4K UPXD

Up/Down/Cross Converter

greenMachine® titan

Description

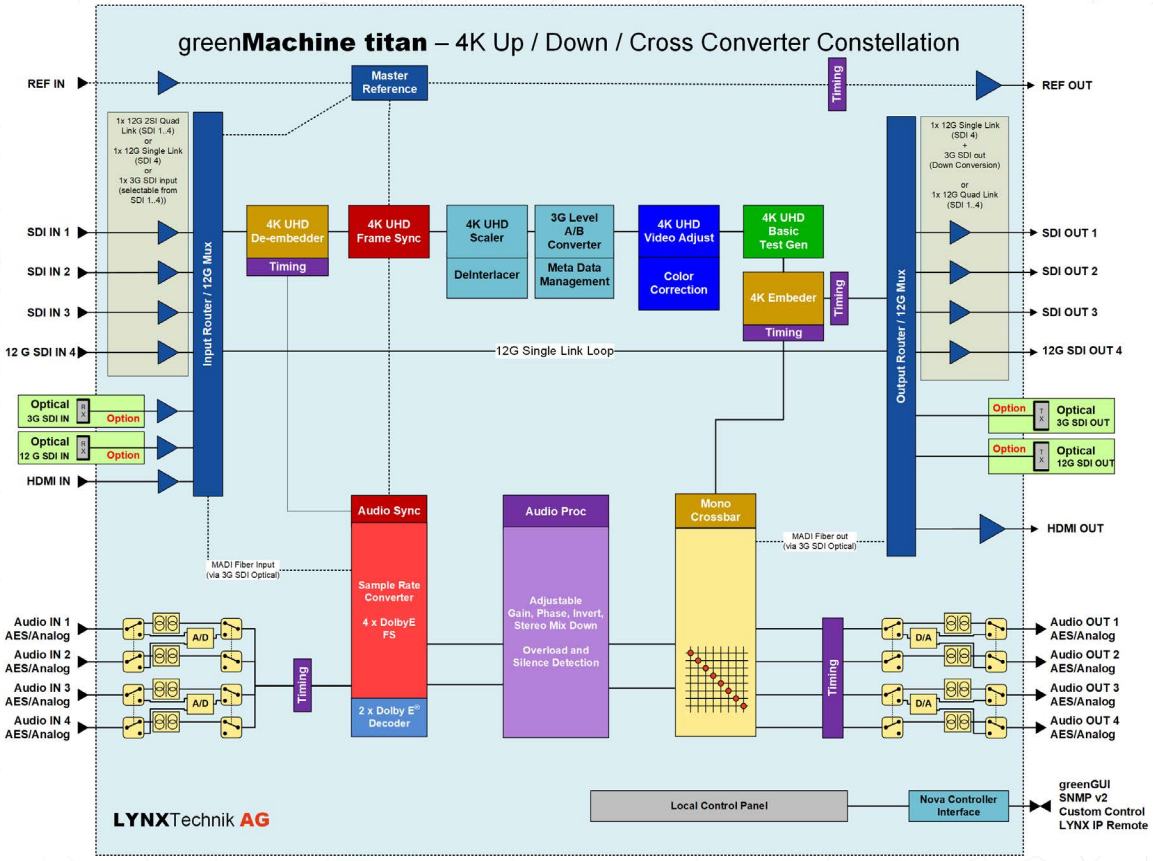
The greenMachine 4KUPXD is a broadcast-quality video processing unit that has a single channel up/down/cross converter with a frame synchronizer supporting formats up to 4K UHD (3840 x 2160). It includes full audio processing capabilities, scalars for the spatial conversion of the video signals including 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.

