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IRT Eurocard

Types DDA-3312
ASI / SDI Path Protection and Distribution Amplifier
&
ZDA-4311RH
Handshake changeover assembly

Designed and manufactured in Australia

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

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Instruction Book

Table of Contents

This instruction book applies to units later than serial number 0402001.

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General Description

The DDA-3312 is a data distribution amplifier that may be used with either DVB ASI or SMPTE SDI 270 Mb/s signals.

Four outputs are provided at the rear of the module and for monitoring purposes there is one on the front panel. On power failure the input signal is switched by a relay to Output 1.

In SDI mode a loss of input or a missing EAV (End of Active Video) is used to indicate failure.

In ASI mode a loss of input or absence of Packet Sync (in either 188 or 204 byte packets) is used.

Indicators are provided on the front panel for:

SDI signal detected
ASI signal detected
ASI signal inverted
Data loss
Module in service
Module in standby

The alarm signals are also available on the rear of the module as contact closures to ground.

The DDA-3312 incorporates a protection facility for switching two outputs to signals from a companion DDA-3312 when a fault is detected.

For this configuration, a special double width rear assembly (type ZDA-4311RH) is required to link the signal and logic sections of two modules.

Changeover-inhibit and changeover-request switches are provided on the front panel for use where modules are so linked.

A manual changeover request may be made either locally by using the front panel switch or remotely via a connection on the rear assembly.

Applications:

- Stand alone cable equaliser and distribution amplifier.
- Paired for redundant path protection switching.

Standard features:

- SDI and DVB-ASI compliant.
- Adaptive cable input equalisation.
- Data regeneration.
- Polarity alarm and inversion capability for ASI.
- Protection switching capability.
- Power fail signal bypass.
- External alarms.
- IRT Eurocard construction compatible with other IRT Eurocard modules and frames.
- Dual power supply operation.

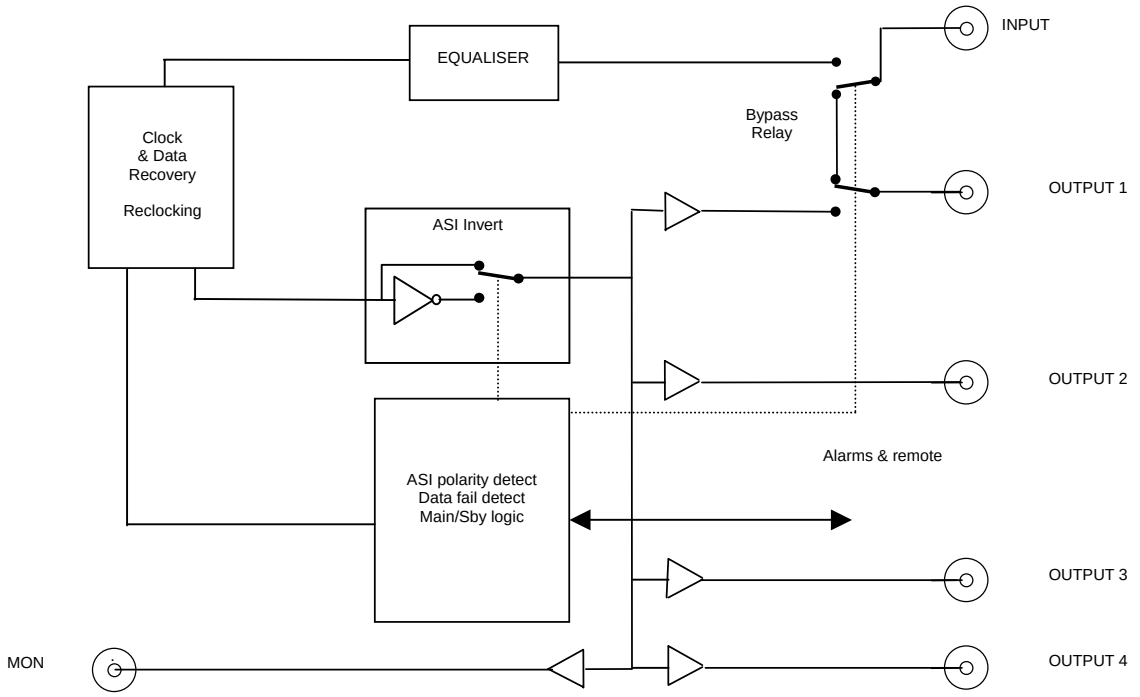
Accessories available:

ZDA-4311RH* Double rear assembly for handshake:	Connects two adjacent DDA-3312's for automatic changeover of two of the four outputs in the event of a fault being detected, plus passthrough of the remaining two on both cards.

