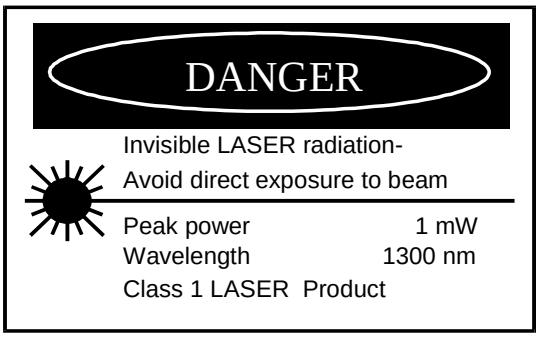
I R T Electronics Pty Ltd A.B.N. 35 000 832 575
26 Hotham Parade, ARTARMON N.S.W. 2064 AUSTRALIA
National: Phone: (02) 9439 3744 Fax: (02) 9439 7439
International: +61 2 9439 3744 +61 2 9439 7439
Email: sales@irtelectronics.com
Web: www.irtelectronics.com

IRT Eurocard

Types RWT-3080 / RWR-3080

Wide Band RF Fibre Optic Link



Designed and manufactured in Australia

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

RWT-3080 / RWR-3080

WIDE BAND RF FIBRE OPTIC LINK

Instruction Manual

Table of Contents

IRT Eurocard
RWT-3080 / RWR-3080

WIDE BAND RF FIBRE OPTIC LINK

General description

The IRT RWT-3080 / RWR-3080 wide band RF fibre optic link is a modular system for transmitting a broadband RF signal ranging from 900 MHz to 2050 MHz along an optical fibre. A system consists of two IRT Eurocard modules, the RWT-3080 LASER transmitter module and the RWR-3080 photo-diode receiver module.

RWT-3080 Laser Transmitter.

As shown on diagram 803767 the RWT-3080 LASER transmitter module consists of a wide bandwidth LASER diode, whose operating current is set by a driver circuit controlled by feedback from the monitoring diode in the laser package. A wide band amplifier is used to drive the LASER with the RF signal applied to the module input.

The monitoring diode output is also connected to comparator circuits which are used to provide optical power indications. The circuits drive two LED lamps on the front panel for laser power ON and FAIL indication, and after passing through a relay circuit, a LOW POWER ALARM is available as an external connection. The adjustment and connection data for this circuit is given in the installation section of the manual.

The power supply comprises two bridge rectifiers whose rectified outputs are paralleled (positive and negative respectively) to provide redundancy. The input to these rectifiers are two independent feeds of 28 Vac (centre tap grounded). The rectified DC are regulated by three-terminal regulators. The DC indicator LED on the front panel is wired in series with a zener diode between +12 and -12 Volts. The zener is to ensure that the LED extinguishes if any one of the regulators fails.

RWR-3080 Photo-diode Receiver.

As shown on diagram 803649 the RWR-3080 photo-diode receiver module consists of an optical detector diode circuit with integral pre-amplifier. Integrated attenuator and discrete amplifier circuits follows to set the output RF level for a system RF gain of unity.

The bias circuit for the optical detector diode is connected to a comparator circuit which is used to provide received optical power indication. The circuit drives a LED lamp on the front panel for LOW SIGNAL indication, and after passing through a relay circuit, a LOW SIGNAL ALARM is available as an external connection. The adjustment and connection data for this circuit is given in the installation section of the manual.

The power supply comprises two bridge rectifiers whose rectified outputs are paralleled (positive and negative respectively) to provide redundancy. The input to these rectifiers are two independent feeds of 28 Vac (centre tap grounded). The rectified DC are regulated by three-terminal regulators. The LED on the front panel is wired in series with a zener diode between +12 and -5.2 Volts. The zener is to ensure that the LED extinguishes if any one of the regulators fails.

