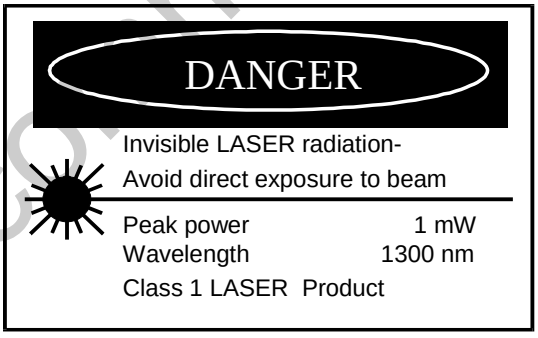
I R T Electronics Pty Ltd A.B.N. 35 000 832 575
26 Hotham Parade, ARTARMON N.S.W. 2064 AUSTRALIA
National: Phone: (02) 9439 3744 Fax: (02) 9439 7439
International: +61 2 9439 3744 +61 2 9439 7439
Email: sales@irtelectronics.com
Web: www.irtelectronics.com

EUROCARD

WIDE BAND RF FIBRE OPTIC LINK

Type RWT-3085 / RWR-3085



Designed and manufactured in Australia

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

RWT-3085/RWR-3085

WIDE BAND
RF FIBRE OPTIC LINK

Instruction Manual

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 RWT-3085 / RWR-3085 wide band RF fibre optic link is a modular system for transmitting a broadband RF signal ranging from 20 MHz to 200 MHz along a single mode optical fibre. A system consists of two IRT Eurocard modules, the RWT-3085 LASER transmitter module and the RWR-3085 photo-diode receiver module.

RWT-3085 Laser transmitter.

As shown on diagram 803950 the RWT-3085 Laser Transmitter module consists of a 1300 nm wide bandwidth laser diode, whose operating current is set by a driver circuit controlled by feedback from the monitoring diode in the laser package. Wide band amplifiers are 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 alarms. The low power alarm drives a LED indicator on the front panel, and after passing through a relay, is also 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 outputs are regulated by three-terminal regulators. The DC indicator LED on the front panel is wired in series with a zener diode and a resistor between +12 and -12 Volts. The zener is to ensure that the LED extinguishes if either of the power supplies fails.

RWR-3085 Photo-diode receiver.

As shown on diagram 803955 the RWR-3085 Photo-diode Receiver module consists of a 1300 nm optical detector diode circuit with integral pre- amplifier followed by an attenuator circuit and signal output amplifier. An optical input level indicator circuit is provided to indicate the loss of input signal to the module.

The optical detector circuit consists of a photo-diode, biased from a +6V supply, followed by an internal amplifier operating from -5V. The output of the amplifier is connected to a FET amplifier whose gain is controlled by its bias which is set by a front panel control. A further amplifier is used to bring the output level up to the level applied to the input of the RWT-3085 Laser Transmitter.

The bias current to the photo-diode is a measure of the optical signal level received and this current is monitored by a comparator circuit which provides an alarm when the signal drops below a preset threshold. The low signal alarm circuit drives a LED indicator on the front panel, and after passing through a relay, is also 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 outputs are regulated by three-terminal regulators. The DC indicator LED on the front panel is wired in series with a zener diode and a resistor between +12 and –5.2 Volts. The zener is to ensure that the LED extinguishes if either of the power supplies fails.

Specifications

RF signal level	+5 dBm maximum
RF circuit input / output impedance	75 Ω
RF circuit input / output return loss	>-20 dB 50 MHz to 200 MHz.
RF signal connections	BNC on rear panel.
System frequency response	± 1.0 dB 30 MHz - 200 MHz
System group delay	± 2 ns 30 MHz - 200 MHz
System carrier to noise	>100 dBc/Hz for 0 dBm RF signal 2 dB optical path loss and better then 40 dB fibre return loss.
Optical signal	1300 nm, -7 dBm ±2 dB
Optical signal connections	SC on module rear.
Maximum system optical loss	8 ±1 dB maximum.
Power requirement per unit	14V-0-14 Vac 4.5 VA
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 & FR-722 with fibre & RF connections on the front panel and alarms on rear.
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	Matching control connectors are supplied with each module Operation manual
Optional accessories	TME-6 module extender card

NOTE: All the parameters specified are only applicable when using single mode (9/125µm) fibre cable.

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.

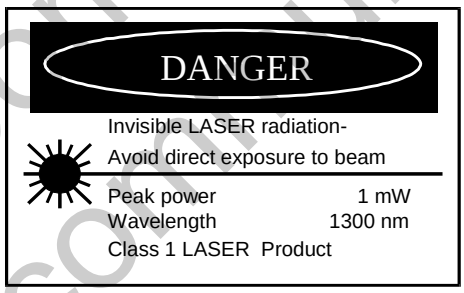
Earthing:

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.



RWT-3085 LASER transmitter module

The RWT-3085 is factory aligned for an optical output level of -9 dBm to -7 dBm and an optimum RF input level of 0 dBm into 75 Ohms.

