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IRT Eurocard Types

DVA-3000
Serial Digital VDA
&
DVA-3001
Reclocking Serial Digital VDA

Designed and manufactured in Australia

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

DVA-3000 & DVA-3001

Serial Digital VDA's

Instruction Manual

Table of Contents

This instruction manual applies to DVA-3000 assembly 803985 and DVA-3001 assembly 804017
units later than S/N 9610000

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.

DESCRIPTION

The IRT DVA-3000 and DVA-3001 are one in six out distribution amplifiers for SMPTE/EBU serial digital video signals.

The units feature an input circuit with automatic cable equalisation for Belden 8281 or PFS1/2 coaxial cable and cable driver circuits for six individually sourced outputs.

In addition the DVA-3001 provides reclocking of the input serial digital signal.

Both types are built in 3U extended Eurocard 220 mm x 100 mm modules designed to mount in the IRT FR-700, FR-722 and FR-748 family of Eurocard frames.

APPLICATIONS

The DVA-3000 and DVA-3001 are intended to be used where 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 input signal cable lengths of less than 20 metres.

Frequent reclocking of a serial digital signal can lead to increased jitter and unnecessary increased cost, complexity and transit time in circuits. The DVA-3000 is therefore the unit of choice where reclocking of the signal is provided by the destination equipment or otherwise where reclocking is not deemed necessary.

The DVA-3001 is the unit of choice where signal deterioration may have occurred and equalisation and reclocking are advised.
Where more than six reclocked outputs are required these can most economically be obtained by a DVA-3001 feeding the required number of DVA-3000's.

Technical specifications

DVA-3000

Input:

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

Outputs:

Number	6.
Signal level	800 mV ± 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 PSF1/2 cable.
Output rise time	<1 ns, (700ps typically).

Connectors:

BNC.

Indicators:

Power	LED (green) for +5v.

Power requirement:

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

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 to the rear.
Size	6 HP x 3U Extended Eurocard (220 mm x 100 mm).
Weight	With rear assembly 330g.
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.
Standard accessories:	Rear connector assembly (supplied with module).

Technical specifications
DVA-3001

Video input:

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

Video outputs:

Number	6.
Type	Reclocked.
Level	800 mV ±10% into 75 Ω.
Impedance	75 Ω.
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 PSF1/2 cable.
Reclocking	Auto rate selection of 143,177,270 and 360 Mb/s.
Output rise time	<1.0 ns, (700 ps typically).
Residual jitter	<200ps, (150ps typically) at 270 Mb/s.

Connectors:

BNC 75 ohms.

Indicators:

Power	LED (green) for +5v.
Signal present	LED (green).
270 Mb/s lock	LED (green).

Power requirement:

Voltage	28 Vac CT (14-0-14 Vac) or ±16 Vdc.
Consumption	7 VA (<240 mA).

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 to the rear.
Size	6 HP x 3U Extended Eurocard (220 mm x 100 mm).
Weight	With rear assembly 365g.
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.
Standard accessories:	Rear connector assembly (supplied with module).

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

CIRCUIT DESCRIPTION

DVA-3000:

The input circuit 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 CLC014 also features an OUTPUT 'EYE' MONITOR point at TP1. The output eye monitor is a signal, which allows verification of signal integrity after equalisation.

The output of the CLC014 input stage is coupled to cable driver circuits, U2 a CLC007 and U3 a CLC006 to provide the six isolated outputs from the DVA-3000.

Note the cable driver outputs are complementary signals thus signal inversion can occur between the input and three of the outputs of the DVA-3000.

The dual AC inputs are rectified by D1 to D4, and then regulated in a LM2575-5 switch mode regulator circuit U4 to provide the +5V operating voltage for the unit.

DVA-3001:

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 CLC016 data retiming PLL with automatic rate selection. The CLC016 is set up for automatic rate selection on the SMPTE 259M/EBU serial data rates of 143,177,270 and 360 Mb/s. As with U1 (the CLC014 input stage) the carrier detect and mute circuit of U2 is used to mute the output when no signal is present. U2 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 retiming stage is coupled to cable driver circuits, U3 a CLC007 and U4 a CLC006 to provide the six isolated outputs from the DVA-3001.

Note the cable driver outputs are complementary signals thus signal inversion can occur between the input and three of the outputs of the DVA-3001.

IC's U5 and U6 provide the necessary LED drivers and logic to decode the rate detection indications from U2. LED LD2 is used to indicate the state of the carrier detect circuit, indicating the presence of signal to the retiming IC U2, and LED LD3 is used to indicate lock of a 270 Mb/s rate signal by U2. Whilst the logic and drivers for indications of 360 Mb/s, PAL and NTSC rates are provided, the LED's for these functions are not provided on the front panel to avoid confusion. These may be inserted by the user if so desired.

The dual AC inputs are rectified by D1 to D4, and then regulated in a LM2575-5 switch mode regulator circuit U7 to provide the +5V operating voltage for the unit.

For units made after October 1998 (Serial numbers post 9812001), links LK1 and LK2 were added. Link LK1 is part of the signal present detection circuitry. With link LK1 IN, signal present will indicate on carrier detect circuit of U2, CLC016. With link LK1 OUT, signal present will indicate when both carrier detect and signal lock circuits of CLC016 are active.