NOTE: Direct connections are made to the rear of the RWT-3080 and RWR-3080 modules for the **OPTICAL** and **RF** cabling, these must be disconnected when a module is to be mounted or removed from the IRT Eurocard mounting frame.

RWT-3080 / RWR-3080 Technical specifications

RF signal connections		SMA on rear connector panel. (BNC adaptors provided.)
Input / output VSWR		<2:1 (75 Ω / 50 Ω).
RF input level		<= -20 dBm total power.
System 3rd order intercept (IP3)		>+10 dBm.
Overall system RF gain		Adjustable for unity gain with 4 dB optical path loss.
System frequency response		± 2 dB 900 MHz - 2050 MHz
System group delay		± 2 ns 900 MHz - 2050 MHz
Noise:	Output noise power	<-120 dBm/Hz.
	Carrier to noise	<-100 dB/Hz for an input level of -20 dBm.
Optical signal connections		SC angle faced (accessible from th rear of the module) for use with single mode (9/125µm) fibre cable.
Optical output power		-7 to -10 dBm.
Maximum system optical loss		4±1 dB maximum.
Power requirement		14V-0-14V AC /3.5 VA
Temperature range		0 - 45° C ambient
Mechanical		6 HP x 3 U x 220 mm IRT Eurocard Suitable for mounting in IRT 19" rack chassis types FR-700 & FR-722 with fibre, RF & alarm connections at the rear.
Finish:	Front escutcheon	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		Matching control connector is supplied with the TX module, and RF adaptor connectors for conversion to BNC is supplied with both modules.
Optional accessories		TME-6 module extender card

NOTE: All the parameters specified are only applicable when using single mode (9/125µm) fibre cable with a return loss of >= 27 dB.

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

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.

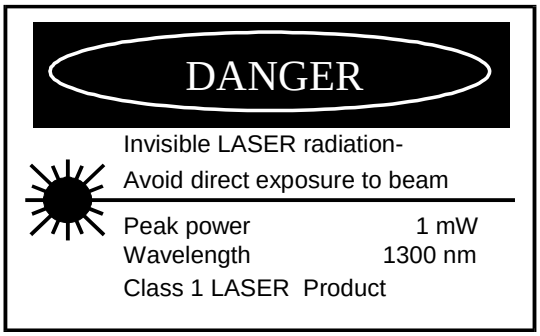
Operational Safety:

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



NOTE: Direct connections are made to the rear of the RWT-3080 and RWR-3080 modules for the **OPTICAL** and **RF** cabling, these must be disconnected when a module is to be mounted or removed from the IRT Eurocard mounting frame.

Installation in frame or chassis:

See details in separate manual for selected frame type.

RWT-3080 LASER transmitter module

The RWT-3080 is factory preset for a optical output of –7 dBm to –10 dBm and a max RF input level of –10 dBm.

Installation requires the unit to be plugged into the front of the selected IRT frame and the rear assembly to be secured to the rear panel of the IRT frame. To install the module in a FR-700 or FR-722(A) frame please see the separate instruction manual "**Eurocard Frames & Power Supplies**".

RF signal connection is made to the SMA connector on the **rear** of the RWT-3080, adaptors are supplied to allow connection to circuits using BNC or F series connectors.

Optical signal connection is made to the SC optical connector on the **rear** of the RWT-3080. **Extreme care must be taken to ensure the cleanliness and consequently the best return loss of the optical connections.**

The optical output power is monitored by comparator circuits which are adjusted to change state if the output is less than -14 dBm.

The external connections for the alarm circuit are available on pins 3 and 4 of SK1 on the rear panel. Pin 3 is the ground connection and pin 4 is the active connection from the alarm circuit. The alarm circuit is wired to give a relay contact closure to ground normally, which opens when a fault condition such as power failure, low optical output or module removal occurs.

RWR-3080 photo-diode receiver module

The RWR-3080 is factory preset for use with the accompanying RWT-3080 transmitter and a optical path attenuation of 2 dB, to give unity gain in the RF signal path.

