IRT Eurocard

Type DDA-4900

**Dual 1 In, 3 Out 270 Mb/s ASI/SDI
Distribution Amplifier**

Designed and manufactured in Australia

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

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Instruction Book

Table of Contents

This instruction book applies to units later than S/N 0603001.

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.

IRT Eurocard
Type DDA-4900
Dual 1 In, 3 Out 270 Mb/s ASI/SDI Distribution Amplifier

General Description

BLOCK DIAGRAM DDA-4900 SIGNAL PATH
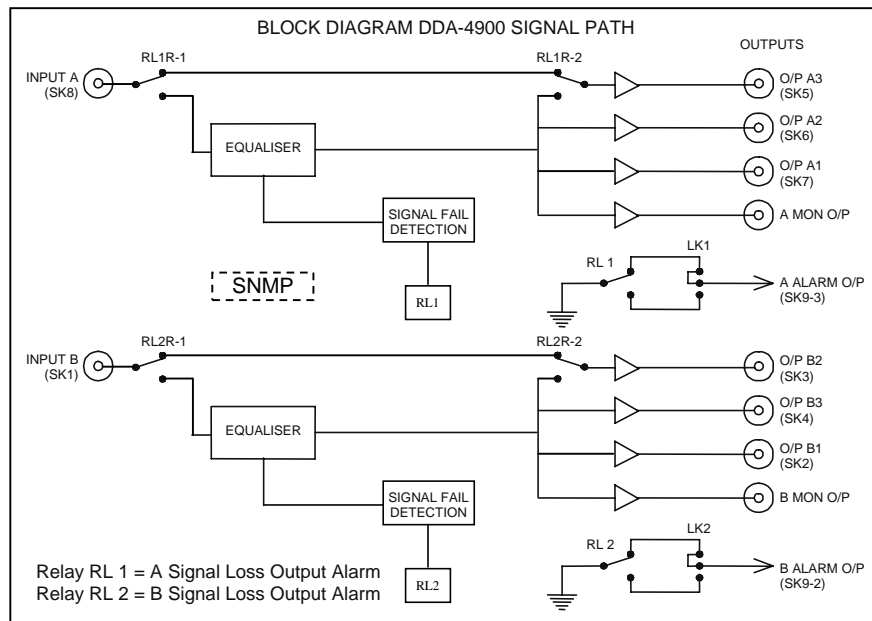
The DDA-4900 270 Mb/s serial digital video distribution amplifier provides the user with a single standard module to cover a wide range of distribution and monitoring functions for ASI or SDI signals. Two triple output distribution amplifiers are provided on the one card. Signal bypass relays automatically switch the inputs to one of their outputs in the event of loss of power.

Due to the fact that standard loop through techniques used in the analogue domain are unsuitable to the digital domain most digital equipment comes with no facility to route the input signal to other locations. As a result a DA is required at almost every point in the digital chain.

Serial digital signals also suffer severe deterioration over relatively short cable distances. The DDA-4900 provides a means of extending the working distances that can be achieved by equalising and re-transmitting the data mid route.

The DDA-4900 may also be used to provide input equalisation for devices not having this feature, as most unequalised inputs will only support cable lengths of less than 20 metres.

Frequent re-clocking of serial digital signals can lead to serious increases in jitter with resultant data errors. The DDA-4900 does not include re-clocking, which minimises these errors, leaving re-clocking to be done by the receiving device. For applications requiring reclocking the DDA-4007 should be used.

To provide for the polarity sensitive nature of ASI signals, all outputs of the DDA-4900 are in phase with the input.

An optional SNMP (Simple Network Management Protocol) plug-in module is available for remote monitoring when used in conjunction with IRT's 4000 series frame fitted with SNMP capability.

The DDA-4900 is a Eurocard module designed to fit IRT's standard Eurocard frames as well as IRT's 4000 series frames for use with IRT's SNMP system and may be used alongside any other of IRT's analogue or digital Eurocards.

Standard features:

- **3 non inverting outputs on each amplifier.**
- **Power fail signal bypass.**
- **Automatic input equalisation to 250 metres.**
- **Low jitter on the output, <0.1UI when equalising 100m of cable.**
- **Automatic output muting on no input.**
- **Front panel monitoring output, signal presence LED and external alarm contacts.**
- **Optional plug-in SNMP monitoring module.**

Technical Specifications

IRT Eurocard module
Type DDA-4900

Input:
Number	2.
Impedance	75 Ohm.
Return loss	>15 dB (typically) 5 MHz to 270 MHz.
Equalisation	Automatic, better than 250 metres at 270 Mb/s for Belden 8281 or equivalent cable. (reduces to approx. 200m when LK3 (input A), LK4 (input B) is closed).