Link LK2 sets the normally closed or open option of the alarm relay contact circuit to the alarm connection on the rear panel.

INSTALLATION

Handling:

The DVA-3000 and DVA-3001 contain static sensitive devices and proper static free handling precautions should be observed.

When individual modules are stored, they should be placed in antistatic bags and proper antistatic procedures should be followed when inserting and removing cards from these bags.

Power:

Ensure that the voltage selection of the IRT mounting frame used to house the DVA-3000 or DVA-3001 and the local AC mains supply voltage match and that the correct rating fuse is installed in the mounting frame power supply.

Earthing:

Chassis earth connection of the equipment mounting frame is via the earth connection on the three pin (IEC) AC mains supply inlet. This is a safety earth and must be connected.

Installation:

To install the module in a frame please see instructions for the appropriate frame type in the frames/PSU's manual.

The DVA-3000 and DVA-3001 do not require any adjustment prior to use. There are no external controls on the front panel of the units.

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

On versions with link settings LK1 and LK2 (Serial numbers post 9812001):

LK1 IN	"Signal Present" will indicate on carrier detect of U2 (CLC016).
LK1 OUT	"Signal Present" will indicate when both carrier detect and signal lock of U2.
LK2	sets the normally closed or normally open contacts of the alarm relay to the rear panel (if fitted).

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 unit is not to be used for an extended period it is recommended that the whole unit be placed in a sealed plastic antistatic bag to prevent dust contamination. In areas of high humidity a suitably sized bag of silica gel should be included to deter corrosion.

WARRANTY and SERVICE

Equipment is covered by a limited warranty period of five years from the date of first delivery unless contrary conditions apply under a particular contract of supply.

Equipment warranty is limited to faults attributable to defects in the 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 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 indicating the nature of the fault.
2. The operating conditions under which the fault 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 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.

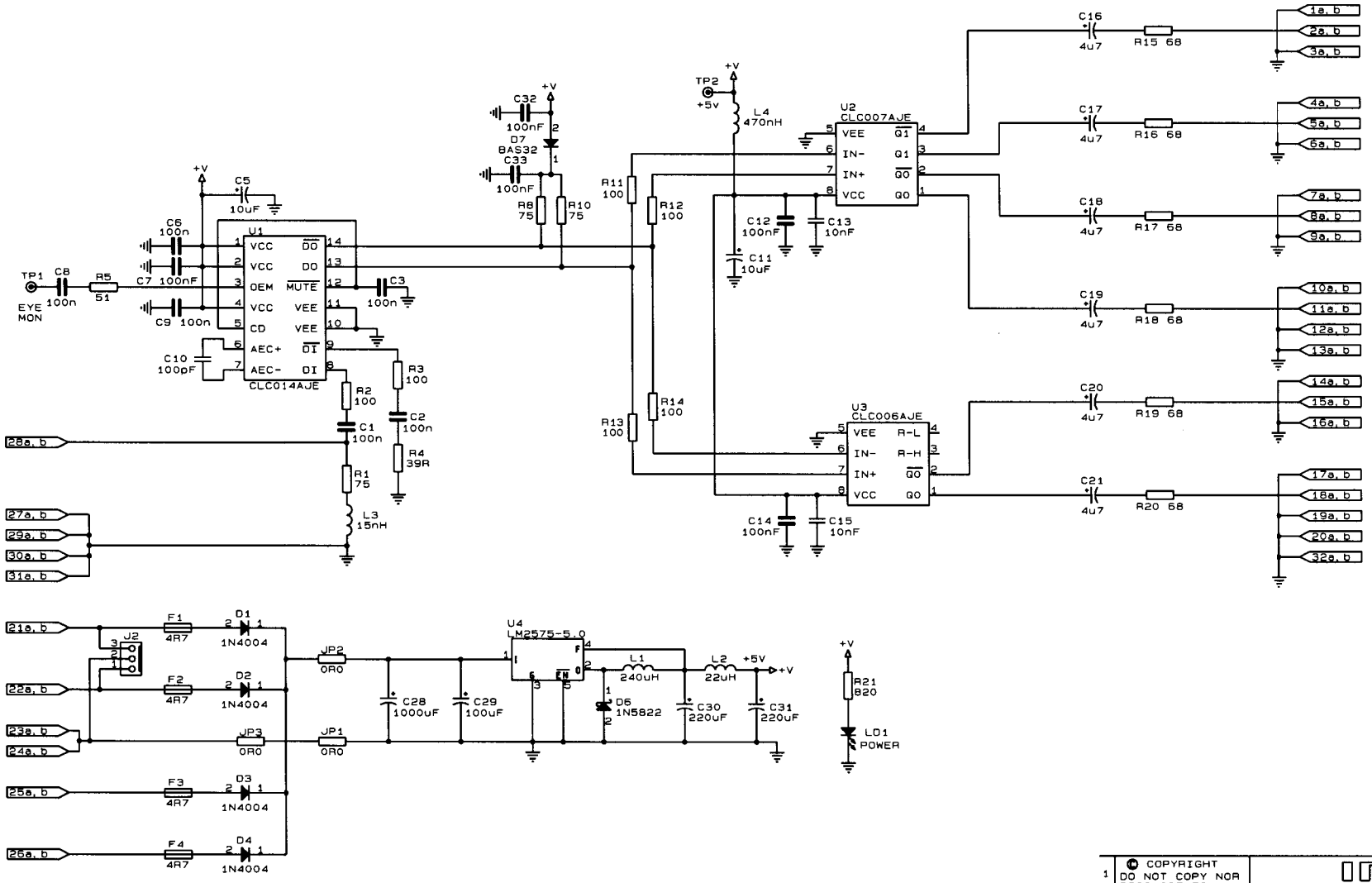
Equipment Service
IRT Electronics Pty. Ltd.
26 Hotham Parade
ARTARMON
N.S.W. 2064
AUSTRALIA

