I R T Electronics Pty Ltd A.B.N. 35 000 832 575
26 Hotham Parade, ARTARMON N.S.W. 2064 AUSTRALIA
National: Phone: (02) 9439 3744 Fax: (02) 9439 7439
International: +61 2 9439 3744 +61 2 9439 7439
Email: sales@irtelectronics.com
Web: www.irtelectronics.com

EUROCARD

AES/EBU Digital to Analogue Converter

Type DAC-3410

Designed and manufactured in Australia

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

DAC-3410

AES/EBU Digital to Analogue Converter

Instruction Manual

This manual applies to units SN 9908001 and above.

Table of Contents

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.

Description.

The IRT DAC-3410 is an AES/EBU digital to analogue converter, with two stereo analogue audio outputs, and six digital AES/EBU monitor outputs from a non-reclocking distribution amplifier for the AES/EBU digital signal. The DAC-3410 will operate at 32,44.1 and 48 KHz.

The digital input can be 75 ohm coax or 110 ohm balanced line with both input types available on the rear assembly and selection of the required input by links on the main circuit board. The two stereo analogue outputs are low impedance 45 ohms sourcing and the digital outputs can be 75 ohm coax or 110 ohm balanced line depending on the rear assembly used.

The DAC-3410 is designed to fit the IRT range of eurocard mounting frames, including the 12 slot FR-700 and 2 slot FRU-1030 rack mounting frames.

Circuit Description.

The DAC-3410 input circuit is a linking arrangement (SW1,SW2) to select either the balanced or unbalanced input from the rear panel input connector. The signal is then coupled to a high speed differential line receiver using transformer T1. The line receiver is buffered by its internal line driver circuit and this signal drives output line driver circuits for the seven digital outputs from the DAC-3410, six to the rear panel assembly via transformers T6-T7 and one to the front panel monitor connector. The six outputs to the rear panel are sourced through 51 ohms resistors to set the output impedance for the balanced output circuits when using the ZAC-3411 rear panel assembly. For 75 ohms output circuits the ZAC-3410 rear panel assembly uses a resistive voltage divider to set the output impedance back to 75 ohms at a nominal level of 1 Vp-p.
The front panel of the DAC-3410 provides led indicators for the presence of audio signal in each stereo channel, loss of input digital signal, presence of dc power and a BNC jack for monitoring the digital AES audio stream.

The digital to analogue converter circuit uses the Crystal CS8412 (U9) digital audio interface receiver and the CS4329 (U10) stereo digital to analogue converter. The circuit is wired to provide automatic selection of the de-emphasis filter of the CS4329 when the emphasis information is included on the channel status of the AES data stream. Link LK8 when closed will enable the auto mute function of the CS4329 to mute the analogue outputs when no EAS data signal is present. The error flag from the CS4812 is used to provide a front panel indication of loss of AES data signal.

A six pole butterworth low pass filter circuit U12 to U15 follows the CS4329 digital to analogue converter to remove the over- sampling noise present on the output signal of the CS4329, this is followed by the gain controls RV1, RV2 and a buffer amplifier before the balanced output amplifiers U16 to U19.

The outputs of the low pass filters, before the gain controls RV1 and RV2 are wired to a audio level detector circuit U101which is part of the front panel assembly of the DAC-3410, this provides visual indication on the front panel using led lamps of the presence of audio signals greater than –40dBFS as set by RV101.

The power supply comprises two bridge rectifiers whose rectified outputs are paralleled (positive and negative respectively) to provide redundancy. The inputs to these rectifiers are two independent feeds of 28 Vac (centre tap grounded). A DC-DC converter module is used to provide the required 5 volts supply for the digital circuits. The DC indicator LED on the front panel is used to indicate presence of the 5 volts supply. Three terminal regulators are used to provide the +/- 12 volts supplies for the analogue circuits comprising operational amplifiers U12 to U19.