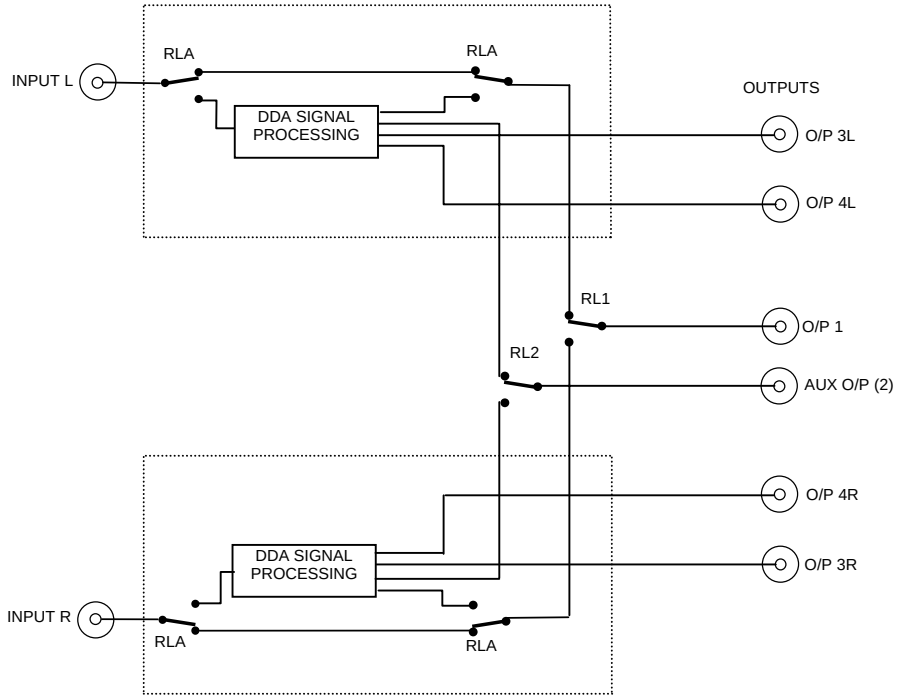
NOTE: * ZDA-4311RH supersedes earlier ZDA-3311RH by being able to be mounted within a 4000 series frame.

Functional diagrams

Block diagram DDA-3312- Signal path



Handshake diagram 2 x DDA-3312



DDA-3312 Technical Specifications

ASI/SDI input:

Number	1.
Impedance	75 Ω
Return loss	>15 dB 5 MHz to 135 MHz.
Equalisation	Automatic, better than 200 metres at 270 Mb/s for Belden 8281 cable.

ASI/SDI outputs:

Number	4 outputs located on rear assembly and one located on front panel. With handshaking - 2 switched, and 2 unswitched.
Type	Reclocked.
Level	800 mV ±10% into 75 Ω.
Return loss	>15 dB 5 MHz to 135 MHz.
DC offset	Nil.
Impedance	75 Ω source terminated.

Performance:

Rise time	<1.0 ns, (700 ns typically).
Residual jitter	<200 ns, (150 ns typically) at 270 Mb/s.

Controls & alarms:

General alarm.	Relay contact closure to Gnd on fail.
Signal fail.	Relay contact closure to Gnd on fail.
Changeover request.	Contact closure to Gnd.

Connectors:

ASI/SDI:	BNC.
Alarm:	Krone LSA plus.

Other:

Power requirements		28 Vac CT (14-0-14) or ± 16 Vdc. <5.5 VA
Temperature range		0 - 50° C ambient.
Mechanical		Suitable for mounting in IRT 19" Eurocard rack chassis with input output connections on the rear panel.
Finish:	Front panel	Grey background, silk-screened black lettering & red IRT logo.
	Rear assembly	Detachable silk-screened PCB with direct mount connectors to Eurocard and external signals.
Dimensions		31 mm x 3 U x 220 mm IRT Eurocard.
Standard accessories		DDA-3312 rear connector assembly.
Optional accessories		Instruction manual. ZDA-4311RH* double rear assembly, for handshake connection of two DDA-3312's.

NOTE: * ZDA-4311RH supersedes earlier ZDA-3311RH by being able to be mounted within a 4000 series frame.

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

ZDA-4311RH Technical Specifications

Controls & alarms: **for both DDA-3312s**

Input:

External changeover request	A ground applied to this input will emulate the operation of the front panel switch “Change Request”.

Outputs:

Power Fail Alarm	Contact closure to ground if power has failed.
General Alarm	Contact closure to ground if Data Loss is detected
Main Tally	Transistor switch to ground to indicate which module is acting as the *Main* (“In Service”) path.

Connectors:

ASI/SDI: BNC.
Alarm: Krone LSA plus.
Tally: Krone LSA plus.

Description of Operation

See schematic diagrams at rear of this manual.

Input:

The signal applied to the Input BNC connector may be either an SDI or ASI at 270 Mb/s. With no power applied to the module RLA switches the input signal directly to the O/P1 connector.

Active path:

When power is applied the input signal is passed to U1, which is a cable equalising circuit. The purpose of this equaliser is to compensate for the losses in the input cable by restoring both the level and the shape digital signal. After this the signal is reclocked by U2.

