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IRT Eurocard

Type MMM-4680 (Iss. 2) & MMX-4680 (Iss. 2)

4 ASI to STM-1
Combiner / DeCombiner

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 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-4680 (Iss. 2) & MMX-4680 (Iss. 2)
4 ASI to STM-1
Combiner / DeCombiner

General Description
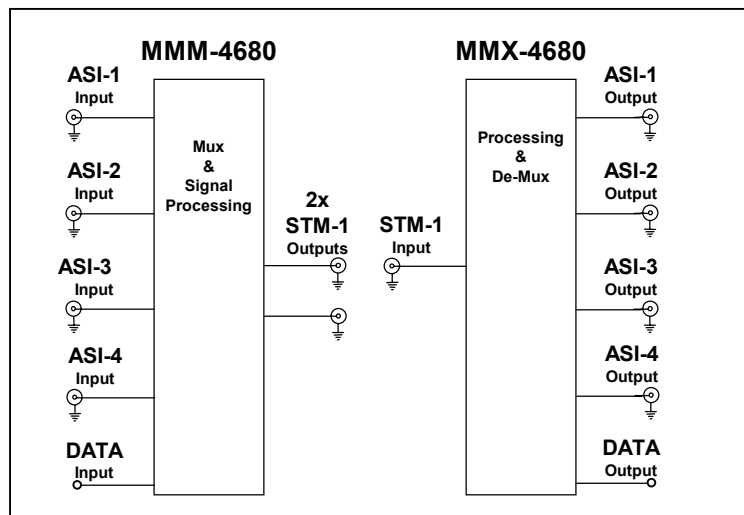
The MMM-4680 (Iss. 2) and MMX-4680 (Iss. 2) are part of a family of data transcoders for converting between the commonly used MPEG2 Transport Stream formats for video distribution in the broadcast industry.

With the MMM-4680 (Iss. 2) up to four ASI and one RS232 data signal can be combined together and converted into a 155Mb/s G.703 (STM-1) electrical signal.

The sum of the ASI input payload rates can be anything up to 148 Mb/s. Inputs may be 188 or 204 byte packet length, burst or continuous, and may have energy dispersal scrambling, interleaving and/or Reed Solomon bytes included. An individual input may be up to 148Mb/s if the other inputs are unused.

The MMX-4680 (Iss. 2) separates the 155 Mb/s G.703 signal back into the original four ASI signals (at their original rates) and the RS232 data signal. The ASI outputs are suitable for Single Frequency Network use, in that there is no data rate conversion or PCR restamping of the ASI streams.

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

RS232 uni-directional data may also be sent on the same link. It can pass rates up to 38kb/s with any combination of start/stop & parity bits. The data rate does not affect the payload available for the ASI streams.

Front panel indication and relay alarm on the MMM-4680 (Iss. 2) transmitter shows if there is an input data rate violation. Corresponding alarm on the MMX-4680 (Iss. 2) receiver shows a loss of STM-1 input.

The MMM-4680 (Iss. 2) and MMX-4680 (Iss. 2) are designed to fit IRT's standard Eurocard frames as well as IRT's 4000 series frame for use with IRT's SNMP system and may be used alongside any other of IRT's analogue or digital Eurocards.

Standard features:
- **Up to 4 ASI and 1 Data stream on one 155 Mb/s (STM-1) G.703 link**
- **Automatic Input equalisation up to 250m**
- **Suitable for Single Frequency Network (SFN) use**
- **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**

Technical Specifications

MMM-4680:

Inputs:

Type 1	4 x ASI-C 75Ω, 800 mVp-p, BNC connector.
Maximum Data Rate	Combined 148 Mb/s
Type 2	RS232 Uni directional data input.

Output:

Type	1 x G.703, 75Ω BNC connector.
Electrical Characteristics	CMI encoded.
Data Rate	155.52 Mb/s.

Alarm Output:

Alarm Output:	MAJOR	Open circuit on sum of ASI input payload rates in excess of maximum allowable 148Mb/s, or loss of power.
	MINOR	Open circuit on no valid input ASI streams present, or loss of power.

MMX-4680:

Input:

Type	1 x G.703, 75Ω BNC connector.
Electrical Characteristics	CMI encoded.
Data Rate	155.52 Mb/s.

Outputs:

Type 1	4 x ASI-C 75Ω, 800 mVp-p, BNC connector.
Data Rate	same as MMM-4680 input rate.
Type 2	RS232 Uni directional data output.

