5700MSC–IP

IP Network Grand Master Clock & Video Master Clock System

The 5700MSC–IP is an IP Network Grand Master Clock and a Video Master Sync Generator both referenced to GPS and/or GLONASS. The system features 2x GbE, 2x10GbE ports, 6x fully timeable sync outputs, 4x SDI outputs and a loop thru reference input. For those hyrbrid plants where LTC outputs and AES/analog audio test sets are required, an optional (+AUX) expansion module is available.

This combo IP Network Grand Master Clock and Master Sync Generator is ideal for timing today's IP–based video broadcast, production and distribution facilities. It provides all the future timing needs of an IP–based plant while providing precision reference to any baseband SDI/Analog systems.

The test generator option(s) provide several test sets which are available on the 4x SDI (SD/HD/3Gbps) outputs as well as over the 10GbE IP outputs (10GbE SFP's are optional). There are 10x independent test signal generators when a test generator option is ordered, any can be routed to the 10GbE outputs, or the SDI outputs (4 generators may be combined to form a 4K signal generator).

As for IP timing formats, the 5700MSC–IP has been designed to be enterprise class, handling all current IP timing needs with the horsepower to address the future. It supports NTP, PTP–IEEE1588, MASTER PCR, AVB–IEEE802.1AS, AES67 profile, and SMPTE 2059–2. IP networking for live production and broadcast environments have very specific needs and requirements that typically involve deterministic flows, high bandwidth, and an SDN–based network design. The 5700MSC–IP can be used to design a robust, safe and deterministic timing system for any IP Network or Hybrid IP/Baseband Video system. The product has been designed to handle timing requirements of several thousands of PTP clients. The 5700MSC–IP has 2x 10 GbE ports as well as two GbE ports that can be configured to provide and distribute any of the timing protocols described above.

This 5700MSC–IP is delivered with a GNSS head (GPS and GLONASS capable) complete with a 50ft cable for remote mounting (100ft, 400ft and fiber optic extension options are available for longer cable lengths).

A high stability, temperature–controlled oscillator provides the 5700MSC–IP 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. Note that the provided GNSS antenna is required for PTP, AVB PCR, or 2059–2 timing protocols to be hosted by the system.

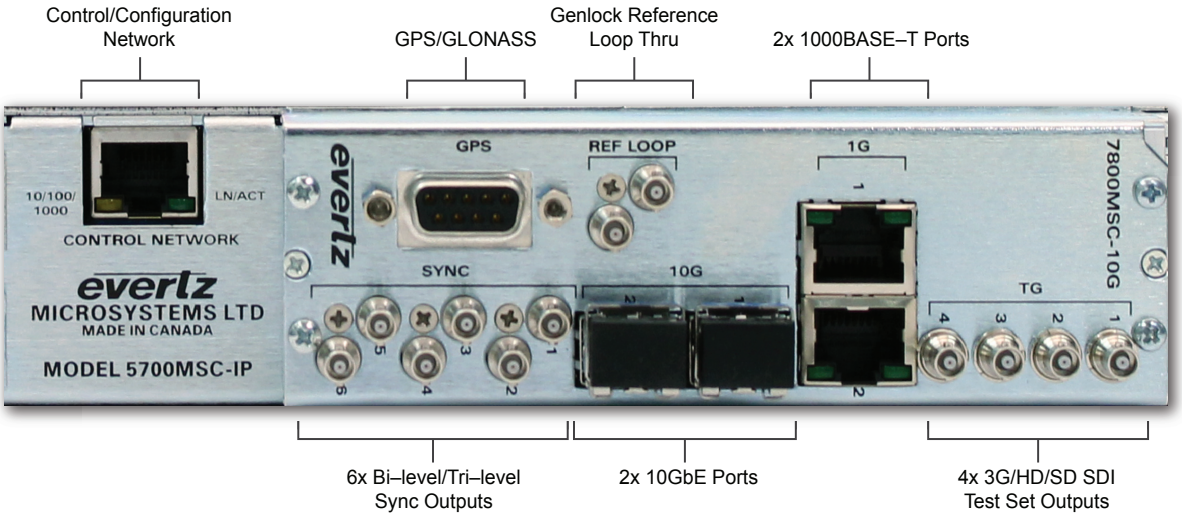
The SPG section of the 5700MSC–IP provides six independent timeable reference outputs. These six sync outputs may be configured to provide independently timed color black (black burst) outputs, independently timed HDTV tri–level sync outputs, 10Mhz outputs, word clock, and various available pulses.

