Model 5700MSC
Master Clock System
Quick Start Guide

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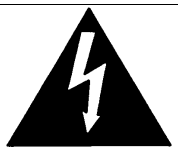
IMPORTANT SAFETY INSTRUCTIONS

	The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated “Dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.
	The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (Servicing) instructions in the literature accompanying the product.

- Read these instructions
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water
- Clean only with dry cloth.
- Do not block any ventilation openings. Install in accordance with the manufacturer’s instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

WARNING
TO REDUCE THE RISK OF FIRE OR ELECTRIC – SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE

WARNING
DO NOT EXPOSE THIS EQUIPMENT TO DRIPPING OR SPLASHING AND ENSURE THAT NO OBJECTS FILLED WITH LIQUIDS ARE PLACED ON THE EQUIPMENT

WARNING
TO COMPLETELY DISCONNECT THIS EQUIPMENT FROM THE AC MAINS, DISCONNECT THE POWER SUPPLY CORD PLUG FROM THE AC RECEPTACLE

WARNING
THE MAINS PLUG OF THE POWER SUPPLY CORD SHALL REMAIN READILY OPERABLE

INFORMATION TO USERS IN EUROPE

NOTE

CISPR 22 CLASS A DIGITAL DEVICE OR PERIPHERAL

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to the European Union EMC directive. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CE

EN60065	Safety
EN55103-1: 1996	Emission
EN55103-2: 1996	Immunity

EN504192 2005
Waste electrical products should not be disposed of with household waste. Contact your Local Authority for recycling advice

INFORMATION TO USERS IN THE U.S.A.

NOTE

FCC CLASS A DIGITAL DEVICE OR PERIPHERAL

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

WARNING

Changes or Modifications not expressly approved by Evertz Microsystems Ltd. could void the user's authority to operate the equipment.

Use of unshielded plugs or cables may cause radiation interference. Properly shielded interface cables with the shield connected to the chassis ground of the device must be used.

REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	First Release	Jan 2017
1.1	Configuring Ethernet Ports section updated	Dec 2017

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1. OVERVIEW

The guide provides steps on how to setup and configure a 5700MSC.

Figure 1-1: 5700MSC Front Panel

1.1. MOUNTING AND POWER CONNECTIONS

The 5700MSC chassis holds the main board, one power supply, and one fan module. Dual power supplies are an available option in which case a second power supply replaces the fan module. The chassis has built-in rack mounting ears and fits in a standard 19” rack. Two fans on each side cool the unit. Clearance of 2” (5cm) must be maintained around the fan exhausts on either side of the chassis. The power supply operates from an AC line frequency of 50Hz to 60Hz, at 100V-240V (auto-sensing). The fan module does not require AC power to function. The power consumption of a 5700MSC is 125 Watts with all options installed.

If dual power supplies are fitted, they should both be supplied with AC power. Each power supply has its own IEC C14 AC power inlet. The inlets are isolated from each other and can be powered by the same AC power source but ideally should be powered from different AC sources for true redundancy. If both supplies are not powered, the unpowered supply will trigger a system fault. A redundant power supply may be added at any time to a unit by removing the fan module and installing the second power supply.

The power supplies and fan module are hot swappable and accessed from the front of the unit by removing the front panel. Each power supply and fan module has a Phillips mounting screw at the front that can be used to secure the module in order to prevent accidental removal.

1.2. FRONT PANEL INSTALLATION

The 5700MSC comes with a removable front panel that is equipped with two color LCD screens, along with 10 pushbuttons, and a control knob for navigating the menu system and configuring the unit. The front panel is secured by the two thumbscrews on either end. The front panel can be removed and re-installed while the unit is running to provide access to the power supplies and for troubleshooting purposes. When re-installing the front panel be sure to fully tighten the thumb screws.

When AC power is applied to the 5700MSC and the power supplies are switched on, the unit will start up automatically. The front panel should become operative within approximately 30 seconds.

1.3. CONFIGURING THE ETHERNET PORTS

Press the **GENERAL** button on the front panel to access the general setup menu. This menu can be used to configure the Ethernet ports on the 5700MSC. The physical ports on the rear plate are used to carry mission-critical data, such as PTP and PCR.

The current menu selection will be indicated by the **>** character. Rotate the control knob or press the ↑ and ↓ buttons to select the *IP Control* menu item and press the **SELECT** button or depress the knob. Assign an unused IP address and subnet mask to the GigE 1, GigE 2, 10GbE 1, 10GbE 2 ports. The ports must be on separate subnets in order to function properly. When entering an IP address, the control knob can be used to set each octet. Depress the control knob while turning to adjust in larger steps. The Ethernet link status and current IP settings can be viewed by pressing the **STATUS** button and selecting the respective port's status screen.

