# 5700ACO
# Automatic Changeover

## User Manual



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Version 1.0, Apr 2018

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# IMPORTANT SAFETY INSTRUCTIONS

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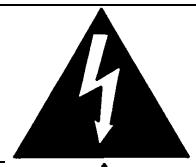
|---|---|
|  | The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated “Dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons. |
|  | The exclamation 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 this information
- 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

This equipment with the CE marking complies with both the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European standards:

- EN60065 Product Safety
- EN55103-1 Electromagnetic Interference Class A (Emission)
- EN55103-2 Electromagnetic Susceptibility (Immunity)

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.

# 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 | Apr 2018 |

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# TABLE OF CONTENTS

## Figures



## Tables

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# 1. OVERVIEW

The 5700ACO Automatic Changeover is intended **to be connected directly to two** 5700MSC-IP Master Clock / Sync Generators (Figure 2-2). The 5700ACO system uses latching relays to ensure maximum reliability and minimal disruption in the event of any failure. The complete system provides the highest level of security for television station video and time synchronization systems. Two power supplies are included as a standard feature, to alleviate any single point of failure concerns.

The above recommended practices provide the highest degree of protection by minimizing the number of point of failure connections within your plant referencing system. If you wish to modify your referencing system from the recommended design, please consult the factory prior to implementation to ensure your system's maximum reliability is maintained.

The front panel has one pushbutton. This button shows the last state which caused a changeover. This is to assist with diagnostics in cases where the problem has cleared before an operator can observe the front panel. Seventy LEDs provide status information as to the health of the two 5700MSC-IPs together with indication as to which one is active. In addition two GPO outputs indicate which master is active and when the inputs from both masters are not the same.

The main circuit board has three switches, behind the front panel for added security. There is an AUTO / MANUAL switch, a GPI / FRONT PANEL switch and an A / B select switch for manual changeover. In automatic mode, all signals from both 5700MSC-IPs are scrutinized to detect any abnormal signals. For example if a level, pulse width, phase, time code error or other abnormality is detected, the 5700ACO circuitry will trigger and the entire bank of signals will be switched to the backup 5700MSC-IP. In manual mode the changeover can be operated from a GPI or from the front panel switch.

The 5700ACO features selectable voting via *Vista*LINK® for auto-changeover feature. Individual inputs may selectively be included or excluded in the voting process to drive auto-changeover logic.

The 5700ACO offers connections for 6 colour black, (or bi-level or tri-level sync signals, or 10 MHz or pulses or word clock), 1 10MHz , 1 Word clock, 8 SD/HD/3G SDI test signals, DARS, 2 AES, analog audio, and two linear time codes (LTC) to each of the two Master 5700MSC-IPs. Each 5700MSC-IP Master offers two LTC outputs that may be used for different time codes. All four LTC signals are fed to the 5700ACO on two 'D' connectors, one for each Master. The LTC outputs from the selected master are available on two XLR connectors. There is an XLR for LTC input which will feed this signal to both 5700MSC-IPs. The Word clock and 10 MHz inputs can also monitor bi-level, tri-level sync signals. Each 5700MSC-IP provides 2 GPO signals which are also on the 'D' connectors. The 5700ACO feeds these signals through to the 2 x 8 terminal blocks. Each 5700MSC-IP is equipped with 2 GPI inputs and 2 GPO outputs. To facilitate installation, these connections are connected through to a 2 x 8 pin terminal block on the 5700ACO. The outputs from the 5700MSC-IP s are passed straight through the 5700ACO. The 5700ACO can monitor these signals and include them in the decision making process. Inputs to the 5700MSC-IPs are internally split by a 'Y' connector to ensure that both 5700MSC-IPs receive the same GPI contact closures.

In the event of a changeover occurrence, it is necessary that all outputs on one 5700MSC-IP have the same timing as those on the other. Identical timing for both 5700MSC-IPs is assured by locking both to the same frequency and phase source (i.e. GNSS, or genlocking one 5700MSC-IP to the other).

***Features***

- Relay switches for all the system critical outputs from two 5700MSC-IP units
  - 6 video/sync outputs
  - 4 SD/HD/3G SDI test signal outputs
  - 10MHz frequency reference*
  - Word Clock output*
  - Balanced and unbalanced DARS and 2 AES outputs*
  - Balanced analog audio output*
  - Linear time code outputs*

* Requires factory installed +AUX hardware option on 5700MSC-IP, IP Master Clocks are available at extra cost.

- Automatic changeover is a voting system based on which source has the most valid signals and that the good signals on the present master are also on the backup.
- Three switches behind the front panel select automatic, front panel or GPI activation of changeover
- 56 Front panel status LEDs show the health of each of the inputs
- 14 Front panel status LEDs show the operational modes of the changeover
- Hot swappable redundant power supply standard
- *Vista*LINK® capable offering remote monitoring and configuration capabilities via SNMP using the model 9000NCP Network Control Panel or Evertz *Vista*LINK® PRO or other third party SNMP manager software.

| Signal Type | Inputs | Outputs |
|---|---|---|
| **Sync** | 12 BNC | 6 BNC |
| **10 MHz** | 2 BNC | 1 BNC |
| **Word clock** | 2 BNC | 1 BNC |
| **DARS / AES** | 2 / 6 BNC | 1 / 3 BNC |
| **LTC** | 2 DB15 | 2 Male XLR |
| **GPIO** | Terminal strip | Terminal Strip |
| **Balanced DARS / AES / Analog audio** | 2 Terminal Strips | Terminal Strip |
| **SD/HD/3G SDI** | 8 BNC | 4 BNC |
| **LTC IN** | | 1 Female XLR |

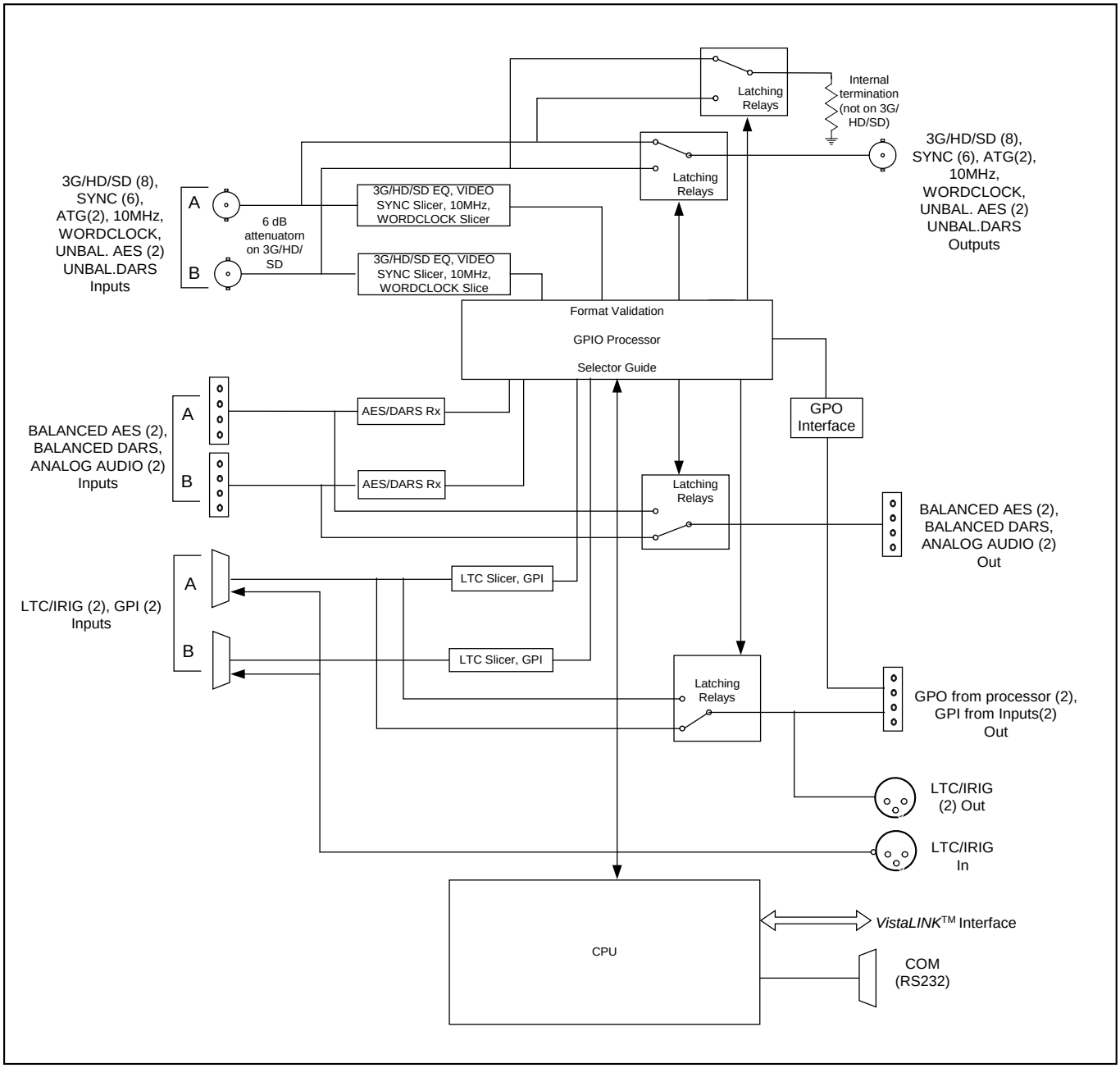


**Figure 1-1 : 5700ACO Block Diagram**

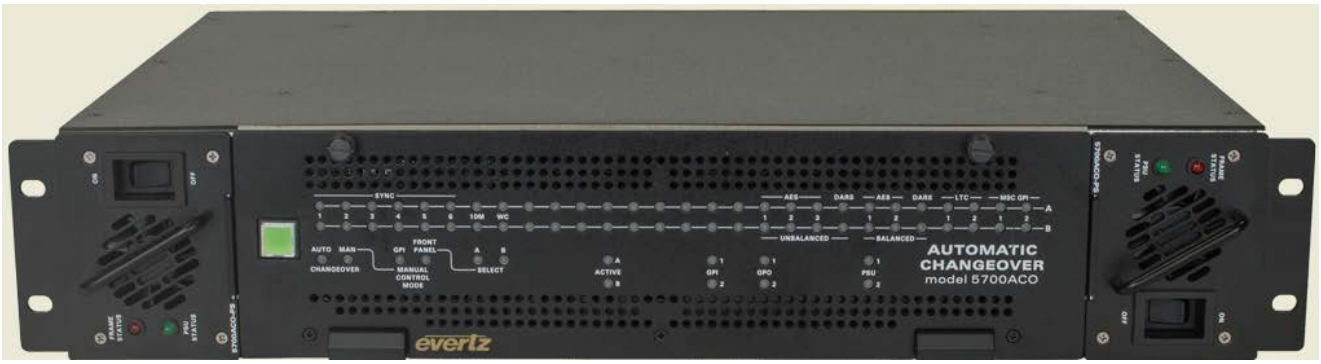


**Figure 1-2 : 5700ACO Front View**

**Figure 1-3 : 5700ACO Rear View**

## 1.1. HOW TO USE THIS MANUAL

This manual is organized into 5 chapters: Overview, Installation, Operation, Technical Information, and *Vista*LINK® Configuration and Control. The overview section provides a brief summary of the 5700ACO module as well as features.

Chapter 2 provides a detailed description of rear panel connectors, and how the module should be connected.

Chapter 3 provides information on automatic changeover operation.

Chapter 4 provides technical information such as specifications and how to update the firmware in the 5700ACO module.

Chapter 5 provides information on *Vista*LINK® configuration.

**This symbol is intended to alert the user to important operating instructions.**

**The exclamation point within an equilateral triangle is intended to alert the user to the presence of important safety related operating and maintenance (Servicing) instructions in this manual.**

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# 2. INSTALLATION

## 2.1. REAR PANEL

**Figure 2-1 : 5700ACO Rear Panel**

The following sections describe the purpose of the rear panel connectors of the 5700ACO. Sections 2.1.1 to 2.1.4 describe the specific signals that should be connected to the 5700ACO. Sections 2.4 and 2.5 give more detail on connecting the system.

### 2.1.1. Coaxial Connections

There are 16 groups of 3 BNC connectors on the 5700ACO rear panel. In each group there is one labelled A, and another labelled B for connection of the indicated signal from the respective 5700MSC-IP Master Clock/SPG. The BNC labelled OUT provides the output from the auto-changeover unit for further distribution throughout your company.

**DARS OUT:*** This group of BNC connectors is for connecting the Digital Audio Reference Signal (DARS) outputs.

**AES OUT: *** This group of BNC connectors is for connecting the Unbalanced AES Audio outputs.

**SYNC 1 to 6:** These groups of BNC connectors are for connecting the sync pulse / colour black outputs.

**SD/HD/3G SDI:** These groups of BNC connectors are for connecting the HD Test signal generator outputs.

**10 MHz: *** This group of BNC connectors is for connecting the 10 MHz outputs.

**WORD CLOCK: *** This group of BNC connectors is for connecting the Word Clock outputs.

* Requires factory installed +AUX hardware option on 5700MSC-IP, IP Master Clocks are available at extra cost.

