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IRT Eurocard Type

DVA-4004

Serial Digital Distribution Amplifier

Designed and manufactured in Australia

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

DVA-4004

Serial Digital Distribution Amplifier

Instruction Manual

Table of Contents

Section	Page
Operational Safety	2
General Description	3
Functional Block Diagram	3
Applications	3
Specifications	4
Circuit Description	5
Installation	6
Front & rear panel diagrams	7
Maintenance & Storage	8
Warranty and Service	8
Equipment return	8
Drawing List Index	9

This instruction manual applies to units later than S/N 0509001

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.

General Description

The IRT DVA-4004 is a one in six out reclocking distribution amplifiers for SMPTE/EBU and ASI serial digital video signals with all output signals in phase with the input signal, an added feature is a bypass circuit which will switch the input circuit to output connector number 1 when the power supply of the unit is not present.

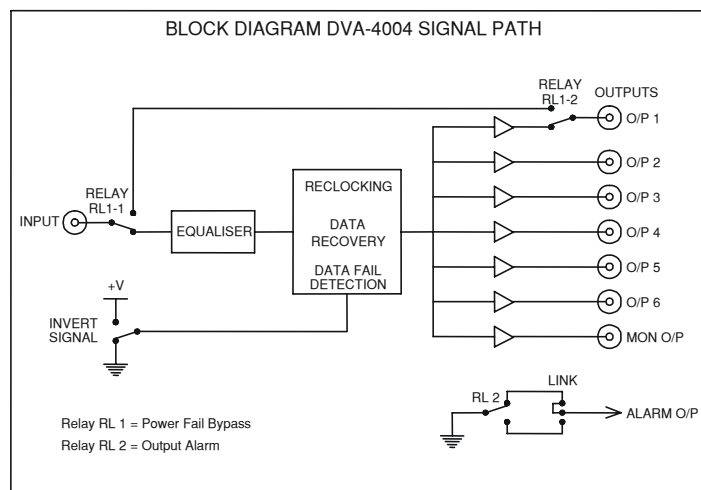
The units feature an input circuit with automatic cable equalisation for Belden 8281 or PFS1/2 coaxial cable and cable driver circuits for seven individually sourced outputs, six to the rear connector panel and one for monitoring on the front panel.

In addition the DVA-4004 allows the signal to be inverted if required by operation of a front panel slide switch to select an inverted signal in the signal path from the input equaliser circuit.

Alarm circuits are provided which will provide remote monitoring of loss of the signal or the power supply via a grounding relay contact, and an indication of the operation of the signal inversion circuit by means of a grounding open collector transistor circuit.

The DVA-4004 is built in 3U extended Eurocard 220 mm x 100 mm module designed to mount in the IRT FRU-3000 and FRU-1030 family of Eurocard frames.

Functional Block Diagram:



Applications

The DVA-4004 is intended to be used where ASI or SDI serial digital signals may be present and multiple signal outputs are required from equipment with only one output and to provide input cable equalisation for devices not having this feature as most unequalised inputs will only support short input signal cable lengths.

In 270 Mb/s ASI signal circuits the DVA-4004 will provide the required in phase outputs needed to preserve the ASI signal and provide the means of inverting the signal if other equipment in the line cause an inversion of the signal. The input connector to output connector 1 bypass feature can preserve one main signal path in the event of power failure. Alarm circuits are provided for external monitoring of the state of the signal inversion circuit and the power fail/signal present circuit.

Technical specifications

DVA-4004

Input:

Number	1.
Impedance	75 Ohm.
Return loss	>15 dB 5 MHz to 360 MHz.

Outputs:

Number	7.
Signal level	800 mV \pm 10%
Impedance	75 Ohm.
Return loss	>15 dB 5 MHz to 360 MHz.
DC offset	Nil.

Performance:

Cable compensation	Automatic, better than 300 metres at 270 Mb/s for Belden 8281 or equivalent cable.
Output rise time	<1 ns, (700ps typically).

Connectors:

BNC.

Indicators:

Power	LED (green) DC.
Signal Present	LED (green) SIG
270 Mb/s lock selected	LED (green) 270
360 Mb/s lock selected	LED (yellow) 360
Inverted signal	LED (yellow) INV

Power requirement:

Voltage	28 Vac CT (14-0-14 Vac) or \pm 16 Vdc.
Consumption	2.5 VA (<80 mA).

General:

Temperature range	0 - 50° C ambient
Mechanical	Suitable for mounting in IRT 19" 1RU and 3RU rack chassis with input, output and power connections to the rear.
Size	6 HP x 3U Extended Eurocard (220 mm x 100 mm).
Weight	With rear assembly 330g.
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.
Standard accessories:	Rear connector assembly (supplied with module).

