5600MSC

Master SPG/ Master Clock System

The 5600MSC Master Sync and Clock Generator is both a broadcast quality master sync pulse generator (SPG) and a master clock. It provides all of the synchronizing signals needed in a 21st century TV station or post production facility at the same time as solving the problem of locking the in-house master clock system to the master video sync pulse generator.

A high stability, temperature controlled oscillator, provides the 5600MSC with better than $5.0x10^{-9}$ (or 0.005ppm) frequency reference. The free running drift of this 10MHz reference will be less then 0.1Hz (which amounts to less then 1 millisecond time drift per day). This guarantees that any frequency drift, with time and temperature, will be within the tolerances expected from the best SPGs or master clocks available in the industry. The 5600MSC may also be referenced to an external 5 MHz or 10 MHz master oscillator if higher stability is required. Both the SPG and the Master Clock sections, may be referenced to high stability time and frequency standards present in the Global Position System (GPS) by adding the GPS option. The 5600MSC provides a high stability 10MHz output reference for use by other devices.

The SPG section provides two banks of three timeable outputs. These six BNC outputs may be configured to provide 6 independently timed color black (black burst) outputs or 6 independently timed HDTV tri-level sync outputs, or 3 of each signal type. Each color black output can optionally carry vertical interval time code (VITC) on a user specified set of lines.

When referenced to the optional GPS receiver, the start of the NTSC four field sequence, or the PAL eight field sequence, will coincide with a specific point in the GPS code. In this way, by referencing all the 5600MSCs in a system to GPS, they will all be automatically locked to each other. This is ideal for applications requiring remote facility frequency, phase and time locked! GPS heads may be remoted from the unit with standard 50 ft. cables included or optional 100 ft. & 400 ft. weatherproof cables. For remote GPS head requirements of greater than 400 ft. or fiber optic isolation, GPS Data Fiber Transmitters & Receivers are also available (7707GPS-DT, 7707GPS-DR).

The unit also has absolute time reference support (ATR). ATR is a set of data currently being proposed by SMPTE and will be inserted onto the SMPTE 318M universal reference signal. This information gives the absolute time of the signal in seconds, and fractions of a second since the SMPTE Epoch (midnight, January 1, 1958 UTC). ATR tells when the signal was created, regardless of current time when the signal is received and provides an additional means of locking two 5600MSCs together. (This feature will be implemented when the signal is standardized by SMPTE.)

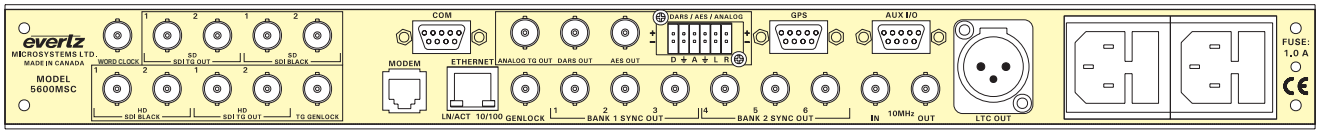
The master clock section provides a primary linear time code (LTC) output on an XLR connector and a 9-pin D connector, as well as a secondary LTC output available only on the 9-pin D connector. The time code may be set from the front panel or referenced to a number of different sources. Having two LTC outputs provides the ability to drive 24 and 30 Fps, or drop-frame and non-drop frame timecode simultaneously. Time may be externally referenced to GPS, or via modem to a high-level time source or extracted from VITC on the reference input. Time derived from such sources can be offset from UTC to a specific time zone as required. When referenced to GPS or by modem, the 5600MSC can provide RFC-1305 compliant NTP via Ethernet, and operates in broadcast and server mode. GPS, NTP and Modem access are all options for the 5600MSC. The 5600MSC includes a battery backed-up real time clock to maintain its time while power is not applied to the unit.