### 2.1.2. Balanced AES, DARS and Analog Audio Connections*

**DARS/AES/ANALOG:** These 16 pin terminal strips are for connecting the balanced version of the AES and DARS signals as well as two balanced analog audio signals. The output cables can be secured into the removable portion of the terminal strips using a small screwdriver. The removable part of the terminal strip is then inserted into the rear panel and secured using the hold down screws. The pinout of these connectors is shown in Table **2-1**.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| DARS + | AES2 + | AES1 + | GND | GND | GND | RIGHT - | RIGHT + |
| DARS - | AES2- | AES1 - | GND | GND | GND | LEFT - | LEFT + |

**Table 2-1 : DARS/AES/ANALOG Terminal Strip Pin Definitions**

* Requires factory installed +AUX hardware option on 5700MSC-IP, IP Master Clocks are available at extra cost.

### 2.1.3. Linear Time Code and GPIO Connections*

**AUX I/O:** These two 15 pin male 'D' connectors contain GPI inputs and outputs and two LTC outputs from the 5700MSC-IP units and should be connected to the AUX I/O Connectors on the respective 5700MSC-IP units using the straight through 15 pin cables provided. The pinout of the **AUX I/O** connector is as follows:

| Pin # | Name | Description |
|---|---|---|
| **1** | LTC IN+ | LTC + input to 5700MSC-IP |
| **2** | LTC1+ | LTC 1 + output from 5700MSC-IP |
| **3** | LTC2+ | LTC 2 + output from 5700MSC-IP |
| **4** | GPO1 | GPO 1 output from 5700MSC-IP |
| **5** | GPO2 | GPO 2 output from 5700MSC-IP |
| **6** | GND | Signal Ground |
| **7** | GND | Signal Ground |
| **8** | STXA | |
| **9** | STXB | |
| **10** | GND | Signal Ground |
| **11** | LTC IN- | LTC - input to 5700MSC-IP |
| **12** | LTC1- | LTC 1 – output from 5700MSC-IP |
| **13** | LTC2- | LTC 2 - output from 5700MSC-IP |
| **14** | GPI1 | GPI 1 input to 5700MSC-IP |
| **15** | GPI2 | GPI 2 input to 5700MSC-IP |

Note that on the B connector, 8 is TX from B, and 9 is TX to A.

**Table 2-2 : AUX I/O Pin Definitions**

* Requires factory installed +AUX hardware option on 5700MSC-IP, IP Master Clocks are available at extra cost.

**LTC 1 OUT, LTC 2 OUT:*** These two male XLR connectors provide the balanced LTC1 and LTC2 time code outputs from the changeover.

* Requires factory installed +AUX hardware option on 5700MSC-IP, IP Master Clocks are available at extra cost.

**ACO CTRL/STATUS:** The top row of the 16 pin terminal strip has two GPI inputs to control the 5700ACO and two GPI Outputs that provide tallies to indicate the status of the 5700ACO.

**MSC:** The bottom row of the 16 pin terminal strip has the two GPI Outputs from the A and B 5700MSC-IP units and a pair of GPI inputs that will be connected to both the A and B 5700MSC-IP units.

The cables can be secured into the removable portion of the terminal strips using a small screwdriver. The removable part of the terminal strip is then inserted into the rear panel and secured using the hold down screws. The pinout of this connector is shown in Table **2-3**.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| GND | GND | ACO GPI1 | ACO GPI2 | GND | GND | ACO GPO1 | ACO GPO2 |
| GND | GND | MSC A GPO1 | MSC A GPO2 | MSC B GPO1 | MSC B GPO2 | MSC A & B GPI1 | MSC A & B GPI2 |

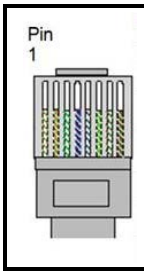
**Table 2-3 : ACO CTRL/STATUS and MSC GPIO Terminal Strip Pin Definitions**

### 2.1.4. Ethernet Connections

The 5700ACO can be configured using the *Vista*LINK® -C Configuration tool connected by Ethernet. (See section 5.1 for information on configuring the IP address of the 5700ACO and section 5.1.1 for information about installing and using the *Vista*LINK® software)

The 5700ACO is designed to be used with either 10Base-T (10 Mbps), 100Base-TX (100 Mbps) also known as *Fast Ethernet* or 1000Base-T (1000 Mbps) also known as Gigabit Ethernet, twisted pair Ethernet cabling systems. When connecting for 10Base-T systems, category 3, 4, or 5 UTP cable as well as EIA/TIA – 568 100Ω STP cable may be used. When connecting for 100Base-TX systems, category 5 UTP cable is required. When connecting to 1000Base-T systems, category 5 or higher UTP or STP cable is required. The cable must be “straight through” with a RJ-45 connector at each end. Make the network connection by plugging one end of the cable into the RJ-45 receptacle of the 5700ACO and the other end into a port of the supporting Ethernet switch.

The straight-through RJ-45 cable can be purchased or can be constructed using the pinout information in Table 2-4. A colour code wiring table is provided in Table 2-4 for the current RJ 45 standards (AT&T 258A or EIA/TIA 258B colour coding shown). Also refer to the notes following the table for additional wiring guide information.




| Pin # | EIA/TIA 568A | AT&T 258A or EIA/TIA 568B | 10BaseT or 100BaseT | 1000BaseT |
|---|---|---|---|---|
| 1 | White/Green | White/Orange | Transmit + | Bidirectional |
| 2 | Green/White or White | Orange/White or Orange | Transmit - | Bidirectional |
| 3 | White/Orange | White/Green | Receive + | Bidirectional |
| 4 | Blue/White or Blue | Blue/White or Blue | Not used (required) | Bidirectional |
| 5 | White/Blue | White/Blue | Not used (required) | Bidirectional |
| 6 | Orange/White or Orange | Green/White or Green | Receive - | Bidirectional |
| 7 | White/Brown | White/Brown | Not used (required) | Bidirectional |
| 8 | Brown/White or Brown | Brown/White or Brown | Not used (required) | Bidirectional |

**Table 2-4 : Standard RJ45 Wiring Colour Codes**

Note the following cabling information for this wiring guide:

- Only two pairs (1,2 and 3,6 are used to carry 10 Base-T and 100 Base-T, but all four pairs (1,2 and 3,6 and 4,5 and 7,8) are required by 1000 Base-T.
- 10BaseT and 100BaseT use the same pins; a crossover cable made for one will also work with the other.
- Pairs may be solid colours and not have a stripe.
- Category 5 cable must use Category 5 rated connectors.

Ethernet switches are used to connect devices on Ethernet networks nowadays. When you have connected the 5700ACO and set up the IP address you should 'ping' the device from your PC to make sure that it is connected correctly.

### 2.1.5. Power Connections

**LINE:** The 5700ACO has redundant universal power supplies operating on 100 to 240VAC, 60 or 50 Hz.

## 2.2. MOUNTING

The 5700ACO is equipped with rack mounting angles and fits into a standard 19 inch by 1 3/4 inch (483 mm x 45 mm) rack space. The mounting angles may be removed if rack mounting is not desired.
Care must be taken to ensure that the side exhaust vents have a 2" (5cm) clearance to allow for proper cooling of the unit. The unit may overheat if cables or brackets are blocking the fan exhaust.

## 2.3. POWER REQUIREMENTS

Power requirements are 100 to 240 volts AC at 50 or 60 Hz. The 5700ACO has redundant universal power supplies that automatically sense the input voltage. Power should be applied by connecting a 3-wire grounding type power supply cord to each of the power entry modules on the rear panel. The power cord should be minimum 18 AWG wire size; type SVT marked VW-1, maximum 2.5 m in length.

**To reduce the risk of electric shock, grounding of the centre pin of the mains plug must be maintained.**

## 2.4. 5700MSC-IP CONNECTIONS

The 5700MSC-IP unit connected to the A inputs of the 5700ACO will be called *Master A*. The 5700MSC-IP unit connected to the B inputs of the 5700ACO will be called *Master B*.

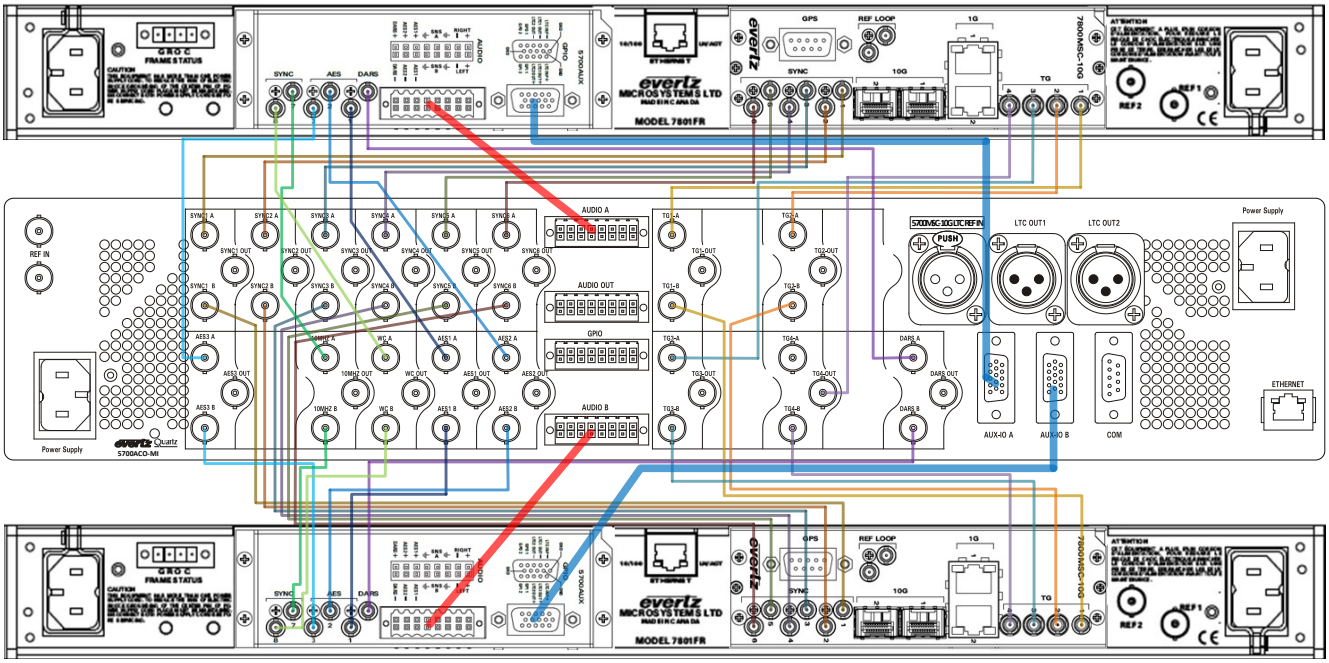


**Figure 2-2 : Redundant Master Clock/SPG with Auto Changeover System Diagram**

### 2.4.1. Sync Outputs

Connect the six Sync outputs of the *Master A* 5700MSC-IP unit to the A Sync inputs of the 5700ACO. Connect the six Sync outputs of the *Master B* 5700MSC-IP unit to the B Sync inputs of the 5700ACO. Connect the Sync outputs of the 5700ACO to your plant distribution amplifier system.

**NOTE: To ensure proper signal detection and distribution, terminate each sync output with 75Ω (for example at the input of a distribution amplifier). If a sync output is double terminated or un-terminated (as may be the case when the signals are directly connected to a patch panel), the 5700ACO will hunt for a good input signal by switching back and forth between input A and B. The flashing LEDs will indicate the Sync output at fault.**

### 2.4.2. 10 MHz Output*

Connect the 10 MHz output of the *Master A* 5700MSC-IP unit to the A 10 MHz input of the 5700ACO. Connect the 10 MHz output of the *Master B* 5700MSC-IP unit to the B 10 MHz input of the 5700ACO. Connect the 10 MHz output of the 5700ACO to your plant 10 MHz reference system.

* Requires factory installed +AUX hardware option on 5700MSC-IP, IP Master Clocks are available at extra cost.

### 2.4.3. Word Clock Output*

Connect the Word Clock output of the *Master A* 5700MSC-IP unit to the A Word Clock input of the 5700ACO. Connect the Word Clock output of the *Master B* 5700MSC-IP unit to the B Word Clock input of the 5700ACO. Connect the Word Clock output of the 5700ACO to your plant Word Clock distribution amplifier system.

* Requires factory installed +AUX hardware option on 5700MSC-IP, IP Master Clocks are available at extra cost.

