HPX-1600
USER GUIDE

Chapter 2-12:
HPX-IM-1672
Dual Ethernet IM

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1. GENERAL CHARACTERISTICS

The Dual Ethernet IM (HPX-IM-1672) is a dual channel 10/100Mbit/s device must be installed only with an Ethernet-Mapper (HPX-1600-MAP-8E) in a HPX-1600-SS. The Dual Ethernet IM allows an Ethernet LAN to be extended over a trunk or WAN. Access to the IM is made via a standard RJ-45 connection. The RJ45 ports of the IM are auto detected then cable or crossover cable can be used for connection.

The Ethernet IM LAN interface can be configured to auto-sense or set to full or half duplex, 10Mbps or 100Mbps connected network devices. The IM should always be connected as a pair of devices connected by a wide area network trunk.

Figure 1: Dual Ethernet IM

Mixed LAN interfaces can be used with one IM operating at 100Mbps and the other IM of the pair at 10Mbps. The Ethernet IM provides a bridged, LAN protocol independent solution that requires minimal configuration and self learns the locally connected LAN devices. The WAN interface of the Ethernet IM conforms to:

- ITU standard X.86: Link Access Procedure: SDH (LAPS)
- ITU standard G.7041 Generic Framing Procedure (GFP)
- PPP

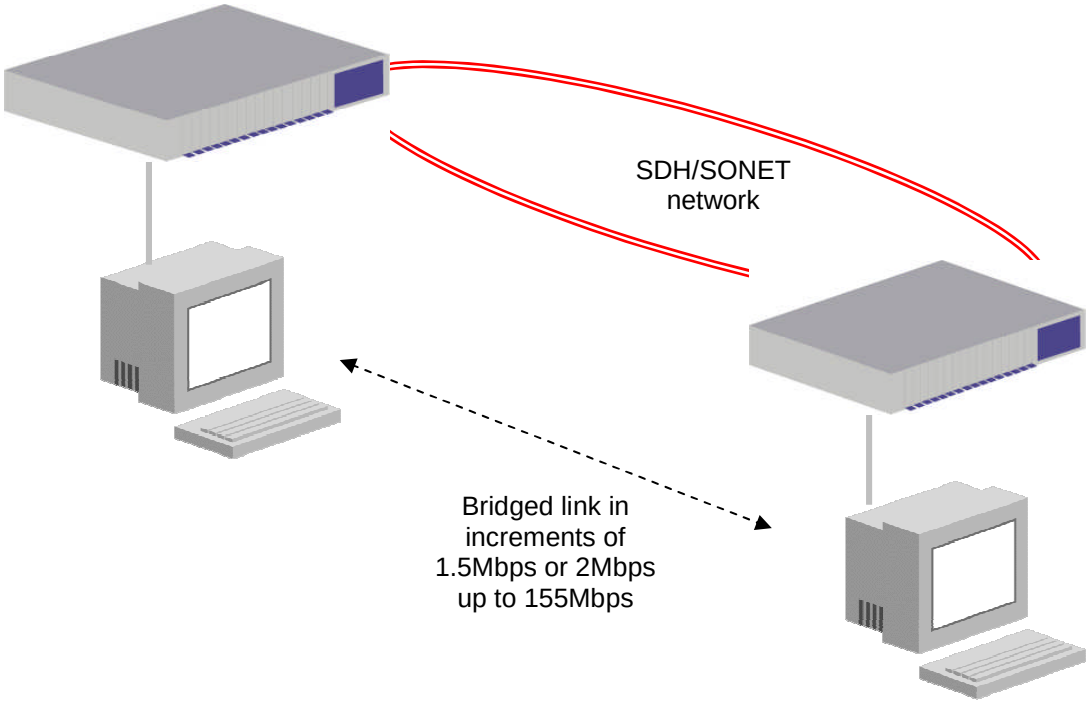


Figure 2: Dual Ethernet IM LAN Bridge Application

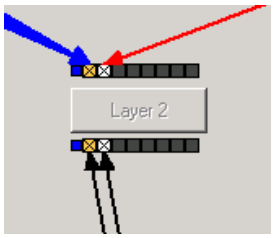
2. IM CONFIGURATION

The Dual Ethernet Interface Modules must be installed with the Ethernet Mapper. The Ethernet interface configuration is managed by the Ethernet Mapper. One Ethernet Mapper supports up to 4x Dual port Ethernet interface modules. Only one Ethernet Mapper is supported in each HPX-1600-SS.

