



MasterMind

SPG/TSG
CHANGEOVER

330-00-xx USER GUIDE

Issue 1.3

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1. APPLICATION

The Trilogy MasterMind Changeover unit, type 330-00-xx, provides failure detection for a pair of synchronising pulse generators (SPGs), and the mechanism to switch between them automatically or manually.

This manual covers a number of variants of the MasterMind product, as shown by the xx part number suffix. Although the unit is designed as a companion to the Trilogy Mentor XL SPGs, the 330-00-xx may be used for any monitoring and/or switching purpose, and with SPGs of other manufacture.

As standard, a single 330-01-00 or 330-12-00 module provides monitoring of sync pulse and colour burst level, for both A (main) and B (reserve) black/burst SPG feeds. Changeover is effected by relay, defaulting to the “A” channel on power fail.

An additional 330-07-00 three channel relay board is also fitted as standard to allow other feeds to be switched. Typical applications include switching of test signals or pulse outputs.

An optional SDI monitoring and changeover module is also available. This decodes the data stream and checks for the presence of the correct timing/framing words. Active buffers effect the changeover.

Modular in its construction, the 330-00-xx allows (over and above the standard configuration) up to 6 additional modules to be fitted. One slot is reserved for an AES/EBU digital audio module. The 5 remaining slots might typically be used to provide the unit with a total of three black/burst modules and two serial digital video modules.

Alternatively a second relay changeover module may be fitted in place of two of these additional modules, to provide a total of six changeover relays for miscellaneous video feeds.

1.1 Available Options

A 330-00-xx changeover unit has 9 “slots” into which modules may be fitted. Optional modules occupy a specific number of these slots as follows:

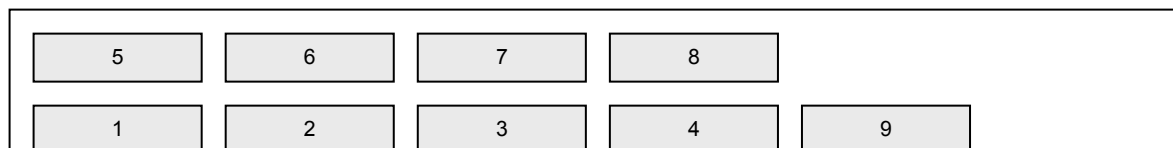
Module	Description	Number of slots	Status
330-01-00	Black/burst monitoring module	1	O
330-02-00	SDI monitoring module (maximum of 2)	1	O
330-03-00	Triple relay switching module (maximum of 1)	2	O
330-06-00	AES/EBU monitoring module	1	O
330-07-00	Triple relay switching module	2	C
330-08-00	5 channel “balanced” relay module	1	C
330-09-00	AES/EBU monitoring module	1	C
330-11-00	SD/HD-SDI monitoring module	1	C
330-12-00	Black/burst detection and switching module	1	C

Notes:

- Status “C” indicates current production items late-2008. Items marked “O” are being phased out.
- 330-08-00 module can switch balanced audio, AES, RS422, LTC or other similar signal.

1.2 Position of option boards

The 330-00-xx chassis has 9 slots for fitting detection and changeover modules: these are shown in the diagram below.



View from the rear of 330-00-xx chassis

There are some restrictions on the location of module types, as shown below.

Module	Description	Number of slots	Default Location	Extra Locations
330-01-00	Black/burst monitoring module	1	3	7,8
330-02-00	SDI monitoring module (max of 2)	1	-	7,8
330-07-00	Triple relay switching module	2	1+2	5+6
330-08-00	5 channel "balanced" relay module	1	-	9
330-09-00	AES/EBU monitoring module	1	-	4
330-11-00	SDI monitoring module	1	-	7,8
330-12-00	Black/burst detection and switching module	1	3	7,8

Standard module provision is:

- Qty 1 - 330-07-00 Triple relay switching module in slots 1 + 2
- Qty 1 - 330-01-00 / 330-12-00 Black/burst monitoring / changeover module in slot 3.

Any additional modules will be factory fitted following the guidelines shown in "extra locations" above.

1.3 Module Identification

To aid identification, modules with BNC connectors are fitted with a coloured plastic ring, visible from the outside of the chassis. See the table below for details.

Module	Description	Ident ring colour
330-01-00	Black/burst monitoring module	Black
330-02-00	SDI monitoring module (max of 2)	Red
330-07-00	Triple relay switching module	Orange
330-11-00	SDI monitoring module	Blue
330-12-00	Black/burst detection and switching module	Violet

1.4 Technical Support

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Please contact Trilogy at the UK headquarters.

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Toll Free Phone and Fax from US: 800-372-3198

In other regions please contact your local dealer. Up to date contact details may be found at www.trilogycomms.com.

1.5 Warranty

Conditions of the warranty may vary according to your terms of purchase. Please consult your sales documentation or if in doubt, contact the offices above, quoting date of purchase and unit serial number.

1.6 Unpacking

Carefully unpack the unit from its transit material and check the unit for signs of damage. Check the contents of the box against our despatch note and your original order to ensure that you have received the correct parts.

In the event that the unit has been damaged or does not match your order, contact Trilogy at the address given at the front of this guide immediately.

2. INSTALLATION

2.1 Rack Mounting

The 1U rack frame has integral 19" mounting ears for direct mounting in a standard 19" rack. Carefully place the unit in your rack and firmly attach it to the rack using 4 bolts.

IMPORTANT: This unit has air intakes on one side of the unit and fan assisted exhaust vents on the other side of the unit. Ensure that these have an unobstructed air flow, otherwise the unit will overheat. Pay particular attention to ensure that any rack wiring or cable trays do not obstruct the vent. 60mm of clear space should be allowed between the vents and any potential obstruction.

2.2 Mains Connection and Fusing

Important

Power Supply Cord Used as Disconnect Means

CAUTION: THE POWER SUPPLY CORD IS USED AS THE MAIN DISCONNECT DEVICE. ENSURE THAT THE SOCKET-OUTLET IS LOCATED/INSTALLED NEAR THE EQUIPMENT AND IS EASILY ACCESSIBLE.

