



**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**

**Type MMM-4710 & MMX-4710**

**4 ASI to ASI**  
**Combiner / DeCombiner**

**Designed and manufactured in Australia**

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

**IRT Eurocard**  
**Type MMM-4710 & MMX-4710**  
**4 ASI to ASI**  
**Combiner / DeCombiner**  
**Instruction Book**

Table of Contents

Section	Page
Operational Safety	2
General Description	3
Technical Specifications	4
Configuration	5
Installation	6
Connections	7
Front and rear layouts	10
Maintenance & Storage	11
Warranty & Service	11
Equipment return	11

This instruction book applies to units later than S/N 0702001.

**Operational Safety:**

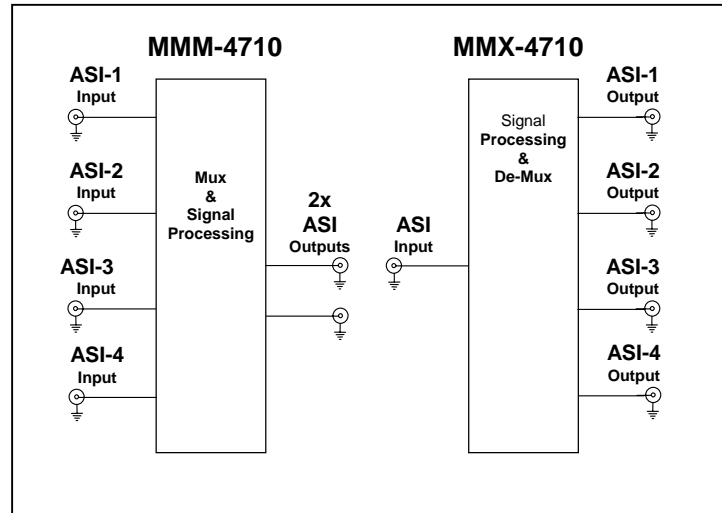
**WARNING**

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 MMM-4710 & MMX-4710**  
**4 ASI to ASI**  
**Combiner / DeCombiner**

**General Description**



The MMM-4710 and MMX-4710 are part of a family of data transcoders for converting between the commonly used MPEG2 Transport Stream formats for video distribution in the broadcast industry.

With the MMM-4710 up to four ASI signals can be combined together and converted into a single ASI signal with a settable output payload rate.

The sum of the ASI input payload rates can be anything up to 0.9 x the set ASI output payload rate. Inputs may be 188 or 204 byte packet lengths, burst or continuous, and may have energy dispersal scrambling, interleaving and/or Reed Solomon bytes included. An individual input may be up to 0.9 x the full set ASI output payload rate if the other inputs are unused.

The output ASI stream is a valid stream, which complies with all facets of ETR290.

Provided the total sum of the ASI inputs does not exceed 0.9 x the set output rate, units can be cascaded to increase the number of ASI inputs into a single ASI output.

The MMX-4710 separates the combined ASI signal back into the original four ASI signals (at their original rates and without any modification of the stream, or stream timing). If more than one MMM-4710 has been cascaded then the MMX-4710's cascade in the reverse order.

Inputs are automatically equalised for lengths of up to 250m of Belden 8281 or equivalent cable.

Front panel indication and relay alarm on the MMM-4710 transmitter shows if there is an input data rate violation. Corresponding alarm on the MMX-4710 receiver shows a loss of ASI input.

The MMM-4710 and MMX-4710 are designed to fit IRT's standard Eurocard frames and may be used alongside any other of IRT's analogue or digital Eurocards.

**Standard features:**

- **Up to 4 ASI streams on one ASI link**
- **Units may be cascaded to increase the number of ASI inputs**
- **Automatic Input equalisation up to 250m**
- **Recovers transmitted ASI signal without any added PCR jitter and with minimal user setup.**
- **Maintains original ASI rate, packet size & coding (energy dispersal scrambling, interleaving or Reed Solomon bytes)**
- **Eurocard format**
- **Suitable for Single Frequency Networks (SFN)**
- **Output format is valid ASI stream compliant with ETR290**

## Technical Specifications

### MMM-4710:

#### Inputs:

Type	4 x ASI-C 75Ω, 800 mVp-p, BNC connector.
Maximum Data Rate	Sum total less than 0.9 x selected output rate.

