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IRT Eurocard
Stereo Audio Switcher

Type AA-751

Designed and manufactured in Australia

IRT Eurocard
Stereo Audio Switcher
Type AA-751

Instruction Book

Table of Contents

This instruction book applies to units later than S/N 9500000.

Note: The AA-751 is a special variation of the AAS-3020. All referances to the AAS-3020 in this manual and on diagrams apply to the AA-751 equally except as noted in the text.

GENERAL DESCRIPTION

The VA-751 stereo switcher is based on the new 3000 series Eurocard switchers, but has been reprogrammed for compoatibility with the older 700 series switchers. This results in the loss of many of the beneficial features of the 3000 series, but provides the advantage, over the AA-720 & AA-725 audio switcher's, of a stereo switcher in a single module.

The VA-751 is supplied without a local control panel and is non latching and thus dependent on a latched signal from either a VA-710/VA-715 video switcher or an external latched signal.

The modules may be mounted in standard IRT Eurocard frames alongside other IRT Eurocard modules for distribution and signal conditioning.. Up to twelve modules may be housed in one 3 RU FR-700 frame.

The FR-722 chassis / PSU allows one or two Eurocards to be configured in a 1 RU style. For example a complete 5 x 1 video plus stereo audio switcher can be assembled from just two modules accommodated in the FR-722.

Redundant power supplies on board are supported by a dual redundant supply from the FR-700/PT-700 or FR-748A/PT-701/PT-748A frame and PSU combinations.

Features:

- Multiple levels available through combining modules in series under common control.
- May be mounted in same frame as other IRT Eurocards including VDA's, ADA's, detectors and processors.

Applications:

- Audio follow switching for use in conjunction with VA-710 or VA-715 video switchers.
- Remote operated switching by simple control interface.

TECHNICAL SPECIFICATIONS

AA-751: 5 x 1 Analogue Stereo Audio Switcher.

Audio inputs:

Number	5 x 2 (5 stereo).
Type	Tranformerless, bridging DC coupled.
Impedance	> 10 KΩ.
Connectors	Plugable screw block connectors.
Max. input level	+24 dBu.
Input CMR	> 40 dB @ 55 Hz.

Audio outputs:

Type	Transformerless, balanced DC coupled.
Number	1 x 2 (left and right).
Impedance	< 44 Ω.
Connectors	Plugable screw block connectors.
Max. output level	+24 dBu into 600 Ω.
DC on output	< ±20 mV.

Performance:

Switching	Within 25 ms. Timing may be synchronised to another switcher.
Gain	±3 dB (adjustable by internal preset).
Frequency response	±0.5 dB for 20 Hz to 20 KHz.
Harmonic distortion	< 0.01% 20 Hz to 20 KHz at +20 dBu output.
Noise	-90 dB, Ref. +20 dBu 20 Hz to 20 KHz.
Crosstalk left/right	-70 dB @ 15 KHz with measured input terminated.
Phase left/right	±0.2° to 20 KHz.
Power consumption	<200 mA (+ 24 dBu, outputs loaded in 600 Ω).

Control inputs/outputs:

Switch Action	Grounding contact.
Tally	Ground. (Open collector switch to ground on the control line)
Number	1 “input” & 1 “output”.
Connectors	Plug in 10 pin dual IDC.

Power requirements:

28 Vac CT (14-0-14) or ± 16V DC.

General:

Temperature range		0 - 50° C ambient
Mechanical		Suitable for mounting in IRT 19" rack chassis types FR-700 & FR-722 with input output and power connections on the rear panel
Finish:	Front escutcheon	Grey enamel, silk screened black lettering & red IRT logo
	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
Standard accessories (supplied with module)		Rear connector assembly including matching connectors for control inputs & outputs.

Due to our policy of continuing development these specifications are subject to change without notice.

Accessories available:-

FR-700 Eurocard module mounting frame:-	Provides mounting for up to 12 IRT Eurocards and one PT-700 Dual AC power supply side by side in 134 mm of standard rack space (3 Rack Units).
FR-722 1 RU chassis conversion/PSU	The FR-722 provides a means of converting Eurocards to a 1 rack unit format. The FR-722 can be fitted with either one or two Eurocards in a horizontal side by side format. A single AC power supply is included to power the cards.
TME-6 Eurocard extender board.	
Control connector assembly tool	For ease of making interconnecting leads between modules or to remote control panels. A range of tools are available from Farnell Components or RS Components for connecting ribbon cable to the HE14 IDC type remote control connectors.

