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TEKTRONIX® SPG8000A
Master Sync/Master Clock Reference Generator

The SPG8000A is a precision multiformat video signal generator, suitable for master synchronization and reference applications. It provides multiple video reference signals, such as blackburst, HD tri-level sync, and serial digital and composite analog test patterns, and it provides time reference signals such as timecode, NTP (Network Time Protocol) and IEEE 1588 Precision Time Protocol (PTP).

The Tektronix SPG8000A Master Sync/Master Clock Reference Generator, available directly from Grass Valley®, is used in a configuration consisting of two units with a single Tektronix ECO8000 Automatic Changeover Unit for most broadcast facility, studio, mobile and post-production timing applications.

For IP installations, the combination of two or more SPG8000A units will support Precision Time Protocol (PTP) IEEE 1588 for clock synchronization of IP-based broadcast equipment and control systems.

Master Video Synchronization and Time Reference Generator
The base configuration includes seven sync outputs that can be configured with independent output formats and independently adjustable timing offsets. A high-accuracy, oven-controlled crystal oscillator provides a stable frequency reference for the system, or the pass-through genlock input can be used to lock to an external video reference or 10 MHz continuous wave signal.

The SPG8000A's Stay GenLock™ feature avoids "synchronization shock" if the external reference suffers a temporary disturbance, by maintaining the frequency and phase of each output signal. When the external reference is restored, Stay GenLock ensures that any accumulated clock drift is removed

by slowly adjusting the system clock within standard limits instead of "jamming" back to the correct phase.

Time reference outputs are available in multiple formats. Three independent linear timecode (LTC) outputs are available, and a fourth LTC connection can be used as input or output. Each LTC output has independent frame rate selection, time source (time-of-day or program time) and time zone offset. Vertical interval timecode (VITC) is available on each NTSC or PAL black output, also with independent time sources and offsets. The SPG8000A can also serve as a Network Time Protocol (NTP) server or as a Precision Time Protocol (PTP) grandmaster clock, providing the time-of-day reference to network-attached devices.

- Multiple independent blackburst and HD tri-level sync outputs provide all the video reference signals required in a video broadcast or production facility

- Four LTC outputs, VITC on blackburst outputs, and NTP server provide time reference signals in a variety of formats

- PTP (IEEE 1588) support, including SMPTE ST 2059-2 and AES67 profiles

- GPS/GLONASS-based synchronization gives an accurate time-of-day reference and deterministic video phase reference across multiple independent systems

- Stay GenLock and Holdover Recovery prevent synchronization shock when the external reference input, PTP, or GPS/GLONASS signal is temporarily lost

- Wide selection of video test patterns in serial digital formats (SD, HD and 3G-SDI) and composite analog formats (NTSC and PAL)

- 4K UHD formats support with full frame 100% and 75% color bars (Quad Link Square Division)

- Dual hot-swappable power supplies ensure continuous availability of reference signals

- Easy to manage with Web-based interface for remote configuration and SNMP for status and alert information

GPS/GLONASS Receiver

An integrated receiver is capable of receiving both GPS and GLONASS signals. When connected to an external antenna that supplies the standard GPS and/or GLONASS RF signal (for example, SPG8000ANT), the SPG8000A can use the GPS/GLONASS system's stable frequency reference.

The GPS/GLONASS signal also includes a precise time–of–day reference that can be used for all timecode outputs. Similar to the Stay GenLock feature, the SPG8000A can maintain the video frequency and phase when the GPS/GLONASS signal is interrupted, and the Holdover Recovery mode will ensure a shock–free realignment of frequency and phase when the GPS/GLONASS signal is restored.

Optional PTP Support

The SPG8000A–GVSTD–PTP model adds two Precision Time Protocol (PTP) engines to the SPG system. The primary PTP engine has the capability to be a master PTP source or lock the SPG to the PTP as a slave. The secondary PTP engine can only be a master. The secondary engine allows implementing two masters when in Internal mode or locked to GPS, and simultaneous Master and Slave operation.

The black outputs support a 1pps mode. This is useful for measuring timing between systems.

