

1x12G/4K & 4x3G Dynamic Real-Time HDR to SDR Converter



Description

The greenMachine HDR Evie+ is the only real-time HDR to SDR converter with sectional dynamic tone mapping on a frame-by-frame basis for up to 4K SDI formats (3840 x 2160p / 60Hz).

HDR EVIE+ provides 4x 3G or 1x 12G 4K/UHD processing channels supporting down-conversion from HDR to SDR through appropriate sectional dynamic tone mapping. For this conversion every frame gets divided into 144 equally sized parts with individual adjustments blended into each other in real-time. It also supports the Wide Color Gamut (WCG) needs of broadcasters and professional AV sectors.

HDR Static provides 4x 3G or 1x 12G 4K/UHD processing channels for static studio conditions to have full control over the conversion. With this constellation LUTs can be used to convert between HDR and SDR to have consistent color conversion.

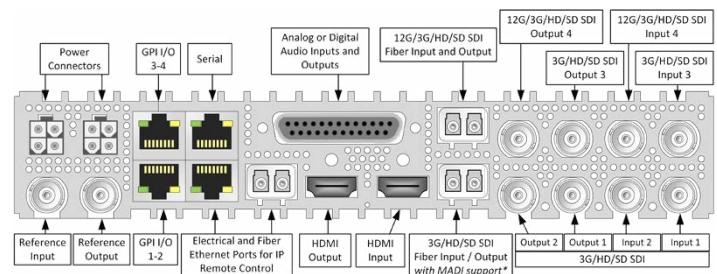
Functions

- *Local Dynamic to Global Dynamic Ratio engine* allows a user to mix sectional tone mapping and global tone mapping
- *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 adjustment of tone mapping calculation speed for 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*
- 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 Correction (RGB/CMYW gain and offset)
- 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

Package includes HDR Static*

- Static HDR <-> SDR Conversion
- 3G Quad channel or 4K UHD single channel configuration
- MADI input and output

*The greenMachine hardware only supports one configuration at a time. It can only either be used in HDR Evie+ configuration or HDR Static configuration.



Technical Specifications

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 W. 2020, BT. 709

Operation Modes

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

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

This project (HA project no. 549/17-31) is financed with funds of LOEWE (Landes-Offensive zur Entwicklung Wissenschaftlich-ökonomischer Exzellenz) Förderlinie 3: KMU-Verbundvorhaben

in cooperation with:

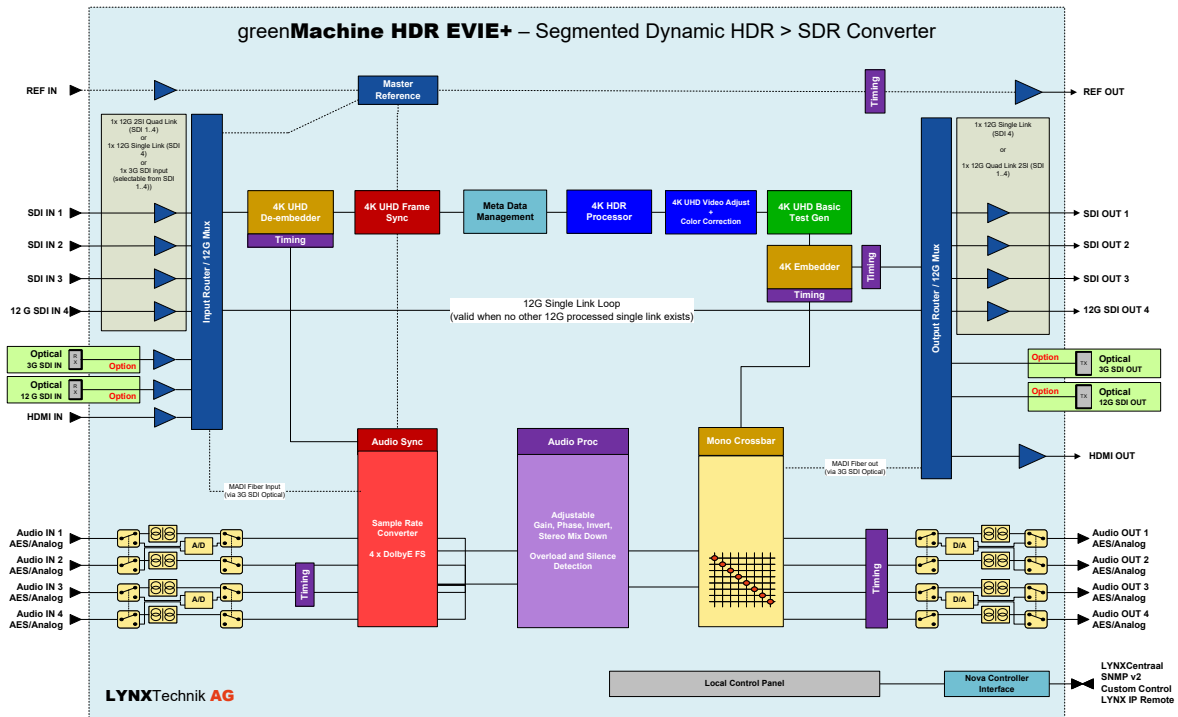


GMPT-HDR EVIE+_Rev2.3 Specifications subject to change

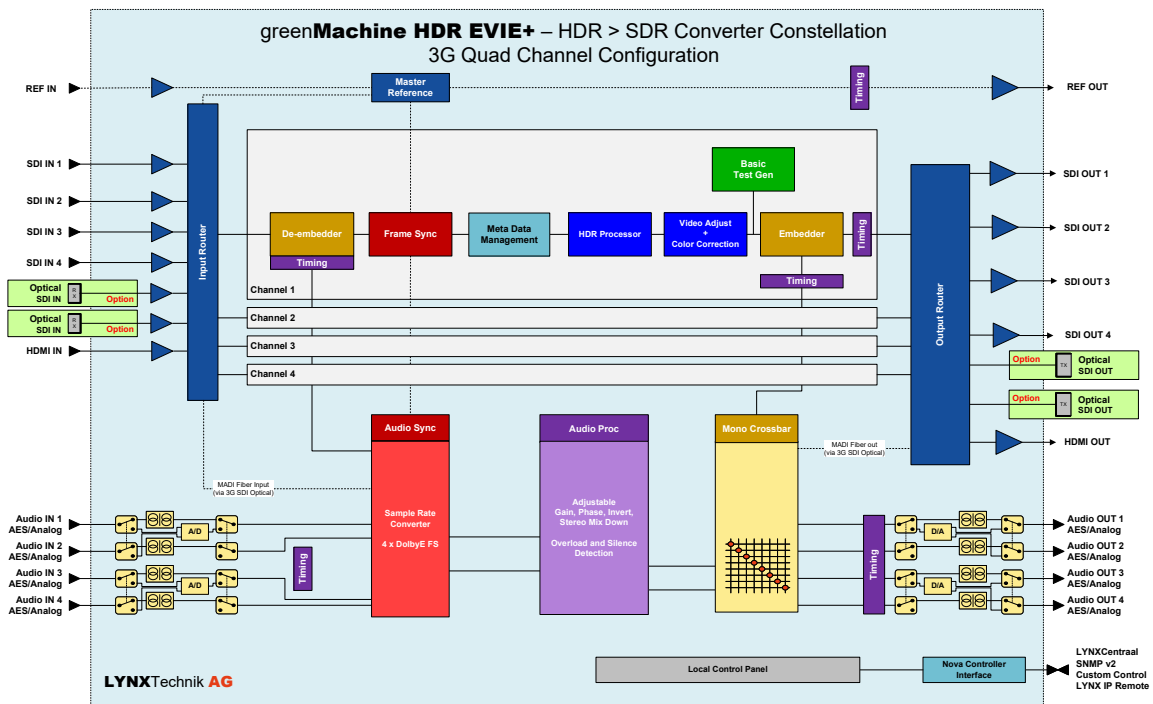


Functional Diagram

12G/4K UHD Single Channel Mode



3G Quad Channel Mode



Hardware Specifications

BNC Connection

SDI Inputs	4x 3G SDI video on 75 Ohm BNC connector (SMPTE 259M, 292M, 424M) 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 @ 3Gbit/s
12G SDI Input*	1x 12G SDI video on 75 Ohm BNC connector (SMPTE 259M, 292M, 424M, 2082) with automatic video format and standard detection
Return Loss:	>7dB to 6GHz; >4dB to 12GHz
SDI Output	4x SDI video on 75 Ohm BNC connector (SMPTE 259M, 292M, 424M)
Timing jitter:	< 0.2 UI @ 270Mbit/s, < 1.0 UI @ 1.5Gbit/s, < 2.0 UI @ 3Gbit/s
Alignment jitter:	< 0.2 UI @ 270Mbit/s, < 0.2 UI @ 1.5Gbit/s, < 0.3 UI @ 3Gbit/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 259M, 292M, 424M, 2082)
Return Loss:	>7dB to 6GHz; >4dB to 12GHz
Reference Input	<ul style="list-style-type: none"> 1x analog video reference on 75 Ohm BNC connector Analog bi-level (SDTV) or tri-level (HDTV) auto detect
Reference Output	<ul style="list-style-type: none"> 1x analog video reference on 75 Ohm BNC connector Analog bi-level (SDTV) or tri-level (HDTV), cross lock capability

Audio Connection

Audio I/O	4x input and 4x output on Sub-D 25 female connector
Analog I/O	input impedance >10k Ohm Output Impedance 150 Ohm
	Analog I/O full scale level: selectable 12, 15, 18, 20, 22, 24 dBu

Technical Information

Power	12V DC @ 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	525 / 59.94Hz 625 / 50Hz																					
HDTV	<table border="0"> <tr> <td>1080i / 50Hz</td> <td>1080p / 30Hz</td> <td>720p / 29.97Hz</td> </tr> <tr> <td>1080i / 59.94Hz</td> <td>1080psf / 23.98Hz</td> <td>720p / 30Hz</td> </tr> <tr> <td>1080i / 60Hz</td> <td>1080psf / 24Hz</td> <td>720p / 50Hz</td> </tr> <tr> <td>1080p / 23.98Hz</td> <td>1080psf / 25Hz</td> <td>720p / 59.94Hz</td> </tr> <tr> <td>1080p / 24Hz</td> <td>720p / 23.98 