Installation requires the unit to be plugged into the front of the mounting frame and the rear assembly to be secured to the rear panel of the mounting frame, to install a module in the frame please see instructions under selected frame type in the relevant manual describing the frames.

RF signal connection is made to the BNC connector on the rear panel of the RWT-3085.

Optical signal connection is made to the optical connector on the rear of the RWT-3085. **Extreme care must be taken to ensure the cleanliness and consequently the best return loss of the optical connections.**

The RF input signal sensitivity is set by a 75 Ohm to 50 Ohm matching pad consisting of R 1, R 2 and R 3. The attenuation of the pad is 15 dB. This pad can be changed to a minimum of 6 dB to increase the sensitivity of the RF input circuit of the RWT-3085.

NOTE: This means that increased signal level at the input may overload the system, great care must be taken if the input sensitivity of the RWT-3085 is changed. Only contemplate changing the system operating levels if the noise floor becomes a problem when operating at low RF levels.

The optical output power is monitored by comparator circuits which are adjusted to change state if the output power falls by 6 dB.

The external connections for the alarm circuit is available on pins 3 and 4 of SK 1 on the rear panel. Pin 3 is the ground connection and pin 4 is the active connection from the alarm circuit. **The alarm circuit output is a relay contact set which is linked to provide a contact closure or a contact open when a fault occurs.** To select the contact closure on fault set the link near RL 1 in the NC position.

RWR-3085 photo-diode receiver module

The RWR-3085 is factory preset to give unity gain in the RF signal path with 3 dB attenuation in the optical path.

Installation requires the unit to be plugged into the front of the mounting frame and the rear assembly to be secured to the rear panel of the mounting frame, to install a module in the frame please see instructions under selected frame type in the relevant sections describing the frames.

RF signal connection is made to the BNC connector on the rear panel of the RWR-3085.

Optical signal connection is made to the optical connector on the rear of the RWR-3085. **Extreme care must be taken to ensure the cleanliness and consequently the best return loss of the optical connections.**

The external connections for the alarm circuit is available on pins 1 and 2 of SK 1 on the rear panel. Pin 1 is the ground connection and pin 2 is the active connection from the alarm circuit. **The alarm circuit output is a relay contact set which is linked to provide a contact closure or a contact open when a fault occurs.** To select the contact closure on fault set LK 8 near RL 1 in the NC position, i.e. 1-2.

To compensate for the optical path loss the RF signal level can be set using the **gain control** (RV 1). **RV 1** is a multiturn potentiometer accessible through a hole on the front panel, positioned above the BNC RF output connector.

The optical input level is monitored by a comparator circuit which is adjusted to change state if the optical input level falls below -15 dBm.

This alarm circuit is connected to pins 1 and 2 of SK 1 on the rear panel. Pin 1 is the ground connection and pin 2 is the active connection from the alarm circuit. **The alarm circuit output is a relay contact set which is linked to provide a contact closure or a contact open when a fault occurs.** To select the contact closure on fault set LK 8 near RL 1 in the NC position, i.e. 1-2.

RWT-3085 Preset adjustments.

RV 2 sets the bias current to the laser diode and thus the optical output from the RWT-3085. Adjustment of RV 2 without monitoring the optical output power and the laser operating linearity will cause misalignment of the RWT-3085 and may cause the system to fail. RV 2 has been factory set for correct operation and should not be adjusted without consulting the manufacturer.
RV 3 is sets an output on indication.
RV 4 sets the output **LOW** indicator circuit as shown by LD 2 on the front panel and the state of the alarm circuit. U 5.

