

# Videotek® VSG-4MTG

## Master Timing Generator



The Videotek® VSG-4MTG is part of the Imagine Communications Reference Sync and Timing platform, and is a ½RU wide, 1RU tall and 12 inches deep 3G/HD/SD master timing generator. The unit is small in size, with redundant power supply inputs, and is low in power consumption and light in weight, making it a perfect fit for all broadcast television and post production environments.

## Features

- Genlocks to standard color black (black burst) meeting NTSC SMPTE ST 170M and PAL ITU R BT. 4705 specifications
- Genlock to tri level sync meeting SMPTE ST 240M/274M/296M specifications
- Support for various time code formats and time code user bit formats, including SMPTE/EBU drop frame or non drop frame time code formats
- GPS support via 10 MHz, PPS and RS-232 interfaces
- NTP and PTP (IEEE-1588) support via a network connection
- VITC support from color black reference input and on color black outputs
- LTC, D-VITC and ATC support
- GPI inputs and outputs
- Redundant external power supply
- Optional auxiliary input and output breakout
- Two LTC outputs
- Support for DARS or word clock

## Processing Features

- Configurable DST and leap second changes
- Auto detection for input sources
- User-definable scheduled call outs to time reference sources, such as GPS receivers
- User-programmable delays for input and output, offsets, time code offsets, output phasing, and input and output jam syncs
- Display of current local time and date

## Details

An internal timing engine processes the incoming reference information, makes appropriate conversions to different time bases and maintains a consistent time base, which is used to drive the unit's outputs. Using a combination of parameters such as leap second information, DST (Daylight Savings Time) rules, and offset values, the VSG4-MTG can be configured to convert incoming International Atomic Time (TAI) to other time bases. This time is then distributed to the module's outputs as time and date information, color black video reference signals and DARS (Digital Audio Reference Signal) or word clock.

The optional GPS-3904 is recommended for use with the VSG-4MTG, as it not only provides GPS locked time and date, but also provides a highly stable master temperature controlled oscillator source for the for the video, audio and time code reference outputs.

The VSG-4MTG has multiple timing inputs that include GPS (Global Positioning System) sourced time and date with 10 MHz, PPS (Pulse Per Second) and serial data time and date inputs, LTC (Linear Time Code), NTP (Network Time Protocol), VITC (Vertical Interval Time Code), D-VITC (Digital Vertical Interval Time Code), ATC (Ancillary Time Code) support and support for IEEE-1588 PTP (Precision Time Protocol).

The video reference input supports NTSC, PAL, SD, HD and 3G formats for video source sync signals including color black (black burst) or tri level sync.

The VSG-4MTG has 5 outputs that can user-selected for color black or tri level sync with individual offsets and formats. This provides for multiple format timing from a single reference source. The VSG-4MTG also provides outputs that include NTP master, PTP master, VITC, and LTC outputs with individual offsets on all outputs, as well as DARS (digital audio reference signal) or word clock output.

The easy-to-use front panel and web user interface allow for instantaneous status on any source or output including date, time and lock information.

The VSG-4MTG provides for daylight savings time and time zone offsets, with an auto changeover function for source failures with primary and secondary source selection for maintaining the uninterruptable status that is required by the most stringent systems.

The unit has dual power supply capabilities and includes two external 110/220 universal AC adapters providing the required DC power input.

## Specifications

Specifications and designs are subject to change without notice

VSG-4MTG MASTER TIMING GENERATOR	STABILITY OVER TIME	PPS (PULSE PER SECOND) ACCURACY	10 MHZ ACCURACY	APPLICATIONS
Standalone (no GPS option)	4PPM (0.34s/day)	4PPM (0.34s/day)	Not Applicable	Time will vary ~2 minutes per year, see below for recommendations
GPS-3903-2	Not Applicable	1 PPS (static) $\pm 50$ nanoseconds	Not Applicable	Recommended for date/time-of-day and time code only reference
GPS-3904	Not Applicable	UTC 15 nanoseconds (one sigma)	$1.16 \times 10^{-12}$ (one day average)	Recommended for date and time-of-day and video/audio/time code reference

