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IRT Eurocard

Types DAI-3200

Digital Audio Inserter for 270 Mb/s SDI

Designed and manufactured in Australia

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

IRT Eurocard

Type DAI-3200

Digital Audio Inserter for 270 Mb/s SDI

Instruction Book

Table of Contents

General description

The DAI-3200 is intended as a high performance audio embedder for 270 Mbit SDI video signals.

A typical SDI signal may contain up to eight audio pairs arranged in four groups although only one pair is normally required for program distribution.

2 AES signals may be inserted into an existing SDI video stream. Existing embedded data packets may be optionally removed and/or replaced via link settings on the PCB.

Each DAI-3200 is capable of inserting one audio group (2 AES signals – 4 channels). Group position selection is made by the front panel local control.

Regenerated SDI outputs are provided to allow connection of more modules if additional channels are required.

The DAI-3200 supports AES/EBU synchronous / asynchronous audio at 48 KHz, 20-bit audio data packets.

An audio presence indicator is provided for each input. If one AES audio pair is missing then those particular channels are set to zero. If both AES pairs are missing, then no packets are inserted.

The DAI-3200 complements the DAX-3201 audio extractor.

Front panel LED's indicate a loss of SDI input and the presence of AES1 and AES2 signals. An external relay alarm is also provided on the rear assembly.

The DAI-3200 is fabricated in IRT's standard Eurocard format and may be housed in a variety of IRT Eurocard frames alongside other standard modules.

Standard features:

- **Standard 75 Ω 270 Mbit/s video input.**
- **Inserts embedded audio – 2 AES signals containing 2 channels each.**
- **Supports SMPTE 272M-A Synchronous 48 kHz Insertion.**
- **Supports SMPTE 272M-AD Asynchronous 48 kHz Insertion.**
- **20 bit audio supported.**
- **Z, C, U data preserved.**
- **Automatic EDH correction and / or insertion.**
- **Ability to replace existing embedded audio.**
- **Optional removal of existing embedded packets.**
- **Automatic selection between 525 & 625 line formats.**
- **Indicators / external alarms for loss of carrier & audio.**
- **Automatic input equaliser to >250 m.**
- **Two 270 Mbit/s SDI outputs for loop through to additional units.**

Equipment provided:

Standard: DAI-3200 SDI audio extractor module.
110 Ohm Rear assembly

Optional: 75 Ohm Rear assembly

Accessories available:

3 RU Eurocard module mounting frame	Two models exist. One mounts up to 12 Eurocard modules and one dual AC power supply side by side in 134 mm of standard rack space (3 Rack Units). The other mounts up to 10 Eurocard modules and two single AC hot plugable power supplies side by side (for redundancy) in 134 mm of standard rack space (3 Rack Units)
1 RU chassis conversion/PSU	Converts Eurocards to a 1-rack unit format. The 1 RU frame 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.

Instruction Book.

Technical specifications
IRT Eurocard module
Type DAI-3200

SDI input:

Number	1 (BNC).
Impedance	75Ω terminated.
Equalisation	Automatic for cables lengths <250 m (Belden 8281).
Format	270 Mbit/s video with or without embedded audio serial data to SMPTE 259M-A/D.

SDI outputs:

Number	2 (BNC).
Type	75Ω sourced.
Format	Regenerated and re-clocked.

AES/EBU inputs:

Number	2
Impedance	110 Ω balanced.

Other:

Power requirements		28 Vac CT (14-0-14) or ± 16 Vdc.
Power consumption		<7 VA.
Temperature range		0 - 50° C ambient.
Connectors		Phoenix plug in terminal blocks unless otherwise noted.
Mechanical		Suitable for mounting in IRT 19" rack chassis with input output and power connections on the rear panel.
Finish:	Front panel	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		30 mm x 3 U x 220 mm IRT Eurocard.
Accessories supplied with module		Rear connector assembly including matching connectors for audio, alarms and controls.
Optional accessories		TME-6 module extender card.