### 2.4.4. Unbalanced DARS, AES1, AES2 and AES3 Outputs*

Connect the unbalanced DARS, AES1, AES2 and AES3 outputs of the *Master A* 5700MSC-IP unit to the A DARS, AES1, AES2 and AES3 inputs of the 5700ACO. Connect the unbalanced DARS, AES1, AES2 and AES3 outputs of the *Master B* 5700MSC-IP unit to the B DARS, AES1, AES2 and AES3 inputs of the 5700ACO. Connect the DARS, AES1, AES2 and AES3 outputs of the 5700ACO to your plant's unbalanced AES distribution amplifier system.

* Requires factory installed +AUX hardware option on 5700MSC-IP, IP Master Clocks are available at extra cost.

### 2.4.5. Balanced DARS, AES1, AES2 and Analog Audio Outputs*

Connect the balanced DARS, AES1, AES2 and analog audio outputs of the *Master A* 5700MSC-IP unit to the A DARS, AES1, AES2 and analog audio input terminal strip of the 5700ACO. Connect the balanced DARS, AES1, AES2 and analog audio outputs of the *Master B* 5700MSC-IP unit to the B DARS, AES1, AES2 and analog audio input terminal strip of the 5700ACO. Connect the DARS, AES1; AES2 and analog audio output terminal strip of the 5700ACO to your plant balanced AES and analog audio distribution amplifier systems. The cables can be secured into the removable portion of the terminal strips using a small screwdriver. The removable part of the terminal strip is then inserted into the rear panel and secured using the hold down screws.

* Requires factory installed +AUX hardware option on 5700MSC-IP, IP Master Clocks are available at extra cost.

### 2.4.6. Video Test Signal Generator Outputs

Connect the SD/HD/3G SDI TG outputs of the *Master A* 5700MSC-IP unit to the A SD SDI TG input of the 5700ACO. Connect the SD/HD/3G SDI TG output of the *Master B* 5700MSC-IP unit to the B SD/HD/3G SDI TG input of the 5700ACO. Connect the SD/HD/3G SDI TG output of the 5700ACO to your plant SDI video distribution amplifier system.

### 2.4.7. LTC and GPIO Connections

Connect the AUX I/O output of the *Master A* 5700MSC-IP unit to the A AUX I/O input of the 5700ACO using one of the straight through interconnect cables provided. Connect the AUX I/O output of the *Master B* 5700MSC-IP unit to the B AUX I/O input of the 5700ACO using one of the straight through interconnect cables provided.

The LTC code outputs are available on two XLR connectors on the rear panel. Output level is from approximately 0.8 V to 9 V using the LTC LEVEL item on the *Output Setup* menu adjustable in the 5700MSC-IP units. Pin 1 of the XLR is ground, and pins 2 and 3 provide a balanced output. The *LTC Output* sub-menus on the *Output Setup* menu in the 5700MSC-IP units are used to configure the LTC outputs.

**NOTE: The LTC outputs of the 5700ACO do not have the capability of powering the 1200 series clocks.**

The GPI1 and GPI2 inputs on **both** 5700MSC-IP units are connected to the GPI1 and GPI2 inputs on the bottom row of the 16 pin terminal block. The GPO1 and GPO2 outputs on the *Master A* 5700MSC-IP unit are available on the *MSC A GPO1* and *MSC A GPO2* pins on the bottom row of the 16 pin terminal block. The GPO1 and GPO2 outputs on the *Master B* 5700MSC-IP unit are available on the *MSC B GPO1* and *MSC B GPO2* pins on the bottom row of the 16 pin terminal block.

The ACO GPI1 and GPI2 control inputs for the 5700ACO are available on the *ACO GPI1* and *ACO GPI2* pins on the top row of the 16 pin terminal block. See section 3.2.2 for information about the operation of the 5700ACO GPI inputs. The GPO1 and GPO2 outputs from the 5700ACO are available on the *ACO GPO1* and *ACO GPO2* pins on the top row of the 16 pin terminal block. See section 3.4 for information about the operation of the 5700ACO GPO outputs.

The GPI and GPO cables can be secured into the removable portion of the terminal strips using a small screwdriver. The removable part of the terminal strip is then inserted into the rear panel. See Table 2-3 for the pinout of the terminal block.

* Requires factory installed +AUX hardware option on 5700MSC-IP, IP Master Clocks are available at extra cost.

## 2.5. CONNECTING THE GENERAL PURPOSE INPUTS AND OUTPUTS

The 16 pin terminal strip connector has 2 general purpose inputs and 2 general purpose outputs for control/status of the Auto-changeover, as well as the GPI inputs and outputs from the two 5700MSC-IP units. The signals on the top row of the connector are for the 5700ACO only and do not connect to the 5700MSC-IP units. (See section 3.3) The signals on the bottom row of the connector are connected directly to the 5700MSC-IP units (see section 2.4.5). The GPI cables can be secured into the removable portion of the terminal strips using a small screwdriver. The removable part of the terminal strip is then inserted into the rear panel.

The GPI inputs are considered high if you leave an input floating (not connected) or pull it up to +5 volts. The GPI inputs are considered low when the GPI input is below 0.8 volts. The user can make the GPIs low simply by connecting the GPI input pins to ground using a button, switch, relay or an open collector transistor. Figure 2-3 shows the circuitry for each of the GPI input pins.

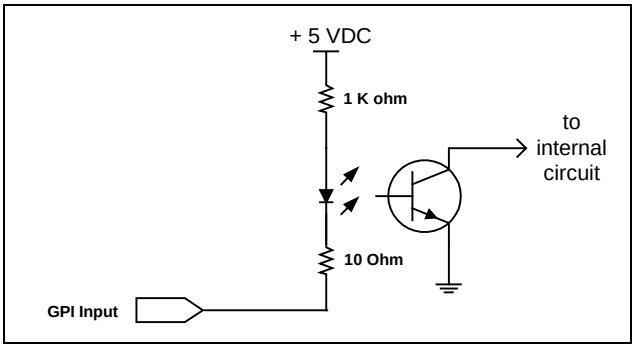



**Figure 2-3 : Typical GPI Circuitry**

The outputs are internally pulled up to 5 volts. Care must be taken to limit the load to 0.5W so there is no affect on the power supply source in the frame. Figure 2-4 and Figure 2-5 shows the circuitry for the GPO1 and GPO2 output pins.

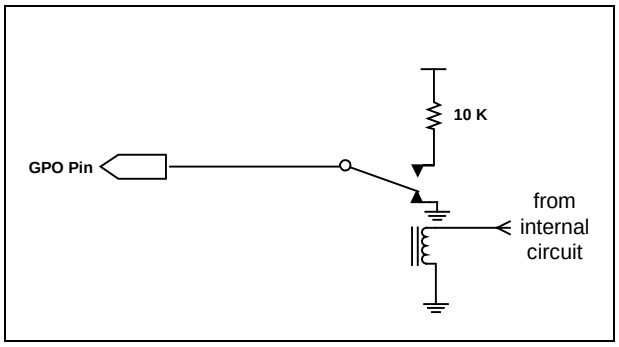



**Figure 2-4 : GPO1 Output Circuitry**

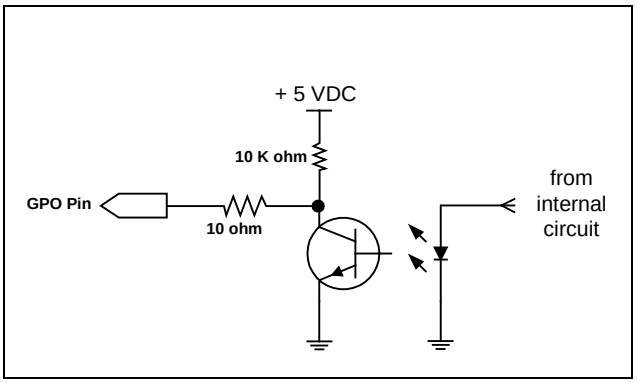



**Figure 2-5 : GPO2 Output Circuitry**

* Requires factory installed +AUX hardware option on 5700MSC-IP, IP Master Clocks are available at extra cost.

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# 3. HOW TO OPERATE THE AUTOMATIC CHANGEOVER

The front panel controls consist of three toggle switches to select the operating mode of the changeover and 70 LED status indicators.

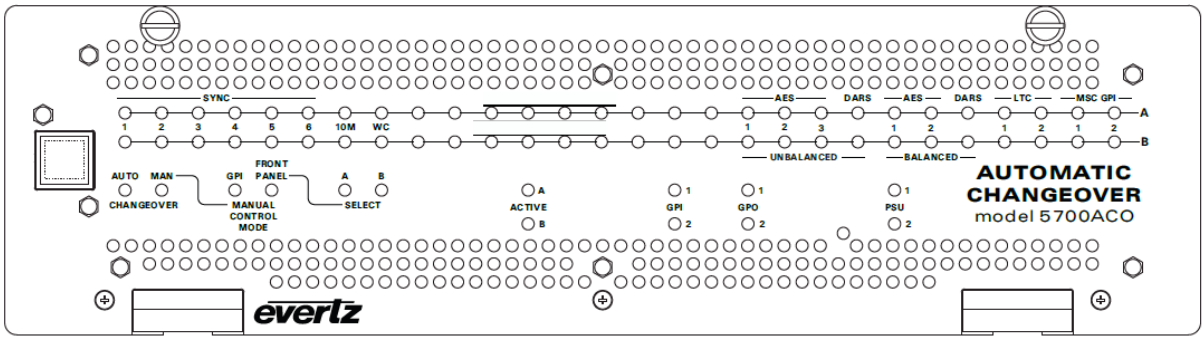


**Figure 3-1 : Model 5700ACO Front Panel**

## 3.1. AN OVERVIEW OF THE STATUS INDICATORS

There are 70 status indicators located on the front panel that show operational status of the 5700ACO at a glance.

### 3.1.1. Operating Mode Indicators

**AUTO** This green LED will be "On" when the unit is operating in the *Automatic* control mode.

**MANUAL** This green LED will be "On" when the unit is operating in one of the two manual control modes.

**GPI*** This green LED will be "On" when the unit is operating in the *Manual GPI* control mode. The LED will be "Off" when the unit is in the *Manual Front Panel* or *Automatic* control mode.

* Requires factory installed +AUX hardware option on 5700MSC-IP, IP Master Clocks are available at extra cost.

**FRONT PANEL** This green LED will be "On" when the unit is operating in the *Manual Front Panel* control mode. The LED will be "Off" when the unit is in the *Manual GPI* or *Automatic* control mode.

**A** This green LED will be "On" when the unit is operating in the *Manual Front Panel* control mode and that Master A is selected. The LED will be "Off" when Master B is selected or the unit is not in the *Manual Front Panel* control mode.

**B** This green LED will be "On" when the unit is operating in the *Manual Front Panel* control mode and that Master B is selected. The LED will be "Off" when Master A is selected or the unit is not in the *Manual Front Panel* control mode.

**ACTIVE OUTPUT** These two green LEDs indicate whether MasterA or MasterB is currently selected.

### 3.1.2. Input Indicators

**A INPUTS:** These twenty-eight green LEDs indicate that the respective input signals from the Master A device are present and valid. If the LED is excluded from the voting pool, the LED will be dim.

**B INPUTS:** These twenty-eight green LEDs indicate that the respective input signals from the Master B device are present and valid. If the LED is excluded from the voting pool, the LED will be dim.

The 5700ACO determines that an input is present and valid according to the following criteria:

| | |
|---|---|
| **Sync:** | H timing detect for 5700ACO |
| **SDI:** | Valid TRS ID |
| **10MHz:** | Level above 1.0Vp-p |
| **Word Clock:** | Level above 0.5Vp-p |
| **DARS/AES:** | Sync word valid |
| **LTC:** | Level above 0.3Vp-p |
| | Valid sync word |

### 3.1.3. ACO GPI Indicators*

**IN 1, 2:** These green LEDs indicate that the corresponding ACO General Purpose Input is active or not. The LED will be "On" when the GPI is active (low).

**OUT 1, 2:** These green LEDs indicate that the corresponding ACO General Purpose Output is active or not. The LED will be "On" when the GPO is active (low).

**Note:** GPI/O requires factory installed +AUX hardware option available at extra cost.

### 3.1.4. Power Supply Indicators

**PSU STATUS 1, 2:** These green LEDs indicate that the corresponding power supply is functioning normally.

## 3.2. FRONT PANEL CONTROL

The Changeover can be operated in one of three modes as selected by the three momentary contact toggle switches on the main circuit board behind front panel. A confidence indication for these modes is reflected on both the LED's located near the toggle switches and on the front door when the door is fully closed.

**NOTE: Figure 3-2 shows the board removed slightly to show the location of the toggle & dip switches. Do not remove the board when selecting changeover modes.**

The 5700ACO changeover uses latching relays that retain their state when there is no power applied. When there is no power applied to the 5700ACO, GPO2 will be connected to ground indicating a fault condition.