Note: There are five interfaces on the 5700MSC-IP that require valid and unique IP addresses. Four are external, on the rear plate: Ethernet GigE 1, Ethernet GigE 2, Ethernet 10G 1 and Ethernet 10G 2, and one (the Frame Ethernet) is internally connected to the 10/100 Ethernet port on the chassis via the frame controller.

Leaving interfaces without unique and valid IP addresses may lead to operational problems. Please also ensure that the frame controller has a unique and valid IP address on the same IP subnet as the Frame Ethernet interface on the 5700MSC-IP, and is not conflicting with it.

If SNMP monitoring or control of the unit is desired, the SNMP feature must first be enabled (it is disabled by default). Select the **GENERAL** menu and press **ESC** to return to the root menu. Scroll down to *EngineeringMenu* and press **SELECT**. A password is required to enable the engineering menu items. Press **SELECT** on *Password* and use the ↑ and ↓ buttons or control knob to enter each digit of the numeric password and then press **SELECT**. The default password is 5700. The SNMP menu should now be accessible and SNMP can be enabled through *SNMP Ctl*. The trap addresses must be assigned if SNMP traps are required to be sent to remote logging software such as VistaLINK® Pro. Contact Evertz customer service if a MIB to the 5700MSC is required.

1.4. SELECTING AND CONNECTING FREQUENCY REFERENCES

Pressing the **INPUT** button on the front panel will select the input menu. From here the frequency and time references of the unit can be configured. Use the control knob to select the *Frequency Ref* menu item and press **SELECT** or depress the knob. The *Reference Src* menu item selects six different ways the 5700MSC can lock its master oscillator.

- ***GNSS Mobile*** – The 5700MSC will look for a Global Navigation Satellite System (GNSS) antenna attached to the GPS port on the back of the unit. This mode is intended for applications where the location of the GNSS antenna is movable such as mobile production trucks. Start-up time before receiving data is optimized assuming the location may have changed from the previous time.

- ***GNSS Fixed*** – The 5700MSC will look for a GNSS antenna attached to the GPS port on the back of the unit. This mode is intended for applications where the location of the GNSS antenna

is fixed. Start-up time before receiving data will be longer the first time the unit is first powered up as the antenna determines the fixed location. Subsequent start-up times will be shorter as the unit assumes the GPS location has not changed from the previous time.

The *GPS Enable* and *GLONASS Enable* menu items in the *Engineering Menu* control whether the receiver will lock to satellites from the GPS and/or GLONASS Global Navigation Satellite Systems.

With either the ***GNSS Mobile*** or ***GNSS Fixed*** menu choices, the ovenized oscillator inside the 5700MSC will lock to the 1PPS pulse from the GNSS antenna. This provides a very accurate frequency reference to the unit. The high precision time and date provided by the GNSS antenna is used to phase the outputs of the 5700MSC by referencing them to a specific point in GNSS time. Multiple 5700MSC units locked to GNSS will all have the same phase on their outputs. This also means the time reference will be forced to GNSS.

- ***Ten MHz*** – The 5700MSC will look for a 5MHz or 10MHz reference on its reference loop input, frame reference 1, or frame reference 2. The 5MHz/10MHz reference should come from a source that has higher stability than the internal oscillator of the 5700MSC such as a Rubidium or Caesium frequency standard. A 5MHz or 10MHz reference does not provide any phase information and the phase of the outputs will not be the same between different 5700MSC units.

- ***Video*** – The 5700MSC will genlock to an analog black burst or HD tri-level reference applied to its reference loop input, frame reference 1, or frame reference 2. The frequency stability of the 5700MSC will be only as good as that of the reference input. The phase of the outputs will be aligned to that of the reference input.

- ***Internal*** – The 5700MSC will free run on its internal high stability ovenized oscillator. Select this option if no external reference is available to the unit.

- ***1588*** – The 5700MSC can synchronize with a PTP master to determine a frequency reference.

There are three other menu items that control how the 5700MSC locks to its reference. These are *Genlock Range*, *Genlock Source*, and *Lock type*. Press the **HELP** button for a short description on what each menu item does.

1.5. SELECTING AND CONNECTING TIME REFERENCES

Once the desired frequency reference has been selected and the antenna/reference connections have been made, the time reference should be selected. The time reference is how the 5700MSC obtains time and date for the system clock. Press the **INPUT** button to access the input menu. Return to the root level by pressing **ESC** a few times. Select the *Time* menu using the control knob and press **SELECT**. Use the *Reference Src* menu item to choose a time reference for the unit. There are other menu items that control how the 5700MSC handles the time reference. Press the **HELP** button to identify the function of each item.

