



Static HDR <> SDR converter

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-ST2084, PQ-BT2100, HLG, Sony SLog3, Arri LogC, Red Log3G10, BMD Film, Panasonic V-Log, Canon C-Log2, SDR

Output Transfer Characteristics

PQ-ST2084, PQ-BT2100, HLG, Sony SLog3, SDR

Colorimetry Supported

Input Colorimetry

Rec 2020, Rec 709, Sony S-Gamut, ACES, DCI-P3, Panasonic V-Gamut, BMD Film, Canon Cinema Gamut, Arri Alexa, Red Wide Gamut

Output Colorimetry

Rec 2020, Rec 709, Auto

Operation Modes

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

Color Processing

- RGB gain, lift, offset and gamma adjustments
- CMYW gain and offset adjustments

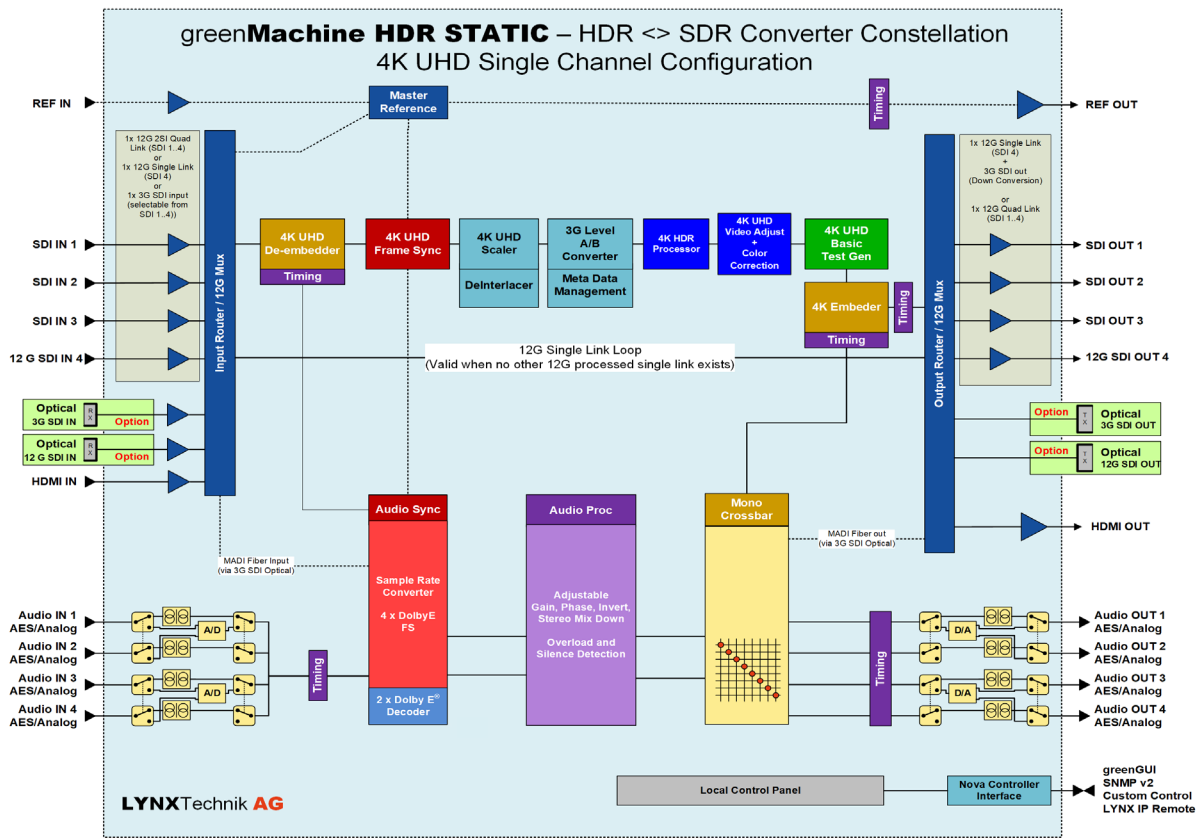
Input / Output Data Range

- 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

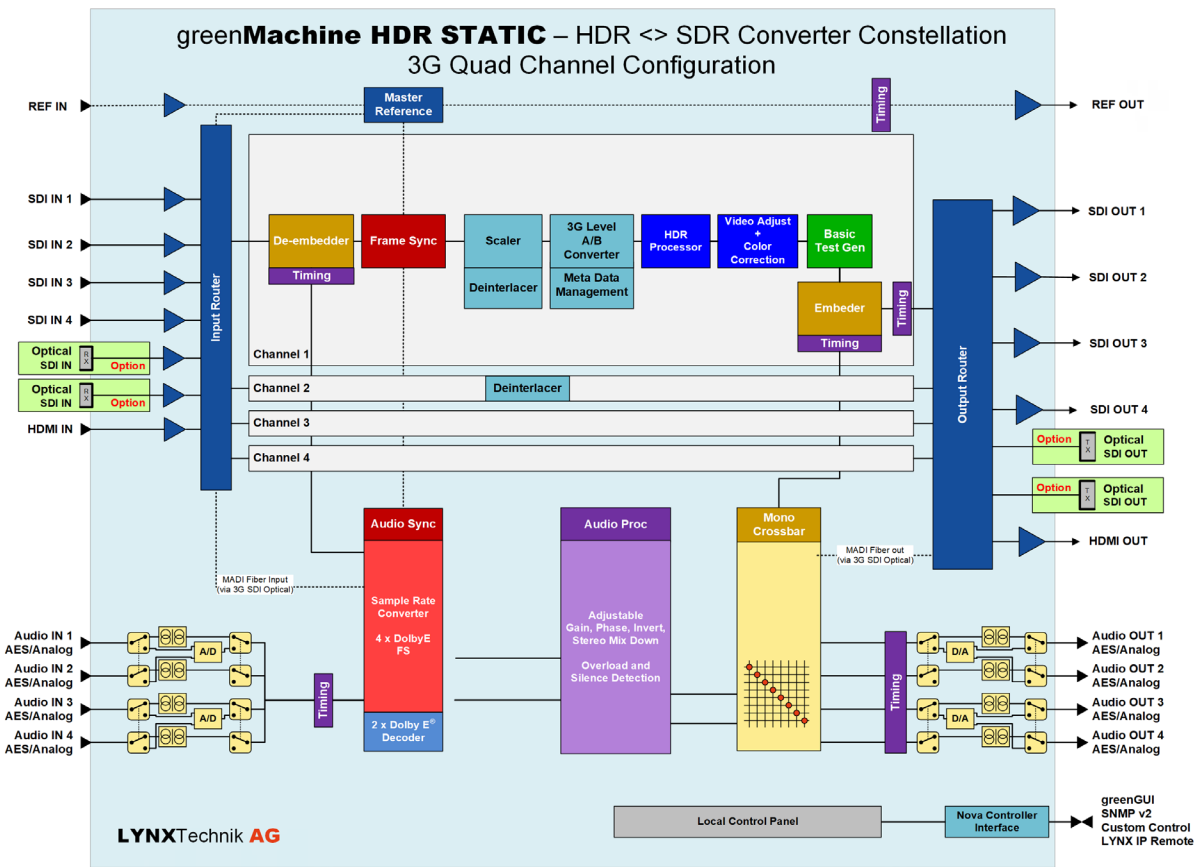
Other included features

- Frame Synchronizer
- 4K UHD / 3G Scaler
- Deinterlacer: one deinterlacer in 4K mode and two deinterlacers on the first two channels in quad 3G mode
- Users can upload and store up to 20 custom LUTs in 33-points .cube format
- 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
- 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 correction
- 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

