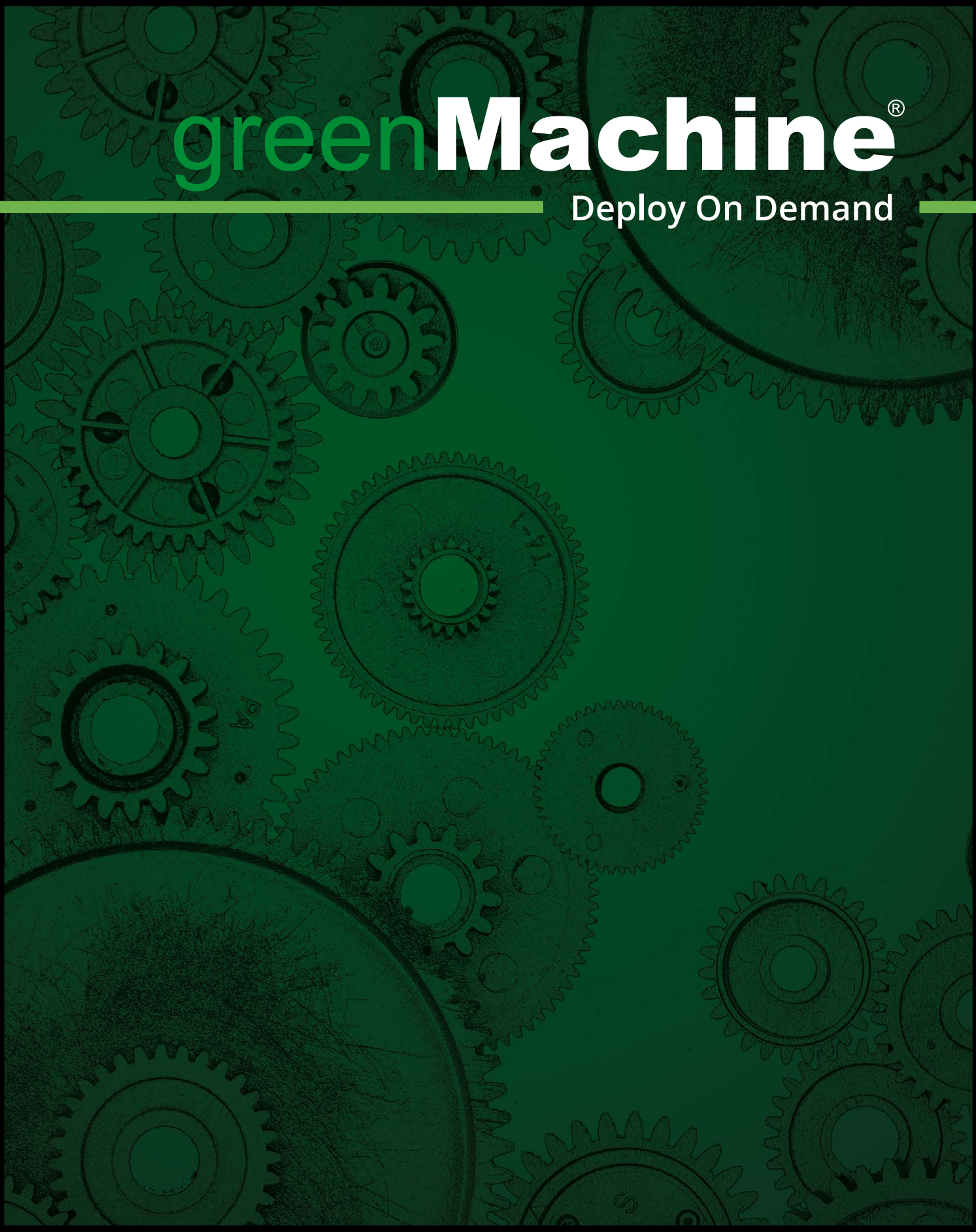
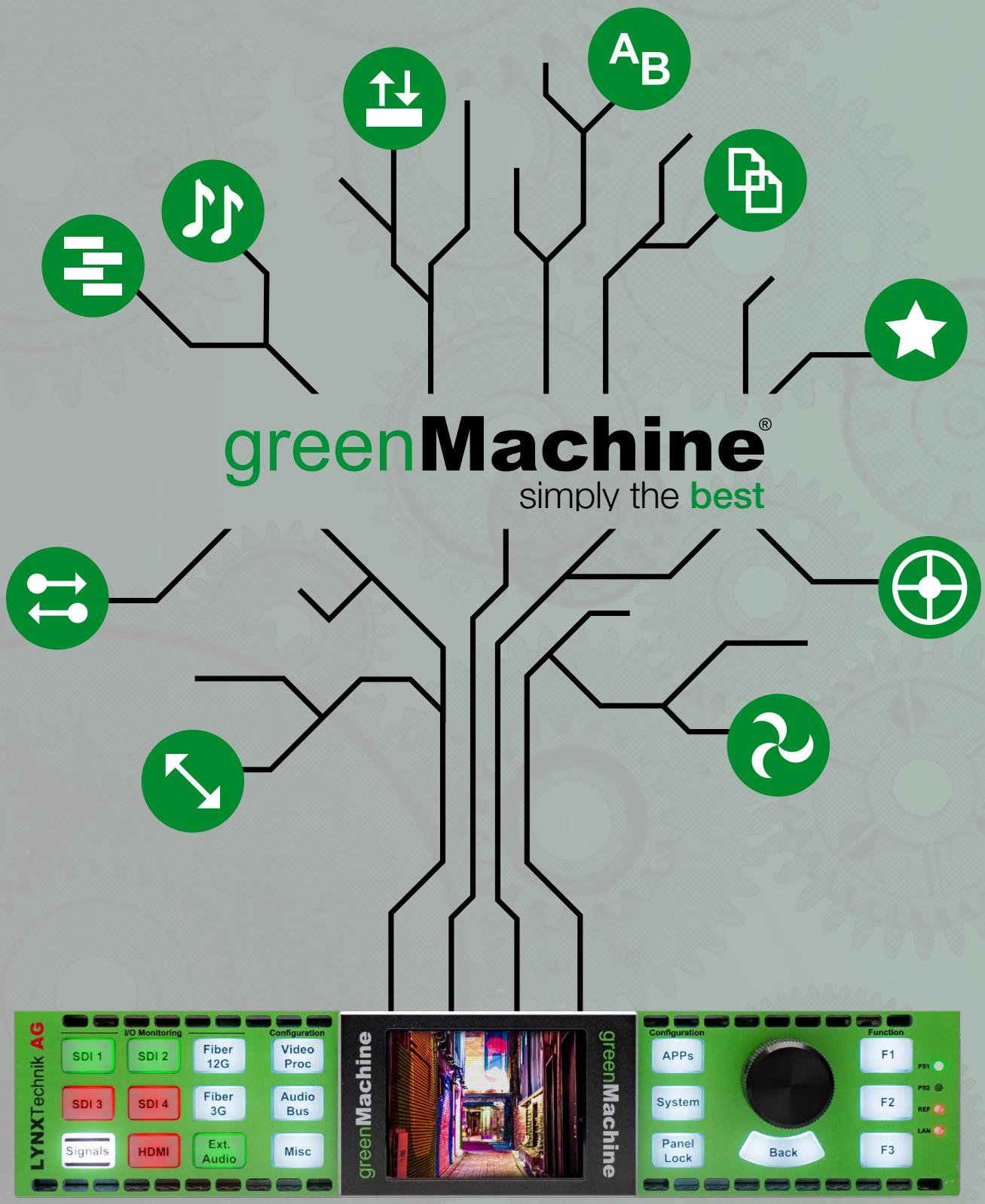
greenMachine®

Deploy On Demand



LYNXTechnik AG® | Broadcast Television Equipment

greenMachine®



greenMachine Catalog 2024/3

greenMachine_Catalog_Rev4.6

Table of Content

Hardware

GM 6840 2
greenMachine titan

GM 6825 4
greenMachine callisto+

HDR Conversion

HDR Evie+ 6
Real-Time Segmented HDR►SDR Converter

HDR Static 10
Static HDR◄►SDR Converter

Up/ Down/ Cross Converter

4K UPXD 12
12G Up-, Down-, Cross-Converter

3G UPXD 14
Quad 3G Up-, Down-, Cross-Converter

2C UPXD 16
Dual Channel 3G Up/ Down/ Cross Converter

Bidirectional Transceiver

BiDi 18
Multi Signal Bi-Directional Transport Solution

Test Pattern Generator

Testor AV 20
AV Test Unit for SDR and HDR with AV Sync Generator and Analyzer

Testor 24
AV Test Unit for SDR and HDR

Rack Frames

RFR 6000 28
1RU 19" Rack Mount Chassis

RYB 6000 29
yellobrik mount extension for RFR 6000

RXT 6001 30
19" Rack Frame extension for RFR 6000

Accessoires

RPS A100 31
Universal AC to DC Power Supply

ABS Case for greenMachine 32

Contact & Service

Knowlege Base 33

Get in Touch 33
Warranty Information

greenMachine®

The greenMachine design concept

As with all our LYNX-Technik products, we follow a thought-out design philosophy. From our Frame Synchronizer with built-in Metadata management and Image Processing capabilities to our one of a kind, dynamic, segmented HDR to SDR conversion solutions with extensive audio editing and routing capabilities you can expect nothing but the best of German engineering for your AV needs.

The greenMachine itself is incredibly easy to set up. Just install the LynxCentraal control software on a PC or MAC, connect it via ethernet to the greenMachine, and select your greenMachine from a list of devices in the software. Your greenMachine will automatically detect the input signal formats and display them for you in the input section of the flowchart diagram in the control software.

Physically the greenMachine is designed to have as small a form factor as possible. Clocking in at only 1RU height it just uses half a standard 19" rack in width to process up to four 3G HD signals simultaneously. For its input and output, it has a wide array of SDI in- and outputs, both optical and electrical, supporting formats of up to 12G or 4K UHD SMPTE standards.

What can the greenMachine do for you?

We offer a wide variety of functionalities. From the simple four-channel frame synchronizer, to up/down/cross converter, specialized single fiber transmission solutions, test generators, or the world's first dynamic HDR to SDR down-converter we've left nothing to desire. If, however, you're still missing the right functionality for you, don't hesitate to contact us or our network of dealers to find a solution suitable for you.

We are continuously working on more out of the box solutions to make your work as easy and intuitive as it can be while keeping the professional flexibility we know you need. Reliable, fast, and efficient.

Any greenMachine seamlessly integrates with up to six yellobriks thanks to the mounting accessoire RYB 6000 - featuring redundant power solutions

greenMachine® - flexibility, done right

Which solutions are available?

The greenMachine packages are toolboxes of core functionalities which, when deployed on a greenMachine, reconfigures that device to have a set processing path of features.
This also allows for the greenmachine to be dynamically switchable.

Currently available for greenMachine titan and callisto+

HDR Evie+: Our latest creation, a fully featured, broadcast quality, real-time, segmented, frame by frame HDR to SDR converter, with frame sync and 4K UHD scaler.

HDR Static: A broadcast quality HDR to SDR, SDR to HDR or cross-standard HDR to HDR converter, with a frame sync and up/down/cross converters supporting formats up tp 4K UHD (3840x2160).

UPXD: A Package of 4K UPXD and 3G UPXD, each broadcast quality up/down/cross converter with frame sync and 12G-SDI and 3G-SDI scaler supporting formats up to 4K UHD (3840x2160).

2C UPXD: A broadcast quality dual 3G up/down/cross converter and dual Scaler with frame sync supporting formats up to 3G-SDI (1920x1080).

Testor AV: A video and audio test signal generator supporting 12G (4K UHD), 3G , HD, and SD-SDI formats with standard static and dynamic video test patterns. It also comes with AV Sync Measurement, Analysis and Correction Tools.

Testor: A video and audio test signal generator supporting 12G (4K UHD), 3G , HD, SD-SDI formats with standard static and dynamic video test patterns with added flexibility that allows users to upload their own user-defined signal patterns.

BIDI Transport: A cost-effective bidirectional transport solution that allows transportation of video, audio, Ethernet, and GPI efficiently across two greenMachine Titan hardware devices.

Note: greenMachine comes with extensive audio processing capabilities, but not all packages make use of them. For more information check the individual package page.

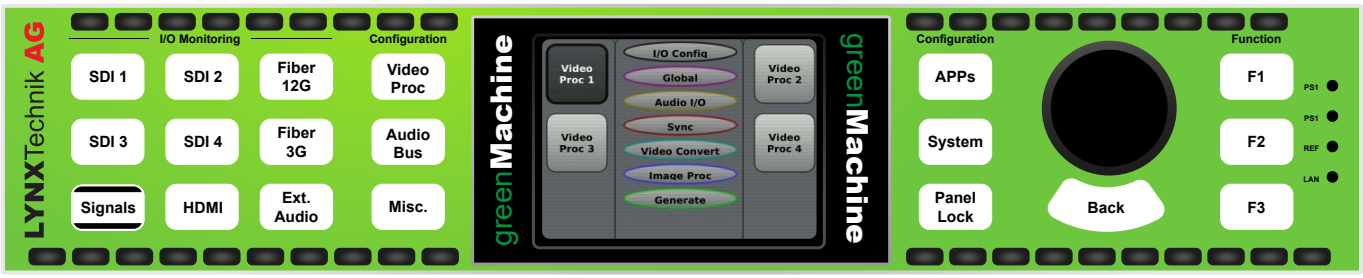
How do I control it?

Most regular controls can be accessed via the front panel of the hardware. Here you can also visualize the hardware status, network information, and more.
For the best possible experience of the greenMachine, we recommend using Lynx Centraal with a PC or MAC in the same network as the greenMachine. Here you can even deploy watermarked test versions of constellations on your local machine or simulate them in software to get a feel for the possibilities before purchasing the hardware.

LynxCentraal is available on the LYNX Technik homepage for free.

lynxcentraal.lynx-technik.com

GM 6840 greenMachine titan



Description

greenMachine titan is an award-winning multi-purpose processing platform that offers many configurations in the form of constellations. Rather than being a fixed application specific box, greenMachine is a combination of general purpose hardware and constellation (pre-defined set of functionalities/ features) for reprogrammable functionality and powerful control software.

One of the main goals of broadcasters and content providers is to create an immersive experience for the viewers, giving them the feeling of being part of the viewing content. The 12G-SDI standard has now been around for some time providing a high number of pixels on 4K UHD televisions, as well as providing 4K content. Although, watching UHD content on a screen with proper resolution may not give the viewer a truly immersive experience. A large number of pixels does not determine the picture quality; color, contrast and brightness are critical too.

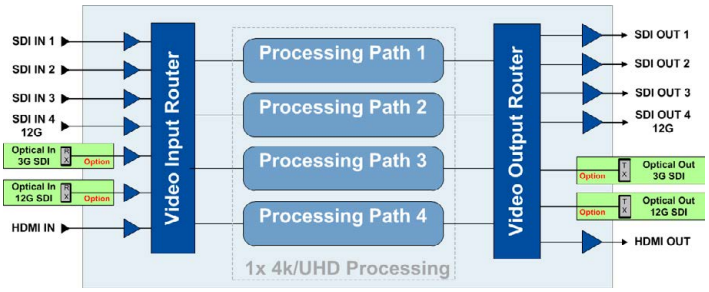
One key component for an immersive viewing experience is High Dynamic Range. One Key issue being, that most end devices only support Standard Dynamic Range not full HDR. The greenMAchine Titan is prepared to take on all of these issues. From the world's most powerful HDR down-converter, to Up/ down/cross ceonversion in 12G, over Automatic Delay compensation setups: The greenMachine titan is the flexible toolbox to support you at any point of a production.

