5601MSC

Master SPG/Master Clock System

The 5601MSC 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 5601MSC 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 5601MSC 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 5601MSC provides a high stability 10MHz output reference for use by other devices.

The SPG section provides six 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. Each color black output can optionally carry vertical interval time code (VITC) on a user specified set of lines. Additionally each output can provide 10MHz, 5MHz, PAL Subcarrier, NTSC Subcarrier, 1 PPS, 1/1.001 PPS, 6/1.001 PPS, PAL color frame pulse and 48KHz word clock.

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).

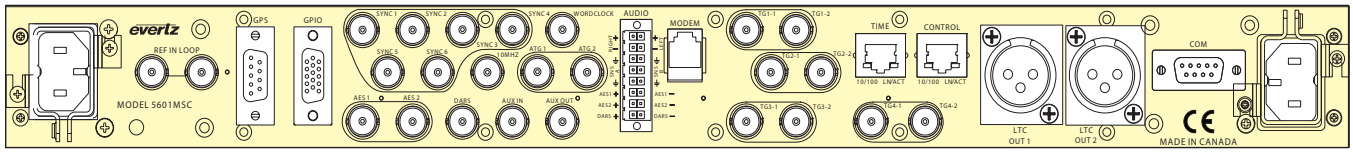
The master clock section provides two longitudinal time code (LTC) or IRIG outputs on XLR connectors and a 15-pin D connector. The time code may be set from the front panel or referenced to a number of different sources. Having two LTC outputs provides the ability to drive 24 and 30 Fps, or drop-frame 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 or LTC or IRIG on the LTC 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 or LTC or IRIG or VITC, the 5601MSC 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 5601MSC. The 5601MSC includes a battery backed-up real time clock to maintain its time while power is not applied to the unit.

The word clock output provides 48KHz word clock or may be configured as an additional sync output. The 10MHz output provides 10 or 5MHz, or may be configured as an additional sync output.

There are two test signal generator options available. The SDTG option provides two composite analog video test signal outputs and two AES and balanced analog audio tone generators and a digital audio reference output (DARS). The SDTG option also provides two standard definition SDI test signal outputs. The HDTG option lets these outputs generate HD or SD test signals. The 3GTG option allows two of these outputs to generate 3G or HD or SD test signals. There are two copies of the HD/SD/3G outputs available.

All versions of the 5601MSC offer an AUX I/O port and a COM port for software upgrades. An optional redundant power supply is also available.

Two 5601MSC units in combination with an Automatic Change Over (model 5601ACO2) provides an extra degree of 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 link through the 5601ACO2 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
- LTC Input
- 5MHz/10MHz frequency reference input
- GPS option for frequency and time reference
- 5MHz/10MHz frequency reference output
- Word clock 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 and SD SDI test generator outputs
- Optional HD/3G/SDI test generator outputs
- Optional Network Time Protocol Server (NTP) server support (GPS option should be ordered with NTP option)
- Dual 6 line x 16 character Alpha-numeric display, with 10 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

The Complete Solution Provider

5601MSC
Master SPG/Master Clock System

Specifications

Analog Sync Outputs:

Standards:	SMPTE 170M (NTSC-M), ITU-R BT.1700-1 (PAL-B) SMPTE 274M (1080p/23.98, 1080p/24, 1080i/50, 1080i/59.94, 1080i/60, 1080p/23.98sF, 1080-/24sF, 1080p/25, 1080p/29.97, 1080p/30, 1035i/59.94, 1035i/60) SMPTE 296M (720p/59.94, 720p/60, 720p/50, 720p/24, 720p/23.98) 625i/48, 625i/47.95 PAL color frm 1Hz, 1/1.001Hz, 6/1.001 Hz, 5MHz, 10MHz NTSC Subcarrier PALB Subcarrier 48KHz Word clock
Connector:	6 BNC per IEC 61169-8 Annex A
Number of Outputs:	6
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:	5MHz, 10MHz
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) Bi-level or Tri-level Genlock GPS with +GP option

Word Clock Output:

Output:	48KHz Word clock

LTC Outputs:

Standard:	SMPTE 12M-1 or IRIG-B
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

LTC Input:

Standard:	SMPTE 12M-1 or IRIG-B
Number of Inputs:	1
Connector:	DB-15

Communications and Control:

Serial Port:	
Connector:	Female DB-9
Level:	RS232
Baud Rate:	115.2 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, LTC, IRIG-B or VITC or have been synchronized via modem within the last 10 days (as per RFC1305)

DARS & AES Test Generator Outputs (with +SDTG 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:	2 unbalanced, 2 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:	2 Loop thru
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 "+SDTG" option installed):

Standard:	SMPTE 170M (NTSC-M) ITU-R BT.1700-1 (PAL-B)
Number of Outputs:	2
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 "+SDTG"option installed):

Standard:	SMPTE 259M-C (270Mb/s)
Number of Outputs:	4 outputs of selected test signal
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

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:	-30 to +10dBu into 10Ω load

SDI Test Generators:

Standards:	With SDTG option, SMPTE 259M-C (270Mb/s) With HDTG option, SMPTE 259M-C (270Mb/s) and SMPTE 292M 4:2:2 YcbCR With 3GTG option, SMPTE 259M-C(270Mb/s), SMPTE 292M4:2:2 YcbCR, and SMPTE 372M dual link, and 3G level A and 3G level B
Number of Outputs:	4
Embedded Audio:	Up to 4 audio groups as specified in SMPTE 299M on each outputs. Selectable tone frequencies (from 60Hz to 10kHz) and audio group.
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

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 11.5" D. (483mm W x 45mm H x 292mm 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

5601MSC	Master SPG/Master Clock System including: 6 bi-level/tri-level sync outputs 5/10 MHz output, 48KHz word clock output, 2 LTC/IRIG outputs Loop thru genlock/5/10MHz input, LTC input, 1 power supply
5601ACO2	2RU Automatic Change Over System (see individual brochure)

Ordering Options (5601MSC)

+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)
+SDTG	4 Dual output SD SDI Test/Black generators 2 NTSC/PAL test signal generator outputs 1 Analog Audio tone generator 1 DARS generator (balanced & unbalanced) 1 AES generator (balanced & unbalanced)
+HDTG	4 Dual output configurable SD/HD SDI Test/Black generators 2 NTSC/PAL test signal generator outputs 1 Analog Audio tone generator 1 DARS generator (balanced & unbalanced) 1 AES generator (balanced & unbalanced)
+3GTG	2 Dual output configurable SD/HD/3G SDI Test/Black generators 2 Dual output configurable SD/HD SDI Test/Black generators 2 NTSC/PAL test signal generator outputs 1 Analog Audio tone generator 1 DARS generator (balanced & unbalanced) 1 AES generator (balanced & unbalanced)

Accessories

WA-T76	100' weatherproof cable for 5601MSC, GPSII & 7707GPS-DT
WA-T77	100' weatherproof cable for 7707GPS-DR to 5601MSC
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

Note: Only one of +SDTG, +HDTG or +3GTG can be installed