An optional word clock output is available for the 5600MSC (+WC) and also audio word clock may be generated from DARS with 520DARS-W module (Refer to 520DARS-W brochure)

There are two test signal generator options available. The STG option provides a composite analog video test signal output, AES and balanced analog audio tone generators and a digital audio reference output (DARS). The STG option also provides two standard definition SDI test signal outputs and two SDI black outputs. The HTG option provides two high definition SDI test signal outputs and two HD SDI black outputs.

All versions of the 5600MSC offer an AUX I/O port and a COM port for software upgrades and/or interconnecting two 5600MSC units (when used with the 5600ACO). An optional redundant power supply is also available.

Two 5600MSC units in combination with an Automatic Change Over (model 5600ACO) provide an extra degree off reliability where dual redundant installations are required. The ACO provides relay changeover for the two LTC outputs, the six Sync pulse outputs, the 10MHz reference output, and the GPI/O interface. A serial cable interconnecting the COM ports of the two 5600MSC units guarantees that the configuration and timing of the units are identical so that changeovers are done with minimal disruption of the plant timing reference. The model 5600ACO2 also provides changeover for the optional test generator signals.



Features & Benefits

- 6 independently timeable reference outputs
- Bi-level or Tri-level outputs selectable (can provide 3 tri-level HD sync outputs and 3 black burst outputs simultaneously)
- 2 Independent LTC Time Code outputs
  (Note: with +L option only 1 LTC Time Code output is available)
- 5MHz/10MHz frequency reference input
- GPS option for frequency and time reference
- 10MHz frequency reference output
- Output frequency stability guaranteed better then 5.0×10^{-9} (or 0.005ppm)
- Optional Modem for time reference dial up
- 2 GPS based units will be in time and phase even when remotely separated by miles
- Optional analog TG output, with DARS and analog audio tone outputs
- Optional SD SDI test generator outputs
- Optional HD SDI test generator outputs
- Optional output
- Optional Network Time Protocol Server (NTP) server support (GPS option should be ordered with NTP option)
- 16 digit Alpha-numeric display, with 20 pushbuttons
- Rack mountable
- Optional redundant power supply
- Automatic changeover units available for dual redundant systems applications
- Compatible with Dual GPS Data Fiber Receivers & Transmitters
- 2 factory presets and 3 user-presets available
- VITC reader on reference input for time reference
- Ten Field Pulse is available on NTSC sync outputs
- Unused menu items can be hidden from user menu
- VistaLINK® control for device configuration and status monitoring

Application Note:

- An optional word clock output is available for the 5600MSC (+WC) and also audio word clock may be generated from DARS with 520DARS-W module (Refer to 520DARS-W brochure)

The Complete Solution Provider

Specifications

Analog Sync Outputs:

Standards:	SMPTE 170M (NTSC-M), ITU-R BT.1700-1 (PAL-B) SMPTE 274M (1080i/60, 1080i/50, 1080p/30sF, 1080p/25, 1080p/25sF, 1080p/24,1080p/24sF and the 1/1.001 divisor versions where applicable) SMPTE 296M (720/60, 720p/50, 720p/24 "Slow PAL" (625i/48 and the 1/1.001 divisor version) Pulses-1Hz, 1/1.001Hz,6/1.001Hz, PAL Colour Frame
Connector:	6 BNC per IEC 61169-8 Annex A
Number of Outputs:	6 (2 banks of 3) configured as: 6 color black (black & burst) - selectable with VITC On/Off or 6 HD tri-level sync or 3 color black (black & burst) and 3 HD tri- level sync All outputs independently timeable
DC Offset:	0V ±0.1V
Return Loss:	> 40dB up to 5MHz
SNR:	> 75dB

10MHz Input and Output:

Input:	0.5V p-p min level, 75Ω (Relay Bypass Protected)
Output:	1V p-p (75Ω terminated)
Connector:	BNC per IEC 61169-8 Annex A
Signal Type:	Sine wave. Harmonics < 40dB typical
Long Term Oscillator Stability:	
Free Running:	0.01ppm
External Ref:	5 or 10 MHz external reference autodetect (max locking range ± 0.1ppm) GPS with +GP option