ATTENTION: LE CORDON D'ALIMENTATION EST UTILISÉ COMME INTERRUPTEUR GÉNÉRAL. LA PRISE DE COURANT DOIT ÊTRE SITUÉE OU INSTALLÉE À PROXIMITÉ DE L'ÉQUIPMENT ET ÊTRE FACILE D'ACCÈS.

The MasterMind is fitted with a single switch mode mains power supply, which will cope automatically with a wide input voltage range (see specification, section 7), connected via an IEC mains plug on the rear of the unit. This should be wired according to the instructions provided with a mating mains socket using suitable cable. See below for earthing requirements.

Mains cable conductors are to be three core (two wire with ground) wire gauge 18 AWG (cross sectional area 0.75mm²) Jacket to be SJT.

Covers are only to be removed by trained personnel. Shock hazard exists with covers removed; therefore disconnect mains supply before removal. Interconnection between circuit boards and panels are all SELV as defined by IEC/EN/CSA/UL 60950-1-200X. The equipment signal connections must only be connected to SELV circuits to prevent hazards from improper connection.

2.3 Earthing Requirements

The unit is provided with a single 4mm earthing stud on the rear panel. Incoming mains earth from the IEC connector is internally bonded to both the chassis and technical 0V to meet safety requirements and performance specifications. The stud allows the addition of an earth strap, if required, in rack installations.

2.4 Remote Connector Pinout

The chassis is fitted with a fixed 25 way Sub-D socket. This gives indications of the unit status, and allows remote control of the selected through path. All inputs and outputs are Grounded for the function stated. Pins are outputs unless indicated otherwise.

PIN	FUNCTION
1	B Input Selected.
2	Combined A Fail.
3	Combined B Fail.
4	Main PSU Fail.
5	Combined Module Regulator Fail.
6	INPUT. Force Output to A. (Option: Module 1A Fail Output).
7	INPUT. Force Output to B. (Option: Module 1B Fail Output).
8	Not Used. (Option: Module 2 A Fail).
9	Not Used. (Option: Module 2 B Fail).
10	Black/Burst 1A Fail.
11	Black/Burst 1B Fail.
12	Black/Burst 2A Fail.
13	Black/Burst 2B Fail.
14	SDI 2A Fail.
15	SDI 2B Fail.
16	Option Board A Fail.
17	Option Board B Fail.
18	Black/Burst 3A Fail.
19	Black/Burst 3B Fail.
20	SDI 1A Fail.
21	SDI 1B Fail.
22	Manual Mode.
23	Local Alarms Off.
24	Remote Alarms Off.
25	Ground.

Notes:

- The indication of Manual Mode, Local Alarms Off and Remote Alarms Off are **not** inhibited by setting the Remote Alarms switch to Off.
- The options indicated on pins 6 & 7 are only available if the Relay Changeover Card (330-03-00 / 330-07-00) is **not** fitted, when additional option cards may be fitted.

2.5 330-06-00 / 330-09-00 AES/EBU Monitoring Module

The chassis is fitted with a fixed 15 way Sub-D socket.

PIN	FUNCTION
1	Ground/Chassis
2	Main 1 input -
3	Reserve 1 input -
4	Output 1+
5	Main 2 input +
6	Reserve 2 input +
7	Ground/Chassis
8	Output 2-
9	Main 1 input +
10	Reserve 1 input +
11	Ground/Chassis
12	Output 1-
13	Main 2 input -
14	Reserve 2 input -
15	Output 2+

2.6 330-08-00 5 channel relay module for balanced audio

This module is suitable for switching analogue audio, LTC, RS232, AES audio or other similar signals (without monitoring). The chassis is fitted with a fixed 37 way Sub-D socket.

The table below shows connector pins for each channel in the form (+,-) for balanced audio.

Channel	Main Input	Reserve Input	Output	Chassis
1.	20,2	22,4	21,3	1
2.	24,5	26,7	25,6	23
3.	27,9	29,11	28,10	8
4.	31,12	33,14	32,13	30
5.	34,16	36,18	35,17	15

Pins 19 and 37 are also connected to chassis.

3. CONFIGURATION

All configuration controls are located behind the front panel. To open, unscrew the latches in the direction indicated, and then pull the front panel towards you. Integral hinge wires allow the front panel to remain attached to the unit.

Behind the panel there are 6 toggle switches, 1 push switch and a bank of dual-in-line switches. Eight LED's visible through the front panel provide an overview of the current unit status; a detailed indication of the status of the unit is displayed on 33 LED's located along the front edge of the main circuit board.

All switches and LEDs are identified by a plate mounted above them.

The function of the switches is described below. The 'Main' Channel is referred to as Channel A. This is the default in the event of a power failure. The 'Reserve' Channel is referred to as Channel B.

For a full description of the operation of the unit, please refer to section 4.

3.1 Toggle Switches

3.1.1 Delay On/Off

Selects the period for which a failure must persist *before* the output switches to the B channel. It is recommended that the delay is switched **ON** to ensure that the unit does not false trigger on glitches, especially when SDI detector modules are used.

3.1.2 Local Alarm On/Off

Silences the internal alarm and enables an LED instead. A remote output reflects the status as Ground = Local Alarms Off.

3.1.3 Battery On/Off

Isolates the internal batteries. The unit is shipped with the batteries isolated.

Note the batteries cannot be trickle charged unless this switch is on. The batteries are used to:

- a) power the internal alarm in the event of a power failure (itself a fault condition)
- b) provide back-up power to the SDI monitoring module(s), when fitted, to allow a route to be maintained for the 'A' SDI input in the event of power loss.

The battery will last for approximately 2 hours if a single SDI monitoring module is fitted, or 1 hour if two are fitted.

3.1.4 Mode Manual / Auto Select

Allows the operational mode to be selected as Manual or Automatic. The monitoring and alarm functions are not affected. The state of this switch is reflected on a remote output as Ground = Manual Mode.