If the Invert switch (SW3) on the front panel is operated U13 will invert the signal. As SDI is not polarity sensitive this function is only useful for ASI signals which have the wrong polarity. RV1 is a factory-preset adjustment for best eye pattern.

U3, U4 and U5 are dual line driver circuits for the line outputs on the rear and the monitoring output on the front panel.

The reclocked signal is converted to 10 bit parallel format by U6. This signal is used by U8. This programmable logic array carries out the signal identification, monitors for signal loss and handles the switching and alarm logic.

RL4 is the power fail alarm relay. Its contact appears on SK1-1 on the rear connector assembly and is connected to ground when there is a loss of power.

RL5 is the general alarm relay. Its contact appears on SK1-2 on the rear connector assembly and is connected to ground when there is either a loss of input signal, ie an absence of end of active video (EAV) for SDI, or an absence of Packet Sync for ASI.

When power is applied to the unit, U12 generates a *power on reset* signal. This signal causes the processing circuit to examine its current status and connections and restore operation to its state prior to power failure.

If the DDA is connected for stand-alone operation all alarms will be reset and normal operation will resume. If the signal is absent or data is outside the prescribed limits outlined above then the general alarm will be activated after the normal detection period has elapsed from the P.O.R. signal being initiated.

For operation in handshake mode see *Handshake* operation description.

Handshake Operation:

See schematic diagram 804839 sheet 5 at rear of this manual.

Purpose:
Handshake interconnection is required when two DDA-3312 modules are to be operated in 1:1 protection switching mode to provide a continuous signal output in the event of failure of one of two signal sources (see the functional block diagram). Handshaking is carried out using the ZDA-4311RH dual width rear connector assembly. Relays on the ZDA-4311RH rear connector assembly are used to switch the signals and they are controlled by logic from the two DDA-3312s.

Operation:
Designate the two DDA-3312s as Left and Right. Assume that the Inhibit/Allow switch on each unit is in the Allow position. Assume that the input signal to the Left unit was applied before the signal to the Right unit.

The Left unit will show “In Service” and will be the active amplifier. The Right unit will show “Standby”. TB2L-3 will also be switched to ground to remotely indicate that the Left unit is the “In Service” module.

If the signal to the Right unit now fails no switching will occur, but the Data Loss light on the Right Unit will show.

If instead, the signal to the Left Unit fails and that of the Right unit does not, then the Right Unit will become “In Service” and the Left unit will become “Standby”. The Left Unit “Data Loss” led will show. TB2L-3 will now go open circuit and TB2R-3 will now be switched to ground to remotely indicate that the Right unit is now the “In Service” module.

Upon return of signal to the Left Unit its “Data Loss” led will extinguish, but the Right Unit will remain the “In Service” unit.

If both units have valid input signals then operation of the “Change Request” button on the “Standby” module will cause it to become the “In Service” module (provided that its “Allow/Inhibit” switch is in the “Allow” position.

Upon power failure and subsequent return of power the unit that was “In Service” will still be “In Service”.

A power failure on one module is treated as a loss of signal.

Inputs & outputs:
It is important to note that in this mode only two outputs of the DDA-3312 are switched. The two unswitched outputs of each DDA-3312 are also provided on the ZDA-4311RH.

Logic connections:
All required logic connections are made by tracks on the double width PCB. Automatic operation is immediately initiated when two modules are plugged into this type of rear assembly.

No external connections are required, but external alarm connections are available from each module for use if desired. Additionally, each module has a connection for an external *Make Main* (“In Service”) control for remote DDA selection. External change requests are made by grounding TB1L-3 or TB1R-3 as appropriate.

A *Main Tally* switch to ground occurs on either TB2L-3 or TB2R-3 to indicate which module is the “In Service” module.

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.

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.

Installation in frame or chassis:

See details in separate manual for selected frame type.

Video connections:

SDI or ASI signal input to input BNC connector on rear connector assembly. Set signal type switch on front panel for current input signal, SDI or ASI or SDI/ASI.
4 BNC outputs are also provided on the rear assembly. Input is automatically bypassed to Output 1 in event of a power failure, therefore use Output 1 as main (most important) output.

ASI signals are phase sensitive. If a signal inversion has occurred somewhere earlier in the system, switch invert signal switch on front panel to correct the data stream.

Alarm and external changeover connections:

A Krone type connector is provided on the rear panel of the module providing the following:

Pin	1	Power Fail - connection to ground indicates that power to the module has failed.
	2	Alarm - connection to ground indicates loss of signal alarm.
	3	External changeover request - connection to ground will make this module “In Service” in handshake mode.
	4	Ground.

Handshaking Operation:

Install two DDA-3312’s side by side in a 3RU frame. Use ZDA-4311RH double width rear connector assembly in place of the standard rear assemblies. Units are designated as L and R on the rear assembly.