**Figure 3-2 : Front Panel & Card Edge Control**

### 3.2.1. Automatic Changeover Mode

To operate the 5700ACO in *Automatic* mode, push the CHG OVER (*Changeover mode)* toggle switch to the *AUTO* position. The 5700ACO will ignore the position of the other two switches in the *Automatic* mode. The *Auto* LED will come on. With the door closed the *ACTIVE OUTPUT* LEDs will indicate the currently selected master. The 5700ACO will decide whether to select the A or B inputs based on which source has the most 'good' signals and that the valid signals present on the currently selected master are also valid on the backup master. The settings made with this switch are saved to the 5700ACO's memory, and will be the same after a power cycle. Please note that while in *Automatic* mode, the GPI/Front Panel LEDs will be on dimly to show what the status will be if the mode is changed back to manual. When a return is made to front panel manual mode, the A/B state will remain the same, regardless of any previous manual settings.

### 3.2.2. Manual GPI Changeover Mode*

To operate the 5700ACO in *Manual GPI* mode, push the *CHG OVER mode* switch to the *MANUAL* position and the CTL SEL (*Manual Control Mode)* switch to the *GPI* position. The *Manual* and *GPI* LEDs will come on. The 5700ACO will decide whether to select the A or B inputs based on the ACO GPI inputs on the top row of the terminal strip on the rear panel. There are two GPI changeover modes described in sections 3.3.1. The *ACTIVE OUTPUT* LEDs will indicate the currently selected master. The settings made with this switch are saved to the 5700ACO's memory, and will be the same after a power cycle.

* Requires factory installed +AUX hardware option on 5700MSC-IP, IP Master Clocks are available at extra cost.

### 3.2.3. Manual Switch Changeover Mode

To operate the 5700ACO in *Manual Front Panel* mode, push the *CHG OVER* switch to the *Manual* position and the *CTL SEL mode* switch to the FP (*Front Panel)* position. The *Manual* and *Front Panel* LEDs will come on. The 5700ACO will decide whether to select the A or B inputs based on the position of the CHG SELECT switch. When the *CHG SELECT* switch is set to *A* Master A will be selected and the *A* LED will come On. When the *CHG SELECT* switch is set to *B* Master B will be selected and the *B* LED will come On. The *ACTIVE OUTPUT* LEDs will also indicate the currently selected master. The settings made with this switch are saved to the 5700ACO's memory, and will be the same after a power cycle.

### 3.2.4. Front Door Button: Recent Event Trigger

The pushbutton on the front door shows the last state to have caused a changeover. If the 5700ACO is in *Automatic* mode and a changeover takes place, pressing this button will cause the LEDs to display the status just before the changeover occurred. The purpose of this is to assist operators in cases where a signal is lost but then returns before an operator can observe the front panel.

## 3.3. DIP SWITCHES

There is an 8 position DIP switch located on the main circuit card inside the 5700ACO. This DIP switch is accessible on the main circuit board behind the front panel of the unit. Table 3-1 shows the assigned DIP switch functions.

**NOTE: Dip switch control is a live function. A power-cycle/reboot is not needed.**

**NOTE: The ON position is down.**

| DIP Switch | Function |
|---|---|
| **1** | GPI Input Mode |
| **2** | Changeover Rate |
| **3** | Bank A Priority Enable |
| **4** | Bank B Priority Enable |
| **5** | |
| **6** | |
| **7** | Change Limiting |
| **8** | Change Limiting |

**Table 3-1 : DIP Switch Functions**

### 3.3.1. GPI Input Mode*

DIP Switch 1 is used to select one of two modes of operation for Manual GPI changeover mode. (See section 3.2.2 for more information about Manual GPI changeover mode)

| DIP 1 | GPI Input Mode |
|---|---|
| **Off (Up)** | GPI Changeover Mode – single GPI input |
| **On (Down)** | GPI Changeover Mode – dual GPI input |

**Table 3-2 : GPI Input Mode Switch Settings**

When DIP switch 1 is in the Off position, the ACO GPI inputs on the top row of the terminal strip on the rear panel are used in conjunction with the front panel switches to control whether the A or B inputs will be selected. Set the front panel *CHG OVER mode* switch to the *MANUAL* position and the *CTL SELECT mode* switch to the *GPI* position. (See section 3.2.2)

| GPI 1 | GPI 2 | Operation |
|---|---|---|
| **Low** | --- | Master A inputs selected |
| **High** | --- | Master B inputs selected |

**Table 3-3 : Single GPI Mode Operation**

In single GPI mode the 5700ACO is controlled by the ACO GPI1 input on the top row of the terminal strip on the rear panel. GPI2 is not used in this mode. When GPI1 is low Master A will be selected. When GPI1 is high Master B will be selected. The *OUTPUT* LEDs will indicate the currently selected master. Single GPI mode is the default condition.

| GPI 1 | GPI 2 | Operation |
|---|---|---|
| **Low** | **Low** | Current bank selected (no change) |
| **Low** | **High** | Master A inputs selected |
| **High** | **Low** | Master B inputs selected |
| **High** | **High** | Current bank selected (no change) |

**Table 3-4 : Dual GPI Mode Operation**

In dual GPI mode the 5700ACO is controlled by both the ACO GPI1 and ACO GPI2 inputs on the top row of the terminal strip on the rear panel. When GPI1 is low and GPI2 is high, Master A will be selected. When GPI1 is high and GPI2 is low Master B will be selected. When both inputs are high or low, no action will be taken. The *OUTPUT* LEDs will indicate the currently selected master.

* Requires factory installed +AUX hardware option on 5700MSC-IP, IP Master Clocks are available at extra cost.

### 3.3.2. Changeover Rate

DIP switch 2 controls the speed of the decision process before a changeover is made.

| DIP 2 | Changeover Rate |
|---|---|
| **Off (Up)** | Changeover in 250mS |
| **On (Down)** | Changeover in 100mS |

**Table 3-5 : Changeover Rate Switch Settings**

When DIP switch 2 is in the Off position, the ACO takes approximately 250 msec. to decide whether it needs to change, thus making it very immune to false changeovers in this mode. When DIP switch 2 is in the ON position, the ACO will decide to change in approximately 100 msec, providing less protection from false changeovers but quicker response to input faults.

### 3.3.3. Bank Priority

The bank priority is controlled by DIP switch 3 and DIP switch 4.

| DIP 4 | DIP 3 | Bank A Priority |
|---|---|---|
| Off (Up) | Off (Up) | Bank A and B have equal priority |
| Off (Up) | On (Down) | Bank A has higher priority |
| On (Down) | Off (Up) | Bank B has higher priority |
| On (Down) | On (Down) | |

**Table 3-6 : Bank A Priority Switch Settings**

When DIP switches 3 and 4 are both in the Off position or both in the ON position, the ACO gives equal priority to each bank. If the number of valid inputs from each bank is equal, the ACO will not switch.

When DIP switch 3 is in the On position, and DIP switch 4 is in the Off position, priority will be given to Bank A. If the number of valid inputs from each bank is equal, bank A will be selected.

When DIP switch 4 is in the On position, and DIP switch 3 is in the Off position, priority will be given to Bank B. If the number of valid inputs from each bank is equal, bank B will be selected.

### 3.3.4. Change Limiting

Change Limiting is controlled by DIP switch 8 and DIP switch 7.

| DIP 8 | DIP 7 | Change Limiting |
|---|---|---|
| Off (Up) | Off (Up) | Unlimited changes |
| Off (Up) | On (Down) | 1 changes only |
| On (Down) | Off (Up) | 2 changes only |
| On (Down) | On (Down) | 2 changes only |

**Table 3-7 : Change Limiting Switch Settings**

When DIP switch 8 and DIP switch 7 are in the Off position, the 5700ACO may change an unlimited number of times depending on inputs when in automatic mode. When DIP switch 7 is in the On

position and DIP switch 8 is in the off position, and in automatic mode, only 1 change will be allowed if they occur within 0.5 seconds. When DIP switch 8 is in the On position, and in automatic mode, only 2 changes will be allowed if they occur within 0.5 seconds. After this, the LEDs beside the switches will flash. The leftmost toggle switch for the manual/auto mode will re-enable the 5700ACO. This is provided to prevent back and forth toggling if an output is shorted out.

**NOTE: When DIP switch 8 is ON, the 5700ACO will not change over after a quick change has happened. User input is needed to allow automatic changes to happen again. It is important to promptly fix the offending input, and re-enable the 5700ACO to ensure correct automatic protection.**

## 3.4. GPO TALLY OUTPUTS

There are two general purpose outputs that can be used to signal alarm conditions to the user. These outputs are driven by normally closed relays inside the 5700ACO. When the relay is energized (active), the output will be pulled to +5 volts by a 10 K ohm pull-up. When the relay is de-energized (normal) the relay contact will connect the output to ground. See Figure 2-4 for a schematic of the GPO output circuitry.

GPO1 is used to indicate whether Master A or Master B is currently selected. It will be low when Master A is selected and high when Master B is selected.

GPO2 is used to indicate whether the Master A and Master B inputs are identical and the power supplies are functioning correctly or not. It will be high when the inputs are identical and the power supplies are good, and will be low when the inputs are not identical, or one or both of the power supplies is not functioning correctly.

The default condition of the 5700ACO outputs when there is no power applied is that the Master that was last active will be selected, and will be indicated by the GPO1 relay. GPO2 will be high impedance.

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# 4. TECHNICAL DESCRIPTION

## 4.1. AUTO CHANGEOVER SWITCH CRITERIA

Understanding how the ACO makes its changeover switch decisions is vital to designing, monitoring, and troubleshooting a synchronizing signal distribution system. This section provides information on how the ACO determines when it is time to switch to the other input.

All inputs, except for analog audio, have signal presence detectors that determine if there is a valid signal present on that input. The detection logic depends on the type of input signal. For instance detecting SDI video is different than detecting time code. The results of all of the signal detectors are fed to one location where the changeover logic is applied.

Some signals may not be “mission critical” but may be included in the sync distribution system. These signals will be switched during a changeover but will not be a part of the decision making process. The presence detection of these signals may be excluded from the decision making process by removing them from the “voting pool” through VistaLINK® configuration, or using the com port.

The selected A side and B side signal present indicators are analyzed as follows. For this example, assume the A side is the currently selected source:

1. If all the present inputs of the A side are also present on the B side, then all is considered stable. Note that even if the ACO is configured to monitor more inputs than what is present, the logic performs a comparison of what is currently present on the A side vs. B.
2. Will any signals be lost if switched? If yes, do not switch. There is no point in switching and/or trading one problem for another.
3. Will any signals be gained if switched? If yes, switch. Note that this criteria covers the case when the A side loses a signal or the B side gains a signal.
4. Once the changeover is complete, the voting logic is now applied to the B side as the selected source.
5. Priority may be applied to one of the sides. In this case, if there is the same number of inputs present on both the A side and the B side, then the ACO will change over to the higher priority side.

## 4.2. CHANGE LIMITING OPERATION

Depending on the reference system architecture and the desired exception handling operating procedures, you may want the ACO to limit the number of switch changes to minimize system reference disturbances and give someone time to diagnose the problem. When a “change limiting” condition is detected, all further changeovers are suspended and the *Auto* LED will flash to indicate a changeover event. Once the problem has been addressed, re-arm the auto changeover logic by moving the *CHANGEOVER MODE* switch to *Manual* mode and back to *Auto* mode. Modifying the “change limiting” mode will also re-arm the ACO. An armed situation is indicated when the *Auto* LED is on solid.

There are three automatic modes of operation:

1. **One Change Mode:** Switch one time only on the first valid switch criteria.
2. **Dual Change Mode:** Suspend all switching when two consecutive criteria are met within a short time period.
3. **Unlimited Change Mode:** Switch whenever a valid criterion is met.

The selection of the above modes will depend on the desired "change over" behavior. Sections 4.2.1 to 4.2.3 provide descriptions for these modes.

### 4.2.1. One Change Mode

The user may want the ACO to switch to the backup unit and stay there until you diagnose the issue. In this case, use the "one change" mode. When an automatic changeover switch occurs, the backup unit is selected and all further changeovers are suspended. The *Auto* LED will flash to indicate a changeover and that attention is needed to troubleshoot the problem. The ACO will have to be re-armed after the problem is resolved; otherwise, a failure on the active system will not trigger a switch. To re-arm the auto changeover logic, move the *CHANGEOVER MODE* switch to *Manual* mode and back to *Auto* mode. Notice that the *Auto* LED is now on solid, indicating an armed situation.

### 4.2.2. Dual Change Mode

The signal paths through the ACO are completely passive except for mechanical relays that will maintain connections, even with the power to the ACO turned off. There are no active components in the signal path, and the input circuitry that is monitoring the inputs (for decision making) is high impedance. This is a good architecture except for one problem: If a signal output of the ACO is shorted to something it should not be shorted to (i.e. ground), then the decision logic will fail. Consider the following:

1. Input A is the selected path.
2. Someone shorts an output of the ACO to ground.
3. This short kills the signal as detected on input A, but input B is fine since it is not connected to the short circuit.
4. The ACO sees the missing signal and switches to input B.
5. Input B is now connected to the shorted output.
6. Input A is now isolated from the shorted output.
7. The ACO sees a missing signal on the B input and a good signal on the A input so it switches to A.
8. The ACO will repeat this condition creating an oscillating A/B switching behavior.