### GENLOCK INPUT

Input Connector Type	BNC female, passive looping
Input Impedance	Hi-Z
Blackburst Input Amplitude (External reference)	NTSC: Sync and burst 286 mV nominal PAL: Sync and burst 300 mV nominal
Blackburst Input Amplitude Tolerance	$\pm 6$ dB
Black Burst Subcarrier Jitter	<1 ns (pk-pk) over one horizontal line
Tri-level Sync Amplitude	600 mV pk-pk nominal
Tri-level Sync Amplitude Tolerance	$\pm 3$ dB
Return Loss	<-40 dB

### 10 MHZ INPUT

Input Connector type	BNC connector
Input Impedance	75 ohms
Level	2 V pk-pk $\pm 3$ dB

### PPS INPUT

Input Connector Type	BNC connector
Input Impedance	75 ohms
Level	TTL; $V_{ih}=2.0$ V min, $V_{il}=0.8$ V max
Edge Transition	20 ns max
Return Loss	<45 dB to 20 MHz

### LTC INPUT

Input connector Type	3 pin Weidmuller or BNC (Differential balanced or unbalanced)
Nominal Input Amplitude	2 volts pk-pk
Minimum Input Amplitude	0.5 volts pk-pk
Maximum Input Amplitude	4.5 volts pk-pk

### DIFFERENTIAL BALANCED

Format	SMPTE/EBU LTC 24/25/30 drop/non-drop auto-sensing
Impedance	Hi-Z (>30 k ohms) or 600 ohms, selectable with switches
Input Sensitivity	500 mV pk-pk

UNBALANCED	
Format	SMPTE/EBU LTC 24/25/30 drop/non-drop auto-sensing
Impedance	Hi-Z (>30k ohms)
Input sensitivity	500 mV pk-pk

SYNC OUTPUTS	
Output Connector Type	5 BNC
Blackburst Signal Level	NTSC: sync and burst 286 mV, nominal PAL: sync and burst 300 mV, nominal
Blackburst Subcarrier Jitter	<1 ns (pk-pk) over one horizontal line
SC/H Phase	0° ±10°
Tri-Level Signal Level	600 mV pk-pk
DC Offset	0 V ±0.5 V
Reference to Output Timing	±100 ns

DAR/WORD CLOCK OUTPUT (SHARED DARS/WORD CLOCK)	
Audio Formats	AES/EBU
Output Connector Type	BNC
Output Impedance	75 ohms nominal
DARS Output Level	1 V pk-pk
Jitter	≤0.25 UI
Output Sample Rate	48 kHz
Word Clock Output Level	5 V TTL level

LTC OUTPUT	
Electrical	Differential balanced
Format	SMPTE/EBU LTC 24/25/30 (frame per seconds) drop/non-drop support
Impedance	Low-Z (<25 ohms per side)
Level	3.9 V pk-pk nominal into 1 k ohms (Low-Z output)
Level	2.5 V pk-pk nominal into 1 k ohms (600 ohms output)
Transition Time	40 μs + 4 μs measured at 10% and 90% amplitude
Electrical	Unbalanced
Format	SMPTE/EBU LTC 24/25/30 (frame per seconds) drop/non-drop support
Impedance	Low-Z (<25 ohms per side) or 600 ohms, selectable with switches on optional break-out board
Level	2 V pk-pk nominal into 1 k ohms
Transition Time	40 μs ±4 μs measured at 10% and 90% amplitude
Display	256x64 OLED display for device configuration
Communication Interfaces	1 Ethernet port RJ-45 10/100 Base-T (web browser control, PTP and NTP interfaces) GPIO connector 26 female pin D-sub Nominal Input Amplitude 2 volts pk-pk Minimum Input Amplitude 0.5 volts pk-pk Maximum Input Amplitude 4.5 volts pk-pk