#### Output:

Type	2 x ASI-C 75Ω, 800 mVp-p, BNC connector, Continuous or Burst (settable).
Payload Rate	10 Mb/s; 34.368 Mb/s (equivalent to E3 rate); 44.736 Mb/s (equivalent to Unframed DS3 rate); 44.210Mb/s (equivalent to Framed DS3 rate); 80 Mb/s; 110 Mb/s; 148 Mb/s (suited for STM-1); and 213 Mb/s.
Switch Settable	

<b>Alarm Output:</b>	MAJOR	Open circuit on sum of ASI input payload rates in excess of set ASI output payload rate, or loss of power.
	MINOR	Open circuit on no valid input ASI streams present, or loss of power.

### MMX-4710:

#### Input:

Type	ASI-C 75Ω, 800 mVp-p, BNC connector. (Equivalent to MMM-4710 output rate).
------	---

#### Outputs:

Type	4 x ASI-C 75Ω, 800 mVp-p, BNC connector.
Data Rate	Same as MMM-4710 input rate.

<b>Alarm Output:</b>	MAJOR	Open circuit on no valid ASI input present, or loss of power.
	MINOR	Open circuit on no valid output ASI streams present, or loss of power.

#### Power Requirements

Power consumption	28 Vac CT (14-0-14) or ±16 Vdc. 6 VA.
-------------------	--

#### Other

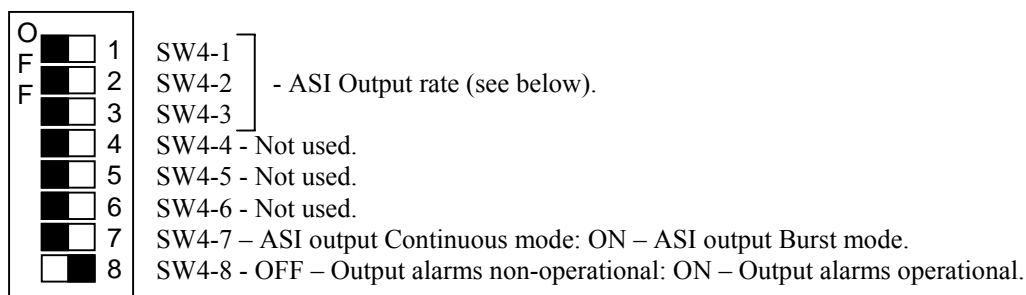
Temperature range	0 - 50° C ambient.
Mechanical	Suitable for mounting in IRT 19" rack chassis with input, output and power connections on the rear panel.
Finish	Grey, silk-screened black lettering & red IRT logo.
Front panel	Detachable silk-screened PCB with direct mount connectors to Eurocard and external signals.
Rear assembly	
Dimensions	6 HP x 3 U x 220 mm IRT Eurocard.

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

## Configuration

### MMM-4710:

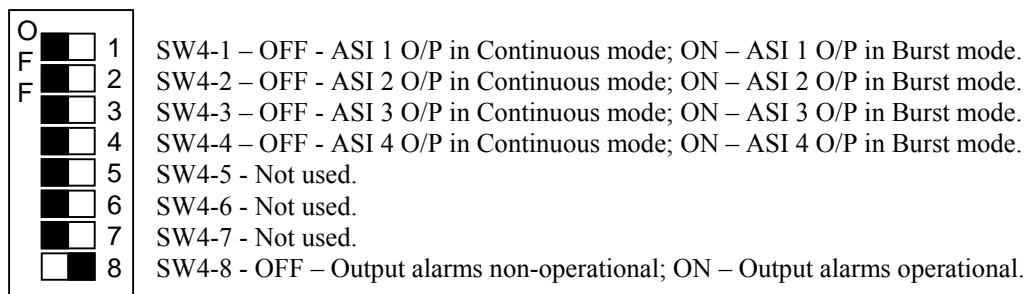
The only user settings on the MMM-4710 is on the DIP switch SW4 as shown below:



SW4-3	SW4-2	SW4-1	Output ASI Payload Rate
OFF	OFF	OFF	34.368 Mb/s (equivalent to E3 rate).
OFF	OFF	ON	44.736 Mb/s (equivalent to DS3 rate).
OFF	ON	OFF	44.210 Mb/s (equivalent to DS3 framed rate).
OFF	ON	ON	148 Mb/s (suited for STM-1).
ON	OFF	OFF	10 Mb/s.
ON	OFF	ON	80 Mb/s.
ON	ON	OFF	110 Mb/s.
ON	ON	ON	213 Mb/s (full rate).

