

IRT Eurocard

Type AMS-3170 2 x 2 relay switcher for SDI, G.703 or analogue video & AES, RS422 or stereo audio signals

Designed and manufactured in Australia

IRT can be found on the Internet at: http://www.irtelectronics.com

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Instruction Book

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This instruction book applies to units later than S/N 9600000.

General Description

The AMS-3170 replaces the RL-740C changeover relay switcher. The new version uses enhanced performance relays in the video path to provide switching capabilities for high speed data signals up to 270 Mb/s making it suitable for switching MPEG data stream signals and SDI video.

Front panel LED indicators are used to indicate the status of each relay circuit.

The AMS-3170 is built to the Eurocard format and will mount in an IRT frame alongside the receiver units or other devices it serves.

The AMS-3170 consists of one "video" and two "balanced audio" switches. Each switch is arranged as a changeover set with two inputs and two outputs. No terminations are provided on the board allowing the switcher to be used in a wide variety of applications and with signals of various types and impedances.

The "video" path may be used with video, SDI, MPEG or RF signals of 75 Ohms. When used with SDI and highspeed data signals all cable lengths should be kept to a minimum. For best performance the outputs should be connected to inputs with automatic cable equalisation.

The "audio" path may be used for balanced or unbalanced audio or control signals (RS232, RS422, RS485 etc). The video circuit uses a special high performance relay, which with the enhanced track layout provides extended high frequency performance with digital signals.

The audio circuit uses two relays in series to provide excellent isolation between the two states.

The AMS-3170 is ideally suited to applications where a simple choice between two inputs or outputs is required and may be easily driven by audio, video or other detector circuits for automatic path selection.

Each switch is equipped with its own transistor driver circuit, which may be bypassed for direct operation of the relay if desired.

Links allow any of the three driver circuits to operate more than one of the sets of relays.

An on board rectifier and 12 volt regulator circuit provides the operating voltage for the relay cards. The AMS-3170 relay card is built to the Eurocard format and will mount in an IRT FR-700 frame, which provides the 28V CT AC required from the PT-700 dual power supply.

Standard features:

- One video and two balanced audio changeover switches in one package.
- Video path suitable for SDI (270 Mb/s), analogue video, MPEG data streams @ 2, 8, 34, 45, 144 Mb/s.
- Audio path suitable for 2 balanced audio or data signals or 4 unbalanced audio or data signals.
- Married or independent operation
- Default path on power fail.
- TTL or direct relay switching.
- Front panel LED status indicators.

Technical Specifications IRT Eurocard module Type AMS-3170

Video:			
Video crosstalk between channels		< -70 dB to 10 MHz. < -60 dB 10 MHz to 100 MHz. < -50 dB 100 MHz to 300 MHz. (With measured channel input terminated by 75 Ω.)	
Audio: Audio Crossta	alk	Between channels with measured channel input terminated by 600 Ohms. Less than -90 dB (20 Hz - 20 KHz).	
Control: Inputs		Ground active control to TTL level interface circuit or if interface circuit bypassed, to the relay coil with the common of the coil circuit connected to +12 Volts.	
Connector	S: Audio: Control:	3 pin plug in screw termination sockets.4 pin plug in screw termination socket.	
Other:			
Relay contact rating		24 Vdc - 1 A 100 Vac - 0.3 A	
Power require	ements:	28 Vac CT (14-0-14) or ± 16 Vdc	
Power consum	nption	1 VA.	
Temperature	range	0 - 50° C ambient	
Mechanical		Suitable for mounting in IRT 19" rack chassis with input, output and	
Finish	Front popul	power connections on the rear panel.	
THIISH.	Rear assembly	Detachable silk-screened PCB with direct mount connectors to Eurocard and external signals	
Dimensions		6 HP x 3 U x 220 mm IRT Eurocard.	
Supplied acce	ssories	Rear connector assembly with matching connectors for control inputs.	
Optional acce	ssories	Instruction manual TME-6 module extender card	

Technical Description

See drawing 804221.

The AMS-3170 consists of one video and two balanced audio switches. Each is equipped with its own transistor driver circuit.