3.1.5 Select B/A

Allows manual selection of Channel A or B, when switched to Manual Mode.

3.1.6 Remote Alarms On/Off

Disables the Remote Alarm outputs except for Remote & Local Alarm, and Manual Mode. Reflected on Remote Output as Ground = Off.

3.2 Reset

This pushbutton resets the unit if the alarm or the relays are latched. Refer to section 4 (Operation) for full details.

3.3 Channel Disable Switches (labelled Card Present)

The bank of DIL switches can be used to disable the fail outputs of cards which are fitted but unused. The switches can also be used to prevent the unit switching over if the inputs to a particular card must be temporarily disconnected. Set the switches “down” to enable (i.e. card is present) or “up” to disable (i.e. card not present).

3.4 Internal Jumper Links

There are no other user adjustments for this unit. Each module has a number of internal jumper links which should be left at the factory settings. For reference, the jumper links perform the following functions:

330-01-00 Black/Burst Monitoring Module	
J6	Not used
J7	Enables burst level detection Channel B
J8	Enables sync level detection Channel B
J9	Not Used
J10	Enables burst level detection Channel A
J11	Enables sync level detection Channel A
J12	Not used
330-02-00 SDI Serial Digital Video Monitoring Module	
LK101	Allows 27MHz OSC for Channel A to be set - should not be made
LK102	Allows Channel A TRS detector to be checked - should not be made
LK201	Allows 27MHz OSC for Channel B to be set - should not be made
LK202	Allows Channel B TRS detector to be checked - should not be made
330-03-00 / 330-07-00 Triple Relay Changeover Module	
	There are no links on the module.
330-06-00 / 330-09-00 AES/EBU Monitoring Module	
	Refer to section 5.
330-10-00 Main Logic Module	
J20	Disables battery during manufacture
J21	Disables battery during manufacture
J22	Disables remote control Output
J23	Disables remote control Output
330-11-00 SDI Serial Digital Video Monitoring Module	
S1	Not currently used.

4. OPERATION

The precise operation of the unit is determined by the switch settings described above. This section describes the operating principles and the effect of various switch settings.

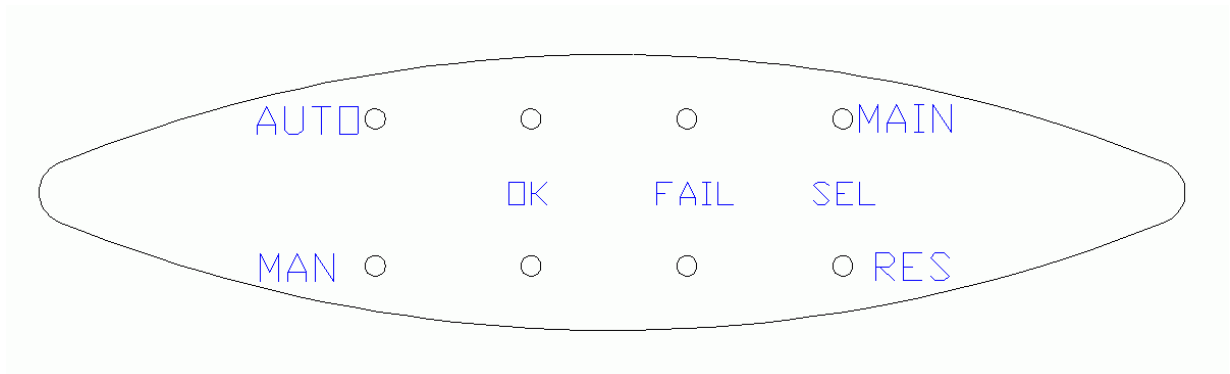
4.1 Operating Principles

The core unit monitors inputs from up to eight Modules, each of which monitors two inputs of its own, designated Channel 'A' and Channel 'B'.

Channel A is the Main input and is the default in the event of a power failure, whereas Channel B is the Reserve. The following modules do not monitor, but change over only when the other modules switch.

- 330-03-00 Triple Relay Switching Module
- 330-07-00 Triple Relay Switching Module
- 330-08-00 5 Channel Relay Module for “balanced audio”

4.1.1 Front Panel LEDs.



LEDs are provided on the front panel to indicate:

- whether automatic or manual operation is selected
- whether the MAIN and/or RESERVE inputs are good
- whether the MAIN and/or RESERVE inputs are failed
- whether the MAIN or RESERVE input is selected

4.1.2 Automatic Operation and Reset Switch.

The unit switches to the B input and the local/remote Alarms will be activated (assuming they are enabled - see above) *only*

a) if any A input fails

and

b) any B input has **not** failed.

In all other cases, the A inputs will be routed to the outputs.

Once B has been selected, it will remain selected and the alarms activated until *either*:

a) any B input fails. In this case the unit will revert to A (and the alarms will remain enabled)

or

b) the reset button is pushed after the A input is restored. This will cancel all alarms.

"Forcing" control inputs on the rear panel D-connector are available that will override the automatically selected output. These are *only* available when the unit is switched to Automatic.

If, in normal operation, a B input fails, the alarms will be activated, and selection of B will not occur, even if an A input subsequently fails.

In all fault conditions, the unit must be reset once the fault has been fixed.

4.1.3 External Fault on the Output of the Unit

An additional feature is provided to detect a fault on the output of the changeover unit.

If the unit detects that an A input has failed, it will switch to B. If a B input then fails within 1 second of it being selected, the unit will flag *both* channels as having failed and latch A as the selected output. A reset will be required to restore normal operation once the fault is cleared.

The assumption, in this situation, is that the fault is caused by equipment external to the SPG/Changeover combination. For example, the cable from the changeover unit may have developed a short circuit.

4.1.4 PSU or regulator failure.

If the main PSU fails, input A will be selected. If the battery switch and local alarms switch is on, PSU failure will be indicated by the audible alarm sounding.

Each module within the unit has separate voltage regulators. Detection of failure of any module's regulators will latch the output to A and light both fail lamps.