### MMX-4710:

The only user settings on the MMX-4710 is on the DIP switch SW4 as shown below:



# 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.

## Connections:

### MMM-4710:

#### ASI Inputs:

Four ASI inputs each with any payload rate up to a maximum combined total payload of 0.9 x the settable ASI output payload rate (see *Configuration* section of this manual). That is,

$$\begin{aligned}\text{Combined Total Payload} &= \text{ASI 1 rate} + \text{ASI 2 rate} + \text{ASI 3 rate} + \text{ASI 4 rate} \\ &\leq 0.9 \times \text{Set Output Payload Rate}\end{aligned}$$

**WARNING:** If the total maximum input payload rate is exceeded, all ASI channels will be corrupted.

ASI inputs may be of 188 or 204 byte packet length, burst or continuous mode, and may have energy dispersal scrambling / interleaving and Reed Solomon bytes if desired. Streams with conditional access may also be passed.

ASI inputs are by BNC connectors each terminated in 75Ω. Input cable equalisation is automatic for up to 250m of high quality 75Ω coaxial cable (Belden 8281 or equivalent). No adjustments are required.

#### ASI Outputs:

Two identical ASI outputs are provided by BNC connectors with a 75Ω characteristic output impedance. The output ASI payload rate is set via a dual in line switch (SW4), see *Configuration* section of this manual. Only high quality 75Ω coaxial cable (Belden 8281 or equivalent) should be used. No adjustments are required, but cable must be terminated in 75Ω at the connected load.

#### Alarm Outputs:

Two relay alarm output states are provided via a phoenix style 4-pin plug. Pin 3 is designated as Major, pin 4 is designated as Minor, and both pins 1 & 2 are ground. Both alarms are referenced to ground.

Alarm conditions are as follows:

- Major switch to Open Circuit on sum of ASI input payload rates in excess of maximum allowable;
- Minor switch to Open Circuit on no valid input ASI streams present.
- Both Major and Minor alarms switch to Open Circuit on power failure.

Note that in order for alarms to operate, switch SW4-8 must be set to the ON position.

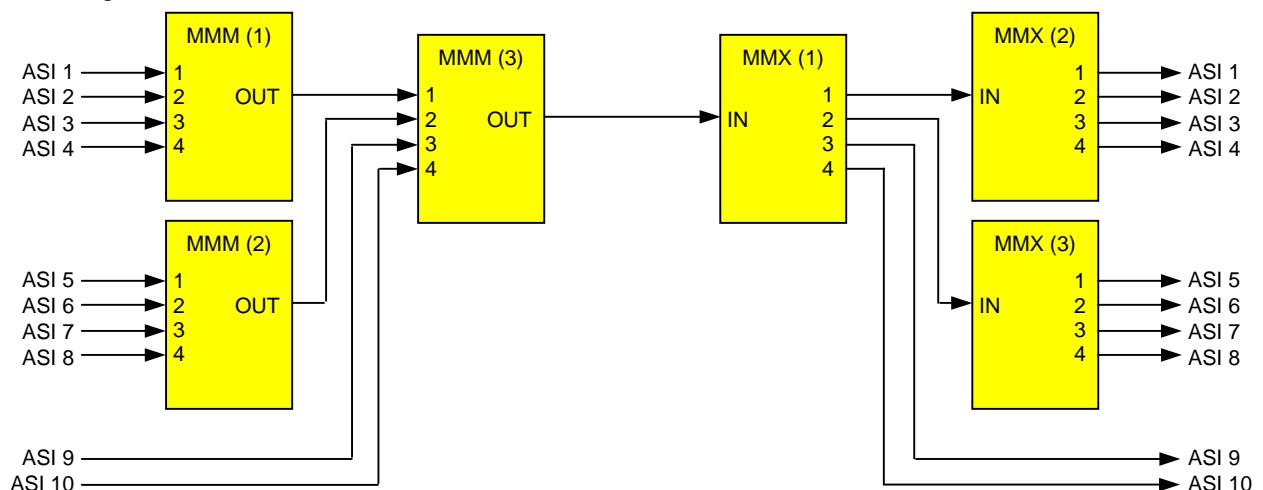
#### Cascading:

It is possible to cascade the output from one or more MMM-4710's into the inputs of another MMM-4710 provided the total sum of the ASI inputs of the final MMM-4710 does not exceed its set ASI output rate.