To address this issue we have designed a number of features to minimize system impact in the event of an output short. One item is a mode that will detect two consecutive changeovers within a short period of time. If this happens, further changes are suspended and the *Auto* LED will flash. This gives you time to diagnose the situation. Once you are satisfied that you have rectified the problem, re-arm the auto changeover logic, by moving the *CHANGEOVER MODE* switch to *Manual* mode and back to *Auto* mode.
Multiple changeover events, separated by more than approximately half a second are considered valid conditions for ACO operation. This is the recommended operating mode because it offers normal operation while minimizing system impact in the event of an output short.

### 4.2.3. Unlimited Change Mode

If you want to change when a valid switch criterion is met, then use the "Unlimited Change Mode."

## 4.3. SWITCHING DECISION TREE

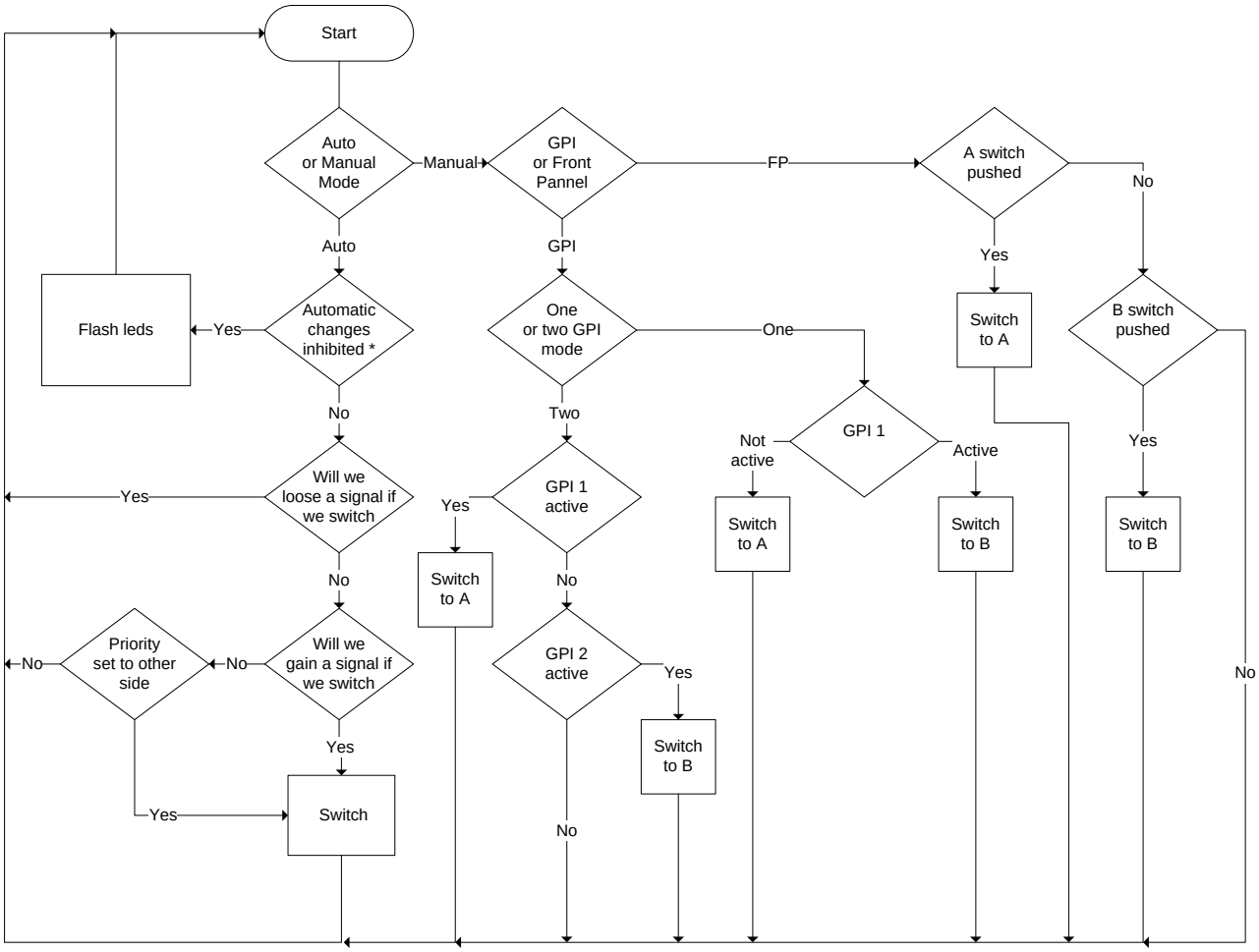



**Figure 4-1 : 5700ACO Switching Logic**

## 4.4. SPECIFICATIONS

### 4.4.1. LTC Outputs

| | |
|---|---|
| **Standard** | SMPTE 12M frame rate set by 5700MSC-IP |
| **Number of outputs** | 2 |
| **Connector** | 3 pin male XLR type outputs |
| **Signal Level** | Set in 5700MSC-IP |

### 4.4.2. Coaxial Inputs and Outputs

| | |
|---|---|
| **Type** | Depends on signal connected from 5700MSC-IP |
| | SD/HD/3G SDI, DARS, AES Audio, bi-level or tri-level sync, colour black, 10 MHz,<br>Word Clock |
| **Number** | 16 groups each consisting of two inputs and one output |
| **Connector** | BNC per IEC 60169-8 Amendment 2 |

### 4.4.3. Balanced DARS, AES1, AES2 and Analog Audio Inputs and Outputs

| | |
|---|---|
| **Type** | Depends on signal connected from 5700MSC-IP |
| | Balanced DARS, AES3 and analog Audio |
| **Number** | 5 groups each consisting of two inputs and one output |
| **Connector** | Removable Terminal Strip |

### 4.4.4. ACO General Purpose Inputs and Outputs

***Inputs***

**Front Panel Single GPI Control Mode (DIP switch 1 Off)**

| | |
|---|---|
| **GPI1** | Master select in Manual GPI control mode<br>Low: Selects Master A<br>High: Selects Master B |
| **GPI2** | Not used |

**Front Panel Dual GPI Control Mode (DIP switch 1 On)**

| | |
|---|---|
| **GPI1** | Master select in Manual GPI control mode<br>Low: Selects Master A |
| **GPI2** | Low: Selects Master B |

***Outputs***

| | |
|---|---|
| **GPO1** | Low: Master A is selected (default when the 5700ACO has no power)<br>High: Master B is selected |
| **GPO2** | Low: Master A & Master B differ or PSU failure<br>High: Master A and B have equivalent signals |

***Type***

| | |
|---|---|
| **Inputs:** | Opto-isolated input with internal pull-up to + 5volts. |
| **Outputs:** | Normally closed relay to ground. 10K internal pull-up to + 5volts when relay is in active position |
| **Connector:** | 4 pins plus 2 ground pins on 16 pin removable terminal block |
| **Signal Level:** | +5V nominal |

### 4.4.5. MSC General Purpose Inputs and Outputs

| | |
|---|---|
| **Inputs** | 2 GPI inputs connected to both Master A and Master B with AUX option |
| **Outputs** | 2 GPI outputs connected from Master A through AUXI/O A<br>2 GPI outputs connected from Master B through AUXI/O B |
| **Connector** | 6 pins on 16 pin removable terminal block |
| **Signal Level** | As specified in 5700MSC-IP manual |

### 4.4.6. Changeover Conditions

Changeover is a voting system based on which source has the most valid signals and that the good signals on the current master are also present on the backup master. The input signals are considered good according to the following criteria:

| | |
|---|---|
| **Sync** | H timing detect |
| **SDI/HDSDI** | Valid TRS ID |
| **10MHz** | Level above 1.0Vp-p |
| **Word Clock** | Level above 0.5Vp-p |
| **DARS** | Sync word valid |
| **LTC** | Level above 0.3Vp-p<br>Sync word valid |
| **GPI** | Input high |

### 4.4.7. Ethernet

| | |
|---|---|
| **Network Type** | Gigabit Ethernet 1000Base-T IEEE 802.3u standard for 1000Mbps baseband CSMA/CD local area network<br>Fast Ethernet 100 Base-TX IEEE 802.3u standard for 100 Mbps baseband CSMA/CD local area network<br>Ethernet 10 Base-T IEEE 802.3 standard for 10 Mbps baseband CSMA/CD local area network |

The 5700ACO is designed to be used with either 10Base-T (10 Mbps), 100Base-TX (100 Mbps) also known as *Fast Ethernet* or 1000Base-T (1000 Mbps) also known as Gigabit Ethernet, twisted pair Ethernet cabling systems. When connecting for 10Base-T systems, category 3, 4, or 5 UTP cable as well as EIA/TIA – 568 100Ω STP cable may be used. When connecting for 100Base-TX systems, category 5 UTP cable is required. When connecting to 1000Base-T systems, category 5 or higher UTP

or STP cable is required. The cable must be “straight through” with a RJ-45 connector at each end. Make the network connection by plugging one end of the cable into the RJ-45 receptacle of the 5700ACO and the other end into a port of the supporting Ethernet switch.

| | |
|---|---|
| **Connector** | RJ-45 |
| **Function** | *Vista*LINK® control and status monitoring |

#### 4.4.8. Electrical

| | |
|---|---|
| **Power** | Auto ranging 100 - 240 Volts AC, 50/60 Hz, 80 VA |
| **Configuration** | Dual redundant supplies |
| **Fuse Rating** | 250 V, 1 amp, time delay |
| **Safety** | ETL Listed, complies with EU safety directives |
| **EMI/RFI** | Complies with FCC Part 15 Class A regulations<br>Complies with EU EMC directive |

#### 4.4.9. Physical

| | |
|---|---|
| **Dimensions** | 19” W x 3.5” H x 11.5” D<br>(483mm W x 90mm H x 292mm D) |
| **Weight** | 16 lbs. (7.0Kg) |

## 4.5. UPGRADING THE FIRMWARE

### 4.5.1. Overview

The firmware in the 5700ACO is contained on a FLASH EPROM. From time to time firmware updates will be provided to add additional features to the unit.

The following equipments are needed in order to update the Firmware:

- PC with available communications port. The communication speed is 57600 baud, therefore a 486 PC or better with a 16550 UART based communications port is recommended.
- “Straight-thru” serial extension cable (DB9 female to DB9 male) or (DB25 female to DB9 male).
- Terminal program that is capable of Xmodem file transfer protocol. (such as TeraTerm)
- New firmware supplied by Evertz.

### 4.5.2. Terminal Program Setup

1. Connect the serial cable to the COM DB9 connector on the rear panel **or** the DB9 on the PCB inside the front panel.

2. Connect the 9 pin connector on the end of the serial update cable to the PCs' RS-232 communications port.

3. Move the jumper J14 to the UPGRADE position.

4. Start the terminal program.

5. Configure the port settings of the terminal program as follows:

| | |
|---|---|
| Baud | **57600** |
| Parity | **No** |
| Data bits | **8** |
| Stop bits | **1** |
| Flow Control | **None** |

6. An alternative to moving the jumper in step 3 is to enter the upgrade via the menu system.

### 4.5.3. Initiating Firmware Upgrade Mode from the Terminal Program

The following is a list of possible reasons for failed communications:

- Defective Serial Upgrade cable.
- Wrong communications port selected in the terminal program.
- Improper port settings in the terminal program. (Refer to step 4 for settings). Note that HyperTerminal will not change port settings while connected. Click on HyperTerm's "Disconnect" Button then click the "Reconnect" button to activate changes to the port settings.

1. Apply power to the unit. After the unit powers up, a banner with the boot code version information should appear in the terminal window, followed by "UPLOAD FILE NOW, CONTROL-X TO CANCEL"

   For example:

```
EVERTZ MCF5272 MONITOR 2.3 BUILD 3 (66 MHZ)
COPYRIGHT 1997, 1998, 1999, 2000, 2001, 2002 EVERTZ MICROSYSTEMS LTD.
28F160C3B FLASH DETECTED
BRD=5700ACO
MODEL=BA5700ACO
PROD=5700ACO
FRAME=7700FR
UPGRADE JUMPER INSTALLED

UPLOAD FILE NOW, CONTROL-X TO CANCEL
```

### 4.5.4. Uploading the New Firmware

1. You should now see a prompt asking you to upload the file.
2. Upload the "*.bin" file supplied using the X-Modem transfer protocol of your terminal program. If you do not start the upload within 10 minutes the unit's Boot code will time out. You can restart the upgrade process by power cycling the unit.

   The 5700ACO application firmware in the bin file will have a name similar to:
   5700ACO.bin

3. The boot code will indicate whether the operation was successful upon completion of the upload.

   For Example:

```
UPLOAD OKAY
MFC5407 WARM BOOT> |
```

4. The following is a list of possible reasons for a failed upload:

   - If you get the message "transfer cancelled by remote" you must restart the terminal program and load the bin file, then remove and install the module again.
   - The supplied "*.bin" file is corrupt.
   - Wrong file specified to be uploaded.
   - Wrong file transfer protocol used – make sure you specify Xmodem, not Xmodem 1K.
   - The PCs' RS-232 communications port cannot handle a port speed of 57600.
   - Noise induced into the Serial Upgrade cable.