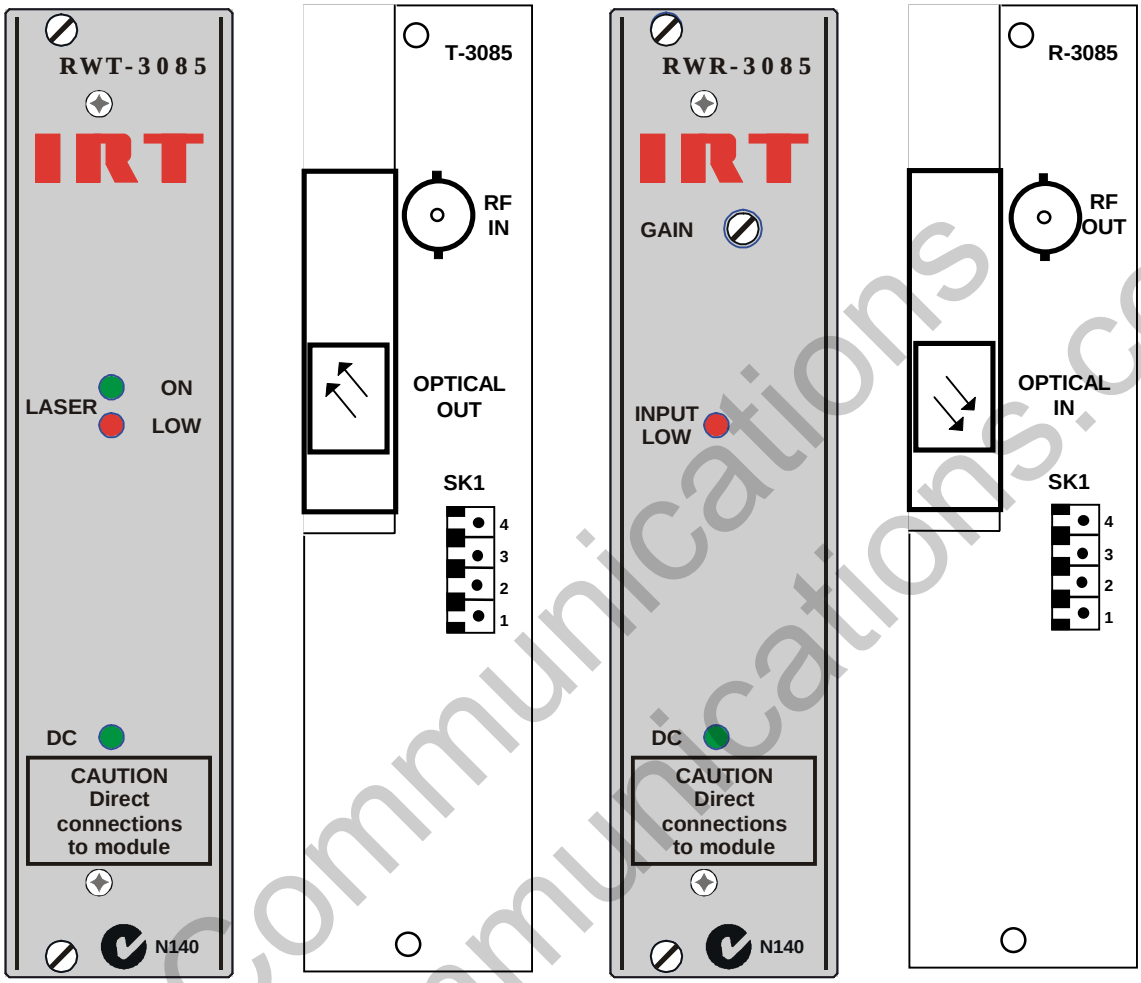
RWR-3085 Preset adjustments.

RV 5 sets the output **LOW** indicator circuit as shown by LD 1 on the front panel, and the state of the alarm circuit.

Diagrams are provided giving details of the power supply and alarm circuits of the RWT-3085 and the RWR-3085. 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.

Front & rear panel connector diagrams

The following front panel and rear assembly drawings are not to scale and are intended to show connection order and approximate layout only.



ZWR-3085RH Change-over Rear Panel

Two RWR-3085 receivers can be operated in a Main/Standby change-over situation for failure of a path using the change-over rear assembly, ZWR-3085RH. This is a double width rear assembly, which takes two RWR-3085 receiver modules side by side. One acts as the Main receiver and the other as the Standby receiver. Should the Main receiver circuit lose its input signal, a relay on the ZWR-3085RH board swaps the output connection with the Standby receiver module.

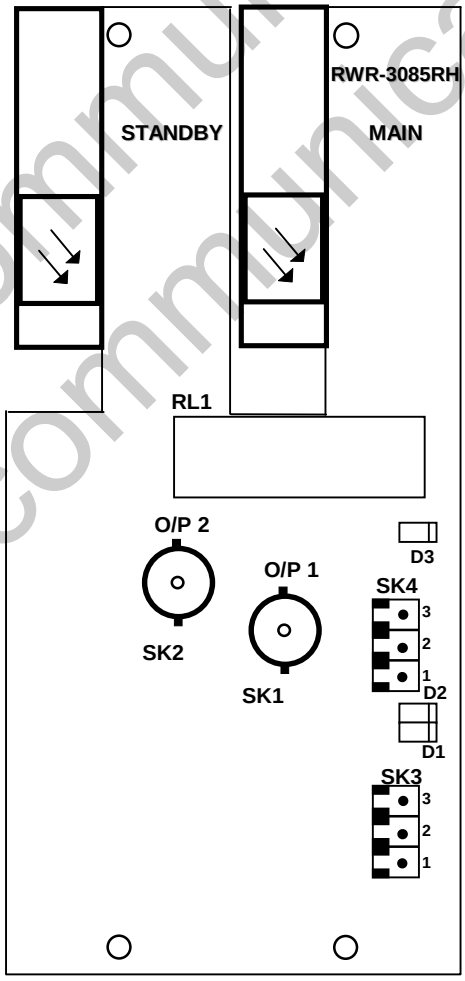
For operation of two receivers in the Main/Standby mode the following connections must be made:
(Refer drawings 803955 and 804298)

1. In the RWR-3085 modules, LK6 must be placed in position 1-2. This will provide a closure to ground at SK4 on the ZWR-3085RH rear connector when signal is present.