Two BNC inputs are provided, *Left* and *Right*. Set module priority by pressing the front panel change request button on your chosen Main feed ensuring correct LED lights on each unit – In Service and Standby.

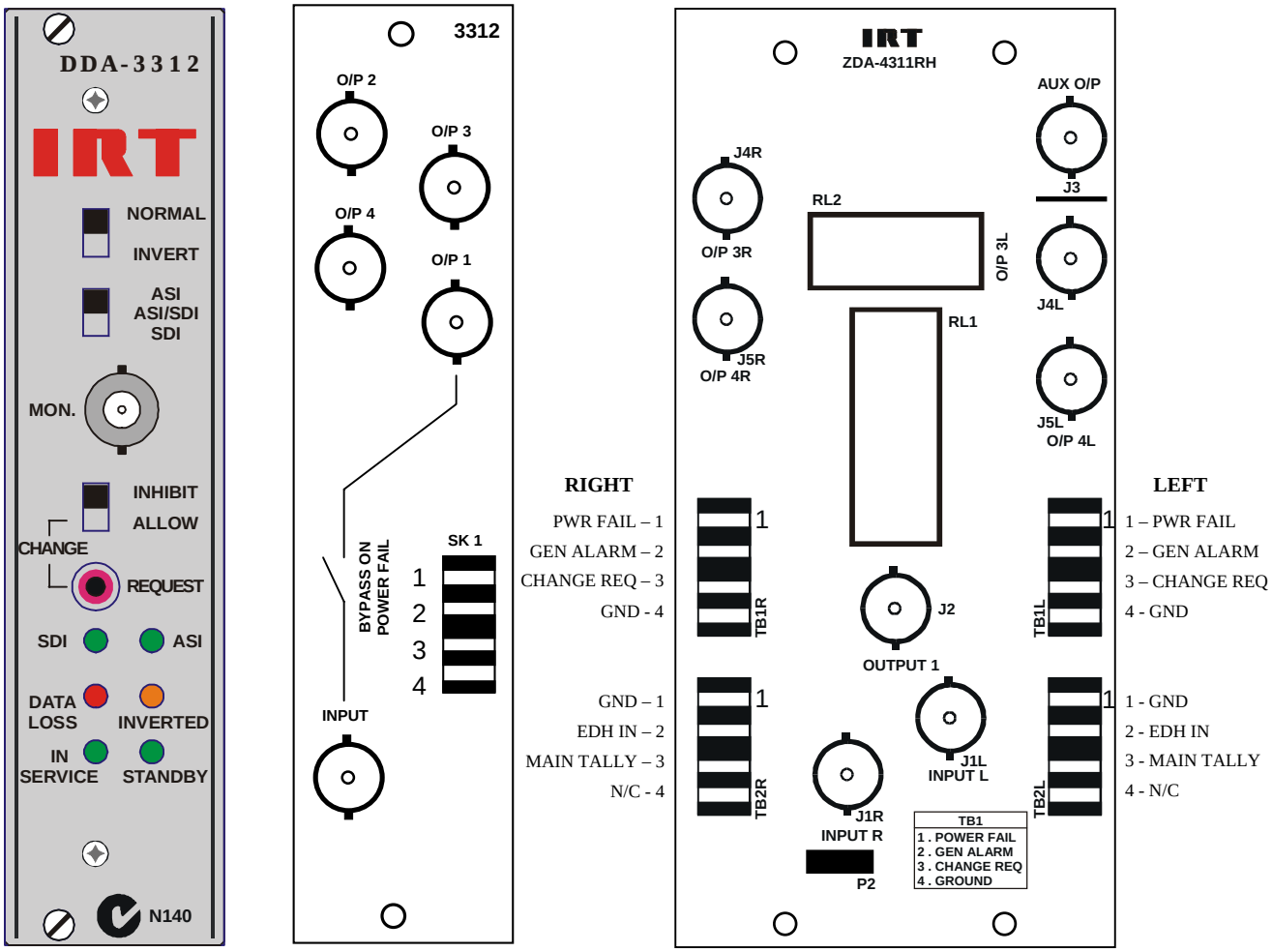
In Service feed is now connected to O/P 1 and to AUX O/P (2) on the ZDA-4311RH rear connector assembly. Both *In Service* and *Standby* feed outputs 3 & 4 come out on their own BNC connectors. Note that these two outputs are unswitched and are therefore unsuitable for main program feeds. They are, however, suitable for monitoring of the modules performance.

As with the standard rear connector assembly, alarm and external change over functions appear on connector TB1L and TB1R, each controlling its relevant module. Pin designations are the same as the standard assembly and are also printed on the ZDA-4311RH assembly.

To remotely monitor which module is acting as the *Main* (“In Service”) module, pin 3 of either TB2L or TB2R switches to ground to act as a Tally.

Front & rear panel 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.