Outputs:
Number	3 ASI/SDI per input.
Signal level	800 mV ± 10%
Impedance	75 Ohm.
Return loss	>15 dB (typically) 5 MHz to 270 MHz.
DC offset	Nil.

Performance:
Output rise time	<1 ns, (700 ps typically).
Residual Jitter	<0.1 UI (measured with up to 300m of Belden 8281 or equivalent cable).

Alarms:
Signal Loss on either channel or power failure	Contact closure. Link selectable N.O./N.C.

Connectors:
BNC.

Indicators:
Power	LED (green) for +5 Vdc.
Signal present	LED (green) when signal present for each input.

Power requirement:
Voltage	28 Vac CT (14-0-14) 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 with input, output and power connections on the rear panel.
Dimensions		6 HP x 3U Extended Eurocard (220 mm x 100 mm).
Weight		With rear assembly 365g.
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
Supplied accessories		Rear connector assembly with matching connector for alarm outputs.

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

Configuration

Link Settings:

LK1   NC   "A" alarm output switches to ground on loss of signal "A" input, or loss of power.

        NO   "A" alarm output switches from ground on loss of signal "A" input, or loss of power.

LK2   NC   "B" alarm output switches to ground on loss of signal "B" input, or loss of power.

        NO   "B" alarm output switches from ground on loss of signal "B" input, or loss of power.

LK3   IN   Signal "A" equalisation reduced to approximately < 200m, for use in noisy environments or when short input cable is used.

        OUT   Signal "A" equalisation extended to full specified rate.

LK4   IN   Signal "B" equalisation reduced to approximately < 200m, for use in noisy environments or when short input cable is used.

        OUT   Signal "B" equalisation extended to full specified rate.

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.

Signal Connections:

The rear assembly has two ASI/SDI inputs designated as "Input A" and "Input B", and two sets of three outputs corresponding to inputs A and B. All inputs and outputs are 75 Ω BNC type for connection with high quality 75 Ω coaxial cable. Both inputs are self-terminating. No loop through facility is available. On loss of power to the module, input A (SK8) is relay bypassed to one of its associated outputs (SK5, the BNC connector directly below input A), whilst input B (SK1) is relay bypassed to one of its associated outputs (SK3, the BNC connector directly above input B).

Each input is independent from the other. ASI and SDI can both be run simultaneously, likewise both inputs can be ASI or both can be SDI.

It is recommended that unused inputs on the rear panel be terminated with 75 Ω termination plugs so that there is no noise pickup to falsely indicate the presence of a signal.

Monitoring is possible via front panel A & B BNC connectors. The presence of signals is indicated by the 'SIGNAL PRESENT' front panel LEDs A & B (green).

Alarm Output Connection:

A 3 pin phoenix style screw connector is provide on the rear assembly for an alarm connection for loss of ASI/SDI input or loss of power. Inputs A and B both have separate alarm outputs on pins 3 and 2 respectively. Pin 1 is ground. The alarms either switch to, or switch from, ground depending on the positions of links LK1 and LK2, see *Configuration* section of this manual for link settings. Both alarms operate independently from each other.

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

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.
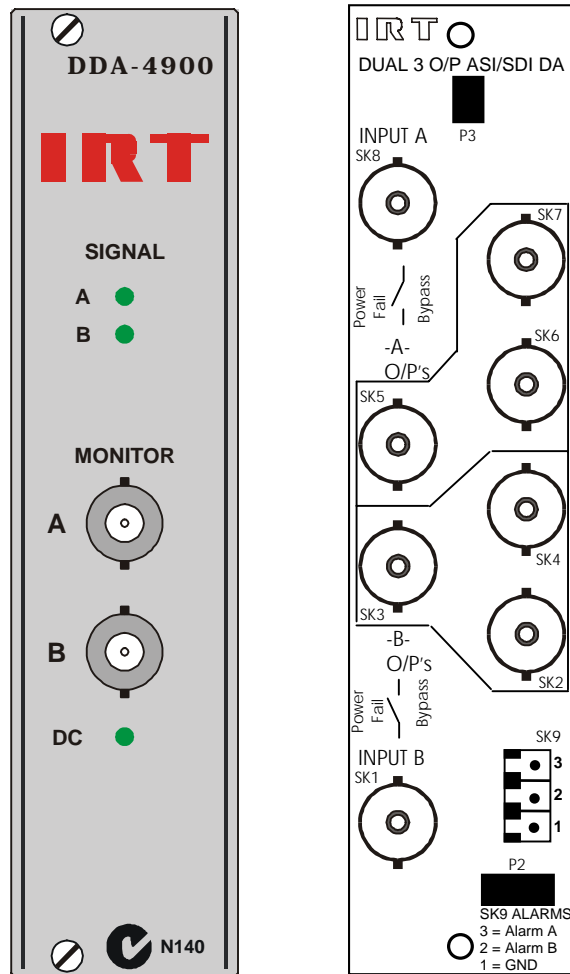
SNMP