2. In the RWR-3085 modules LK1 must be closed. This will provide the +ve voltage for the relay on the rear assembly.

3. The relay on the rear assembly connects the output of the Main module to the O/P 1 connector, SK1, in the energised condition. At the same time the output of the Standby receiver will be connected to the O/P 2 connector, SK 2. On change-over these signal connections will swap. Wiring SK3 PIN 2 to SK4 PIN 3 will complete the circuit so that O/P 1 is the main output and on failure the relay will release and switch to the output from the Standby module.

4. An alarm can only be obtained from the RWR-3085 when LK2 is in the "AGC" position, pin 2 - pin 3. Thus an RWR-3085 will give an alarm on loss of "RF Signal" at the receiver and the required "RF Signal Level" must be set by RV2. The factory preset is for an "RF Signal Level" at the output of -10 dBm when the RWR-3086 is operated in the "AGC" mode.



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.

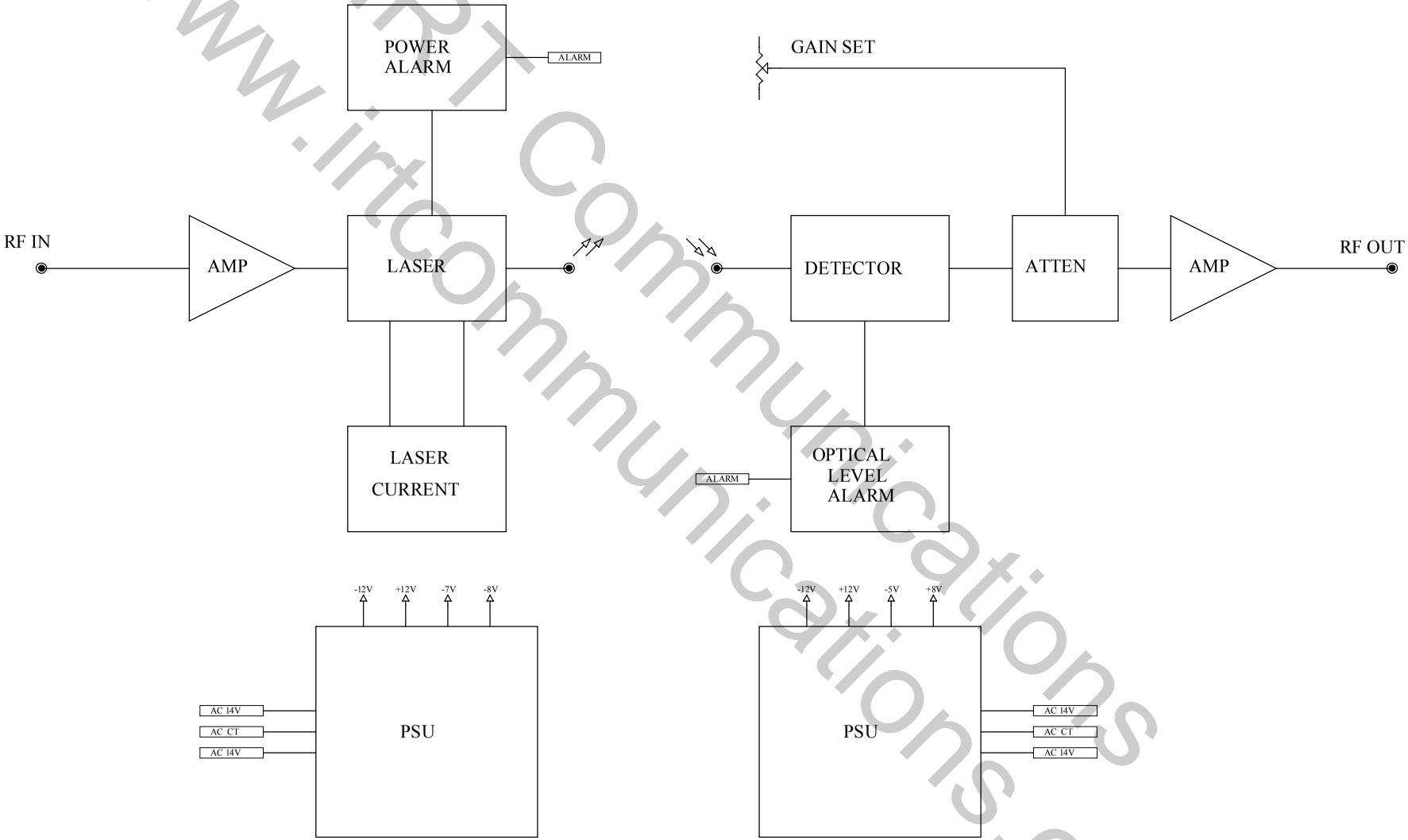
The equipment should be returned **to the agent who originally supplied the equipment or, where this is not possible**, to IRT direct as follows.