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

Drawing List Index

Note: Components marked n/c on the diagrams are optional and are not included on standard production units. They are shown to assist with interpretation of additional or optional functions, which may be included or are necessary for factory set-up procedures.

Drawing #	Sheet #	Description
803985	1	DVA-3000 serial digital VDA schematic diagram.
803985	2	DVA-3000 component layout.
803985	3	DVA-3000 front and rear panel layout.
803776	1	DVA-3000 rear assembly schematic diagram.
804017	1	DVA-3001 input, output and power supply diagram.
804017	2	DVA-3001 reclocking and indicator diagram.
804017	3	DVA-3001 component layout.
804017	4	DVA-3001 front and rear panel layout.
803941	1	DVA-3001 rear assembly schematic diagram.



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SIZE A3	TITLE DVA-3000 SERIAL DIGITAL VIDEO DISTRIBUTION AMPLIFIER	
SCALE	DRAWING No. 803985	SHEET 1 OF 3

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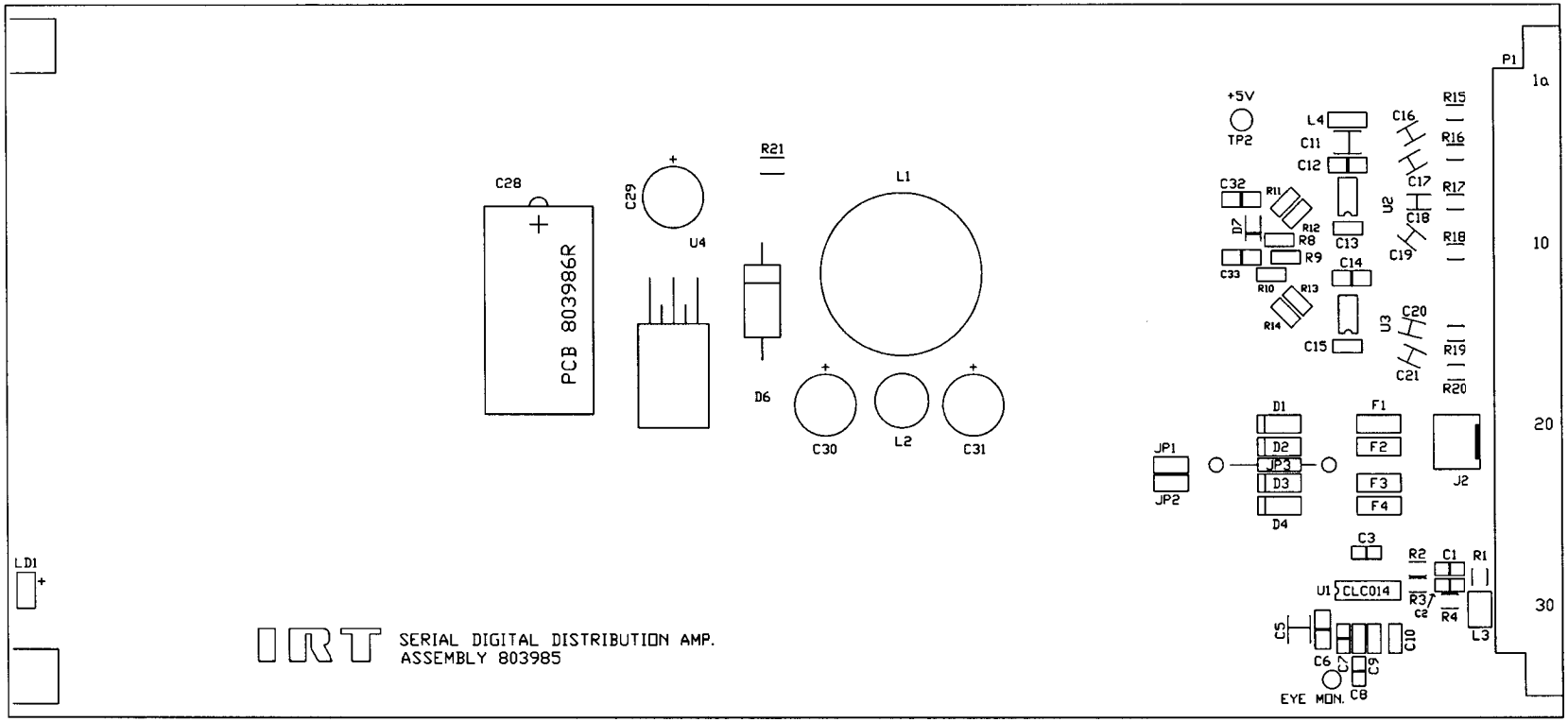