DAC-3410 Specifications

Inputs	2
Type	1 x 110 Ω balanced. or 1 x 75 Ω unbalanced. selected by link on PCB.
Format	AES3-1992 standard.
Input level	200 mVp-p minimum.
Input cable length	>500m Belden (8281) >200m 110 Ω (AES digital high quality shielded pair).
Outputs	
AES/EBU	6
Rear panel type ZAC-3410 or	75 Ω unbalanced >1Vp-p.
Rear panel type ZAC-3411	110 Ω balanced >3Vp-p.
Front panel monitoring	1 x 75 Ω unbalanced.
Format	AES3-1992 standard.
Performance	
Frequency range	32,44.1 or 48 KHz.
Output signal rise and fall times	<20 ns.
Analogue:	
Number	2 stereo
Type	45 Ω balanced.
Performance	
Frequency range	32,44.1 or 48 KHz.
Output level for full code	+24 dBu (variable by internal factory preset)
Frequency response	+/-0.1 dB 50 Hz to 15 KHz. +/-0.2 dB 15 KHz to 20 KHz.
THD+N	<0.025%
Noise	-100 dBFS ('A' weighted with idle channel, input all zeros)
Linearity	,+/-0.5 dB at –90 dBFS.
De-emphasis	automatic from channel status.
Power requirement per unit	14V-0-14Vac <6 VA
Connectors	
Unbalanced	BNC.
Balanced	Phoenix 3 terminal plug-in screw terminal blocks.
Operating temperature range	0 - 50° C ambient
Mechanical	6 HP x 3 U x 220 mm IRT Eurocard Suitable for mounting in IRT 19" rack chassis types FR-700 & FRU-1030.
Finish: Front panel	Grey powder coat, silk-screened black lettering & red IRT logo
Rear assembly	Detachable silk-screened PCB with direct mount connectors to Eurocard and external signals
Standard accessories	Operation manual
Optional accessories	TME-6 module extender card

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

Installation

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.

Signal Connections

Signal connections are made to the connectors on the selected rear panel of the DAC-3410.

The input signal can be either 75 ohms unbalanced terminating or 110 ohms balanced terminating, the **input selection** is done be links **SW1,SW2 on the module pcb** near pin 32 of the input connector. Move the links provided to the 75 or 110 positions marked on the board as required. The input signal is then connected to the appropriate input connector on the rear panel.

For unbalanced 75 ohms output circuits use the ZAC-3410 rear panel and for balanced 110 ohms output circuits use the ZAC-3411 rear panel assembly.

The presence of AES signal at the output of the ZAC-3410 can be monitored using the front panel monitoring BNC socket provided.

RV1 and RV2 the analogue audio gain controls are factory preset to give a audio output level of +24 dBU for a 0 dBFS AES digital input signal.

LK8 selects the auto mute function of the CS4329 D/A converter, the factory setting is ON.

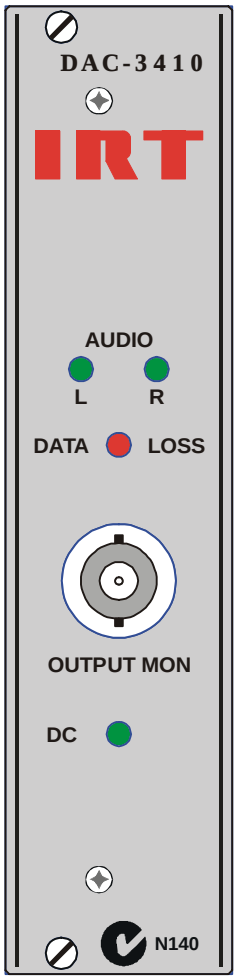
RV101 on the front panel set the threshold for the audio presence indicator LEDs on the front panel. The factory setting is for a –40 dBFS digital input signal.

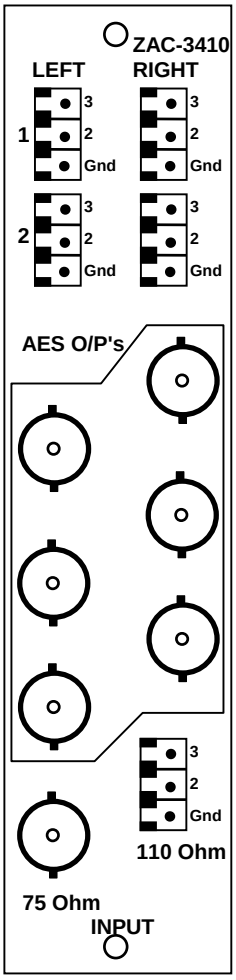
Diagrams are provided giving details of the circuits of the DAC-3410.

