5601MSC

Master SPG/Master Clock System

IM160518

The 5601MSC Master Sync and Clock Generator is 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 1.0x10-8 (or 0.01ppm) frequency reference. The free running drift of this 10MHz reference will be less then 0.1Hz (which amounts to less than one 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 section of the 5601MSC may be referenced to high stability time and frequency standards present in the Global Position System (GPS) by adding the GPS option (+GP). The 5601MSC may also be referenced to high stability time and frequency standards present in the Global Navigation Satellite System (GLONASS) by adding the GPS/GLONASS option (+GPSG).

The SPG section of the 5601MSC provides six timeable reference outputs. These six BNC outputs may be configured to provide independently timed color black (black burst) outputs or 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 wordclock.

When referenced to the optional GPS receiver, the start of the NTSC four field sequences, or the PAL 8 field sequence, will coincide with a specific point in the GPS code. In this way, by referencing all the 5601MSCs 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).

On the 5601MSC, the master clock section provides two longitudinal timecode (LTC) or optional 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. Time derived from such sources can be offset from UTC to a specific time zone as required. Time may be externally referenced to GPS, modem, or VITC or GLONASS, LTC, IRIG or SNTP. The 5601MSC can provide RFC-1305 compliant NTP via Ethernet, and operates in broadcast and server mode. The 5601MSC can act as a PTP/IEEE-1588 server on its time port. GPS, NTP, PTP and Modem access are all options. The 5601MSC includes a battery backed-up real time clock to maintain its time while power is not applied to the unit.

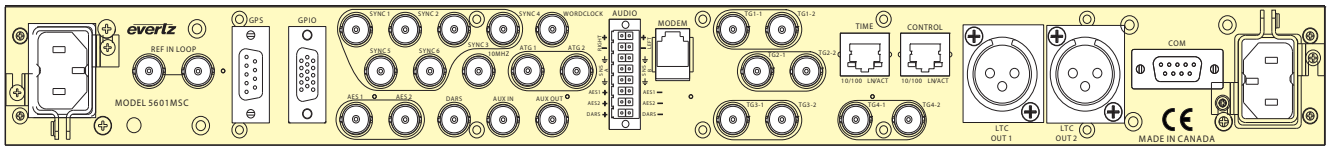
On the 5601MSC, a wordclock output is a standard feature. It provides a 48 kHz wordclock or may be configured as an additional sync output. Also, the 10MHz output provides 10MHz or 5MHz, or may be configured as an additional sync output.

There are four test signal generator options available. The SDTG option provides two composite analog video test generators, two AES and one DARS outputs (both balanced and unbalanced), and two balanced analog audio tone channels. The SDTG option also provides four standard definition SDI test signal generators. The HDTG option includes all features of the SDTG option and adds support for HD formats. The 3GTG option includes all features of the HDTG option and adds support for dual-link and 3G formats. Each test generator has two outputs and a large suite of test signals available. When the 3GTG option is ordered, 3D test signals are also available. In the 4K/UHDTV mode the four test generators are combined into one quad-link test generator.

The 5601MSC offers an optional redundant power supply. The redundant power supplies and fans are hot-swappable.

Automatic Changeover

Two 5601MSC units in combination with an Automatic Change Over (model 5601ACO2) provide an extra degree of reliability. Again, the ACO provides relay changeover for the two LTC outputs, the six sync pulse outputs, the 10MHz reference output, wordclock and the GPI/O interface. The model 5601ACO2 also provides changeover for all the optional test generator signals.



5601MSC Rear Panel

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Features & Benefits

- 6 independently timeable programmable reference outputs
- Bi-level or Tri-level outputs selectable
- 2 Independent LTC/IRIG-B Time Code outputs
- LTC/IRIG-D Input (optional IRIG-B)
- Reference loop input for video and 10MHz/5MHz references
- GPS option for frequency and time reference (GLONASS option)
- SNTP option for time reference
- 3.58/4.43/5 MHz frequency reference output
- 10MHz frequency reference output
- Wordclock output
- Output frequency stability guaranteed better then 1.0 x 10-8 (or 0.01ppm)
- Optional modem for time reference dial up
- 2 GPS based units will be in time and phase even when remotely separated by miles
- Optional test generators available are (refer to ordering options):
  - Composite Video
  - AES/DARS
  - Analog Audio Tones
  - SD SDI
  - HD SDI
  - 3Gb/s
- Optional Network Time Protocol (NTP) server support (NTP requires a time reference shuch as GPS/GLONASS, modem, VITC, LTC or SNTP. GPS/GLONASS is the recommended reference)
- Optional PTP/IEEE-1588 master support
- Dual 6 line x 16 character Alpha-numeric display, with 10 pushbuttons
- Rack mountable
- Optional redundant hot swappable 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
- VistaLINK® control for device configuration and status monitoring
- All active components are front panel extractable & serviceable
- Fans are hot swappable