Installation requires the unit to be plugged into the front of the selected IRT frame and the rear assembly to be secured to the rear panel of the IRT frame. To install the module in a FRU-3000 or FRU-1030 frame please see the separate instruction manual "**Eurocard Frames & Power Supplies**".

RF signal connection is made to the SMA connector on the **rear** of the RWT-3080, adaptors are supplied to allow connection to circuits using BNC or F series connectors

Optical signal connection is made to the optical connector on the **rear** of the RWR-3080. **Extreme care must be taken to ensure the cleanliness and consequently the best return loss of the optical connections.**

To overcome any optical path loss the RF signal level can be set using the gain control (RV1). **RV1** is a multi-turn potentiometer positioned on the front of the module, accessible through a hole on the panel.

The optical input signal level is monitored by a comparator circuit, which is adjusted to change state if the optical path loss exceeds 7 dB.

The external connections for the alarm circuit are available on pins 1 and 2 of SK1 on the rear panel. Pin 1 is the ground connection and pin 2 is the active connection from the alarm circuit. The alarm circuit is wired to give a relay contact closure to ground normally, which opens when a fault condition such as power failure, low optical input or module removal occurs.

RWT-3080 Preset adjustments.

RV2 sets the bias current to the laser diode and thus the optical output from the RWT-3080.
RV3 sets the output **ON** indicator circuit as shown by LD1 on the front panel.
RV4 sets the output **LOW** indicator circuit as shown by LD2 on the front panel.

RWR-3080 adjustment.

RV1 sets the output RF level of the module by applying a bias voltage to the gain pin of the detector module.

RWR-3080 Preset adjustment.

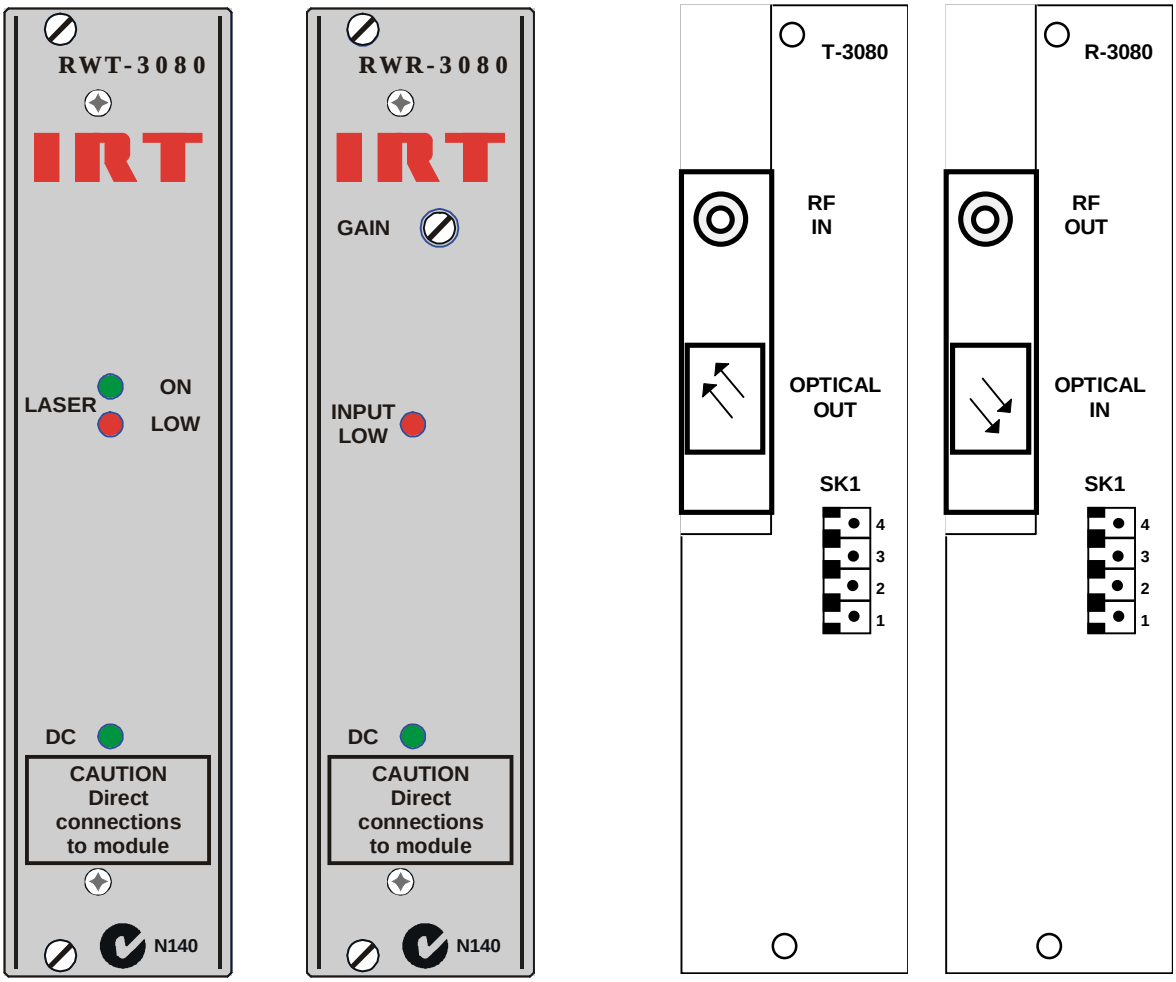
RV1 sets the input **SIGNAL LOW** alarm circuit threshold as shown by LD2 on the front panel.
RV2 sets the APD **photo diode bias voltage** typically set for 32.5V at TP1.