Supported SDI Formats

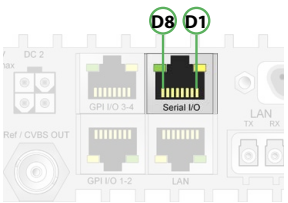
SDTV Formats	525 / 59.94Hz 625 / 50Hz		
HDTV Formats	1080i / 50Hz 1080i / 59.94Hz 1080i / 60Hz 1080p / 23.98Hz 1080p / 24Hz 1080p / 25Hz 1080p / 29.97Hz	1080p / 30Hz 1080psf /23.98Hz 1080psf / 24Hz 1080psf / 25Hz 720p /23.98 Hz 720p / 24Hz 720p / 25Hz	720p / 29.97Hz 720p / 30Hz 720p / 50Hz 720p / 59.94Hz 720p / 60Hz
3G Formats Level A and B	1080p / 50Hz 1080p / 59.94Hz 1080p / 60Hz		
12G Formats Single Link	3840 x 2160p / 50Hz 3840 x 2160p / 59.94Hz 3840 x 2160p / 60Hz		
12G 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		

Technical Specifications

Power	12V DC @ 45W (supports 7 - 24V DC 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 to 40°C (41 to 104°F)
	Humidity: 90% maximum, non-condensing



UART Pinout

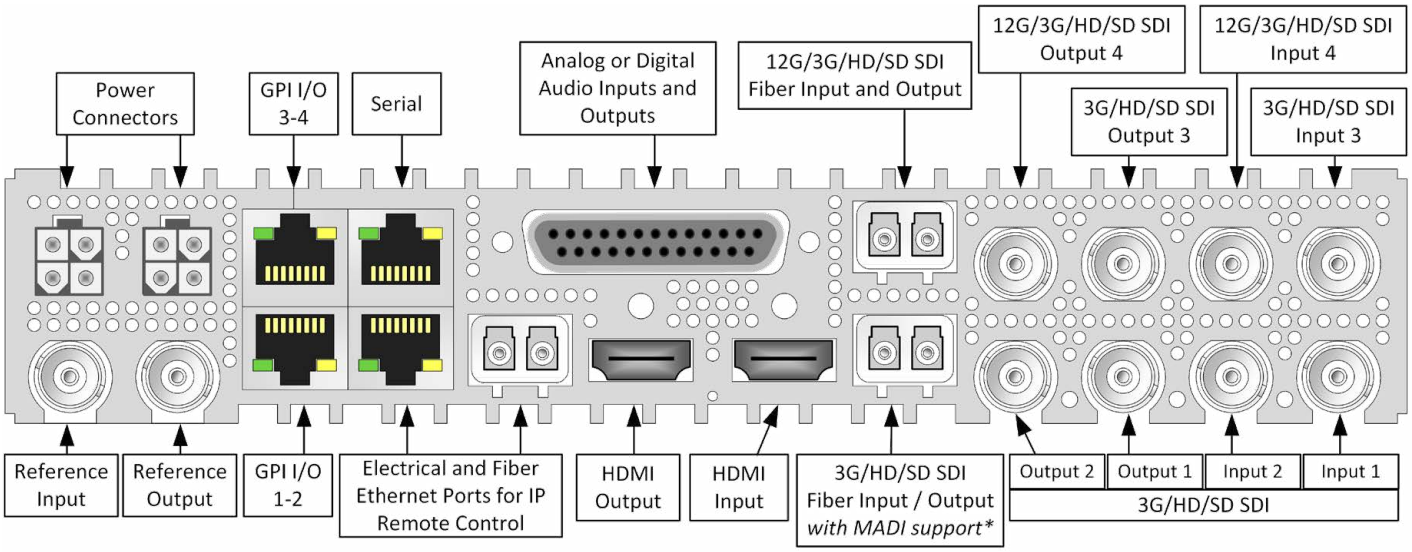


RS-232	Uncrossed	Crossed	RS-422	Uncrossed	Crossed
D1	NC	GND	D1	GND	NC
D2	NC	GND	D2	GND	NC
D3	CTS (in)	RTS (out)	D3	TX_B (-)	RX_B (-)
D4	RX (in)	TX (out)	D4	RX_B (-)	TX_B (-)
D5	RTS (out)	CTS (in)	D5	RX_A (+)	TX_A (+)
D6	TX (out)	RX (in)	D6	TX_A (+)	RX_A (+)
D7	GND	NC	D7	NC	GND
D8	NC	GND	D8	GND	NC

Note:
Pinout in table is pinout of RJ-45 greenMachine serial port. Pinout can be changed between Uncrossed and Crossed in LynxCentraal.

Hardware Information

Connections



Connection Details

SDI Inputs	3x 3G SDI Video 75 Ohm BNC connector SMPTE 292M, 424M, 259M automatic video format & 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
	1x 12G SDI Video 75 Ohm BNC connector SMPTE 292M, 424M, 259M, 2081, 2082 automatic video format & standard detection Return Loss: same as 3G SDI; >7dB to 6GHz; >4dB to 12GHz
SDI Outputs	3x 3G SDI Video 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
	1x 12G SDI Video 75 Ohm BNC connector SMPTE 292M, 424M, 259M, 2081, 2082 Return Loss: same as 3G SDI; >7dB to 6GHz; >4dB to 12GHz
HDMI I/O	1x input and 1x output - 10 bit HDMI 4K/UHD 1.4b

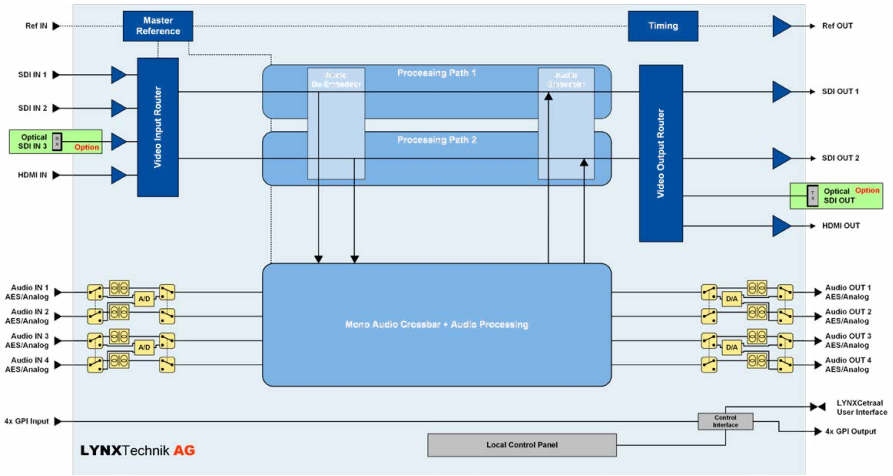
Audio I/O	4x input and 4x output - Sub-D 25 female connector Analog: Input impedance >10k Ohm Output Impedance 150 Ohm Analog I/O full scale level: selectable 12, 15, 18, 20, 22, 24 dBu Digital: AES3 balanced transformer isolated; Digital output level: 4V peak to peak nom
Optical I/O (Optional)	1x 3G 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 Mbit/s)
Reference Input	1x analog video reference 75 Ohm BNC connector Auto detect: Analog bi-level (SDTV) or tri-level (HDTV)
Reference Output	1x analog video reference 75 Ohm BNC connector Analog bi-level (SDTV) or ri-level (HDTV) cross lock capability
GPI I/O	1x RJ45 Connector 4x general purpose inputs 4x general purpose outputs
Serial Data	EIA/ETA RS232C / RS422 /RS 485 (selectable through LynxCentraal) RJ45 connector ESD protection for up to 16kV

GM 6825 greenMachine callisto+

Description

The greenMachine callisto+ platform provides for simultaneous processing of up to two individual SD/HD/3G SDI signals. The hardware itself is a powerful general-purpose audio and video processing appliance that can perform many different functions using one of the available greenMachine configurations (constellations), i.e. 2CUPXD.
The user can select and license just the constellation, or multiple constellations required at the point of order and can switch between these licensed constellations at any time. Additionally, they may purchase licenses for additional constellations in the future. As all constellations are pre-installed, unlicensed constellations can be deployed for testing and proof of system concept but will show watermarks at the outputs.

Fiber SFP options are available for one SD/HD/3G SDI input and output. The Nova controller (full remote control) is included in the basic framework.



Features

- 2x 3G general purpose A/V processing appliance
- Internal input and output signal routers
- Compatible with available greenMachine callisto+ constellations
- Integrated control panel with color display for live image monitoring, audio level meters, status indication and menu driven control interface
- Small footprint: 1RU high x half 19" rack width
- 2x electrical SD/HD/3G SDI inputs. Level A and B DL
- 2x electrical SD/HD/3G SDI outputs. Level A and B DL
- 1x HDMI input (1.4b) and 1x HDMI output (1.4b) up to 3G
- 1x Analog reference input and output (bi-level or tri-level sync)
- 1x Electrical LAN I/O connection
- 4x Balanced analog audio or digital AES Audio inputs
- 4x Balanced analog audio or digital AES Audio outputs
- 4x GPI inputs and 4x GPI outputs
- 1x Optional SDI fiber I/O (basic fiber or CWDM): SD/HD/3G
- 1x Optional Ethernet LAN fiber connection (basic or CWDM)
- Optional redundant power protection
- Optional 19" rack frame
- Nova controller included: Full remote control using LynxCentraal control software
- Full SNMP V2 support

Supported SDI Formats

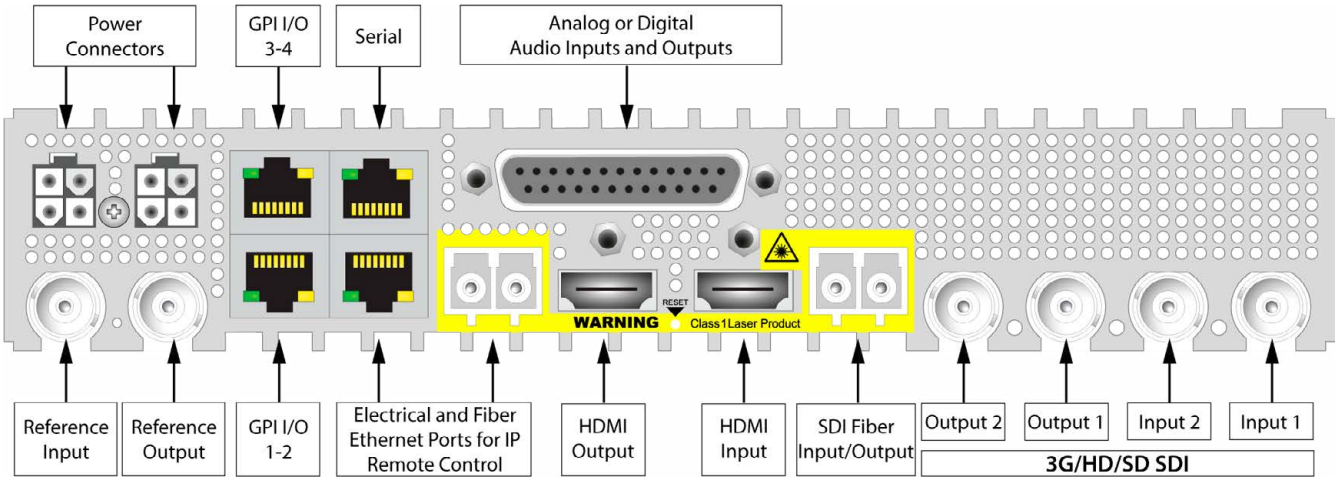
SDTV Formats	525 / 59.94Hz 625 / 50Hz		
HDTV Formats	1080i / 50Hz 1080i / 59.94Hz 1080i / 60Hz 1080p / 23.98Hz 1080p / 24Hz 1080p / 25Hz 1080p / 29.97Hz	1080p / 30Hz 1080psf / 23.98Hz 1080psf / 24Hz 1080psf / 25Hz 720p / 23.98Hz 720p / 24Hz 720p / 25Hz	720p / 29.97Hz 720p / 30Hz 720p / 50Hz 720p / 59.94Hz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

Technical Specifications

Power	12V DC @ 45W (supports 7 - 24V DC input range)
	2x power connections for redundant power supply
Mechanical	W: 218mm (19.5"), H: 44mm (1.75"), D: 225mm (8.86") - including connectors
	Weight: 1.28kg (2.82lb)
Ambient	Temperature: 5 to 40°C (41 to 104°F)
	Humidity: 90% maximum, non-condensing

Hardware Information

Connections

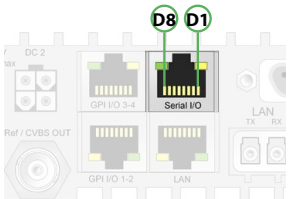


Connection Details

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)	
Ethernet (LAN)	1x 10/100/1000 BaseT RJ45 Connector	
Optical I/O (Optional)	1x 3G SDI SFP Transceiver (SMPTE 297M - 2006)	

Optical Ethernet (Optional)	IEEE 802.3z 1000Base-X Gbit/s Ethernet over Fiber at 1Gbit/s (125 MBit/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 Lynx-Centraal) - 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 required for this)

UART Pinout



RS-232	Uncrossed	Crossed	RS-422	Uncrossed	Crossed
D1	NC	GND	D1	GND	NC
D2	NC	GND	D2	GND	NC
D3	CTS (in)	RTS (out)	D3	TX_B (-)	RX_B (-)
D4	RX (in)	TX (out)	D4	RX_B (-)	TX_B (-)
D5	RTS (out)	CTS (in)	D5	RX_A (+)	TX_A (+)
D6	TX (out)	RX (in)	D6	TX_A (+)	RX_A (+)
D7	GND	NC	D7	NC	GND
D8	NC	GND	D8	GND	NC

Note:
Pinout in table is pinout of RJ-45 greenMachine serial port. Pinout can be changed between Uncrossed and Crossed in LynxCentraal.

HDR Evie+

Real-Time Segmented HDR▶SDR Converter

packages:
GMPT HDREVIE+
licenses:
GMC-HDR-EVIE+-titan

Description

The greenMachine HDR Evie+ (Enhanced Video Image Engine), 1 RU half 19" rackmount, is a real-time segmented frame-by-frame broadcast-quality High Dynamic Range (HDR) to Standard Dynamic Range (SDR) converter, with frame sync supporting formats up to 4K UHD (3840x2160).

It is the world's first system that uses the advanced algorithm for sectional dynamic tone mapping which automatically analyzes different sections of an image in HDR stream and applies optimal corrections on a frame by frame basis in real-time. This unique capability is unlike any other solution today and is the perfect real-time production tool for sports or any live broadcast event needing high-quality real-time HDR to SDR conversions. HDR EVIE+ fits best in the single native HDR workflow reducing cost on equipment and manual operations.

HDR EVIE+ provides 1x 4K/UHD or 4x up to 3G-SDI processing channels supporting down-conversion from HDR transfer characteristics to SDR through appropriate sectional dynamic tone mapping. It also supports Wide Color Gamut (WCG) needs of broadcasters, and professional AV live events requirement.

Features

Operation Modes

- 4K UHD single channel configuration
- 3G HD quad channel configuration

Sectional Dynamic HDR Down-Conversion

Input Transfer Characteristics	PQ ST-2084, PQ BT-2100, HLG, Sony SLog3, Arri LogC, Red Log3G10, BMD Film, Panasonic V-Log, Canon C-Log2
Output Transfer Characteristics	Standard Dynamic Range (SDR)

Colorimetry Supported

Input Colorimetry	BT.2020, BT.709, Sony S-Gamut, ACES, DCI-P3, Panasonic V-Gamut, BMD Film, Canon Cinema Gamut, Arri Alexa, Red Wide Gamut
Output Colorimetry	BT.2020, BT. 709

Color Processing

- RGB gain and offset adjustment
- CMYW gain and offset adjustment

Input / Output Data Range

- Full range : Video signal representation (10bits) in full range of values from 0 to 1023 decimal (according to ITU BT 2100)
- Narrow range : Traditional video signal (10 bits) representation from 64 to 940 decimal values

Dynamic Processing

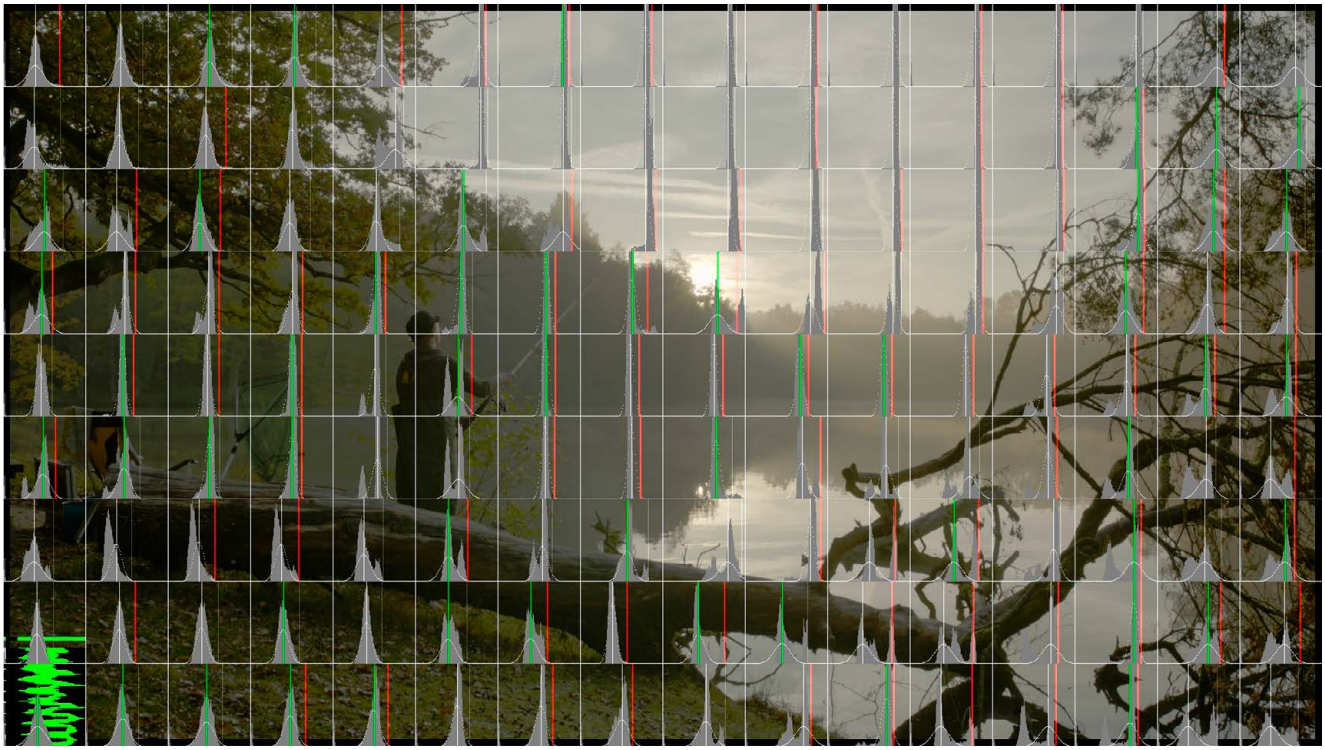
- Local Dynamic to Global Dynamic Ratio engine allows a user to mix sectional tone mapping and global tone mapping proportionally
- Global Dynamic to Static Ratio engine allows a user to mix dynamic tone mapping and static tone mapping proportionally
- Dynamic adaptation speed engine (frame-by-frame) allows a user to adjust tone mapping calculation speed to get smooth and consistent viewing impression
- Automated Scene Detection engine allows a user to adjust the parameter that detects a scene change for automated adjustment of image brightness levels
- User-adjustable target brightness, contrast, and saturation

Other included features

- Frame Synchronizer
- Embedding /De-embedding with DolbyE™ embedding support
- Basic Audio & Video Test Generator
- Audio Processing with gain adjustment, mute, inversion, and stereo to mono mix-down
- MetaData Management
- Video Adjustment include saturation, gain, black and hue adjustment
- Color matching
- Timing with available video and audio delay per channels is 30 frames and 1.3 seconds respectively
- Nova controller with full SNMP v2 support and custom control

What is Segmented HDR to SDR Down Conversion?