It is available with a main processing board and optional redundant power supply.

Features & Benefits

- Modular 1RU design
- IP Network Grand Master Clock for NTP, PTP–IEEE1588, MASTER PCR, AVB–IEEE802.1AS, and SMPTE 2059–2
- 2x 1000BaseT RJ–45 ports
- 2x 10GbE ports (SFP's are not provided and are optional)
- 6x independently timeable sync outputs
- 4x optional SDI test generator outputs with the +SDI–TG option (supports SD/HD/3Gbs SDI)
- Optional 10GbE video test generator support with the +10G–TG option (SFP's are not included)
- Configurable to run in Boundary Clock mode for larger enterprise scale network designs (with an upstream 5700MSC–IP Grand Master Clock)
- GNSS (GPS and/or GLONASS) referenced system — outdoor antenna and 50ft cable provided
- Optional 100ft, 400ft and fiber optic extenders available for GNSS antenna
- All active components are front panel extractable & serviceable
- Optional dual power supply for redundancy (+2PS option)
- Full featured front panel control interface
- Contact closure output for critical warning
- VistaLINK® control for device configuration and status monitoring
- Multi System GPS referenced designs will be in sync and timed
- An optional expansion module (+AUX option) provides AES and analog audio test generator, LTC, DARS and GPIO functionality

Rear Panel View



The Complete Solution Provider

5700MSC–IP 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, IRIG DATUM 1/1.001Hz pulse, 6/1.001Hz pulse
CW Signals: 5MHz, 10MHz, NTSC–M Subcarrier, PAL–B Subcarrier
Wordclock: 48KHz Wordclock Level 5V CMOS (1kΩ) or ±1V (75Ω)
10MHz Output: 1.0V p–p, 2.0V p–p, in 75Ω, SNR > 70dB rms SFDR > 50dBc
Connector: 75Ω HD–BNC
Number of Outputs: 6
DC Offset: 0V ±0.05V
Return Loss: > 40dB up to 10MHz
SNR: > 75dB rms
Output Levels: 1.0V p–p, 2.0V p–p, in 75Ω, selectable

GPS/GLONASS Receiver:
Temperature: –40°C to +70°C
Humidity: 95% R.H. Condensing at 60°C

1000BASE–T Timing Network:
Quantity: 2
Network Type: IEEE 802.3 (10BASE–T) IEEE 802.3u (100BASE–TX) IEEE 802.3ab (1000BASE–T)
Connector: RJ–45
Timing: NTP, PCR AVB (IEEE802.1AS) IEEE1588 (annex J) SMPTE 2059–2 AES67

10GbE Timing Network:
Quantity: 2
Network Type: IEEE 802.3ae (10GbE)
Connector: SFP (SFP not included), LC/UPC
Timing: NTP, PCR AVB (IEEE802.1AS) IEEE1588 (annex J) SMPTE 2059–2 AES67

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: 75Ω HD–BNC
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

SDI Test Generators (with +SDI–TG, or +10G–TG Option):
Standards: 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
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 Outputs: 4
Embedded Audio: Up to 4x audio groups as specified in SMPTE ST 299–1 or SMPTE ST 272
Selectable tone frequencies (from 20Hz to 12kHz) and audio group
Connector: 75Ω HD–BNC
Signal Level: 800mV nominal drive
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

Electrical:
Voltage: Auto–ranging 100 to 240V AC, 50/60Hz
Configuration: Optional redundant supply available
Power: 125W (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