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
803950	1	RWT-3085 / RWR-3085 optical link block diagram
803950	2	RWT-3085 optical transmitter schematic diagram
803955	1	RWR-3085 optical receiver schematic diagram
803955	2	RWR-3085 optical receiver schematic diagram
804298	1	ZWR-3085/6RH C/O Rear Panel for RWR3085/6



1 16/12/96
2 12/01/99

DRAWN K.N.
CHECKED C.N.
ENG. APP.
CONTRACT No.

IRT

SIZE A3

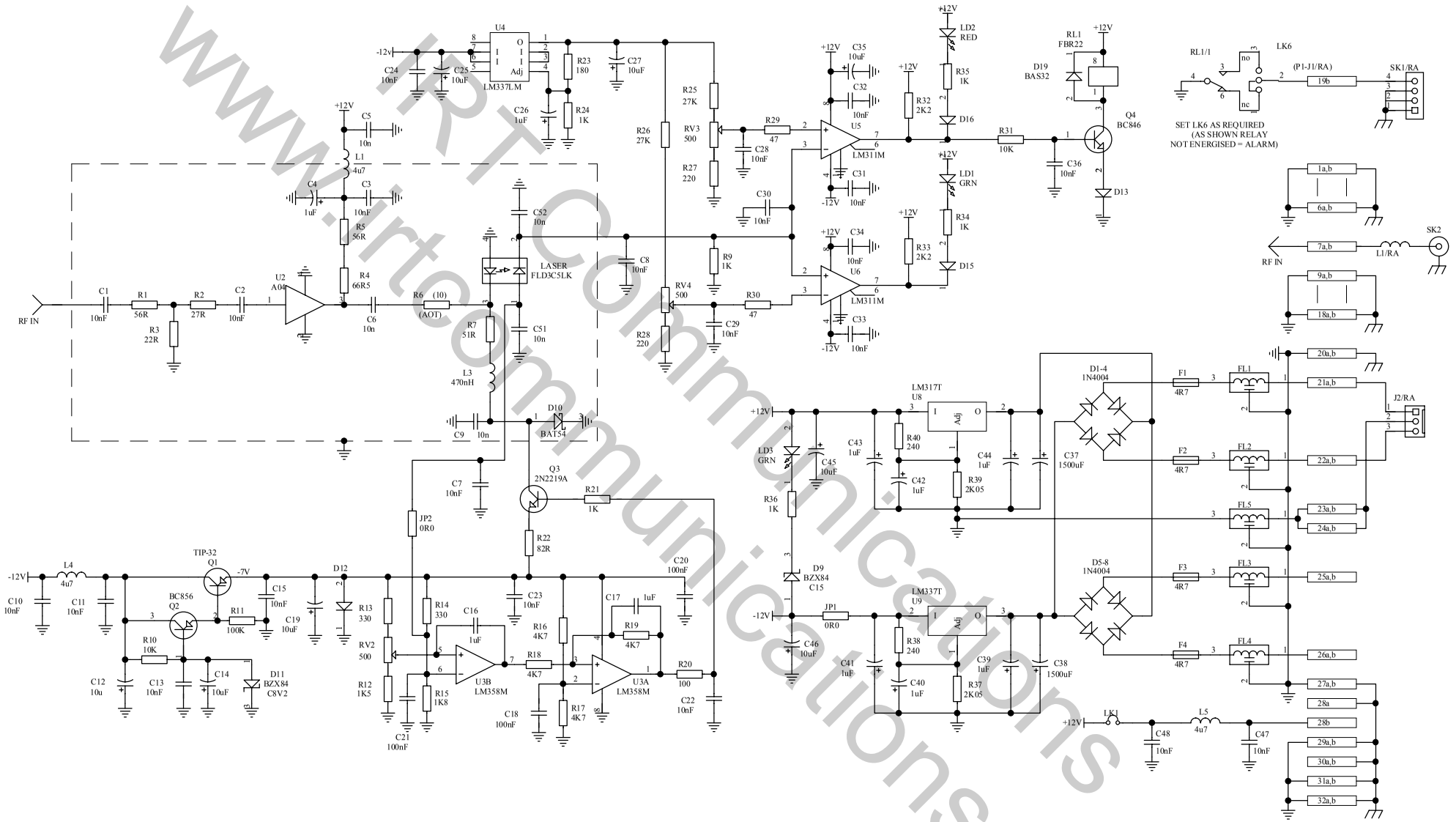
TITLE RWT/RWR-3085
70 & 140 MHz IF
OPTICAL LINK