Summary

5601MSC Signal Inputs / Outputs

5601MSC Specifications

Analog Sync Outputs:

Output Standards:	
Black Burst:	SMPTE ST 170 (NTSC-M), ITU-R BT.1700-1 (PAL-B)
Bi-Level:	Slo-Pal 625i/48, 625i/47.95, 480p/59.94
HD Tri-Level:	SMPTE ST 274 (1080p/23.98, 1080p/24, 1080i/50, 1080i/59.94, 1080i/60, 1080p/23.98sF, 1080p/24sF, 1080p/25, 1080p/29.97, 1080p/30, 1080p/50, 1080p/59.94, 1080p/60) SMPTE ST 296 (720p/59.94, 720p/60, 720p/50, 720p/30, 720p/24)
Pulse Signals:	PAL color frame, 1Hz pulse, IR1G DATUM 1/1.001Hz pulse, 6/1.001Hz pulse
CW Signals:	5MHz, 10MHz, NTSC-M Subcarrier, PAL-B Subcarrier
Wordclock:	48kHz Wordclock
Connector:	6 BNC per IEC 61169-8 Annex A
Number of Outputs:	6
DC Offset:	0V ±0.05V
Return Loss:	> 40dB up to 10MHz
SNR:	> 75dB rms

10MHz Output:

Output Levels:	1.0V p-p, 2.0V p-p, in 75Ω, selectable
Connector:	BNC per IEC 61169-8 Annex A
Output Type:	10MHz sine wave (default), all other analog sync standards (see above) selectable
SNR:	>70dB rms
SFDR:	>50 dBc

Wordclock Output:

Output Type:	48kHz Wordclock (default), all other analog sync standards (see above) selectable
Connector:	BNC per IEC 61169-8 Annex A
Risetime:	< 25ns
Levels:	5V CMOS (1kΩ) or ±1V (75Ω)

LTC Outputs:

Standard:	SMPTE ST 12-1 or IRIG-B
Frame Rate:	24, 25, 30 and 29.97 (drop frame and non-drop frame)
Number of outputs:	2 balanced
Connectors:	3-pin male XLR type, Female DB-15
Level:	
Un-powered:	Adjustable, 1.0V to 8.0V p-p, balanced
Powered:	2V p-p with 11V DC offset to drive downstream 1200 series slave clocks on LTC1 only
Output Impedance:	44Ω balanced (un-powered)
Rise Time:	40 ±10µs
Jitter:	< 2µs

IRIG Input/Outputs (with +IRIG option installed):

Standard:	IRIG 200-04 B122, B123, B126, B127
Number of outputs:	2, shared with LTC, may be both LTC, 1LTC-1IRIG, both IRIG
Connectors:	3 pin male XLR type, Female DB-15
Level:	1.0-8.0 p-p, balanced
Output Impedance:	44Ω balanced

LTC Input:

Standard:	SMPTE ST12-1 or IRIG-B
Number of Inputs:	1 balanced
Connector:	Female DB-15
Input impedance:	>30kΩ balanced
Sensitivity:	0.25V p-p min

Communications and Control:

Serial Port:	
Connector:	Female DB-9
Level:	RS-232
Baud Rate:	115200 baud
Format:	8 data bits, no parity, 2 stop bits

GPS/GLONASS Receiver (with "+GP" or "+GPSG" option installed)

Temperature:	-40°C to +70°C
Humidity:	95% R.H. Condensing at 60°C
Dimensions:	3.74" D x 2.85" H (100mm x 72mm)

Modem (with "+M" option installed):

Connector:	RJ-11 telephone jack
Baud Rate:	300/1200 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:	NTP V4 compliant, broadcast and server mode support Time must be referenced to GPS, LTC, VITC or have been synchronized via modem within the last 10 days (as per RFC1305)
SNTP Input:	NTP V4 compliant

PTP/IEEE-1588 (+PTP option installed):

	PTP version 2 support on Time Ethernet port

DARS & AES Test Generator Outputs (with +SDTG, HDTG or 3GTG installed):

Standard:	
Unbalanced:	SMPTE ST 276-1single ended AES (24-bits) (1V p-p into 75Ω)
Balanced:	AES3 (24-bits) (4Vp-p 110Ω terminated)
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
AES Tones:	Menu selectable

Genlock Input (Video/10MHz selectable):

