SNMP

TPD-4000

8 Input / 8 Output Relay SNMP Interface

IRT COMMUNICATIONS

User Manual

Revision History:

Revision	Date	By	Change Description	Applicable to:
00	17/10/2007	AL	Original Issue.	S/N: ≥ 0505001
01	24/03/2016	AL	Upgraded to I.R.T. Communications company name.	S/N: ≥ 0505001

Table of Contents:

This instruction book applies to units later than S/N: 0505001.

OPERATIONAL SAFETY

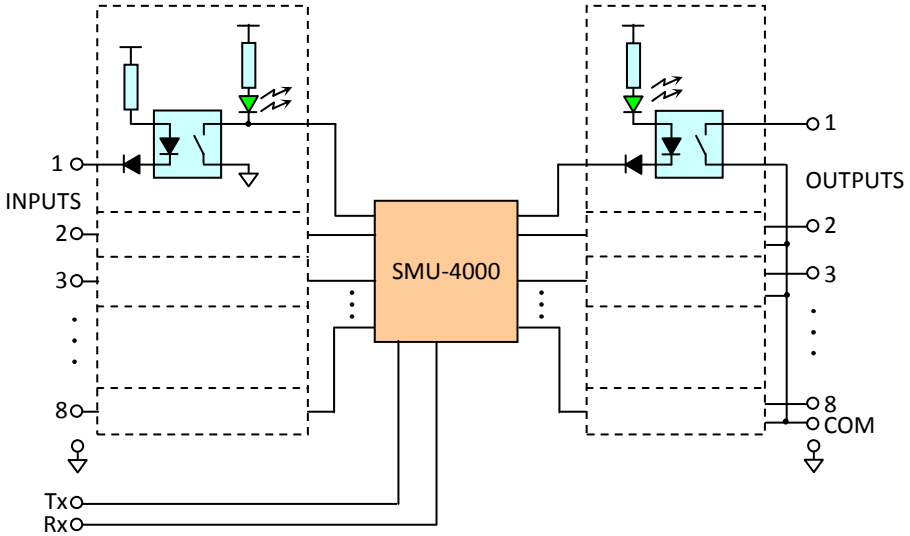
WARNING

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.

GENERAL DESCRIPTION

BLOCK DIAGRAM TPD-4000 SIGNAL PATH



The TPD-4000 is an 8 input / 8 output solid state relay module designed to work in conjunction with IRT's 4000 series Simple Network Management Protocol (SNMP) frame.

The TPD-4000 finds particular use in gathering alarm and status information from non-SNMP controlled devices that use either relay or transistor switch to ground output ports, such as IRT's 3000 series Eurocards, for situations that require SNMP monitoring.

As well as being used for gathering information from non-SNMP devices, the TPD-4000 also has the ability to control non-SNMP devices that only need simple switching so that remote control is possible via an SNMP network.

8 independent inputs are opto-coupled being activated by a switch to ground contact. These inputs are fed to an IRT SNMP module for communication to an SNMP network.

8 solid state relay outputs have a common connection on one side of their relay that can be either connected to ground or to an external common signal. The switched side of the output switches either open circuit or to ground (or external common).

The TPD-4000 is a standard IRT Eurocard module and may be housed in IRT's 4000 series SNMP Eurocard frame.

Standard Features:

- **Eight alarm input ports**
- **Eight solid state relay control output ports**
- **SNMP control via 4000 series frame**

TECHNICAL SPECIFICATIONS

Inputs:

Number	8 (plus 1 common).
Type	Switch to ground.
Control drive current range	2.0 to 25 mA.
Switch to ground control drive current	3.8 mA.

Outputs:

Number	8 (plus 1 common).
Type	Solid state relay.
Operating voltage range	0 to ±250 V (dc or ac peak).
Maximum load current	170 mA (ac or dc) @T_A=+40°C, 5mA control.
Maximum on state resistance	15 Ω.
Maximum off-state leakage	1.0 µA @T_A=+25°C, ±250V.

Power Requirements:

Voltage	28 Vac CT (14-0-14) or ±16 Vdc.
Power consumption	< 3 VA.

Connectors:

2 pin Phoenix pluggable screw block.