Physical:
Dimensions: 19" W x 1.75" H x 11.5" D (483mm W x 45mm H x 292mm D)
Weight: 8lbs (3.5kg)

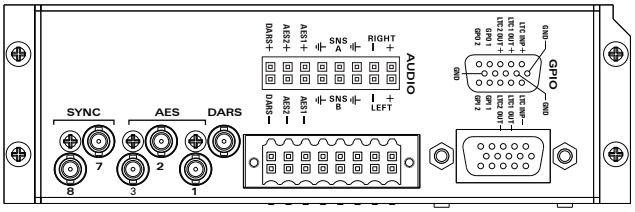
+AUX Expansion Module Option (AES & Analog Audio Test Set, DARS, GPIO and LTC)

LTC Outputs:
Standard: SMPTE ST 12–2 or IRIG–B
Frame Rate: 24, 25, 30 and 29.97 (drop frame and non–drop frame)
Number of outputs: 2x balanced
Connectors: Female high density DB–15
Level:
Un–powered: Adjustable, 1.0–8.0V 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

DARS & AES Test Generator Outputs:
Standard:
Unbalanced: SMPTE ST 276–1 single–ended AES (24–bit) (1V p–p into 75Ω)
Balanced: AES3 (24–bit) (4V p–p 110Ω terminated)
Number of Outputs:
DARS: 1 unbalanced, 1 balanced
AES Test Gen: 2 unbalanced, 2 balanced
Connector:
Unbalanced: 75Ω HD–BNC
Balanced: Removable Terminal Strip
Sampling Rate: 48kHz
Impedance:
Unbalanced: 75Ω unbalanced
Balanced: 110Ω balanced
AES Tones: Menu selectable

Analog Audio Tone Generator:
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

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



Ordering Information

5700MSC–IP	IP Network Grand Master Clock & Video Master Clock System (includes GPS/GLONASS receiver antenna & 50ft cable, loop thru genlock, IEEE 1588, 2x 1000GbE ports, 6x sync outputs, 2x10GbE ports (10GbE SFP's not included) and 1x power supply)

SFP Options:
+SFP10G–TR13–A 1310nm laser, standard sensitivity 1310nm optical transceiver, 10km, single mode

Ordering Options:
+2PS Redundant Power Supply
+SDI–TG 4x outputs, configurable SD/HD/3G SDI Test/black generators
+10G–TG Test Generater outputs over 10GbE Ports and 4x SDI outputs, configurable SD/HD/3G SDI Test/black generators (* includes +SDI–TG option)
+AUX Includes expansion test module which provides AES and Analog audio test generator, DARS, GPIO, and LTC outputs

5700MSC–IP

IP Network Grand Master Clock & Video Master Clock System

The 5700MSC–IP is an IP Network Grand Master Clock and a Video Master Sync Generator both referenced to GPS and/or GLONASS. The system features 2x GbE, 2x10GbE ports, 6x fully timeable sync outputs, 4x SDI outputs and a loop thru reference input. For those hyrbrid plants where LTC outputs and AES/analog audio test sets are required, an optional (+AUX) expansion module is available.

This combo IP Network Grand Master Clock and Master Sync Generator is ideal for timing today's IP–based video broadcast, production and distribution facilities. It provides all the future timing needs of an IP–based plant while providing precision reference to any baseband SDI/Analog systems.

The test generator option(s) provide several test sets which are available on the 4x SDI (SD/HD/3Gbps) outputs as well as over the 10GbE IP outputs (10GbE SFP's are optional). There are 10x independent test signal generators when a test generator option is ordered, any can be routed to the 10GbE outputs, or the SDI outputs (4 generators may be combined to form a 4K signal generator).