LTC Outputs:

Standard:	SMPTE 12M-1
Frame Rate:	Nominal 24, 25, and 30 (drop frame and non-drop frame)
Number of outputs:	2
Connectors:	3-pin male XLR type, Female DB9
Level:	
Unpowered:	Adjustable, 0.5V to 4.5V p-p
Powered:	2V p-p with 11V DC offset to drive downstream 1200 series slave clocks
Output Impedance:	66Ω balanced (unpowered)
Rise Time:	40 ±10µs
Jitter:	< 2µs

Communications and Control:

Serial Port:	
Connector:	Female DB-9
Level:	RS-232
Baud Rate:	57.6 Kbaud
Format:	8 data bits, no parity, 2 stop bits

GPS Receiver (with "+GP" option installed):

Temperature:	-40°C to +70°C
Humidity:	95% R.H. Condensing at 60°C
Dimensions:	5.8" D x 3.9" H (147mm x 100mm)

Modem: (with "+M" option installed):

Connector:	RJ-11 telephone jack
Baud Rate:	300 baud Bell 103 compatible

Ethernet:

Network Type:	Fast Ethernet 100 Base-TX IEEE 802.3u standard for 100Mb/s baseband CSMA/CD local area network Ethernet 10 Base-T IEEE 802.3 standard for 10Mb/s baseband CSMA/CD local area network
Connector:	RJ-45
Function:	VistaLINK® control NTP port with +T option installed

NTP Port (+T option installed):

Standard:	RFC-1305 compliant, broadcast and server mode support Time must be referenced to GPS or or VITC or have been synchronized via modem within the last 10 days (as per RFC1305)

DARS & AES Test Generator Outputs (with +STG option installed):

Standard:	
Unbalanced:	SMPTE 276M single ended AES (24-bits) (1V p-p into 75Ω)
Balanced:	AES3-1992 (24-bits) (4 p-p unterminated)
Number of Outputs:	
DARS:	1 unbalanced, 1 balanced
AES Test Gen:	1 unbalanced, 1 balanced
Connector:	
Unbalanced:	BNC per IEC 61169-8 Annex A
Balanced:	Removable Terminal Strip
Sampling Rate:	48kHz
Impedance:	
Unbalanced:	75Ω unbalanced
Balanced:	110Ω balanced
Return Loss:	> 25dB to 10MHz (with external 75Ω termination)
AES Tones:	Menu selectable

Genlock Input:

Type:	Autodetects standard SMPTE 170M (NTSC-M), ITU-R BT.1700-1 (PAL-B), Color Black 1V p-p with optional VITC Composite Bi-level sync (525i/59.94 or 625i/50) 300mV HD Tri-level Sync (same HD standards as sync outputs)
Number of Inputs:	1
Connector:	BNC per IEC 61169-8 Annex A
Video:	Max: 2V p-p video Min: Sync level 150mV
Frequency Lock	
Range:	±50ppm from nominal
Input Impedance:	High impedance, isolated, differential - external termination required
Return Loss:	> 25dB to 10MHz (with external 75Ω termination)

Analog Composite Video Test Signal Generator (with "+STG" option installed):

Standard:	SMPTE 170M (NTSC-M) ITU-R BT.1700-1 (PAL-B)
Number of Outputs:	1
Connector:	BNC per IEC 61169-8 Annex A
Signal Level:	1V p-p nominal
DC Offset:	0V ±0.1V
Output Impedance:	75Ω
Return Loss:	>35dB to 10MHz (with external 75Ω termination)
SNR:	> 75dB

SDI Test Generator Outputs (with "+STG"option installed):