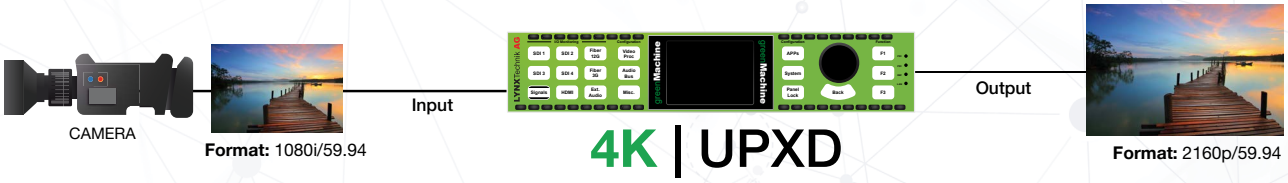
Features

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 the external reference 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 also 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 provide access to all the channels in the input SDI and allow 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 constellation fully supports MADI, if the greenMachine is equipped with an optionally available MADI SFP. All incoming and outgoing MADI signals have internal audio processing and are connected to the internal audio matrix and can be rearranged.
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 audio (AES and MADI) 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	Adds full SNMP v2 along with LYNX IP remote control protocol functionality to the system. It enables CustomControl feature that allows users to design customized control panels for a computer, giving specific simplified user-specific controls.

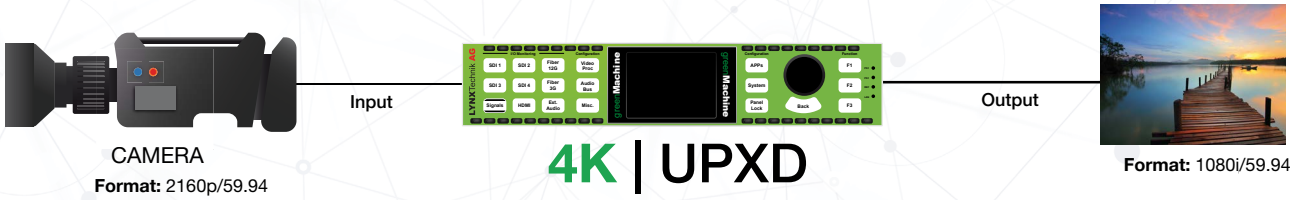
Functional Diagram



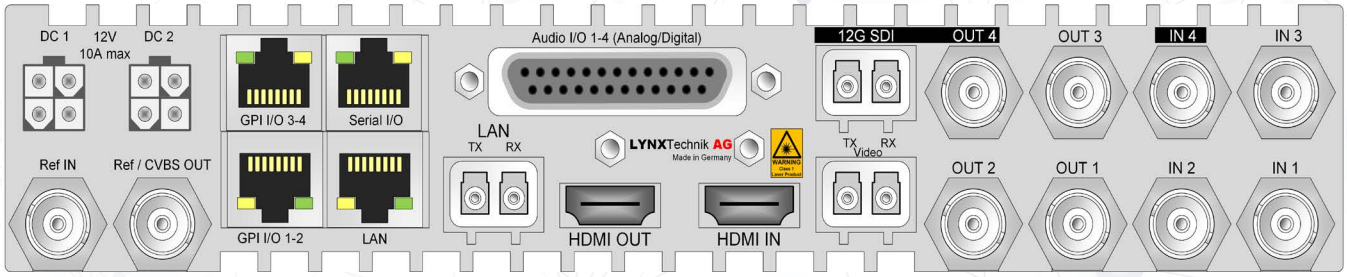
Example 1: HD-SDI to 4K-SDI up-conversion



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 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
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
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
HDMI	• 1x Input 10 bit HDMI 1.4b • 1x Output 10 bit HDMI 1.4b	
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)	

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 • Analog bi-level (SDTV) or ri-level (HDTV), cross lock capability
Serial Data	EIA/ETA RS232C / RS422 /RS 485 (selectable through greenGUI) - 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: 1.4kg (3.09lb)
Ambient	Temperature: 5°C to 40°C (41°F to 104°F) maintaining specification
	Humidity: 90% maximum, non-condensing