Alarm Output:

Alarm Output:	MAJOR	Open circuit on no valid STM-1 input present, or loss of power.
	MINOR	Open circuit on no valid output ASI streams present, or loss of power.

Power Requirements

Power Requirements	28 Vac CT (14-0-14) or ±16 Vdc.
Power consumption	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	Front panel	Grey, silk-screened 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.

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

Configuration

MMM-4680 (Iss. 2):

The only user settings on the MMM-4680 (Iss. 2) is on the DIP switch SW4 as shown below:

SW4-1 - Not used.
SW4-2 - Not used.
SW4-3 - Not used.
SW4-4 - Not used.
SW4-5 - Not used.
SW4-6 - Not used.
SW4-7 - Not used.
SW4-8 - OFF – Output alarms non-operational: ON – Output alarms operational.

MMX-4680 (Iss. 2):

The only user settings on the MMX-4680 (Iss. 2) is on the DIP switch SW4 as shown below:

SW4-1 – OFF - ASI 1 O/P in Continuous mode; ON – ASI 1 O/P in Burst mode.
SW4-2 – OFF - ASI 2 O/P in Continuous mode; ON – ASI 2 O/P in Burst mode.
SW4-3 – OFF - ASI 3 O/P in Continuous mode; ON – ASI 3 O/P in Burst mode.
SW4-4 – OFF - ASI 4 O/P in Continuous mode; ON – ASI 4 O/P in Burst mode.
SW4-5 - Not used.
SW4-6 - Not used.
SW4-7 - Not used.
SW4-8 - OFF – Output alarms non-operational; ON – Output alarms operational.

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-4680 (Iss. 2):
ASI Inputs:
Four ASI inputs each with any payload rate up to a maximum combined total payload of 148 Mb/s. That is,

Total payload (148Mb/s maximum) = ASI 1 rate + ASI 2 rate + ASI 3 rate + ASI 4 rate

WARNING: If the total maximum 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 scrambling / interleaving and Reed Solomon bytes if desired.

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.

STM-1 Outputs:
Two identical STM-1 outputs are provided by BNC connectors with a 75Ω characteristic output impedance. 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 148Mb/s;
        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.
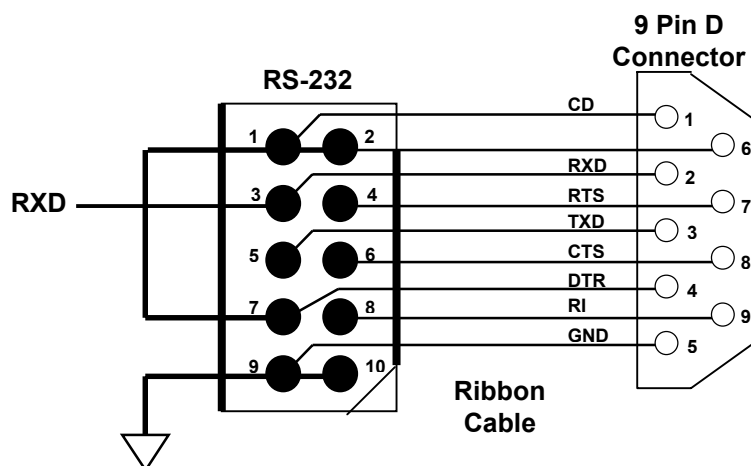
MMM-4680 (Iss. 2)
Rear Assembly Connections
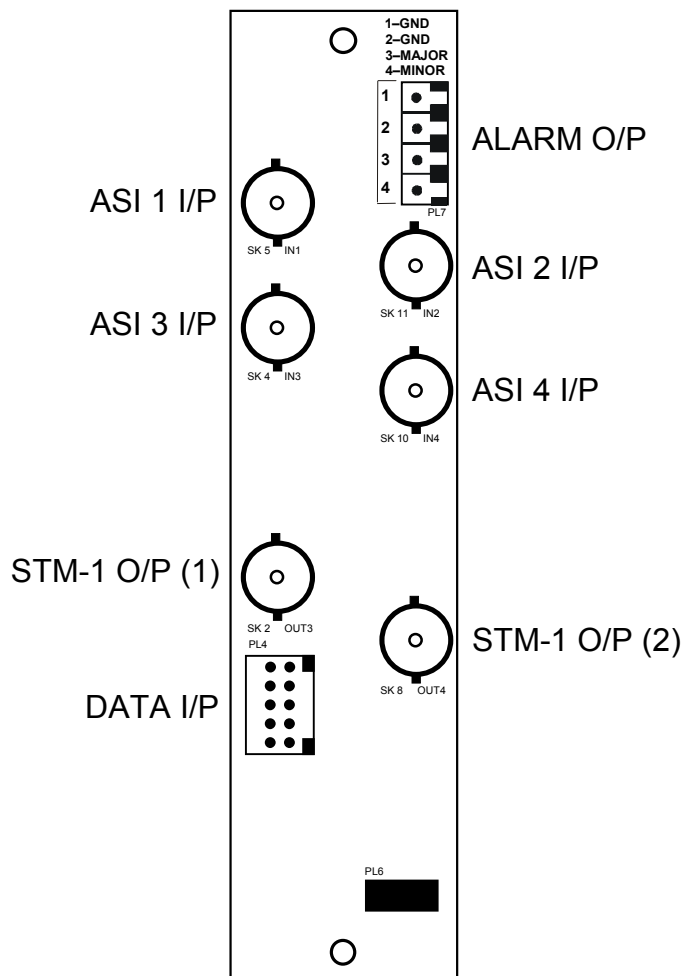
RS-232 Data Input:
The RS-232 data input port is via a 10 pin HE14 style of header. Pins 1, 2 and 7 are connected together on the PCB. Pins 9 and 10 are both earthed. Pin 3 is the RS-232 *receive data* (RXD) connection. Data rates may be up to 38k4 Baud. Note that data transfer is unidirectional only, i.e. there is no direct data return path.