### 4.5.5. Completing the Upgrade

1. Ensure the upgrade jumper is set to RUN. Power cycle the unit. The unit should now reboot.

2. You can now close the terminal program and disconnect the RS-232 serial cable from the PC.

## 4.6. SERIAL PORT CONFIGURATION AND STATUS

The COM serial port is used to configure the 5700ACO and read back status.

Connect a straight through serial cable (supplied with the 5700ACO) between the COM serial port on the rear panel and a PC's serial port. Start TeraTerm (or an equivalent terminal program) on the PC and configure the port settings of the terminal program as follows:

| | |
|---|---|
| Baud | **57600** |
| Data bits | **8** |
| Parity | **None** |
| Stop bits | **1** |
| Flow Control | **None** |

Once the unit is powered-up, the TeraTerm connection displays boot-up status information and once completed, ends with the “Status Message” as shown below:

```
Initialization Completed – 5700ACO Running
```

Press the <Enter> key to see the main Menu. In the Main Menu, the following options are present for module configuration.

```
 ---------------------------------------------
|                   Main Menu                 |
|           (5700ACO 1.8.1 b19029)            | < 5700ACO Firmware Version Information
 ---------------------------------------------

(1) Network Configuration
(2) SNMP Configuration
(3) Voting Control
(4) Show status
(5) Upgrade
```

### 4.6.1. Network Configuration

1) **Network Configuration** - set the IP parameters for this 5700ACO

```
ip address:           192.168.1.200
netmask address:      255.255.255.0
gateway:              0.0.0.0
broadcast address:    192.168.1.255
DHCP enabled:         False
---------------------------------
(1) Set IP Address
(2) Set Netmask
(3) Set Gateway
(4) Set Broadcast Address
(5) Use DHCP
(6) Enable Ethernet

(S) Save and exit
(X) Exit without saving
```

### 4.6.2. SNMP Configuration

2) **SNMP Configuration** – set the TRAP destination IP address which originate at this 5700ACO (if enabled)

```
-------------------------------------------------
Trap Destination 1: 192.168.1.88
-------------------------------------------------
(1) Set Trap IP Address
(2) Remove Trap IP Address

(S) Save and exit
(X) Exit without saving
```

### 4.6.3. Voting Control

3) **Voting Control** – set which input channel pair is included in the voting pool.

---- 5700 ACO Voting Control ----

(1) Sync 1
(2) Sync 2
(3) Sync 3
(4) Sync 4
(5) Sync 5
(6) Sync 6
(7) LTC 1
(8) LTC 2
(9) GPO 1
(10) GPO 2
(11) Ten MHz
(12) Word Clock
(13) Balanced AES 1
(14) Balanced AES 2
(15) Balanced DARS
(16) Unbalanced AES 1
(17) Unbalanced AES 2
(18) Unbalanced AES 3
(19) Unbalanced DARS
(20) Global enable individual channel voting.

(S) Save and Exit
(X) Exit

**NOTE: (20) Enable channel voting is a global enable. If this is not enabled, then all the items from 1 to 28 are not valid, and act as if they are set to be included in voting.**

### 4.6.4. Show Status

(4) **Show Status** – shows a synopsis of all of the above 3 items, and also shows the status of all input channels. There are no settable controls under this menu item.

Software V1.0 34

Trap destinations
---
Community Strings
Read-Only: |public|
Read-Write: |private|
---
IP address: 192.168.8.98
netmask address: 255.255.255.0
gateway: 192.168.8.10
broadcast address: 192.168.8.255
DHCP enabled: False
Ethernet: enabled
---
In voting, I = included, E = excluded.
Individual channel voting enabled.
Sync 1 = I. Sync 2 = I. Sync 3 = I. Sync 4 = I. Sync 5 = I. Sync 6 = I.
LTC 1 = I. LTC 2 = I. GPO 1 = I. GPO 2 = I.
Word Clock = I. Ten MHz = I.
Balanced AES 1 = I. Balanced AES 2 = I. Balanced DARS = I.
Unbalanced AES 1 = I. Unbalanced AES 2 = I. Unbalanced AES 3 = I. Unbalanced DARS = I.
---
Input status. A = present on input A, a = not present on input A
B = present on input B, b = not present on input B
Sync 1 = abSync 2 = abSync 3 = ab
Sync 4 = abSync 5 = abSync 6 = ab
LTC 1 = abLTC 2 = abGPO 1 = ABGPO 2 = AB
Ten MHz = abWord Clock = ab
Balanced AES1 = ab Balanced AES2 = ab Balanced DARS = ab
Unbalanced AES1 = abUnbalanced AES2 = abUnbalanced AES3 = abUnbalanced DARS = ab
Power Supply Left = FAIL. Power Supply Right = OK
Temperatures (deg C): CPU = 31, FPGA = 41, PS Left = 26, PS Right = 25
Fans: Front Left OK Rear Left OK Front Right OK Rear Right OK
Door is Open. Current output selected is B

### 4.6.5. Upgrade

5) **Upgrade** – enters an upgrade mode for firmware upgrades. If entered you will be prompted again to be sure you wish to do an upgrade. See section 4.5.4 above for details on how to complete the upgrade.

# 5. *VISTA*LINK® CONFIGURATION AND CONTROL

*Vista*LINK® is Evertz's remote monitoring and configuration platform which operates over an Ethernet network using Simple Network Management Protocol (SNMP). SNMP is a standard computer network protocol that enables different devices sharing the same network to communicate with each other. *Vista*LINK® provides centralized alarm management, which monitors, reports, and logs all incoming alarm events and dispatches alerts to all the VLPro Clients connected to the server. Device configuration through *Vista*LINK® PRO can be performed on an individual or multi-unit basis using simple copy and paste routines, which reduces the time to configure each unit separately. Finally, *Vista*LINK® enables the user to configure devices in the network from a central station and receive feedback that the configuration has been carried out.

There are 3 components of SNMP:

1. An SNMP manager, also known as a Network Management System (NMS), is a computer running special software that communicates with the devices in the network. Evertz *Vista*LINK®-C Configuration Utility graphical user interface (GUI), third party or custom manager software may be used to monitor and control Evertz *Vista*LINK® enabled products.

2. Managed devices (such as 5700ACO), each with a unique address (OID), communicate with the NMS through an SNMP Agent. The 5700ACO communicate directly with the manager using its internal mini-Agent.

3. A virtual database, known as the Management Information Base (MIB), lists all the variables being controlled, which both the Manager and Agent understand. Please contact Evertz for further information about obtaining a copy of the MIB for interfacing to a third party Manager/NMS.

## 5.1. CONNECTING THE 5700ACO TO *VISTA*LINK®

Follow the instructions in section 2.1.4 to connect the 5700ACO to the Ethernet network. Once you have established a physical connection you will need to set up the IP address, subnet, and SNMP TRAP destination addresses of the 5700ACO using the procedure in section 4.6.1.

### 5.1.1. Installing VISTALINK®

In order to control the 5700ACO, you will need at least version 10.5.4 or later of the *Vista*LINK®-C configuration tool. If you received the *Vista*LINK® Toolkit CD-ROM with the 5700ACO, insert it into the PC's CD-ROM drive. In a few seconds a screen will appear with a menu guiding you through the *Vista*LINK® installation. You want to press the button to install the *Vista*LINK-C Configuration tool.

If you have an older version of *Vista*LINK®, or you are upgrading firmware in an existing 5700ACO and do not have *Vista*LINK® contact the Evertz customer support department to receive your free copy of the *Vista*LINK®-C Configuration utility.

### 5.1.2. Using VistaLINK® to Configure the 5700ACO

The 5700ACO should be auto-discovered by *Vista*LINK® PRO and appear under the *Hardware* section of the *Vista*LINK® PRO Navigation Tree named with its given IP Address. If the 5700ACO is not auto-detected (because it is on another subnet) it can be manually added by right clicking the *Hardware* node and selecting *Add/Update frame*.

Right click the discovered 5700ACO to open the *Configuration View* screen. The screen is broken into ten tabs. To view the other screens, click on the appropriate tab of the configuration screen.

Once you have finished configuring the 5700ACO items on the configuration screen you can save the configuration in *Vista*LINK®. You can also send it to the 5700ACO by pressing the *Apply* button on the *Vista*LINK® toolbar.

## 5.2. GENERAL CONTROL

The *General Control* section enables the user to set specific switch controls for the changeover feature.

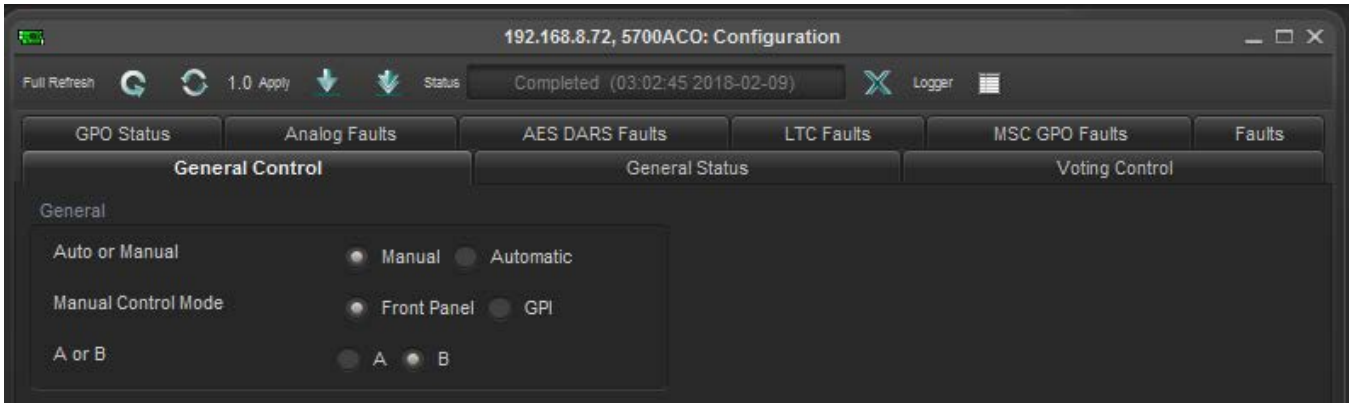



**Figure 5-1 : *Vista*LINK® – General Control**

**Auto or Manual:** Enables the user to specify manual or automatic control of the module.

**Manual Control Mode:** When in *Manual* mode, this selects the type of manual control. Front Panel control or GPI control can be selected.

**A or B:** When the *Manual/FrontPanel* control mode is selected, these radio buttons allow remote control of which bank is active. Clicking on these buttons will initiate a switch to the selected bank. These buttons will be greyed out (disabled) when not in the *Manual/FrontPanel* control mode.

## 5.3. GENERAL STATUS

The *General Status* section indicates the status of various parameters for the 5700ACO. These status conditions will not be updated live unless the auto refresh is enabled.

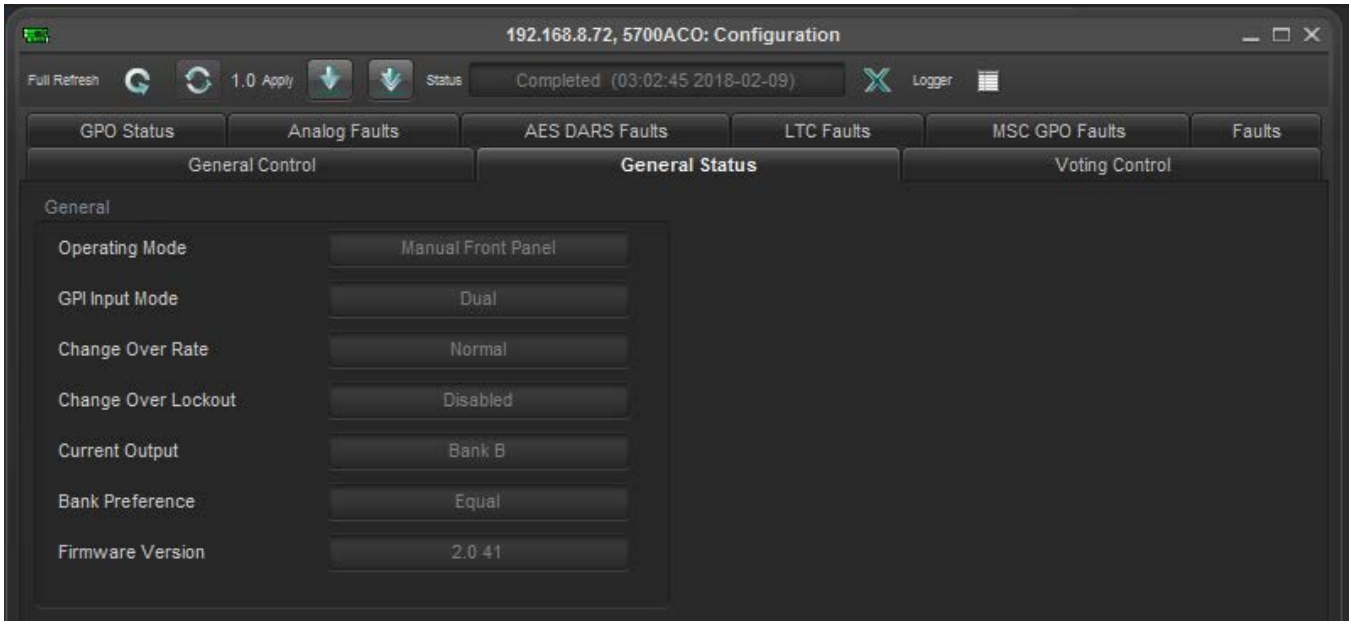



**Figure 5-2 : *Vista*LINK® – General Status**

**Operating Mode:** This field indicates the operating mode which is currently in use. This can be set in the General Control section or by the switches on the main board (See section 3.2).