As for IP timing formats, the 5700MSC–IP has been designed to be enterprise class, handling all current IP timing needs with the horsepower to address the future. It supports NTP, PTP–IEEE1588, MASTER PCR, AVB–IEEE802.1AS, AES67 profile, and SMPTE 2059–2. IP networking for live production and broadcast environments have very specific needs and requirements that typically involve deterministic flows, high bandwidth, and an SDN–based network design. The 5700MSC–IP can be used to design a robust, safe and deterministic timing system for any IP Network or Hybrid IP/Baseband Video system. The product has been designed to handle timing requirements of several thousands of PTP clients. The 5700MSC–IP has 2x 10 GbE ports as well as two GbE ports that can be configured to provide and distribute any of the timing protocols described above.

This 5700MSC–IP is delivered with a GNSS head (GPS and GLONASS capable) complete with a 50ft cable for remote mounting (100ft, 400ft and fiber optic extension options are available for longer cable lengths).

A high stability, temperature–controlled oscillator provides the 5700MSC–IP 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. Note that the provided GNSS antenna is required for PTP, AVB PCR, or 2059–2 timing protocols to be hosted by the system.

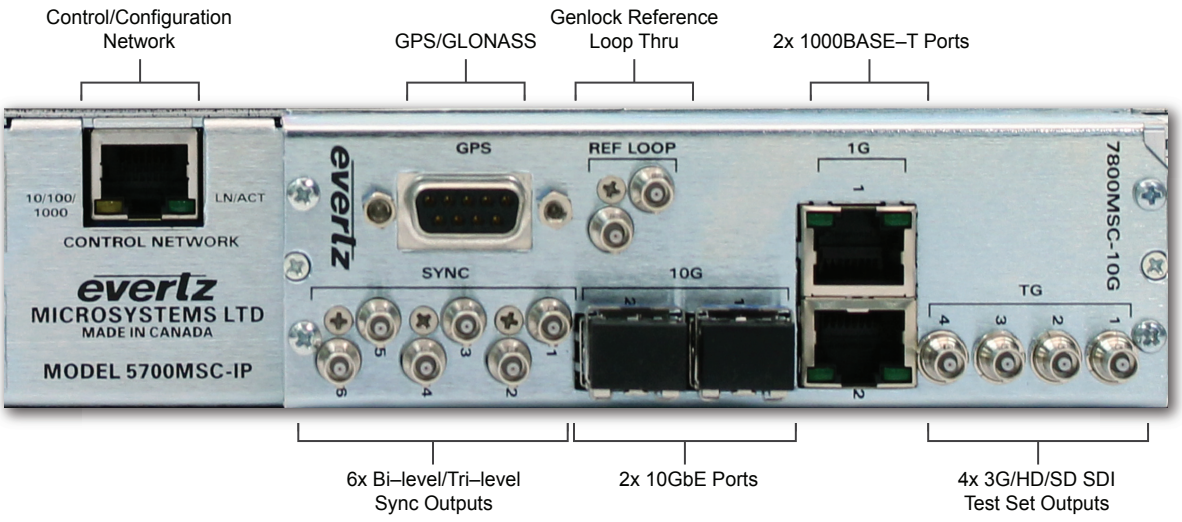
The SPG section of the 5700MSC–IP provides six independent timeable reference outputs. These six sync outputs may be configured to provide independently timed color black (black burst) outputs, independently timed HDTV tri–level sync outputs, 10Mhz outputs, word clock, and various available pulses.

It is available with a main processing board and optional redundant power supply.

Features & Benefits

- Modular 1RU design
- IP Network Grand Master Clock for NTP, PTP–IEEE1588, MASTER PCR, AVB–IEEE802.1AS, and SMPTE 2059–2
- 2x 1000BaseT RJ–45 ports
- 2x 10GbE ports (SFP's are not provided and are optional)
- 6x independently timeable sync outputs
- 4x optional SDI test generator outputs with the +SDI–TG option (supports SD/HD/3Gbs SDI)
- Optional 10GbE video test generator support with the +10G–TG option (SFP's are not included)
- Configurable to run in Boundary Clock mode for larger enterprise scale network designs (with an upstream 5700MSC–IP Grand Master Clock)
- GNSS (GPS and/or GLONASS) referenced system — outdoor antenna and 50ft cable provided
- Optional 100ft, 400ft and fiber optic extenders available for GNSS antenna
- All active components are front panel extractable & serviceable
- Optional dual power supply for redundancy (+2PS option)
- Full featured front panel control interface
- Contact closure output for critical warning
- VistaLINK® control for device configuration and status monitoring
- Multi System GPS referenced designs will be in sync and timed
- An optional expansion module (+AUX option) provides AES and analog audio test generator, LTC, DARS and GPIO functionality