Diagrams are provided giving details of the circuits of the RWT-3080 and the RWR-3080. The optical and RF signal sections are housed in sealed shielded sections containing no user serviceable parts. Should service be required on these circuits, please return the unit to the supplier for repair and alignment.

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 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 $A100.00 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 $A100.00 will apply, whether the equipment is within the warranty period or not.

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

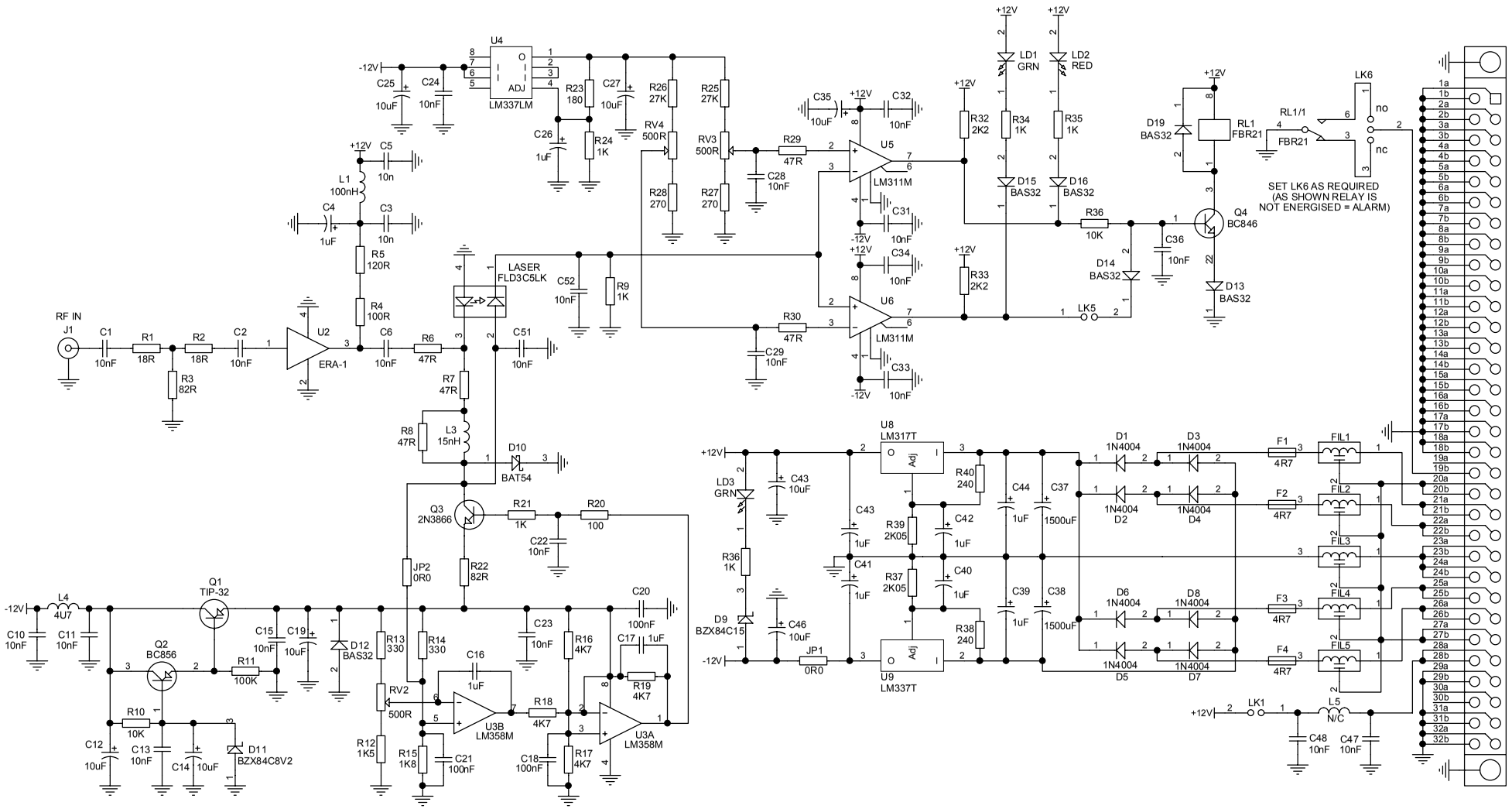
The equipment should be returned **to the agent who originally supplied the equipment or, where this is not possible**, to IRT direct as follows.