What Is It?

SNMP stands for Simple Network Management Protocol. It is an application layer protocol for managing IP (Internet Protocol) based systems. SNMP enables system administrators to manage system performance, and to find and solve system problems. SNMP runs over UDP (User Datagram Protocol), which in turn runs over IP.

Three types of SNMP exist: SNMP version 1 (SNMPv1), SNMP version 2 (SNMPv2) and SNMP version 3 (SNMPv3). It is not the intention here to discuss the differences between various versions, only to bring attention to the fact that IRT Electronics modules, fitted with SNMP capability, use SNMPv1.

An SNMP managed network consists of three key components: Network Management Systems (*NMS*), *agents*, and *managed devices*.

An *NMS* is the console through which the network administrator performs network management functions, such as monitoring status (e.g. alarm states) and remote controlling, of a set of managed devices. One or more *NMS*s must exist on any managed network. Generally the *NMS* is a computer running third party SNMP control software. There are a number of third party SNMP software applications currently available on the market.

An *NMS* polls, or communicates with, an *agent*. An *agent* is a network management software module that resides in a *managed device*. An *agent* has local knowledge of management information and translates that information into a form compatible with SNMP. The *agent*, therefore, acts as an interface between the *NMS* and the managed devices. The *NMS* sends a request message, and control commands for the managed devices, to the *agent*, which in turn sends a response message, containing information about the *managed devices*, back to the *NMS*.

A *managed device* contains an SNMP *agent* and resides on a managed network. *Managed devices* collect and store management information and make this information available to *NMS*s using SNMP.

Managed device agent variables are organised in a tree structure known as a Management Information Base (*MIB*). Within the *MIB* are parameters pertaining to the *managed device*. An Object Identifier (OID) number within the *MIB* defines the managed device type. This is a unique number specific to the model of *managed device*. Other information relating to the device is also stored, information such as alarm states, controllable settings, etc. The *MIB* tree is organised in such a way that there will be no two *MIB* files with conflicting placements.

Normally an *NMS* polls an *agent* for information relating to the *MIB* in a managed device to be sent back to the *NMS*. When certain conditions are met within the *MIB*, such as major alarm conditions, for example, the *agent* automatically sends what is known as a *trap* to the *NMS* without any prompting from the *NMS*. This allows automatic notification of a predetermined event.

SNMP Block Diagram
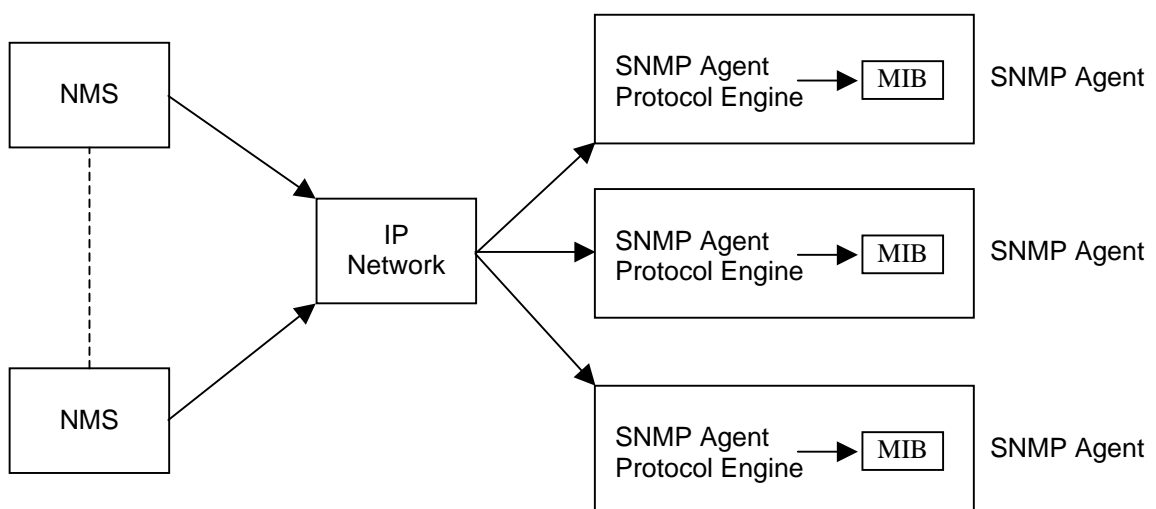
SNMP with IRT Products:

IRT Electronics currently employs SNMPv1 with its 4000 series frame. The frame acts as an *agent* when fitted with a CDM-4000 module. This module has its own designated slot next to the power supply so as to not affect the number of modules that the frame will take. Communication between the *NMS*, the frame and its loaded modules are via this CDM-4000 module. Note that the *NMS* software is third party and not supplied by IRT Electronics.

Ethernet connection for SNMP operation is via an RJ45 connector on the rear of the frame, below the mains inlet. Ethernet rate runs at either 10 baseT or 100 baseT.

Frame parameters, such as Name, Address and Location, are set via an RS232 interface, a D9 connector on the rear of the frame below the mains inlet. A software terminal emulator, such as Tera Term or HyperTerminal, is used for setting and reading the parameters of the frame.

IRT modules that are SNMP compatible need a plug-in SMU-4000 module with a program relevant to the module that it is plugged into. Depending on the module, besides the module identification, parameters such as alarm states, inputs and controls etc. are communicated to the CDM-4000 *agent* via a data bus on the rear of the frame. Thus the CDM-4000 collects information on what is loaded within the frame, what positions they occupy, and their current status for communication to the *NMS* when the *NMS* sends a request for information.

In the event of a major alarm from any of the SNMP compatible modules, or power supplies, a *trap* is automatically sent by the CDM-4000 *agent* to the *NMS* without any prompting by the *NMS*. This alerts the operator to any fault conditions that may exist that need immediate attention.
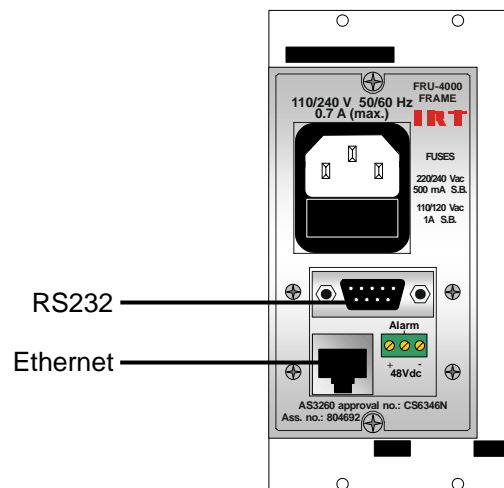