4.1.5 Delay Switch (see 3.1.1)

With the Delay Switch set to off, a detected fault will be indicated on the remote connector, and a changeover to the B input effected within 125ms.

With the Delay Switch set to on, the individual alarms on the remote connector will still indicate individual input failures within 125ms, but the Reserve Output will not be selected unless the failure persists for at least 1 second.

4.1.6 Manual Operation

In Manual Mode, the unit follows the A/B select switch (see 3.1.5), but the alarms will still be activated should any failure occur.

4.1.7 Battery on/off

If a SDI Monitoring Module (330-02-00) is fitted, the batteries will provide a short term backup (up to 2 hours) in the event of power supply failure. No other module (including the new SDI Module 330-11-00) needs power to route the Main input to the output. The internal alarm draws negligible current.

It should be noted that disabling the battery back-up will also prevent the batteries from being trickle charged. There will be no supply to the internal alarm either.

5. 330-06-00 / 330-09-00 AES/EBU MONITORING MODULE

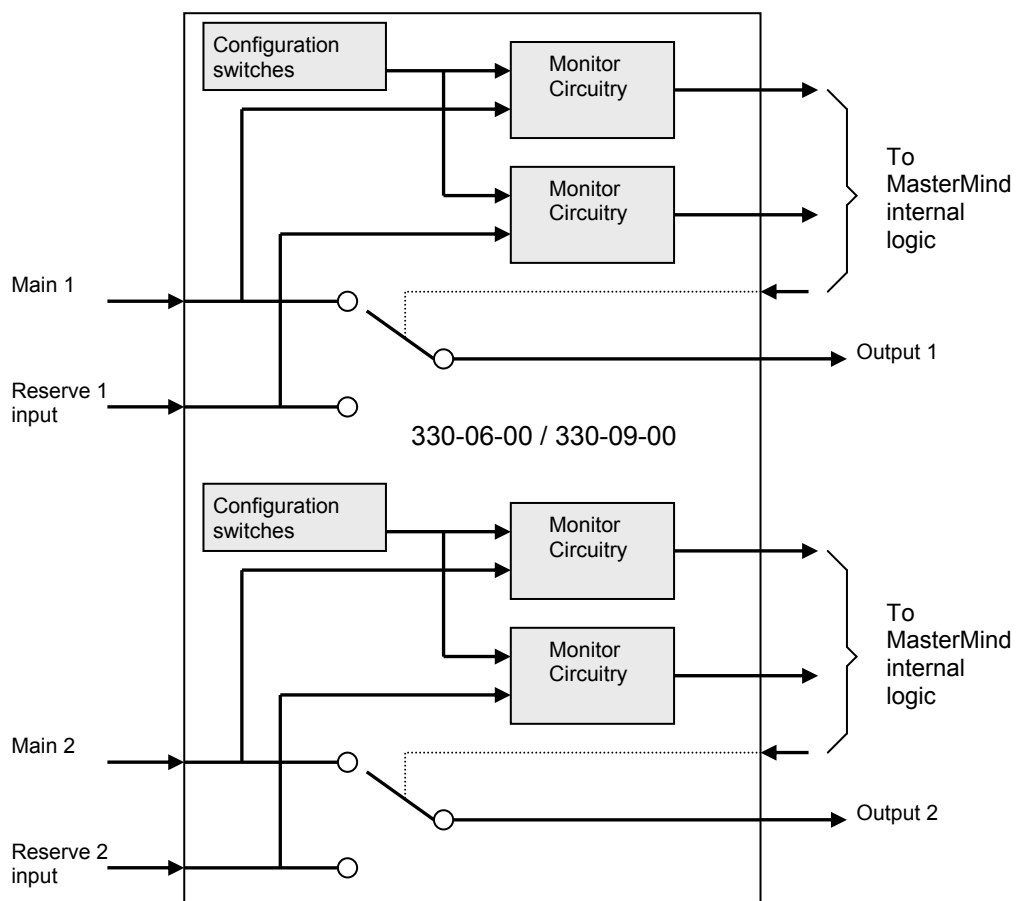
The unit may be fitted with an optional AES Monitoring and Changeover module. This section gives instructions for its use.

5.1 General

The AES module has a dedicated position in the frame and occupies a single unit width. It has four AES inputs, termed Main 1, Reserve 1, Main 2 and Reserve 2. It has two AES outputs termed Output 1 and Output 2.

The module monitors all four inputs and reports the presence of each signal to the MasterMind internal logic. Under control of the internal logic, Main 1 or Reserve 1 can be routed to Output 1 and Main 2 or Reserve 2 can be routed to Output 2.

When the unit is not powered, Main 1 is routed to Output 1 and Main 2 is routed to Output 2.

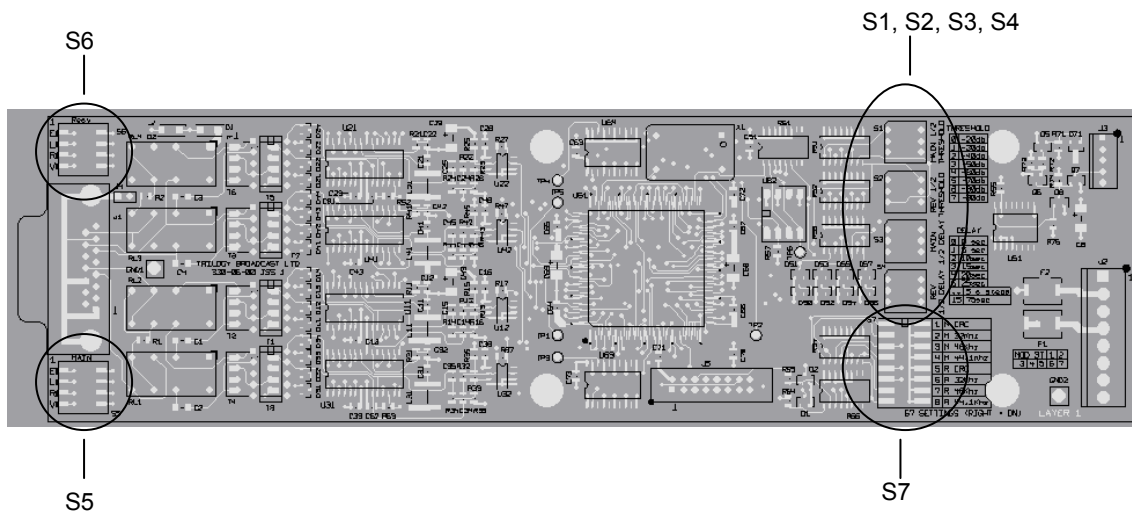


Some features of the monitoring circuitry can be configured using switches on the module. These include:

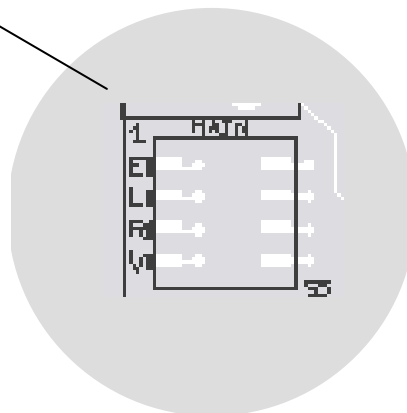
- Enable/disable the monitoring for any of the AES inputs. See 5.2.1.
- Enable/disable monitoring of the audio level contained within the AES signals. The amplitude at which an error is indicated and the delay before the error is reported are configurable. See 5.2.3.
- Enable/disable monitoring of the AES Validity flag. See 5.2.1.
- Enable/disable monitoring of the Channel status CRC. See 5.2.2.
- Selection of AES frequency for which an error will be indicated. See 5.2.2.

5.2 Configuration

Configuration of the AES Module is achieved using switches on the PCB. There are two 4-way switches at the module edge, either side of the 15 way D-connector and there are a number of multi-way switches within the module.



Press switch segment down towards front edge of board to enable each function.



5.2.1 **S5 and S6**

There are 2 four-way piano key style switches at the front of the board, one either side of the 15 way D-type. They house the most frequently used controls. Note that each switch function applies to Main 1 *and* Reserve 1 (S5) or Main 2 *and* Reserve 2 (S6), ensuring that each signal of each Main/Reserve pair is treated equally.

5.2.1.1 **S5**

Switch Posn	Function when down (on). See diagram above.
1 ('E').	Enable Main/Reserve 1 monitoring. If this is off, monitoring of these signals will be disabled.
2 ('L').	Enable Main/Reserve 1 channel 1 audio level monitoring. If this switch is off, the audio content of the channel 1 of the AES signals will be disregarded. If this switch is on, the audio level will be compared against a threshold and an error reported if it is below the threshold for a pre-set amount of time.
3 ('R').	Enable Main/Reserve 1 channel 2 audio level monitoring. If this switch is off, the audio content of the channel 2 of the AES signals will be disregarded. If this switch is on, the audio level will be compared against a threshold and an error reported if it is below the threshold for a pre-set amount of time.
4 ('V').	Enable Main/Reserve 1 AES validity monitoring. If this is on, the validity bit in the AES data stream will be monitored and an error will be reported if this bit indicates that non-audio data is present.

5.2.1.2 **S6**

Switch Posn	Function when down (on). See diagram above.
1 ('E').	Enable Main/Reserve 2 monitoring. If this is off, monitoring of these signals will be disabled.
2 ('L').	Enable Main/Reserve 2 left audio level monitoring. If this switch is off, the audio content of the channel 1 of the AES signals will be disregarded. If this switch is on, the audio level will be compared against a threshold and an error reported if it is below the threshold for a pre-set amount of time.
3 ('R').	Enable Main/Reserve 2 right audio level monitoring. If this switch is off, the audio content of the channel 2 of the AES signals will be disregarded. If this switch is on, the audio level will be compared against a threshold and an error reported if it is below the threshold for a pre-set amount of time.
4 ('V').	Enable Main/Reserve 2 AES validity monitoring. If this is on, the validity bit in the AES data stream will be monitored and an error will be reported if this bit indicates that non-audio data is present.

5.2.2 S7 (330-06-00 only)

S7 is an 8 way DIL switch internal to the module with the following functions:

Switch Posn	Function when ON (right)
1.	Enable Main/Reserve 1 channel status CRC monitoring. When off, the channel status CRC will be ignored, when on, an error in the channel status CRC will be reported.
2.	Enable Main/Reserve 1 32kHz monitoring. See notes below
3.	Enable Main/Reserve 1 48kHz monitoring. See notes below
4.	Enable Main/Reserve 1 44.1kHz monitoring. See notes below
5.	Enable Main/Reserve 2 CRC monitoring. When off, the channel status CRC will be ignored, when on, an error in the channel status CRC will be reported.
6.	Enable Main/Reserve 2 32kHz monitoring. See notes below
7.	Enable Main/Reserve 2 48kHz monitoring. See notes below
8.	Enable Main/Reserve 2 44.1kHz monitoring. See notes below

Notes:

- The functions in the above table are **not** available on the 330-09-00 module. Switch S7 is fitted to the module but all switch positions should be set to OFF (left).
- If all of the three frequency monitoring switches are on **or** off then the frequency of the incoming signal will be ignored, otherwise any frequency applied that is not enabled by the relevant switch will cause an error to be reported.

5.2.3 S1, S2, S3, S4

A series of multi-position rotary switches, internal to the module, set the delay and audio threshold of the audio monitoring circuitry. These settings will only have an effect if the audio monitoring is enabled using S5 and S6. When enabled, if the audio level is consistently below the threshold for at least the delay period, an error will be reported.

S1 and S3 set the threshold and delay values respectively for the Main/Reserve 1 signals, and S2 and S4 set the threshold and delay values respectively for the Main/Reserve 2 signals.