Functional Diagram Single 4K UHD Channel

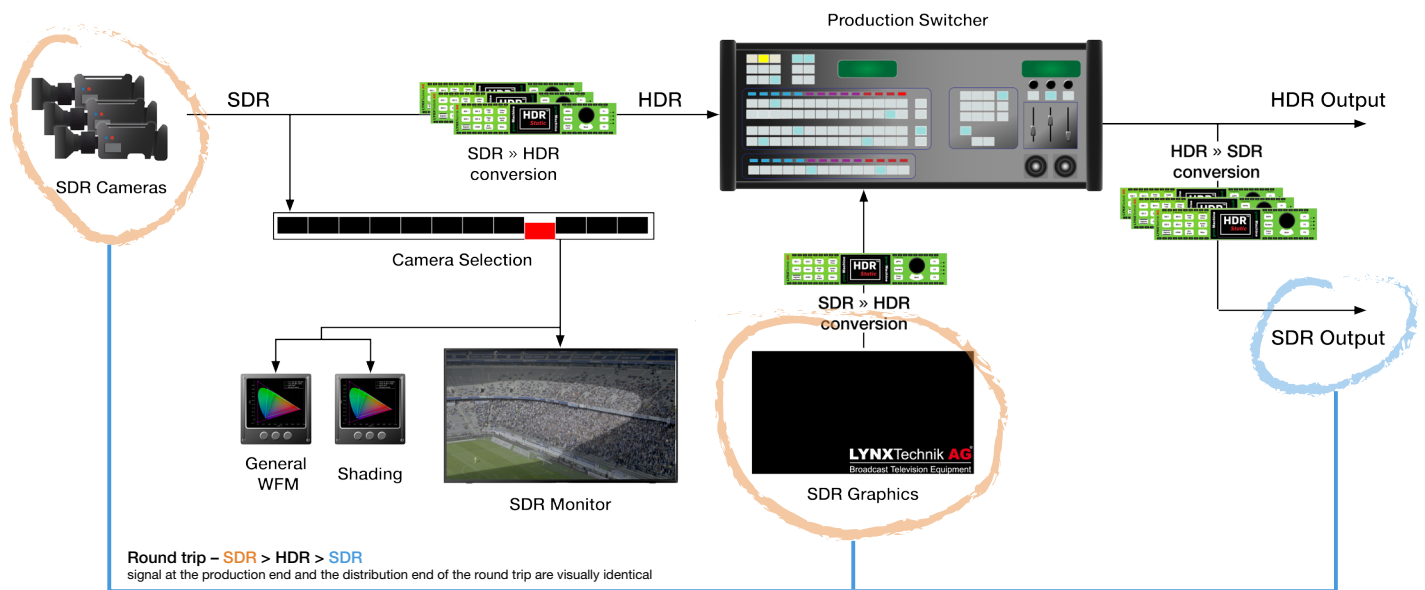


Functional Diagram Quad 3G Channel

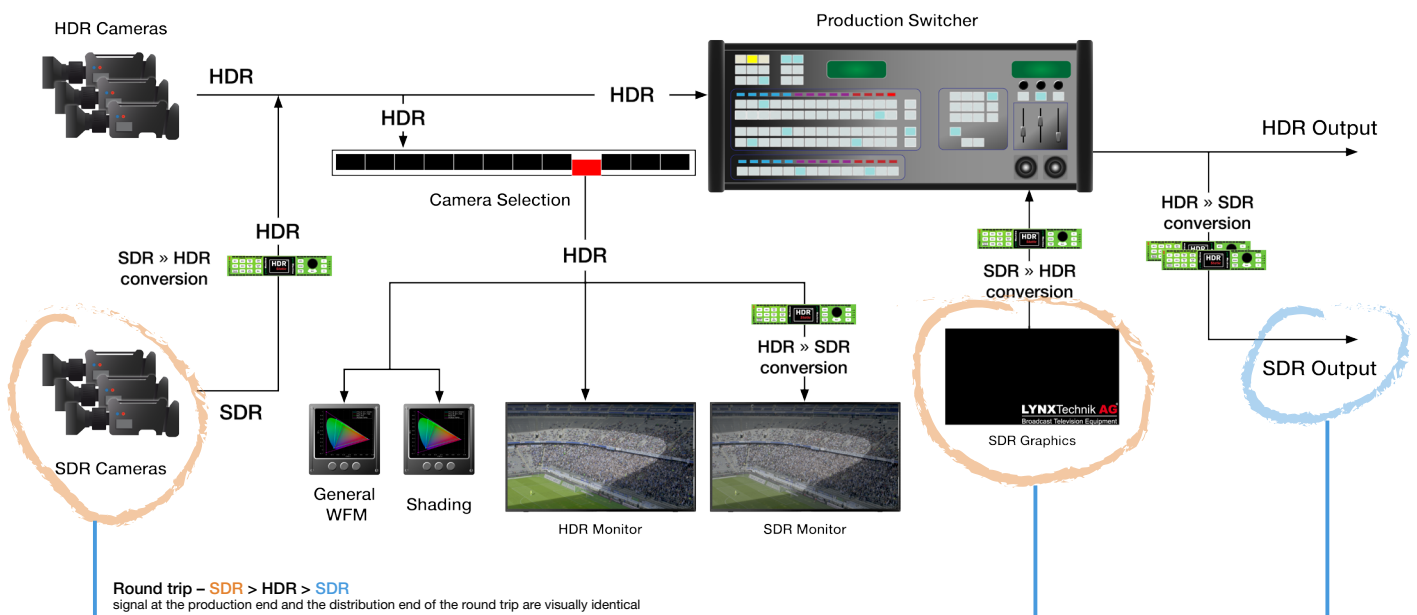


Example Applications

Example 1: Live outside broadcast with SDR Cameras (SDR>HDR>SDR roundtrip)



Example 2: Live outside broadcast with mixed HDR and SDR Cameras (SDR>HDR>SDR roundtrip)

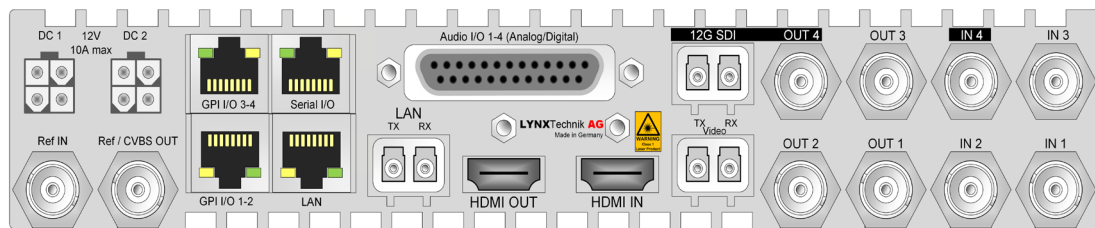


The roundtrip conversion via greenMachine HDR Static will provide the SDR image which is visually identical to the SDR camera image and SDR graphics, making it a transparent conversion process.

Hardware Specifications

SDI Inputs	3x 3G SDI video on 75 Ohm BNC connector - SMPTE, 292M, 424M, 259M with automatic video format and standard detection Return Loss: >15dB from 5MHz to 1.5GHz, >10dB from 1.5GHz to 3GHz Automatic cable EQ (Belden 1694A): 340m@270Mbit/s, 150m@1.5Gbit/s, 110m@2.97Gbit/s