POWER	
Power connector barrel type with screw lock	
Power Input	12 VDC $\pm$ 1.2 VDC
Power Consumption	<20 W nominal
Non-resetting Fuse	2.5 A, 16 VDC
AC Adapter Included	

MECHANICAL	
Mechanical (H x W x D)	1.74 x 8.46 x 13.21 in. (4.42 x 21.49 x 33.32 cm)
Weight	3.05 lbs (1.38 kg)

ENVIRONMENTAL	
Operating Temperature	32° to 122° F (0° to 50° C)
Storage Temperature	-22° to 149° F (-30° to 65° C)
Humidity (non-condensing)	Operating: 20% to 80%
Non-operating	5% to 90%
Altitude Operating	6562 ft (2000 m)

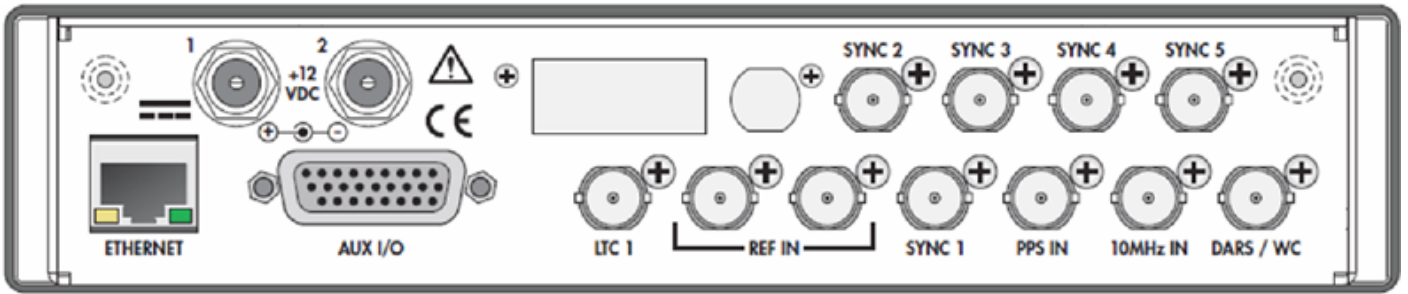
## Ordering Information

VSG-4SYS-M	VSG-4MTG system, includes 2 VSG-4MTG master timing generator, 1 VSX-11-3G multifomat sync changeover Unit, 1 DRT-5 and 1 RMT-U1 rack mount trays, and 2 VSG-4-BRK-1 breakout panel
VSG-4MTG	Master Timing Generator supporting NTP, LTC, VITC, D-VITC, ATC, five reference outputs, IEEE-1588 PTP capability, includes two PSU-12-1 power adaptors for redundancy, optional GPS-3904 antenna and receiver, DRT-5 dual rack mount tray and BLK-5 blank filler panel