The Ethernet Mapper supports GFP, and X.86 (LAPS) framing, VCAT and LCAS bandwidth management.

Bandwidth granularity is supported as low as VC11, VT1-5 (T1) and as multiples of STS-1 and VC3.

The Ethernet Mapper is configured from the SDH cross connect Window and represented by text "Layer 2" Bounded above and below by eight connection boxes.



The upper connection boxes represent the WAN (SDH/SONET) interface and can be connected to one or more VCGs. Please refer to Chapter 3-7.

The lower connection boxes represent the LAN interface and may only be connected to the Dual Ethernet Interface Module HPX-IM-1672.

Figure 3: Ethernet Mapper

The LAN side parameters are configured by a "double-click" on the selected lower LAN connection box. This displays the associated properties for the LAN interface, or by clicking on any of the Ethernet port buttons at the main screen.

Port Enable, switches on the port for use.

Connection offers the administrator the choice of Auto configuration or selecting fixed port rate and mode options.

If using "Auto Negotiate", Haliplex recommend that the attached third party Ethernet devices also be configured for "Auto Negotiate".

The remaining configuration options are greyed out if not supported by the installed Ethernet Mapper hardware.

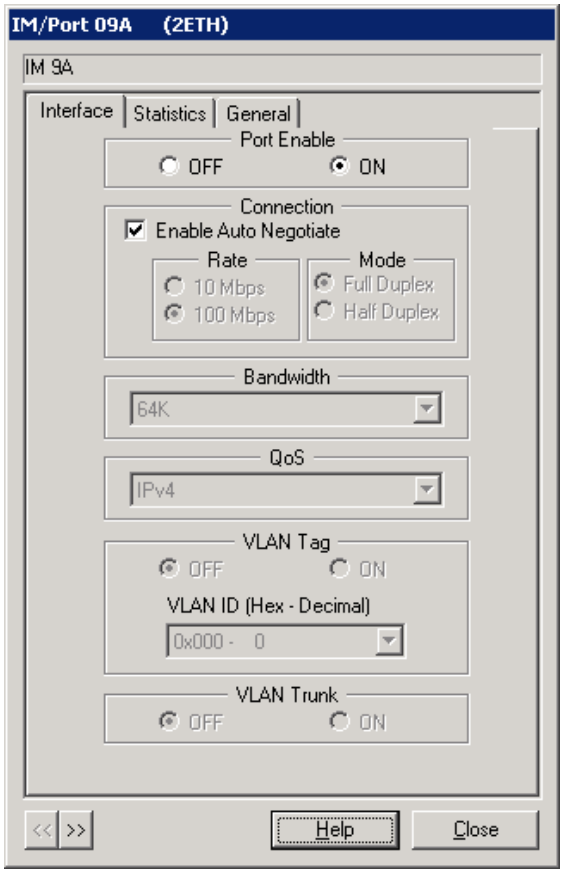


Figure 4: Ethernet Mapper properties

3. IM ALARMS

The Alarm section is used to set the alarm conditions to the desired priority. The alarms are set to activate between 5 and 6 seconds after the event.

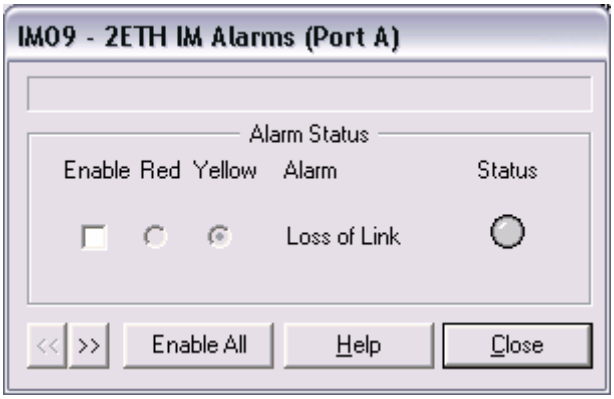


Figure 5: Ethernet IM Alarm Monitor Setup Window

A **Loss of Link** alarm is used to show when the Ethernet signal is present. An Ethernet IM will detect either a 10 or 100 Mbit/s connection to another port configured as a switch.