General Function



Dynamic conversion can be divided into two levels. For the base level, the entire image is analyzed and the transfer curve is adjusted based on the result of the analysis (global approach).
In this case, a compromise has to be made between contrast level and preserving as much information as possible. The flatter the image, the less detail is lost in the highlights and shadows.

However flat images are not desirable therefore the conversion algorithm must decide between what information is important and what level of gradation is acceptable. Within an HDR workflow, the real advantages are that a real HDR aperture control can be used with a large variance in exposure.

The weighing decision described above can also be carried out separately on different areas of the image (sectional approach), so that lights and shadows are treated differently and can therefore, be adjusted to each other.
Lights can be lowered, and shadows can be brightened without affecting each other. In other words, a steeper image impression can be achieved with the same contrast range of the scene.

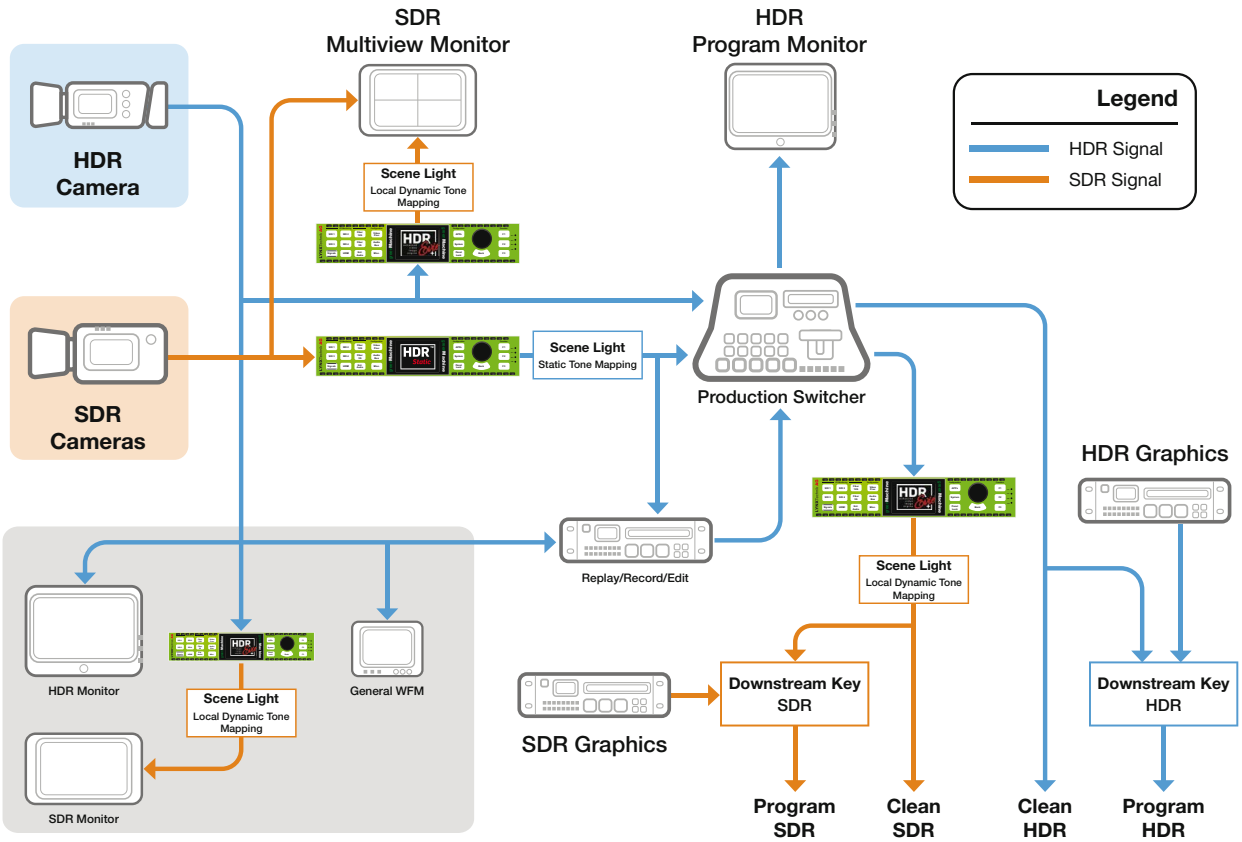
Another key advantage is that the increased contrast range benefits the HDR image as well as the SDR image. It is possible to display almost all of the image information in SDR.

Ordering Information

greenMachine Package			
Includes	**GM 6840:**	greenMachine titan Processors	
	GMC-HDR-EVIE+-titan	greenMachine titan - HDR EVIE+ DYNAMIC Converter/Processor. 4K UHD 12G-SDI or 4x 3G-SDI. Constellation Licence (Constellation Licence)	
	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	
GMPT HDREvie+ (N/EU/US/UK)		greenMachine titan - HDR EVIE+ DYNAMIC Converter/Processor. 4K UHD 12G-SDI or 4x 3G-SDI (EU/UK/US/None power cord) (Hardware & License) Power plug Variants (please specify when ordering) GMPT HDREvie+ N Power supply without Plug GMPT HDREvie+ EU Power Supply with EU Plug GMPT HDREvie+ US Power Supply with US Plug GMPT HDREvie+ UK Power Supply with UK Plug	EAN: 4250479327870
License Only (no hardware included)			
GMC-HDR-EVIE+-titan		greenMachine titan - HDR EVIE+ DYNAMIC Converter/Processor. 4K UHD 12G-SDI or 4x 3G-SDI. Constellation Licence. (No Hardware)	EAN: 4250479327252

Workflow Example

Paralell Production of HDR and SDR Content with Mixed Inputs



With this setup a dynamic HDR/SDR conversion after the HDR production is automatically made and an SDR version in generated without having to spend additional time or manpower during the production process. This method allows the image to be shaded and controlled by using an HDR monitor only.

Since additional graphics are usually rendered in SDR, they can be added to the Clean Feed signal after the dynamic conversion. For the HDR channel, a static SDR/HDR up-conversion of the graphics can be used with HDR Static.

Read more about HDR/SDR Paralell Productions

HESSEN
Hessisches Ministerium für Wissenschaft und Kunst
LOEWE
Exzellente Forschung für Hessens Zukunft

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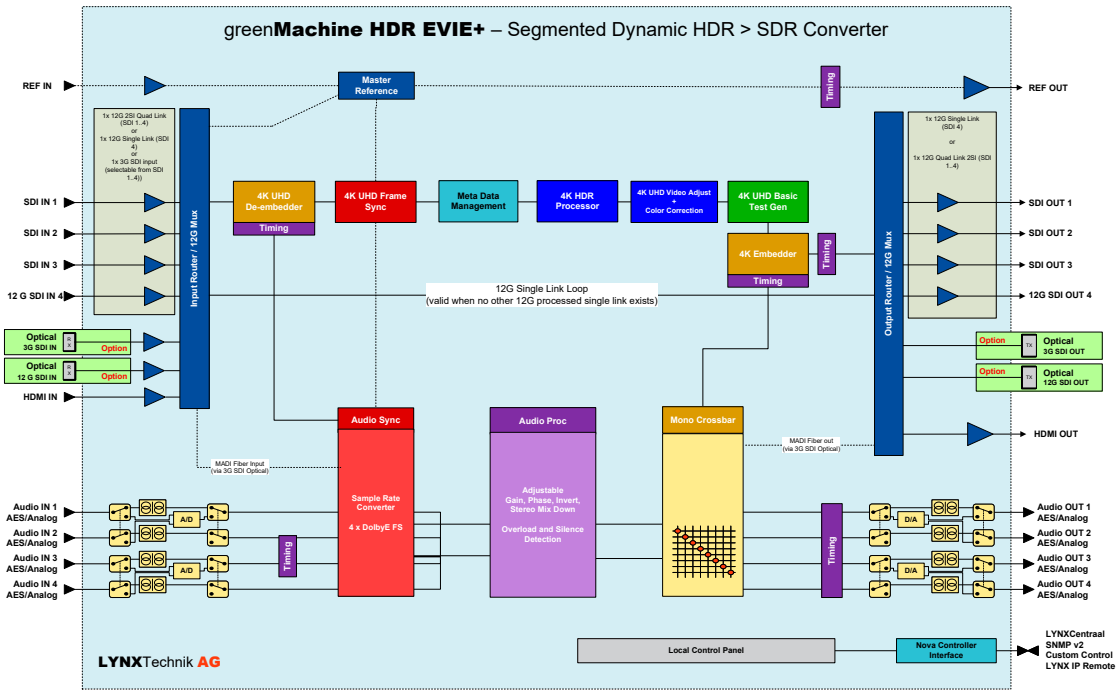
(State Offensive for the Development of Scientific and Economic Excellence).

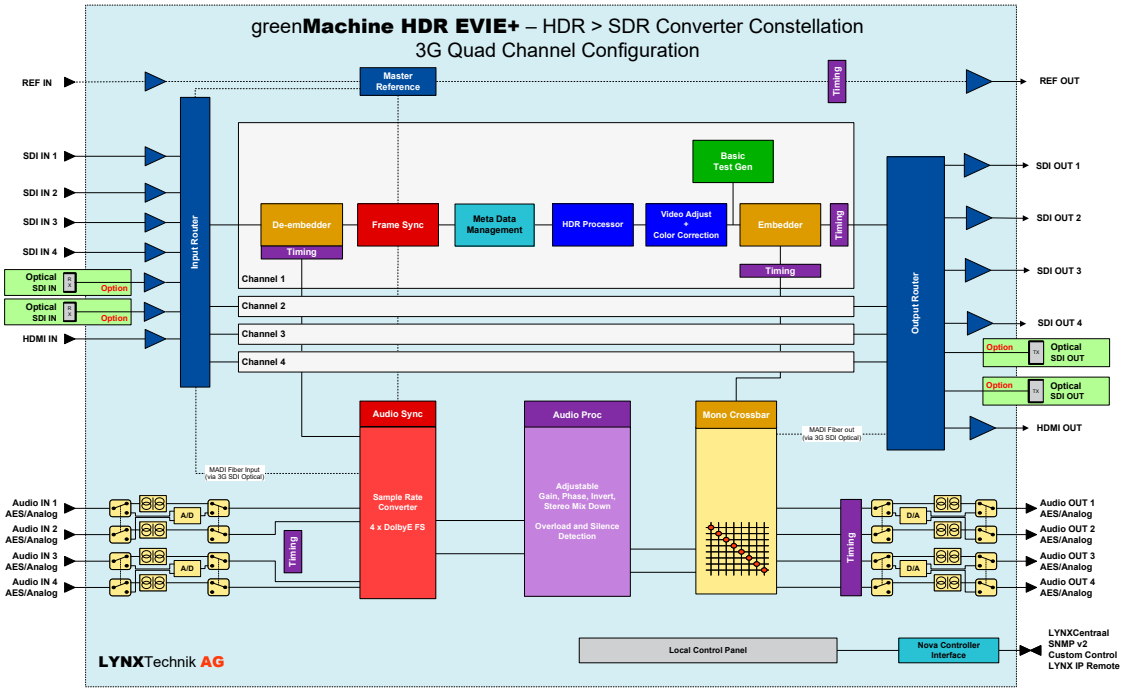
in cooperation with:
Hochschule RheinMain
University of Applied Sciences
Wiesbaden Rüsselsheim

Functional Diagrams

Single Channel 4K UHD



Quad Channel 3G



HDR Static

Static HDR◀▶SDR Converter

packages:
GMPT HDRS
licenses:
GMC-HDR-STATIC-titan

HDR™ Static

Description

The greenMachine HDR Static, 1 RU half 19" rackmount, is a real-time broadcast-quality HDR to SDR, SDR to HDR or cross-standards HDR to HDR converter with frame sync supporting formats up to 4K UHD (3840x2160). HDR Static applies color and contrast parameters equally throughout a specific piece of content, i.e. an average brightness/color range is determined across an entire program.

HDR Static greenMachine processor has an advanced algorithm that overcomes the issues arising from "round-tripping" SDR>HDR>SDR. The SDR signal at the production end and the distribution end of the round trip are visually identical making the whole SDR▶HDR▶SDR conversion process transparent. Supporting 4 x 3G or 1x 4K/UHD processing channel, HDR Static provides up, down and cross-conversions in HDR and SDR curves through appropriate static tone mapping. It also supports Wide Color Gamut (WCG) needs of broadcasters, and professional AV live events requirement. HDR Static is most suitable for the environments outdoor/indoor where the light conditions does not change dynamically.

For dynamically changing lighting conditions, check greenMachine HDR Evie+.

Features

Static HDR <> SDR Conversion

Input Transfer Characteristics	PQ ST-2084, HLG, Sony SLog3, SDR
Output Transfer Characteristics	PQ ST-2084, HLG, Sony SLog3, SDR

Colorimetry Supported

Input Colorimetry	BT.2020, BT.709
Output Colorimetry	BT.2020, BT. 709

Operation Modes

- 3G Quad channel configuration
- 4K UHD single channel configuration

Color Processing

- RGB gain and offset adjustment
- CMYW gain and offset adjustment

Input / Output Data Range

- Full range : Video signal representation (10bits) in full range of values from 0 to 1023 decimal (according to ITU BT 2100)
- Narrow range : Traditional video signal (10 bits) representation from 64 to 940 decimal values

Other included features

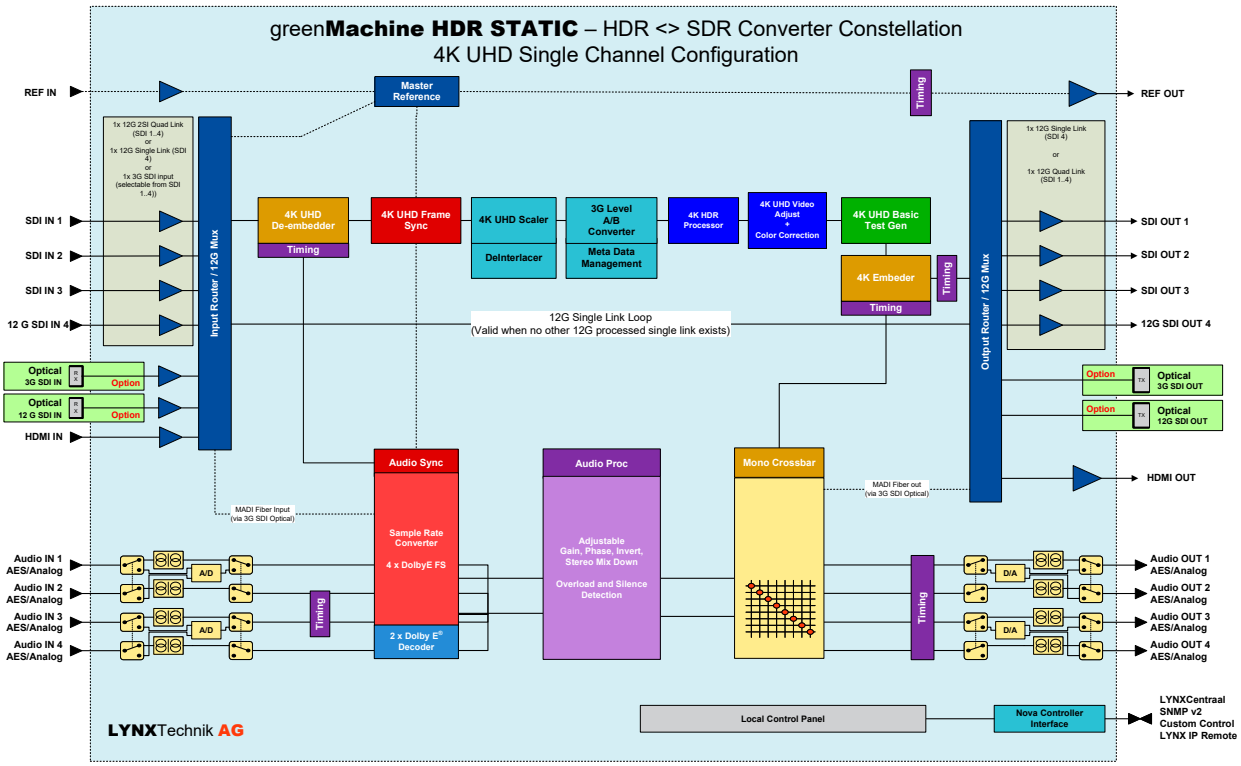
- Frame Synchronizer
- 4K UHD / 3G Scaler
- Deinterlacer: one deinterlacer in 4K mode and two deinterlacers on the first two channels in quad 3G mode
- Embedding /De-embedding with DolbyETM embedding support
- Basic Audio & Video Test Generator
- Audio Processing with gain adjustment, mute, inversion, and stereo to mono mix-down
- Two Dolby E® Decoder for decoding 8 audio channels in a Dolby E® stream
- MADI input and output
- MetaData Management
- Video Adjustment include saturation, gain, black and hue adjustment
- Color matching
- Timing with available video and audio delay per channels is 30 frames and 1.3 seconds respectively
- Nova controller with full SNMP v2 support and custom control