**GPI Input Mode:** This field indicates the GPI input mode which is currently in use. The type of GPI control is set with the DIP switches (See section 3.1.1).

**Change Over Rate:** This field displays the change over rate that has been selected by the DIP switches (See section 3.3.2).

**Change Over Lockout:** This field indicates what kind of change limiting has been selected. Change limiting is controlled by DIP switches 7 and 8 (See section 3.3.4).

**Current Output:** Displays which bank is selected as the current output of the 5700ACO.

**Bank Preference:** This field reports which bank is preferred by 5700ACO. The bank preference is set by the bank priority DIP switches (See section 3.3.3).

**Firmware Version:** This field displays the current firmware version.

## 5.4. VOTING CONTROL

The *Voting Control* section is used to configure how the 5700ACO makes decisions regarding valid signals. It also decides when to switch to the backup signals.

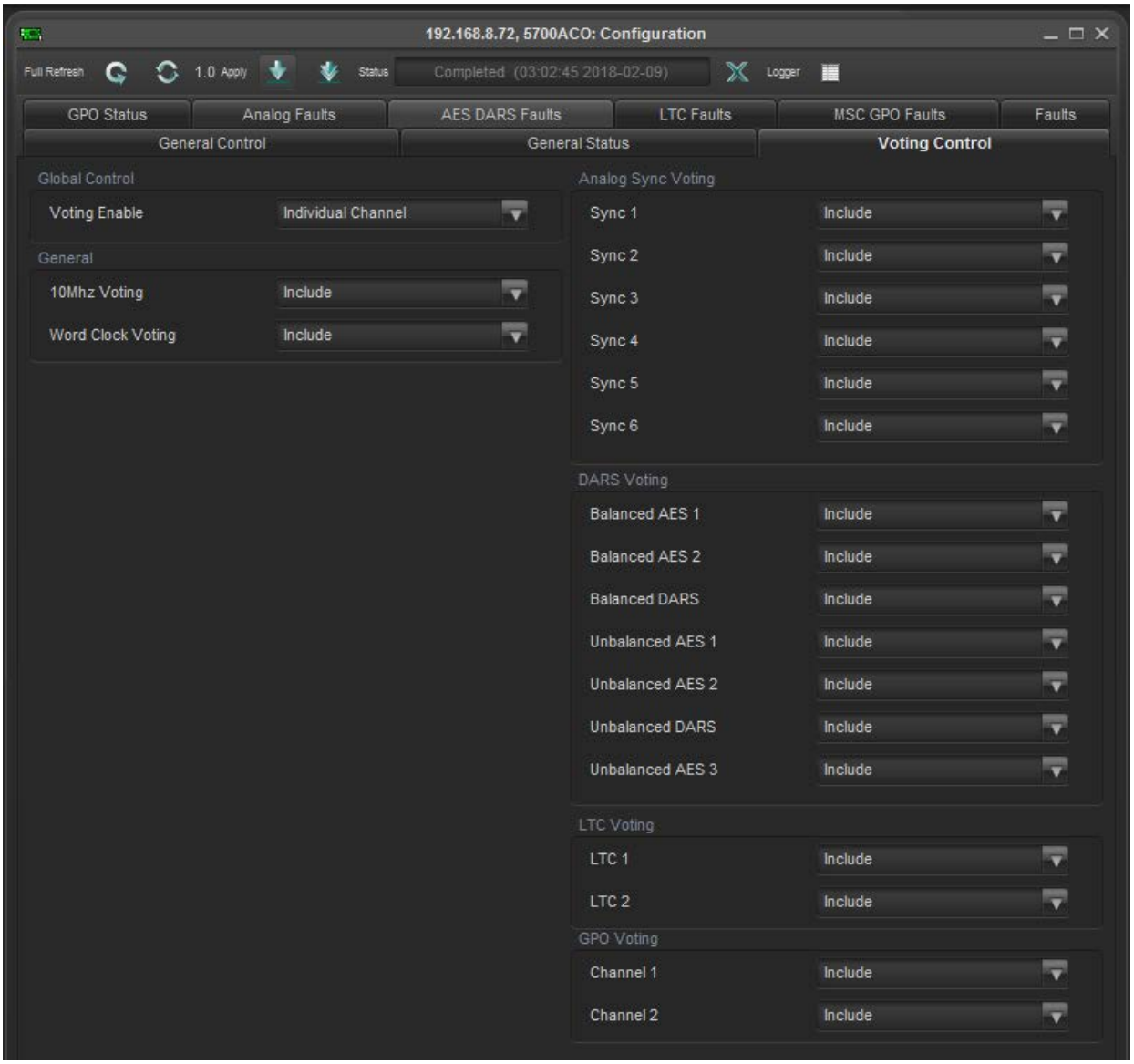
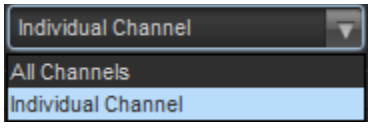



**Figure 5-3 : *Vista*LINK® – Voting Control**

**Globe Control**




**Voting Enable:** This dropdown allows the user to select if all inputs are monitored or if channels are individually included or excluded from the voting process to drive auto-changeover logic.

## General


**10Mhz voting:** If this field is set to include, the 10Mhz input status will be included in the voting process. If set to exclude, the input will not be included in the process.

**Word Clock Voting:** If this field is set to include, the word clock input status will be included in the voting process. If set to exclude, the input will not be included in the process.

## Analog Sync Voting

There are six analog sync outputs that can be monitored. For brevity, only Sync 1 will be explained in the manual.

**Sync1:** If this field is set to include, the Sync1 inputs will be monitored for presence. If set to exclude, these inputs will not be included in the process.

## DARS Voting

For brevity, only *Balanced AES 1 and Balanced Dars* will be discussed in the manual.

**Balanced AES1:** If this field is set to include, Balanced AES1 will be included in the voting process. If set to exclude, the signal will not be included in the process.

**Balanced DARS:** If this field is set to include, Balanced DARS will be included in the voting process. If set to exclude, the signal will not be included in the process.

## LTC Voting

For brevity, only *LTC 1* will be discussed in the manual.

**LTC1:** If this field is set to include, LTC1 will be included in the voting process. If set to exclude, the input will not be included in the process.

## GPO Voting

For brevity, only *Channel 1* (GPO 1) will be discussed in the manual.

**Channel 1:** If this field is set to include, Channel 1 will be included in the voting process. If set to exclude, the input will not be included in the process.

## 5.5. GPO STATUS

The *GPO Status* section enables the user to view the status of various GPO Input and Output conditions for the 5700ACO. These status conditions will not be updated live unless the auto refresh is enabled.

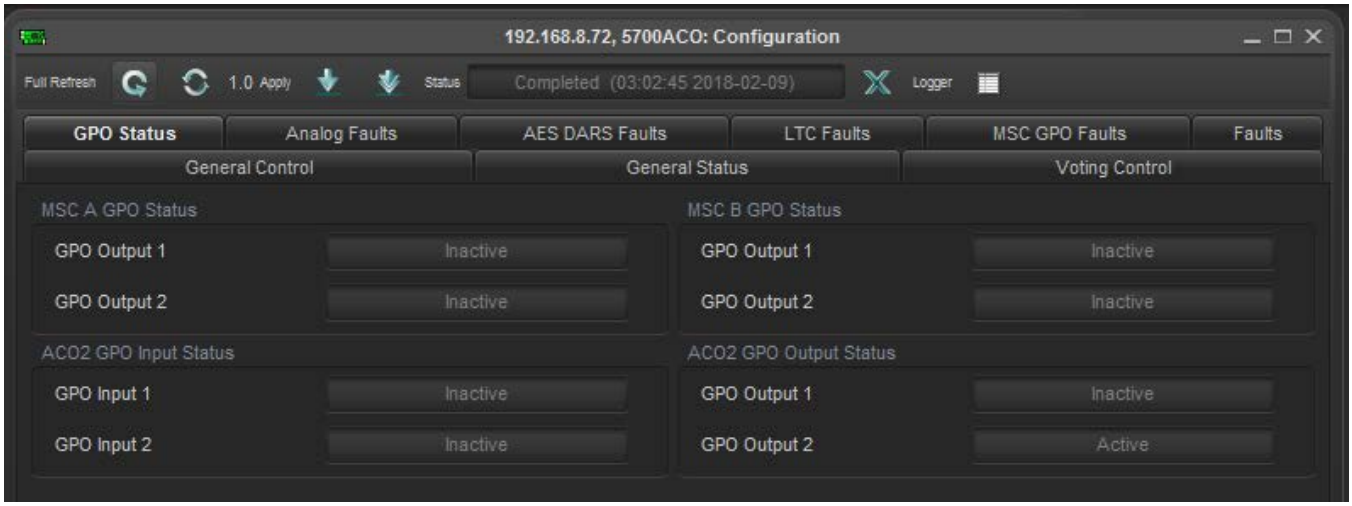



**Figure 5-4 : *Vista*LINK® – GPO Status**

**MSC A GPO Status:** This section indicates the status of the two GPOs from the 5700MSC-IP on bank A. An "Active" condition means the GPO is being asserted by the 5700MSC-IP (pulled low). The 5700MSC-IP can be configured to activate the GPOs on various fault conditions such as fan failure or GPS loss.

**MSC B GPO Status:** This section displays the status of the two GPOs from the 5700MSC-IP on bank B.

**ACO GPO Input Status:** This section indicates the current status of GPO inputs of the 5700ACO.

**ACO GPO Output Status:** This section indicates the current status of GPO outputs of the 5700ACO. See section 3.4 for information on how these GPOs operate.

## 5.6. 5700ACO FAULT TRAP CONTROLS

Figure 5-5 to Figure 5-9 5-9 show the 5 tabs used to determine which SNMP trap messages will be sent by the 5700ACO.

### 5.6.1. Analog Faults

The *Analog Faults* section, as illustrated in Figure 5-5, allows the user to enable or disable Analog traps and view trap status. To enable a particular trap, simply click the box located beside each trap so that a check-mark appears. When a check-mark is present, the trap is enabled. When a check-mark is not present, the trap is disabled.

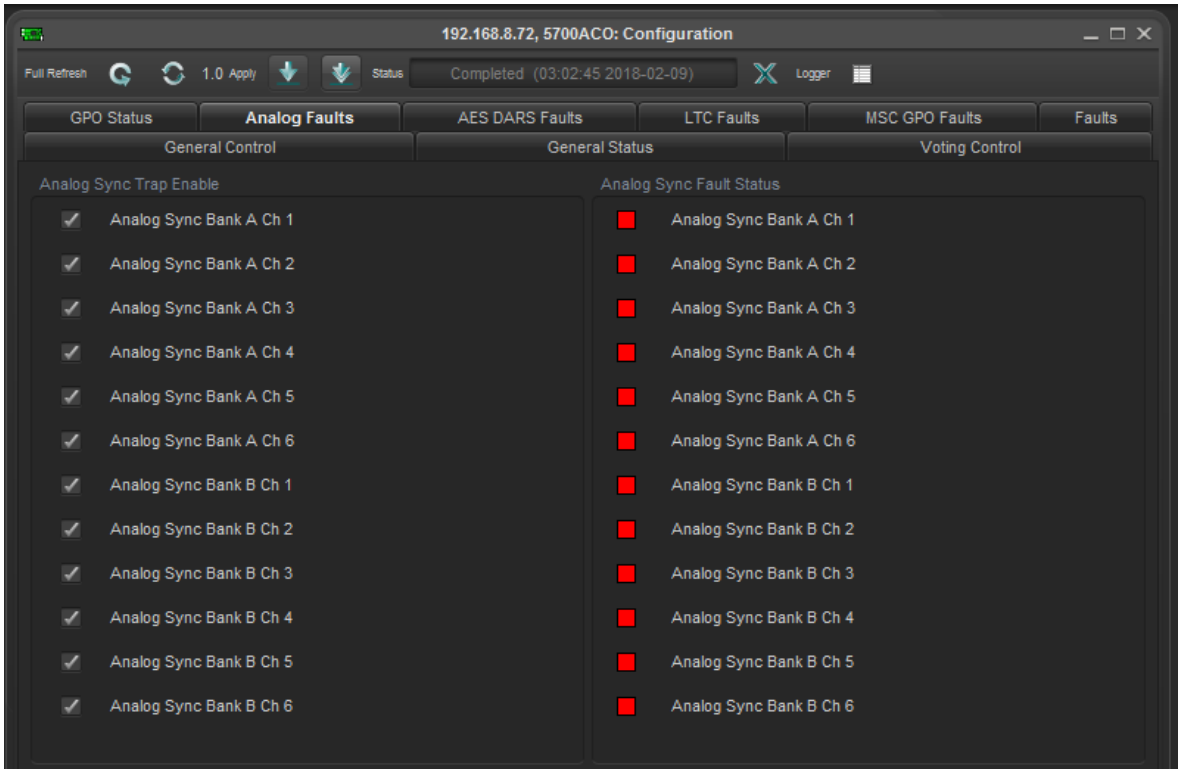



**Figure 5-5 : *Vista*LINK® – Analog Faults**

### 5.6.2. AES DARS Faults*

As illustrated in Figure 5-6, this section allows the user to enable AES DARS traps and monitor the trap status.