Threshold settings (S1 and S2)

Switch Posn	Value
0.	-20dB (WRT to peak)
1.	-30dB
2.	-40dB
...	(Successive steps of 10 db)
7.	-90db
8-9	Not used.

Delay settings (S3 and S4)

Switch Posn	Value (330-06-00)	Value (330-09-00)
0.	Zero delay	Zero delay
1.	5 seconds	5 seconds
2.	10 seconds	10 seconds
...	(Successive steps of 5 secs)	(Successive steps of 5 secs)
9.	45 seconds	45 seconds
A	n/a	50 seconds
...	n/a	(Successive steps of 5 secs)
F	n/a	75 seconds

Notes

- If the delay is adjusted whilst the unit is powered, the unit may take up to 1 ½ minutes to settle – this may be avoided by powering the unit down and back on.

6. 330-11-00 SD/ HD SDI DETECTION AND SWITCHING MODULE

6.1 General

The 330-11-00 provides two inputs, switched to a single output, suitable for changing between A and B (Main and Reserve) feeds of SD or HD SDI video.

The module will switch to the B (Reserve) path if the following conditions are detected:

- **Lock Error.** Set whenever the device has not correctly locked.
- **Format Error.** Set when the device is locked but ASI rather than SMPTE is detected.

Also:

- **Data Error.** Set when an error (detailed below) within the received data stream has been detected by the device. This condition is a logical OR of all detectable errors listed. The Data error signal can be disabled by turning DIP switch '1' on. Default is enabled.

In the event of a power failure, the module defaults to input A (Main) by bypass relay.

6.2 Data Errors

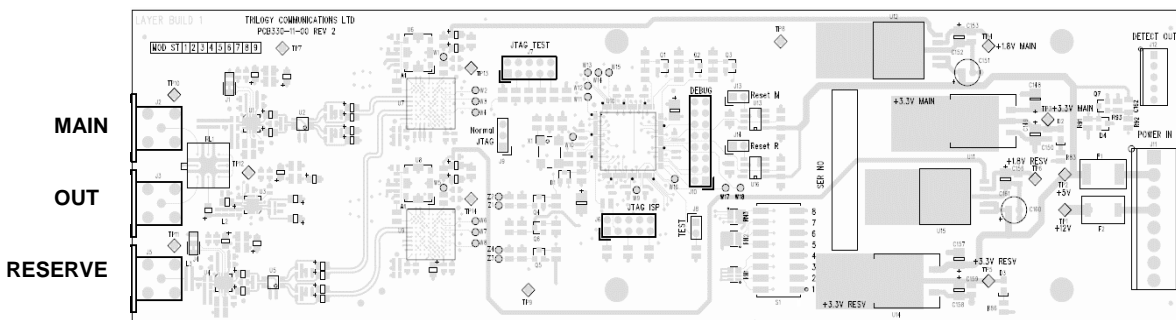
See note above.

Data Error	Description
Video Standard Error.	Set when a mismatch between the received SMPTE352M packets and the calculated video standard occurs.
Luma Checksum Error.	Set when ancillary data packet checksum error has been detected in the Y channel.
Chroma Checksum Error.	Set when ancillary data packet checksum error has been detected in the C channel.
Start of Active Video Error.	Set when TRS errors are detected in either 8-bit or 10-bit TRS words. In HD mode only Y channel TRS codes will be checked.
End of Active Video Error.	Set HIGH when TRS errors are detected in either 8-bit or 10-bit TRS words. In HD mode only Y channel TRS codes will be checked.
Active Picture CRC Error.	Set in SD mode when an Active Picture (AP) CRC mismatch has been detected in Field 1 or 2
Full Field CRC Error.	Set in SD mode when a Full Field (FF) CRC mismatch has been detected in Field 1 or 2.
Luma CRC Error.	Set in HD mode when a mismatch occurs between the calculated and received CRC values in the Y channel.
Chroma CRC Error.	Set in HD mode when a mismatch occurs between the calculated and received CRC values in the C channel.
Line Number Error.	Set in HD mode when a mismatch occurs between the calculated and received line numbers.

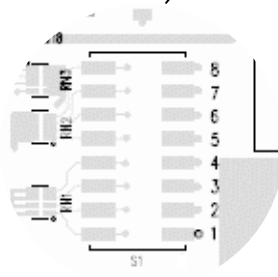
6.3 S1 DIP Switch Functions

Default position is all switches OFF.

No.	Function	OFF	ON	Note
1	Data Error	Enabled	Disabled	User option.
2	Not Used			Leave OFF
3	JTAG/Host Mode	JTAG mode	Host mode	For factory use Only
4	20/10 bit Mode	20 bit	10 bit	For factory use Only
5	IO Processor	Off	On	For factory use Only
6	Not Used			Leave OFF
7	Not Used			Leave OFF
8	Not Used			Leave OFF



