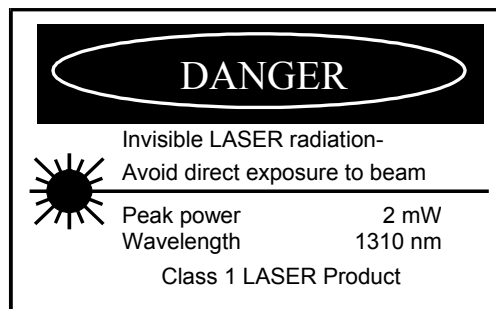




IRT Electronics Pty Ltd A.B.N. 35 000 832 575  
26 Hotham Parade, ARTARMON N.S.W. 2064 AUSTRALIA  
National: Phone: (02) 9439 3744 Fax: (02) 9439 7439  
International: +61 2 9439 3744 +61 2 9439 7439  
Email: [sales@irtelectronics.com](mailto:sales@irtelectronics.com)  
Web: [www.irtelectronics.com](http://www.irtelectronics.com)

**IRT Eurocard**  
**Types RWT-3820 / RWR-3820**  
**L Band RF Fibre Optic Link**



**Designed and manufactured in Australia**

**IRT can be found on the Internet at:  
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# RWT-3820 / RWR-3820

## L BAND RF FIBRE OPTIC LINK

### Instruction Manual

Table of Contents	
Section	Page
Operational Safety	3
General description	4
Technical specifications	5
Pre-installation	6
Installation	7
RWT-3820 LASER transmitter module	7
RWR-3820 photo-diode receiver module	8
Front and rear layouts	9
Maintenance & storage	10
Warranty & service	10
Equipment return	10
Drawing index	11

This instruction book applies to serial numbers later than S/N: 0410001

## 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.

### Optical Safety

The light emitted from the LASER diode used in this system is invisible and may be harmful to the human eye. Avoid looking directly into the fibre optic cable or connectors or into the collimated beam along their axis when the device is in operation. Operating the LASER diode outside of its maximum ratings may cause device failure or a safety hazard.

### DANGER



Invisible LASER radiation-  
Avoid direct exposure to beam

---

Peak power	2 mW
Wavelength	1310 nm

Class 1 LASER Product

# IRT Eurocard RWT-3820 / RWR-3820

## L BAND RF FIBRE OPTIC LINK

### General description

The IRT RWT-3820 / RWR-3820 Wide Band RF Fibre Optic Link is a modular system for transmitting broadband RF 'L' band FM modulated signals over an optical fibre cable. The system response is from 900 - 2150 MHz.

The link is designed for transferring the down converted 'L' band signals from satellite dishes to main equipment buildings. Fibre optic cable provides low signal attenuation with no gain or cable equalisation requirements with the added benefit of immunity to RFI and EMI and protection against lightning strikes.

The system is designed for single mode fibre (9/125  $\mu\text{m}$ ) at 1300 nm with a path loss of up to 12 dB. The operating distance will depend upon the actual cable and connector losses.

RF signal connections are made to 75 $\Omega$  SMC connectors on the rear panels. BNC and F adapters are provided.

Optical connections are made to SC/PC optical connectors on at the rear of the module.

Modules can be installed in IRT 1 RU or 3 RU frames.

#### **RWT-3820 Laser Transmitter.**

Wide band amplifiers are used to drive the DFB LASER with the RF signals applied to the module input. The signal level is set by a front panel control for optimum signal to noise ratio. A pilot signal is added to the RF path to monitor the RF path integrity at the receiver.

Pilot signal level and laser output LED indicators are provided as well as a relay contact set for external alarm indication of laser power or DC supply loss.

LNB power can be applied through a connector on the rear panel.

#### **RWR-3820 Photo-diode Receiver.**

The receiver consists of an optical detector diode module followed by an adjustable gain stage and amplifiers to provide two RF outputs from the receiver.

The output signal level is adjusted to the required level as seen at the RF Mon connector. This level is the same as the rear output signal level.

Pilot and optical signal level LED indicators are provided as well as a relay contact set for external alarm indication of optical signal, pilot or DC supply loss.