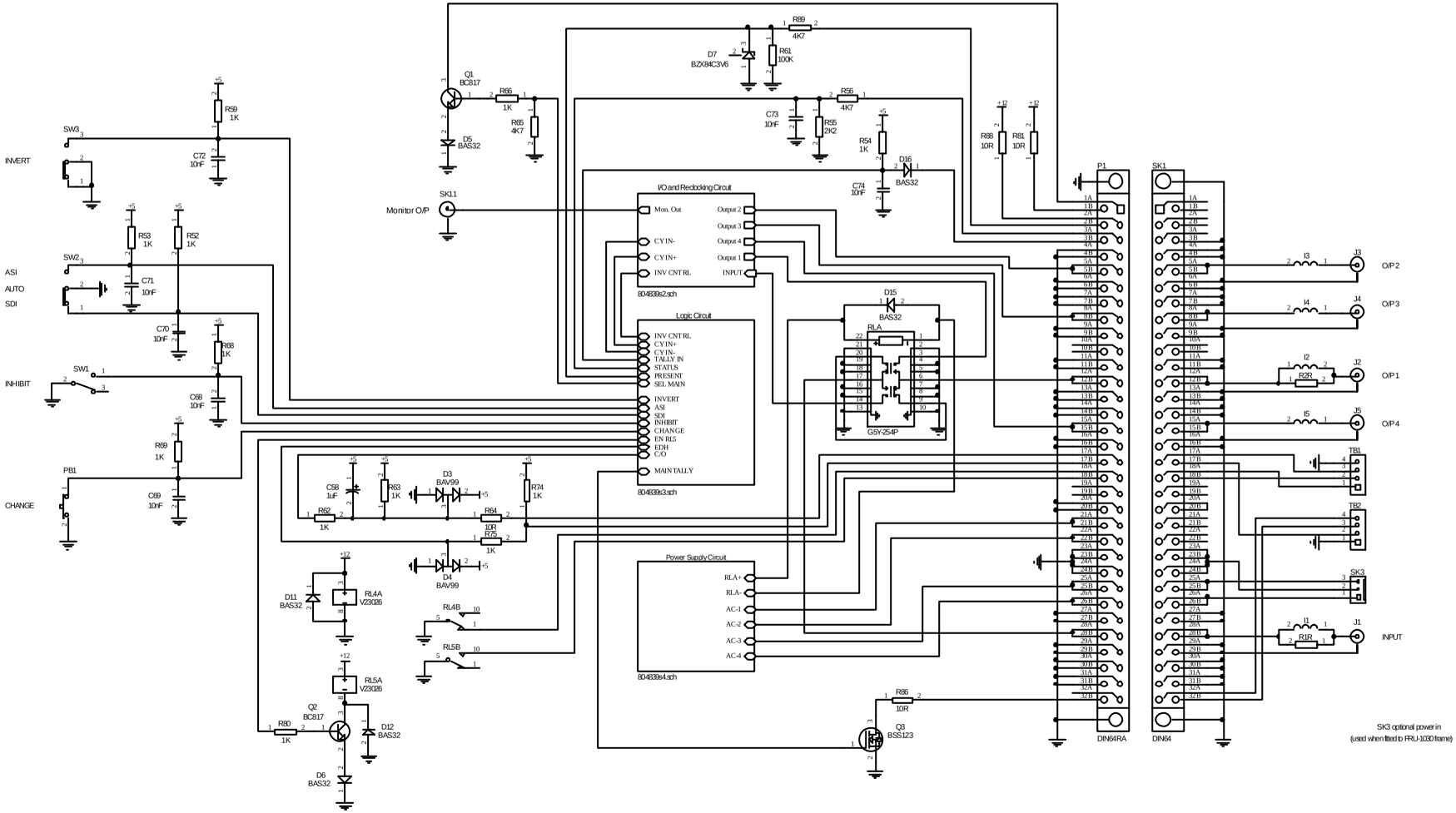
The equipment should be returned **to the agent who originally supplied the equipment or, where this is not possible**, to IRT direct as follows.

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

Drawing index

Drawing #	Sheet #	Description
804839	1	DDA-3312 Reclocking Serial DA schematic
804839	2	DDA-3312 I/O and reclocking circuit schematic
804839	3	DDA-3312 logic schematic
804839	4	DDA-3312 power supply schematic
804839	5	DDA-3312 handshake arrangement