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

Technical description

Audio Packet Distribution

Groups are embedded in non-switching lines with each group residing in a fixed number of bytes from the End of Active Video (EAV) flag. Each group contains either 3 or 4 AES words in length. Preserving this distribution simplifies insertion or removal of audio groups. This method is supported by other manufacturers.

Each of the two channels within the AES group must be the same data rate. If both channels are present, input one is deemed master and the packet distribution is performed according to its input rate.

Input 1 corresponds to channels 1 & 2 of the audio group while Input 2 corresponds to channels 3 & 4. Note that Input 2 may experience clicks or pops and C channel errors if asynchronous to Input 1.

If Input 1 is not present then Input 2 becomes master. If neither is present then no audio packets are embedded.

Group 1	Immediately after EAV.
Group 2	64 bytes after EAV.
Group 3	128 bytes after EAV.
Group 4	192 bytes after EAV.

Configuration

Links:

	Link	Normal	Function
	LK 1	IN:	Pass existing embedded data.
		OUT:	Remove existing embedded data.
	LK 2	IN top:	Alarm out - Normally closed.
		IN bottom:	Alarm out - Normally open.
	LK 3	Not fitted	(reserved for future use).
	LK 4	Not fitted	(reserved for future use).
	LK 5	Not fitted	(reserved for future use).
	LK 6	Not fitted	(reserved for future use).
	LK 7	Not fitted	(reserved for future use).
	LK 8	Not fitted	(reserved for future use).
	LK 9 (when LK 1 out)		
		IN:	Erase selected embedded data.
		OUT:	Erase all embedded data.
*	LK 10 (when LK 1 out and LK 9 in)		
		IN:	Place embedded data next to End of Active Video (EAV). (erase group 1 & selected group location)
		OUT:	Place embedded data at fixed locations. (erase existing audio at location)
*	LK 11	IN:	Don't insert control packet.
		OUT:	Insert control packet.
	LK 12	IN top:	Forced NTSC audio distribution.
		IN bottom:	Forced PAL audio distribution.
		OUT:	Auto detection and auto distribution (default).

Switches:

Sw 1	Front panel:	Group selection 1 – 4.
Sw 2	Not fitted (reserved for future use).	

*** <u>NOTE:</u>**

LK 10:
LK10 is designed to override the special audio group placement. The inserted group will reside immediately after the EAV flag, thus replacing Audio Group 1 if present.

If LK 1 is OUT and an audio group other than group 1 is embedded, plus the SDI input already contains this group number, then two possible audio groups with the same group number may exist resulting in corrupted audio.

If LK 1 is OUT and LK 9 is IN, all existing embedded audio is erased resulting in no conflict and therefore no problem.

If LK 1 is OUT, LK 9 is IN and LK 10 is IN, both the locations of group 1 and the position of the intended group are erased.

Thus, if existing embedded audio is not required, then set LK 1 OUT and LK 9 OUT to erase all existing embedded audio. Otherwise, when multiple DAI-3200's are used, the first DAI-3200 would be set to LK 1 OUT, LK 9 OUT and subsequent DAI-3200's would be set to LK 1 OUT, LK 9 IN and LK 10 OUT to allow add and append operation.

LK 11:
LK 11 is used to control the insertion of Audio Control Packets. Audio Control Packets are used to tell the decoder the format of the embedded audio, parameters such as synchronous or asynchronous, sampling rate 32 kHz, 44.1 kHz, 48 kHz etc. are defined.

Each group must have a control packet except in the case of 48 kHz synchronous operation when the Audio Control Packet is defined as OPTIONAL. In the absence of an Audio Control Packet, 48 kHz synchronous operation is assumed.

Installation

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.

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:

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

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.

Installation in frame or chassis:

See details in separate manual for selected frame type.