Ordering Information

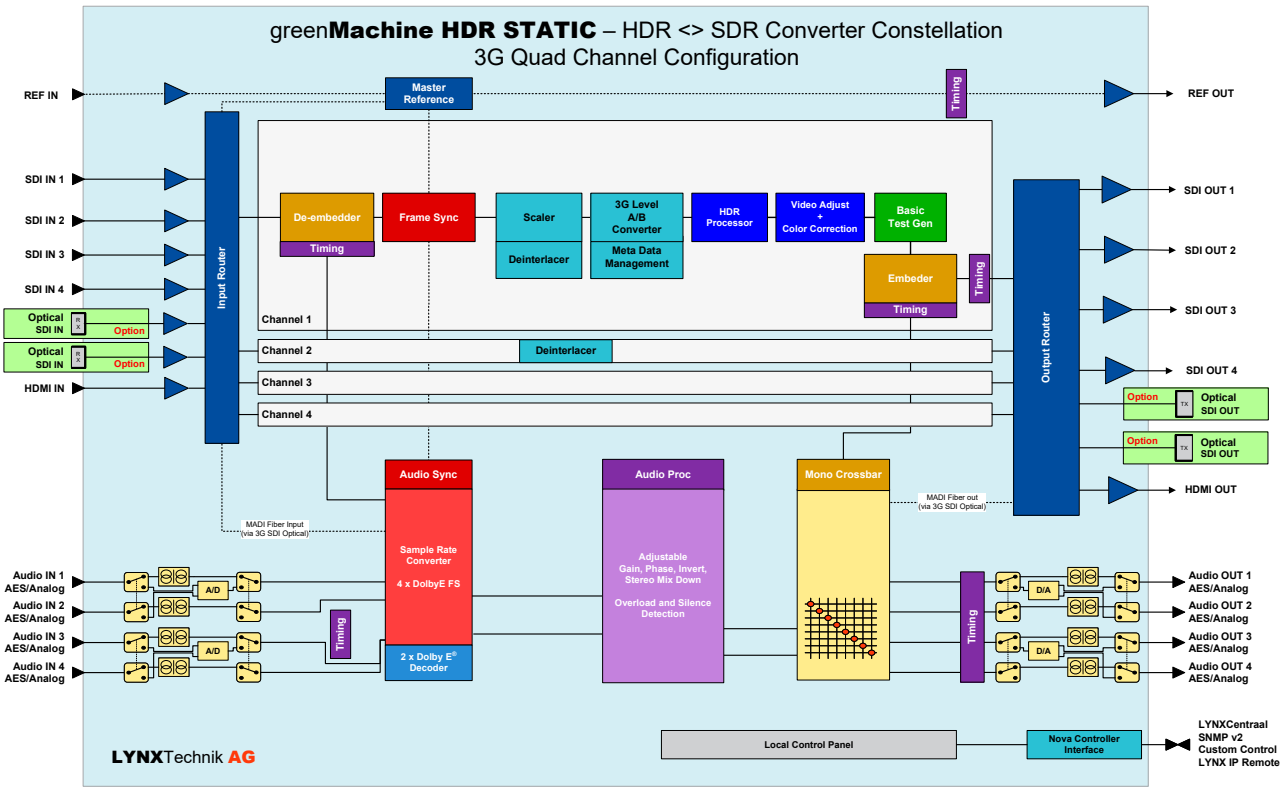
greenMachine Package			
Includes	**GM 6840:**	greenMachine titan Processors	
	GMC-HDR-STATIC-titan	greenMachine titan - HDR STATIC Converter/Processor. 4k UHD 12G-SDI with UPXD or 4x 3G-SDI with Dual UPXD converter + Dual Scaler (Constellation Licence)	
	RFR 6000	Rack Frame for 1 or 2 greenMachines (without power supplies)	
	2x RPS A100:	Primary and Redundant Power Supplies with Region Specific Power Cord	
GMPT HDRS (N/EU/US/UK)	greenMachine titan - HDR STATIC Converter/Processor. 4k UHD 12G-SDI with UPXD or 4x 3G-SDI with Dual UPXD converter + Dual Scaler (Hardware & License) Power plug Variants (please specify when ordering) GMPT HDRS N — Power supply without Plug GMPT HDRS EU — Power Supply with EU Plug GMPT HDRS US — Power Supply with US Plug GMPT HDRS UK — Power Supply with UK Plug	EAN: 4250479327863	
License Only (no hardware included)			
GMC-HDR-STATIC-titan	greenMachine titan - HDR STATIC Converter/Processor. 4k UHD 12G-SDI with UPXD or 4x 3G-SDI with Dual UPXD converter + Dual Scaler (Constellation Licence)	EAN: 4250479326118	

Functional Diagrams

Single Channel 4K UHD



Quad Channel 3G



4K UPXD

12G Up-, Down-, Cross-Converter

packages:
GMPT UPXD
licenses:
GMC-4KUPXD

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.

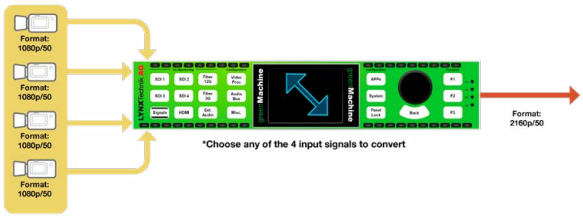
The greenMachine 4KUPXD system comes with a fully-featured local control interface with LCD which displays image previews and audio level meters of the processed video paths in addition to the graphical user interface called LynxCentraal. It is also supported by the Nova controller which enables the module to be remotely controlled and monitored via third party master control software.

Features

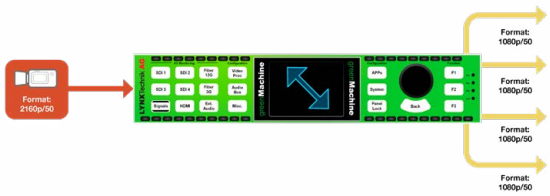
Processing Path	1x12G 4K UHD with 2SI quad-link <>single link conversion.
4K/3G-Scaler	A spatial converter with a powerful region of interest (ROI) selection and scaling. Conversion Mode supported: • Pillar box/Letterbox • Center cut, • 14:9 conversion • stretch to fill • Custom ROI
Deinterlacer	Broadcast/quality 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 artifacts. Only available on channel 1 & 2.
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	Manages the embedded metadata in the video signals. Time code, Closed captions and Teletext can be monitored and/or converted.
Video Adjustment	Includes saturation, gain black and hue adjustments, blanking interval deletion and aperture correction. Also provides a horizontal flip and YCrCb headroom clipping functionality.
Color Matching	Provides adjustment in gain and offset for red, green and blue (RGB) and cyan, magenta, yellow, and white (CMYW).
Dolby E® decoder	• Two Dolby E decoders can be used to decode all 8 channels contained in a Dolby E stream. • Dolby metadata can be mapped to VANC acc. to SMPTE 2020-3 and SMPTE 2020-2.
MADI in/out	Incoming MADI signals are routed to the internal audio crossbar. Outgoing MADI signal can be completely re-arranged in the internal audio crossbar.
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.
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)
Embedder/De-embedder:	Multi-format audio embedder and de-embedder providing access to all the channels in the input SDI and allows shuffling and embedding them to the output(s). Can also embed DolbyE™ signals which in conjunction with the frame synchronizer will always maintain the guard band. Also possible to incorporate separate AES and/or analog audio inputs and outputs.
Basic Audio & Video Test generator	Wide range of test patterns. 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. Available video delay per channel is 30 frames, audio delay is 1.3 second per AES audio channel.
Nova Controller	Full SNMP v2 along with LYNX IP remote control protocol functionality. Enables CustomControl feature that allows users to design customized control panels for a workstation, giving specific user simplified controls.

Application Examples & Functional Diagram

Application Examples

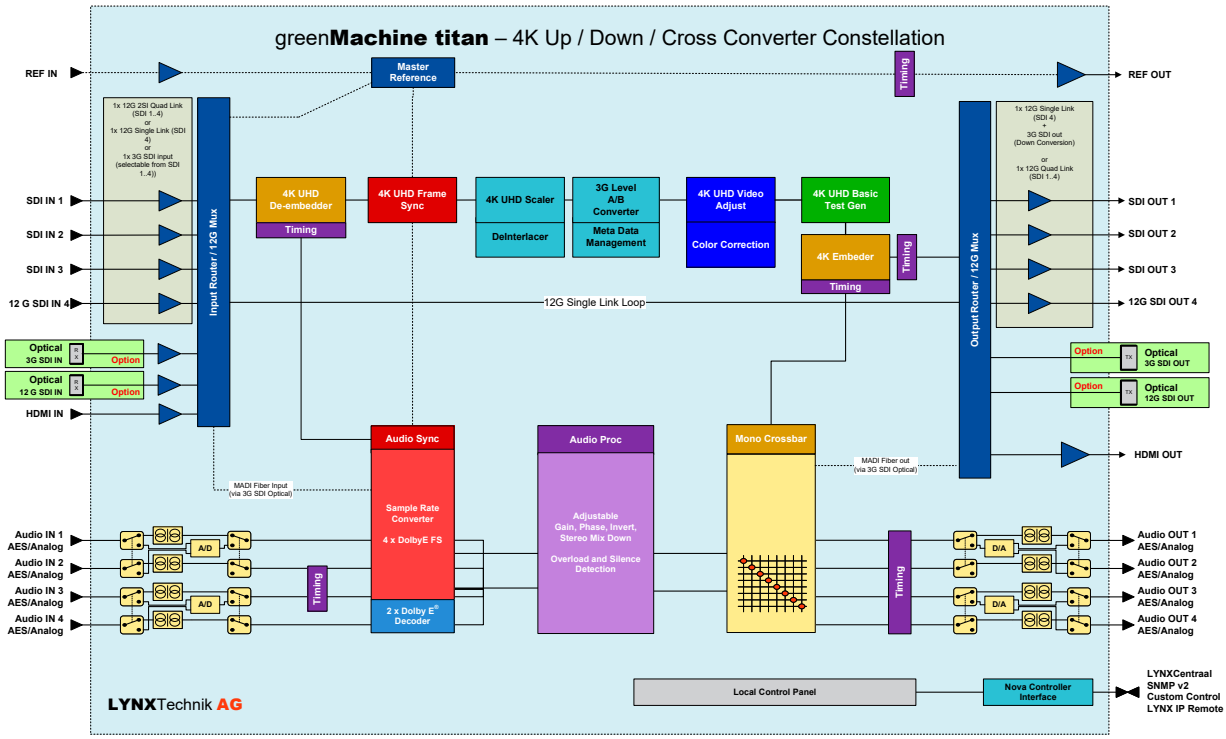


Upscaling



Downscaling

Functional Diagram - Single Channel 4K UHD



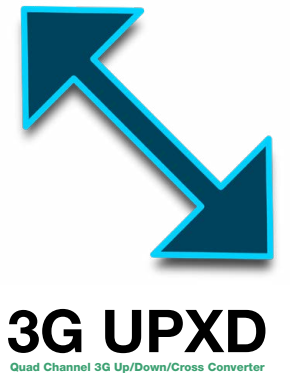
Ordering Information

greenMachine Package			
Includes	**GM 6840:**	greenMachine titan Processors	
	GMC-4KUPXD:	greenMachine titan - 4k UHD 12G-SDI UPXD converter with FS and Audio processor. Constellation Licence	
	GMC-3GUPXD:	greenMachine titan - 4 Channel 3G-SDI Dual UPXD converter + Dual Scaler, FS and Audio processor. Constellation Licence	
	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	
GMPT UPXD (N/EU/US/UK)	4K Up/Down/Cross-converter + Frame Synchronizer 3G Up/Down/Cross Converter + Frame Synchonizer + Dual Scaler (Hardware & License) Power plug Variants (please specify when ordering) GMPT UPXD N Power supply without Plug GMPT UPXD EU Power Supply with EU Plug GMPT UPXD US Power Supply with US Plug GMPT UPXD UK Power Supply with UK Plug		EAN: 4250479929333
License Only (no hardware included)			
GMC-4KUPXD	greenMachine titan - 4k UHD 12G-SDI UPXD converter with FS and Audio processor. Constellation Licence (No Hardware)		EAN: 4250479326064

3G UPXD

Quad 3G Up-, Down-, Cross-Converter

packages:
GMPT UPXD
licenses:
GMC-3GUPXD



Description

The greenMachine 3GUPXD is a broadcast-quality video processing unit that has a quad-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 two processing channels.
The greenMachine 3GUPXD provides 4x3G processing channels with independent embedder & de-embedder, audio processing, Dolby E® decoding, color matching and many more features on each channel. 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.

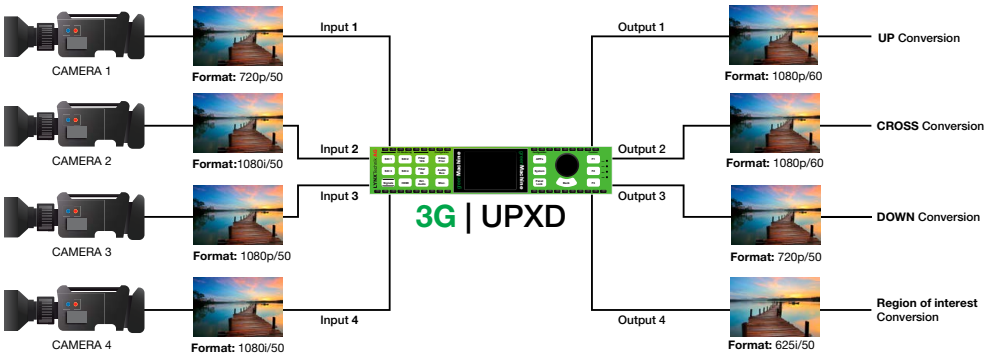
Features

Processing Path	Four independant 3G processing paths (4x3G)
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 • Custom ROI
Deinterlacer	Deinterlace SD & HD video formats on channel 1 & 2
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 artifacts.
Frame Synchronizer	Proprietary "flywheel" function uses external reference for reliable and dynamic synchronization of SDI sources Extracts embedded audio and re-embeds with delay to automatically match the internal video processing delay
Metadata Management	Manage embedded metadata, including: Time code, Closed captions and Teletext
Video Adjustment	• Saturation, black gain, and hue adjustments • Blanking interval deletion and aperture correction • YCrCb headroom clipping functionality • Horizontal flip
Color Matching	Adjust gain and offset for: • red, green and blue (RGB) • cyan, magenta, yellow, and white (CMYW)
DolbyE® Decoder	Two DolbyE® decoders can decode all 8 channels contained in a DolbyE® stream Dolby metadata can be mapped to VANC acc. to SMPTE 2020-3 and SMPTE 2020-2

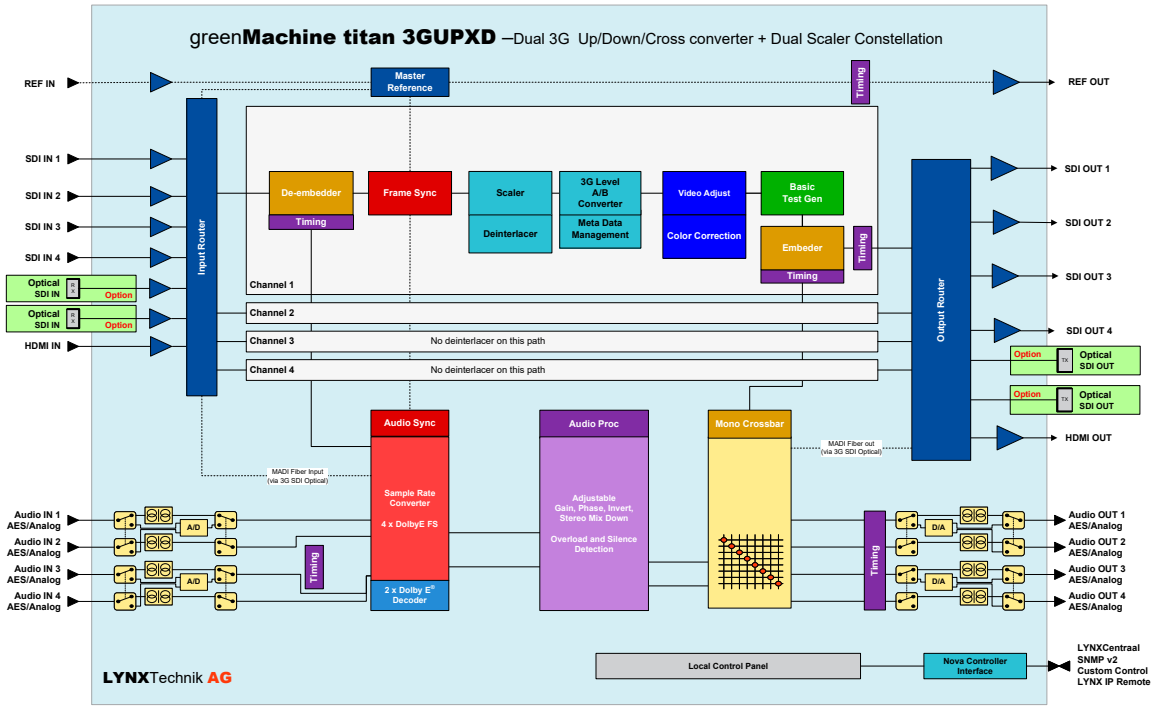
MADI in/out	Rerout in internal Crossbar: • Incoming MADI signal • Outgoing MADI signal
Audio Processing	Gain adjustment, mute, inversion, and stereo to mono-mix on each mono audio channel. Includes silence and overload monitoring, as well as 1kHz test signal
3G level A/B	• Automatic detection of 3G level A/B • 3G level A <> 3G level B dual-link conversion (3G level A acc. to SMPTE ST425-1/4:2:2, 10Bit)
Embedder/De-embedder:	Multi-format audio embedder and de-embedder with access to all channels in the input SDI Allows shuffling and embedding the output(s) Embed DolbyE® signals which in conjunction with the frame synchronizer always maintain the guard band Possible to incorporate separate AES and/or analog audio in/outputs
Basic Audio & Video Test generator	Wide range of test patterns. Can be configured to work in conjunction with the frame synchronizer to output a test pattern on TRS errors.
Timing	Video and AES audio channel can be individually delayed Available video delay per channel is 30 frames, audio delay is 1.3 second per AES audio channel.
Nova Controller	Full SNMP v2 along with LYNX IP remote control protocol functionality. Enables CustomControl feature that allows users to design customized control panels for a workstation, giving specific user simplified controls.