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	CHECKED	SCALE N.T.S.	DRAWING No. 803985 — SHEET 2 OF 3
	ENG. APP.		
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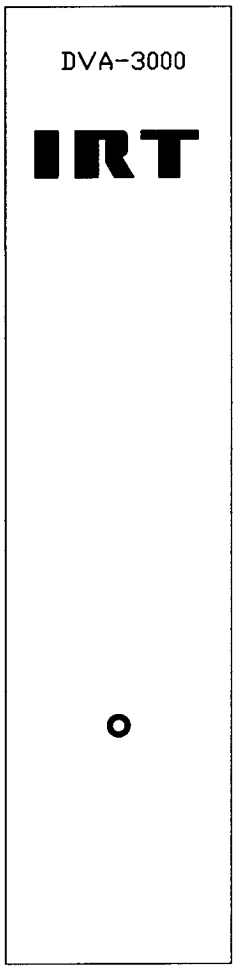

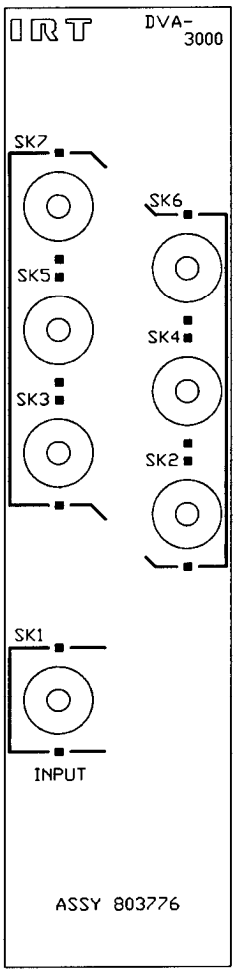

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TITLE: DVA-3000 FRONT AND REAR PANELS

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SHEET 3 OF 3

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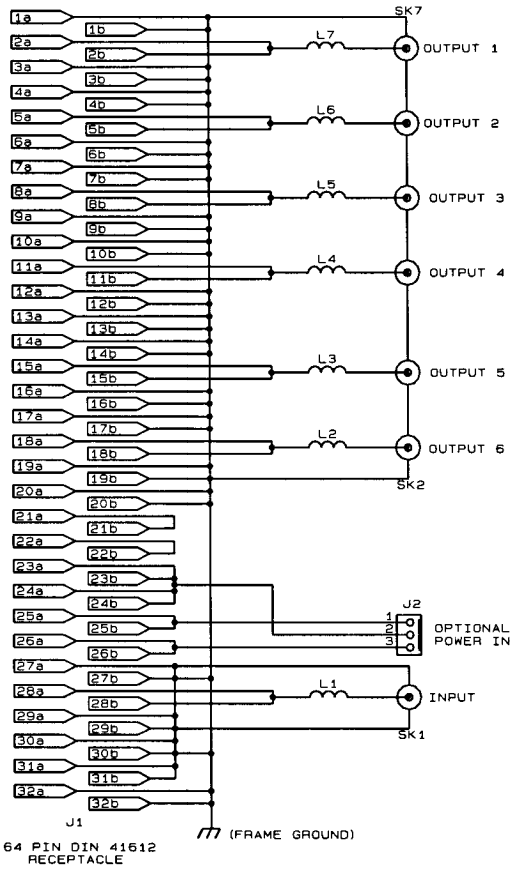

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SIZE	TITLE: DVA-3000 REAR ASSEMBLY
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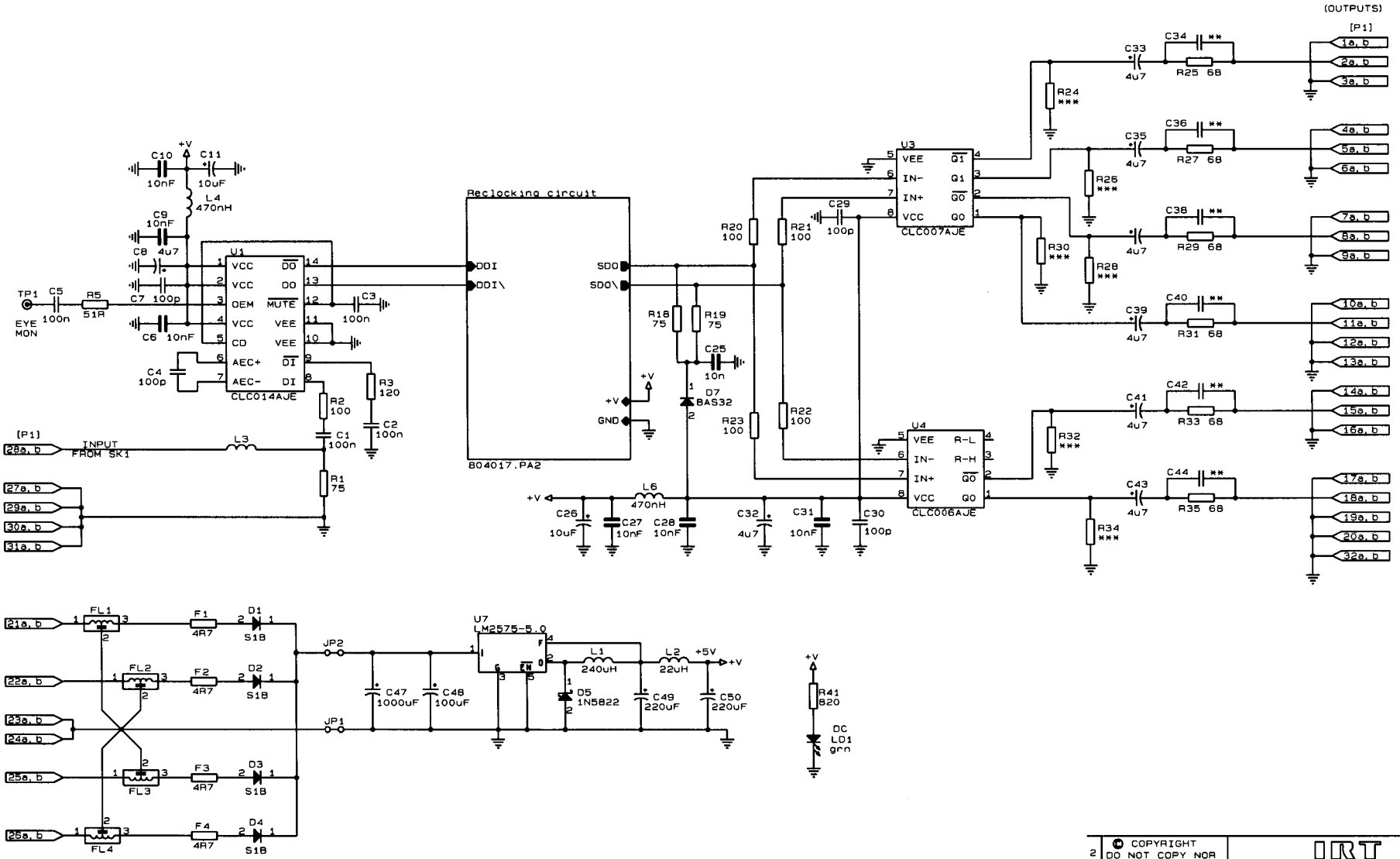