SCALE

DRAWING No. 803950

SHEET 1 OF 4

IRT Electronics Pty. Ltd.
ARTARMON NSW AUSTRALIA 2064

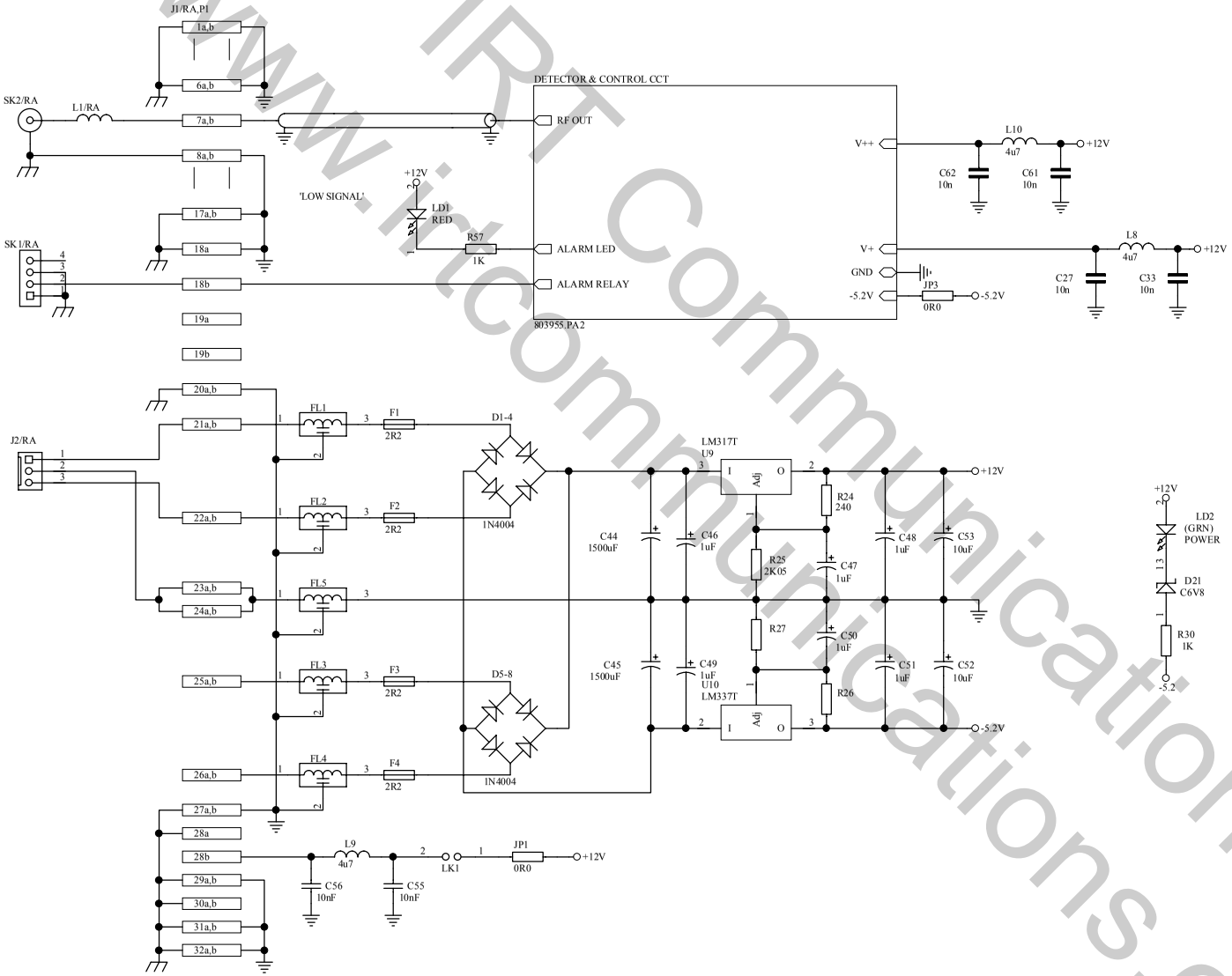


NOTE: UNLESS OTHERWISE MARKED DIODES ARE BAS32

PCB 804219

DRAWN K.N.	SIZE A3	TITLE RWT-3085 WB LASER MODULE PCB ASSEMBLY	
CHECKED	SCALE	DRAWING No. 803950	SHEET 2 OF 4
ENG. APP.			
CONTRACT No.	IRT Electronics Pty. Ltd. ARTARMON NSW AUSTRALIA 2064		