Relays:

In each circuit two relays are used in series to provide better isolation between selected paths. The two relay coils are wired in parallel with a reverse protection diode and an LED indicator.

One side of this arrangement is connected directly to the +12 Vdc supply and the other to the output of the transistor driver circuit and to two links.

Links LK 8, 9 & 10 allow the relays to be grouped and links LK 3, 5 & 7 allow the transistor driver circuit to be bypassed and the relays driven directly from the control input(s). See *Configuration* for set-up details.

Driver circuits:

The three relay driver circuits are identical and the reference numbers following are for the video circuit only.

Diode D 6 and resistor R 1 provide a normally high pull-up configuration to a +5 Vdc line for compatibility with TTL circuits. Diode D 6 provides supply protection against input levels greater than + 5 Vdc.

The RC network of R 2 and C 5 is included to minimise noise triggering the driver.

Transistors Q 1 & 2 form a darlington pair with very high gain to ensure positive switching. Resistors R 3, 4 & 5 set the switching point to approximate TTL levels for logical "0" & "1". Q 3 is the output driver for the relay coils and LED indicator.

When direct drive to the relays is enabled LK 2 is broken and LK 3 is installed. This results in the transistor driver circuit turning off transistor Q 3. Thus the collector of Q 3 may be pulled high or low by the external connection without conflict between the transistor driver circuit and external control circuit.

Power supply:

The AMS-3170 power supply consists of full wave rectifier circuits D 1 - D 4, C 1, C 2, three terminal regulator U 1 and C 3 & 4 to provide the +12 volts required to operate the relay circuits.

A second three terminal regulator, U2, provides +5 Vdc for input control signal clamping.

An alternate DC input for the AMS-3170 is available from an external source. See *Configuration* for details.

Pre-installation:

Handling:

This equipment may contain or be connected to static sensitive devices and proper static free handling precautions should be observed.

Where individual circuit cards are stored, they should be placed in antistatic bags. Proper antistatic procedures should be followed when inserting or removing cards from these bags.

Power:

Earthing:

The earth path is dependent on the type of frame selected. In every case particular care should be taken to ensure that the frame is connected to earth for safety reasons. See frame manual for details.

Signal earth: For safety reasons a connection is made between signal earth and chassis earth. No attempt should be made to break this connection.

Operational Safety:

WARNING

Operation of electronic equipment involves the use of voltages and currents that may be dangerous to human life. Note that under certain conditions dangerous potentials may exist in some circuits when power controls are in the **OFF** position. Maintenance personnel should observe all safety regulations.

Do not make any adjustments inside equipment with power **ON** unless proper precautions are observed. All internal adjustments should only be made by suitably qualified personnel. All operational adjustments are available externally without the need for removing covers or use of extender cards.

Internal Adjustments

The AMS-3170 requires no internal adjustments for correct operation.

Configuration

Direct drive to relays:

Provision has been made for bypassing the transistor relay drivers if required. This may be desirable in situations where switching is to be initiated by alarm circuits with relay outputs (Such as the VG-737 video sync detector or VG-739 priority encoder.).

The relay driver circuit can be bypassed as follows:

- Cut the PCB tracks at link points LK 2, 4 & 6. (Provision is made at LK 2, 4 & 6 for installing a link at a later date if normal TTL operation is again required.)
- 2. Wire shorting links in positions LK 3, 5 & 7.

Ensure that only one link is installed of each pair so that the circuit is set for either TTL or direct operation, but not both.

Relay grouping:

Each video and audio channel is equipped with its own driver circuit. However each circuit is capable of driving all three sets of relays if required. Links LK 8, 9 & 10 provide a means of inter-connecting the relay sets so that only one or two control inputs are required.

Some useful configurations are:

Unison operation:	All three circuits switch from one control signal.
	Disconnect LK 4 & 5. Connect LK 8, 9 & 10.
	Control is via SK 2 pin 1.

Separate video & stereo audio operation:

One control signal for video and separate control signal for stereo audio. Disconnect LK 6. Connect LK 9 & 10. Control for video is via SK 2 pin 1. Control for stereo audio is via SK 2 pin 2.

Input termination:

No terminations are provided on the module so that the switcher can function in change-over mode. For $2 \ge 1$ switcher applications the following terminations should be installed.