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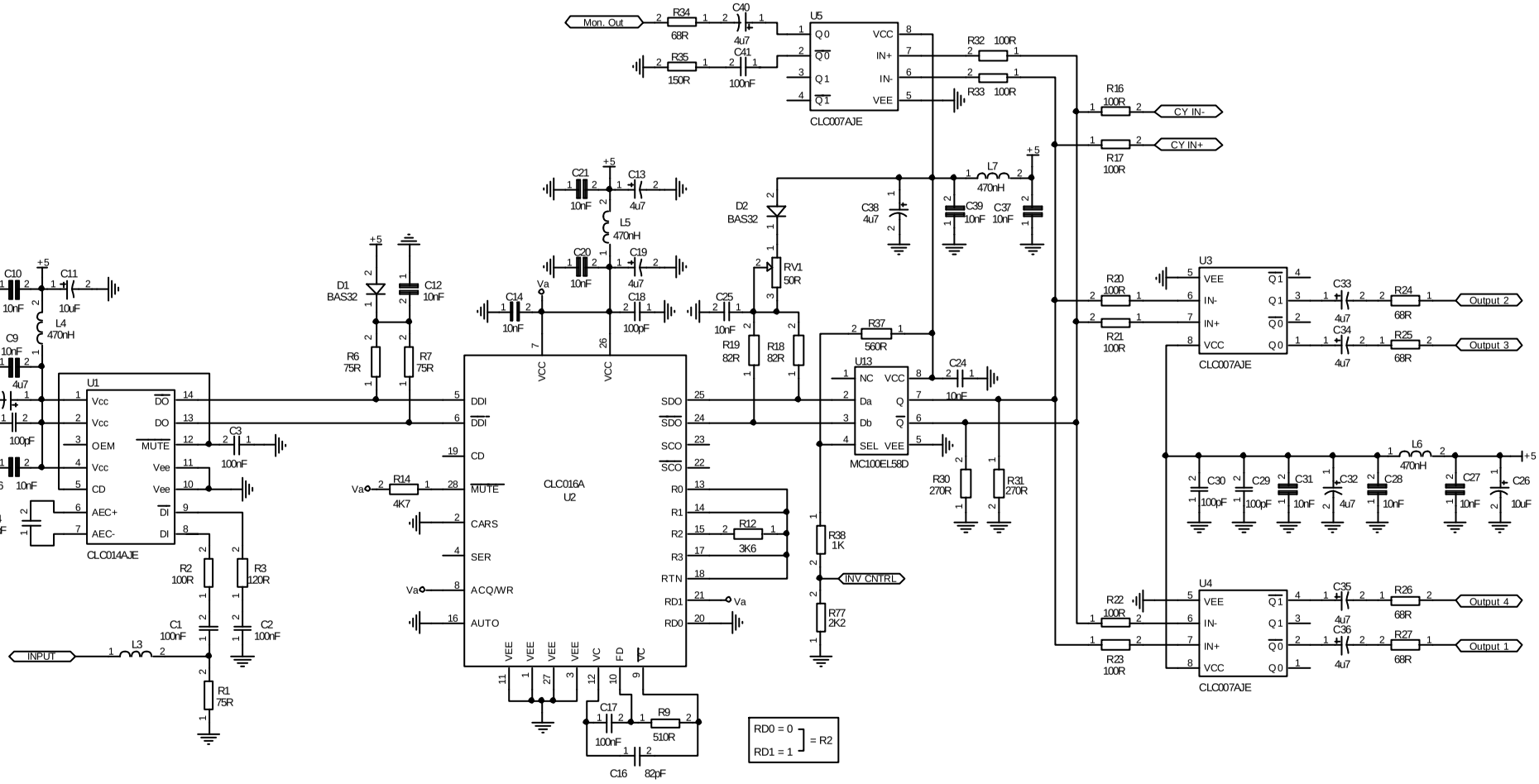
	Date: 3-Jun-2004		ARTARMON NSW AUSTRALIA 2064