Application Example & Functional Diagram

Application Example



Functional Diagram - Quad Channel 3G



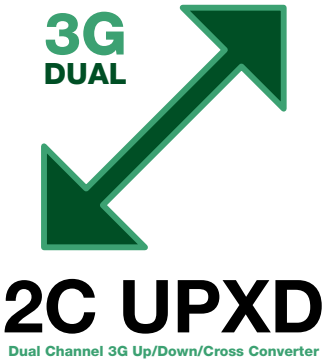
Ordering Information

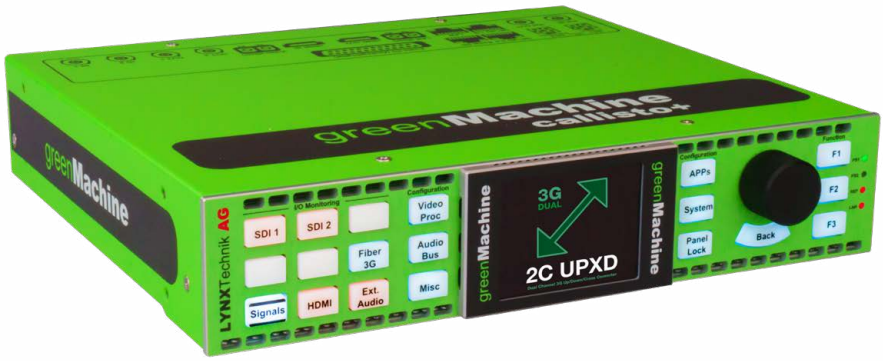
greenMachine Package		
Includes	**GM 6840:**	greenMachine titan Processors
	GMC-4KUPXD:	greenMachine titan - 4k UHD 12G-SDI UPXD converter with FS and Audio processor. Constellation Licence
	GMC-3GUPXD:	greenMachine titan - 4 Channel 3G-SDI Dual UPXD converter + Dual Scaler, FS and Audio processor. Constellation Licence
	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
GMPT UPXD (N/EU/US/UK)	4K Up/Down/Cross-converter + Frame Synchronizer 3G Up/Down/Cross Converter + Frame Synchonizer + Dual Scaler (Hardware & License) Power plug Variants (please specify when ordering) GMPT UPXD N Power supply without Plug GMPT UPXD EU Power Supply with EU Plug GMPT UPXD US Power Supply with US Plug GMPT UPXD UK Power Supply with UK Plug	EAN: 4250479929333
License Only (no hardware included)		
GMC-3GUPXD	greenMachine titan - 4 Channel 3G-SDI Dual UPXD converter + Dual Scaler, FS and Audio processor. Constellation Licence. (No Hardware)	EAN: 4250479326521

2C UPXD

Dual Channel 3G Up/ Down/ Cross Converter

packages:
GMPC 2CUPXD
licenses:
GMC-2UPXD





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.

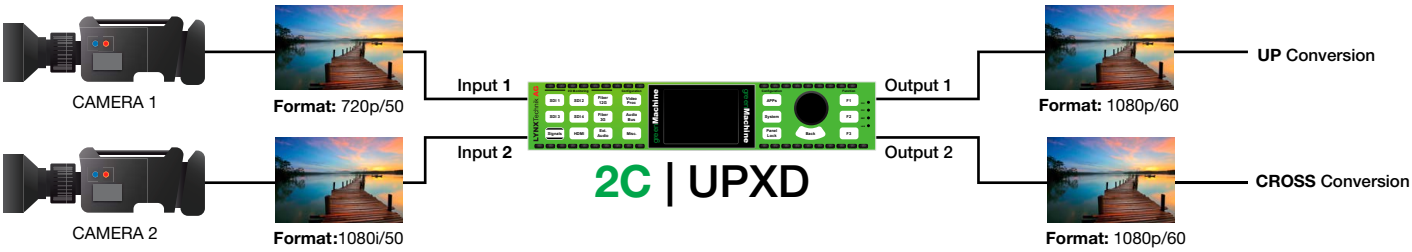
Features

Processing Channels:	Two independant 3G processing paths (2x3G)
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 • Custom ROI
Deinterlacer:	Deinterlace SD & HD video formats on both channels
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 artifacts.
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:	Proprietary "flywheel" function uses external reference for reliable and dynamic synchronization of SDI sources Extracts embedded audio and re-embeds with delay to automatically match the internal video processing delay
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).

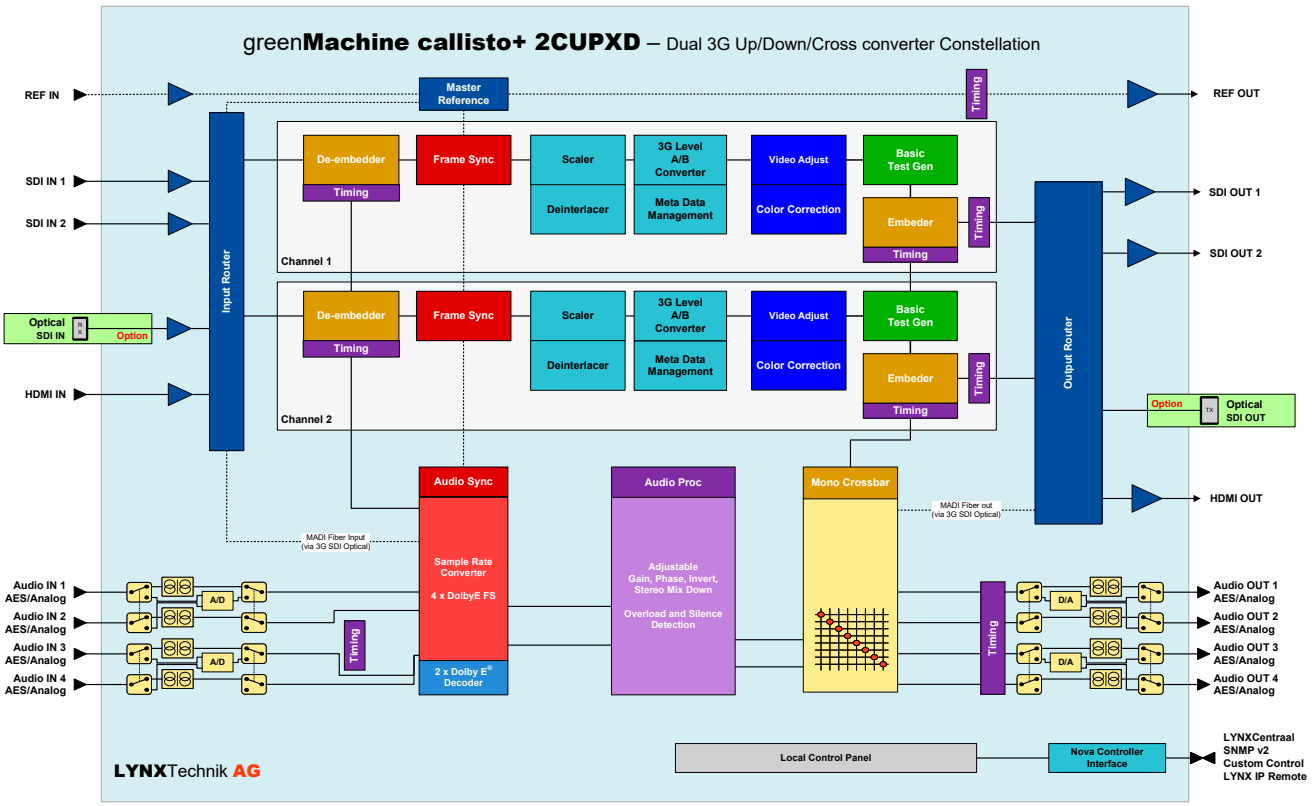
Embedder/ De-embedder:	A multi-format audio embedder and de-embedder provide access to all the channels in the input SDI and allow shuffling and embedding them to the output(s).
Audio Processing:	It provides gain adjustment, mute, inversion, and stereo to mono-mix on each mono audio channel including 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.
LynxCentraal	LynxCentraal 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.

Application Example & Functional Diagram

Application Example



Functional Diagram: Dual Channel 3G



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)	EAN: 4250479328136	

BiDi

Multi Signal Bi-Directional Transport Solution

packages:
GMPT BIDI
licenses:
GMC-BiDi-Transport

BiDi
Transport Solution

Description

The greenMachine BIDI is a multi-signal bi-directional transport solution that allows transportation of video, audio, and GPI efficiently across two greenMachine Titan hardware devices. It is a flexible solution for applications that require an exchange of multiple signals consisting of video, audio, and GPIs, on two single-fiber links over long distances. The ethernet control information can be transported over a single fiber link over bidirectional SFPs.

A Master/Slave model of communication is used between the two greenMachine Titan hardware devices where one machine will act as a Master device while the other will be a Slave. The greenMachine BIDI can transport one of the options below in both directions simultaneously:

1. 6xHD signals (1.485Gbit/s) with four external analog/digital audio signals and four GPIs
2. 4x 3G signal with four GPIs (two groups of embedded audio)
3. 3x3G signal, 1x HD signal, four external analog/digital audio signals and four GPIs

The options given above can be mixed proportionally up to 12Gbit/s throughput. The reference of one of the two greenMachines (aka the Master) is also transmitted to the other greenMachine (aka the Slave) and can be used in the remote location to synchronize cameras, as an example.
A 1Gbit/s ethernet transport link provides easy control of the two greenMachine via LynxCentraal software. For the signal transport to occur which consists of video, audio, and GPIs, the two greenMachine Titans need to be connected via two single-mode fiber cables over transceiver SFPs. For the ethernet control signal transmission, one single-mode fiber cable is required over bidirectional SFPs.

The greenMachine titan hardware comes with a fully featured local control interface with an LCD which displays image previews and audio level meters of the processed video paths in addition to the graphical user interface.

Features

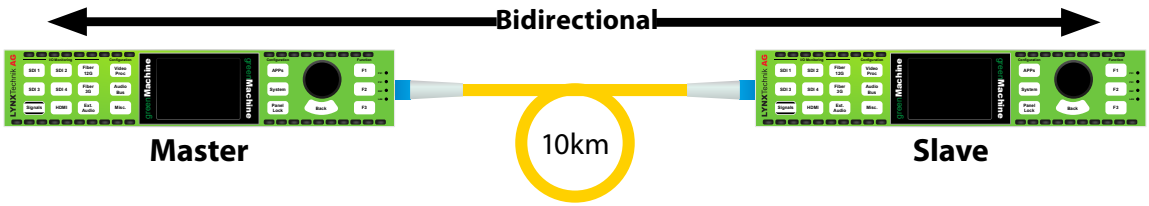
- Multi-signal bidirectional transport solution through bi-directional 12G SDI channel
- SDI, HDMI and optical inputs and outputs
- 4x Audio transport in both directions
- 4x GPIO in both directions
- 1x Serial I/O (UART)
- 1x 1Gbit Ethernet transport
- 4 Audio inputs and outputs switchable between analog and digital
- 1x MADI via optical (3G)
- Included transceivers and bidirectional SFP modules for full signal transport
- Timed reference output
- Integrated local control panel for configuration and monitoring
- Extensive monitoring features such as image previews and audio level meters available on the local control panel and control software
- Full remote control using LynxCentraal control software CustomControl Panels
- Full SNMP v2 support
- Optional video and ethernet CWDM fiber I/O with all 18 wavelengths selectable
- Optional redundant power protection
- Optional 19" rack frame

Ordering Information

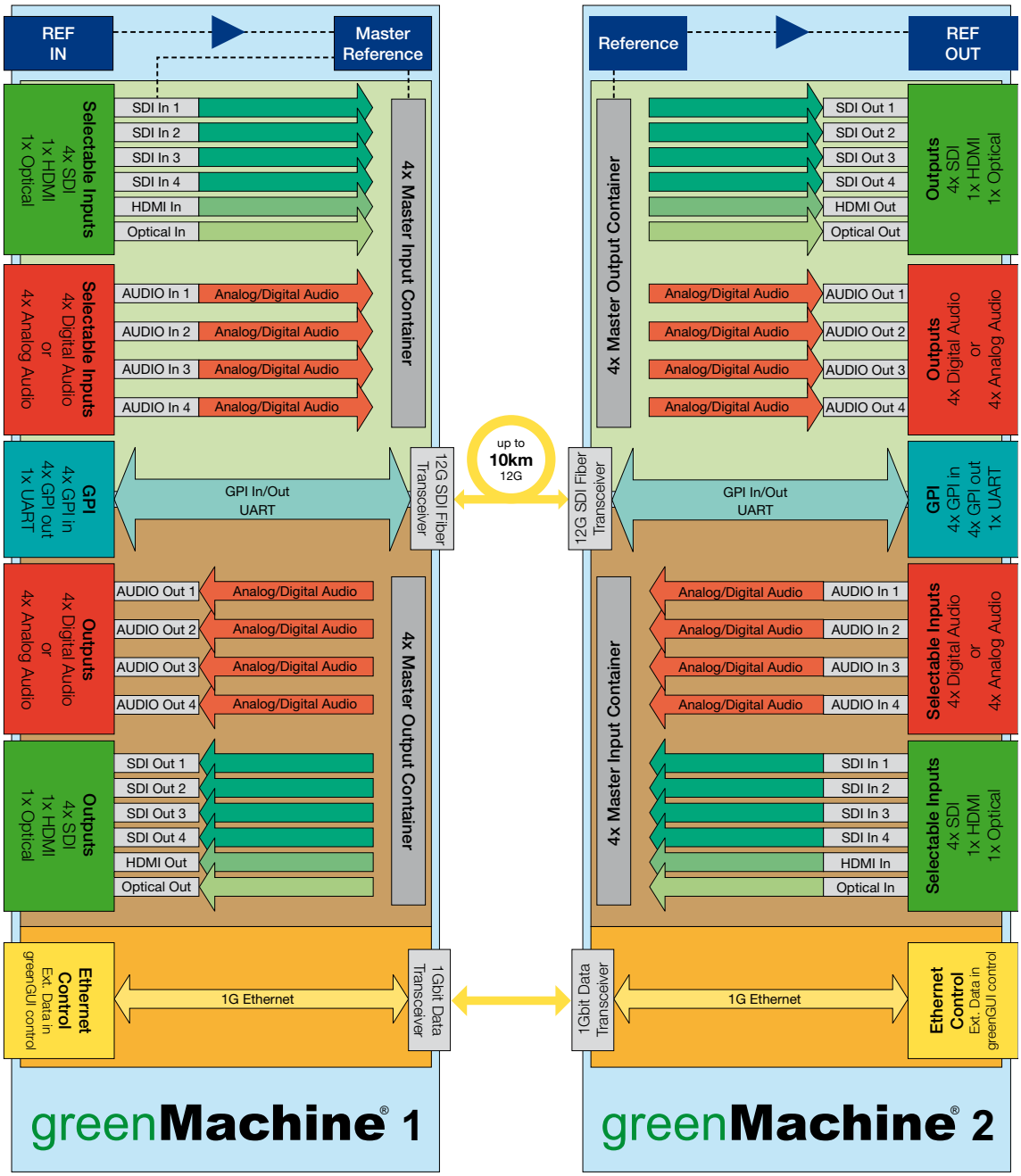
greenMachine Package			
Includes	**GM 6840:**	greenMachine titan Processors	
	2x GMC-BiDi-Transport:	greenMachine titan - Multi Signal Audio/Video/Data Bi-Directional Transport System Licence	
	SFPs:	12G: 1x OH-BD-12G-1270-LC, 1x OH-BD-12G-1330-LC, Ethernet: 1x OH-BD-51-1310-LC, 1x OH-BD-51-1550-LC	
	2x RFR 6000	Rack Frame for 1 or 2 greenMachines (without power supplies)	
	4x RPS A100:	Primary and Redundant Power Supplies with Region Specific Power Cord	
GMPT BIDI (N/EU/US/UK)	greenMachine titan - Multi Signal Audio/Video/Data Bi-Directional Transport System (2x greenMachines) Power plug Variants (please specify when ordering) GMPT BIDI N — Power supply without Plug GMPT BIDI EU — Power Supply with EU Plug GMPT BIDI US — Power Supply with US Plug GMPT BIDI UK — Power Supply with UK Plug		EAN: 4250479327917
License Only (no hardware included)			
GMC-BiDi-Transport	greenMachine titan - Multi Signal Audio/Video/Data Bi-Directional Transport System Licence (No Hardware)		EAN: 4250479326088

Application Example & Functional Diagram

Application Example



Functional Diagram



Testor AV

AV Test Unit for SDR and HDR with AV Sync Generator and Analyzer

packages:
GMPT TESTOR AV
licenses:
GMC-TESTOR AV-titan

Testor AV
Video and Audio Testing with
AV Sync Generator and Analyzer

Description

The greenMachine Testor is a feature-rich and user-friendly multi-format test signal generator. It is an ideal troubleshooting A/V solution for technicians & engineers working in field such as on studio applications and for line-up tasks in master control rooms.