Rear Panel View



The Complete Solution Provider

5700MSC–IP 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, IRIG DATUM 1/1.001Hz pulse, 6/1.001Hz pulse
CW Signals: 5MHz, 10MHz, NTSC–M Subcarrier, PAL–B Subcarrier
Wordclock: 48KHz Wordclock Level 5V CMOS (1kΩ) or ±1V (75Ω)
10MHz Output: 1.0V p–p, 2.0V p–p, in 75Ω, SNR > 70dB rms SFDR > 50dBc
Connector: 75Ω Mini BNC, bayonet positive locking (Amphenol)
Number of Outputs: 6
DC Offset: 0V ±0.05V
Return Loss: > 40dB up to 10MHz
SNR: > 75dB rms
Output Levels: 1.0V p–p, 2.0V p–p, in 75Ω, selectable

GPS/GLONASS Receiver:
Temperature: –40°C to +70°C
Humidity: 95% R.H. Condensing at 60°C

1000BASE–T Timing Network:
Quantity: 2
Network Type: IEEE 802.3 (10BASE–T) IEEE 802.3u (100BASE–TX) IEEE 802.3ab (1000BASE–T)
Connector: RJ–45
Timing: NTP, PCR AVB (IEEE802.1AS) IEEE1588 (annex J) SMPTE 2059–2 AES67

10GbE Timing Network:
Quantity: 2
Network Type: IEEE 802.3ae (10GbE)
Connector: SFP (SFP not included), LC/UPC
Timing: NTP, PCR AVB (IEEE802.1AS) IEEE1588 (annex J) SMPTE 2059–2 AES67

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: 75Ω Mini BNC, bayonet positive locking (Amphenol)
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

SDI Test Generators (with +SDI–TG, or +10G–TG Option):
Standards: 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
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 Outputs: 4
Embedded Audio: Up to 4x audio groups as specified in SMPTE ST 299–1 or SMPTE ST 272
Selectable tone frequencies (from 20Hz to 12kHz) and audio group
Connector: 75Ω HDBNC
Signal Level: 800mV nominal drive
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

Electrical:
Voltage: Auto–ranging 100 to 240V AC, 50/60Hz
Configuration: Optional redundant supply available
Power: 125W (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

Physical:
Dimensions: 19" W x 1.75" H x 11.5" D (483mm W x 45mm H x 292mm D)
Weight: 8lbs (3.5kg)

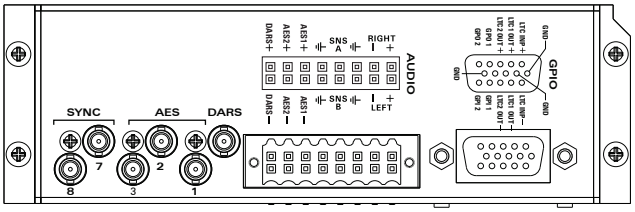
+AUX Expansion Module Option (AES & Analog Audio Test Set, DARS, GPIO, and LTC)

LTC Outputs:
Standard: SMPTE ST 12–2 or IRIG–B
Frame Rate: 24, 25, 30 and 29.97 (drop frame and non–drop frame)
Number of outputs: 2x balanced
Connectors: 3–pin male XLR type, Female DB–15
Level:
Un–powered: Adjustable, 1.0–8.0V 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