Standard:	SMPTE 259M-C (270Mb/s)
Number of Outputs:	2 outputs of selected test signal 2 outputs of black video
Embedded Audio:	Up to 4 groups as specified in SMPTE 259M
Connectors:	BNC per IEC 61169-8 Annex A
Signal Level:	800mV nominal
DC Offset:	0V ±0.5V
Rise and Fall Time:	900ps nominal
Overshoot:	< 10% of amplitude
Return Loss:	> 15dB up to 270Mb/s
Jitter:	< 0.2 UI
Genlock:	Provided internally by 5600MSC

Analog Audio Tone Generator (with "+STG" option installed):

Number of Outputs:	2
Type:	Balanced analog audio
Connector:	6 pins on 12-pin removable terminal strips
Output Impedance:	66Ω
Signal Level:	-20 to +8dBu into 10kW load

HDTV Test Generator Outputs (with "+HTG" option installed):

Standards:	SMPTE 292M 4:2:2, YCbCr SMPTE 372M dual link 4:4:4 GBRA or YCbCr Same standards as HD sync outputs
Number of Outputs:	
4:2:2:	2 outputs of selected test signal 2 outputs of black video
4:4:4:	2 dual link outputs of selected test signal
Embedded Audio:	Up to 4 audio groups as specified in SMPTE 299M. Selectable tone frequencies (from 60Hz to 10kHz) and audio group. Audio can be embedded on test signal or black or both outputs.
Connector:	BNC per IEC 61169-8 Annex A
Signal Level:	800mV nominal
DC Offset:	0V ±0.5V
Rise and Fall Time:	200ps nominal
Overshoot:	< 10% of amplitude
Jitter:	< 0.2 UI
Genlock Input:	HD Tri-level Sync or NTSC or PAL Color Black 1V p-p, (provided from one of the Sync outputs)

Word Clock Output (with +WC option installed):

Signal:	0,0V-0.5V, 48kHz Word Clock
Connector:	BNC per IEC 61169-8 Annex A
Number of Outputs:	1

General Purpose Inputs and Output:

Number of Inputs:	2
Number of Outputs:	2 (function menu selectable)
Type:	Opto-isolated, active low with internal pull-ups to +5V
Connector:	4 pins plus 2 ground pins on 9-pin female D connector
Signal Level:	+5V nominal

Physical:

Dimensions:	19" W x 1.75" H x 18.75" D. (483mm W x 45mm H x 477mm D)
Weight:	8lbs (3.5kg)

Electrical:

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

Configuration: Optional redundant supply available with +2PS option

Power:	90W max (all options installed)
Safety:	ETL Listed Complies with EU safety directives
EMI/RFI:	Complies with FCC Part 15 Class A Complies with EU EMC Directive

Ordering Information

5600MSC	Master SPG/Master Clock System
5600ACO	1RU Automatic Change Over System (see individual brochure)
5600ACO2	2RU Automatic Change Over System (see individual brochure)

Ordering Options (5600MSC)

+2PS	Redundant power supply
+M	Modem Option
+GP	GPS Option (includes GPS receiver and 50' weatherproof cable)
+T	Network Time Protocol (Most be ordered with +GP or +M option)
+STG	• NTSC/PAL test signal generator • Audio tone generator (analog) • DARS generator (balanced & unbalanced) • AES generator (balanced & unbalanced) PLUS an SD-SDI Test Generator with 2 SD-SDI test signals and 2 SD-SDI black
+HTG	HD SDI Test Generator with 2 HD-SDI test signals & 2 HD-SDI black
+WC	Optional Word Clock Output
+L	LTC Input option

Accessories

WA-T76	100' weatherproof cable for 5600MSC, GPSII & 7707GPS-DT
WA-T77	100' weatherproof cable for 7707GPS-DR to 5600MSC
WA-T11	400' weatherproof cable for GPS receiver

For other weatherproof cable lengths, contact factory

For remote GPS head requirements greater than 400' cables or fiber optic isolation order:

7707GPS-DT	Dual GPS Data Fiber Transmitter
7707GPS-DR	Dual GPS Data Fiber Receiver