**NOTE: Direct connections are made to the rear of the RWT-3820 and RWR-3820 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-3820 / RWR-3820 Technical specifications

RF signal connections	75Ω SMC on module rear panel. (BNC and F adapters provided).
RF Monitor connections	BNC connectors on transmitter and receiver front panels. Allows easy setting up of RF levels.
RF input level	Adjustable in the range -40 dBm to -20 dBm total power.
RF output level	Adjustable in the range -45 dBm to -20 dBm total power.
Input / output VSWR	< 2: 1 (75 Ω).
System frequency response	900MHz to 2150 MHz operation.
500 MHz flatness	± 1.5 dB.
36 MHz flatness	± 0.5 dB.
System group delay	±2 ns 900 MHz - 2150 MHz.
Carrier to noise	> 26 dB for 36 MHz bandwidth.
Intermodulation products.	< 40 dBc.
Tx optical output power	0 dBm.
Rx optical input power	-5 dBm to -15 dBm. (Note: 10 dB pad provided for back to back operation where path attenuation is less than 5 dB).
System optical budget	12 dB.
Optical signal connections	SC/PC (accessible from the rear of the module) for use with single mode (9/125 μm) fibre cable.
LNB power supply	13 or 18V input to rear panel, SK3, can be applied.
<b>Power Requirements</b>	28 Vac CT (14-0-14) or ±16 Vdc
Power consumption	6 VA for RWT-3820 and 5 VA for RWR-3820
Mechanical	Suitable for mounting in IRT 19" rack chassis with optical, RF & alarm connections at the rear.
Finish:	Front panel Grey with black lettering & red IRT logo. Rear assembly Detachable silk-screened PCB with direct mount connectors to Eurocard and external signals.
Dimensions	32 mm x 3 U x 220 mm IRT Eurocard.
Optional accessories	TME-6 module extender card.

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

## Installation

**NOTE:** Direct connections are made to the rear of the RWT-3820 and RWR-3820 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-3820 LASER transmitter module

The RWT-3820 is factory preset for a optical output of 0 dBm and a RF input level of -40 dBm to -20 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 1RU or 3RU frame please see the separate instruction manual "**Frames & PSU's**".

RF signal connection is made to the 75 ohms SMC connector on the **rear panel** of the RWT-3820, adapters are supplied to allow connection to circuits using BNC or F series connectors.

A RF signal monitor connector is provided on the front panel. The RF level at this connector should be -40dBm as adjusted by the front panel RF gain control RV1. At this RF level the laser modulation is set for the best signal to noise and inter-modulation of the transmission system. For a input signal of -40dBm the RF gain control will be at the maximum (fully clock-wise) position, for higher input levels the gain will have to be backed up and adjusted to set the level at the RF monitor connector to -40dBm. **Note: the RF Monitor connector will need to be terminated with the 75 ohms termination provided when not in use.**

Optical signal connection is made to the SC/PC optical connector on the **rear** of the RWT-3820. **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 level varies by more than  $\pm 3$ dB from the output level set during alignment. A led indicator on the front panel will light green when the laser is operating normally and change to red if the laser power deviates by  $\pm 3$ dB from the pre-set level.

The RWT-3820 includes a pilot tone generator at 10.7 MHz. This allows for the verification of the RF signal path at the receiver. A led indicator on the front panel will light green when the pilot is operating normally and change to red if the pilot signal fails.

The alarm circuit accepts signals from the laser power low always, from the laser power high on LK1 closure and pilot fail circuit on LK2 closure to operate relay RL1. External connections from the alarm relay are available on pins 2 and 3 of SK4 on the rear panel. The alarm circuit is wired to give a relay contact closure when a fault condition such as power failure, low or high optical output, failure of the pilot tone generator occurs. A second alarm contact closure is available at J3.

LNB power can be applied to the RF in cable through J3 on the rear panel after closing LK5.

## **RWR-3820 photo-diode receiver module**

The RWR-3820 is factory preset for use with the accompanying RWT-3820 transmitter and an 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 1RU or 3RU frame please see the separate instruction manual “**Frames & PSU’s**”.