DARS & AES Test Generator Outputs:
Standard:
Unbalanced: SMPTE ST 276–1 single–ended AES (24–bit) (1V p–p into 75Ω)
Balanced: AES3 (24–bit) (4V p–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

Analog Audio Tone Generator:
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

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



Ordering Information

5700MSC–IP	IP Network Grand Master Clock & Video Master Clock System (includes GPS/GLONASS receiver antenna & 50ft cable, loop thru genlock, IEEE 1588, 2x 1000GbE ports, 6x sync outputs, 2x10GbE ports (10GbE SFP's not included) and 1x power supply)

SFP Options:

+SFP10G–TR13–A	1310nm laser, standard sensitivity 1310nm optical transceiver, 10km, single mode

Ordering Options

+2PS	Redundant Power Supply
+SDI–TG	4x outputs, configurable SD/HD/3G SDI Test/black generators
+10G–TG	Test Generater outputs over 10GbE Ports and 4x SDI outputs, configurable SD/HD/3G SDI Test/black generators (* includes +SDI–TG option)
+AUX	Includes expansion test module which provides AES and Analog audio test generator, DARS, GPIO, and LTC outputs

5700MSC-IP

IP Network Grand Master Clock & Video Master Clock System

The 5700MSC-IP is an IP Network Grand Master Clock and a Video Master Sync Generator both referenced to GPS (or GNSS). The system features 2 x GbE, 2 x 10GbE ports, 6 fully timeable sync outputs, 4 SDI outputs, and a loop thru reference input. For those hybrid plants where LTC outputs and AES/analog audio test sets are required, an optional (+AUX) expansion module is available.

This combo IP Network Grand Master Clock and Master Sync Generator is ideal for timing today's IP based video broadcast, production, and distribution facilities. It provides all the future timing needs of an IP based plant while providing precision reference to any baseband SDI/Analog systems.

The test generator option(s) provide several test sets which are available on the 4 SDI (SD/HD/3Gbps) outputs as well as over the 10GbE IP outputs (10GbE SFP's are optional). There are 10 independent test signal generators when a test generator option is ordered, any can be routed to the 10GbE outputs, or the SDI outputs (4 generators may be combined to form a 4K signal generator).

As for IP timing formats, the 5700MSC-IP has been designed to be enterprise class, handling all current IP timing needs with the horsepower to address the future. It supports NTP, PTP- IEEE1588, MASTER PCR, AVB-IEEE802.1AS, AES67 profile, and SMPTE 2059-2. IP networking for live production and broadcast environments have very specific needs and requirements that typically involve deterministic flows, high bandwidth, and an SDN based network design. The 5700MSC-IP can be used to design a robust, safe, and deterministic timing system for any IP Network or Hybrid IP/Baseband Video system. The product has been designed to handle timing requirements of several thousands of PTP clients. The 5700MSC-IP has two 10 GbE ports as well as two GbE ports that can be configured to provide and distribute any of the timing protocols described above.

This 5700MSC-IP is delivered with a GPS(GNSS) head complete with a 50ft cable for remote mounting. (100ft, 400ft and fiber optic extension options are available for longer cable lengths).

A high stability, temperature controlled oscillator provides the 5700MSC-IP 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. Note that the provided GPS/GNSS antenna is required for PTP, AVB PCR, or 2059-2 timing protocols to be hosted by the system.