The greenMachine Testor is a video and audio test signal generator and supports two configurations:
1.Single Channel 4K/UHD (up to 3840 x 2160p) – 12Gbit/s SDI and quad-link (2SI)
2.Four independent (quad) channels up to 3G SDI

Along with standard static and dynamic video test signals & patterns, greenMachine Testor also provides the flexibility to users to upload their own user-defined signal patterns. Logos and text can be added to the test signals as well.

Want to see more?

Visit the Testor AV Showcase Website for tutorials, demos and further information?

testorAV.lynx-technik.com

Features

Processing Path	4x3G 1x12G
AV Sync:	**Generator:** Multi-channel GLITS AV Test signal **Analyzer:** Measure delays of audio channels **Overlay:** Visualize measurements and overlay them on output signal. Two greenMachines running Testor needed
Test Signals	Standard static and dynamic video test signals and patterns.
User-defined Signal Patterns	For added flexibility, users can upload their own user-defined signal patterns. Logos and text can also be added to test signals. It is useful for channel identification.
HDR Test signals	Additional test signals for various HDR standards (PQ, HLG, SLOG3). HDR test patterns currently only available in 4K/UHD mode.
Integrated Graphics Editor	Tool to place images & logos, text and even user-defined signals, patterns, and graphics. All items can be moved and edited simply with a computer mouse.
Scalar	Ensures users can scale test patterns to match the format.

Audio Test Generator	16-channel audio test generator with adjustable level, phase, frequency, mix-down, and an EBU/AV sequence. All the audio measures are embedded into the SDI video or routed to the external audio outputs of greenMachine.
MADI Signal	Can generate 64/56 channel MADI Signal (via 3G fiber) with each channel freely assignable to the 16-channel audio test generator.
Audio crossbar	All audio generator channels can be individually assigned to the embedder inputs and the external audio outputs (AES or analog).
Ref signal	The timing of the audio and the video test signals including the output reference signal (Bi-level SD or Tri-level HD) can be individually set in relation to an attached input reference signal.
Nova Controller	Full SNMP v2 along with LYNX IP remote control protocol functionality. Enables CustomControl feature that allows users to design customized control panels for a workstation, giving specific user simplified controls.

Ordering Information

greenMachine Package		
Includes	**GM 6840:**	greenMachine titan Processors
	GMC-TESTOR AV-titan:	greenMachine titan - 4k UHD 12G-SDI or 4x 3G-SDI Audio & Video Test Signal Generator. With AV SYNCH Analyzer functionality. Constellation Licence. (No Hardware)"
	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
GMPT TESTOR AV (N/EU/US/UK)	4k UHD 12G-SDI or 4x 3G-SDI Audio & Video Test Signal Generator. With AV Sync Analyzer functionality(Hardware & License) Power plug Variants (please specify when ordering) GMPT TESTOR AV N Power supply without Plug GMPT TESTOR AV EU Power Supply with EU Plug GMPT TESTOR AV US Power Supply with US Plug GMPT TESTOR AV UK Power Supply with UK Plug	EAN: 4250479929357
License Only (no hardware included)		
GMC-TESTOR AV-titan	greenMachine titan - 4k UHD 12G-SDI or 4x 3G-SDI Audio & Video Test Signal Generator. With AV SYNCH Analyzer functionality. Constellation Licence. (No Hardware)	EAN: 4250479929364

AV Sync Generator and Analyzer

General Information

The AV Sync Generator and Analyzer feature allows synchronization measurements between multi-channel audio and video within a signal path. To use this measurement methodology, an AV Sync Generator is activated through the selected test pattern and passed through the signal path to be measured.

The generated test signal includes video and audio markers, which use the "GLITS" (BBC) audio test signal standard for that purpose. The video marker consists of a horizontal black line in the center of the video image, flashing into one frame every four seconds (the "Black Flash"). In addition, two black bars moving toward each other and colliding in the middle (commonly referred to as "Clap Bars") indicate the upcoming Black Flash to the watcher. The audio markers are small gaps in the tone that begin with a precise timing relationship to the Black Flash. The test signal uses 4 different frequencies to detect audio channel swaps.

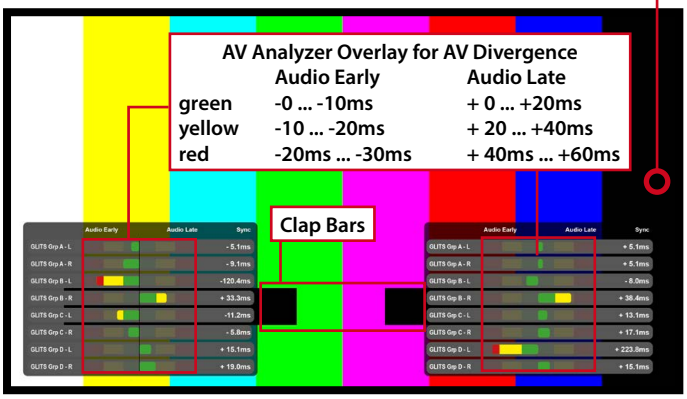
The generated video and audio markers can be activated on most existing test signals in the greenMachine's Testor constellation. Up to four so-called GLITS test signals can be generated (one in 12G mode).

Up to four signal chains can be measured simultaneously and the measurement results are shown within LynxCentraal. In addition, the measurement results of one input channel can be overlayed on the incoming measured signal and routed out of greenMachine's SDI output 4, the optical, or HDMI output for external monitoring. (If SDI output 4 is used for the measurement overlay, it can't be used for the generator side anymore.)

It is possible to use one greenMachine as an AV Sync generator and analyzer at the same time.

*__NOTE:__ *If the AV Sync overlay output is enabled, the reference source automatically jumps to the selected Overlay Video Source. If you want to use the Overlay feature with only one greenMachine, there must be a clock/sync uncupled device (e.g. a Frame Sync) between gM Output and gM Input.*

Compatible with most test patterns, backgrounds, and video feeds that don't conflict with "Black Flash" or audio



AV Sync analyzer overlay on standard colorbars*

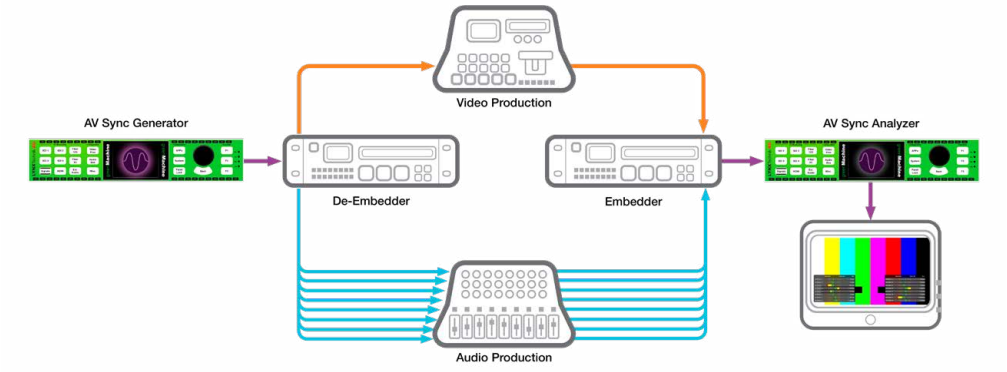
Incompatible Test Patterns

Some test patterns would cause interference with the AV Sync Generator and thus also the analyzer. The AV Sync Generator is not offered for these patterns:

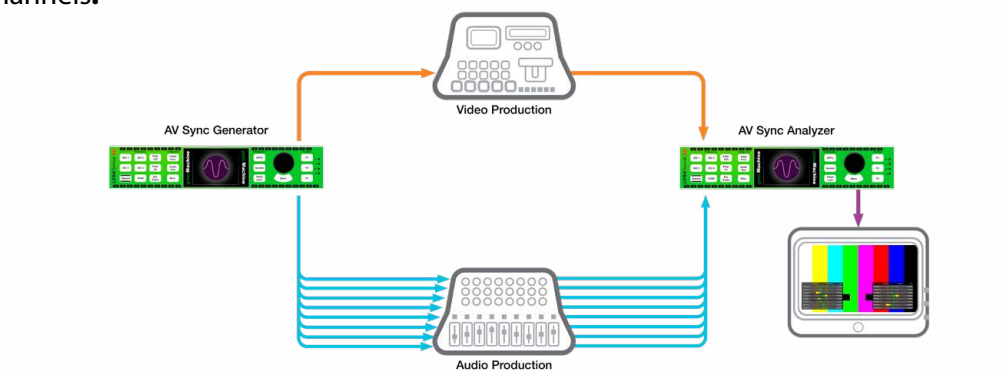
EBU AV Sync (SDR and HDR)	Colorbar SMPTE
HDR PLUGE BT.814 (HLG and PQ)	Strobe Pattern
Flash Black	Flash White
Convergence Grill	Persistence Test
Four-Level PLUGE	Full Field Black

Workflow Diagrams: Working with Embedded and Discrete Audio Channels

Embedded audio channels**:**



Discrete audio channels**:**



AV Delay Compensation

General Information

The "AV Delay Compensation Feature" is a mostly automated delay compensation of any SDI based audio and video processing installation (Fiber or BNC) available with Testor AV and LynxCentraal. It offers the convenient choice of a single click action or an extensive dialogue for correction settings, including backups of results. Both include the option to correct switched audio channels, if necessary.

With the AV Delay Correction feature any processing path up to 12G-SDI (excl. 6G-SDI) can be automatically tested, measured, and corrected. Besides a greenMachine with a TestorAV constellation, and a PC or MAC with LynxCentraal version 1.6.0 installed, a second greenMachine titan with a compatible constellation is recommended (for example HDR Evie+, HDR Static, UPXD).

Recorded delay settings can also be applied to a greenMachine callisto+ with 2C UPXD deployed. Please note that no default constellation of any greenMachine is able to correct audio delays, a compatible constellation is always necessary. If necessary, the same greenMachine titan that was used to measure the delay with Testor AV can be used to apply the corrections. For this, a compatible constellation has to be deployed on the machine and the recorded delay settings need to be applied.

Connect an output of the greenMachine Testor AV to the input of your system under test. Return the signal from the output of the system under test back into the greenMachine Testor AV. If your second greenMachine is part of the processing path (for example as an Up / Down / Cross Converter) route the output signal of that greenMachine to the first greenMachine with Testor AV.

To test the signal chain, connect your greenMachines and PC or MAC via ethernet. Start LynxCentraal and enter the "green" section. Select your greenMachine with Testor AV and double click the generator on the desired processing path (Purple Column) and enable the "AV Sync Generator Enable" parameter on the right.

Return to the overview of the grenMachine with Testor AV (Click the "FIT" button next to the plus and minus button on top of the viewport) and double click the corresponding input in the MIX IN (Orange Column) section that displays the measured delays as bar graphs. Here you can instantly apply the correction to a target greenMachine.

For a more extensive test with the options to save and restore results, the bottom part of the MIX IN column offers the "AV Delay Recording and Compensation" function. The popup dialogue will extensively explain each option and step. Should more details be necessary, please refer to the Quick Reference Guide for Testor AV.

Additional Notes

The following points are some technical limitations and quality-of-life improvements, should you encounter issues during the test:

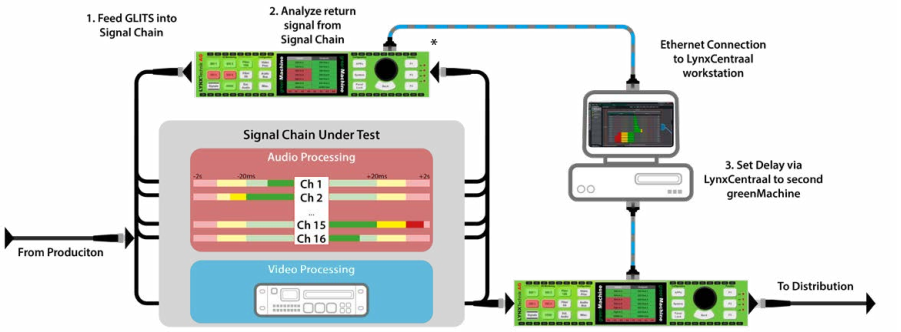
1. The AV Delay Compensation can test and monitor up to four paths with 16 audio channels each in 3G, or 64 audio channels in 12G.
2. The system under test can be connected via BNC or Fiber, but not via HDMI.
3. It is generally recommended to connect your greenmachines to the same reference signal as your usual SDI Reference and enable the "Source in Sync" checkbox in the target greenmachine to avoid complications during measuring and correction.
4. The greenMachine Testor AV does not need to be present in the signal chain after the measurement is taken.
5. We generally recommend measuring multiple points over time to reduce measurement errors because of exceptional measurement results
6. Measurements that have been exported are XML files that can be imported and applied at any time. Results of a measurement that aren't exported will be lost when exiting LynxCentraal.

Workflow Example: AV Delay Compensation Setup and Workflow

Two dedicated greenMachines

To conveniently correct the measured delay in three easy steps, without re-deploying a different license on the same machine follow the diagram to the right.

The greenMachine used for testing does not need to remain in the signal chain, and can be re-used in other setups.



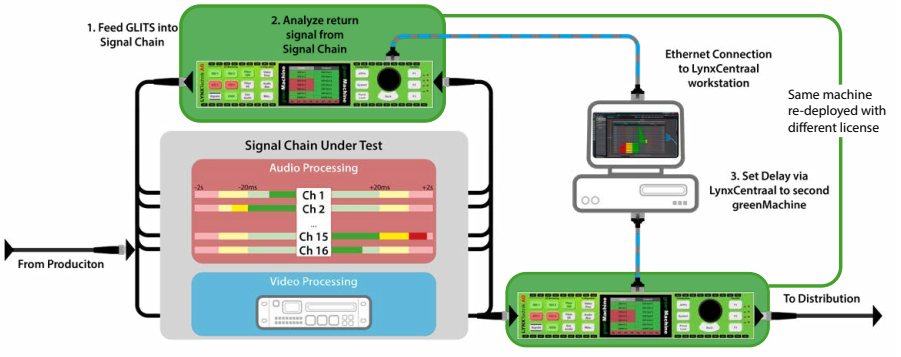
* This greenMachine can be removed one the measurement has been taken.

With **single** greenMachine

If the same greenMachine is used to measure and correct the delay an instant correction is not possible, since the target machine with Testor AV deployed on it does not support setting a delay for a throughput signal.

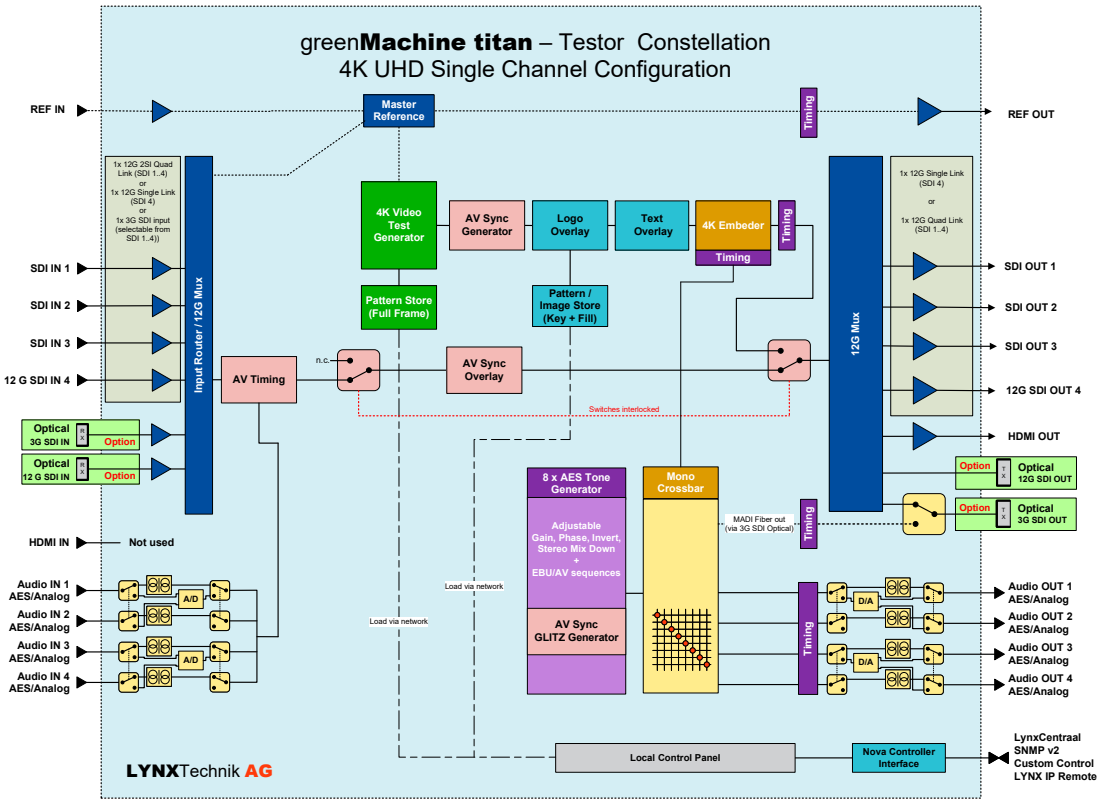
The results of a measurement will have to be (temporarily) saved in LynxCentraal and applied to the machine, once it's reconnected at the output of the Signal chain under test.