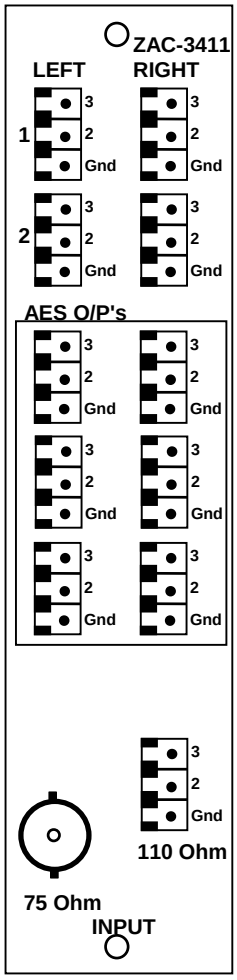
NOTE: If it is necessary to remove a component from the circuit board during maintenance **IT IS ESSENTIAL TO ADD SOME SOLDER TO THE COMPONENT SOLDER JOINTS BEFORE REMOVAL IS ATTEMPTED**. This will add some solder flux to the joint and allow the heat from the iron to flow quickly into the joint and prevent localised overheating and damage to the circuit board.
Rear assemblies may be removed for maintenance. Make sure that extraction force is applied equally and steadily at the top and bottom of the rear assembly. SHOULD THIS NOT BE DONE THERE IS A GOOD CHANCE THAT YOU WILL BEND THE MODULE CONNECTOR PINS making it very difficult to re-install the rear assembly.

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 1 hour's labour, at IRT's current labour charge rate, 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 1 hour's labour will apply, whether the equipment is within the warranty period or not. Contact IRT for current hourly rate.

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

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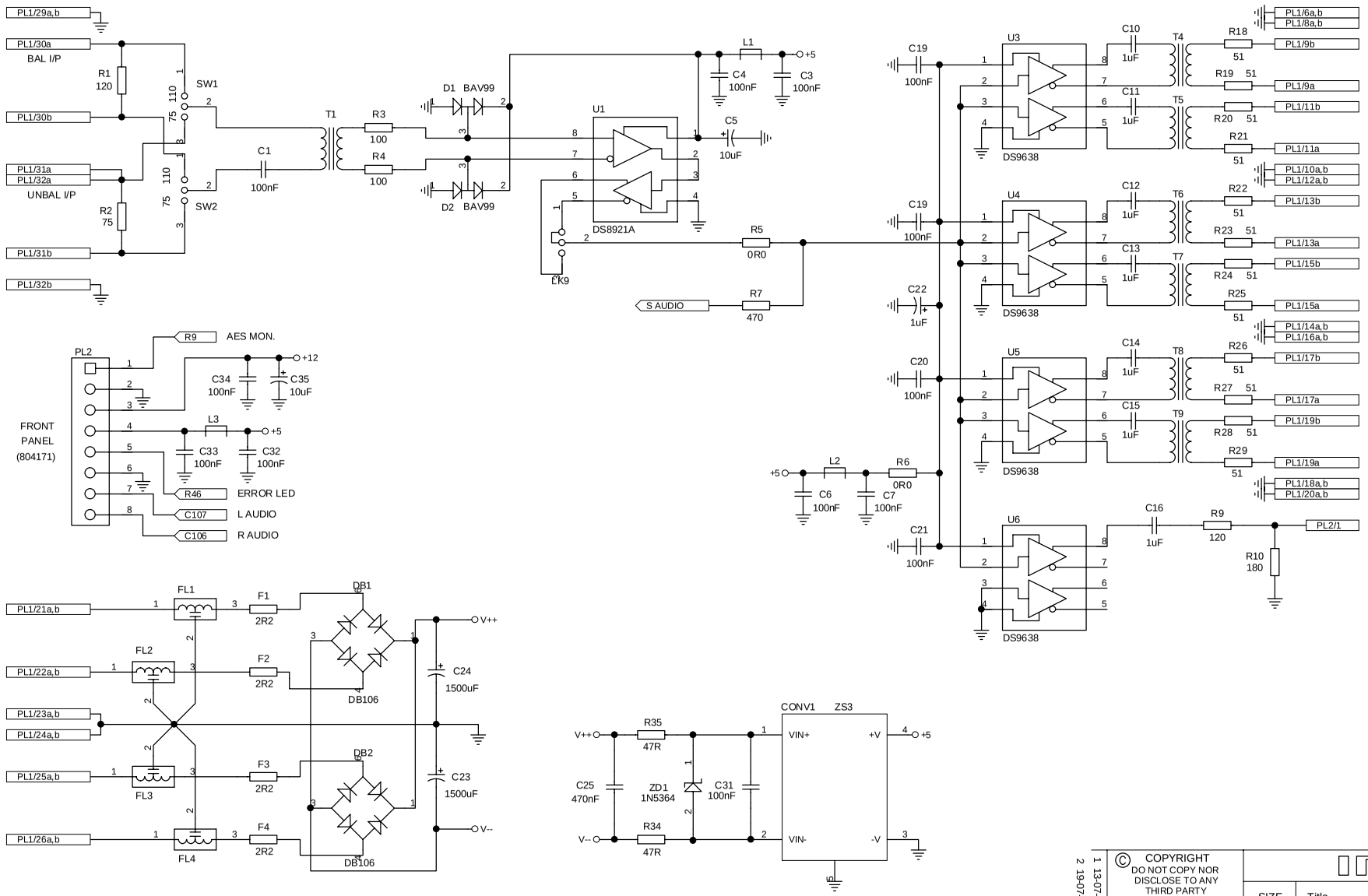