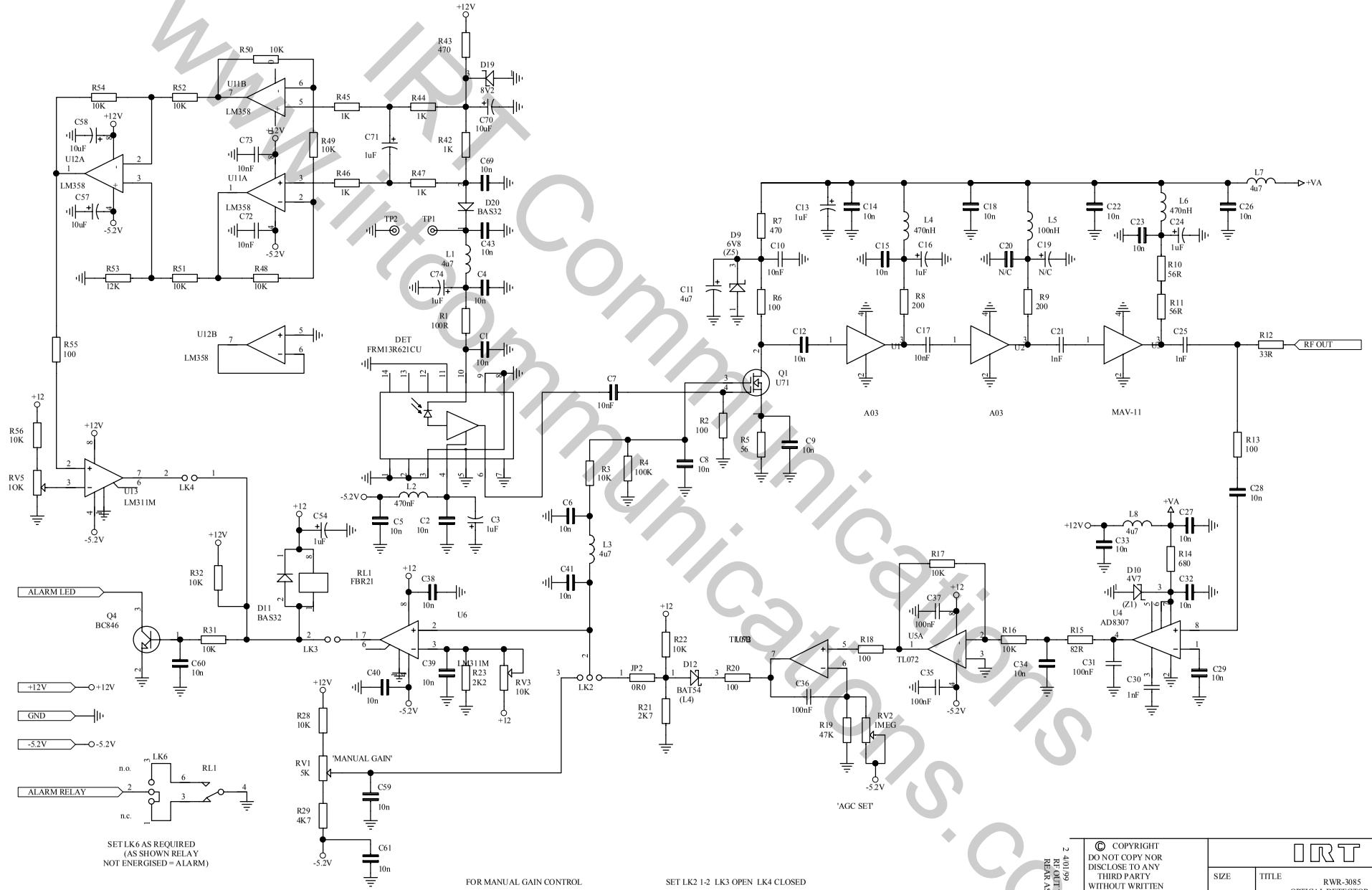
1 16/12/96 RF THRO
2 12/01/99 REAR ASSY

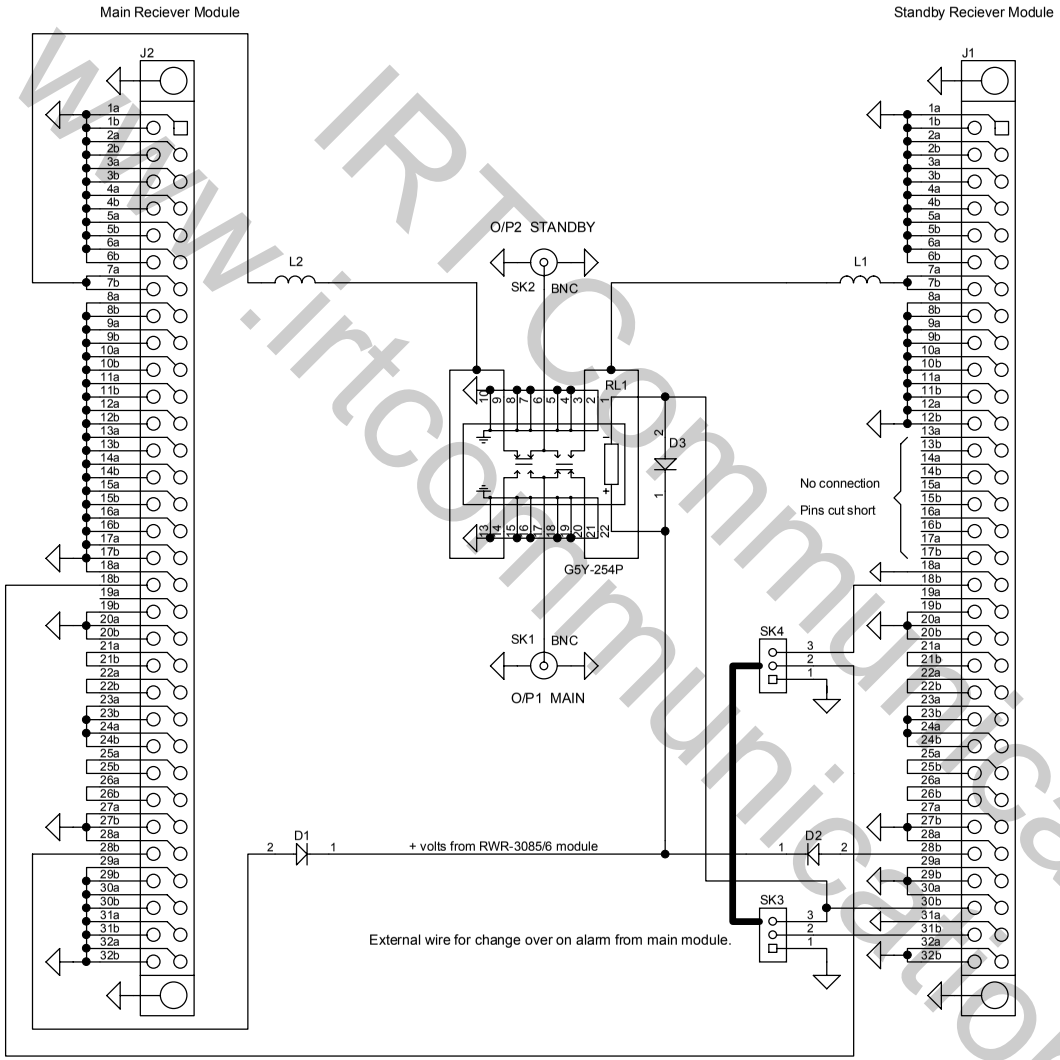


PCB 803555R/X

2 4/01/99 RF OUT THRO REAR ASSY

DRAWN K.N.	SIZE A3	TITLE RWR-3085 OPTICAL DETECTOR PCB ASSEMBLY
CHECKED	SCALE	DRAWING No. 803955
ENG. APP.		SHEET 1 OF 4
CONTRACT No.	IRT Electronics Pty. Ltd. ARTARMON NSW AUSTRALIA 2064	





LINK SETTINGS FOR RECIEVER MODULES
WHEN USED WITH ZWR-3085/6RH CHANGE-OVER REAR PANEL.

LINK SETTINGS IN BOTH RWR-3085 MODULES.

LK1	CLOSED	
LK6	1-2	
MANUAL GAIN	LK2	1-2
	LK4	CLOSED (LK3 OPEN)
AGC OPERATION	LK2	2-3
	LK3	CLOSED (LK4 OPEN)

LINK SETTINGS IN BOTH RWR-3086 MODULES.

LK1	CLOSED	
LK6	1-2	
AGC OPERATION	LK2	2-3
	LK3	CLOSED (SHOULD BE CLOSED WITH WIRE LINK).
	LK4	SHOULD BE OPEN

Note: For operation of two recievers in a Main - Standby mode the following connections must be made.

In the RWR-3085 and RWR-3086 modules LK6 must be placed in position 1-2. This will provide a contact closure to ground at SK4 when signal is present.

In the RWR-3085 and RWR-3086 modules LK1 must be closed. This will provide +ve voltage for the relay on the rear assembly.

The relay on the rear assembly connects the output of the Main module to O/P1 connector SK1 in the energised condition.