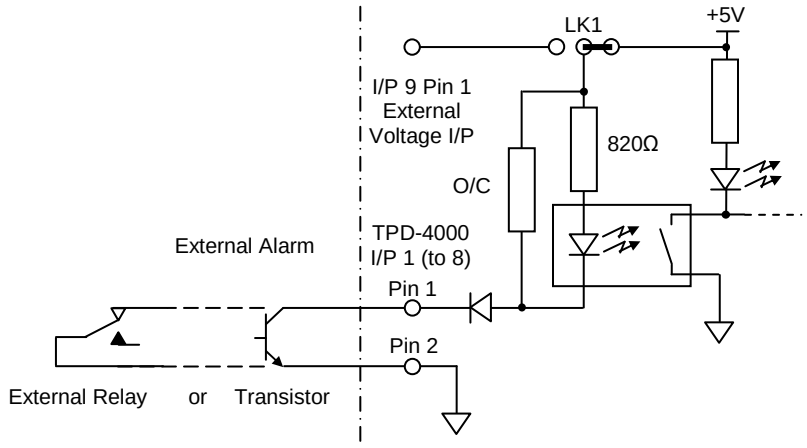
Other:

Temperature range		0 - 50°C ambient.
Mechanical		Suitable for mounting in IRT's 19" 4000 series rack frame with input and output connections on the rear panel.
Finish	**Front panel**	Grey background, black lettering & red IRT logo.
	Rear assembly	Detachable silk screened PCB with direct mount connectors to Eurocard and external signals.
Dimensions		6 HP x 3 U x 220 mm IRT Eurocard.
Standard accessories		SMU-4000 SNMP plug-in management controller.

TECHNICAL DESCRIPTION

The TPD-4000 is designed for use within IRT's 4000 series frame fitted with Simple Network Management Protocol (SNMP) capability.

Eight opto-coupled semiconductor relay inputs accept individual switch to (or from) ground contacts from external devices, which interface to an SNMP management controller sub-board. An on board link, LK1, sets the opto-coupler voltage, common to all input devices, to either an internal +5V or to an external voltage reference. The external voltage reference is via the I/P 9 (pin 1) connector on the rear assembly.



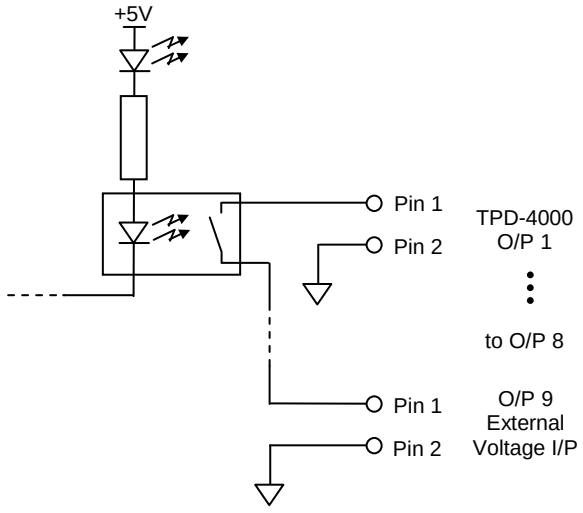
TPD-4000 Input Circuit

When a signal is received at an input port, the TPD-4000 reports the change in state via SNMP to indicate whether an alarm, or change of state, has occurred to the device connected to that port.

The in series resistors to the opto-couplers are 820Ω 0603 surface mount resistors with a power ratings of 0.063 Watts. For external voltage references greater than about 7.5V requires a change in resistor value greater than 820Ω so as to not over drive the resistor power rating. Resistor values would depend on external voltage applied.

There is also a provision for an extra resistor to be added, currently marked O/C (open circuit) above. Should the external alarm require more current drive on its output, the added resistor would allow this without impeding on the actual opto-coupler drive.

The TPD-4000 also has eight semiconductor relay outputs for use as control ports to switch non-SNMP devices. One half of all the outputs are commoned together. The common connection is via O/P 9 (pin 1) on the rear assembly. Connecting this common pin to ground (O/P 9, pin 2) will cause any of the output ports to switch to ground when activated. Likewise, it is possible to add an external voltage to this common pin, in which case the outputs would switch to this external voltage when activated.



TPD-4000 Output Circuit

Using an existing SNMP Network Management System (NMS), input and output ports can be individually named to denote the equipment the ports are connected to.