Supported SDI Formats

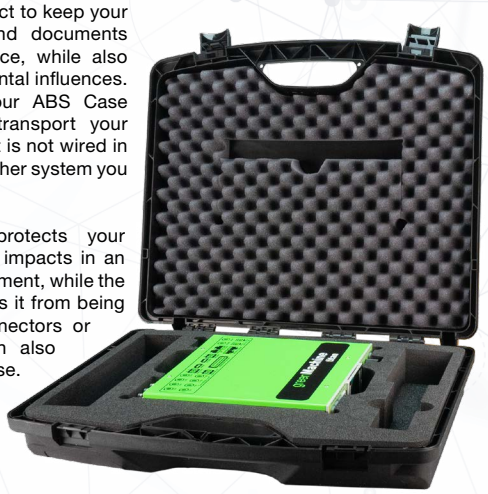
SDTV Formats	525 / 59.94Hz 625 / 50Hz		
HDTV Formats	1080i / 50Hz 1080i / 59.94Hz 1080i / 60Hz 1080p / 23.98Hz 1080p / 24Hz 1080p / 25Hz 1080p / 29.97Hz	1080p / 30Hz 1080psf /23.98Hz 1080psf / 24Hz 1080psf / 25Hz 720p /23.98 Hz 720p / 24Hz 720p / 25Hz	720p / 29.97Hz 720p / 30Hz 720p / 50Hz 720p / 59.94Hz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

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 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.



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.

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

RXT 6001 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 A100 power supplies.

RXT 6001 installed in RFR 6000

RPS A100 - AC to DC Power Supply 12V/8A

The RPS A100 AC to DC Desktop power supply unit provides 100 watts of continuous output power. The power supply is equipped with IEC320-C14 AC inlet.

Plugs are available for regions EU, US and UK as well as an option without a power plug (N). When ordering just add the region shorthand at the end of the module name.

Fiber Options

Basic 3G SDI Video Fiber Transmitter & Receiver		Power / Sensitivity
OH-TX-1-LC/ST/SC	SDI Fiber TX SFP - LC/SC or ST - 1310nm	-5dBm
OH-RX-1-LC/ST/SC	SDI Fiber RX SFP - LC/SC or ST - 1270 - 1610nm	-16dBm

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

CWDM SDI Video Fiber Transmitter (TX) and Transceiver (TR) (12G variants support 1.5G/3G/6G and 12G SDI)		Power / Sensitivity	
OH-TR-4-XXXX-LC **XXXX** = Wavelength	SDI Fiber Transceiver, Singlemode - CWDM capable - 40km* - LC 18 wavelengths acc. to ITU T G692.2: 1270nm through 1610nm.	-1dBm	–

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.

Ordering Information

greenMachine Package		
Includes	**GM 6840:**	greenMachine titan Processors
	RPS A100:	Primary Power Supplies with Region Specific Power Cord
	GMC-4KUPXD:	4K Up/Down/Cross Converter Constellation License

GMPT 4KUPXD **(N/EU/US/UK)**	4k Up/Down/Cross-converter + Frame Synchronizer (H/W & License) Power plug Variants (please specify when ordering) GMPT 4KUPXD N Power supply without Plug GMPT 4KUPXD EU Power Supply with EU Plug GMPT 4KUPXD US Power Supply with US Plug GMPT 4KUPXD UK Power Supply with UK Plug	EAN: 4250479327887

License Only (no hardware included)		
GMC-4KUPXD	4K Up/Down/Cross Converter Constellation	EAN: 4250479326064

Accessories and Power Supply		
RFR 6000	1 RU 19" Rack Mount Chassis	EAN: 4250479324466
RXT 6001	19" Rack Frame Extension for RFR 6000	EAN: 4250479326507
RPS A100 (N/EU/US/UK)	AC to DC Desktop Power Supply Module 12V/8A (with None / EU / US / UK plug)	EAN: 4250479327955

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