CIRCUIT DESCRIPTION

Power supplies:

Input power to module may be fed by a number of means.

1. One or two 14 - 0 - 14 Vac supplies via connections on the 64 pin DIN rear connector of the module. (Used when module is mounted in FR-700 chassis or FR-748A chassis fitted with one or two PT-701 PSU's.)
2. Two ±16 Vdc supplies via connections on the 64 pin DIN rear connector of the module. (Used when module is mounted in FR-748A chassis fitted with one or two PT-748A PSU's.)
3. One 14 - 0 - 14 Vac supply and one ±16 Vdc supply via connections on the 64 pin DIN rear connector of the module. (Used when module is mounted in a FR-748A chassis fitted with 1 x PT-701 PSU and 1 x PT-748A PSU.)
4. A single 14 - 0 - 14 Vac supply connected to the 3 pin male connector on the module side of the rear assembly. (Used when module is mounted in FR-722 chassis.)

The input power is isolated by fusible resistors F 1 to F 4. Should these fail they should be only replaced by a similar type of the same value or protection of the common power supply will be compromised.

If an AC supply is provided, the isolated AC is full wave rectified by diodes D 1 to D4 and D5 to D 8 to provide a raw DC voltage of approximately 20 V at filter capacitors C 17 and C 18. The actual voltage will vary depending on the type of frame, loading of PSU by other modules and the local mains supply voltage.

If a DC supply is provided, the isolated DC passes through the diodes D 1 to D4 and D5 to D 8 which provide protection against accidental reverse polarity connection of the DC supply. Where a DC supply is used the input voltage must be at least ±15 Vdc under all conditions to ensure sufficient margin for the proper operation of the following voltage regulators and losses in the input fusible resistors and diodes.

AA-751: (See diagram 803754 sheet 2.)
The raw DC power is fed to three terminal regulator IC's which provide ±12 Vdc rails for the audio circuits. The +12 Vdc is also supplied to the remote logic connector PL 4 pin 1 via a current limiting resistor R 34 for use by control panels.
The 12 Vdc rails are further connected to two more three terminal regulator to provide the ±5 Vdc. The +5 Vdc is required by the logic control circuits and ±5 Vdc for the audio matrix switching IC's.
A number of 10 µF tantalum tag capacitors are located at key points in the circuit to suppress interference on the DC rails. Should any of these fail they should be replaced by high quality tantalum tag capacitors of at least 16 Vdc rating.

Power indicator LED's:

Modules have a green LED on the front panel to indicate presence of DC power in the module. This LED is supplied from the +5 Vdc regulated supply rail.

Switching Logic:

Control logic for each switcher module is performed by a Programmable Logic Array (PLA) which has been programmed for the required operations. This component will only function correctly when loaded with the correct program and is therefore only available through IRT.

Each module of the switcher group has two control connectors on its rear assembly.
They are labelled PL 4 and PL 5. For descriptive purposes PL 4 is called the "input" connector and PL 5 the "output" connector.

The pins on these connectors have the following functions:

	PL 4	PL 5
1A	+12 V	NC
1B	Ground	Ground
2A	Switch 5	Data 4
2B	Switch 4	Data 3
3A	Switch 3	Data 2
3B	Switch 2	Data 1
4A	Switch 1	Data 0
4B	Don't connect	Don't connect
5A	Don't connect	Don't connect
5B	Don't connect	Don't connect

To operate the desired matrix point the relevent switch line is held to ground for as long as required.
If no input is held to ground the switcher will give no output.

Note that resistor array RP 1 is shown on the schematic as having its common connection to ground. This configuration applies to the 3000 series switcher format. On the AA-751 this connection is to the +5 Vdc supply in order to provide the normally high input state required for connection to ground switch selection.

Sync path:

The AA-751 is operated in a remote sync only and will only switch when a change on the data lines is received.
The local sync generator provided on the PCB is not used in this application..

Signal path:

(See diagram 803754 sheet 1.)
The audio signals for Left & Right channels are processed by identical circuits; the Left on the main PCB and the Right on a sub-board mounted over the Left channel section of the main PCB.

Balanced inputs 1 - 5 are terminated with resistors R 1 to R 20 resulting in an input impedance greater than 10 KΩ. The signal is then buffered by amplifiers U 1 to U 5 and switched by analogue switch matrix IC's U 6 & U7.