IRT SNMP Connections
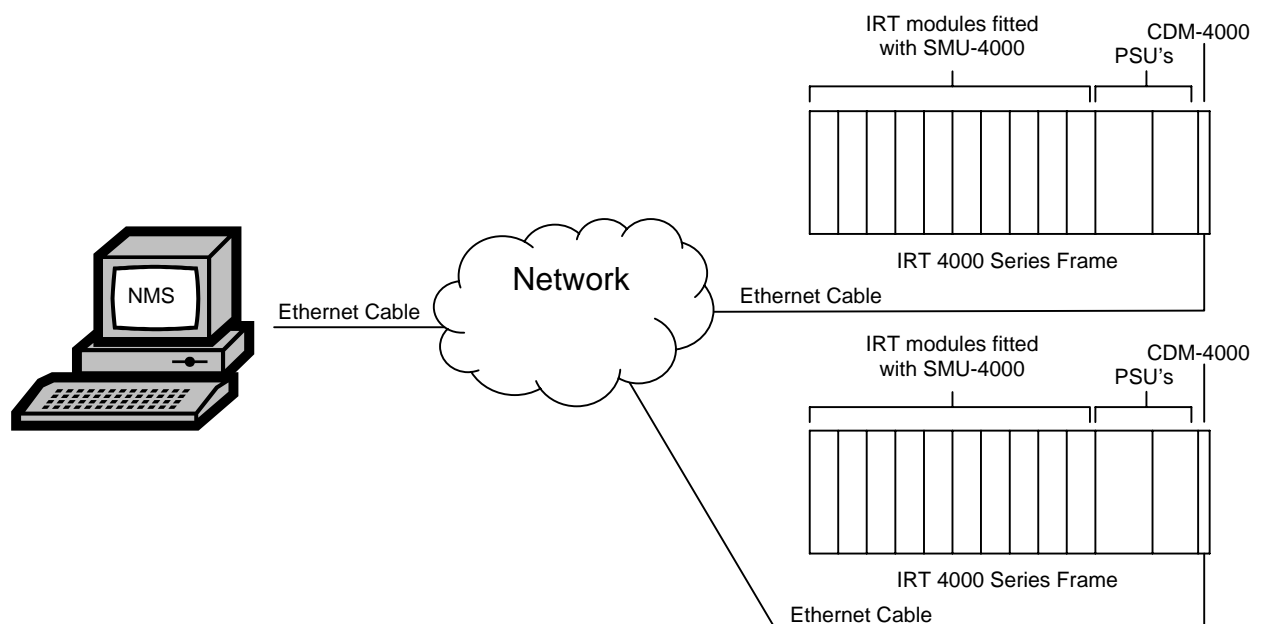
IRT 4000 Series SNMP Setup

SMU-4000 Installation

The SMU-4000 plug-in SNMP management controller module can only be fitted to IRT's 4000 series modules that are capable of being SNMP upgradeable. To determine whether a module is SNMP upgradeable, a square section on the main PCB is silk screened and fitted with three multipin sockets – as shown below:
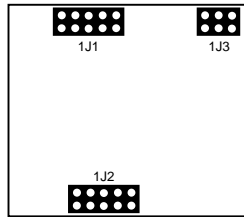
This is where the SMU-4000 plug-in SNMP management controller module is fitted. The three sets of multipins on the underside of the SMU-4000 line up with the three sets of multipin sockets on the main PCB module. Align all pins and then gently press the SMU-4000 all the way down into place.

If the SMU-4000 is not already programmed with the correct firmware to match the module that it is being plugged into, it then needs to be programmed via the pins on the topside of the SMU-4000.

Note that installation will generally be done by IRT Electronics at the time of ordering.

Note also that an SMU-4000 will only be functionally operational when the main module that it is plugged into is fitted into an IRT 4000 series frame fitted with a CDM-4000 SNMP agent and being interrogated by a suitable Network Management System.
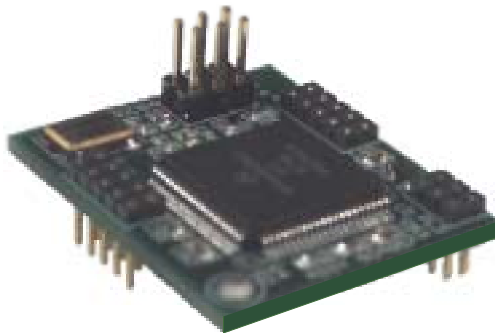

Figure 1: SMU-4000 module

DDA-4900 SNMP Functions:

With the DDA-4900 installed in an IRT 4000 series frame with SNMP capability, the DDA-4900 can be interrogated by an SNMP Network Management System (NMS).

The following SNMP functions are capable of being monitored and controlled by an NMS:

An indication that the A input or B input is present;
Whether "Trap" function is enabled;
Trap automatically sent, if enabled, if either of the alarm conditions occurs;
Trap automatically sent, if enabled, if either of the alarm conditions clears;
Unit reset control.

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

Drawing List Index

IRT

SIZE A3

Title
Dual SDI/ASI Distribution Amplifier
DDA-4900

DRAWN	K.N.
CHECKED	
ENG. APP.	

Drawing No. 805104

SCALE N.T.S.

Sheet 1 of 4

Revision: 1

Date: 9-Jun-2006

IRT Electronics Pty. Ltd.
ARTARMON NSW AUSTRALIA 2064

1 13-06-02

PCB 805105

ALARM CIRCUITS
"A" Signal Loss
"B" Signal Loss
Ground

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

ALARM CIRCUIT
CONTACT CLOSURE (OR BREAK)
TO GROUND ON ALARM, AS SET BY LK1 and LK2