



Haliplex
Communication Systems

HPX-1600 USER GUIDE

**Chapter 2-8:
HPX-IM-1610
HSF IM**

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1. GENERAL CHARACTERISTICS

The High-Speed Fibre (HSF) Interface Module (IM) allows an HPX-1600-SS to connect to a peer HPX-1600-SS or a cascaded HPX-100 CPE over a fibre optic link. It can carry up to 16 asynchronous E1/T1 circuits over single mode fibre plant and can operate at to 65Mbps.

The standard IM is a 1310nm type which can transmit up to 50km depending on the fibre plant. HSF IMs can be installed in IM slots 01 to 14 on the HPX-1600-SS. If a HSF is installed in an IA chassis, the HSF is soft configured to operate as a LSF.



Figure 1: HSF IM

1.1. FIBRE INTERFACE OPTIONS

The high Speed Fibre IM is available with a wide range of alternative fibre optic interfaces that are specified at the point of factory order. The following table summarises the possible options and permissible combinations of fibre interface.

Mode	Connector	Wavelength		Product Definition Suffix
		Tx	Rx	
Single Mode	SC/PC	1310nm	1310nm	-SM-SC-13
			1550nm	-SM-SC-SF1
		1550nm	1310nm	-SM-SC-SF2
			1550nm	-SM-SC-15
	FC/PC	1310 Tx & Rx		-SM-FC-13
		1550 Tx & Rx		-SM-FC-15

Table 1 - Interface Options

The standard module operates at 1310nm with separate transmit and receive fibres. The range of this two fibre module can be extended with the factory fitted optional 1550nm optical module. Where only a single fibre exists, the WDM single fibre optic module option may be ordered. These single fibre modules must be installed in matched pairs (SF1 & SF2) so that transmission in one direction is at 1330nm and the return direction is at 1550nm. The maximum transmission of the single fibre module is as for the 1310nm module.

Option code	Description	Wavelength (nm)		Fibre Type (um)	Tx Power (dBm)	Rx Sensitivity (dBm)	Typ Max Range (Km)
		Tx	Rx				
13	1310nm Fibre Optic transmit and receive (2 fibres)	1310	1310	9/125	0 to -5	-36	50
15	1550nm Fibre Optic transmit and receive (2 fibres)	1550	1550	9/125	0 to -5	-36	100
SF1	Single Fibre transmit 1310nm & receive 1550nm (WDM)	1310	1550	9/125	0 to -5	-36	50
SF2	Single Fibre transmit 1550nm & receive 1310nm (WDM)	1550	1310		0 to -5	-36	

Table 2: Fibre Optic max range

2. IM CONFIGURATION

The IM configuration dialog has configuration tabs as discussed below.

2.1. INTERFACE PARAMETERS

The Interface Tab indicates the settings of the HSF IM and allows the user to configure the mode from E1 to T1.

2.1.1. SETTINGS

Under the settings, the type of connector of the HSF IM along with the transmitting and receiving wavelengths are displayed. The mode in use is Single Mode Fibre (SMF).

2.1.2. MODE

The Mode allows the HSF IM to be interchangeable to connect to an E1 or T1 payload within either an SDH or SONET trunk type. The user can select which mode to operate in and is set when a connection within the cross connect has been made and installed. Once the mode is set it cannot be changed unless the cross connections to the Tributary are deleted and the new changes have been installed. In T1 mode, a connection can be made to an E1 or a T1 payload, when in E1 mode it can only be connected to an E1 payload.