- ***GNSS*** – When a GPS or GLONASS receiver is connected to the unit, it can obtain continuous time and date updates from GNSS. If the frequency reference has been set to one of the GNSS

modes, the time reference will also be forced to GNSS. However it is also possible to use a frequency reference other than GNSS (such as video) and still use GNSS as a very accurate time reference. See note above regarding GLONASS operation.

- ***VITC*** – The 5700MSC will look for Vertical Interval Time Code on the selected line of a black burst signal that is applied to the reference loop input, frame reference 1, or frame reference 2. It can also decode date information from the user bits in several different formats. In order to use VITC as a time reference, the frequency reference must first be set to *Video*.

- ***None*** – The 5700MSC will not acquire time from any outside source. The time and date must be manually entered using the front panel in the **GENERAL** menu. The high frequency stability of the unit and battery backup will ensure the 5700MSC keeps fairly accurate time.

- ***SNTP*** – The 5700MSC can synchronize once daily to time and date from an NTP server.

- ***1588*** – The 5700MSC can synchronize with a PTP master to determine the time and date.

1.6. CHECKING THE STATUS OF THE UNIT

After the input references are connected and set up, the status of the unit can be checked by pressing the **STATUS** button on the front panel. There are several different status screens which can be selected by using the control knob or the ↑ and ↓ buttons. The status of the frequency and time references can be viewed by choosing the *Lock status* screen and pressing **SELECT**. Press **ESC** to return to the status menu to select another screen for viewing. Any screen name that is highlighted with a red or yellow background indicates that one of the statuses in that screen is in a fault or warning condition.

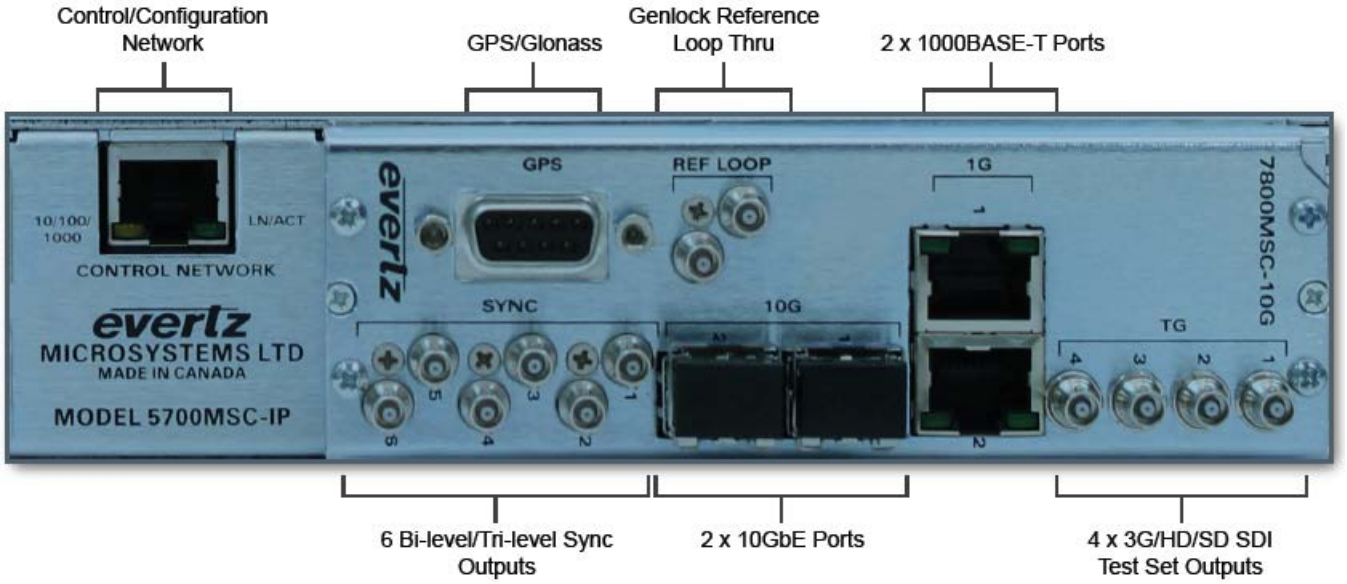

Figure 1-2: 5700MSC Rear Panel View

1.7. WIRING THE OUTPUTS

Most outputs are provided as Mini-BNC connectors and wiring is straightforward. The GigE 1 and GigE 2 ports use a standard RJ-45 connector, and the 10GbE ports require an SFP10G-TR13-A (not included).

1.8. CONFIGURING THE SYNC OUTPUTS

The sync outputs of the 5700MSC are configured in the **OUTPUT** menu, accessed by pressing the **OUTPUT** button. All sync outputs are derived from the master oscillator and will be locked in frequency and phase. The sync outputs are all programmable to output several different sync types and can be phased independently from each other.