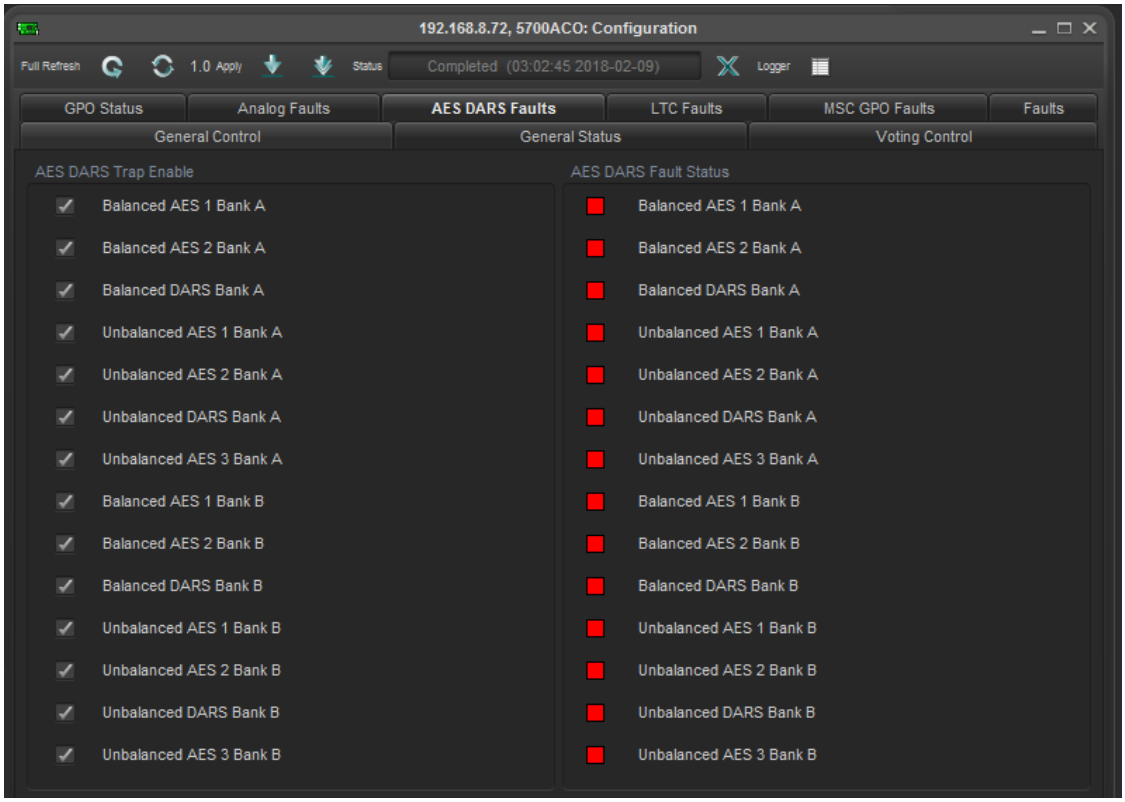



**Figure 5-6 : *Vista*LINK® – AES DARS Faults**

To enable a particular trap, simply click the box located beside each trap so that a check-mark appears. When a check-mark is present, the SNMP trap is enabled. When a check-mark is not present, the trap is disabled.
The *AES DARS Fault Status* section displays whether a fault is active or not. If the box is green, then the corresponding fault is not active. If the box is red, then the corresponding fault is active.

* Requires factory installed +AUX hardware option on 5700MSC-IP, IP Master Clocks are available at extra cost.

### 5.6.3. LTC Faults

The *LTC Faults* section, as illustrated in Figure 5-7, allows the user to enable LTC traps and monitor the trap status.

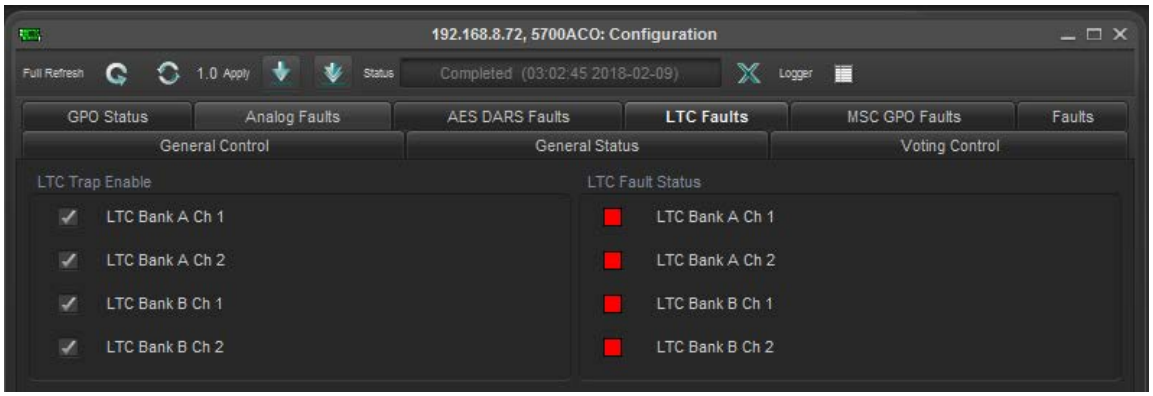



**Figure 5-7 : *Vista*LINK® – LTC Faults**

To enable a particular trap, simply click the box located beside each trap so that a check-mark appears. When a check-mark is present, the SNMP trap is enabled. When a check-mark is not present, the trap is disabled.
The *LTC Fault Status* section displays whether a fault is active or not. If the box is green, then the corresponding fault is not active. If the box is red, then the corresponding fault is active.

* Requires factory installed +AUX hardware option on 5700MSC-IP, IP Master Clocks are available at extra cost.

### 5.6.4. MSC GPO Faults

This section, as illustrated in Figure 5-8, allows the user to enable MSC GPO traps and monitor the trap status.

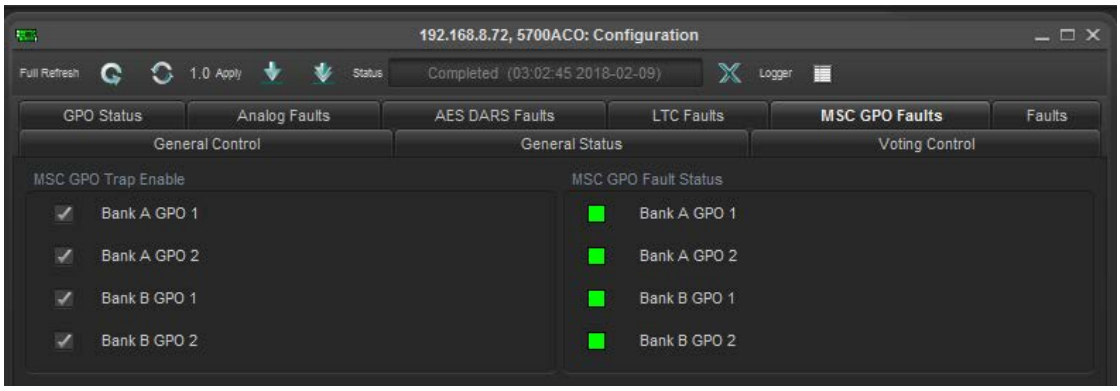



**Figure 5-8 : *Vista*LINK® – MSC GPO Faults**

To enable a particular trap, simply click the box located beside each trap so that a check-mark appears. When a check-mark is present, the SNMP trap is enabled. When a check-mark is not present, the trap is disabled.
The *MSC GPO Fault Status* section displays whether a GPO is activated or not. An activated GPO indicates a fault condition. If the box is green, then the corresponding GPO is not active. If the box is red, then the corresponding GPO has been activated by the 5700MSC-IP.

* Requires factory installed +AUX hardware option on 5700MSC-IP, IP Master Clocks are available at extra cost.

### 5.6.5. Faults

The *Faults* tab, as illustrated in Figure 5-9, allows the user to enable a variety of traps such as *Ten MHz*, *Word Clock*, *Current Output*, *Power Supply*, *Fan*, *Door Open* traps.

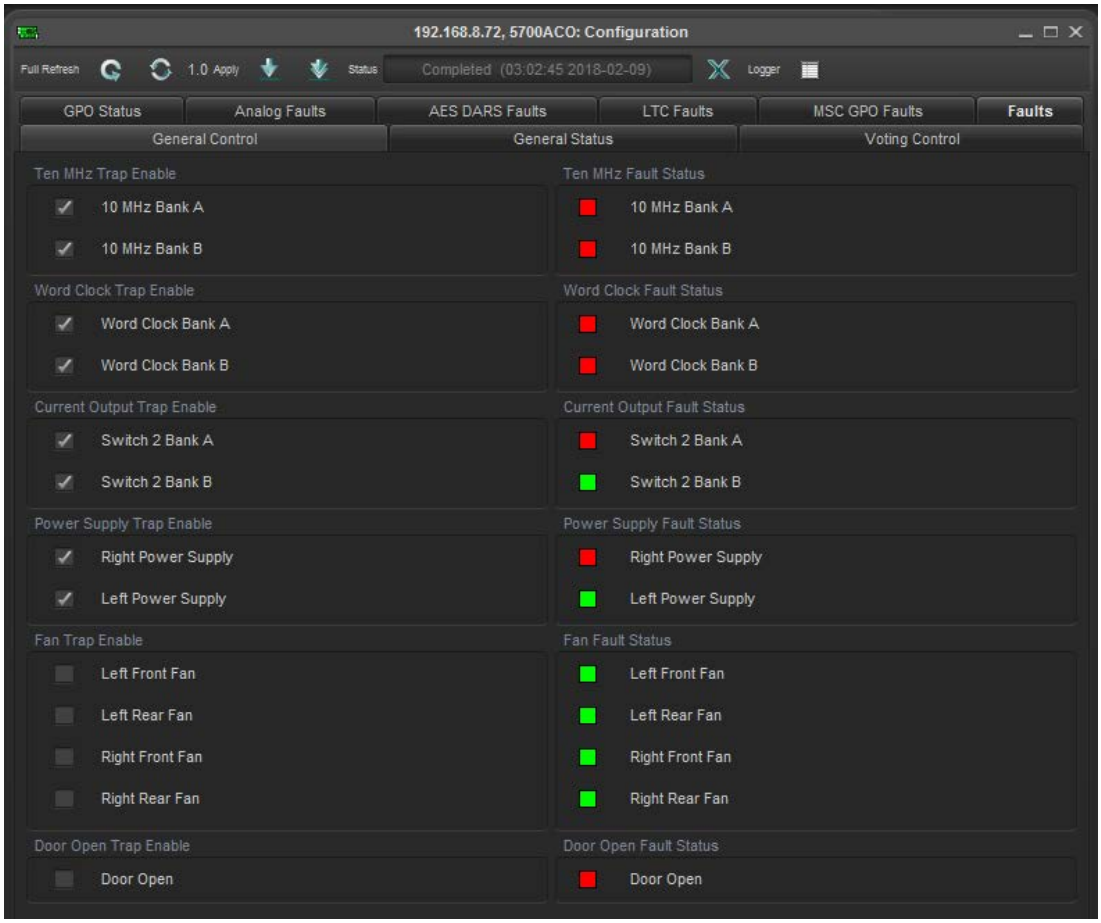



**Figure 5-9 : *Vista*LINK® – Faults**

To enable a particular trap, simply click the box located beside each trap so that a check-mark appears. When a check-mark is present, the trap is enabled. When a check-mark is not present, the trap is disabled.

The *Fault* section defines whether the respective fault is active or not. If the box is green, then the corresponding fault is not active. If the box is red, then the corresponding fault is active.