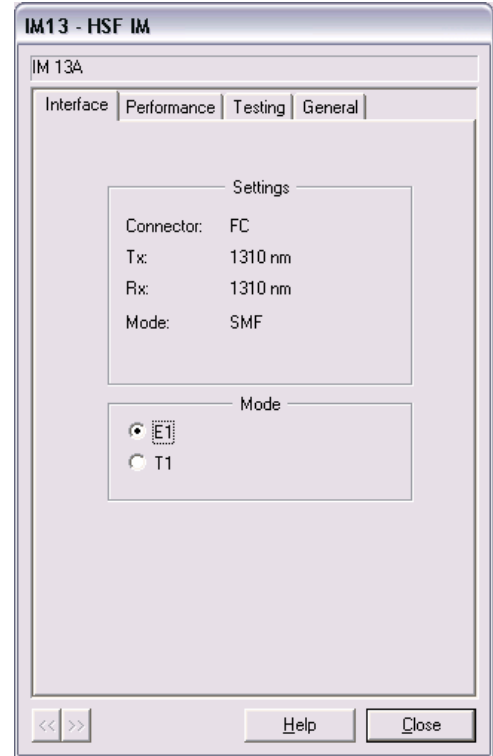
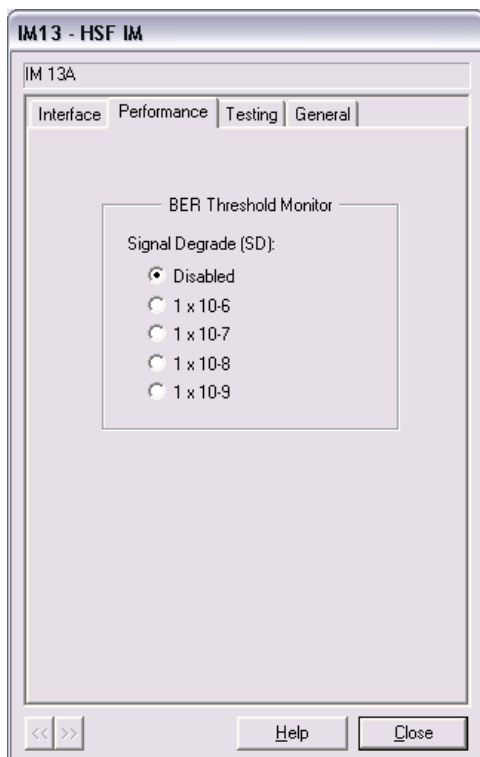


Figure 2: HSF IM Configuration Dialog Interface Tab

2.2. PERFORMANCE PARAMETERS



BER Threshold Monitor

Signal Degradation (SD)

Select the signal degradation bit error to trigger SD alarm.

Figure 3: HSF IM Configuration Dialog Performance Tab

2.3. TESTING PARAMETERS

The testing tab allows the user to select Line, Equipment Loopback, Line and Equipment of no loopback. Refer to section 3 for further details.

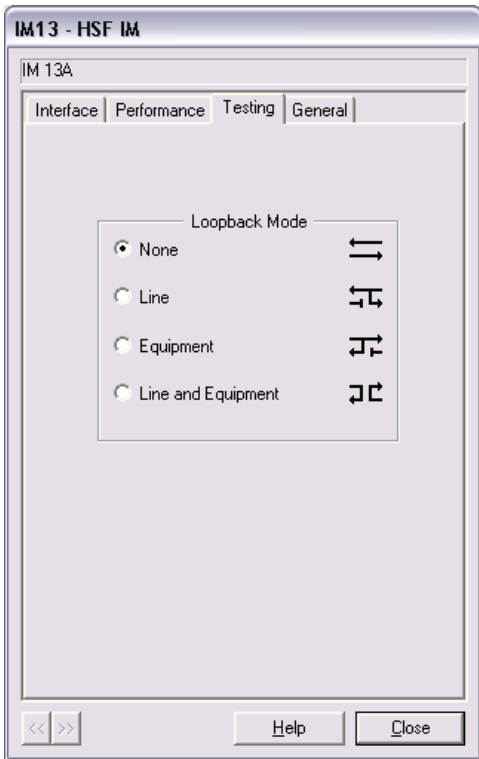


Figure 4: HSF IM Configuration Dialog Testing Tab

3. IM TESTING

The HSF IM has no loopback selected as the default setting for normal IM operation. However, for testing purposes, one of three loopback options can be set. The three available loopback options are illustrated below in Figure 5.