In the **OUTPUT** menu, the sync outputs are configured using the *SYNC 1* to *SYNC 6* sub-menus. Each sync output can set to output any number of black burst or HD tri-level standards. They are all phased independently. When configuring a sync output, the mode must be selected first. By default, the mode of all sync outputs are set to NTSC-M black burst for North American units, and PAL-B black burst for European units. Configure the mode of each sync output to the format desired for the installation.

There are numerous other configuration settings for each sync output, some may be disabled (dark text) or enabled (white text) depending on the output mode selected. Scroll over each of the available menu items and press the **HELP** button for more information on the function of each menu item.

1.9. CONFIGURING THE TEST GENERATOR OUTPUTS

The unit has been equipped with four video test generators on Mini-BNC outputs. Each generator can output a number of **SDTG**, **HDTG**, or **3GTG** options. These are configured in the *TG 1*, *TG 2*, *TG 3*, and *TG4* menus. All test generators are derived from the master oscillator and will be automatically locked in frequency and phase. The test generators are independent from one another and can be configured to different formats and different phase offsets. By default, all phases will be aligned to the selected frequency reference.

The unit also has two 10GbE ports that can output test generators if the +10G-TG option is ordered. Each 10GbE port can output 3 test generators, which can be configured in the *TG 5, IP 1a*; *TG6, IP1b*; *TG7, IP1c*; *TG8, IP2a*; *TG9, IP2b*; and *TG10, IP 2c* menus.

The quickest and easiest way to discover how to configure the outputs is to scroll through the available menu items and press the **HELP** button for a description of each menu item function.

1.10. CONFIGURING THE TIME OUTPUTS

All time outputs from the unit come from the System Time clock. This clock can be viewed by pressing the **STATUS** button and selecting the *System/In time* screen. When the time reference is obtained from a GNSS sources, the system time will be Coordinated Universal Time (UTC). UTC time is the same at all locations around the world.

In order to output local time, the Time Zone must be selected to match the time zone offset of your location. For example, in North America, Eastern Standard Time (EST) is UTC –5:00 hours. Central

Standard Time (CST) is UTC –6:00 hours. Mountain Standard Time (MST) is UTC –7:00 hours. Pacific Standard Time is UTC –8:00 hours. The 5700MSC also supports Daylight Savings Time, which must be enabled separately for each time output. Below are descriptions of the time outputs available from the 5700MSC.

- ***Sync Outputs*** – When a Sync output mode is set to NTSC-M or PAL-B black burst, VITC time can be inserted onto two lines in the vertical blanking interval. The VITC is controlled by the *Vitc Ctl*, *Vitc Line 1*, *Vitc Line 2*, *Dropframe Ctl*, *Color Frame*, *Set Jam Time*, *Jam Output*, *Jam all Vitc*, *Time offset*, *Time Zone*, and *DST enable* menu items.

- ***Server Protocols*** – The 5700MSC will support Network Time Protocol and Precision Time Protocols. These are configured by pressing the **GENERAL** button and entering the *NTP rules*, *PTP All ports, PTP GigE 1, PTP GigE 2, PTP 10G 1, and PTP 10G 2* sub-menus. The 5700MSC hosts an NTP server and also sends out periodic NTP broadcasts. NTP time should always be UTC. PTP broadcast rates are determined using the PTP sub-menus listed above.

- ***Test Generator Outputs*** – Timecode can be "burned-in" at the bottom of any of the the 5700MSC test signal outputs. These are configured by pressing the **OUTPUT** button and entering the appropriate TG menu. The time is controlled by the *TC Burn In*, *Dropframe Ctl, Set Jam Time, Jam Output, Jam all VitcLtc, Time Offset*, *Time Zone*, and *DST enable* sub-menu items.

1.11. FINAL STEPS OF SET UP AND SECURING ALL CONNECTIONS

Once the 5700MSC has been configured, the various *STATUS* screens should be checked to ensure there are no items displayed with a red or yellow background. The left LCD screen should show "Sys OK" and "Ref OK" with a green background in the bottom corners.

The power supply and fan modules (accessed by removing the front panel) should be secured to the chassis by fastening the Phillips mounting screw. The GPS D-Sub connector on the back of the unit should be secured to the 5700MSC using mounting screws. The AC power cords can be fixed to the unit using the retaining clips provided.

1.12. ACCESS CONTROL

The engineering menu password can be changed from the default to prevent unauthorized tampering of SNMP and menu access control settings. The *SNMP Ctl* menu item can be changed to *SNMP off* or *SNMP status* to prevent remote SNMP control of the unit. Furthermore, pressing the **PANEL LOCK** button can lock the front panel. This prevents accidental changes by someone bumping or leaning into the front panel. The front panel can be unlocked by pressing the **SELECT** and **PANEL LOCK** buttons simultaneously.