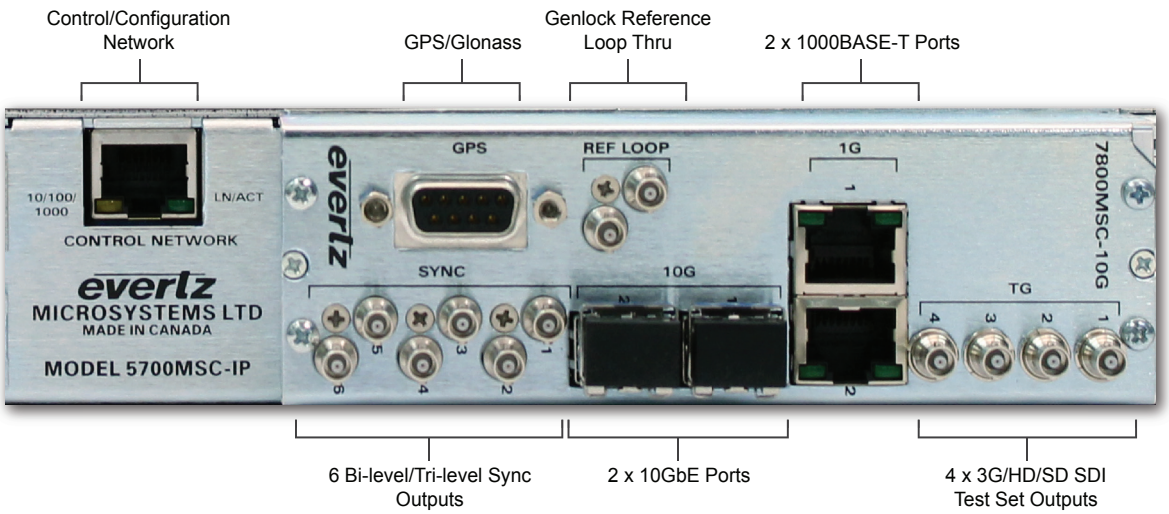
The SPG section of the 5700MSC-IP provides six independent timeable reference outputs. These six sync outputs may be configured to provide independently timed color black (black burst) outputs, independently timed HDTV tri-level sync outputs, 10MHz outputs, word clock, and various available pulses.

It is available with a main processing board and optional redundant power supply.

Features & Benefits

- Modular 1RU design
- IP Network Grand Master Clock for NTP, PTP- IEEE1588, MASTER PCR, AVB-IEEE802.1AS, and SMPTE 2059-2
- 2 x 1000BASE-T RJ45 ports
- 2 x 10 GbE ports (SFP's are not provided and are optional)
- 6 independently timeable sync outputs
- 4 optional SDI test generator outputs with the +SDI-TG option (supports SD/HD/3Gbs SDI)
- Optional 10GbE video test generator support with the +10G-TG option (SFP's are not included)
- Configurable to run in Boundary Clock mode for larger enterprise scale network designs (with an upstream 5700MSC-IP Grand Master Clock)
- Can drive and interoperate with the sister product, the modular 570GMP-10G devices which act as Boundary Clocks for larger enterprise scale designs.
- GPS/GNSS(Glonass) referenced system - outdoor antenna and 50ft cable provided.
- Optional 100ft, 400ft and fiber optic extenders available for GPS antenna
- All active components are front panel extractable & serviceable
- Optional dual power supply for redundancy (+2PS option)
- Full featured front panel control interface
- Contact closure output for critical warning
- VistaLINK® control for device configuration and status monitoring
- Multi System GPS referenced designs will be in sync and timed
- An optional expansion module (+AUX option) provides AES & analog audio test generator, LTC, DARS, and GPIO functionality

Rear Panel View



The Complete Solution Provider

5700MSC-IP 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, IRIG DATUM 1/1.001Hz pulse, 6/1.001Hz pulse
CW Signals:	5MHz, 10MHz, NTSC-M Subcarrier, PAL-B Subcarrier
Wordclock:	48kHz Wordclock Level 5V CMOS (1kΩ) or ±1V (75Ω)
10MHz Output:	1.0V p-p, 2.0V p-p, in 75Ω, SNR > 70dB rms SFDR > 50dBc
Connector:	75Ω Mini BNC, bayonet positive locking (Amphenol)
Number of Outputs:	6
DC Offset:	0V ±0.05V
Return Loss:	> 40dB up to 10MHz
SNR:	> 75dB rms
Output Levels:	1.0V p-p, 2.0V p-p, in 75Ω, selectable

GPS/GLONASS Receiver:

Temperature:	-40°C to +70°C
Humidity:	95% R.H. Condensing at 60°C

1000BASE-T Timing Network:

Quantity:	2
Network Type:	IEEE 802.3 (10BASE-T) IEEE 802.3u (100BASE-TX) IEEE 802.3ab (1000BASE-T)
Connector:	RJ-45
Timing:	NTP, PCR AVB (IEEE802.1AS) IEEE1588 (annex J) SMPTE 2059-2 AES67

10GbE Timing Network:

Quantity:	2
Network Type:	IEEE 802.3ae (10GbE)
Connector:	SFP (SFP not included), LC/UPC
Timing:	NTP, PCR AVB (IEEE802.1AS) IEEE1588 (annex J) SMPTE 2059-2 AES67

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:	75Ω Mini BNC, bayonet positive locking (Amphenol)
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

SDI Test Generators (with +SDI-TG, or +10G-TG Option):

Standards:	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 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 Outputs:	4
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:	75Ω Mini BNC, bayonet positive locking (Amphenol)
Signal Level:	800mV nominal drive
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

Electrical:

Voltage:	Auto ranging 100 to 240V AC, 50/60Hz
Configuration:	Optional redundant supply available
Power:	125W (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

Physical:

Dimensions:	19" W x 1.75" H x 11.5" D (483mm W x 45mm H x 292mm D)
Weight:	8lbs (3.5kg)

+AUX Expansion Module Option (AES & Analog Audio Test Set, DARS, GPIO, and LTC)

LTC Outputs:

Standard:	SMPTE ST 12-2 or IRIG-B
Frame Rate:	24, 25, 30 and 29.97 (drop frame and non-drop frame)
Number of outputs:	2 balanced
Connectors:	Female DB-15
Level:	
Un-powered:	Adjustable, 1.0V to 8.0V p-p, balanced
Output Impedance:	44Ω balanced (un-powered)
Rise Time:	40 ±10µs
Jitter:	< 2µs

DARS & AES Test Generator Outputs:

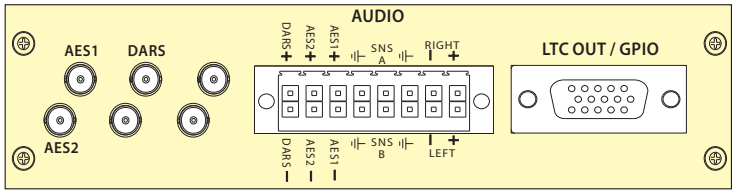
Standard:	
Unbalanced:	SMPTE ST 276-1single ended AES (24-bits) (1V p-p into 75Ω)
Balanced:	AES3 (24-bits) (4Vp-p 110Ω terminated)
Number of Outputs:	
DARS:	1 unbalanced, 1 balanced
AES Test Gen:	2 unbalanced, 2 balanced
Connector:	
Unbalanced:	BNC per IEC 61169-8 Annex A
Balanced:	Removable Terminal Strip
Sampling Rate:	48kHz
Impedance:	
Unbalanced:	75Ω unbalanced
Balanced:	110Ω balanced
AES Tones:	Menu selectable

Analog Audio Tone Generator:

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

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



Ordering Information

5700MSC-IP	IP Network Grand Master Clock & Video Master Clock System [includes GPS/Glonass receiver antenna & 50ft cable, loop thru genlock,IEEE 1588, 2 x 1GbE ports, 6 sync outputs, 2 x 10GbE ports (10GbE SPF's not included), and 1 power supply]

Ordering Options

+2PS	Redundant Power Supply
+SDI-TG	4 outputs, configurable SD/HD/3G SDI Test/black generators
+10G-TG	Test Generater outputs over 10 GbE Ports, & 4 SDI outputs, configurable SD/HD/3G SDI Test/black generators (*includes +SDI- TG option)
+AUX	Includes expansion test module which provides AES & Analog audio test generator, DARS, GPIO, and LTC outputs

SFP Options:

+SFP10G-TR13-A	1310nm laser, standard sensitivity 1310nm optical transceiver, 10km, single mode