At the same time the output of the Standby reciever will be connected to O/P2 connector SK2. On change over these signal connections will swap.
Wiring SK3 PIN 2 to SK4 PIN 3 will complete the circuit, so that O/P1 is the main output and on failure the relay will release and switch to the output from the standby module.

When using the RWR-3085 with LK2 in the "MAN" position pin 1-pin 2, and LK4 closed an alarm will occur on loss of optical signal level.
When operating the RWR-3085 in "AGC" LK2 pin2 - pin 3, and LK3 closed an alarm will occur on loss of "RF SIGNAL".

NOTE: THIS IS IMPORTANT 'AN ALARM CAN ONLY BE OBTAINED FROM THE RWR-3086 WHEN LK2 IS IN THE "AGC" POSITION pin 2 - pin 3.
Thus a RWR-3086 will give an alarm on loss of "RF SIGNAL" at the reciever and the required "RF SIGNAL LEVEL" must be set by RV2.
The factory preset is for a "RF SIGNAL LEVEL" at the output of -10dBm when the RWR-3086 is operated in the "AGC" mode.

1 10-07-2000 2 24-07-2000		IRT	
	DRAWN K.N.	SIZE A3	Title ZWR-3085/6RH C/O Rear Panel for RWR-3085/6
	CHECKED ENG. APP.	SCALE N.T.S.	Drawing No. 804298 — Sheet 1 of 2
	Revision: 2 Date: 17-Sep-2001	IRT Electronics Pty. Ltd. ARTARMON NSW AUSTRALIA 2064	