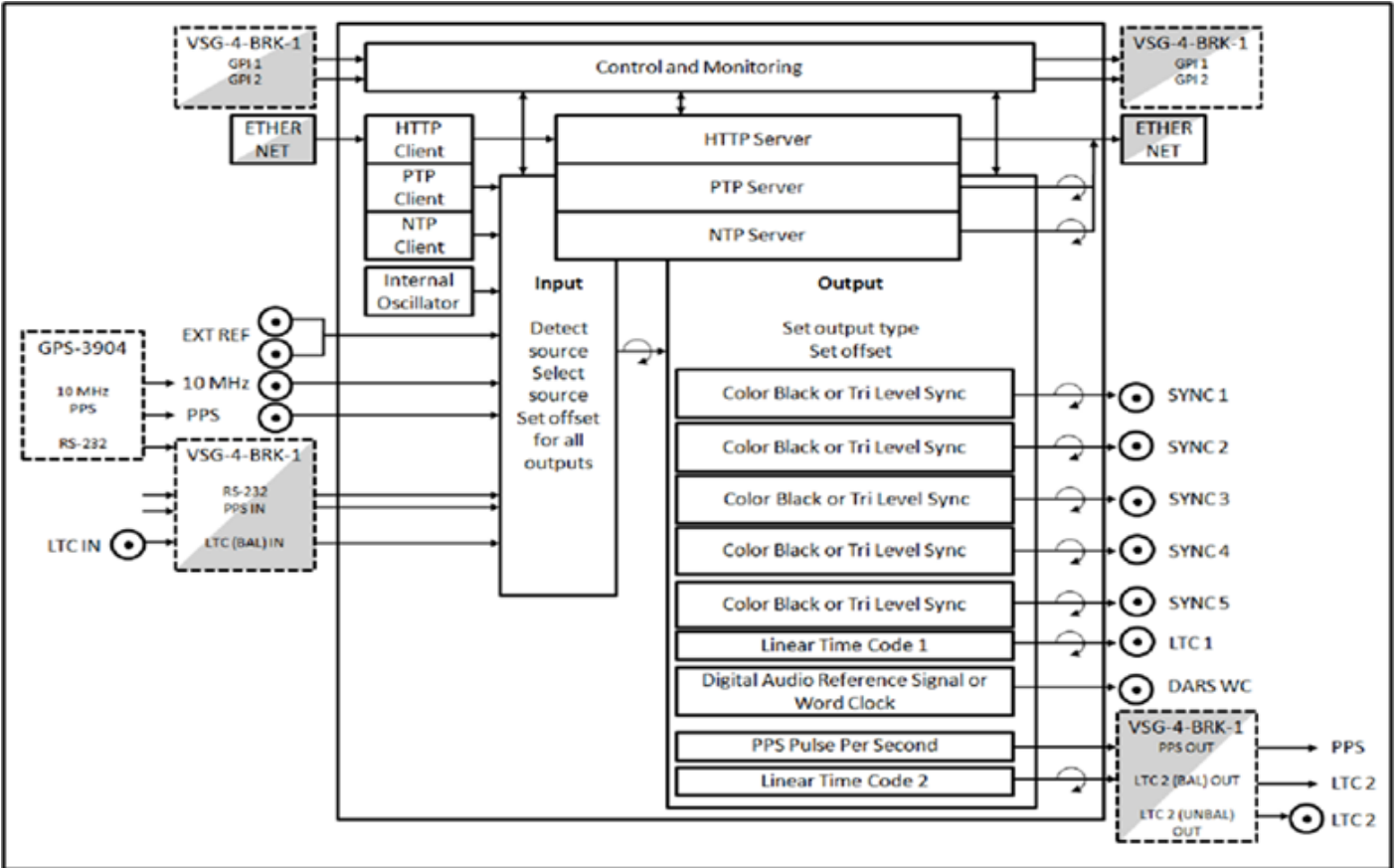
OPTIONS	
VSG-4-BRK-1	Breakout panel and 5 ft cable with HD26 pin DSUB male to female connectors for the VSG-4xxx series and DL-870
DRT-5	Dual rack mount tray for VSG-4 series and DL-870, BLK-5 blank front filler available (DRT-ADP-1 DRT adaptor required for installing DRT-4 products in the DRT-5 rack tray (CMN-41, CMN-MV, LLM-1770, VSG-401))
BLK-5	Blank panel for left or right side of DRT-4A or DRT-5
PSU-12-1	Spare or replacement power supply for Videotek VSG-4xxx and Selenio DL-870, 12 VDC output with threaded coupling ring, input 90 to 264 VAC
RMT-U1	Rack mount tray holds up to 8 VSG-4 series power supplies or a combination of items

OPTIONAL GPS ANTENNA AND RECEIVER	
GPS-3904	GPS antenna and receiver kit, 110-240 VAC operation, serial data, 10 MHz and PPS outputs, includes AC power supply, RG-59 antenna cable (23m/75ft), for use with VSG-4MTG, VSG-4CSD and VSG-4TSG for time/date and video/audio timecode applications
GPS-3902-RM	Rack mount kit, holds up to two GPS-3903-2, GPS-3904 receivers

Back Panel



Block Diagram



The optional VSG4BRK1 breakout adaptor provides GPS PPS, RS232, LTC and GPI inputs and output connections