Test Signal Outputs

The SPG8000A includes two composite analog outputs (NTSC or PAL) that can be used to generate test patterns such as color bars,

or serve as additional blackburst outputs and two fully independent serial digital video generator channels of two outputs each. Each channel can be configured to any standard 3G/HD/SD–SDI format and frame rate. The selected test pattern can be generated on both outputs per channel, or one output can generate digital black.

A wide variety of standard test patterns are included, such as color bars, convergence grid, step scales, ramps, multiburst, SDI pathological test matrix and a real–time programmable zone plate generator. Bitmap images can be downloaded to the SPG8000A's flash memory for arbitrary user–defined test patterns. ID text, burn–in timecode, circle, and color logo overlays can be added to any test pattern, and several

ancillary data packet types, including ancillary timecode and user-defined packets, can be inserted into the SDI output signal.

The four SDI outputs can be configured to support 4K UHD full frame, 100% and 75% color bars for quad link square division mode. This allows simple verification of your 4K UHD workflow within the production studio or mobile truck. Note: VPIDs are compliant only to HD and 3G formats in 4K UHD formats.

Also included is an audio/video delay test sequence, which in conjunction with a Tektronix waveform monitor, can be used to ensure A/V delay compliance.

Audio Reference Signals

Several audio reference signals are available on the SPG8000A. All configurations include a 48 kHz word clock output and five AES/EBU output pairs. One pair is dedicated to a Digital Audio Reference Signal (DARS) output, and the other four pairs are used for test tone generation, with independent tone frequency and amplitude settings for each of the 8 channels.

Audio tone generation, including Dolby E format, is provided as embedded audio on each of the SDI outputs. Various Dolby E audio frame start locations can be set to test the error handling ability of the signal processing equipment in the signal path. Embedded Dolby E metadata are also included in the Dolby E test stream. Supported Dolby E program configurations include mono, stereo, 5.1 and 7.1 surround sound audio.

Remote Access

The SPG8000A includes a 10/100/1000Base-T Ethernet interface for remote access to the instrument. A web-based user interface can be used for all configuration settings and for monitoring system status.

Alarm and key status information is also available using Simple Network Management Protocol (SNMP) messaging, enabling easy integration with network management systems. Remote control and alarm reporting is also available using a general purpose interface (GPI). The SPG8000A has a front-panel USB port that can be used to backup and restore presets and other user data, and to perform system firmware upgrades.

Backup Power Supply

For mission-critical applications, all SPG8000A configurations include a second power supply module. Under normal operation, the designated backup supply is seldom used, ensuring that it has maximum remaining life should the primary supply fail. The backup supply is load-tested once each day to verify that it can serve as the primary supply if necessary.

The usage time of each supply is logged as "temperature-weighted hours", a metric that best estimates the calculated life of the supply. A front-panel LED will indicate when the supply is nearing its end-of-life.

If the primary supply is interrupted for any reason, the system will switch to the backup without any disruption to system operation. Power supply modules are hot-swappable for easy replacement, and feature a locking mechanism to prevent the power cable from accidental disconnection.

Rackmount slides and rails kit for SPG8000A (1 RU height, standard full depth) are included in all configurations.

Input Specifications

All specifications apply to all SPG8000A configurations unless noted otherwise.

Reference Input

Connector: BNC ×2, passive loop-through

Input impedance: 75Ω

Input signal:

NTSC/PAL blackburst

HD tri-level sync:

    1080/60/59.94/50i

    1080/30/29.97/25/24/23.98p

    1080/24/23.98PsF

    720/60/59.94/50p

10 MHz continuous wave

Amplitude range: –8 dB to +6 dB

S/N ratio: >40 dB

SCH phase: 0 ±40°

Return loss: ≥30 dB at 300 kHz to 10 MHz

Lock stability:

    ±3 dB amplitude change: <1 ns

    Jitter with burst lock: <0.5°

    Jitter with sync lock: <1 ns

    Jitter with CW lock: <1 ns (typ. 1°)

Genlock

Timing adjustment range: Anywhere in the color frame

Timing adjustment resolution: <0.5° of NTSC/PAL subcarrier, 1 ns with tri-level sync input

Color framing: Keeps accuracy even with ±45° SCH error of input reference signal

Genlock tune range: ±7.5 × 10⁻⁶

GPS/GLONASS Receiver

Type: L1 frequency (GPS – 1575.42 MHz, GLONASS – 1602.00 MHz), C/A Code, 32 channels