The matrix is addressed by data lines A & B and enable lines CE 1 & CE 2 produced by the PLA logic controller. This allows selection of either no output or output from one only of the input pairs to each of U 6 & U 7. Thus when U 6 is active no output is selected from U 7 and vice versa.

The outputs of U 6 & U 7 are coupled in a low impedance mixing bus which is available via J 4 for expanded operation. This facility is not used in the AA-751.

The mixing bus for the +ve and -ve signals is then buffered by U 8 with gain adjustment set by RV 1.
The output balanced connector is fed via series resistors R 26 & R 27 which provide an approximate 22 Ω output source impedance.

It should be noted that the audio signal is DC coupled throughout.

Internal Adjustments

The following adjustable circuit elements are factory set and should not be adjusted unless a component has been changed. They are not 'operational' controls. Before adjusting any of these controls allow time for the module to reach temperature stability.

AA-751:

RV 1	Main board	Audio gain -- Right channel.
RV 1	Sub-board	Audio gain -- Left channel.

Operational Safety

WARNING

Operation of electronic equipment involves the use of voltages and currents which may be dangerous to human life. Maintenance personnel should observe all safety regulations. Do not change components or make adjustments inside the equipment with power **ON** unless proper precautions are observed. Note that under certain conditions dangerous potentials may exist in some circuits even though power controls are in the **OFF** position.

CONFIGURATION

Interconnecting modules:

Control from an external controller or switcher may be connected to PL 4. See *Circuit description -- Switching logic* for connection details.

For four or more channel operation AA-751 modules may be looped by joining PL 5 (data out) on one module to PL 4 (data in) on the next.

Link Settings:

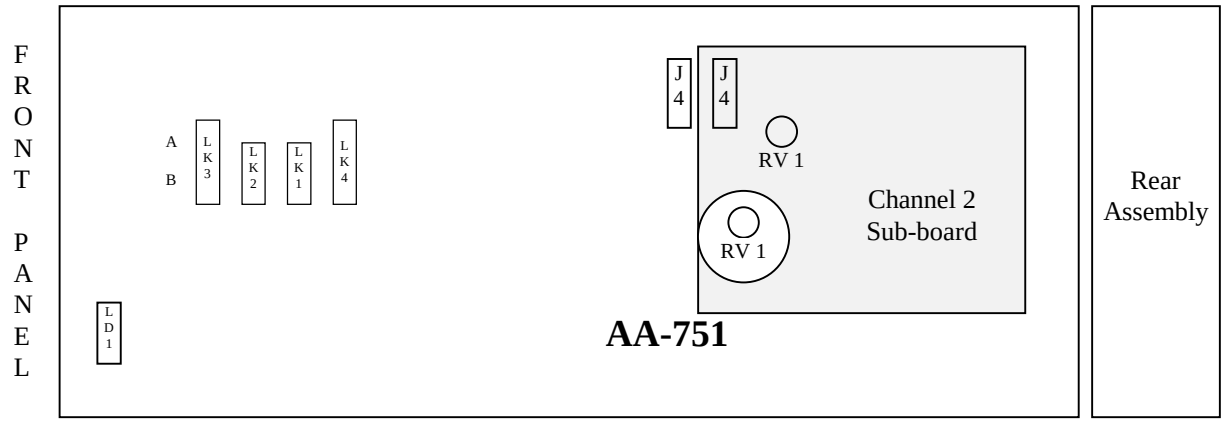
Links LK 1 & LK 2: Not used on AA-751.

Link LK 3: Not used on AA-751.

Link LK 4: Not used on AA-751.

Location Of Links & User Settings

The following location diagrams are not to scale and are intended only to assist in finding the location of links and other settings which may need to be changed by the user during *configuration*.



Pre-Installation

Handling:

The modules used in this equipment contain 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 and proper antistatic procedures should be followed when inserting or removing cards from these bags.

Power:

AC mains supply: Ensure that operating voltage of unit and local supply voltage match and that correct rating fuse is installed for local supply.

DC supply: Ensure that correct polarity is observed and that DC supply voltage is maintained within the operating range specified.

Earthing:

AC mains supply: Chassis earth connection of the equipment is via the earth connection on the three pin mains input. This is a safety earth and must be connected.