Circuit Description

The input circuit again consists of U1 a CLC014 adaptive cable equaliser IC, which automatically adapts to equalise any cable length from zero metres to lengths that attenuate the signal by 40dB at 200MHz. This corresponds to 300 metres of Belden 8281 cable. A carrier detect and output mute circuit in the CLC014 is used to mute the output when no signal is present. The CLC014 is insensitive to the pathological patterns that can be present in the serial digital video signal.

The output of the CLC014 input stage is coupled to U2 a ECL multiplexer which can be switched to select a normal or inverted signal stream to U3 a CLC016 data re-timing PLL with automatic rate selection. The CLC016 is set up for manual rate selection of the serial data rates of 270 and 360 Mb/s using link LK3. As with (the CLC014 input stage) the carrier detect and mute circuit of U2 is used to mute the output when no signal is present. U3 the CLC016 has a low residual output jitter of less than 170 ps p-p at 270 Mb/s and is insensitive to the pathological patterns that can be present in the serial digital video signal.

The output of the CLC016 re-timing stage is coupled to CLC007 cable driver circuits U4, U5, U6 and U7 to provide the seven isolated outputs from the DVA-4004. A relay RL1 wired in a change-over configuration is wired in the input signal path and the signal path to output 1 on the rear panel, with this relay energised by the +5 volts supply the input and output circuits are completed to provide normal operation of the DVA-4004. When +5 volts supply is not present the relay will switch the input signal to output 1 on the rear panel to provide a fail-safe circuit for the signal.

Note the cable driver outputs are wired so that all outputs are in phase with the input signal of the DVA-4004 when the front panel slide switch is in the NORMAL position.

IC U8 provides the necessary LED drivers and logic to decode the rate detection indications from U3. LED LD5 is used to indicate the state of the carrier detect circuit, indicating the presence of signal to the re-timing IC U3, and LED's LD3 and LD2 are used to indicate PLL rate of 270 Mb/s or 360 Mb/s signal by U3.

Monitoring circuits are provided to indicate loss of signal or power to the unit and the state of the signal inversion circuit of the DVA-4004. Monitoring of loss of signal or power this is done by a relay RL2 which is energised when signal is detected by the reclocking IC U3, the relay contact is set by LK2 to provide a contact closure to ground on failure. The state of the front panel switch is monitored by U9 a opto-isolator circuit whose output is a npn transistor with the emitter grounded, this transistor will be switched to ground when the signal inversion switch is switched to INVERT.

The dual AC inputs are rectified by D1 to D4, and then regulated in a LM2575-5 switch mode regulator circuit U10 to provide the +5V operating voltage for the unit.

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.

Ensure that the front panel slide switch is in the NORMAL position for correct operation with ASI signals.

LK3 and LK4 set the PLL lock frequency of U3. LK3 is used to switch between 270 Mb/s (link closed) and 360 Mb/s (link open). LK4 is not fitted, it may be fitted if operation at 143 Mb/s or 177 Mb/s if desired.

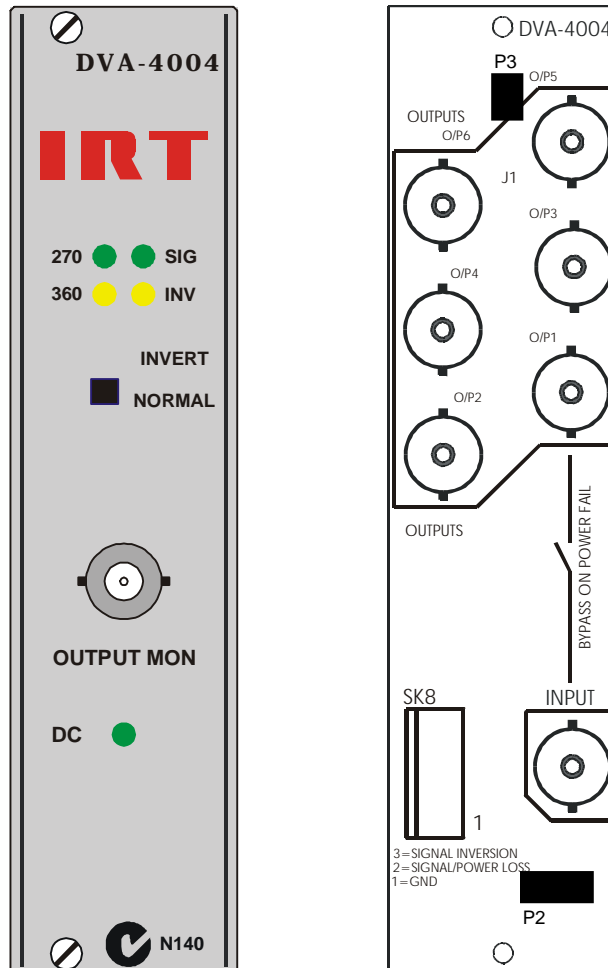
LK3	RATE SELECTED
Closed	270 Mb/s
Open	360 Mb/s

Link LK2 sets the operation of RL2 contact set, the position closest to the board edge is the normally closed position which will give a contact closure to ground on a signal or power failure, this is the preferred position for common alarm circuits from a number of units.