12G SDI Input	1x 12G SDI video on 75 Ohm BNC connector - SMPTE 292M, 424M, 259M, 2081, 2082 with automatic video format and standard detection Return Loss: same as 3G SDI; >7dB to 6GHz; >4dB to 12GHz
HDMI Input / Output	1x 10 bit HDMI 4K/UHD 1.4b
Optical I/O (Optional)	1x 3G SDI SFP Transceiver (SMPTE 297M - 2006) 1x 12G SDI SFP Transceiver (SMPTE 292M, 424M, 2081, 2082) - no SD SDI (270Mbit)
Ethernet (LAN)	1x 10/100/1000 BaseT RJ45 Connector
Optical Ethernet (Optional)	IEEE 802.3z 1000Base-X Gbit/s Ethernet over Fiber at 1 Gbit/s (125 MB/s)
GPI I/O	4x general purpose inputs + 4x general purpose outputs - RJ45 Connectors
Reference Input	1x analog video reference on 75 Ohm BNC connector Analog bi-level (SDTV) or tri-level (HDTV) auto detect
SDI Output	3x SDI video on 75 Ohm BNC connector (SMPTE, 292M, 424M, 259M) Timing jitter: < 0.2 UI @ 270Mbit/s, < 1.0 UI @ 1.5Gbit/s, < 2.0 UI @ 2.97Gbit/s Alignment jitter: < 0.2 UI @ 270Mbit/s, < 0.2 UI @ 1.5Gbit/s, < 0.3 UI @ 2.97Gbit/s Return Loss: >15dB from 5MHz to 1.5GHz, >10dB from 1.5GHz to 3GHz