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

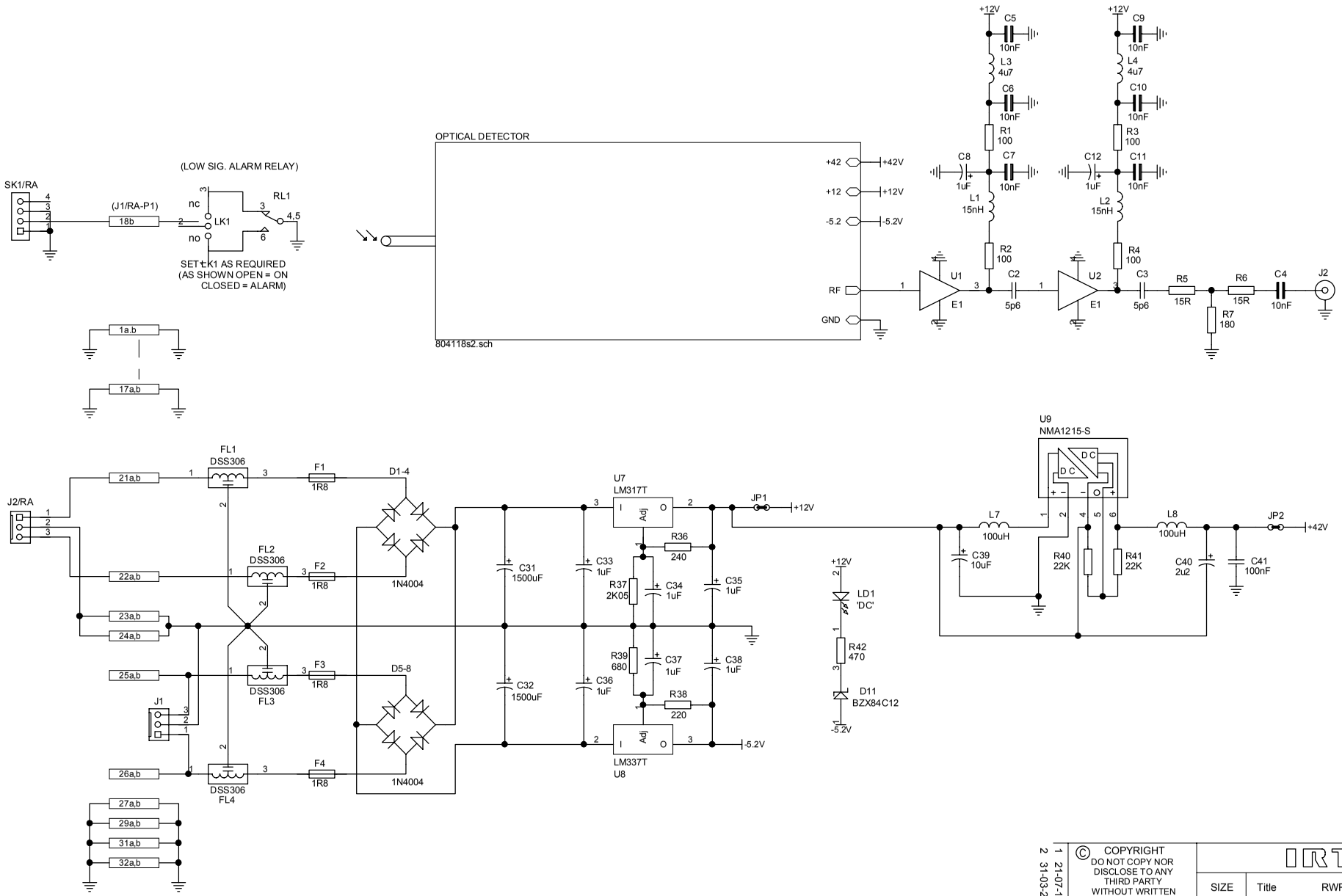
Drawing #	Sheet #	Description
803767	1	RWT-3080 schematic diagram
804118	1	RWR-3080 schematic diagram
804118	2	RWR-3080 schematic diagram