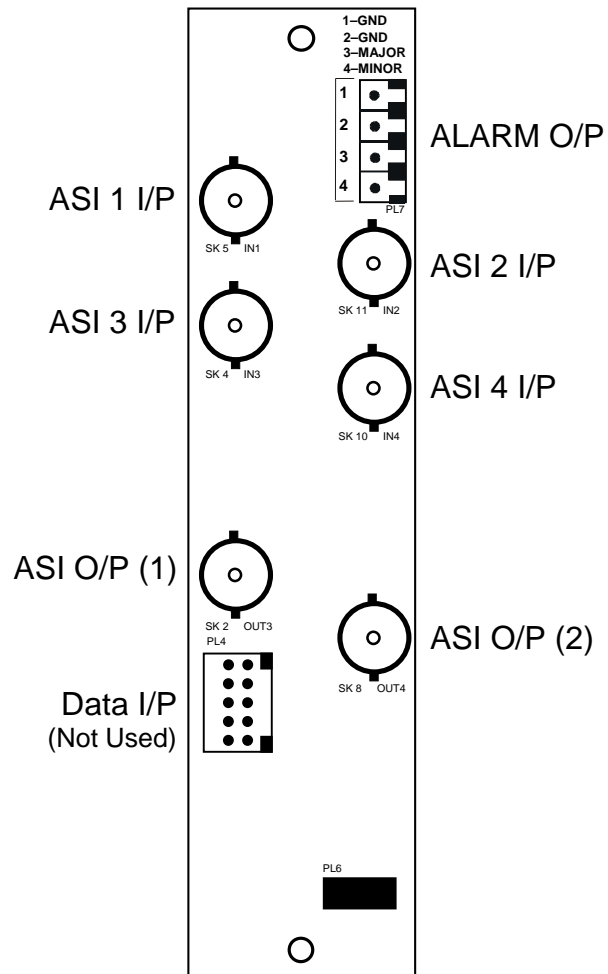
For example, it is possible to have, say, four 2Mb/s ASI streams combined together with one MMM-4710 with its output rate set to 10Mb/s and use this combined 10Mb/s ASI stream and feed it into one of the input ports of another MMM-4710, thus allowing more ASI streams to be combined at the output of the second MMM-4710. It is even possible to cascade this output into yet another MMM-4710, providing that the sum of the inputs into this unit does not exceed its set output ASI rate.

At the receiving end the MMX-4710's are arranged in the reverse order to give the original ASI streams.

For example:



# MMM-4710 Rear Assembly Connections





## MMX-4710:

### ASI Input:

The ASI input port on the rear assembly is a 75Ω terminated BNC connector for an MMM-4710 encoded signal only. Use of high quality 75Ω coaxial cable (Belden 8281 or equivalent) is recommended.

### ASI Outputs:

Four ASI outputs are provided as 75Ω output BNC connectors. Each ASI output has a payload rate and packet size equivalent to the corresponding ASI input on the matching MMM-4710. Each ASI output may be configured as either burst or continuous mode. Switch SW4-1 sets ASI 1 output mode, switch SW4-2 sets ASI 2 output mode, switch SW4-3 sets ASI 3 output mode and switch SW4-4 sets ASI 4 output mode. With the switch position OFF the ASI output is in Continuous mode. With the switch position ON the ASI output is in Burst mode.

### Alarm Outputs:

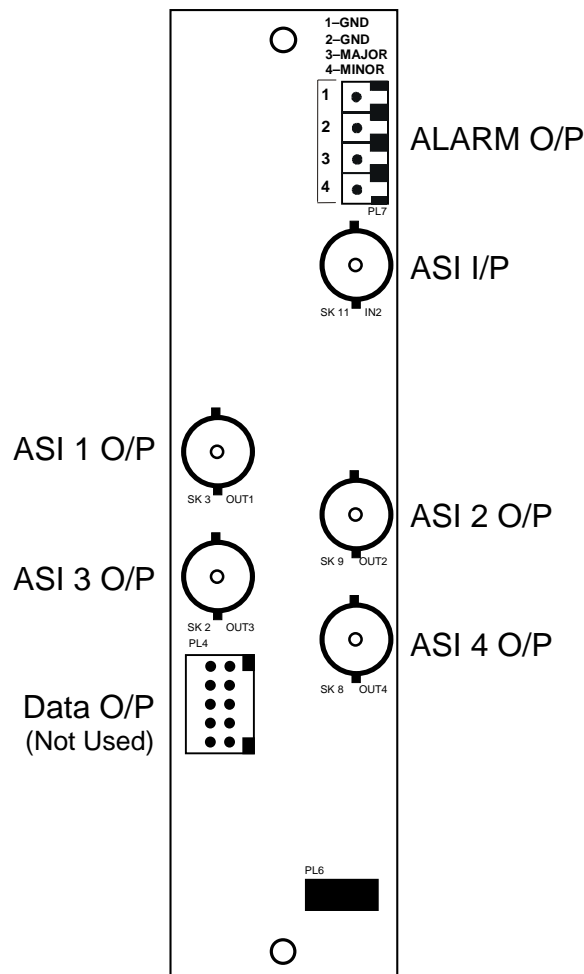
Two relay alarm output states are provided via a phoenix style 4-pin plug. Pin 3 is designated as Major, pin 4 is designated as Minor, and both pins 1 & 2 are ground. Both alarms are referenced to ground.

