

## TSG-460D Universal SPG/TPG & Time Reference

The TSG-460D is the ultimate sync, test pattern & time reference generator designed to satisfy all needs of broadcast serial digital (Standard, High Definition, 3G & 4K UHD), IP and mixed/hybrid, post-production, Studio, OB and other operational environments. It provides all the reference (color Black, Tri-Level Sync), timing and test signals, including LTC and VITC, together with analog audio, AES audio & Wordclock, needed to satisfy any application in PAL, NTSC, SD-SDI, HD-SDI, 3G-SDI, 4K-UHD, IP and hybrid installations. It also provides time reference signals, NTP (Network Time Protocol), and can simultaneously be an IEEE 1588 PTP (Precision Time Protocol) Grandmaster or Follower. The unit is supplied with dual “hot swap” redundant power supplies for maximum security.



The TSG-460D is designed for use either as a Master or, when externally locked, as a Follower SPG. Where it is critical to have a backup SPG, the TSG-465A auto changeover unit complements the TSG-460D. This can be user configured to monitor and changeover analog video, digital video, timecode and AES/EBU digital audio signals.

### FEATURES

- Outstanding performance, stability and reliability
- PAL/NTSC/625/525 switchable
- Comprehensive range of test patterns for all analog and digital applications
- $\pm 4$  field (PAL) /  $\pm 2$  field (NTSC) timing range
- Multiple & independently configurable reference outputs (PAL/NTSC/Tri-Level Sync in all HD formats)
- 4 LTC (standard and offset) or pulse outputs (User programmable)
- VITC on all SD outputs (User Select) analog stereo tone output with programmable interrupt
- Embedded audio
- Lock time to VITC on genlock ref input
- User programmable & animated text idents (3) (independent on each test out)
- 10Mhz reference input
- Genlock to color Black
- 2 pairs independent SD (std), HD, 3G, 4K SDI color black and test patterns (with embedded tone/silence) AES digital tone, Silence, Wordclock
- Remote control, SNTP Server & Client over Ethernet – including remote control via Ross Video Dashboard
- GPS receiver option – lock time to UTC, lock frequency & phase to GPS 10Mhz
- IEEE1588 PTP v2 Grandmaster – locked to GPS reference or free run when not. PTP and baseband outputs aligned and in sync. IEEE1588 PTP v2 Follower – locks to external PTP Grandmaster reference.

## SPECIFICATION

Conforms to relevant EBU, CCIR or SMPTE specifications.

### Video Inputs (BNC)

75 Ohm looping reference  
10 MHz terminating reference

### Video Outputs (BNC)

Analog composite test (2) standard  
Analog color black (2) standard  
Color black/tri-level (3 independent pairs)  
SDI (SD (std)/HD or 3G) color black with embedded silence (2 independent pairs)  
SDI (SD (std)/HD or 3G) test pattern with embedded tone (2 independent pairs)

**Balanced Audio/AES/LTC Outputs** Molex  
Microclasp 30 pin connector

### Unbalanced AES Audio

AES (2) standard  
DARS (1) standard

### WordClock

(TTL) 2 BNC standard

### Controls and Indicators

LCD display, rotary knob & switch

### Ethernet

100BaseT RJ45 standard  
GbE RJ45 TSG460D-PKG/02.

### GPS Antenna Input

SMB jack

### Timecode Outputs

LTC 4 (user select) standard  
VITC (user select) standard

### Color Black Outputs

Fsc stability:  $\pm 1$  Hz over temperature range SCH  
phase: 0 degrees  $\pm 5$  degrees  
Return loss:  $>35$ dB to 5 Mhz

### Sync Pulse Generator Subcarrier Output

NTSC or PAL

### Pulse and Pattern Outputs

Signals: meet or exceed relevant EBU, CCIR and SMPTE specifications

### Genlock

H range:  $\pm 4$  fields (PAL). Moves all timing relative to the reference input.  
Subcarrier: 0 to 360 degrees  
Resolution:  $<0.5$  degrees of subcarrier

### Mechanical

Height: 1 rack unit  
Width: 19" rack mounting  
Depth: 16" (overall)  
Weight: 13.25 lb (unpacked)

### Voltage

Auto ranging 100 to 240V AC, 50/60Hz

### Power

21 Watts maximum

### Ordering Information

TSG-460D: SPG/TPG & Time Ref Dual PSU  
TSG-460D-PKG/01: HD + 3G SDI package  
Includes TSG-460/03 & TSG-460/04  
TSG-460D-PKG/02: PTP Ready package  
Includes PTP Hardware (not enabled)  
TSG-460/02: 2 additional SDI outputs - Option  
TSG-460/03: HD SDI outputs – Option key  
TSG-460/04: 3G SDI outputs – Option key  
TSG-460/05: NTP – Option key  
TSG-460/06: GPS receiver/antenna – Option  
TSG-460/09: 4K UHD – Option key TSG-460/  
GbE PTP – Option key