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2 19-07-1999	SIZE A3	Title DAC-3410 EAS/EBU D-A CONVERTER
	DRAWN K.N.	
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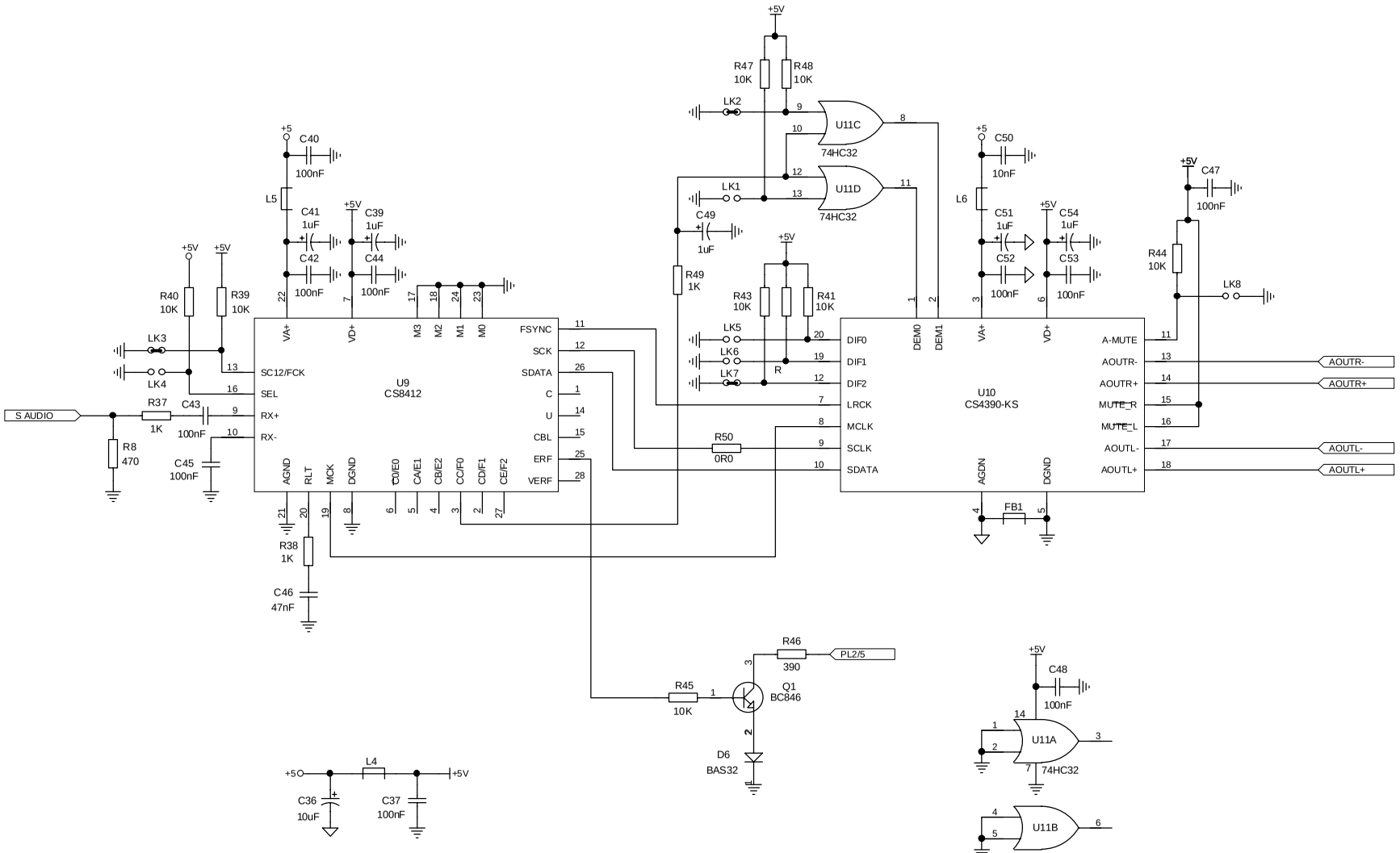
	Date: 15-Feb-2001	IRT Electronics Pty. Ltd. ARTARMON NSW AUSTRALIA 2064