Time accuracy: Within 150 ns to GPS/GLONASS/UTC

Acquisition time: 2 minutes on boot up with warm oven, good satellite signal, and known position

GPS/GLONASS Antenna Input

Connector: BNC

Input impedance: 50Ω, internally terminated

DC antenna power output voltage: 3.3V or 5V at 55 mA

Fault protection: Short-circuit/open detection and protection

Return loss: 8 dB at 1575 MHz

Time Reference

Source: GPS or GLONASS signal, PTP input, LTC input, VITC read from NTSC/PAL genlock input, or can enter manually

Time zone offset: –23:59 to +23:59

Daylight saving adjustment: Start/end from recurring calendar or manually scheduled, with adjustable offset

Leap second adjustment: Inserted at 00:00 UTC on the scheduled date, or deferred up to 24 hours

LTC Input

Connector: Available through D-sub 15-pin connector

Formats: 24 fps (24 Hz or 23.98 Hz), 25 fps, 30 fps, 30 fps drop-frame (29.97 Hz) per SMPTE ST 12

Timing to video: Compliant with SMPTE ST 12 and continues to operate over at least 90% of possible timing range

Signal voltage range: 0.5 to 10 Vp-p differential, 1 to 5 Vp-p single ended

Noise tolerance: –30 dB SNR RMS white noise with 10 kHz BW to the p-p signal level, or –10 dB SNR for 5 MHz white noise

Hum tolerance: 0 dB hum-to-signal ratio

Error immunity: 100 consecutive frames with consistent time code must be detected for time to be considered valid

Input impedance: Nominal 600Ω differential, 300Ω single ended

Output Specifications

All specifications apply to all SPG8000A configurations unless noted otherwise.

Reference Outputs

Number of outputs: 7 analog sync outputs in base configuration

Connector: BNC ×7

Formats: NTSC/PAL black burst, HD tri-level sync, 10 MHz continuous wave, or 1 pps

Format Combinations:

NTSC/PAL black burst: Available on all outputs (BLACK 1-5 and CMPST 1-2)

HD tri-level sync: Black outputs 1-3 can independently produce any of the formats from the following rate groups:

    Integer: 720 (50p, 60p), 1080 (24sF, 24p, 25p, 30p, 48p, 50i, 50p, 60i, 60p)

    Non-integer: 720 (59.94p), 1080 (23.98sF, 23.98p, 29.97p, 47.95p, 59.94i, 59.94p)

Black outputs 4-5 can independently produce any of the formats from the following rate groups:

    Integer: 720 (50p, 60p), 1080 (24sF, 24p, 25p, 30p, 50i, 60i)

    Non-integer: 720 (59.94p), 1080 (23.98sF, 23.98p, 29.97p, 59.94i)

10 MHz CW: BLACK 3 output only

1 pps: Black outputs 1-3 only

Output impedance: 75 Ω

Return loss:

≥40 dB from 300 kHz to 5 MHz

≥25 dB from 5 MHz to 30 MHz

Black Burst Mode for Reference Sync Outputs

Standards: SMPTE ST 170, ITU-R BT.1700-1, EBU N14, SMPTE RP 154, SMPTE RP 318M-B

Formats: NTSC-M (7.5 IRE black), NTSC-J (0 IRE black), PAL-B

Time Code: Optional VITC insertion

    Line: One or two lines, user selectable

    Source: Time-of-day with adjustable offset, or program (elapsed) time counter

Amplitude accuracy: ±2%

SCH phase: < ±5°

Timing adjustment: Independent per output

    Range: Anywhere in the color frame

    Resolution: Clock resolution 18.5 ns (1/54 MHz)

    Fine resolution 0.1 ns on BLACK 1-3

HD Tri-level Mode for Reference Sync Outputs

Standards: SMPTE ST 240, SMPTE ST 274, SMPTE ST 296, SMPTE RP 211

Formats:

    1080/60/59.94/50I

    Black 1-3 outputs: 1080/60/59.94/50/48/47.95/30/29.97/25/24/23.98P

    Black 4-5 outputs: 1080/30/29.97/25/24/23.98P

    1080/24/23.98PsF

    720/60/59.94/50P

Amplitude accuracy: ±2%

Timing adjustment: Independent per output

    Range: Anywhere in the color frame

    Resolution: Clock resolution 13.5 ns (1/74.25 MHz)

    Fine resolution 0.2 ns for BLACK 1-3

LTC Outputs

Number of outputs: 3 or 4 (LTC1 is selectable as input or output)

Connector: Available through D-sub 15-pin connector

Formats: 24 fps (24 Hz or 23.98 Hz), 25 fps, 30 fps, 30 fps drop-frame (29.97 Hz) per SMPTE ST 12

Source: Time-of-day with adjustable offset, or program (elapsed) time counter

Output amplitude: 5V ±10%, adjustable from 0.5V to 5V in 0.5 V steps

Word Clock Output

Connector: BNC ×1

Output level: 5V DC (CMOS compatible) or 1V AC into 75 Ω (AES level)

Frequency: 48 kHz

3 Gb/s Formats

Formats		Sample structure	Frame/Field rates
Level A			
	1280×720	4:4:4 Y'C'$_B$C'$_R$(+A)/10-bit 4:4:4 R'G'B'(+A)/10-bit	60/59.94/50/30/29.97/25/24/23.98P
	1920×1080	4:2:2 Y'C'BC'R/10-bit	60/59.94/50P
		4:4:4 Y'C'$_B$C'$_R$(+A)/10-bit 4:4:4 R'G'B'(+A)/10-bit	60/59.94/50I 30/29.97/25/24/23.98P 30/29.97/25/24/23.98PsF
		4:4:4 Y'C'$_B$C'$_R$/12-bit 4:4:4 R'G'B'/12-bit	60/59.94/50I 30/29.97/25/24/23.98P
		4:2:2 Y'C'$_B$C'$_R$/12-bit	60/59.94/50I 30/29.97/25/24/23.98P 30/29.97/25/24/23.98PsF
	2048×1080	4:4:4 R'G'B'/12-bit 4:4:4 X'Y'Z'/12-bit	30/29.97/25/24/23.98P 30/29.97/25/24/23.98PsF
Level B Dual-Link			
	1920×1080	4:2:2 Y'C'$_B$C'$_R$/10-bit	60/59.94/50P
		4:4:4 Y'C'$_B$C'$_R$(+A)/10-bit 4:4:4 R'G'B'(+A)/10-bit	60/59.94/50I 30/29.97/25/24/23.98P 30/29.97/25/24/23.98PsF
		4:4:4 Y'C'$_B$C'$_R$/12-bit 4:4:4 R'G'B'/12-bit	60/59.94/50I 30/29.97/25/24/23.98P 30/29.97/25/24/23.98PsF
		4:2:2 Y'C'$_B$C'$_R$(+A)/12-bit	60/59.94/50I 30/29.97/25/24/23.98P 30/29.97/25/24/23.98PsF
	2048×1080	4:4:4 R'G'B'/12-bit 4:4:4 X'Y'Z'/12-bit	30/29.97/25/24/23.98P 30/29.97/25/24/23.98PsF
Level B Dual-Stream			
	2× 1920×1080	4:2:2 Y'C'$_B$C'$_R$(+A)/10-bit	60/59.94/50I 30/29.97/25/24/23.98P 30/29.97/25/24/23.98PsF
	2× 1280×720	4:2:2 Y'C'$_B$C'$_R$(+A)/10-bit	60/59.94/50/30/29.97/25/24/23.98P

Specifications (cont.)

