greenMachine® Datasheet

Testor
Video and Audio Testing

packages:
GMPT TESTOR
licenses:
GMC-TESTOR-titan

✗ callisto+
✓ titan

4x3G / 1x 12G Test Signal Generator

Description

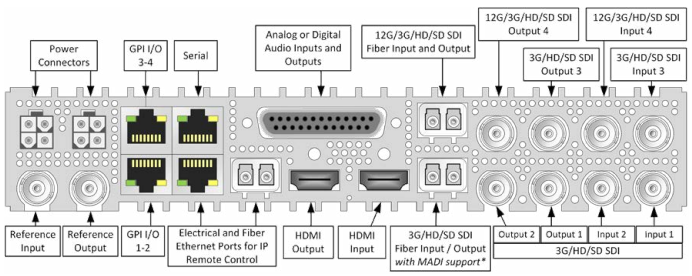
The greenMachine Testor is a feature-rich and user-friendly multi-format test signal generator and AV sync analyzer. It is the ideal troubleshooting AV solution for technicians & engineers working in the field (OB or temporary installations), in studio applications, and for line-up tasks in master control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

Front-/Backpannel



Functions

Test Signals:	36 SDR + 6 HDR test signals and patterns 2 dynamic test patterns
User-defined Signal Patterns:	Upload user-defined and customizeabe signal patterns logos and text
HDR Test signals:	BT.2111: PQ Full/Narrow , HLG Narrow and SLOG3 Full
	BT.814: HLG, PQ
Integrated Overlay Editor:	Tool to place images and logos, add text, and user-defined signals, patterns, and graphics
Audio Test Generator:	16-channel audio test generator with adjustable level, phase, frequency, mix-down, and EBU/AV sequence
	Audio signals can be embedded into the SDI video output(s) and/or routed to the external audio outputs
AV Delay Test:	Test signal generator which is compatible with most standard AV delay meters.
H/V Rolling:	Horizontal and vertical rolling and speed adjustments.
Link Indicator:	For UHD signals, allows indication of 2SI link on quad link channels.
MADI Signal:	Generate a 64/56 channel MADI Signal and use audio crossbar to assign 16-channel audio test generator. (MADI transmission requires optional SFP)

Technical Specifications

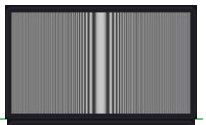
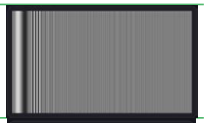
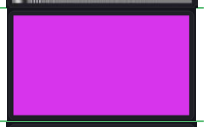
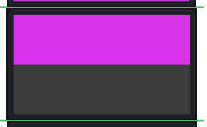
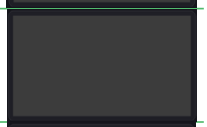
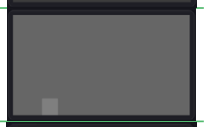
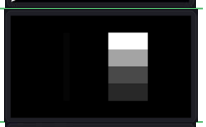
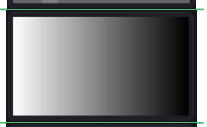
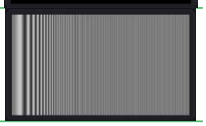
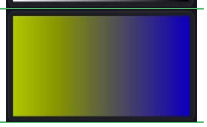
Operation Modes

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

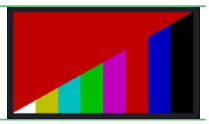
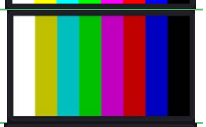
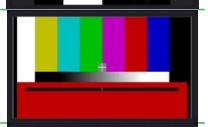
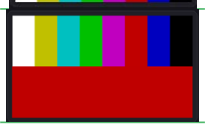
Input / Output Data Range

- 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) in range of values from 64 to 940 decimal

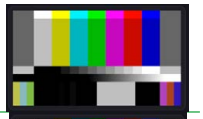
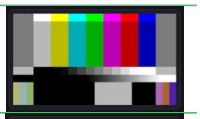
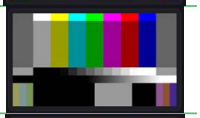
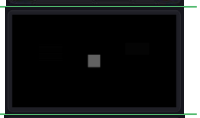
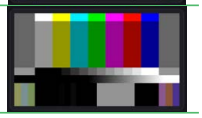
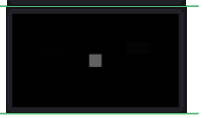
Standard Test Patterns

Center Sweep		Multiburst		Ramp Up CR	
Convergence Grille		Pathological EQ		Ramp Up Y	
Color Temperature		Pathological EQ/ PLL		Ramp Up YCbCr	
Flash Black		Pathological PLL		Staircase	
Flash White		Persistence Test		Zoneplate	
Four-Level PLUGE		Ramp Down Y		Zoneplate Moving	
Frequency Sweep		Ramp Up CB			