Type:	Autodetects standard SMPTE ST 170 (NTSC-M), ITU-R BT.1700-1 (PAL-B), Color Black 1V p-p with optional VITC and 10- field pulse HD Tri-level Sync (same HD standards as sync outputs)
Number of Inputs:	2 Loop thru High impedance, isolated, differential external termination required
Connector:	BNC per IEC 61169-8 Annex A
Return Loss:	>40dB to 10MHz (with external 75Ω termination)
Input Level Range:	
Video:	-3.5dB (double-terminated) to +6dB (un-terminated)
10MHz:	0.3V p-p to 4.0V
Frequency Lock Range:	
Wide mode:	±15ppm min
Narrow mode:	±0.1ppm min

Analog Composite Video Test Signal Generator (with +SDTG, HDTG or 3GTG installed):

Standard:	SMPTE ST 170 (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 ±0.05V
Output Impedance:	75Ω
Return Loss:	>40dB to 6MHz
Frequency response:	± -0.1dB to 5.5MHz
SNR:	> 75dB rms

Analog Audio Tone Generator (with +SDTG, HDTG or 3GTG installed):

Number of Outputs:	2
Type:	Balanced analog audio
Connector:	6 pins on 16-pin removable terminal strips
Output Impedance:	66Ω
Signal Level:	-30 to +10dBu into 10kΩ load
DC Offset:	< 10mV
Noise floor:	< -90dBu, unweighted
THD+N:	< -100dB with 1kHz @ +10dBu into 10kΩ load

SDI Test Generators:

Standards:	With SDTG option, SMPTE ST 259-C (270Mb/s), With HDTG option, SMPTE ST 259-C (270Mb/s), SMPTE ST 292-1 4:2:2 With 3GTG option, SMPTE ST 259-C (270Mb/s), SMPTE ST 292-1 4:2:2, SMPTE ST 372 dual link, and SMPTE ST 424 SMPTE ST 259-C (270Mb/s), SMPTE ST 292-1 4:2:2, SMPTE ST 372 dual link, and SMPTE ST 424, For SMPTE ST 2048-2 and SMPTE ST 2036-1 2160 line formats Quad link SMPTE ST 292-1 4:2:2 Quad link SMPTE ST 424 4:2:2 SMPTE ST 425-3 Dual link 3Gb/s SMPTE ST 425-5 Quad link 3Gb/s
Number of Generators:	4 (2 outputs per)
Embedded Audio:	Up to 4 audio groups as specified in SMPTE ST 299-1 or SMPTE ST 272 Selectable tone frequencies (from 20Hz to 12kHz) and audio group
Connector:	BNC per IEC 61169-8 Annex A
Signal Level:	800mV nominal drive (1600mV drive for 5601AC02)
DC Offset:	0V ±0.5V
Rise and Fall Time:	100ps HD/3G, 600ps SD
Overshoot:	< 10% of amplitude
Jitter:	< 0.2 UI
Return Loss:	> 15dB to 1.5GHz > 10dB to 3GHz

General Purpose Inputs and Output:

Number of Inputs:	2
Number of Outputs:	2 (function menu selectable)
Output Type:	Opto-isolated, active closure to GND, 20kΩ pull-ups to +5V
Input Type:	Opto-isolated, senses closure to GND, pull-ups to +5V
Connector:	4 pins plus 2 ground pins on DB-15 female

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

The Complete Solution Provider

5601MSC 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 outputs Loop thru genlock/5/10MHz input, LTC input, 1 power supply
5601ACO2	2RU Automatic Change Over System (see individual brochure)

Ordering Options

+2PS	Redundant power supply
+M	Modem Option
+GP	GPS Option (includes GPS receiver and 50' weatherproof cable)
+GPSG	GLONASS/GPS option (includes GLONASS/GPS receiver and 50' weatherproof cable)
+T	Network Time Protocol Server, SNTP client
+SDTG	4 Dual output SD SDI Test generators 2 NTSC/PAL test signal generator outputs 1 Stereo Analog Audio tone generator 1 DARS generator (balanced & unbalanced) 2 AES generator (balanced & unbalanced)
+HDTG	4 Dual output configurable SD/HD SDI Test/Black generators 2 NTSC/PAL test signal generator outputs 1 Stereo Analog Audio tone generator 1 DARS generator (balanced & unbalanced) 2 AES generators (balanced & unbalanced)
+3GTG	4 Dual output configurable SD/HD/3G SDI Test generators 2 NTSC/PAL test signal generator outputs 1 Stereo Analog Audio tone generator 1 DARS generator (balanced & unbalanced) 2 AES generator (balanced & unbalanced) Includes 3D test sets
+IRIG	LTC inputs and outputs are IRIG compatible
+4K	1 UHDTG SDI Test Generator. When enabled, uses all 4 SDI test generator outputs. When disabled, 4 dual output configurable SD/HD/3G SDI test generators. 2 NTSC/PAL test signal generator outputs 1 Stereo analog tone generator 1 DARS generator (balanced & unbalanced) 2 AES generators (balanced & unbalanced) Includes 3D test sets
+PTP	PTP Master on Time Ethernet port

Accessories

WA-T76	Optional 100' weatherproof cable for GPS receiver
WA-T11	Optional 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
WA-T77	Optional 100' cable for 7707GPS-DR to 5601MSC

5601MSC

Master SPG/Master Clock System

IM160518

The Evertz 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 Broadcast 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.