Set switch
LEFT = ON
RIGHT = OFF

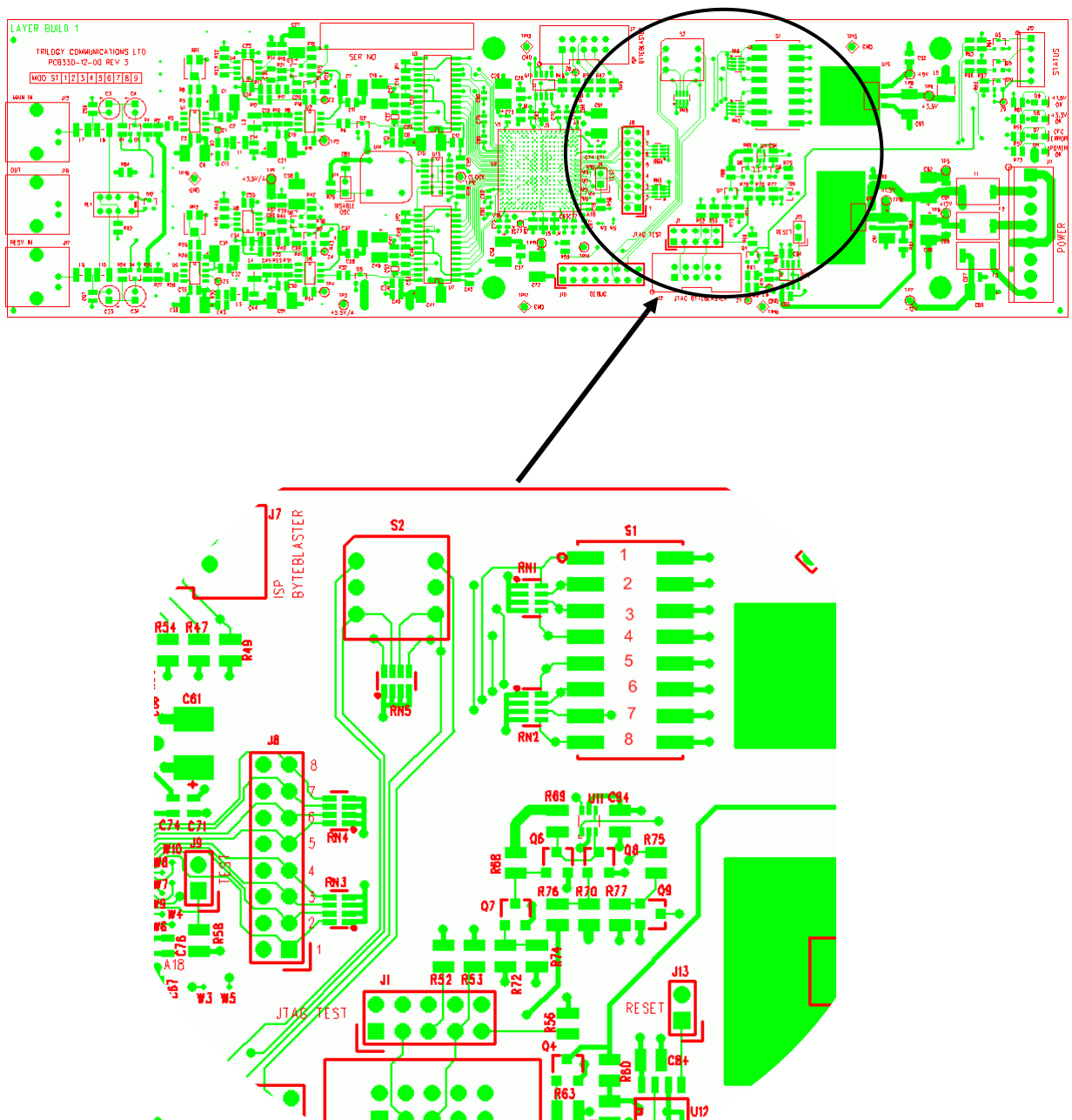


7. 330-12-00 BLACK AND BURST DETECTION AND SWITCHING MODULE

The 330-12-00 module is a two input, one output detection and switching module for video black and burst signals. In the event of designated fault conditions, set by on-board links and switches, the output will switch from “A” to “B”.

- Selected signal path is un-terminated and should be terminated externally.
- Un-selected signal path is terminated on-board with 75Ω.
- In the event of power failure, the output will be switched by relay to “A”.

7.1 Switch and Link location



7.2 DIP Switch S1 Functions

Individual errors can be allowed to cause a fail condition or inhibited as required. Other than Sync Amplitude, the enables apply to both channels. Default positions of switches shown in **Bold**.

No.	Function	OFF	ON	Notes
1	Sync Monitor A	Disabled	Enabled	User option.
2	Sync Monitor B	Disabled	Enabled	User option.
3	Line Standard	Disabled	Enabled	User option.
4	Burst Amplitude	Disabled	Enabled	User option.
5	Burst Frequency	Disabled	Enabled	User option.
6	Video Amplitude	Disabled	Enabled	User option.
7	Reserved	Disabled	n/a	Leave OFF.
8	Reserved	Disabled	n/a	Leave OFF.

Video Amplitude monitors signal excursions above peak yellow or below sync tip. If several consecutive samples are over range, an error is flagged. This also allows detection of unterminated signals.

7.3 J8 Link Functions

The settings below are ignored unless the error is enabled by the appropriate DIP switch.

Links are arranged in four pairs, as indicated below. Note that Default settings are applied if the links of each pair are Both On **or** Both Off. Alternative settings are applied if one link is Off and the other link is On. Fit link to position marked by appropriate threshold to select.

Default position of all links is ON.

No.	Function	One link ON	Default
1	Sync Threshold	-9dB	-6dB
2	Sync Threshold	-3dB	-6dB
3	Burst Amplitude	-9dB	-6dB
4	Burst Amplitude	-3dB	-6dB
5	Burst Frequency	3.5MHz	Either
6	Burst Frequency	4.5MHz	Either
7	Line Standard	525 lines	Either
8	Line Standard	625 lines	Either

For example:

- To set a Sync Amplitude threshold of -3dB on Channel A only, set S1/1 to ON, S1/2 to OFF, J8/1 to OFF and J8/2 to ON.

7.4 Other Link and Switch Functions

The following are provided to aid testing and have no useful function in normal operation.

Ref.	Function	Type	Default	Notes
S2	Test Select	Hex Switch	'0'	Switch Not Fitted
J9	Test Mode	2-pin Link	Open	
J13	Reset	2-pin Link	Open	Link Not Fitted
J14	Oscillator Disable	2-pin Link	Open	Link Not Fitted
J1	JTAG Test Header	5x2 Header	n/a	Header not Fitted
J2	JTAG Prog. Header	5x2 Header	n/a	
J7	ISP Header	5x2 Header	n/a	Header not Fitted
J10	Test Header	8x2 Header	n/a	

8. TROUBLESHOOTING

8.1 Identifying Problems

This unit is provided, by its very nature, with a comprehensive set of fault monitoring facilities. If it is not behaving as you would expect, please ensure that:

- You have read this user guide thoroughly.
- Mains power is correctly applied, and the fuse in the IEC connector has not blown. If power is applied, one or more LEDs on the front panel will be lit.
- The signals you wish to monitor are correctly connected to the equipment.
- The unit is configured as you require. Read this user guide. The unit may simply require that the reset button is pressed.
- You examine the internal status LEDs to determine which module is indicating a fault. Check that the regulator fail LED is *not* lit, and that the appropriate "module present" LED *is* lit.
- If you suspect a module is faulty, turn the unit off and re-power it 5 minutes later to allow the individual module thermal fuse to reset. Note that you will still have a path for SPG A when you remove power.