PCB 804219R

8 11-07-1997
9 14-02-2000,ECR1075

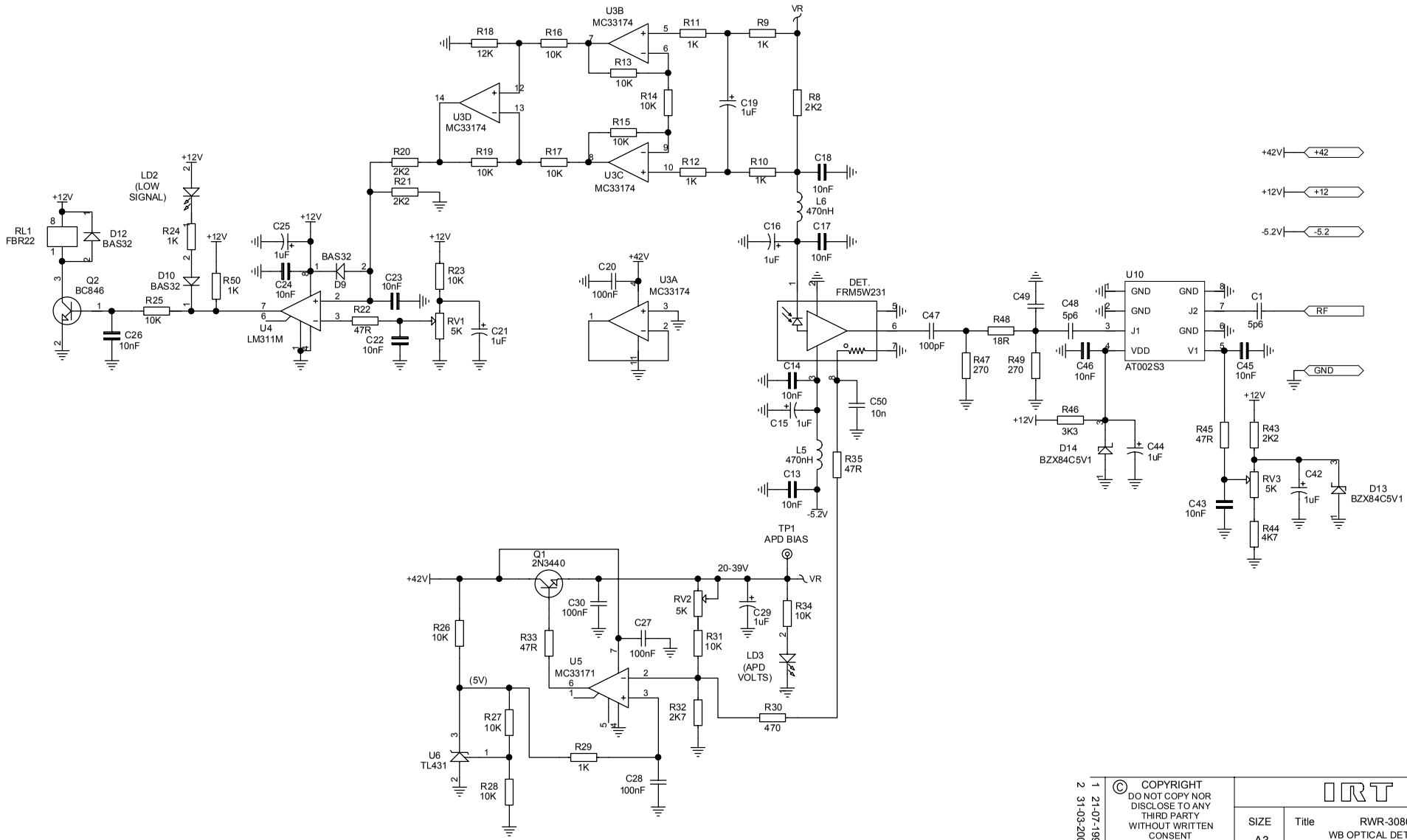
DRAWN	SIZE A3	Title	RWT-3080 WB LASER MODULE PCB ASSEMBLY
CHECKED	SCALE N.T.S.	Drawing No.	803767
ENG. APP.			Sheet 1 of 3
Revision: 8	IRT Electronics Pty. Ltd. ARTARMON NSW AUSTRALIA 2064		
Date: 27-Feb-2001			



1	21-07-1997
2	31-03-2000 ECR1083

IRT

SIZE A3	Title RWR-3080 WB OPTICAL DETECTOR	
DRAWN K.N.		
CHECKED	SCALE N.T.S.	Drawing No. 804118 — Sheet 1 of 4
ENG. APP.		
Revision: 2	IRT Electronics Pty. Ltd. ARTARMON NSW AUSTRALIA 2064	
Date: 27-Feb-2001		



1	21-07-1997	
2	31-03-2000 ECR1083	

IRT

DRAWN K.N.	SIZE A3	Title RWR-3080 WB OPTICAL DETECTOR DETECTOR CIRCUIT
CHECKED	SCALE N.T.S.	Drawing No. 804118
ENG. APP.		Sheet 2 of 4
Revision: 2		IRT Electronics Pty. Ltd. ARTARMON NSW AUSTRALIA 2064
Date: 27-Feb-2001		