12G SDI Output	1x 12G SDI video on 75 Ohm BNC connector - SMPTE 292M, 424M, 259M, 2081, 2082 Return Loss: same as 3G SDI; >7dB to 6GHz; >4dB to 12GHz
Serial Data	EIA/ETA RS232C / RS422 /RS 485 (selectable through greenGUI) - RJ45 connector ESD protection for up to 16kV
Reference Output	1x analog video reference on 75 Ohm BNC connector Analog bi-level (SDTV) or ri-level (HDTV), cross lock capability
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
Power	12VDC @ 45W nominal (supports 7 - 24VDC input range) 2x power connections for redundant power supply
Mechanical	W: 218mm (1/2 19"), H: 44mm (1.75"), D: 225mm (8.86") - including connectors. Weight: 1.4kg (3.09lb)
Ambient	Temperature: 5°C to 40°C (41°F to 104°F) maintaining specification Humidity: 90% maximum, non-condensing
Model #	GMPT TESTOR EU - (EAN# 4250479326262) GMPT TESTOR UK - (EAN# 4250479326279) GMPT TESTOR US - (EAN# 4250479326286)
Includes	greenMachine Titan: GM6840 Static HDR Constellation: GMC-HDR-Static-titan Primary Power Supply: R PS 6120 with EU/UK/US power cord



Supported SDI Formats

SDTV Formats	525 / 59.94Hz 625 / 50Hz		
HDTV Formats	1080i / 50Hz 1080i / 59.94Hz 1080i / 60Hz 1080p / 23.98Hz 1080p / 24Hz 1080p / 25Hz 1080p / 29.97Hz	1080p / 30Hz 1080psf / 23.98Hz 1080psf / 24Hz 1080psf / 25Hz 720p / 23.98 Hz 720p / 24Hz 720p / 25Hz	720p / 29.97Hz 720p / 30Hz 720p / 50Hz 720p / 59.94Hz 720p / 60Hz
3Gbit/s Formats Level A and B	1080p / 50Hz 1080p / 59.94Hz 1080p / 60Hz		
12Gbit/s Formats Single Link	3840 x 2160p / 50Hz 3840 x 2160p / 59.94Hz 3840 x 2160p / 60Hz		
12Gbit/s Formats Quad Link 2SI Level A and B (4 x 3Gbit/s)	3840 x 2160p / 50Hz 3840 x 2160p / 59.94Hz 3840 x 2160p / 60Hz		

Other Broadcast Applications

- **GMC-HDR-EVIE:** Dynamic HDR > SDR converter
- **GMC-Testor:** Static HDR <> SDR converter
- **GMC-4KUPXD:** 4K Up/down/cross converter
- **GMC-3GUPXD:** 3G Up/down/cross converter
- **GMC-Quad3G-FS:** 4x3Gbit/s Frame Synchronizer
- **GMC-BiDi-Transport:** Bi-directional Transport (requires two greenMachine working in Master & slave configuration).

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

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

RPS 6120 - Redundant Power Supply

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



Fiber Options

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

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

More SFP options are available.

ABS Case for greenMachine

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.



RXT6001 19" Rack Extension for RFR 6000

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

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



RXT 6001 installed in RFR 6000

Ordering Information

greenMachine Titan Hardware and HDR Static License		
GMPT HDR Static EU	Static HDR to SDR converter EU (H/W & License)	EAN: 4250479326231
GMPT HDR Static UK	Static HDR to SDR converter UK (H/W & License)	EAN: 4250479326248
GMPT HDR Static US	Static HDR to SDR converter US (H/W & License)	EAN: 4250479326255
HDR Static License Only		
GMC-HDR-STATIC-titan	greenMachine titan HDR Static constellation (License only- includes no hardware)	EAN: 4250479326118
Accessories and Power Supply		
RFR 6000	1 RU 19" Rack Mount Chassis	EAN: 4250479324466
RXT6001	19" Rack Frame Extension for RFR 6000	EAN: 4250479326507
RPS 6120 EU	Desk Power supply with EU cord	EAN: 4250479324343
RPS 6120 UK	Desk Power supply with UK cord	EAN: 4250479324350
RPS 6120 US	Desk Power supply with US cord	EAN: 4250479324367

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:



For greenMachine the following regulatory and safety standards apply:

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

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

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



HDR Static Rev 3.2 Specifications subject to change