CONFIGURATION

Link Settings:

LK1	1-2	External Voltage Input Common (see *Technical Description* section)
	2-3	+5Vdc Internal Input Common (standard)

Switch Settings:

Sw1-1	Not used – Reserved for future use.
Sw1-2	Not used – Reserved for future use.
Sw1-3	Not used – Reserved for future use.
Sw1-4	Not used – Reserved for future use.
Sw1-5	Not used – Reserved for future use.
Sw1-6	Not used – Reserved for future use.
Sw1-7	Not used – Reserved for future use.
Sw1-8	Not used – Reserved for future use.

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.

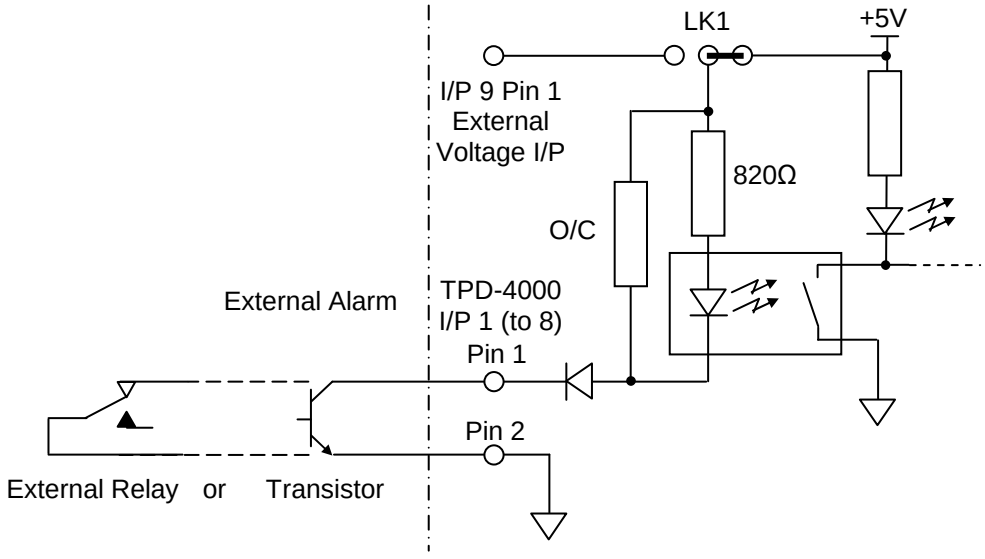
Installation in frame or chassis:

See details in separate manual for selected frame type.

Inputs:

Inputs 1 to 8 are each via separate 2-pin phoenix style connectors. Pin 1 is the active alarm input, whilst pin 2 is permanently connected to ground.

Alarm inputs may be either relay contacts or transistor types. For transistor drivers that require more sink current for proper operation than is normally supplied by the TPD-4000, a resistor can be added in parallel to the opto drive I/P circuit, currently marked O/C (open circuit).



TPD-4000 Input Circuit

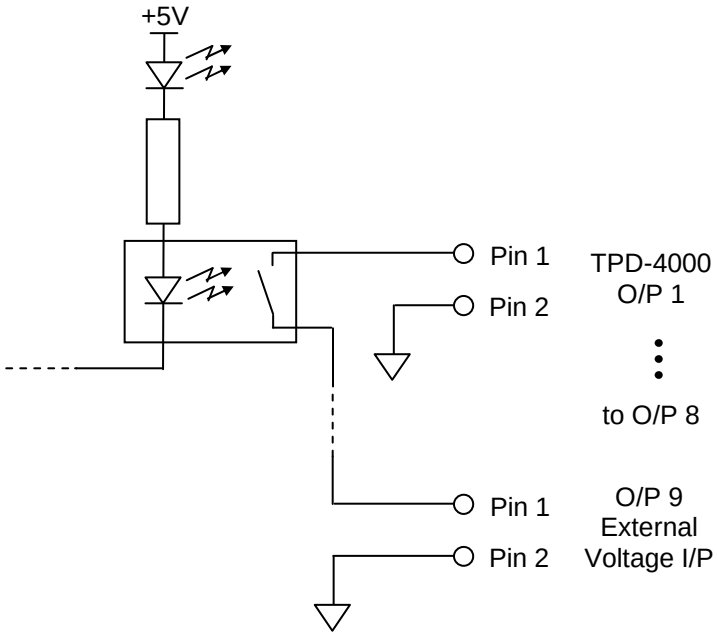
Input 9 pin 1 is for an external common voltage input. This is used in conjunction with LK1. Use of this requires special consideration. See *Technical Description* section for detailed explanation.