The presence of the internal +5 Vdc supply is indicated by the front panel LED (green).

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.

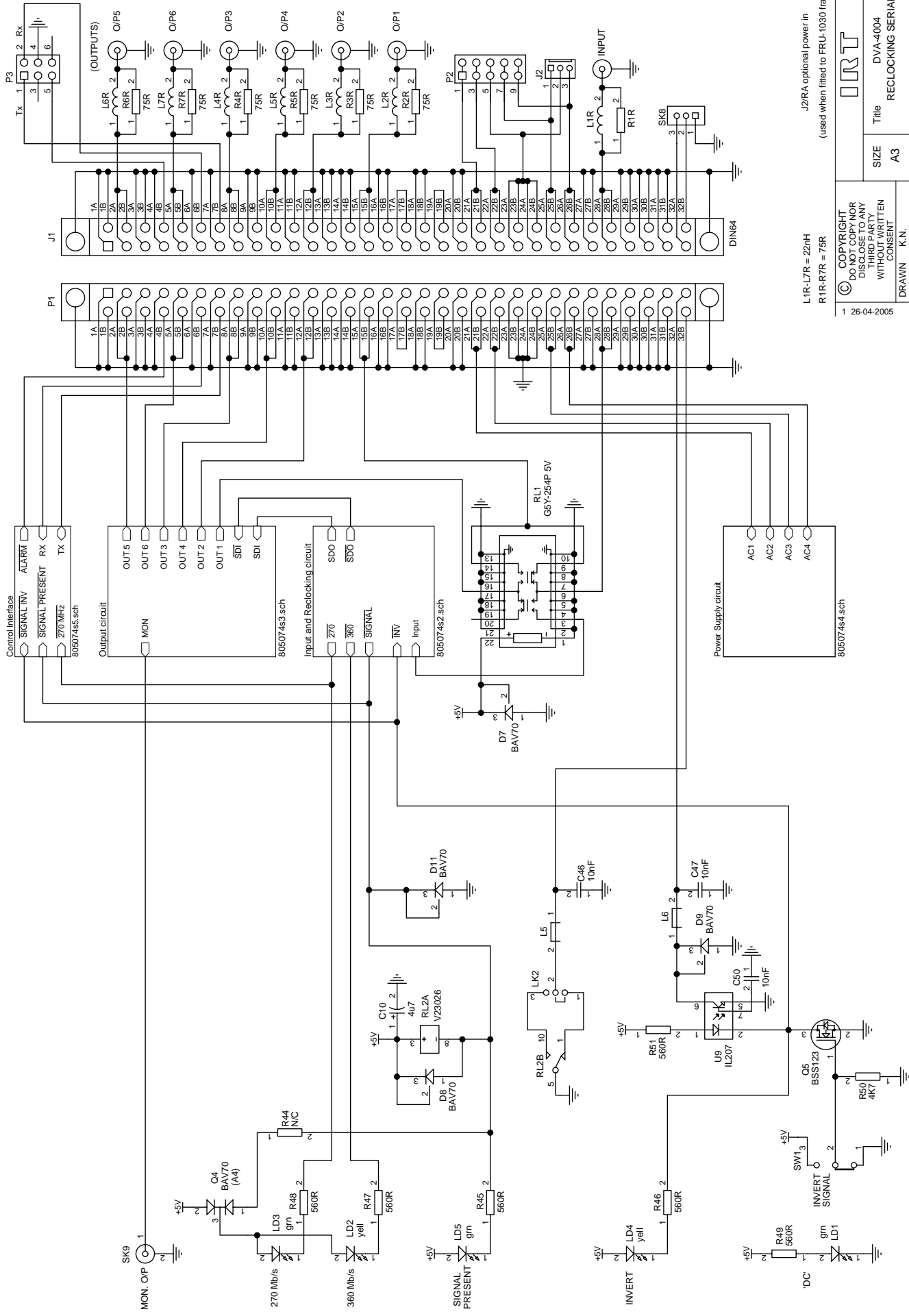
Equipment Service
IRT Electronics Pty Ltd
26 Hotham Parade
ARTARMON
N.S.W. 2064
AUSTRALIA

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

Fax: 61 2 9439 7439

Drawing List Index

Drawing #	Sheet #	Description
805074	1	DVA-4004 serial digital VDA schematic diagram.



J2/RA optional power in
(used when fitted to FRU-1030 frame)

L1R-L7R = 22nH
R1R-R7R = 75R

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DRAWN K.N.		SIZE A3	
CHECKED ENG. APP.		SCALE N.T.S.	
Revision: 1		Drawing No. 805074	
Date: 15-Oct-2007		Sheet 1 of 5	
		ARTARMON NSW AUSTRALIA 2064	

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