4. LED INDICATORS

Each Ethernet IM has two alarm indication LEDs for each of the “A” and the “B” port.
The LED interpretations are summarised below in Table 1.

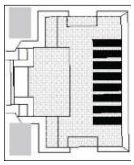
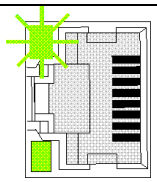
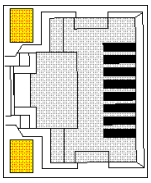
RJ45 LED Display		**Interpretation**
	All LEDs off	**IM is off** **Or** **LAN not connected**
	Top LED flashing– green Bottom LED - Green	**Receiving or Transmitting packet** **LAN connected**
	Yellow Yellow	**Firmware loaded waiting for Configuration files to be loaded**

Table 1: Dual Ethernet IM LED Interpretations

5. INTERFACE SPECIFICATIONS

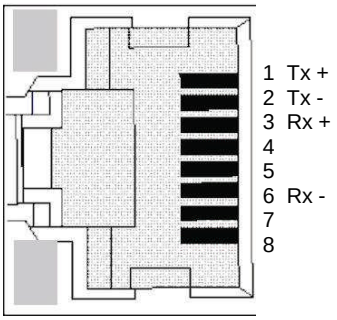


Figure 6: RJ45 pin outs

IM connector	RJ-45 connector configured as a NIC
Link Speed	10/100 Mbit/s (Half or Full duplex and auto-negotiation)
Trunk Speed	n x T1, E1, E3 or DS3, where n = 1, . . 63
Power Consumption	~3W
Alarm Monitoring	Loss of Link and Loss of WAN link
Indicator LEDs	LED indicators show the link status, WAN status, Tx/Rx, and firmware upgrade status
Bridging function	Has capacity to learn up to 1024 MAC addresses with automatic aging and purging
Standards	IEEE802.3
WAN protocol	Complies with ITU-T X.86(LAPS) and ITU G.7041 GFP

Table 2: Interface Specifications

RJ45 pin #	Signal name	Signal name	RJ45 pin #
1	Tx +	Rx +	1
2	Tx -	Rx -	2
3	Rx +	Tx +	3
6	Rx -	Tx -	6

Table 3: Ethernet patch cable - IM to hub/switch

RJ45 pin #	Signal name	Signal name	RJ45 pin #
1	Tx +	Rx +	3
2	Tx -	Rx -	6
3	Rx +	Tx +	1
6	Rx -	Tx -	2

Table 4: Ethernet Cross over patch cable - IM to PC (NIC)

6. INTERNATIONAL COMPLIANCES

All HPX-1600 products have achieved the following international compliances;

- CE
- A Tick
- C Tick
- FCC part 15 class B
- UL

FCC COMPLIANCE STATEMENT

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE:
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures

- *Reorient or relocate the receiving antenna*
- *Increase the separation between the equipment and the receiver*
- *Connect the equipment into an outlet on a circuit different from that to which the receiver is connected*
- *Consult the dealer or an experienced radio/TV technician for help*

Warning: *Any changes or modifications not expressively approved by Haliplex Pty Ltd could void the user's authority to operate this equipment.*

6.1. ELECTROMAGNETIC COMPATIBILITY (EMC)

- CISPR 22 class B
- EN55022
- FCC part 15 class B
- AS/NZS3548
- EN300386-1

6.2. SAFETY

- IEC60950, UL60950, and AS-NZ60950:2000 for General safety

6.3. IMMUNITY

- EN61000-4-2
- EN61000-4-3
- EN61000-4-4
- EN1000-4-5
- EN1000-4-11