SDI Video Fiber Transceiver		Power / Sensitivity
OH-TR-1-LC	SDI Fiber Transceiver, Singlemode - LC - 1310nm	-5dBm -18dBm
OH-TR-0-850-MM	SDI Fiber Transceiver, Multimode - LC - 850nm	-5dBm -15dBm
12G SDI Video Fiber (support 1.5G/3G/6G and 12G SDI)		Power / Sensitivity
OH-TR-12G-LC	12G SDI Fiber Transceiver, Singlemode - LC - 1310nm	-5dBm -12dBm
OH-TX-12G-LC	12G SDI Fiber Transmitter, Singlemode - LC - 1310nm	-5dBm -
OH-RX-12G-LC	12G SDI Fiber Receiver, Singlemode - LC	- -12dBm
CWDM SDI Video Fiber Transmitter (TX) and Transceiver (TR) (12G variants support 1.5G/3G/6G and 12G SDI)		Power / Sensitivity
OH-TR-12G-XXXX-Y-LC XXXX = Wavelength	12G SDI Fiber Transceiver - CWDM capable - 10km* - LC 18 wavelengths acc. to ITU T G692.2 1270nm through 1610nm.	-2...+3 (dBm) -10dBm (6G,12G) -14dBm (1.5G,3G)
OH-TX-12G-XXXX-LC XXXX = Wavelength	12G SDI Fiber Transmitter - CWDM capable - 10km* - LC 18 wavelengths acc. to ITU T G692.2 1270nm through 1610nm.	-2...+3 (dBm) -
OH-TX-4-XXXX-Y-LC XXXX = Wavelength	SDI Fiber Transceiver, Singlemode - CWDM capable - 40km* - LC 18 wavelengths acc. to ITU T G692.2: 1270nm through 1610nm.	-1dBm -
12G SDI Video Fiber Bidirectional Transceiver (support 1.5G/3G/6G and 12G SDI)		Power / Sensitivity
OH-BD-12G-1270-LC	SDI Fiber Bidirectional Transceiver - WDM capable - 10km* - LC OH-BD-12G-1330-LC required at opposing end	-3...+3 dBm -10dBm (6G,12G) -14dBm (1.5G,3G)
OH-BD-12G-1330-LC	SDI Fiber Bidirectional Transceiver - WDM capable - 10km* - LC OH-BD-12G-1270-LC required at opposing end	-3...+3 dBm -10dBm (6G,12G) -14dBm (1.5G,3G)
Basic Ethernet Fiber Transceiver		Power / Sensitivity
OH-TR-51-LC	Ethernet Fiber Transceiver, Singlemode - 10km* - LC - 1310nm	-3dBm -21dBm
CWDM Ethernet Fiber Transceiver		Power / Sensitivity
OH-TR-54-XXXX-LC XXXX = Wavelength	Ethernet Fiber Transceiver, Singlemode - CWDM capable - 40km* - LC 18 wavelengths acc. to ITU T G692.2 1270nm through 1610nm.	0dBm -21dBm

* 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.

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.



One greenMachine in Rack Mount

RXT6001 19" Rack Extension for RFR 6000

The greenMachine is ideally suited for standalone applications but this powerful processing platform reaches its full potential when used within a system design.

The RXT 6001 is a compact and flexible rack extension for RFR 6000. It can be setup to hold up to four RPS 6120 power supplies.



RXT 6001 installed in RFR 6000

RPS 6120 - Redundant Power Supply

The second external in line power supply for redundant power protection.



Ordering Information

greenMachine Titan Hardware and 4KUPXD License		
GMPT 4KUPXD EU	4K UHD Up/Down/Cross-converter + Frame synchronizer EU (H/W & License)	EAN: 4250479325784
GMPT 4KUPXD UK	4K UHD Up/Down/Cross-converter + Frame synchronizer UK (H/W & License)	EAN: 4250479325791
GMPT 4KUPXD US	4K UHD Up/Down/Cross-converter + Frame synchronizer (H/W & License)	EAN: 4250479325807
4KUPXD License Only		
GMC-4KUPXD	greenMachine titan 4KUPXD constellation: 4K Up/Down/Cross Converter (License only - includes no hardware)	EAN: 4250479326064
Accessories and Power Supply		
R FR 6000	1 RU 19" Rack Mount Chassis	EAN: 4250479324466
RXT6001	19" Rack Frame Extension for RFR 6000	EAN: 4250479326507
R PS 6120 EU	Desk Power supply with EU cord	EAN: 4250479324343
R PS 6120 UK	Desk Power supply with UK cord	EAN: 4250479324350
R PS 6120 US	Desk Power supply with US cord	EAN: 4250479324367

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 6120 power supply (EA11011H-120) complies with the following safety standards:
UL CCC PSE



4KUPXD Rev 3.0 Specifications subject to change