Connections:

Controls

- Group select (1,2,3 or 4)
- Channel pair select (1&2 or 3&4)

Indicators and alarms
The alarm output on the rear of the DAI-3200 indicates a loss of 270 Mb/s data or loss of power. This alarm output is a relay contact settable for either N/O or N/C contacts by link LK2.
LED's on the front panel indicate:

Loss of SDI input
Audio present
DC power

SDI Video:

Input:
The SDI input is a single BNC connector terminated in 75 Ohms.
The input equaliser compensates automatically for losses of up to 250 metres of high quality 75 Ohm coaxial cable. Performance tests are made using Belden 8281 cable as a reference. Actual results and bit error rates will depend on the quality of the cable and the noise environment as well as the quality of the originating equipment.

Outputs:
Two SDI outputs are provided. These are equalised and reclocked outputs and so will exhibit a small time delay with respect to the input. This may need to be taken into account if they are to be used for other than monitoring purposes. These outputs are matched 75 Ohm impedance and should only be used with 75 Ohm coaxial cable. They must be 75 Ohm terminated at the destination in order to obtain correct levels and performance.

AES Audio:

AES audio inputs are provided in either unbalanced or balanced formats. The AES signals are encoded as stereo and therefore does not require separate connections for 'Left' and 'Right' channels. 2 input AES signals may be inserted into the one group.

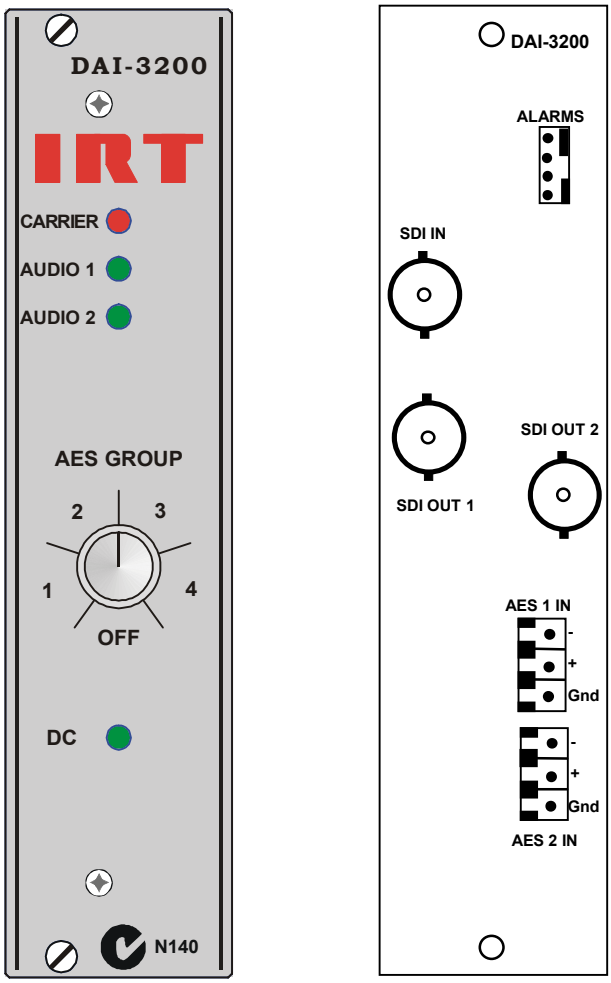
The unbalanced BNC input connectors, on the 75 Ohm rear connector unit, should only be used with 75 Ohm coaxial cable and must be 75 Ohm terminated at the source in order to obtain correct levels and performance.

The balanced inputs, on the 110 Ohm rear connector unit, should be used with high quality twisted pair shielded cable and terminated in a balanced configuration of 110 Ohms at the source. This format is not polarity (phase) conscious, but +ve and -ve marks are provided beside the output connector for consistency in wiring. However, it is important that the cable lengths and losses of the pair be the same. In particular, patch bays can introduce these problems, resulting in distorted eye patterns and thus, high bit error rates.

This format is not generally suited to long cable runs. For these applications the unbalanced 75 Ohm input should be used.

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 assist 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.