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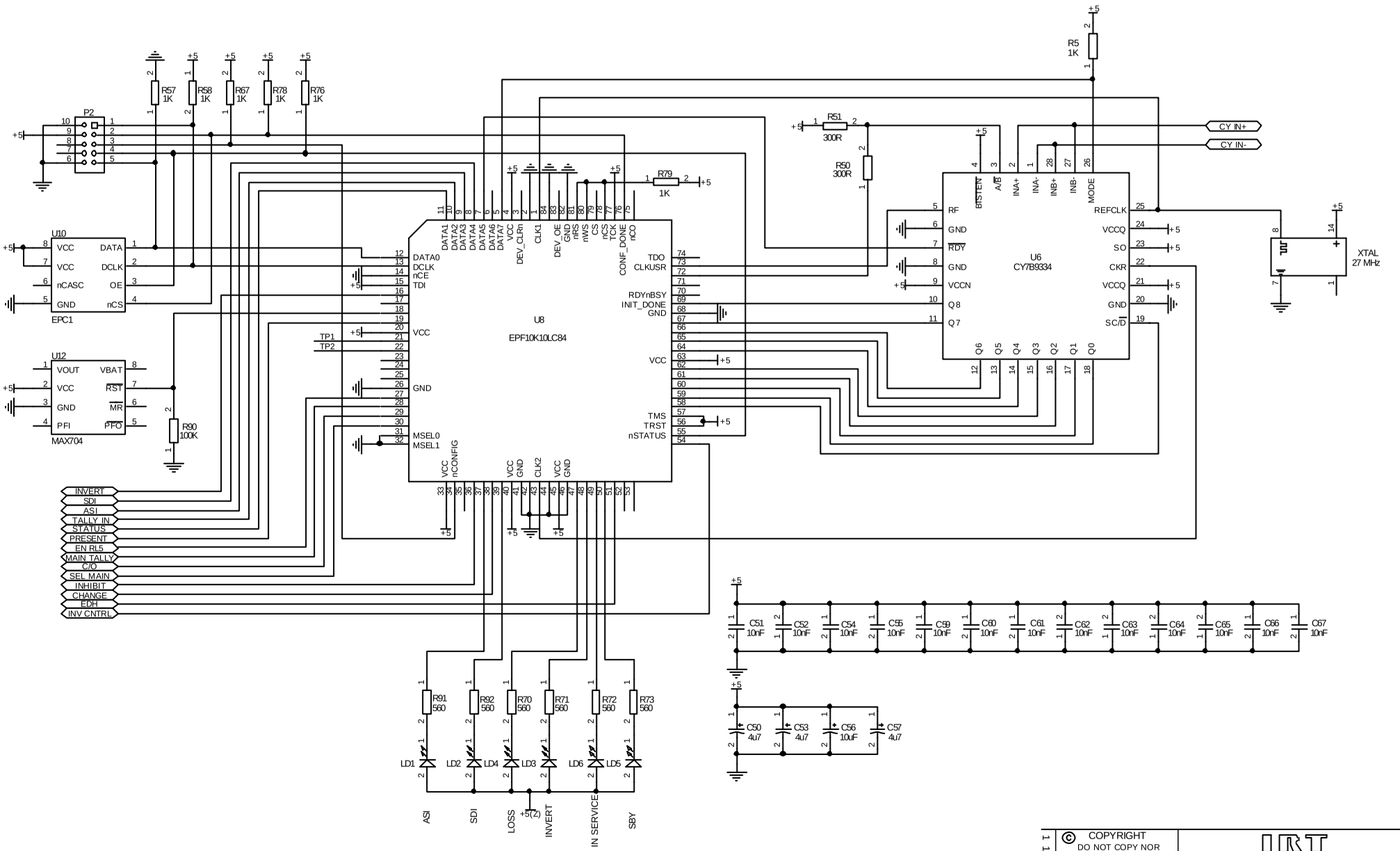
Date: 3-Jun-2004			



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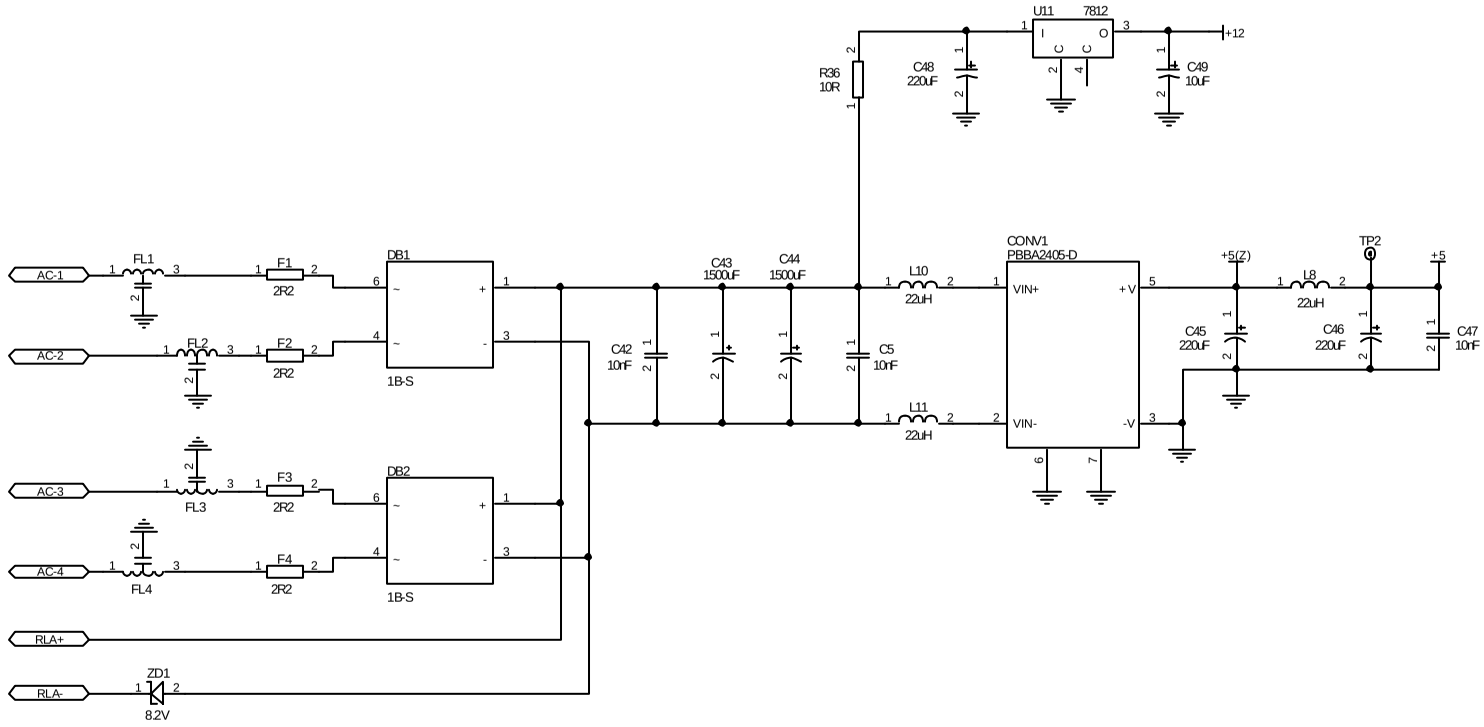