The system has been designed to meet 24hour/365 day operational requirements. Hence, it is front panel accessible with power supplies and system electronics front extractable. No re-cabling is necessary to remove or replace the system electronics.

A high stability, temperature controlled oscillator provides the 5601MSC with better than $5.0x10^{-9}$ (or 0.005ppm) frequency reference. The unit can provide a 10MHz output reference for use by other devices. The free running drift of this 10MHz reference will be less than 0.1Hz which amounts to less than 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 Positioning System (GPS) by adding the GPS option.

The SPG section provides six programmable outputs. These six BNC outputs may be configured to provide independently timed color black (black burst) outputs or 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 wordclock.

The wordclock output provides 48kHz wordclock or may be configured as an additional sync output. The 10MHz output provides 10MHz or 5MHz, or may be configured as an additional sync output.

When referenced to the optional GPS receiver, the start of the NTSC four field sequence, and the PAL eight field sequence, will coincide with a specific point in the GPS code. In this way, by referencing all the 5601MSCs in a system to GPS, they will all be automatically locked to each other in both standards. This is ideal for applications requiring remote facility frequency, phase and time lock GPS heads may be remotely located from the unit with a standard 50 ft cable (included) or optional 100 ft & 400 ft weatherproof cables. For remote GPS head requirements greater than 400 ft or for 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) 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 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 VITC, the 5601MSC can provide RFC-1305 compliant NTP via Ethernet, and operate 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.

As an option, two independent IRIG time code signals can be generated instead of above LTC. Available both on XLRs and 15-pin D connectors, they can be used with balanced cables or coax cables (with provided cable adaptors). Similarly, IRIG time code input can be substituted for the LTC input.Thus Evertz 5601MSC can be configured to serve as a multistandard time code converter between any of: GPS <-> VITC <-> LTC <-> IRIG.

There are three test signal generator options available. The SDTG option provides two composite analog video test generators, two AES and one DARS outputs (both balanced and unbalanced), and two balanced analog audio channels. The SDTG option also provides four standard definition SDI test signal generators. The HDTG option includes all features of the SDTG option and adds support for HD formats. The 3GTG option includes all features of the HDTG option and adds support for dual-link and 3G formats. Each test generator has two outputs and a large suite of test signals available. When the 3GTG option is ordered, 3D test signals are also available.

All versions of the 5601MSC offer 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) provide 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, wordclock 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 5601ACO2 also provides changeover for all the optional test generator signals.

Features & Benefits

- 6 independently timeable programmable reference outputs
- Bi-level or Tri-level outputs selectable
- 2 Independent LTC / optional IRIG Time Code outputs
- LTC / optional IRIG time code input
- Reference loop input for video and 10MHz/5MHz references
- GPS option for frequency and time reference
- 5MHz/10MHz frequency reference output
- Wordclock 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 test generators available are (refer to ordering options):
  - Composite Video
  - AES/DARS
  - Analog Audio Tones
  - 3Gb/s
  - HD SDI
  - SD SDI
- Optional Network Time Protocol (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
- VistaLINK® control for device configuration and status monitoring
- All active components are front panel extractable & serviceable

The Complete Solution Provider

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Specifications

Analog Sync Outputs:

Output Standards:	
Black Burst:	SMPTE 170M (NTSC-M), ITU-R BT.1700-1 (PAL-B)
Bi-Level:	Slo-Pal 625i/48, 625i/47.95
HD Tri-Level:	SMPTE 274M (1080p/23.98, 1080p/24, 1080i/50, 1080i/59.94, 1080i/60, 1080p/23.98sF, 1080p/24sF, 1080p/25, 1080p/29.97, 1080p/30) SMPTE 296M (720p/59.94, 720p/60, 720p/50, 720p/24)
Pulse Signals:	PAL color frame, 1Hz pulse, 1/1.001Hz pulse, 6/1.001Hz pulse
CW Signals:	5MHz, 10MHz, NTSC-M Subcarrier, PAL-B Subcarrier
Wordclock:	48kHz Wordclock
Connector:	6 BNC per IEC 61169-8 Annex A
Number of Outputs:	6
DC Offset:	0V ±0.05V
Return Loss:	> 40dB up to 10MHz
SNR:	> 75dB rms

10MHz Output:

Output Levels:	1.0V p-p, 2.0V p-p, in 75Ω, selectable
Connector:	BNC per IEC 61169-8 Annex A
Output Type:	10MHz sine wave (default), all other analog sync standards (see above) selectable
SNR:	>70dB rms
SFDR:	>50 dBc

Wordclock Output:

Output Type:	48kHz Wordclock (default), all other analog sync standards (see above) selectable
Connector:	BNC per IEC 61169-8 Annex A
Risetime:	< 35ns
Levels:	5V CMOS (1kΩ) or ±1V (75Ω)

LTC / IRIG Outputs:

Standard:	SMPTE 12M-1 or IRIG Standard 200-04
Number of outputs:	2 balanced, individually selectable as LTC or IRIG
Connectors:	3-pin male XLR type, Female DB-15
Output Impedance:	44Ω balanced (unpowered)
LTC Frame Rate:	23.98, 24, 25, 29.97 and 30 (drop frame and non-drop frame)
LTC Rise Time:	40 ±10µs
LTC Level:	
Unpowered:	Adjustable, 0.8 to 9.0V p-p, balanced
Powered:	2V p-p with 11V DC offset to drive downstream 1200 series slave clocks
IRIG Format:	IRIG-B120/B122/123/127: 100pps, 1kHz carrier, amplitude modulated
IRIG Level:	Adjustable, 0.1V to 4.0V p-p single-ended (double that if used as balanced)

LTC / IRIG Input:

Standard:	SMPTE 12M-1 or IRIG Standard 200-04
Number of Inputs:	1 balanced
Connector:	Female DB-15
Input impedance:	>30kΩ balanced
LTC Sensitivity:	0.25V p-p min
IRIG Sensitivity:	0.10V p-p min

Frequency Lock Range:

Wide mode:	±15 ppm min
Narrow mode:	±0.1 ppm min

Communications and Control:

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
Serial Port (RS-232):	
Connector:	Female DB-9
Function:	Firmware upgrades

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

Temperature:	-40°C to +70°C
Humidity:	95% R.H. Condensing at 60°C
Dimensions:	3.74" D x 2.85" H (100mm x 72mm)

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

Connector:	RJ-11 telephone jack
Baud Rate:	300/1200 baud Bell 103 compatible

NTP (+T option installed):

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

DARS & AES Test Generator Outputs (with +SDTG, HDTG or 3GTG installed):

Standard:	
Unbalanced:	SMPTE 276M single ended AES (24-bits) (1V p-p into 75Ω)
Balanced:	AES3-1992 (24-bits) (4Vp-p 110Ω terminated)
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
AES Tones:	Menu selectable

Genlock Input (Video/10MHz selectable):

Type:	Autodetects standard SMPTE 170M (NTSC-M), ITU-R BT.1700-1 (PAL-B), Color Black 1V p-p with reader of VITC and 10- field pulse HD Tri-level Sync (same HD standards as sync outputs)
Number of Inputs:	2 Loop thru High impedance, isolated, differential - external termination required
Connector:	BNC per IEC 61169-8 Annex A
Return Loss:	>40dB to 10MHz (with external 75Ω termination)
Video Input Range:	From -3.5dB (double-terminated) to +6dB (unterminated)
10MHz Input Range:	0.3V p-p to 4.0V p-p

Analog Composite Video Test Signal Generator (with +SDTG, HDTG or 3GTG installed):

Standard:	SMPTE 170M (NTSC-M) ITU-R BT.1700-1 (PAL-B)
Number of Outputs:	2, independant
Connector:	BNC per IEC 61169-8 Annex A
Signal Level:	1V p-p nominal
DC Offset:	0V ±0.05V
Output Impedance:	75Ω
Return Loss:	>35dB to 6MHz
Frequency response:	± -0.1dB to 5.5MHz
SNR:	> 75dB rms

Analog Audio Tone Generator (with +SDTG, HDTG or 3GTG installed):

Number of Outputs:	2
Type:	Balanced analog audio
Connector:	6 pins on 16-pin removable terminal strips
Output Impedance:	66Ω
Signal Level:	-30 to +10dBu into 10kΩ load
Noise floor:	< -90dBu, unweighted
THD+N:	< -100dB with 1kHz @ +10dBu into 10kΩ load

SDI Test Generators:

Standards:	With SDTG option, SMPTE 259M-C (270Mb/s) With HDTG option, SMPTE 259M-C (270Mb/s) and SMPTE 292M (1.5Gb/s) With 3GTG option, SMPTE 259M-C(270Mb/s), SMPTE 292M(1.5Gb/s), SMPTE 372M (dual link) and SMPTE 424M (3Gb/s)
Number of Generators:	4 independant (2 outputs per)
Embedded Audio:	Up to 4 audio groups as specified in SMPTE 299M or SMPTE 272M Selectable tone frequencies (from 20Hz to 12kHz) and audio level
Connector:	BNC per IEC 61169-8 Annex A
Signal Level:	800mV nominal drive (1600mV drive for 5601AC02)
Rise and Fall Time:	100ps HD/3G, 600ps SD
Jitter:	< 0.2 UI
Return Loss:	> 15dB to 1.5GHz > 10dB to 3GHz