Please note that any delay caused by processing in the greenMachine can not be measured if it wasn't present for the measurement in it's processing configuration.

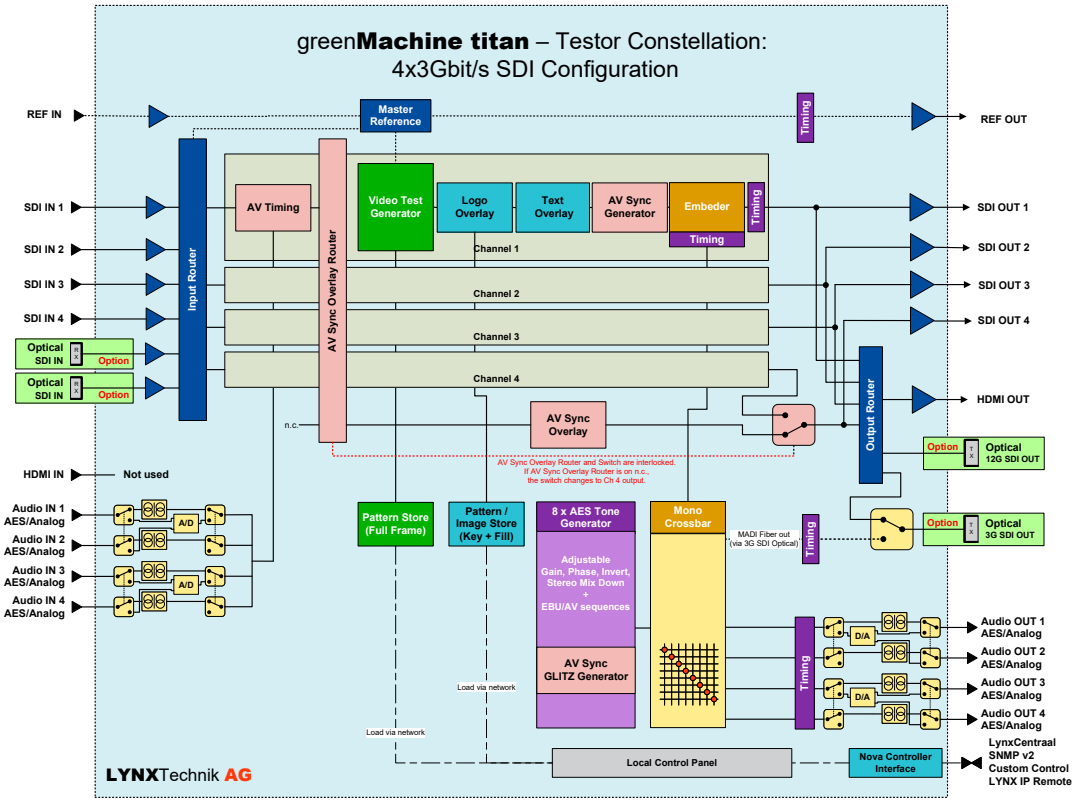


Functional Diagrams

Single Channel 4K UHD



Quad Channel 3G



Testor

AV Test Unit for SDR and HDR

packages:
GMPT TESTOR
licenses:
GMC-TESTOR-titan

Testor
Video and Audio Testing

Description

The greenMachine Testor is a feature-rich and user-friendly multi-format test signal generator and AV sync analyzer. It is the ideal troubleshooting AV solution for technicians & engineers working in the field (OB or temporary installations), in studio applications, and for line-up tasks in master control rooms.

The greenMachine Testor is a video and audio test signal generator and supports two configurations:

1. **Single Channel 4k/UHD: single link and quad-link (2SI) 12G-SDI**
2. **Quad Channel 3G: four independent 3G-SDI channels**

In addition to the extensive industry standard static and dynamic video test signals & patterns, greenMachine Testor also provides the option for users to upload their own static custom signal patterns. Graphics and text can also be added to the test signals.

Features

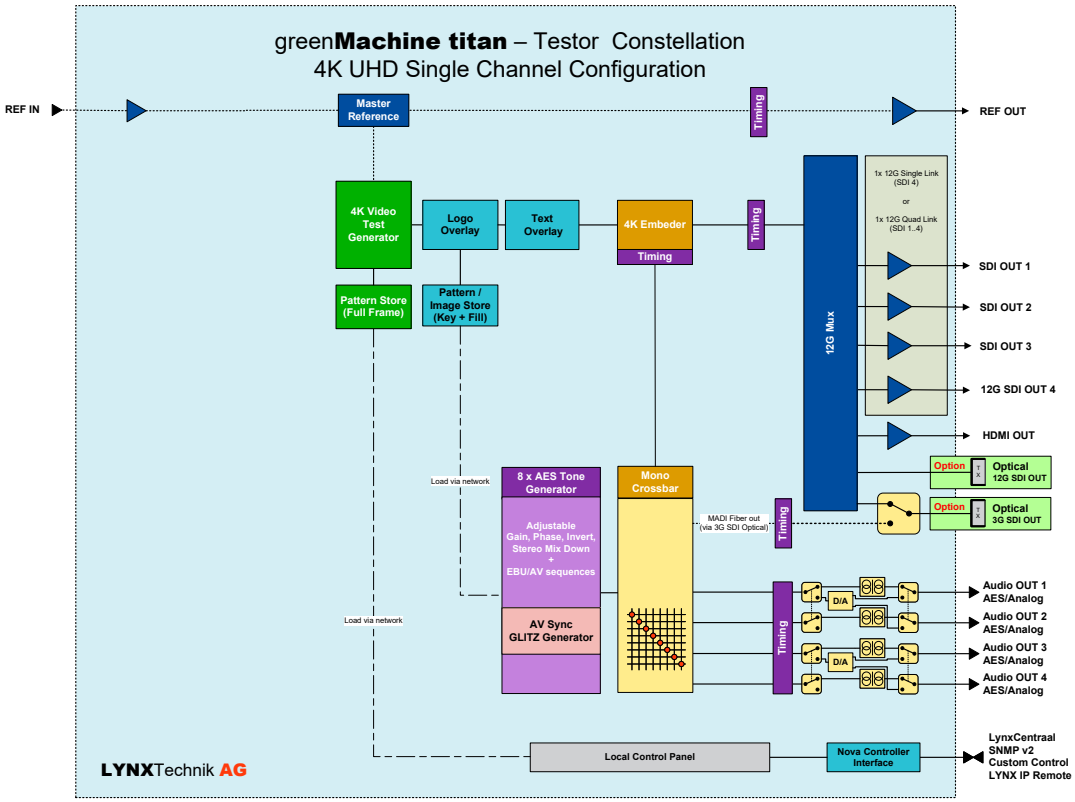
Processing Path	4x3G 1x12G
Test Signals	Standard static and dynamic video test signals and patterns.
User-defined Signal Patterns	For added flexibility, users can upload their own user-defined signal patterns. Logos and text can also be added to test signals. It is useful for channel identification.
HDR Test signals	Additional test signals for various HDR standards (PQ, HLG, SLOG3). HDR test patterns currently only available in 4K/UHD mode.
Integrated Graphics Editor	Tool to place images & logos, text and even user-defined signals, patterns, and graphics. All items can be moved and edited simply with a computer mouse.
Scalar	Ensures users can scale test patterns to match the format.
Audio Test Generator	16-channel audio test generator with adjustable level, phase, frequency, mix-down, and an EBU/AV sequence. All the audio measures are embedded into the SDI video or routed to the external audio outputs of greenMachine.
MADI Signal	Can generate 64/56 channel MADI Signal (via 3G fiber) with each channel freely assignable to the 16-channel audio test generator.
Audio crossbar	All audio generator channels can be individually assigned to the embedder inputs and the external audio outputs (AES or analog).
Ref signal	The timing of the audio and the video test signals including the output reference signal (Bi-level SD or Tri-level HD) can be individually set in relation to an attached input reference signal.
Nova Controller	Full SNMP v2 along with LYNX IP remote control protocol functionality. Enables CustomControl feature that allows users to design customized control panels for a workstation, giving specific user simplified controls.

Ordering Information

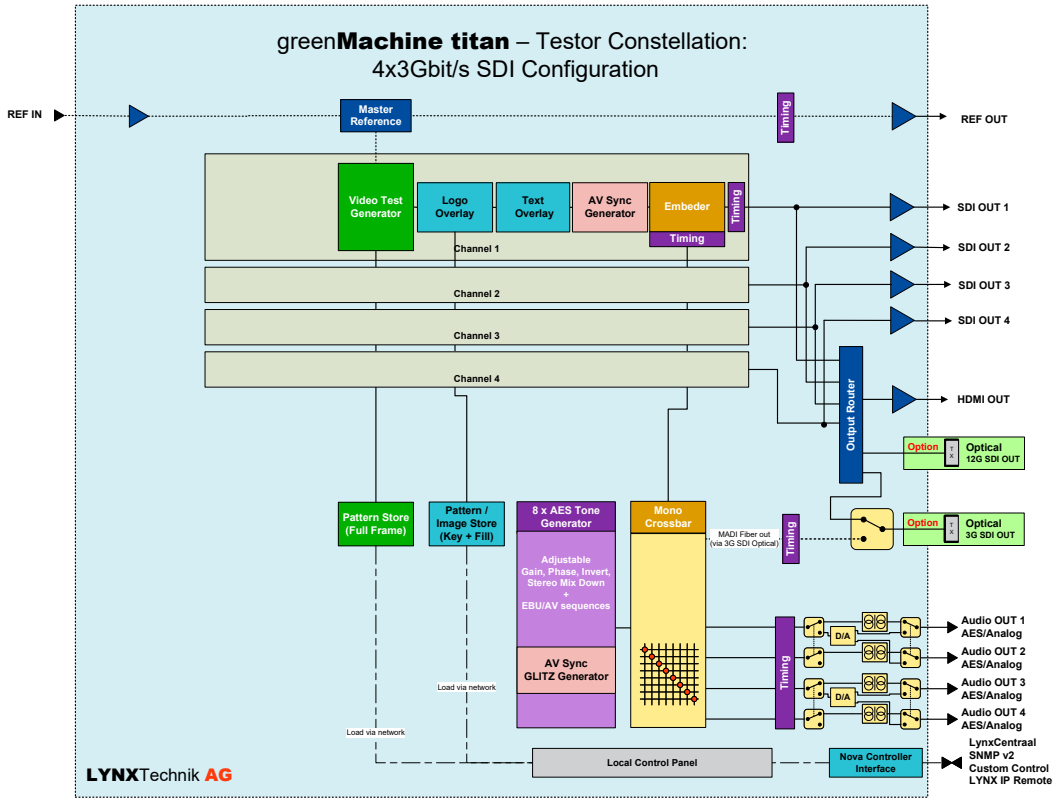
greenMachine Package			
Includes	**GM 6840:**	greenMachine titan Processors	
	GMC-TESTOR AV-titan:	greenMachine titan - 4k UHD 12G-SDI or 4x 3G-SDI Audio & Video Test Signal Generator. With AV SYNCH Analyzer functionality. Constellation Licence. (No Hardware)"	
	RFR 6000	Rack Frame for 1 or 2 greenMachines (without power supplies)	
	2x RPS A100:	Primary and Redundant Power Supplies with Region Specific Power Cord	
GMPT TESTOR (N/EU/US/UK)	greenMachine titan - 4k UHD 12G-SDI or 4x 3G-SDI Audio & Video Test Signal Generator (Hardware & Software) Power plug Variants (please specify when ordering) GMPT TESTOR N Power supply without Plug GMPT TESTOR EU Power Supply with EU Plug GMPT TESTOR US Power Supply with US Plug GMPT TESTOR UK Power Supply with UK Plug		EAN: 4250479929357
License Only (no hardware included)			
GMC-TESTOR-titan	greenMachine titan - 4k UHD 12G-SDI or 4x 3G-SDI Audio & Video Test Signal Generator. Constellation Licence. (No Hardware)		EAN: 4250479326101

Functional Diagrams

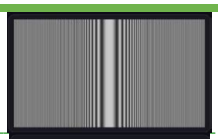
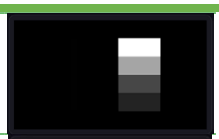
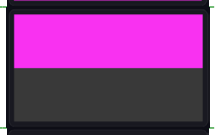
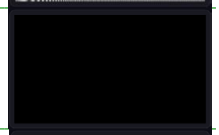
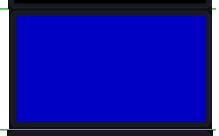
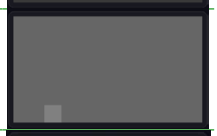
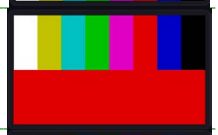
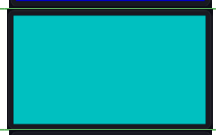
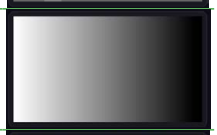
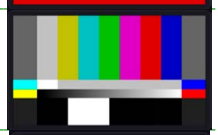
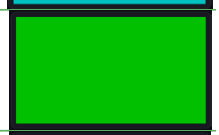
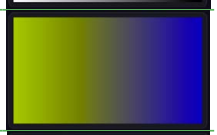
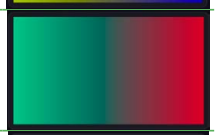
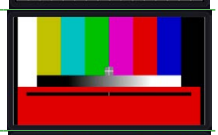
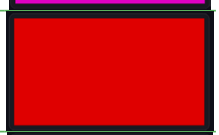
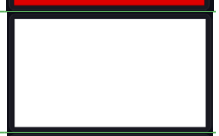
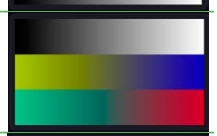
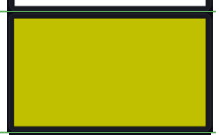
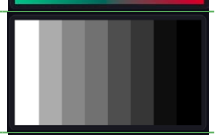
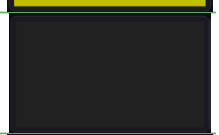
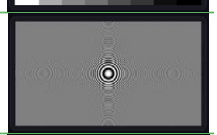
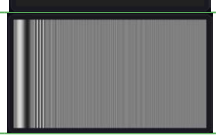
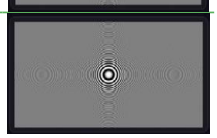
Single Channel 4K UHD



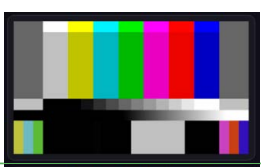
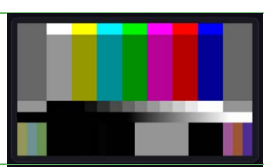
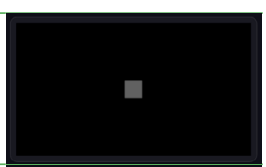
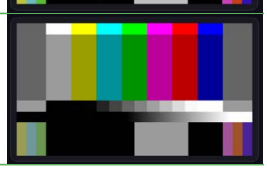
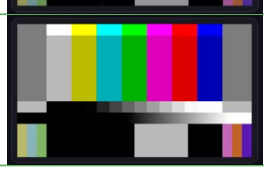
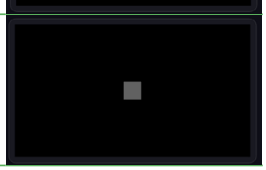
Quad Channel 3G



Available Test Patterns for Testor AV and Testor

Center Sweep 	Four-Level PLUGE 	Pathological EQ 
Color Temperature 	Frequency Sweep 	Pathological EQ/ PLL 
Color Bar 100% 	Full field Black 	Pathological PLL 
Color Bar 75% 	Full field Blue 	Persistence Test 
Color Bar 75% over Red 	Full field Cyan 	Ramp Down Y 
Colorbar SMPTE 	Full field Green 	Ramp Up CB 
Convergence Grille 	Full field Magenta 	Ramp Up CR 
EBU AV Sync 	Full field Red 	Ramp Up Y 
Field Pattern Colorbar/Red Only Available for Interlaced standard (SD and 1080i) 	Full field White 	Ramp Up YCbCr 
Field Pattern Red/Colorbar Only Available for Interlaced standard (SD and 1080i) 	Full field Yellow 	Staircase 
Flash Black 	Grey 15% 	Zoneplate 
Flash White 	Multiburst 	Zoneplate Moving 