Outputs:

Outputs are used to control external devices that require simple switch operations.

Outputs 1 to 8 are each via separate 2-pin phoenix style connectors. Pin 1 is the active control output, whilst pin 2 is permanently connected to ground.

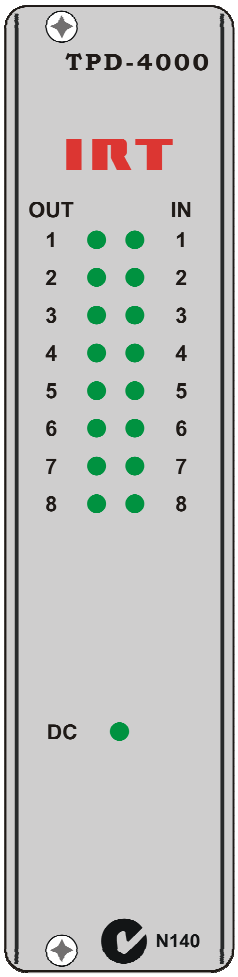
All outputs are commoned together and brought out by O/P 9 pin1. Pin 2 is connected to ground. For switch to ground applications, pin 1 of O/P 9 must be connected to pin 2 of O/P 9. Voltages other than ground can be connected to O/P 9 pin 1 to provide output voltage switching.



TPD-4000 Output Circuit

Front & Rear Panel Connector 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.



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 I.R.T. Communications 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.

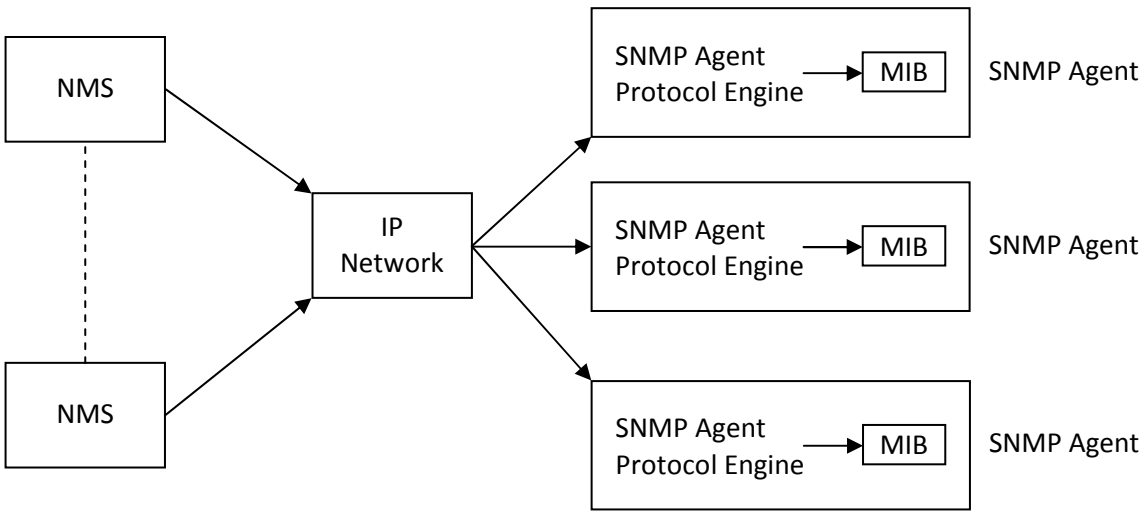
An *NMS* polls, or communicates with, an *agent*. An *agent* is a network management software module that resides in a *managed device*. An *agent* has local knowledge of management information and translates that information into a form compatible with SNMP. The *agent*, therefore, acts as an interface 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:

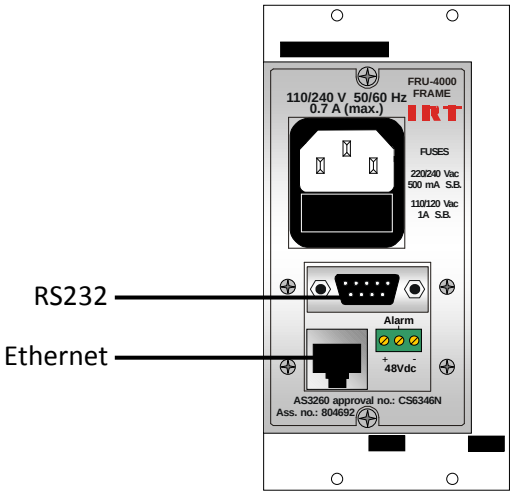
I.R.T. Communications currently employs SNMPv1 with its SNMP capable frames. The frame acts as an *agent* when fitted with a CDM-xxxx module. This module has its own designated slot next to the power supply so as to not affect the number of modules that the frame will take. Communication between the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

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.