Serial Digital Test Signal Outputs

Number of outputs: 2 independent test pattern generators with 2 outputs each

Video signal: Test pattern on both outputs or test pattern on one output and digital black on the second output

Connector: BNC ×4

Output impedance: 75Ω

Output amplitude: 800 mVp-p ±3%

Overshoot: ≤1% (typical)

Serial Digital Test Signal Outputs

Rise/Fall time:

HD, 3G: ≤70 ps (typical) (20-80%)

SD: ≤700 ps (typical) (20-80%)

Jitter:

HD, 3G:

    ≤40 ps (typical) (alignment)

    ≤80 ps (typical) (timing)

SD:

    ≤200 ps (typical) (alignment)

    ≤200 ps (typical) (timing)

Timing adjustment: Independent per generator channel

    Range: Anywhere in the frame

    Resolution: One clock cycle at the Y, G, or X pixel rate

Return loss:

    ≥15 dB from 5 MHz to 2.5 GHz (typical)

    ≥10 dB from 2.5 GHz to 3 GHz (typical)

Standard Definition (SD) Formats

Standards: SMPTE ST 259, SMPTE ST 272, SMPTE ST 291

Bit rate: 270 Mb/s

Formats:

    720×486/59.94/I (525 lines)

    720×576/50/I (625 lines)

High Definition (HD) Formats

Standards: SMPTE ST 274, SMPTE ST 291, SMPTE ST 292, SMPTE ST 296

Bit rate: 1.485 Gb/s and 1.485/1.001 Gb/s

Formats:

    1280×720/60/59.94/50/30/29.97/25/24/23.98P

    1920×1080/60/59.94/50I

    1920×1080/30/29.97/25/24/23.98P

    1920×1080/30/29.97/25/24/23.98PsF

3 Gb/s Formats

Standards: SMPTE ST 291, SMPTE ST 424, SMPTE ST 425-1

Bit rate: 2.97 Gb/s and 2.97/1.001 Gb/s

Alpha channel: Same as Y/G channel or flat field (0% to 100% in 10% steps)

4K UHD Outputs

Output mode: Quad Link Square Division

Standards: All supported 3G/HD-SDI standards

Formats: All supported 2048×1080 and 1920×1080 3G/HD-SDI formats

Test signals: Full frame 75% and 100% color bars only

Test Patterns (SD/HD/3G-SDI)

Color bars: 100%, 75%, SMPTE EG 1, SMPTE RP 219, SMPTE EG 432-1

Flat field: Full field 0% (Black), 50%, 100% (White), Red, Green, Blue, Cyan, Magenta, Yellow

Linearity test: Ramp, Limit Ramp, Valid Ramp, Shallow Ramp Matrix, 5/10 Step Staircase

Monitor: Checkerboard, Clean Aperture, Convergence, Black-White Step Scale, Black-Dark Gray Step Scale, Pluge and Luma Reference

Production: Aperture, Window, SMPTE ST 303 Color Reference, ChromaDuMonde

SDI pathological: Equalizer Test, PLL Test, SDI Matrix per SMPTE RP 178/SMPTE RP 198

Frequency response: Multiburst, Real-time parametric moving zone plate

Pulses: 2T Pulse and Bar, Color Pulses, Co-siting Pulse

Full-frame picture: User-defined bitmap files (BMP format) can be downloaded to flash memory and displayed in any format

Video Overlays

Logo: 24-bit color bitmap file (BMP format) or 32-bit with transparency, up to 1920×1080 pixel size. Adjustable on-screen position

ID text: Programmable string from front-panel entry (printable ASCII characters) or downloaded text file (UTF-8 encoding) for any Unicode characters. A pre-installed TrueType font is provided for Latin, Greek, and Cyrillic characters; an alternate TrueType font file may be downloaded to support other character sets. Character size is adjustable (%APH, 0.1% resolution)

Burnt-in time code: On-screen display of the current time code value (HH:MM:SS:FF) for the output, updated every field. Character size is 10% APH

Circle: Adjustable diameter (%APH).

Border: Text and circle overlays are rendered as near-white objects, with a selectable enclosing near-black bounding area

Blink: Text and circle overlays can blink on and off for dynamic on-screen activity

Position: All overlay objects have adjustable on-screen position

Embedded Audio

Standards: SMPTE ST 272 (SD), SMPTE ST 299 (HD/3G)

Active channels: 16 channels (SD, HD, 3G-A), 32 channels (3G-B)

Sample frequency: 48 kHz

Digital coding: 24 bits (HD, 3G), 20 bits (SD)

Signal alignment: Async. and Sync. (no frame #), Synchronous (frame #)