General Purpose Inputs and Output:

Number of Inputs:	2
Number of Outputs:	2 (function menu selectable)
Output Type:	Opto-isolated, active closure to GND, 20k Ω pull-ups to +5V
Input Type:	Opto-isolated, senses closure to GND, pull-ups to +5V
Connector:	4 pins plus 2 ground pins on DB-15 female

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
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 outputs Loop thru genlock/5/10MHz input, LTC input, 1 power supply
5601ACO2	2RU Automatic Change Over System (see individual brochure)

Ordering Options (5601MSC)

+IRG	1 IRIG-B12 receiver (shares connector with LTC in) 2 IRIG-B12 generators (share connectors with LTC out)
PS	Redundant power supply
+M	Modem Option
+GP	GPS Option (includes GPS receiver and 50' weatherproof cable)
+T	Network Time Protocol (Must be ordered with +GP or +M option)
+SDTG	4 Dual output SD SDI Test generators 2 NTSC/PAL test signal generator outputs 1 Stereo Analog Audio tone generator 1 DARS generator (balanced & unbalanced) 2 AES generator (balanced & unbalanced)
+HDTG	4 Dual output configurable SD/HD SDI Test/Black generators 2 NTSC/PAL test signal generator outputs 1 Stereo Analog Audio tone generator 1 DARS generator (balanced & unbalanced) 2 AES generators (balanced & unbalanced)
+3GTG	4 Dual output configurable SD/HD/3G SDI Test generators 2 NTSC/PAL test signal generator outputs 1 Stereo Analog Audio tone generator 1 DARS generator (balanced & unbalanced) 2 AES generator (balanced & unbalanced) Includes 3D test sets

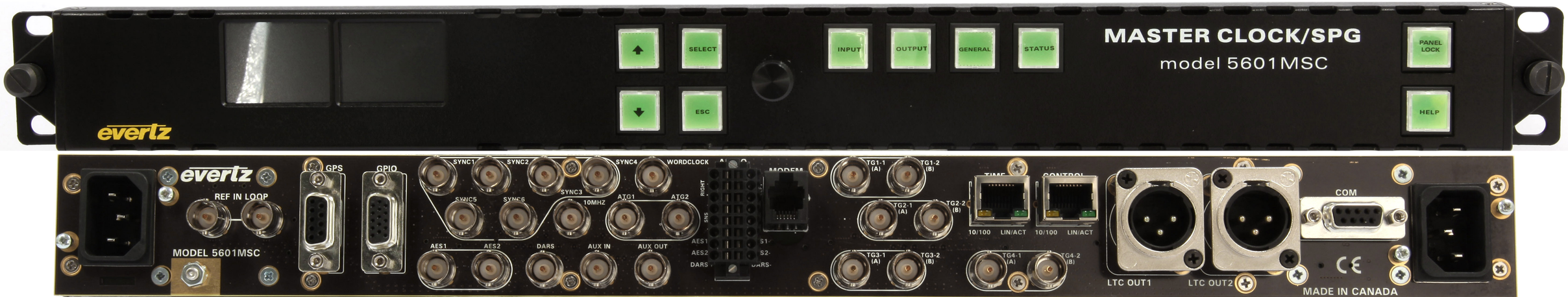
Accessories

WA-T76	Optical 100' weatherproof cable for GPS receiver
WA-T11	Optical 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
WA-T77	Optical 100' weatherproof cable for 7707GPS-DR to 5601MSC

IM160518


MASTER CLOCK/SPG
model 5601MSC
SELECT
ESC
INPUT
OUTPUT
GENERAL
STATUS
PANEL LOCK
HELP
everlz
REF IN LOOP
MODEL 5601MSC
GPS
GPIO
SYNC1
SYNC2
SYNC3
SYNC4
SYNC5
SYNC6
WORDCLOCK
10MHZ
ATG1
ATG2
AES1
AES2
DARS
AUX IN
AUX OUT
MODEM
TG1-1 (A)
TG1-2 (B)
TG2-1 (A)
TG2-2 (B)
TG3-1 (A)
TG3-2 (B)
TG4-1 (A)
TG4-2 (B)
TIME
CONTROL
10/100
LIN/ACT
LTC OUT1
LTC OUT2
COM
MADE IN CANADA