For connection to a standard RS-232 9 pin D connector, wire as per the diagram below:

MMX-4680 (Iss. 2):

STM-1 Input:

The STM-1 input port on the rear assembly is a 75Ω terminated BNC connector for an MMM-4680 (Iss. 2) 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-4680 (Iss. 2). 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 STM-1 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-4680 (Iss. 2)
Rear Assembly Connections
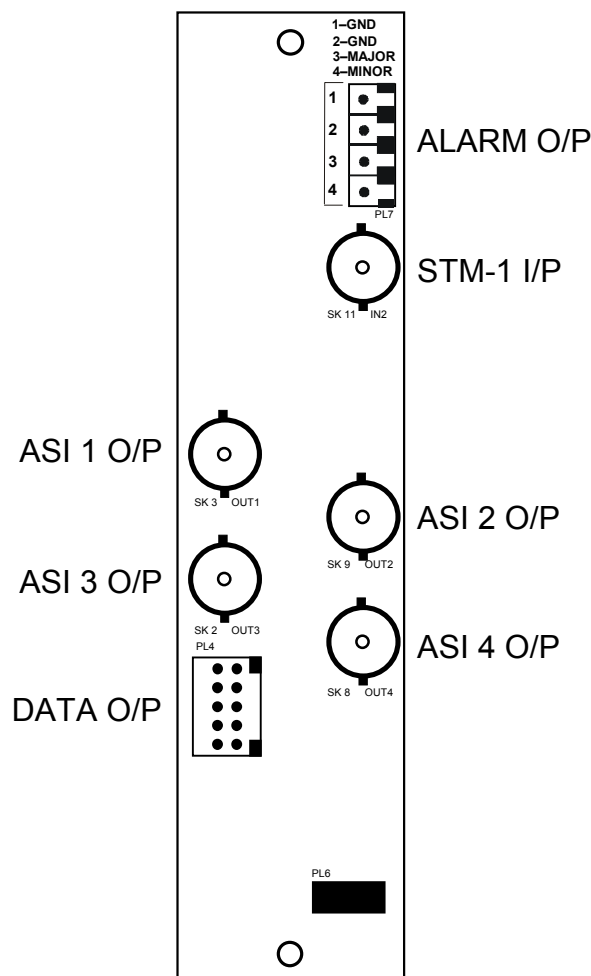
RS-232 Data Output

The RS-232 data output port is via a 10 pin HE14 style of header. Pins 1, 2 and 7 are connected together on the PCB. Pins 9 and 10 are both earthed. Pin 5 is the RS-232 *transmit data* (TXD) connection. Data transfer is unidirectional only, this is a receive path only.