Hz</td> <td>720p / 60Hz</td> </tr> <tr> <td>1080p / 25Hz</td> <td>720p / 24Hz</td> <td></td> </tr> <tr> <td>1080p / 29.97Hz</td> <td>720p / 25Hz</td> <td></td> </tr> </table>	1080i / 50Hz	1080p / 30Hz	720p / 29.97Hz	1080i / 59.94Hz	1080psf / 23.98Hz	720p / 30Hz	1080i / 60Hz	1080psf / 24Hz	720p / 50Hz	1080p / 23.98Hz	1080psf / 25Hz	720p / 59.94Hz	1080p / 24Hz	720p / 23.98 Hz	720p / 60Hz	1080p / 25Hz	720p / 24Hz		1080p / 29.97Hz	720p / 25Hz	
1080i / 50Hz	1080p / 30Hz	720p / 29.97Hz																				
1080i / 59.94Hz	1080psf / 23.98Hz	720p / 30Hz																				
1080i / 60Hz	1080psf / 24Hz	720p / 50Hz																				
1080p / 23.98Hz	1080psf / 25Hz	720p / 59.94Hz																				
1080p / 24Hz	720p / 23.98 Hz	720p / 60Hz																				
1080p / 25Hz	720p / 24Hz																					
1080p / 29.97Hz	720p / 25Hz																					
3Gbit/s Level A	1080p / 50Hz 1080p / 59.94Hz 1080p / 60Hz																					
12Gbit/s* Single Link	3840 x 2160p / 50Hz 3840 x 2160p / 59.94Hz 3840 x 2160p / 60Hz																					
12Gbit/s* Quad Link 2SI Level A (4 x 3G)	3840 x 2160p / 50Hz 3840 x 2160p / 59.94Hz 3840 x 2160p / 60Hz																					

***NOTE:** 12G SDI operations not supported on 3G constellations and constellation modes (i.e. 3G quad channel configuration)

Optical Connection (optional SFP required)

Optical SDI I/O	<ul style="list-style-type: none"> 1x 3G SDI SFP Transceiver (SMPTE 297M - 2006) 1x 12G SDI SFP Transceiver (SMPTE 292M, 424M, 2081 2082) - no SD SDI (270Mbit)**
Optical Ethernet	IEEE 802.3z 1000Base-X Gbit/s Ethernet over Fiber at 1Gbit/s (125 MB/s)

****NOTE:** 12G SFPs can be used with 3G constellation and constellation modes, but only support 3G signals

AV Connection

HDMI	<ul style="list-style-type: none"> 1x Input 10 bit HDMI 1.4b 1x Output 10 bit HDMI 1.4b
Digital	AES3 balanced transformer isolated; Digital output level: 4V peak to peak nom
MADI	64 channel MADI supported on selected constellations (optional MADI SFP required for this)