Tone frequency: 10.0 Hz to 20000.0 Hz, 0.5 Hz resolution

Level: –60 to 0 dBFS, 1 dB steps

Channel identification: Audible click, AES channel origin bytes

Ancillary Data

Error detection and handling: EDH packet inserted in SD-SDI signals per SMPTE RP 165

Video payload identifier: Optional VPID insertion per SMPTE ST 352

Ancillary time code: Optional ATC insertion per SMPTE ST 12M-2

　Format: ATC-LTC and/or ATC-VITC

　Source: Time-of-day with adjustable offset, or program (elapsed) time counter

User-programmable ANC packet:

　Content: DID, SDID, DC, UDW (255), CS; Automatically calculate checksum and/or parity, or manual override

　Location: Line number, sample offset, luma/chroma channel, virtual link (3G)

　Mode: Continuous insertion or single packet

Composite Analog Test Signal Outputs

Number of outputs: 2 independent test pattern generators

Connector: BNC ×2

Standards: SMPTE ST 170 M, ITU-R BT.1700-1, EBU N14, SMPTE RP 154, SMPTE RP 318

Formats: NTSC-M (7.5 IRE black), NTSC-J (0 IRE black), and PAL-B

Test patterns:

　NTSC: 100% Color Bars, 75% Color Bars, SMPTE EG 1 Color Bars, 40% Flat Field, Convergence, Pluge and Luma Reference, Black with 10 Field ID

　PAL: 100% Color Bars, 75% Color Bars, 100% Color Bars over Red, 75% Color Bars over Red, 40% Flat Field, Convergence, Pluge and Luma Reference

Time code: Optional VITC insertion

　Line: One or two lines, user selectable

　Source: Time-of-day with adjustable offset, or program (elapsed) time counter

Luminance amplitude accuracy: ±1% (video at 100%)

Chroma amplitude accuracy: ±2%

Timing adjustment: Independent per output

　Range: Anywhere in the color frame

　Resolution: Clock resolution 18.5 ns (1/54 MHz)

Output impedance: 75Ω

Return loss: ≥30 dB to 30 MHz

Audio Test Signal Outputs

Standards: ANSI S4.40 (AES3), AES3-ID

Outputs: 8 channels (4 AES/EBU pairs)

Output impedance: 75Ω, unbalanced

Connector: BNC ×4

Output amplitude: 1V ±0.2V

Frequency (Hz): 50, 100, 150, 200, 250, 300, 400, 500, 600, 750, 800, 1000, 1200, 1500, 1600, 2000, 2400, 3000, 3200, 4000, 4800, 5000, 6000, 8000, 9600, 10000, 12000, 15000, 16000, 20000

Level: –60 to 0 dBFS, 1 dB step

Sampling frequency: 48 kHz (lock on video signal)

Quantization: Linear PCM, 20 or 24 bits (2's complement)

Transfer coding: Bi-phase mark

Audio/Video synchronization: Free run or synchronized with video framing

Timing adjustment: ±160 ms in 1 ms steps

DARS Output

Outputs: 2 channels (1 AES/EBU pair)

Output impedance: 75Ω, unbalanced

Connector: BNC ×1

Output amplitude: 1 ±0.2V

Frequency, level: No signal

Sampling frequency: 48 kHz (lock on video signal)

Quantization: Linear PCM, 20 or 24s (2's complement)

Transfer coding: Bi-phase mark

SGP8000A PTP Option Specifications

All specifications apply to the SPG8000A-GVSTD-PTP model.

Connectors

Ethernet connection 1: RJ45 8P8C connector supporting 10/100/1000Base-T

Ethernet connection 2: SFP cage accepting 1 Gigabit Ethernet modules, MSA standard (orderable as SFP-ETH-RT-M85-LC and SFP-ETH-10-S13-LC)

Internet Protocol Version

IPv4

Profiles Supported

SMPTE ST 2059-2, AES67, General, AVB

Operating Modes

In Internal, GPS or Genlock reference modes, user may select one or two PTP masters. If locked to PTP input, then user may enable one PTP master

Communication Mode Support

General AVB and AES67 profiles: Supports both Multicast and Unicast

SMPTE ST 2059-2 profile master mode: Supports Multicast, Mixed, Mixed without grant negotiation, and Unicast

SMPTE ST 2059-2 profile slave mode: Supports Multicast, Mixed with negotiation, Mixed without negotiation and Unicast with negotiation

Specifications (cont.)