For connection to a standard RS-232 9 pin D connector, wire as per the diagram below:
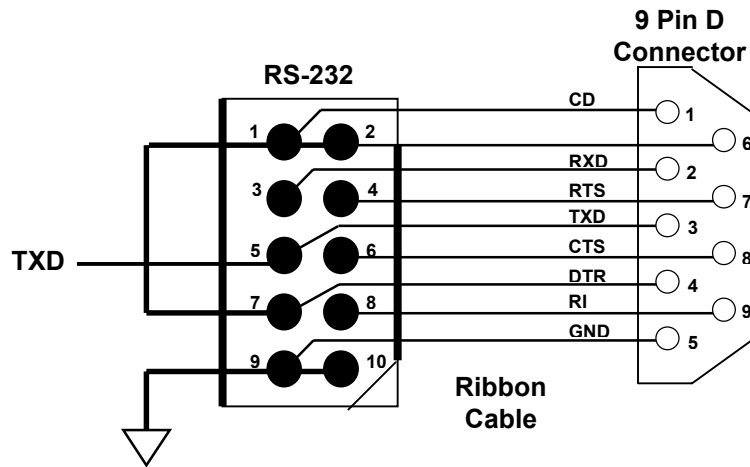
Front & rear panel connector diagrams

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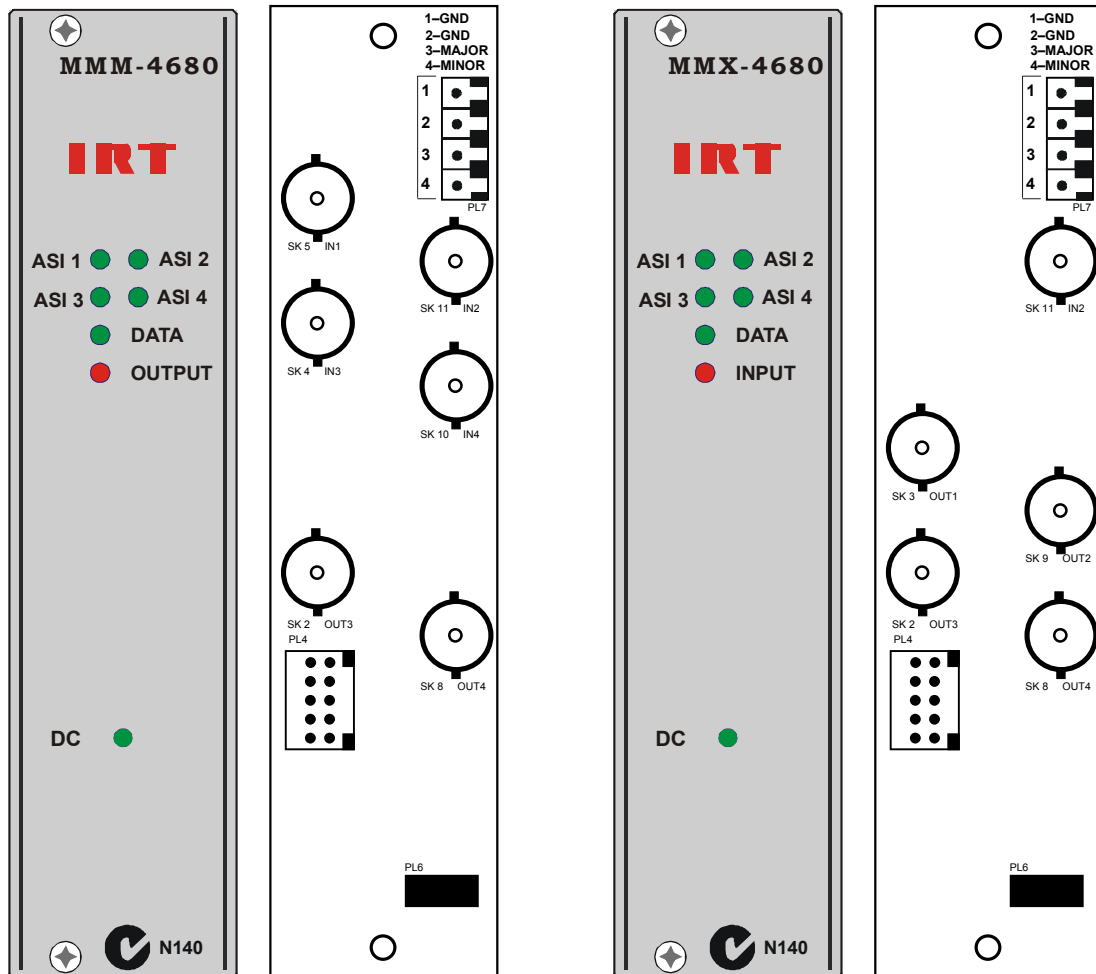
Maintenance & Storage

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
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