Network Connection

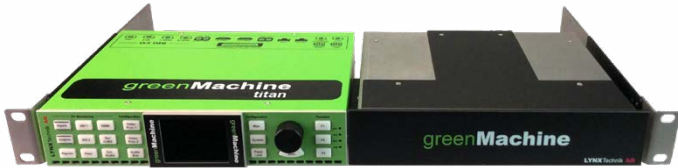
Ethernet (LAN)	1x 10/100/1000 BaseT RJ45 Connector
GPI I/O	<ul style="list-style-type: none"> 4x general purpose inputs (RJ45 Connector) 4x general purpose outputs (RJ45 Connector)
Serial Data	EIA/ETA RS232C / RS422 / RS 485 (selectable through Lynx-Centraal) - RJ45 connector ESD protection for up to 16kV



Options: Rack Frames, Carry Case, and SFP Options

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



RXT 6001 installed in RFR 6000

ABS Case for greenMachine

The transport case is perfect to keep your greenMachine[®], cables and documents organized and in one place, while also protecting it from environmental 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.



SFP Fiber Options (12G variants also support 6G/3G/1.5G SDI)

12G SDI Video Fiber Transmitter		Power	
OH-TX-12G-LC	12G SDI Fiber TX SFP - LC - 10km* - 1310nm	-5dBm	
12G SDI Video Fiber Receiver		Sensitivity	
OH-RX-12G-LC	12G SDI Fiber RX SFP - LC - 10km* - 1270-1610nm	-10dBm (12G) -14dBm (6G/3G) -16dBm (1.5G)	
12G SDI Video Fiber Transceiver		Power	Sensitivity
OH-TR-12G-LC	12G SDI Fiber Transceiver, Singlemode - 10km* - LC - 1310nm	-5/+0.5 dBm	-10dBm (12G/6G) -14dBm (3G/1.5G)
CWDM SDI Video Transceiver (TR)		Power	Sensitivity
OH-TR-4-XXXX-LC XXXX = Wavelength	3G SDI Fiber Transceiver, Singlemode CWDM capable - 40km* - LC 18 wavelengths acc. to ITU T G692.2: 1270 - 1610nm.	-4 ... +2 dBm	-20dBm (3G/1.5G/SD)
OH-TR-12G-XXXX-LC XXXX = Wavelength	12G SDI Fiber Transceiver, Singlemode CWDM capable - 10km* - LC 18 wavelengths acc. to ITU T G692.2: 1270 - 1610nm.	-2/+3 dBm	-10dBm (12G/6G) -14dBm (3G/1.5G)

* 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 Processor Hardware
	RPS A100:	Primary Power Supplies with Region Specific Power Cord
	GMC-HDR-EVIE++-titan:	HDR EVIE+ Constellation License
GMPT HDREVIE+ (N/EU/US/UK)	1 x 12G / 4 x 3G Dynamic HDR>SDR converter (H/W & 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-HDREVIE++-titan	greenMachine titan Dynamic HDR>SDR converter: 1 x 4k / 4 x 3G Dynamic HDR>SDR converter	4250479326118
Accessories and Power Supply		
RFR 6000	1 RU 19" Rack Mount Chassis	4250479324466
RXT 6001	19" Rack Frame Extension for RFR 6000	4250479326507
RPS A100 (N/EU/US/UK)	AC to DC Desktop Power Supply Module 12V/8A (with None / EU / US / UK plug)	4250479327955

More broadcast applications:

- GMC-TESTOR: Audio & Video Test signal generator in 4K UHD or Quad 3G mode including HDR test patterns
- GMC-4KUPXD: 4K Up/down/cross converter
- GMC-3GUPXD: Dual 3G Up/down/cross converter and Dual scaler
- GMC-4FS: 4x3Gbit/s Frame Synchronizer
- GMC-BiDi-Transport: Bi-directional Transport

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

For greenMachine the following regulatory and safety standards apply:

CE: EN 55103-1/1996, EN 55103-2/1996, EN 60950-1/2006
 Following the provisions of 2004/108/EC and 2006/95/EC directives.
FCC: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15, Subpart B of the FCC Rules.

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



GMPT-HDR-EVIE+_Rev2.3 Specifications subject to change