Video:

Output A only is used and should be terminated at connected equipment. Output B should be terminated in 75 Ohms (or 50 Ohms if being used for 50 Ohm RF signals) using a BNC termination plug.

Audio:

Outputs A only are used and should be terminated at connected equipment.

Output B may be terminated if desired by connecting termination resistors to the connector on the rear assembly of the module. The resistor values should be chosen to match the characteristic impedance of the rest of the connected audio system. For example for balanced 600 Ohms, two 300 Ohm resistors should be used.

In most modern audio systems a low output impedance of approximately 40 Ohms and input impedances of greater than 10 KOhms are used. If this is the case no termination of the unused audio output is required.

Installation in frame or chassis:

See details in separate manual for selected frame type.

See also Configuration.

Video connections:

Video signal connections are made to BNC coaxial connectors. No termination of inputs is provided on the module. When switched to the output the input load impedance is that of the load connected to the output.

Audio connections:

Audio signal connections are made to plug in balanced screw terminating connectors. No termination of inputs is provided on the module. When switched to the output the input load impedance is that of the load connected to the output.

Control connections:

Control connections are via SK 2 plug in screw terminating connector located on the rear assembly.

Connecting the appropriate control input to ground will cause the relay s to operate and the output state to cross over as follows:

Control	Input		Output
High	А	\leftrightarrow	А
	В	\leftrightarrow	В
Low (Gnd)	A B	$\leftrightarrow \\ \leftrightarrow$	B A

Control input connector SK 2 pin configuration is as follows:

Pin	Description	
	T T T T	

- 1 Video control
- 2 Left audio control
- 3 Right audio control
- 4 Gnd.

Front & rear panel connector diagrams

The following front panel and rear assembly drawings are not to scale and are intended to show relative positions of connectors, indicators and controls only.



Maintenance & storage

Maintenance:

No regular maintenance is required.

Care however should be taken to ensure that all connectors are kept clean and free from contamination of any kind. This is especially important in fibre optic equipment where cleanliness of optical connections is critical to performance.

Storage:

If the equipment is not to be used for an extended period, it is recommended the whole unit be placed in a sealed plastic bag to prevent dust contamination. In areas of high humidity a suitably sized bag of silica gel should be included to deter corrosion.

Where individual circuit cards are stored, they should be placed in antistatic bags. Proper antistatic procedures should be followed when inserting or removing cards from these bags.

Warranty & service

Equipment is covered by a limited warranty period of three years from date of first delivery unless contrary conditions apply under a particular contract of supply. For situations when "**No Fault Found**" for repairs, a minimum charge of \$A100.00 will apply, whether the equipment is within the warranty period or not.

Equipment warranty is limited to faults attributable to defects in original design or manufacture. Warranty on components shall be extended by IRT only to the extent obtainable from the component supplier.

Equipment return:

Before arranging service ensure that the fault is in the unit to be serviced and not in associated equipment. If possible, confirm this by substitution.

Before returning equipment contact should be made with IRT or your local agent to determine whether the equipment can be serviced in the field or should be returned for repair.

The equipment should be properly packed for return observing antistatic procedures.

The following information should accompany the unit to be returned:

- 1. A fault report should be included indicating the nature of the fault
- 2. The operating conditions under which the fault initially occurred.
- 3. Any additional information which may be of assistance in fault location and remedy.
- 4. A contact name and telephone and fax numbers.
- 5. Details of payment method for items not covered by warranty.
- 6. Full return address.
- 7. For situations when "**No Fault Found**" for repairs, a minimum charge of \$A100.00 will apply, whether the equipment is within the warranty period or not.

Please note that all freight charges are the responsibility of the customer.

Phone:

Email:

The equipment should be returned to the agent who originally supplied the equipment or, where this is not possible, to IRT direct as follows.

Equipment Service IRT Electronics Pty Ltd 26 Hotham Parade ARTARMON N.S.W. 2064 AUSTRALIA

61 2 9439 3744

service@irtelectronics.com

Fax: 61 2 9439 7439

Drawing Index

Drawing #	Sheet #	Description
804221	1	AMS-3170 main circuit schematic.