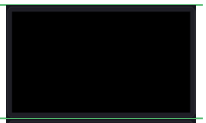
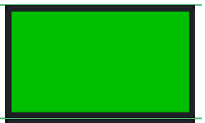
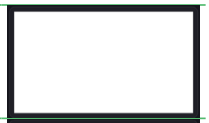
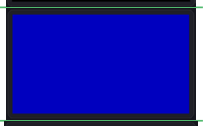
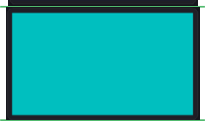
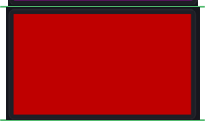
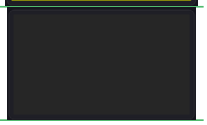
Color Bars

Color Bar 100%		Colorbar SMPTE		Field Pattern Red/ Colorbar	
Color Bar 75%		EBU AV Sync			
Color Bar 75% over Red		Field Pattern Colorbar/Red			

HDR Test Patterns

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

Full Field Color Tests

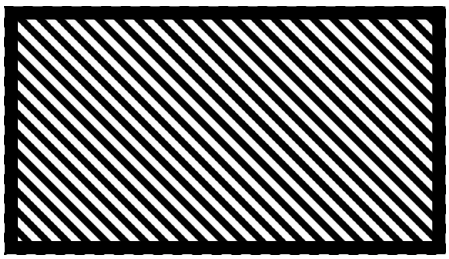
Full field Black		Full field Green		Full field White	
Full field Blue		Full field Magenta		Full field Yellow	
Full field Cyan		Full field Red		Grey 15%	

Dynamic Test Patterns

Zebra Pattern

The Zebra Pattern is a display tearing and aspect ratio validator. The 45° angled, 20px wide, black and white bars move across an entire array of panels at the speed of 1px per frame. Individual delays of panels can easily be noticed this way.

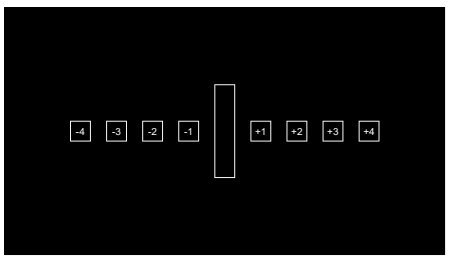
A precise delay in frames or ms can be calculated in regards of the frame rate of the display. Please note that greenMachine Testor can not change the individual delay of led panels.



Strobe Pattern

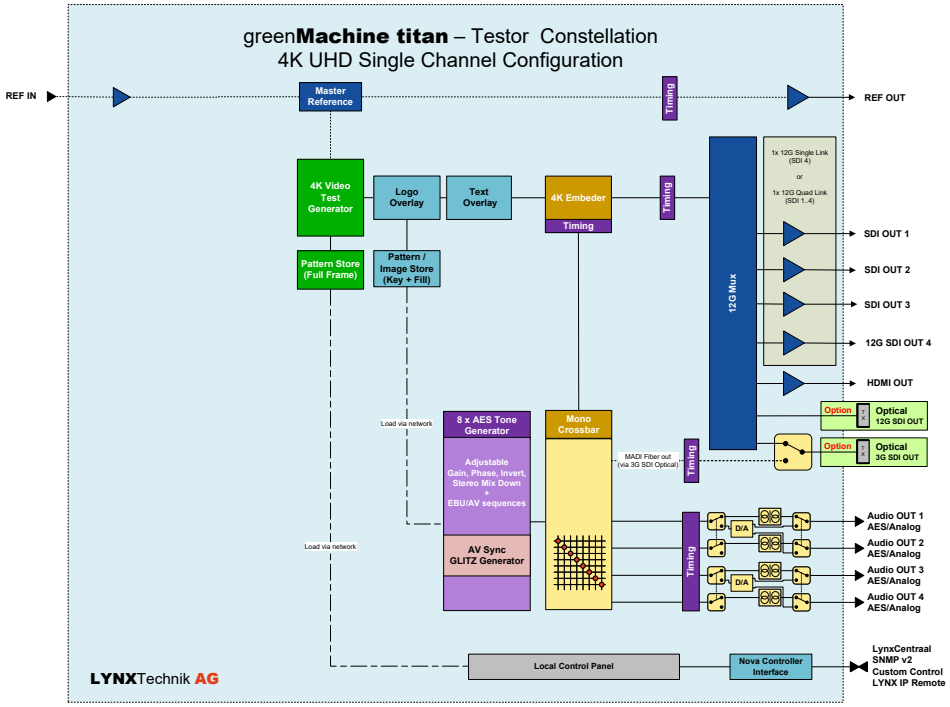
The background strobes one white frame periodically every 100 frames. If synchronization of all displays is accurate, a simultanious strobe will be visible.
To veryfy sincronicity a synchronized (genlocked) or high-speed camera has to film the screens.