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.

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

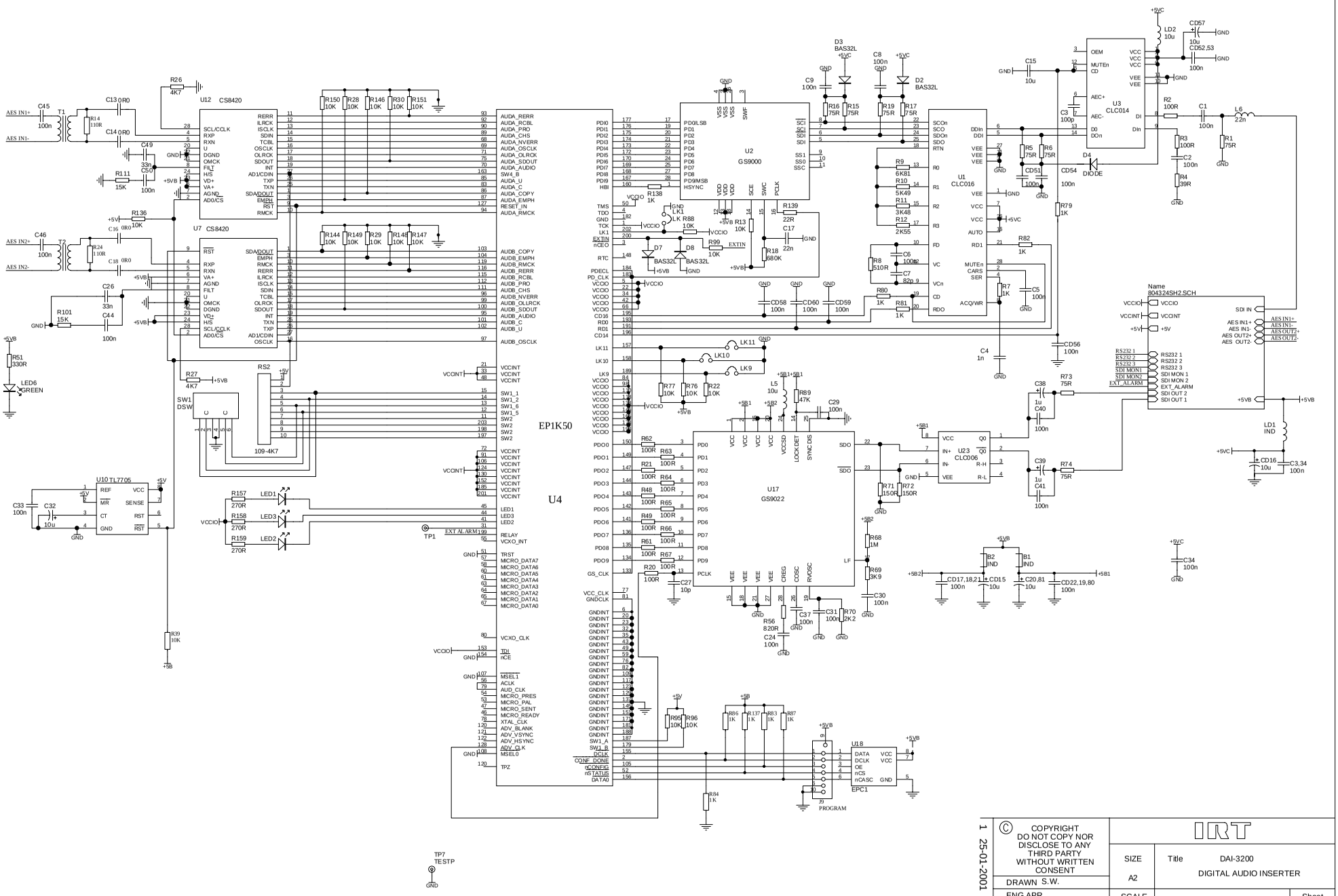
The equipment should be returned **to the agent who originally supplied the equipment or, where this is not possible**, to IRT direct as follows.