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4	14-12-2000 ECR1158

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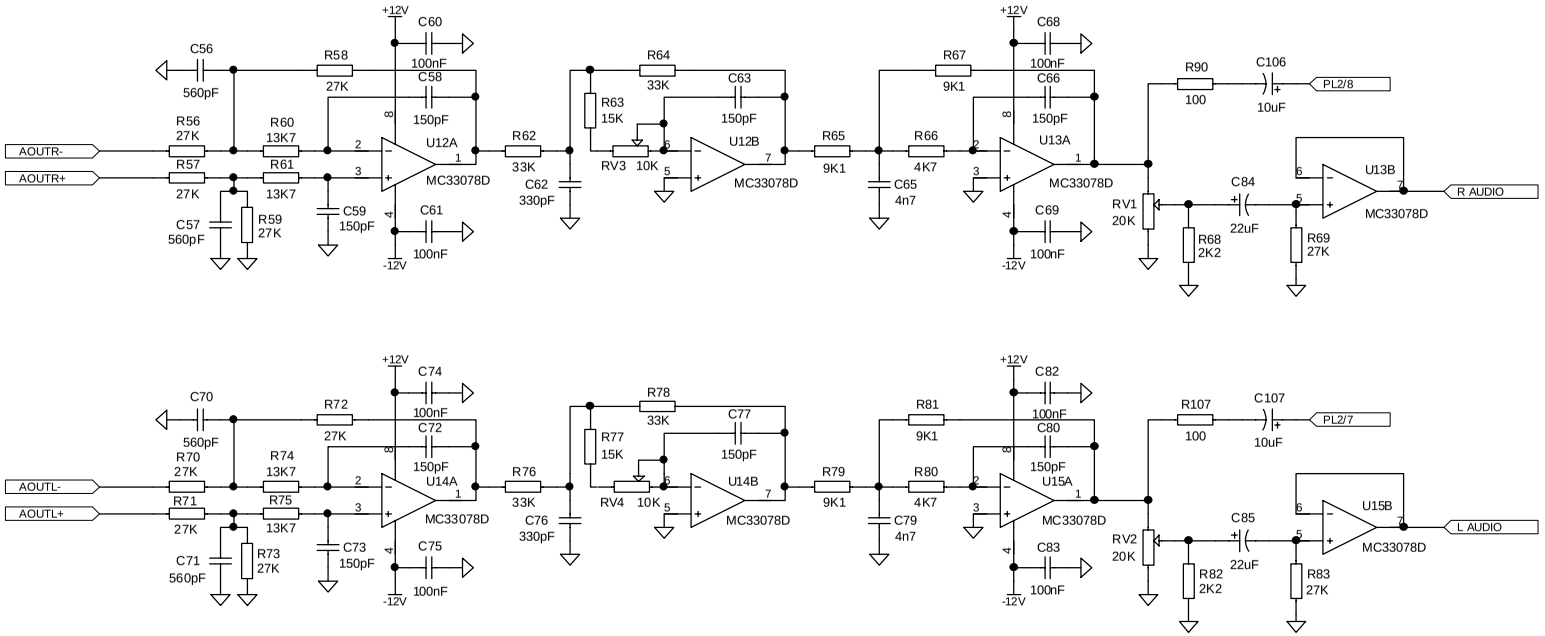