Alarm conditions are as follows:

- Major switch to Open Circuit on no valid ASI input present;
- Minor switch to Open Circuit on no valid output ASI streams present.
- Both Major and Minor alarms switch to Open Circuit on power failure.

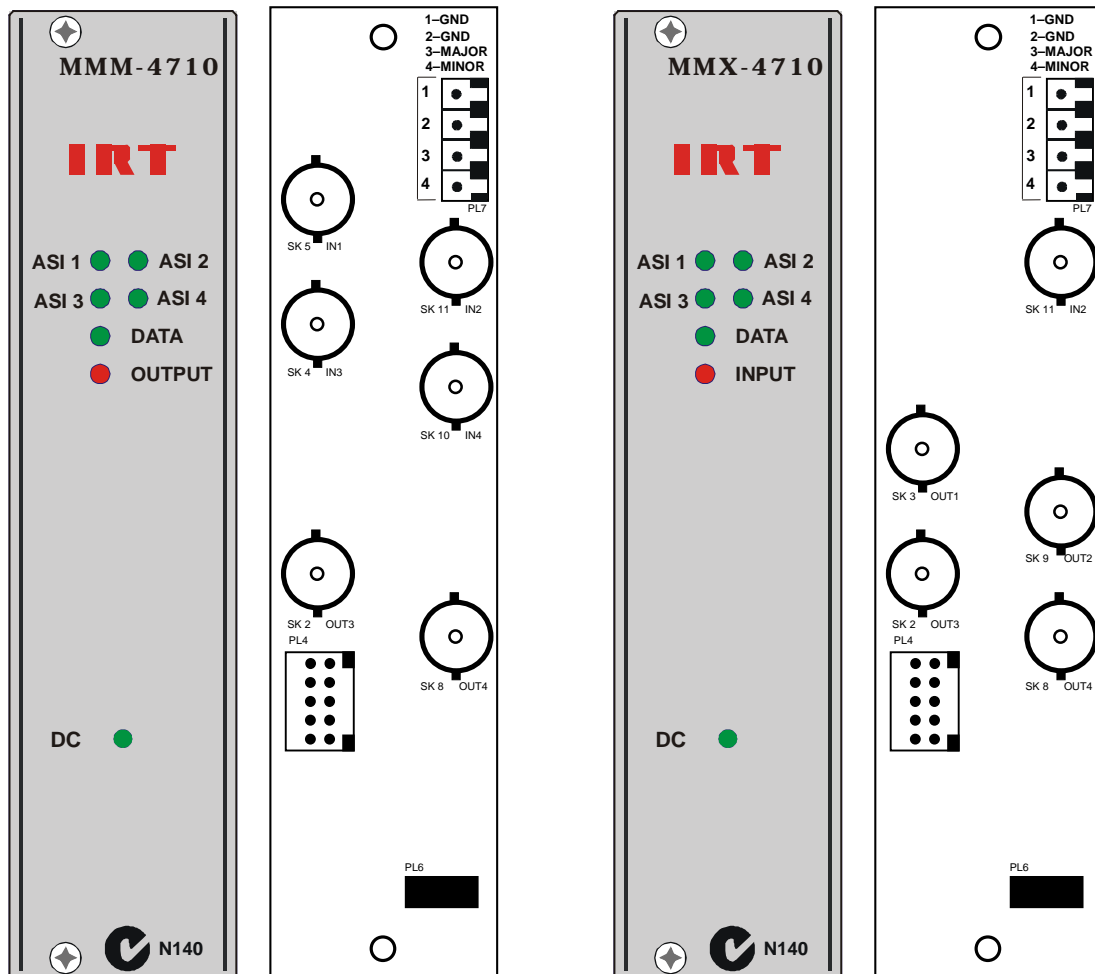
Note that in order for alarms to operate, switch SW4-8 must be set to the ON position

## MMX-4710 Rear Assembly Connections



## 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  
Email: [service@irtelectronics.com](mailto:service@irtelectronics.com)

Fax: 61 2 9439 7439