The counters to the left and right of the sync bar will indicate how many frames ahead or behind any individual display is.

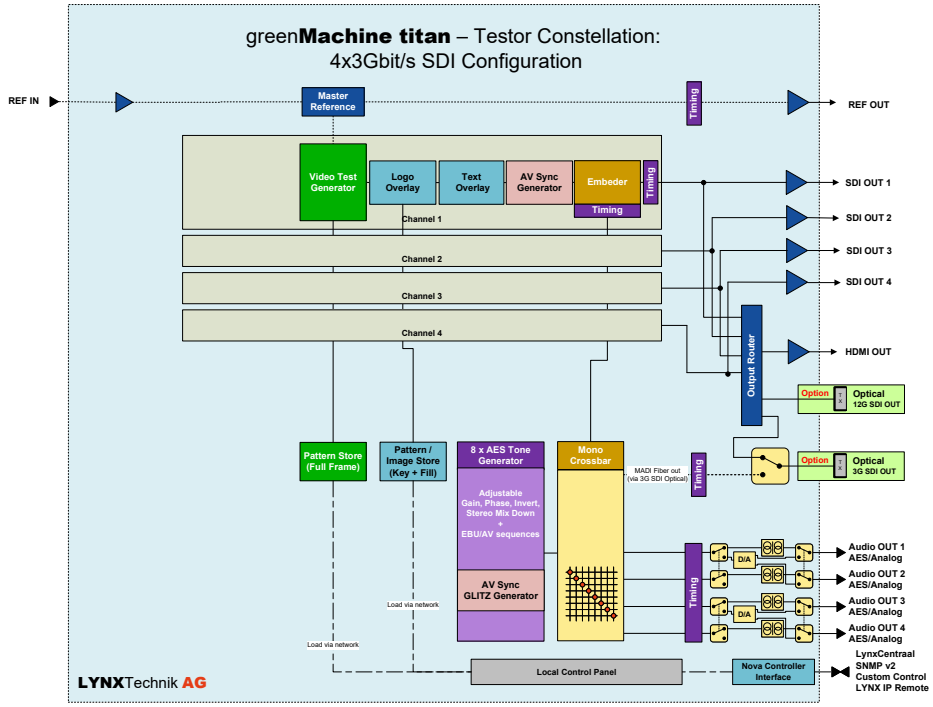


Functional Diagram

12G-SDI Single Channel Mode



3G-SDI 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 "Input 4" (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 "Output 4" (SMPTE 259M, 292M, 424M, 2082)	
	Return Loss:	>7dB to 6GHz; >4dB to 12GHz
Reference Input	• 1x analog video reference on 75 Ohm BNC connector • Analog bi-level (SDTV) or tri-level (HDTV) auto detect	
Reference Output	• 1x analog video reference on 75 Ohm BNC connector • Analog bi-level (SDTV) or tri-level (HDTV), cross lock capability	

Supported SDI Formats

SDTV	525 / 59.94Hz 625 / 50Hz		
HDTV	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-SDI Level A	1080p / 50Hz 1080p / 59.94Hz 1080p / 60Hz		
12G-SDI* Single Link	3840 x 2160p / 50Hz 3840 x 2160p / 59.94Hz 3840 x 2160p / 60Hz		
12G-SDI* 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. quad channel 3G-SDI configuration or 3GUPXD)

Optical Connection (optional SFP required)

Optical SDI I/O	• 1x 3G SDI SFP Transceiver (SMPTE 297M - 2006) • 1x 12G SDI SFP Transceiver (SMPTE 292M, 424M , 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-SDI SFPs can be used with 3G-SDI constellations and constellation modes, but only support 3G-SDI signals

AV Connection

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

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
Digital	AES3 balanced transformer isolated; Digital output level: 4V peak to peak nom
MADI	64 channel MADI supported on selected constellations (optional MADI SFP reqired for this)

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

Network Connection

Ethernet (LAN)	1x 10/100/1000 BaseT RJ45 Connector
GPI I/O	• 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 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.

SFP Fiber Options (12G variants also support 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 (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) -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) -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 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	
	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)	4250479326101	

More broadcast applications:

- *GMC-3GUPXD*: Dual 3G Up/down/cross converter and Dual scaler
- *GMC-4KUPXD*: 4K Up/Down/Cross Converter
- *GMC-HDREvie+*: Segmented, Dynamic HDR>SDR converter
- *GMC-4FS*: 4x3Gbit/s Frame Synchronizer
- *GMC-BiDi-Transport*: Bi-directional Transport

The greenMachine hardware can be configured for a different broadcast application by re-deploying a different application called "constellation". These perpetual licenses are 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