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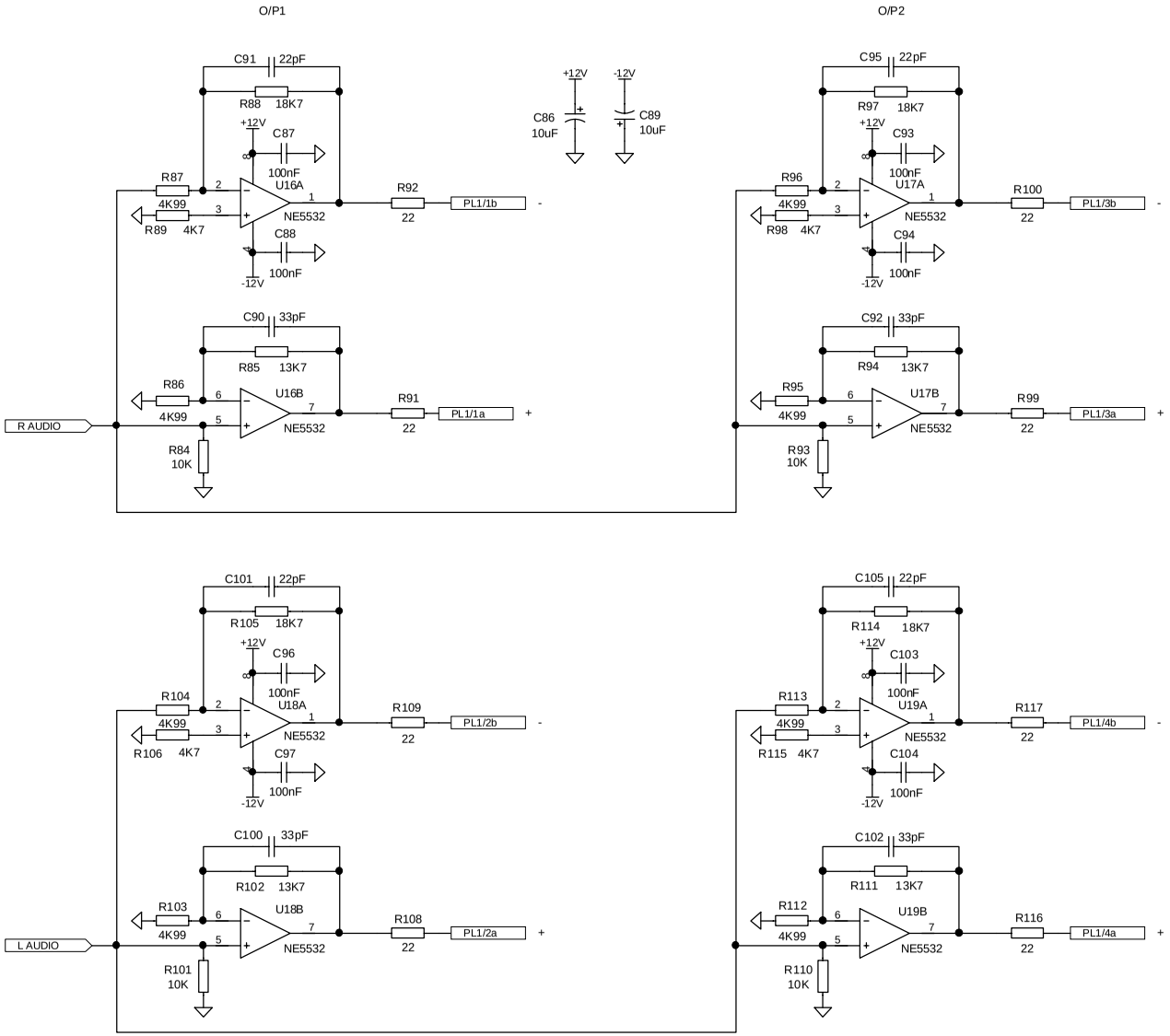