- Line loopback
 - Data is sent through the IM connectors to the backplane and loops back to the IM connector, whilst the data sent from the backplane through the IM is dropped.
- Equipment loopback
 - Data is sent through the backplane to the IM connector and loops back to the backplane, whilst the data sent from the IM connector is dropped.
- Line and Equipment loopback
 - Data that is sent through the IM connector loops back out to the IM connector. Data that is sent from the backplane through the IM is looped back out to the backplane.

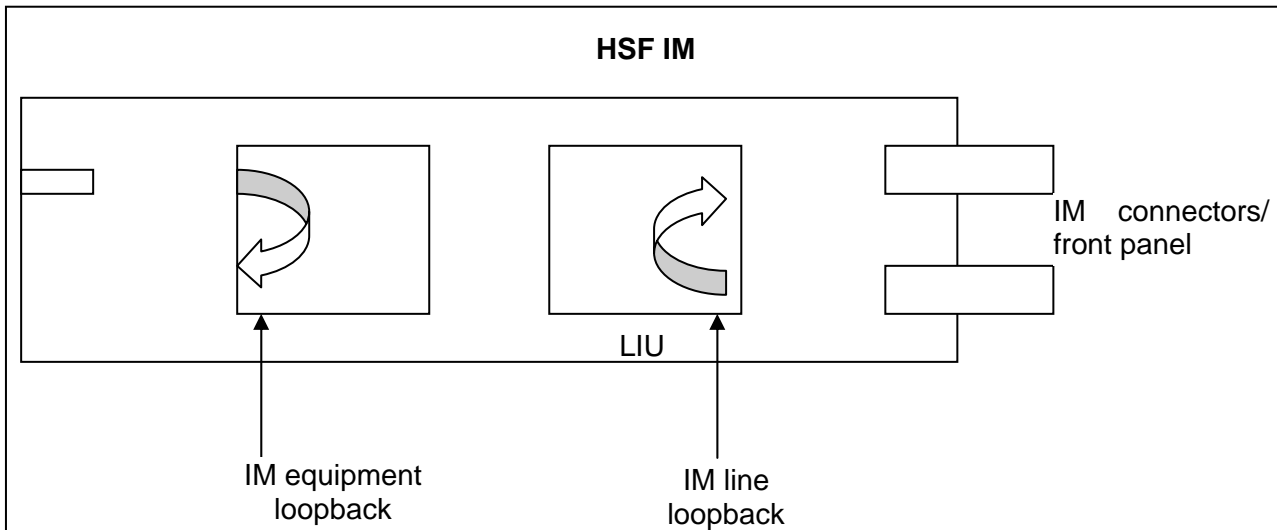


Figure 5: HSF IM loopback options

4. IM ALARMS

The alarms available on the HSF IM are:

- LOS – Loss of signal
- LOF – Loss of framing
- SD – Signal degrade

The IM alarm monitor setup window for the HSF IM is shown in Figure 6.

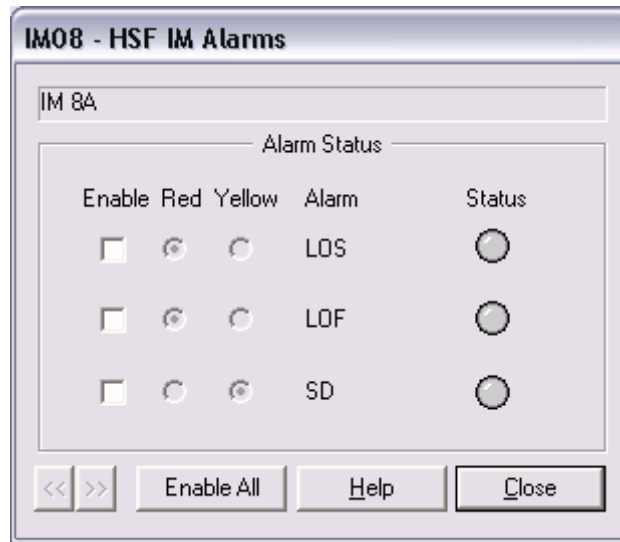


Figure 6: HSF IM Alarm Monitor Setup Window

LOS

The LOS alarm is set if the node identifies a loss of signal. If there is a LOS, all the other options are irrelevant.