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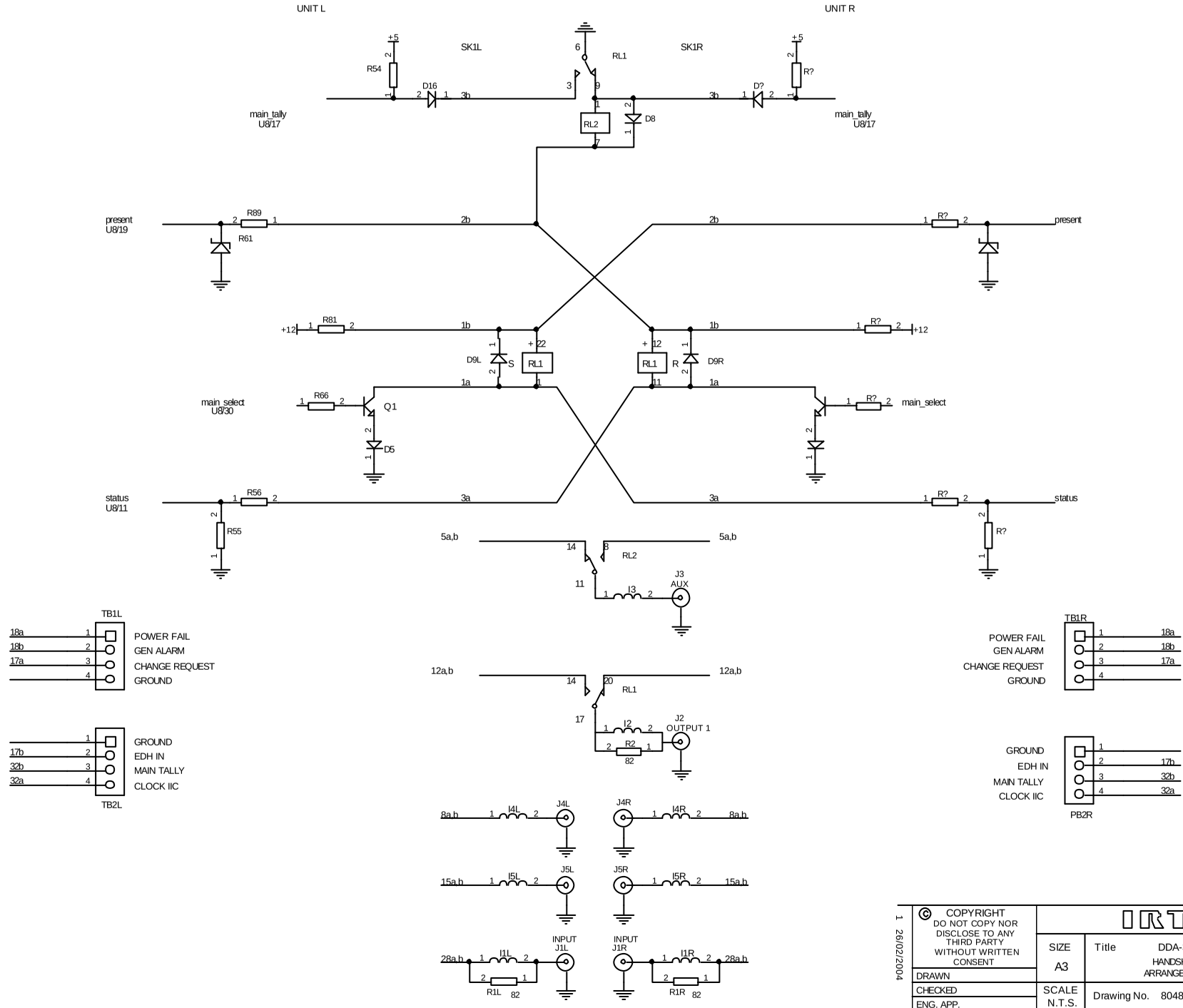

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