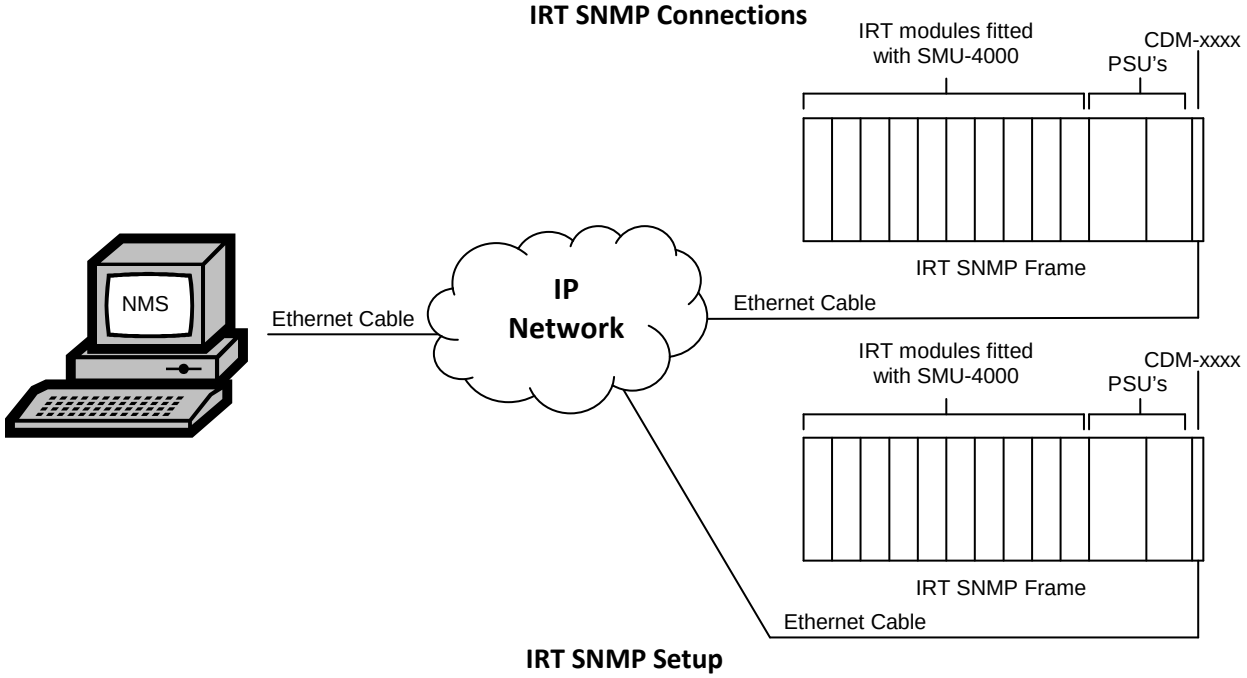
Frame parameters, such as Name, Address and Location, are set via an RS232 interface, a D9 connector on the rear of the frame below the mains inlet. A software terminal emulator, such as Tera Term or HyperTerminal, is used for setting and reading the parameters of the frame.

IRT modules that are SNMP compatible may need an optional plug-in SNMP 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-xxxx *agent* via a data bus on the rear of the frame. Thus the CDM-xxxx 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-xxxx *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 SNMP Setup

TPD-4000 SNMP Functions:

When used in an IRT FRU400 Frame with a CDM400 SNMP Module fitted, the TPD-4000 can be interrogated and controlled by an SNMP Network Management System (NMS).

SNMP Traps on alarm states can be optionally sent.

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

The Inputs can be individually named
The state of the Inputs, either on or off
The Outputs can be individually named
The state of the Outputs, either on or off
Trap Enable
Trap sent on change of Input state
Reset

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 directly. Details of IRT's direct address can be found at I.R.T. Communications' website.

Web address: www.irtcommunications.com

Email: sales@irtcommunications.com