RF signal connection is made to the SMC connector on the **rear** of the RWT-3820, adapters 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 panel** of the RWR-3820. **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 front panel gain control (RV3), while at the same time monitoring the output level using the front panel RF monitor connector which outputs the same RF level as the rear output connector. **Note: the RF Monitor connector will need to be terminated with the 75 ohms termination provided when not in use.**

The optical input signal level is monitored by a current sense and comparator circuit, which is adjusted to change state if the optical path loss exceeds the maximum optical budget by 3 dB.

The alarm circuit accepts signals from the optical level on LK1 closure and pilot fail circuits on LK2 closure to operate relay RL1. The external connections for the alarm circuit are available on pins 2 and 3 of SK4 on the rear panel. The alarm circuit is wired to give a relay contact closure when a fault condition such as power failure or low optical input occurs. A second alarm contact closure is available at J3.

### **RWT-3820 adjustments.**

**RV1** sets the RF modulation level of the laser by applying a bias voltage to the RF attenuator circuit.

### **RWT-3820 Preset adjustments.**

**RV2** sets the output **LOW** indicator circuit as shown by LD3 on the front panel.

**RV3** sets the output **HIGH** indicator circuit as shown by LD3 on the front panel.

**RV4** sets the bias current to the laser diode and thus the optical output from the RWT-3820.

### **RWR-3820 adjustment.**

**RV3** sets the output RF level of the module by applying a bias voltage to the RF attenuator circuit.

### **RWR-3820 Preset adjustment.**

**RV1** sets the pilot **SIGNAL LOW** alarm circuit threshold as shown by LD2 on the front panel.

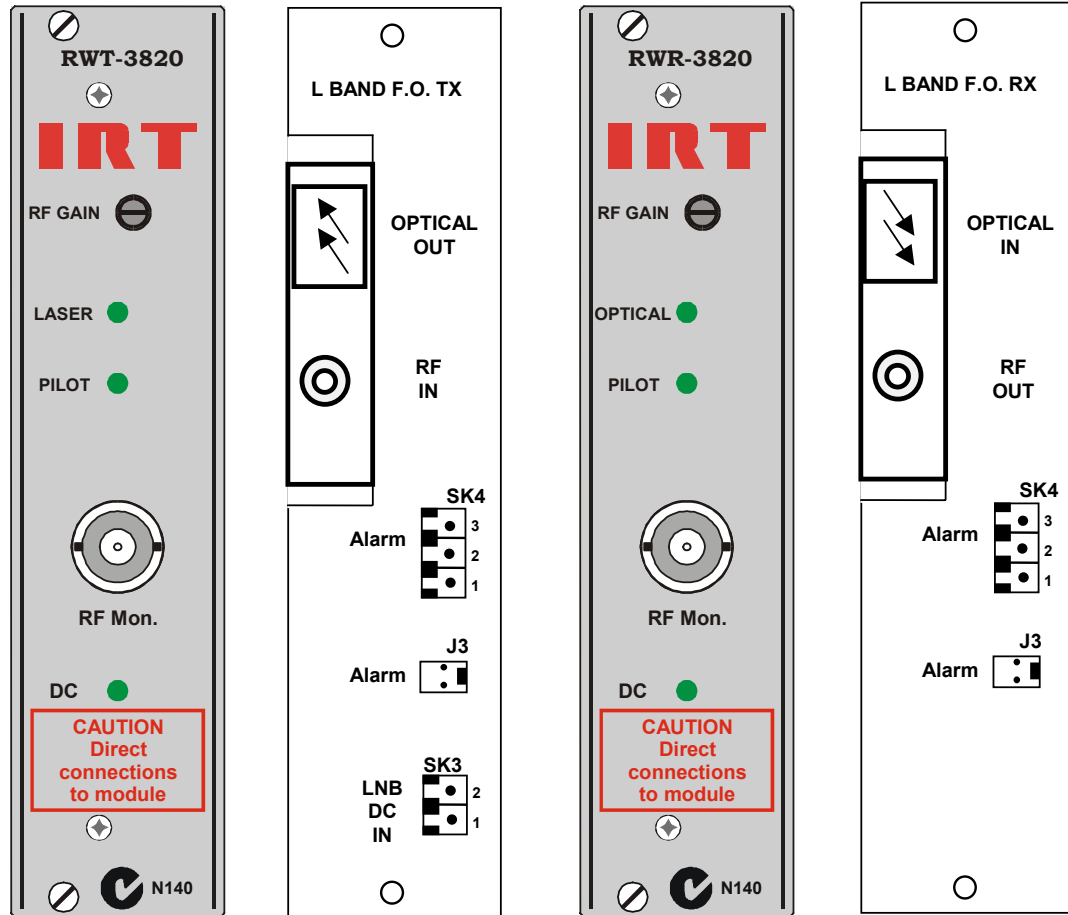
**RV2** sets the input **SIGNAL LOW** alarm circuit threshold as shown by LD3 on the front panel.