LOF

The LOF alarm is set if the node identifies a loss of framing. For a LOF to occur there must be a signal.

SD

The SD alarm is set on a signal degrade. A signal degrade is detected within the frame aligner signal, this knows what the error-free frame should be and if the frame alignment detects an error in the frame it identifies as the frame payload having errors. The SD BER Threshold can be configured in the Performance TAB of the IM Configuration Dialog. Refer to Section 2.2 for further details.

5. IM INDICATORS

The Fibre Optic IM is available in several variants, which all use a common front panel display. There is a single LED, which displays the status of the fibre optic trunk. When the IM is synchronised over an optical trunk with a peer fibre optic IM the LED is illuminated Green. Failure of synchronisation or Loss of Signal will cause the LED to show RED.

**Any alarm condition is latched and displayed for 15 seconds.
Therefore the optic link may be up and operational but still displaying an alarm.**

Table 3 shows the alarm states indicated by various LED displays.

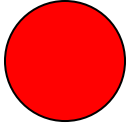
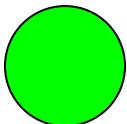
	<p>Red LED steady or flashing: Loss of signal Loss of synchronisation</p>
	<p>Green LED Steady = Optic Fibre Trunk is synchronised with peer system interface Flashing = Receiver Synchronised, but slipping</p>

Table 3: HSF IM LED Interpretations

6. IM CONNECTOR

Some of the Fibre Optic IM models have two fibre optic connectors on the front of the IM.

The top connector is used for Receive, the lower connector for Transmit.

Each Fibre Optic trunk runs in Duplex mode and requires two Single Mode fibres.

Fibre Optic conductor specifications;
9µm core
125µm cladding

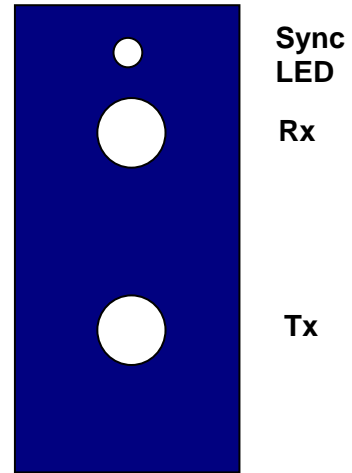


Figure 7: Fibre Optic connector

7. INTERFACE SPECIFICATIONS

Bit Rate	65 Mbps
IM Connector	FC SC
Fibre Size	core: 9µm cladding: 125µm
Power Consumption	Max 1.1W
Alarm Monitoring	Loss of incoming signal (LOS) Loss of framing (LOF) Signal Degrade (SD)
Bit Rate Tolerance	± 20ppm
Indicator LED's	Red: Loss of carrier Green: Carrier detected
Mode	Single Mode Full duplex: two fibres, one fibre per direction (Tx & Rx)
Capacity	One transmitter and receiver pair per module
Jitter Generation	< 0.01 UIrms
Loopback	Line Loopback Equipment Loopback Line and Equipment Loopback None
Minimum optical receiver sensitivity	-36dBm
Minimum optical receiver overload	0dBm
Transmitter Power	0 to -5dBm

Table 4: Interface Specifications

8. 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 expressly approved by Haliplex Pty Ltd could void the user's authority to operate this equipment.*

8.1. ELECTROMAGNETIC COMPATIBILITY (EMC)

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

8.2. SAFETY

- IEC60950, UL60950, and AS/NZS60950:2000 for General safety
- IEC60825-1 & -2 for Laser Safety

8.3. IMMUNITY

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