NOTES: ** 1p8 CAPACITORS USED ONLY WITH GS9007 O/P IC'S
*** 150 OHM RESISTORS USED ONLY WITH GS9007 O/P IC'S

PCB 804018 ISS.4

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SIZE A3	TITLE DVA-3001 RECLOCKING SER. D.A. (CLC CHIPSET)	
SCALE	DRAWING No. 804017	SHEET 1 OF 4

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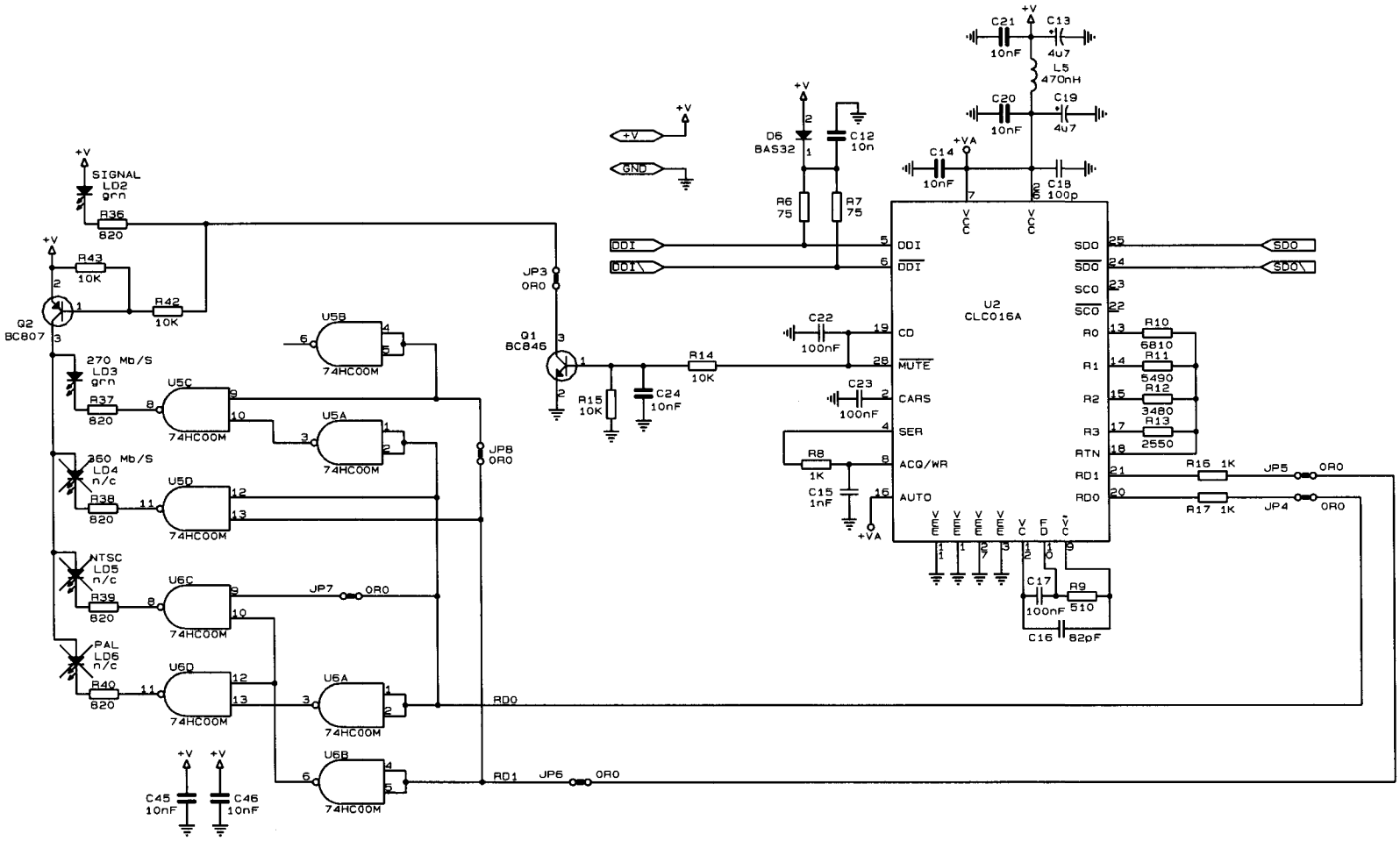