Maximum Message Rates

Total maximum message rate for the two masters is 512 per second on the Announce message and 8192 per second on the Sync and Delay Response messages

At 8 messages per second, this accommodates approximately 500 end points in Unicast and 1000 end points in Multicast; higher message rates will reduce the number of end points that may be supported

Master Mode SMPTE ST 2059-2 Synchronization Metadata TLV Support

Master outputs Multicast SM TLV when active

Slave Mode Lock Time at 8 Messages per Second

Typically three minutes if not previously locked

Slave Mode Lock Range

±7.5 ppm

Timing Offset

Typically less than 1 µs for up to 7 hops of PTP compliant switches and less than 500 ns of uncompensated asymmetric network delay

Asymmetric Delay Correction

Slave supports manual entry or a delay compensation value up to ±20 µs

General Specifications

All specifications apply to all SPG8000A configurations unless noted otherwise.

Internal Oscillator

Frequency accuracy in Internal mode:

$\pm135 \times 10^{-9}$ over 1-year calibration interval

Typically $\pm10 \times 10^{-9}$ just after adjustment

Frequency accuracy over temperature:

$\pm2 \times 10^{-9}$ for ±5°C variation

$\pm10 \times 10^{-9}$ for 0 to 50°C

Frequency variation from vibration and shock: $\pm25 \times 10^{-9}$ from 6 ms half-sine shocks over 20g

Frequency drift: $< \pm100 \times 10^{-9}$ per year for internal and Stay GenLock® modes at constant temperature

Remote Access

Network interface: 10/100/1000 Base-T

Configuration: Web-based user interface, HTML with JavaScript

Management: SNMPv2

General Purpose Interface (GPI)

Connector: Two outputs and one input also available on the same 15-pin D-sub connector as the LTC signals

Outputs: Two, user-selectable to assert on specific events

1, 2: Assert on one or more of: GPS/GLONASS signal warning, loss of lock, near loss of lock, loss of input signal, or timer expiration

Output level: 0.5-5V

Inputs Two: (using 3 pins on connector)

1: Pin 3 is programmable to be either a user-selectable input to signal GPS/GLONASS reacquisition, jam sync, or restart timer, or is the MSB of the preset input group

2: When pin 3 is programmed to be part of the preset input group, then three pins on the connector can be used to recall presets 1-7

When pin 3 is programmed to be a user-selectable input, then two pins on the connector can be used to recall presets 1-3

Input level: 0.8-2.4V

Physical

Dimensions:

Height: 44 mm (1.7 in.)

Width: 483 mm (19 in.)

Depth: 559 mm (21.5 in.)

Weight (net): 4.85 kg (10.7 lbs.)

Environmental

Power consumption:

130 VA (max) on active power supply input

130 VA on backup supply input during 5s daily load test

Temperature: 0 to +50 °C

Altitude: 3,000 m (9,842 ft.)

Source voltage: 100 to 240 VAC ±10%, 50/60 Hz

Ordering

SPG Configuration

SPG8000A-GV-STD

SPG8000A Master Sync Generator with DARS output, two BB/ tri-level sync outputs, GPS & NTP support, two 3G/HD/SD-SDI test gen outputs, redundant power supply and rackmout rail kits

SPG8000A-GVSTD-PTP

SPG8000A-GV-STD configuration with PTP supporting SMPTE ST 2059-2 and AES67 profiles

Options

SPG800AUP PTP

SPG8000A Field Upgradable PTP option to add PTP (IEEE 1588) support, including SMPTE ST 2059-2 and AES67 profiles

SPG8000ANT

GPS/GLONASS rooftop antenna (5.0 VDC, 1588 MHz range signals, F connector) for receiving GPS and/or GLONASS satellite signals. The antenna works with the integrated internal GPS/GLONASS receiver of a SPG8000A with Option GPS.

SFP-ETH-RT-M85-LC

Ethernet 1 GigE multimode fiber Cartridge/850 nm with LC/PC connector

SFP-ETH-10-S13-LC

Ethernet 1 GigE 10 km Fiber Cartridge/1310 nm with LC/PC connector

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