Diagrams are provided for the RWT-3820 and the RWR-3820. 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.



## 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.

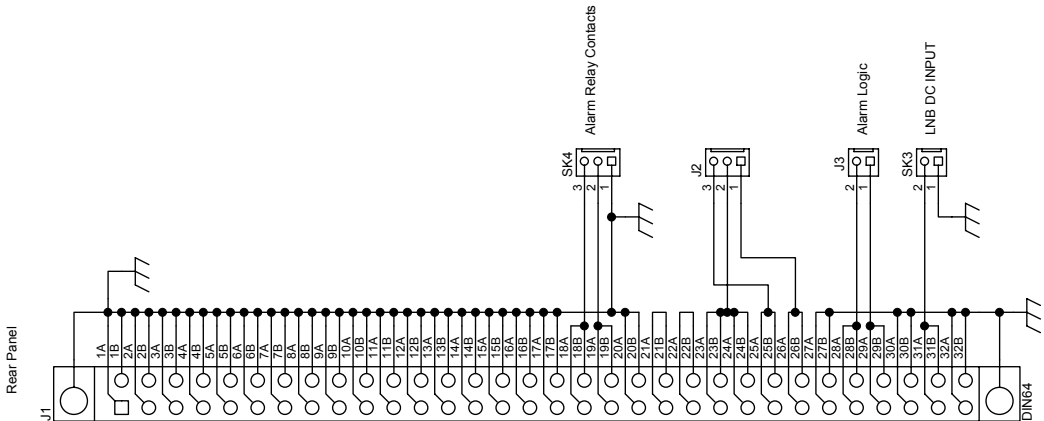
The equipment should be returned **to the agent who originally supplied the equipment or, where this is not possible**, to IRT direct as follows.