NOTE: LD4, LD5 and LD6 not used, circuitry provided for possible future use.

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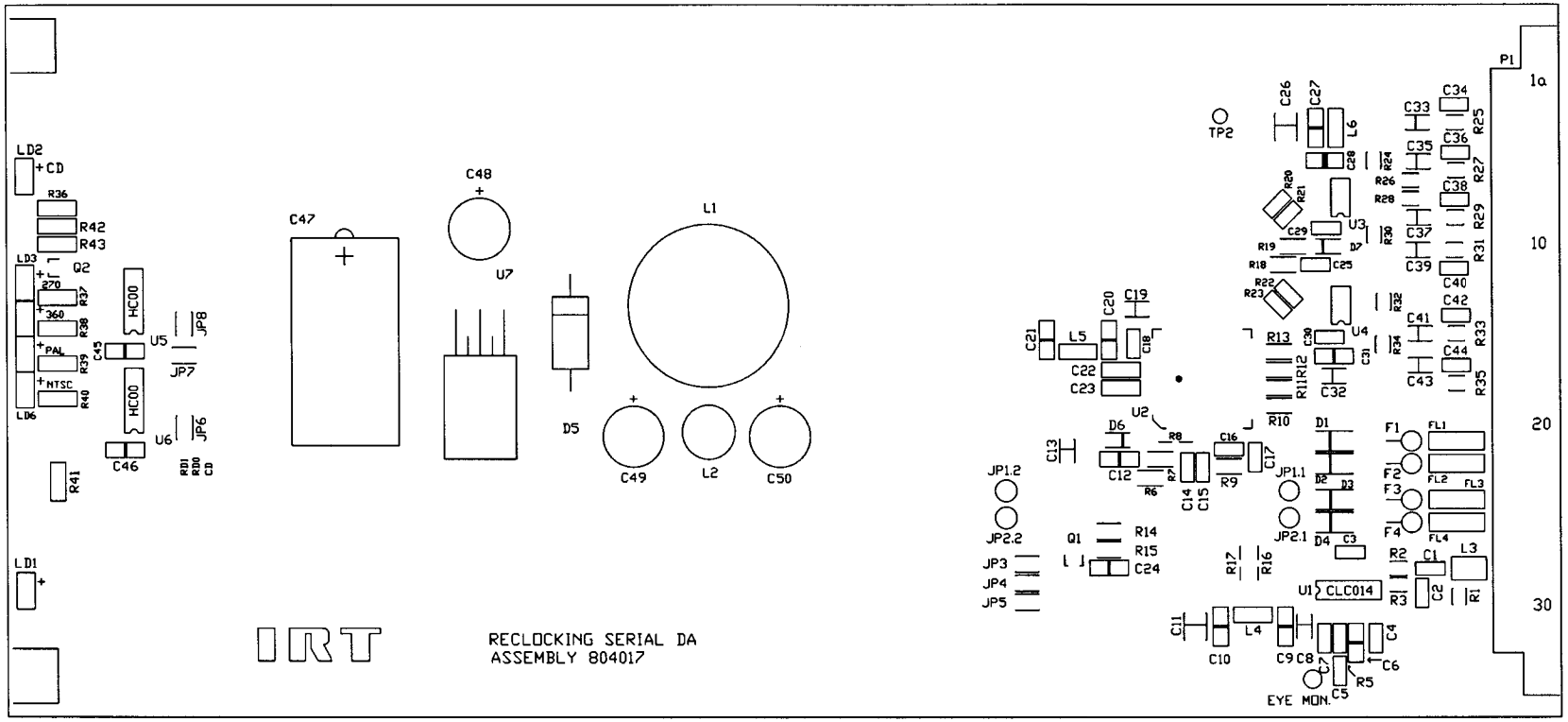

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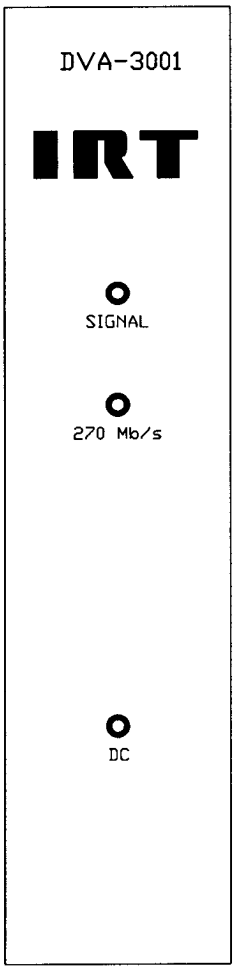