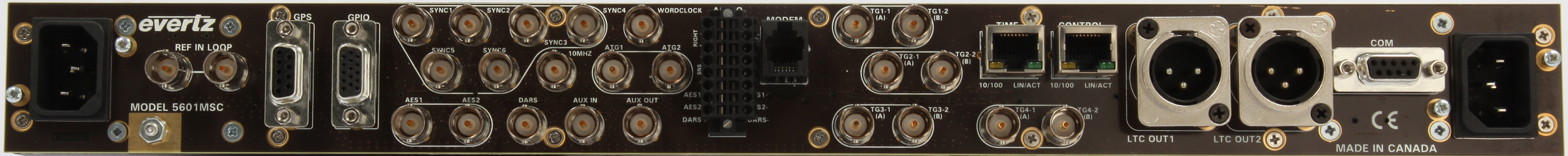
IM160518


MASTER CLOCK/SPG
model 5601MSC
PANEL LOCK
INPUT
OUTPUT
GENERAL
STATUS
LOCK
HELP
SELECT
ESC
evertz

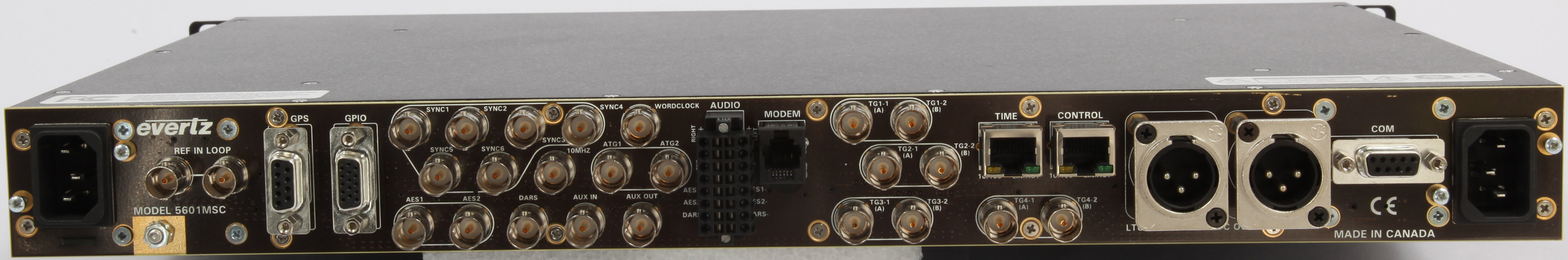
IM160518


This device complies with Part 15 of the FCC Rules.
Operation is subject to the following conditions:
(1) this device may not cause harmful interference
(2) this device must accept any interference
that may cause undesired operation
FCC
evertz
REF IN LOOP
GPS
GPIO
SYNC1
SYNC2
SYNC4
WORDCLOCK
AUDIO
MODEM
TIME
CONTROL
COM
LTC OUT1
DARS

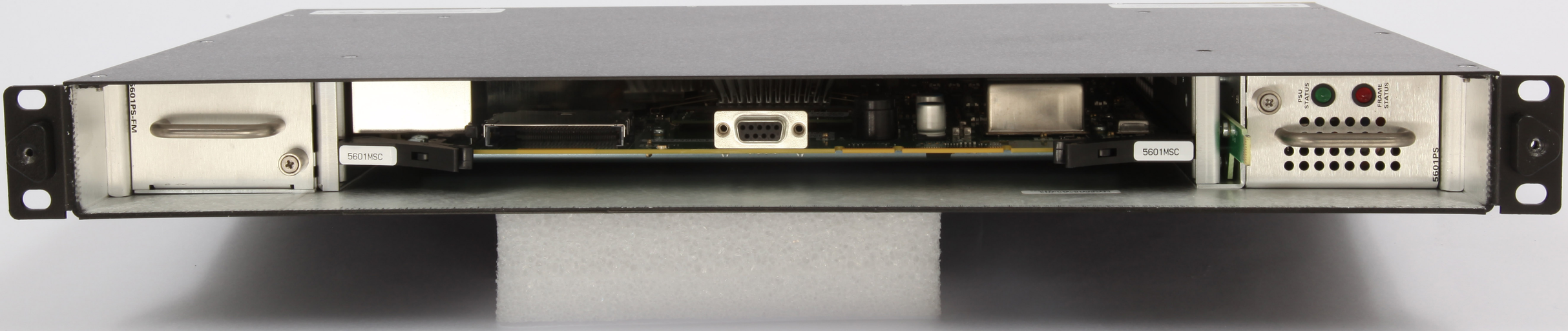
IM160518


evertz
REF IN LOOP
MODEL 5601MSC
GPS
GPIO
SYNC1
SYNC2
SYNC3
SYNC4
WORDCLOCK
SYNC5
SYNC6
10MHZ
ATG1
ATG2
AES1
AES2
DARS
AUX IN
AUX OUT
RIGHT
SNS
AES1
AES2
DARS
S1-
S2-
DARS-
MODEM
TG1-1 (A)
TG1-2 (B)
TG2-1 (A)
TG2-2 (B)
TG3-1 (A)
TG3-2 (B)
TG4-1 (A)
TG4-2 (B)
10/100
LIN/ACT
10/100
LIN/ACT
LTC OUT1
LTC OUT2
COM
MADE IN CANADA