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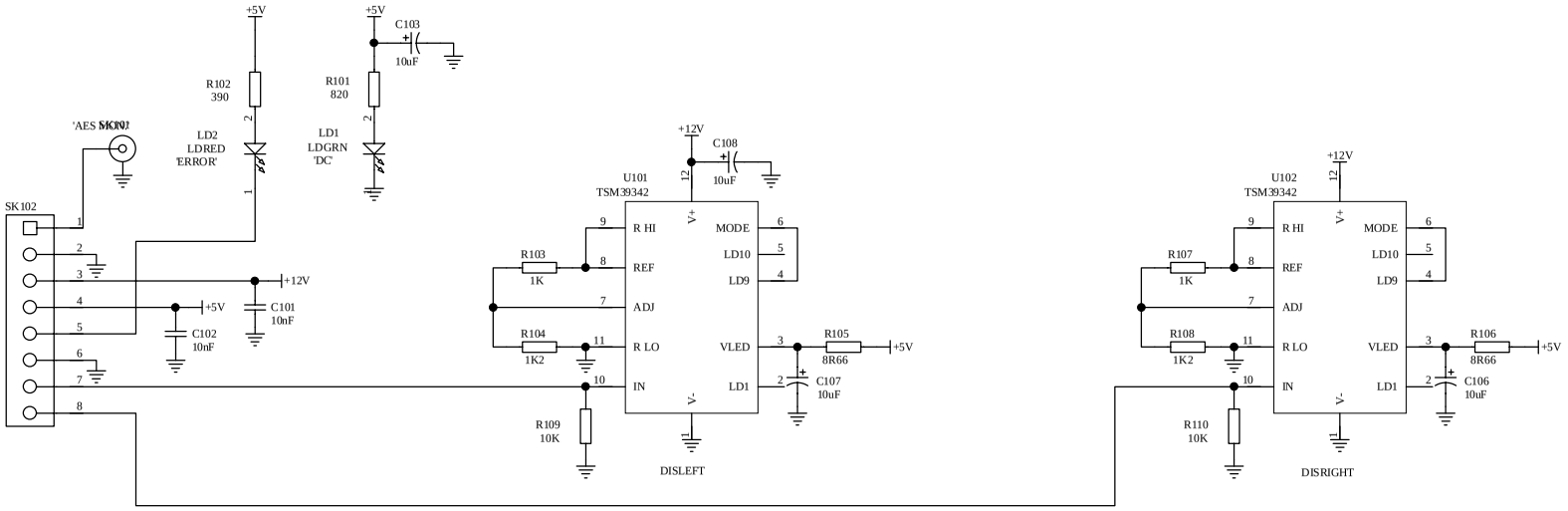

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CONTRACT No.

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SIZE A3

TITLE
DAC-3410
FRONT PANEL SUB-BOARD

SCALE

DRAWING No. 804171

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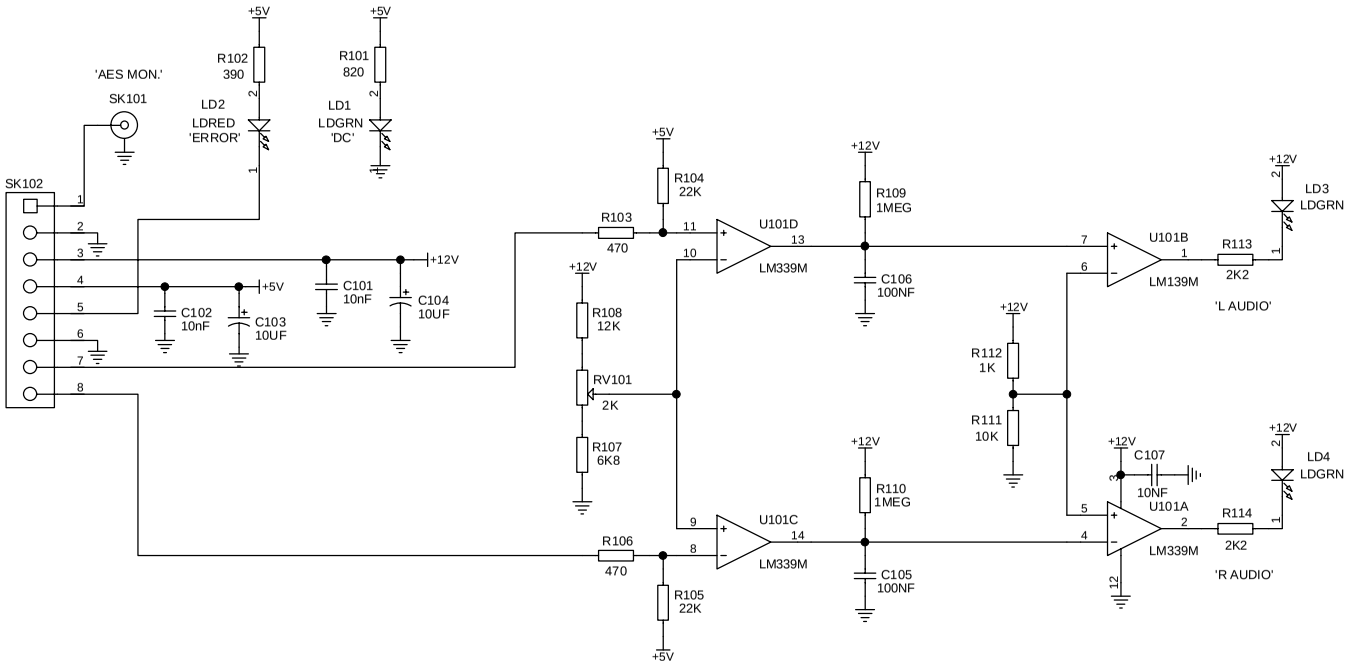