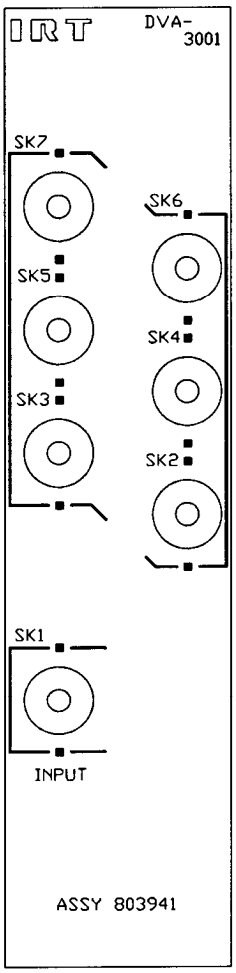

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SIZE A4	TITLE DVA-3001 FRONT AND REAR PANELS	
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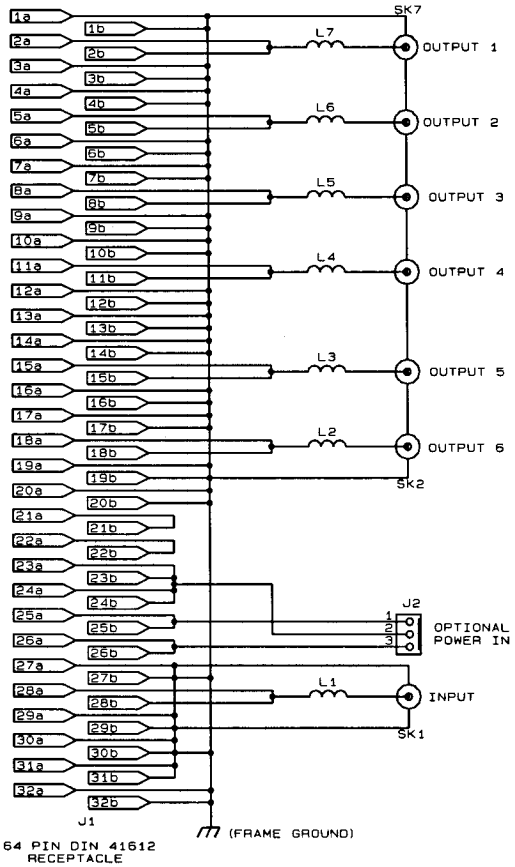

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SIZE | TITLE: DVA-3001 REAR ASSEMBLY

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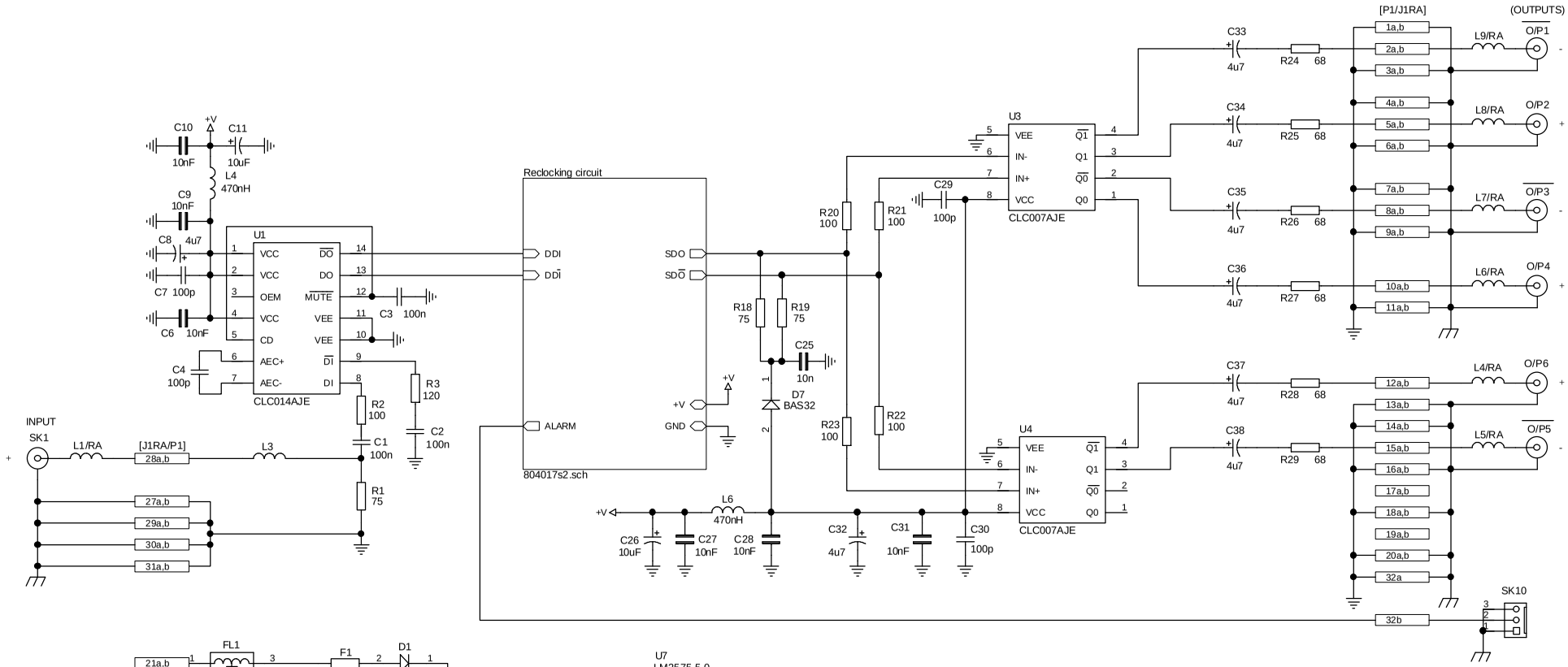