IM160518


everlz
REF IN LOOP
MODEL 5601MSC
GPS
GPIO
SYNC1
SYNC2
SYNC4
WORDCLOCK
SYNC5
SYNC6
SYNC3
10MHZ
ATG1
ATG2
AES1
AES2
DARS
AUX IN
AUX OUT
AUDIO
RIGHT
LEFT
MODEM
TG1-1 (A)
TG1-2 (B)
TG2-1 (A)
TG2-2 (B)
TG3-1 (A)
TG3-2 (B)
TG4-1 (A)
TG4-2 (B)
TIME
CONTROL
COM
MADE IN CANADA

IM160518



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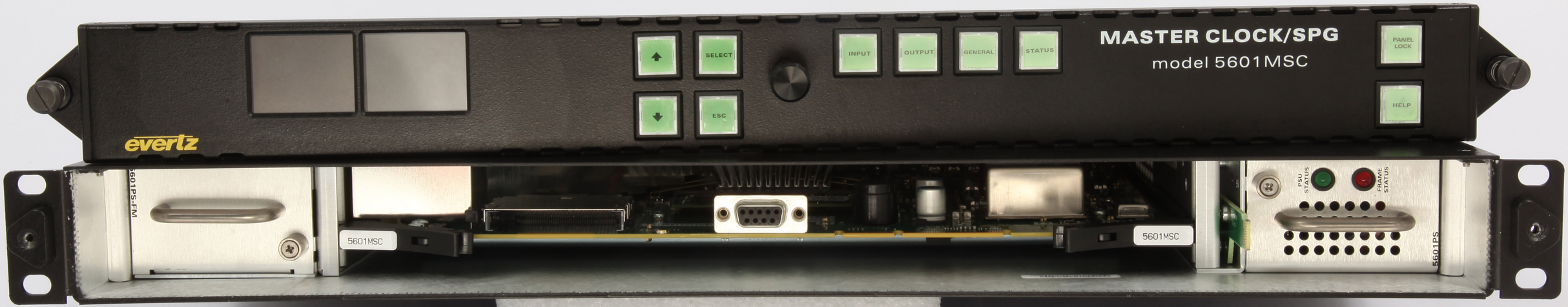
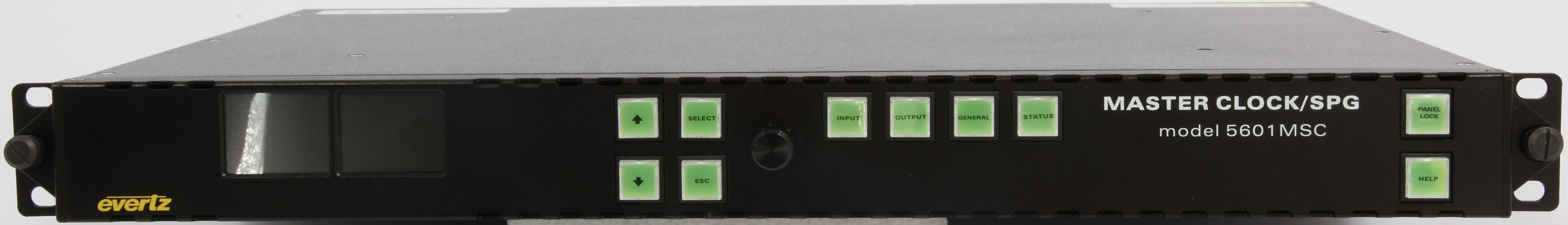

MASTER CLOCK/SPG
model 5601MSC
everlz
SELECT
ESC
INPUT
OUTPUT
GENERAL
STATUS
PANEL LOCK
HELP
5601PS-FM
5601MSC
5601MSC
PSU STATUS
FRAME STATUS
5601PS

IM160518


SELECT
ESC
INPUT
OUTPUT
GENERAL
STATUS
MASTER CLOCK/SPG
model 5601MSC
PANEL LOCK
HELP
evertz

Evertz 5601MSC-GP (Option)

IM160518

Evertz 5601MSC-GP (Option)

IM160518

IM160518

Evertz 5601MSC-GP (Option)

IM160518

Evertz 5601MSC-GP (Option)

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Evertz 5601MSC-GP (Option)

IM160518 Evertz 5601MSC-GP (Option)