8.2 Fault Finding Hints

1. Disable all input channel switches except the one you are checking.
2. Check that the input signal matches the option board, e.g. that you are feeding a Black & Burst signal into the correct type board. It may be necessary to remove the lid to verify this.
3. Check that the input signal levels are correct and are not double terminated. The OK & FAIL LEDs on the front panel will indicate whether the signal is correct.
4. The SDI detector 330-02-00 is ***not*** dual standard and is normally set for PAL input. The board must be factory re-aligned to operate with NTSC.
5. If the power supply is suspected, remove the lid and check the voltage rails on the main Logic Board 330-10-00 as follows:

+5V @ TP6
0V @ TP8
+12V @ TP5
-12V @ TP7

WARNING! Removing the lid may expose live mains voltages. Take care and if any doubt, do not carry out this test.

6. Check the operation of the fan. A fan failure going unnoticed for a long period may result in permanent failure of a module.

If you need further advice, please contact Trilogy Communications by emailing support@trilogycomms.com and our staff will be pleased to assist.

9. SPECIFICATION

9.1 General

Mains Power Requirement	90-260V, 47-63Hz, 40VA maximum, depending on number of option boards fitted.
Battery Life	2hr approx. when 1 off 330-02 fitted, 1hr approx. when 2 off 330-02 fitted.
Height	44mm (1U rack mounting)
Depth	435mm (excluding mating connectors)
Width	482.6mm (including rack ears)
Width	450mm (excluding rack ears)
<u>Remote Alarm Outputs</u>	
Type	Open Collector
Max. Voltage	50V D.C.
Max. current	500mA

9.2 330-01-00 Black/Burst Detection and Switching Module

Sync. Detection	Fail indicated for sync $<-3.5\text{dB} \pm 0.75\text{dB}$
Burst Detection	Fail indicated for burst $<-3.5\text{dB} \pm 0.75\text{dB}$.
Changeover	By relay, power fail defaults to input A. The de-selected input is terminated by 75R. Selected input must be externally terminated.
Return Loss	$<-48\text{dB}$
Crosstalk between A and B	$<-65\text{dB}$ 0-5.5MHz

9.3 330-02-00 SDI Detection and Switching Module

Changeover	By serial receiver/driver, power fail defaults to input A by battery back-up when enabled.
Output Return Loss	$<-14\text{dB}$
Input Return Loss	$<-14\text{dB}$
Crosstalk between A and B	$<-40\text{dB}$ @ 270MHz

9.4 330-03-00 Relay Switching Module

Return Loss	$<-48\text{dB}$
Crosstalk between A and B	$<-65\text{dB}$ 0-5.5MHz

9.5 330-06-00 AES/EBU Detection and Switching Module

Changeover	By relay: power fail defaults to A inputs.
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9.6 330-07-00 Relay Switching Module

Return Loss	$<-35\text{dB}$ @ 5MHz $<-20\text{dB}$ @ 270MHz $<-8\text{dB}$ @ 1.4GHz
Crosstalk between A and B	$<-65\text{dB}$ 0-5.5MHz
SDI Jitter (HD and SD)	$\approx 0.2\text{UI}$ with pathological check field

9.7 330-08-00 5 channel Relay Switching Module

Changeover	By PO47 relay: power fail defaults to A inputs.
AES signal isolation (12MHz)	> 33dB
AES signal crosstalk (12MHz)	< -48dB
Audio signal isolation (20KHz)	> 80dB
Audio signal crosstalk (20KHz)	< -80dB

9.8 330-09-00 AES/EBU Detection and Switching Module

Changeover	By relay: power fail defaults to A inputs.
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9.9 330-11-00 SD/HD-SDI Detection and Switching Module

Power	+5V @ 750mA, +12V @ 30mA
Power fail	Monitors +12V, +5V plus +3.3V and +1.8V for each channel.
Input Return Loss	<-18dB (SD & HD)
Output Return Loss	<-15dB (SD & HD)
Timing Jitter	< 0.30UI (SD & HD)
Alignment Jitter	< 0.20UI (SD & HD)
Changeover	Synchronous switching by serial receiver with buffer/driver.
Fail-safe	In the event of a power fail defaults to input A by bypass relay.
Error conditions	No Signal / Lock, Format Error or Data Error. <ul style="list-style-type: none"> ○ Lock Error. Set whenever the device has not correctly locked. ○ Format Error. Set when the device is locked but ASI rather than SMPTE is detected. ○ The Data Error signal is set when an error (detailed below) within the received data stream has been detected by the device. This condition is a logical 'OR'ing of all detectable errors listed ○ The Data error signal can be disabled by turning DIP switch '1' on. Default is enabled.

9.10 330-12-00 Black/Burst Detection and Switching Module

Power	+5V @ 130mA, +12V @ 70mA, -12V @ 45mA
Power fail	Monitors \pm 12V, +5V plus +3.3V and +1.5V.
Threshold Accuracy	\pm 1dB
Return Loss	<-40dB
Crosstalk between A and B	<-60dB @ 4.433MHz
Changeover	By relay, power fail defaults to input A. The de-selected input is terminated by 75R. Selected input must be externally terminated.
Fail-safe	In the event of a power fail defaults to input A.
Error conditions	No Signal, Sync Amplitude, Burst Amplitude, Burst Frequency, Line Standard, Video Amplitude Errors. Power Fail / Reset.