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

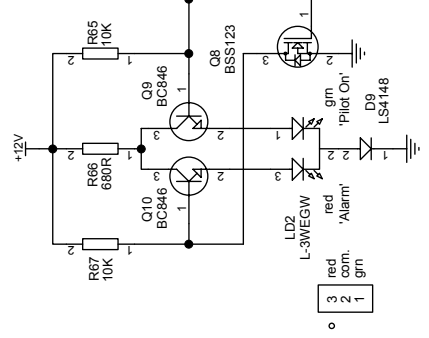
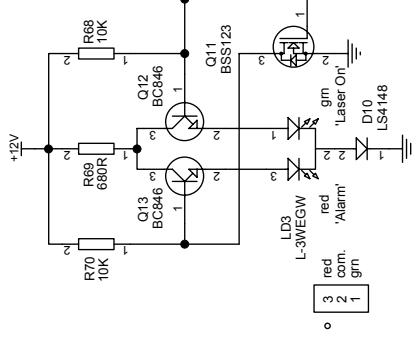
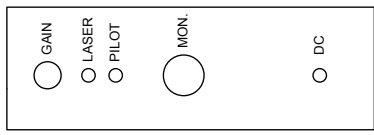
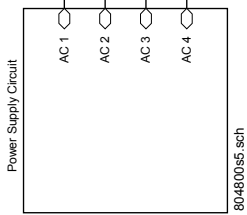
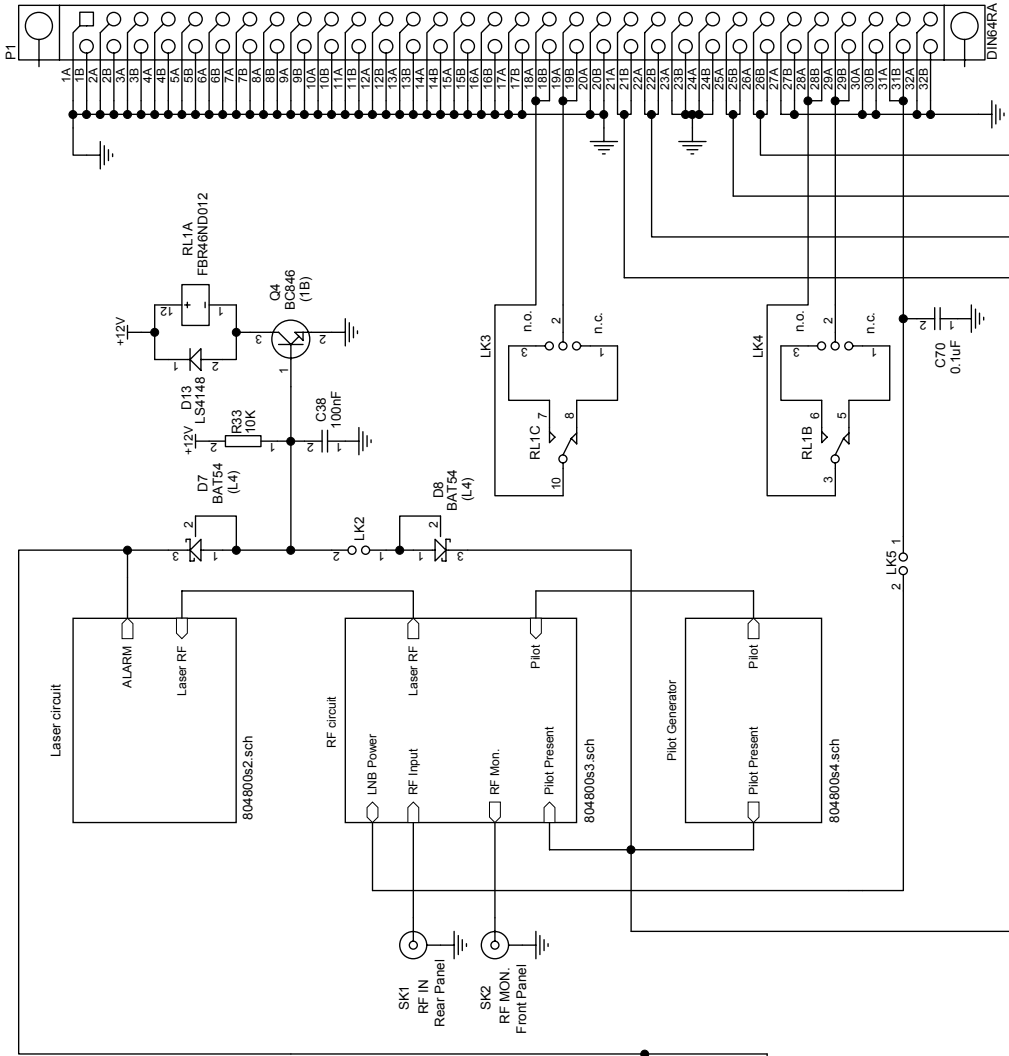
Phone: 61 2 9439 3744                      Fax: 61 2 9439 7439  
Email: [service@irtelectronics.com](mailto:service@irtelectronics.com)