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

Phone: 61 2 9439 3744 Fax: 61 2 9439 7439
Email: service@irtelectronics.com

Drawing index

Drawing #	Sheet #	Description
804324	1	DAI-3200 schematic diagram.
804324	2	DAI-3200 schematic diagram.



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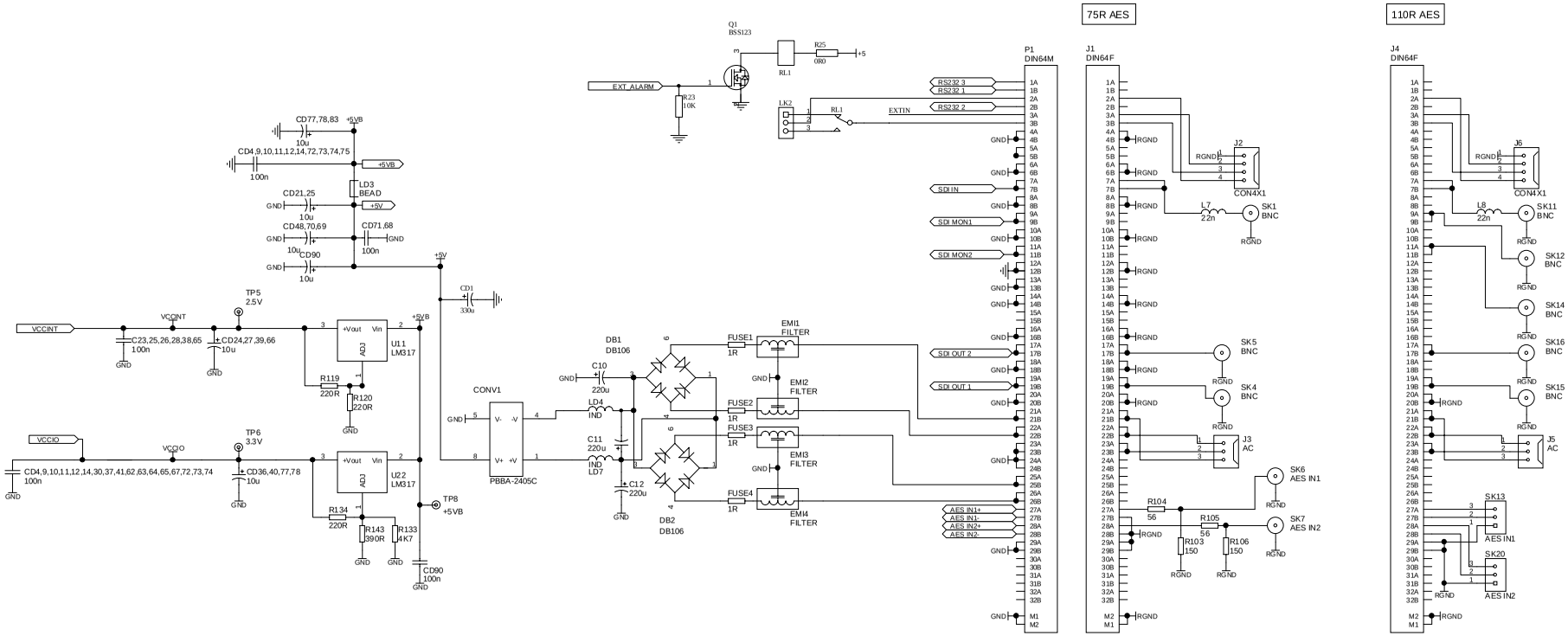
	ENG.APR.	SCALE N.T.S.	Drawing No. 804324 Sheet 1 of 2
	CHECKED		
	Revision: 1	IRT Electronics Pty. Ltd.	
	Date: 16-Mar-2001	ARTARMON NSW AUSTRALIA 2064	



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Revision: 1		IRT Electronics Pty. Ltd.
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