DC supply: Chassis earth connection of the equipment is via the positive terminal on the DC input. The DC positive supply should be connected to earth at the supply . A separate chassis earth connection is available on the centre connector of the DC input connector which may be connected if desired.

Signal earth: The power supply wiring on each Eurocard has a common reference earth connected to the reference earth of the main frame power supply. For AC mains supply this is the centretap of the stepdown transformers and for DC supply it is the common output of the +ve & -ve DC-DC converters. In both cases there is no direct connection between this earth and chassis earth.
For safety reasons a connection should be made between signal earth and chassis earth at some point in the system. For best performance of the system some experimentation may be required in determining the best placement of this connection. In order to avoid earth loops, resulting in the introduction of hum, only one connection should be made between the signal and chassis earths.

Audio: balanced signal connection with Gnd pin marked on rear assembly. Internally connected to PSU reference earth.

INSTALLATION

Installation in frame or chassis:

See details in separate section for selected frame type.
Before installing in frame make any required link changes as detailed in the configuration section.

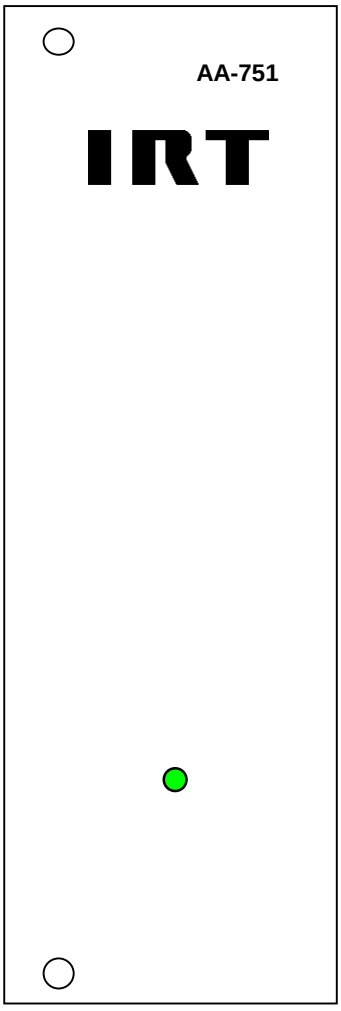
AA-751: Audio Connections:

If input termination is required then termination resistors should be fitted to the input sockets.
Follow the polarity markings on the rear assembly or incorrect phasing will result.

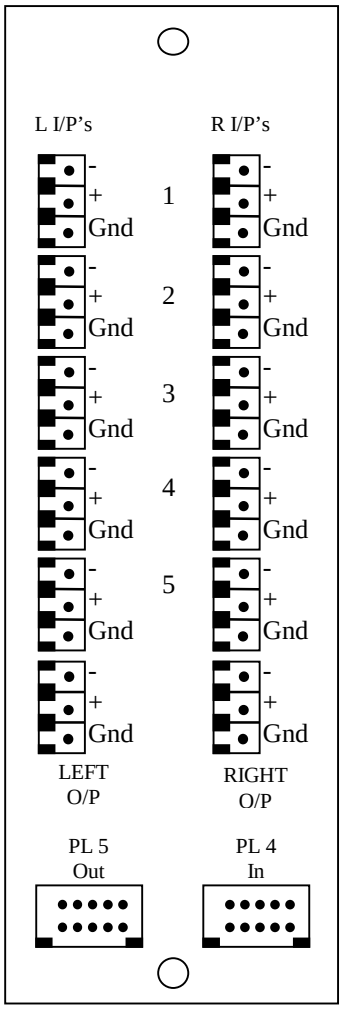
FRONT & REAR PANEL LAYOUTS

The following front and rear panel drawings are not to scale and are intended to show approximate relative positions of controls and connections only.

Front panel layout for:
AA-751



AA-751 - Rear



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.

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 assist deter corrosion.

Where individual circuit cards are stored, they should be placed in antistatic bags and 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 five years from date of first delivery unless contrary conditions apply under a particular contract of supply.

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:

Prior to 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 phone and fax numbers.
5. Details of payment method for items not covered by warranty.
6. Full return address.

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

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
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AUSTRALIA

Phone: 61 2 9439 3744
Fax: 61 2 9439 7439

Drawing list index

Drawing #	Sheet #	Description
803754	1	AAS-3020 audio circuit schematic
803754	2	AAS-3020 control circuit schematic

No Circuits Available in PDF format for this device!