HDR Test Patterns

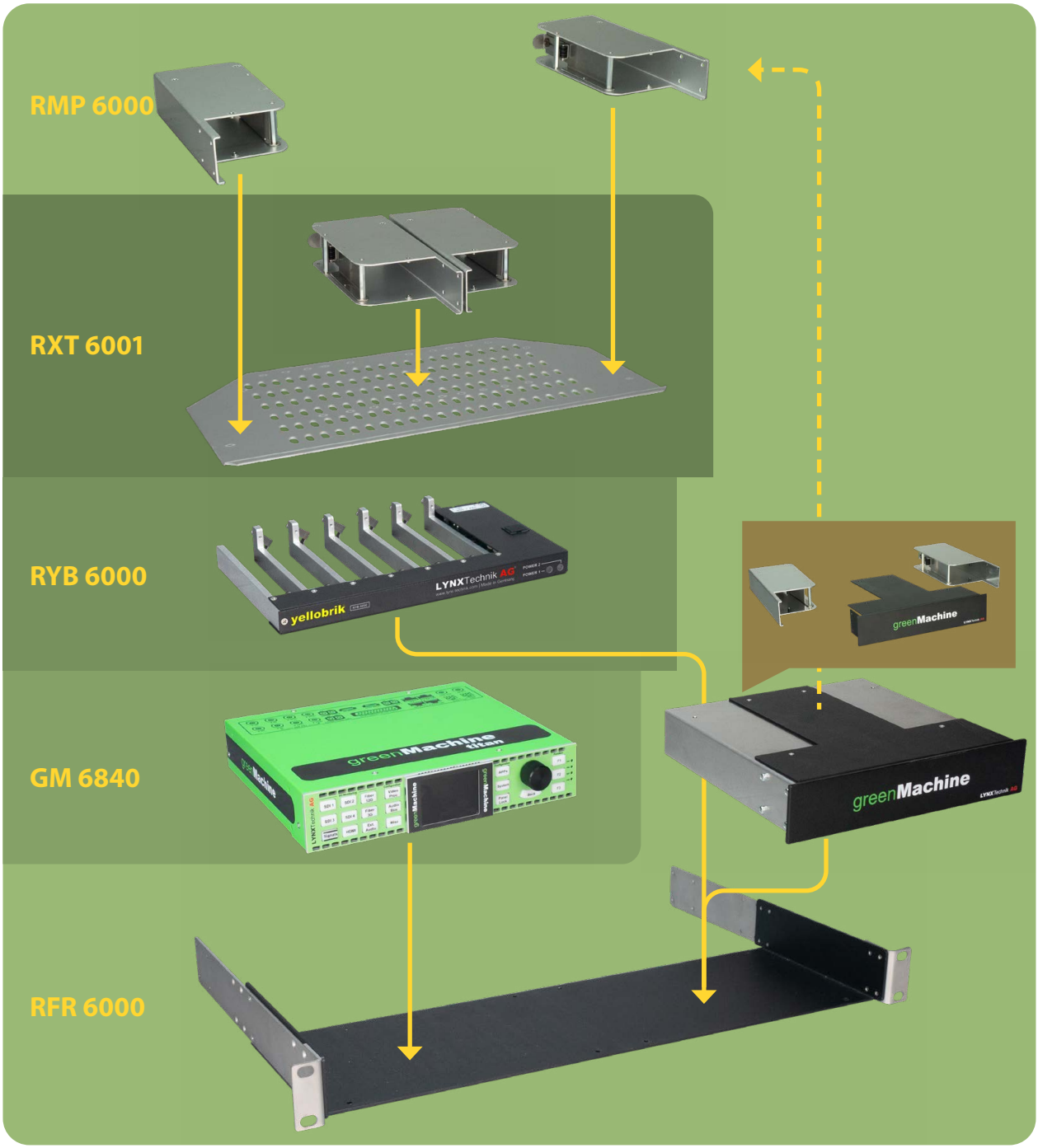
HDR Colorbar BT.2111 HLG Narrow 	HDR Colorbar BT.2111 PQ Narrow 	HDR PLUGE BT.814 HLG 
HDR Colorbar BT.2111 PQ Full 	HDR Colorbar BT.2111 Slog3 Full 	HDR PLUGE BT.814 PQ 

Rack Frame Construction Overview

The Concept

With it's standalone, 1RU high /9.5" wide design the greenMachine is fit to be placed and plugged almost anywhere access to a wall plug is given. If you prefer to install it in a rack we offer a wide range of rack building options. Be it:

- RFR 6000: An additional greenMachine in a rack mount tray
- RXT 6001: Holders for power supplies
- RYB 6000: Placement option for up to 6 yellobriks with primary/redundant power, and GPIO



RFR 6000 and add-on construction overview

RFR 6000

1RU 19” Rack Mount Chassis

Description

The greenMachine is ideally suited for standalone “desktop” applications. However, rack mounting preferred in some situations. For larger permanent system installations where multiple greenMachines are used, rack mounting is essential.The RFR 6000 is a compact 19” rack mounting solution occupying 1RU of vertical rack space. It has can be configured to accommodate one or two greenMachines. In either configuration the RFR 6000 also provides innovative mounting options for one or two of the external RPS 6120 “brick” power supplies both of which can be securely mounted within the 19” 1RU footprint.

Features

- Standard 19” rack mount
- Compact 1RU design
- Accommodates one or two greenMachines
- Innovative mounting options for up to two RPS A100 power supplies
- Forward rack position adjustable to recessed, flush or protruded

Specifications

Height	1RU
Width	19” rack mount
Depth Single Module	29.7cm (11.69”)
Depth Two Modules	44.7cm (17.59”)
Weight	1.5 kg (3.31 Lbs)
Model #	RFR 6000 - (EAN# 4250479324466)
Includes	RFR 6000 rack frame, Phillips screwdriver and quick reference guide.

Power Supply Mounting

The greenMachine includes the RPS 6120 primary power supply, which is an external desktop “brick” style power supply. An optional second power supply can be added for redundant protection. When installing the greenMachine into the RFR 6000 rack frame we have provided two separate power supply “caddies” each of which can securely accommodate an RPS A100 brick power supply. Installation is simple and requires no tools and provides easy access should the power supply need to be removed or replaced. The power supply caddies can be relocated to the rear of the frame when two greenMachines are installed.


Recessed


Flush


Protruded

Ordering Information

Name	Discription	EAN
RFR 6000	1RU 19” Rack Mount Chassis	4250479327269
RYB 6000	yellobrik mount extension for RFR 6000	4250479324466
RXT 6001	Power Supply Mounting Case	4250479324466
RPS A100	Secondary Power Supply	4250479327955

RYB 6000 yellobrik mount extension for RFR 6000

Description

The RFR 6000 is a compact 19" rack mounting solution occupying 1RU of vertical rack space. It has can be configured to accommodate one or two greenMachines. In either configuration the RFR 6000 also provides innovative mounting options for one or two of the external RPS 6120 "brick" power supplies both of which can be securely mounted within the 19" 1RU footprint.

The RPB 6000 power bridge cable is available for the greenMachine callisto. This cable provides power redundancy when the frame is configured for two greenMachine callistousing dual power supplies. Simply cross connect the power connections of both greenMachinecallisto with the power bridge cable and each greenMachine shares the two power supplies for primary and redundant power protection.

Features

- Standard 19" rack mount
- Compact 1RU design
- Accommodates one or two greenMachines
- Innovative mounting options for up to two RPS A100 power supplies
- Forward rack position adjustable to recessed, flush or protruded

Specifications

Height	1RU
Width	19" rack mount
Depth Single Module	29.7cm (11.69")
Depth Two Modules	44.7cm (17.59")
Weight	1.5 kg (3.31 Lbs)
Model #	RFR 6000 - (EAN# 4250479324466)
Includes	RFR 6000 rack frame, Phillips screwdriver and quick reference guide.

Ordering Information

Name	Discription	EAN
RYB 6000	yellobrik mount extension for RFR 6000	4250479325012

RYB 6000 installed and fully loaded on RFR 6000. Neither greenMachine , nor RFR 6000 or displayed yellobriks included.

RXT 6001

19” Rack Frame extension for RFR 6000

Description

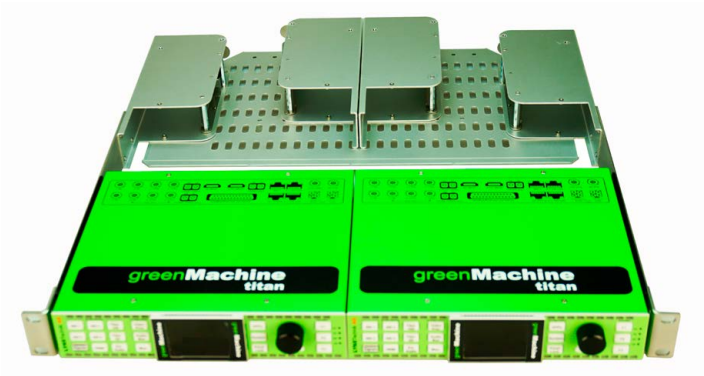
The RXT 6001 is a compact and flexible rack extension for RFR 6000. It can be setup to hold up to four RPS 6120 power supplies.
The power supply mounting brackets can be arrnged in several different configurations, depending on your needs.
It Is reccommended to use rack rails to support the weight of additional power supplies

Specifications

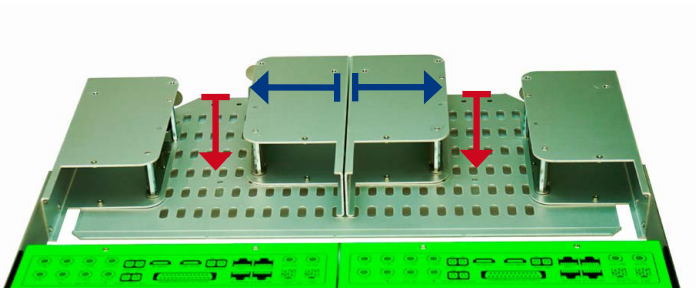
Height	1RU
Width	19” rack mount
Depth Single Module	29.7cm (11.69“)
Depth Two Modules	44.7cm (17.59“)
Weight	1.5 kg (3.31 Lbs)
Model #	RFR 6000 - (EAN# 4250479324466)
Includes	RFR 6000 rack frame, Phillips screwdriver and quick reference guide.

Features

- Compact 1 RU design
- Accomodates four power supplies for 2 greenMachines
- Innovative mounting for up to four RPS6120 power supplies
- Power cases position adjustable on the rack frame



Two greenMachines setup



Adjustable mounting position

Ordering Information

Name	Discription	EAN
RXT 6001	19” Rack Frame extension for RFR 6000	4250479326507

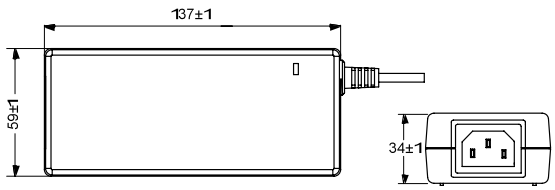
RPS A100 Universal AC to DC Power Supply

Description

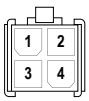
The RPS A100 AC to DC Desktop power supply unit provides 100 watts of continuous output power. The power supply is equipped with IEC320-C14 AC inlet.

Features

- 100W Universal AC input / Full range
- Built-in active PFC function
- Energy efficiency level VI
- LED indicator for Power on



Note:
1. Measurements are in mm
2. Net weight: approx. 450g

Connector	Pin Assignment	
	1	GND
	2	NC
	3	NC
	4	+12V

Specifications

Output	**DC Voltage**	12V
	Rated Current	8.3A
	Current Range	0~8.3A
	Rated Power (max.)	100 W
	Ripple & Noise (max)	230mVp-p
	Voltage Tolerance	±5.0%
	Line Regulation	±1.0%
	Load Regulation	±5.0%
	Setup, Rise Time	2000ms, 30ms / 230VAC 2500ms, 30ms / 115VAC at full load
	Hold Up Time	20ms / 230VAC 20ms / 115VAC at full load
Input	**Voltage Range**	100~240VAC
	Frequency Range	50~60Hz
	Efficiency (Typ)	Level VI or CoC Tier II
	AC Current	2A
	Inrush Current (max.)	Cold start 80/115AC 120/230VAC
Protection	**Overload**	105 ~ 160% rated output power
	Overvoltage	105 ~ 135% rated output voltage
	Over Temperature	Shut down o/p voltage, re-power on to recover
Environment	**Working Temp.**	0 ~ +90°C
	Working Humidity	20% ~ 90% RH non-condensing
	Storage Temp.	-20 ~ +85°C
	Humidity	10 ~ 95% RH non-condensing
	Temp. Coefficient	±0.03% / °C 0~45 °C)
	Vibration	10 ~ 500Hz, 2G 10min./1cycle, period for 60min. each along X, Y, Z axes
Others	**MTBF**	368.75K hrs min. MIL-HDBK-217F(25 °C)
	Dimension	137*59*34 mm (L*W*H)
	Weight	450g
Safety Standards		UL62368-1, CSA C22.2 No. 62368-1, TUV EN62368-1, BSMI CNS14336, CCC GB4943.1, PSE J62368-1,AS/NZS 60950.1, FCC, IRAM, RCM

Ordering Information

Name	Description	EAN
RPS A100	AC to DC Desktop Power Supply Module 12V/8A	4250479327955

ABS Case for greenMachine

greenMachine® not included

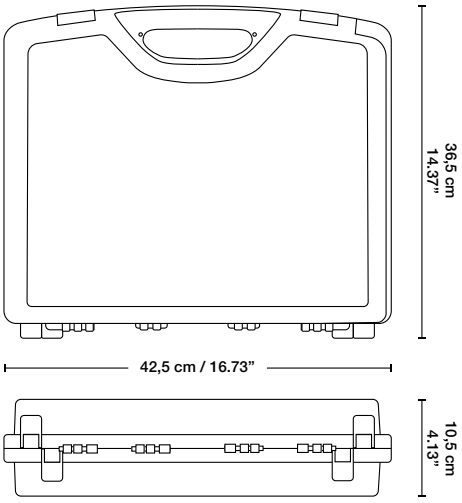
Description

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.

Features

- Impact dampening ABS Case
- Various storage spaces for supplies
- Sturdy closing mechanisms

Specifications

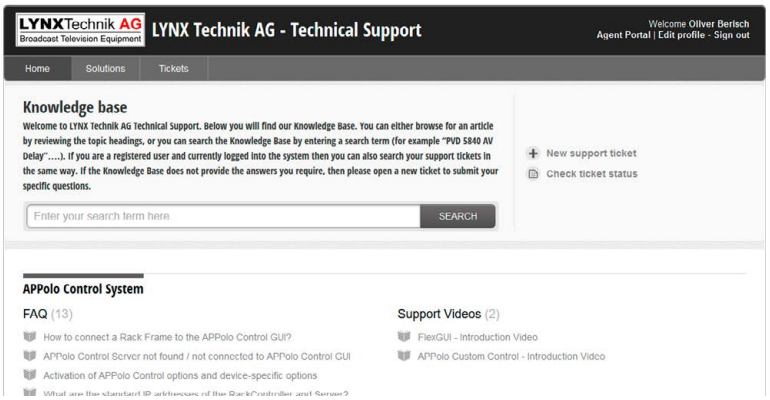


Ordering Information	
Name	**EAN**
ABS Case for greenMachine	4250479327573

Knowlege Base

We have lots of articles, tips, and tutorial videos which should answer most of your questions. Just visit the LYNXTechnik knowlege base.

support.lynx-technik.com



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ticket.lynx-technik.com

Need help finding the right product?

salescontact.lynx-technik.com

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Warranty Information

LYNX Technik AG warrants that the product will be free from defects in materials and workmanship for a period of three (3) years from the date of shipment. If this product proves defective during the warranty period, LYNX Technik AG at its option will either repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product.

In order to obtain service under this warranty, customer must notify LYNX Technik of the defect before expiration of the warranty period and make suitable arrangements for the performance of service. Customer shall be responsible for packaging and shipping the defective product to the service center designated by LYNX Technik, with shipping charges prepaid. LYNX Technik shall pay for the return of the product to the customer if the shipment is within the country which the LYNX Technik service center is located. Customer shall be responsible for payment of all shipping charges, duties, taxes and any other charges for products returned to any other locations.

This warranty shall not apply to any defect, failure, or damage caused by improper use or improper or inadequate maintenance and care. LYNX Technik shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than LYNX Technik representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; c) to repair any damage or malfunction caused by the use of non LYNX Technik supplies; or d) to service a product which has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty servicing the product.

THIS WARRANTY IS GIVEN BY LYNX TECHNIK WITH RESPECT TO THIS PRODUCT IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED. LYNX TECHNIK AND ITS VENDORS DISCLAIM ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. LYNX TECHNIK`S RESPONSIBILITY TO REPAIR AND REPLACE DEFECTIVE PRODUCTS IS THE SOLE AND EXCLUSIVE REMEDY PROVIDED TO THE CUSTOMER FOR BREACH OF THIS WARRANTY. LYNX TECHNIK AND ITS VENDORS WILL NOT BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IRRESPECTIVE OF WHETHER LYNX TECHNIK OR THE VENDOR HAS ADVANCE NOTICE OF THE POSSIBILITY OF SUCH DAMAGES.

Notes

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

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