## Drawing index

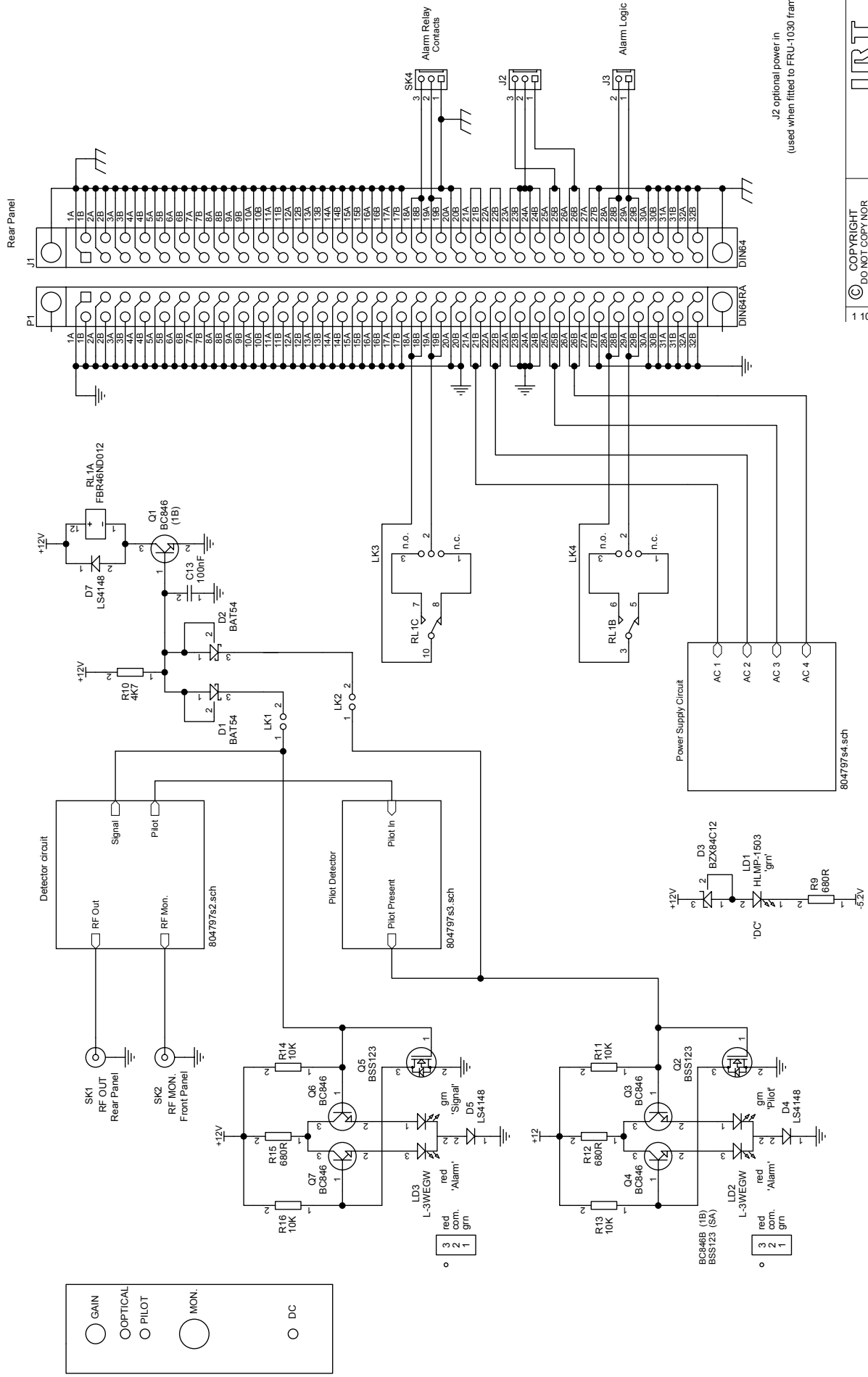
Drawing #	Sheet #	Description
804800s1	1	RWT-3820 schematic diagram – sheet 1
804797s1	1	RWR-3820 schematic diagram – sheet 1



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



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ENG. APP.	Revision: 1	Date: 27-Feb-2006	ARTARMONNSW.AUSTRALIA.2064



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

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110-01-02	DRAWN K.N.	SIZE A3	SCALE N.T.S.
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Date: 27-Feb-2006	ARTARMONNSW.AUSTRALIA 2064		

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