J2/RA optional power in

(used when fitted to FRU-1030 frame)

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2 17-07-1997
3 28-09-1998

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SIZE A3	Title DVA-3001 RECLOCKING SERIAL D.A. (CLC CHIPSET)	
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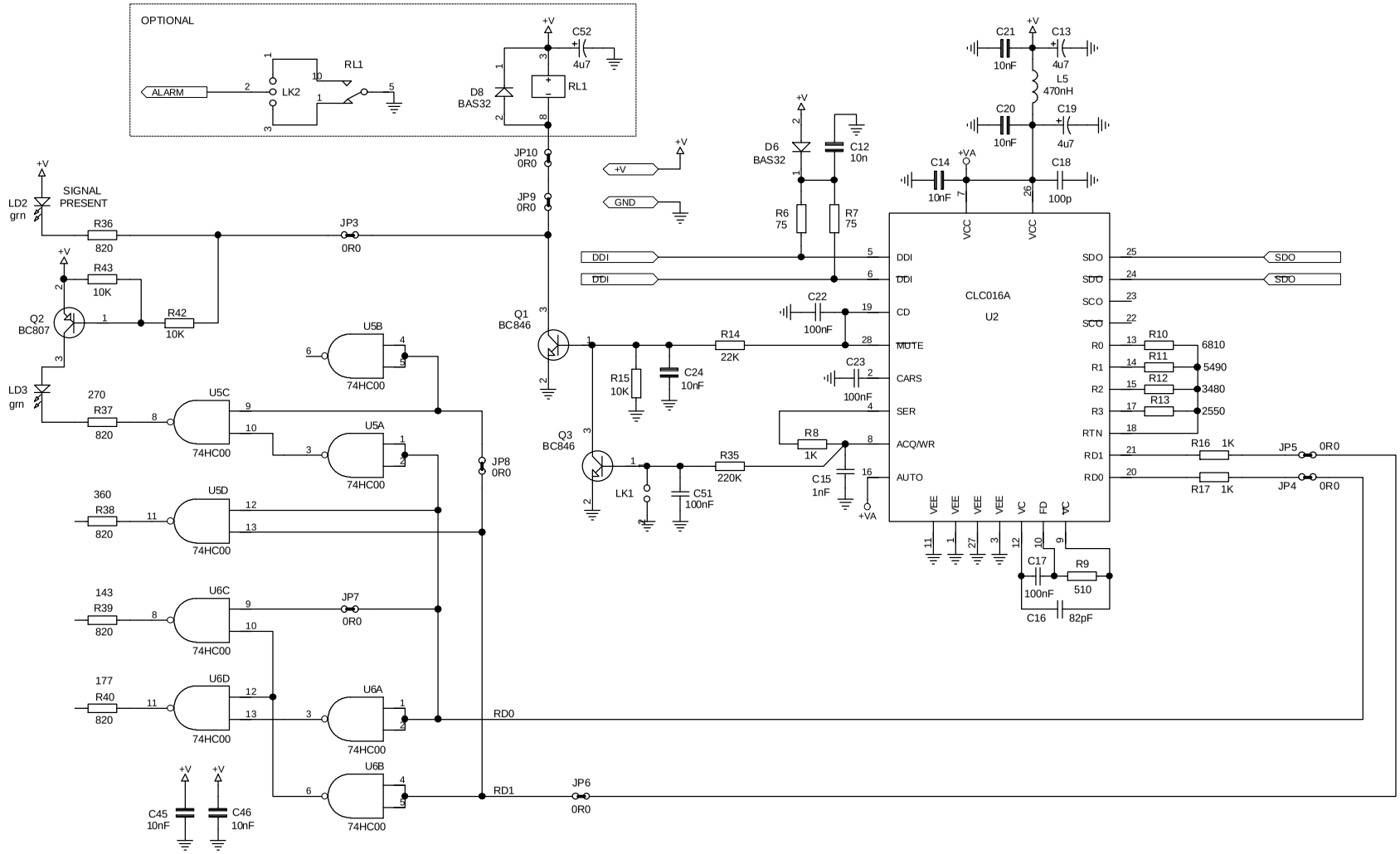
Date: 26-Jun-2003		



NOTE: Optional 'SIGNAL PRESENT' relay circuit available.

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3 28-09-1998

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Revision: 3
Date: 26-Jun-2003

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Title DVA-3001
RECLOCKING SERIAL D.A.
(CLC CHIPSET)

SCALE N.T.S.

Drawing No. 804017

Sheet 2 of 4

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