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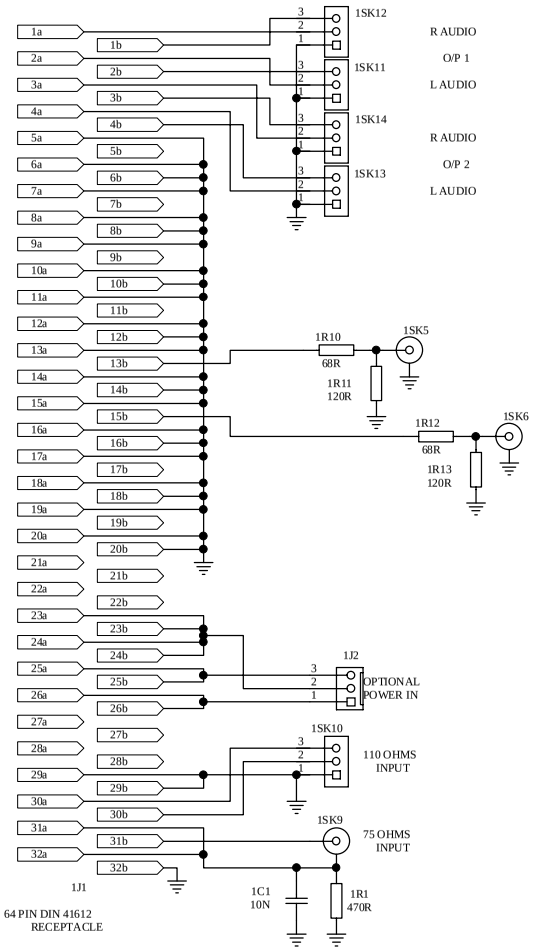

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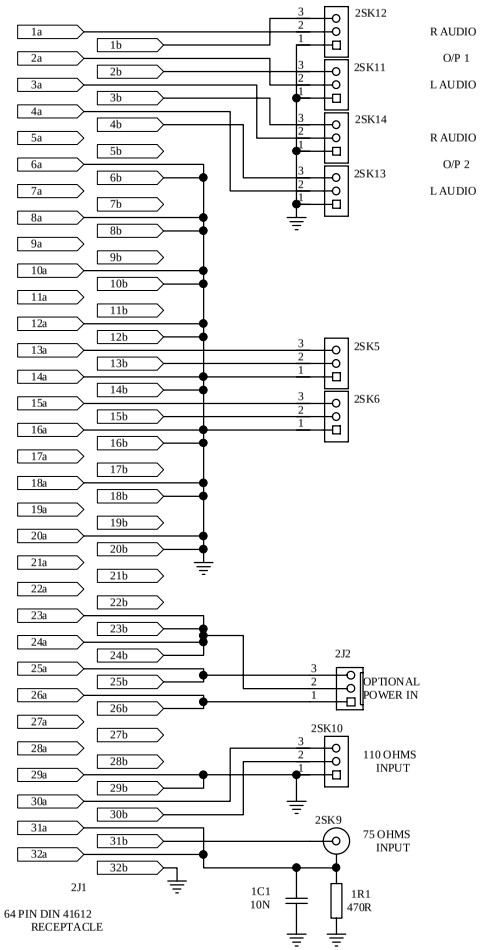
CONTRACT No.	IRT Electronics Pty. Ltd. ARTARMON NSW AUSTRALIA 2064	



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SIZE

TITLE
ZAC-3411
110 OHMS REAR ASSEMBLY
FOR DAC-3410

SCALE

DRAWING No. 804199

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1 OF 1

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