



Haliplex
Communication Systems

HPX-1600 USER GUIDE

**Chapter 2-7:
HPX-IM-1614
LSF IM**

TABLE OF CONTENTS

| | |
|--|----------|
| 1. GENERAL CHARACTERISTICS | 1 |
| 1.1. FIBRE INTERFACE OPTIONS..... | 2 |
| 2. IM CONFIGURATION | 3 |
| 2.1. INTERFACE PARAMETERS | 3 |
| 2.2. PERFORMANCE PARAMETERS..... | 3 |
| 2.3. TESTING PARAMETERS | 4 |
| 3. IM TESTING..... | 4 |
| 4. IM ALARMS..... | 5 |
| 5. IM INDICATORS | 5 |
| 6. INTERFACE SPECIFICATIONS..... | 6 |
| 7. INTERNATIONAL COMPLIANCES | 7 |
| 7.1. ELECTROMAGNETIC COMPATIBILITY (EMC) | 8 |
| 7.2. SAFETY..... | 8 |
| 7.3. IMMUNITY | 8 |

TABLE OF FIGURES

| | |
|---|---|
| FIGURE 1 : LSF INTERFACE MODULE | 1 |
| FIGURE 2: LSF IM CONFIGURATION DIALOG INTERFACE TAB..... | 3 |
| FIGURE 3: LSF IM CONFIGURATION DIALOG PERFORMANCE TAB..... | 3 |
| FIGURE 4: LSF IM CONFIGURATION DIALOG TESTING TAB | 4 |
| FIGURE 5: LOOP BACK OPTION FOR LOW SPEED FIBRE IM | 4 |
| FIGURE 6: LOW SPEED FIBRE IM ALARM MONITOR SETUP WINDOW | 5 |

LIST OF TABLES

| | |
|---|---|
| TABLE 1: INTERFACE OPTIONS | 2 |
| TABLE 2: FIBRE OPTIC MAX RANGE..... | 2 |
| TABLE 3: LSF IM LED INTERPRETATIONS | 5 |
| TABLE 4: INTERFACE SPECIFICATIONS | 6 |

1. GENERAL CHARACTERISTICS

The Low Speed Fibre (LSF) Interface Module (IM) allows an HPX-1600 to connect to other LSF modules installed in other Haliplex products and carries two E1 streams over a fibre optic link. The LSF module has a single trunk interface but is presented to the Digital Access Cross Connect as two independent E1 trunks resulting in a total of 64 addressable DS0 (64Kbps) time slots. The LSF module can operate at 65Mbps and operates in a synchronous mode only and can be terminated at the DACS of a HPX-1600-IA or HPX-1600-SS.

Control signals used in voice interface cross connects are also carried transparently over the fibre optic trunk, such that PCM30 or RBS methods of Channel Associated Signalling are not required.

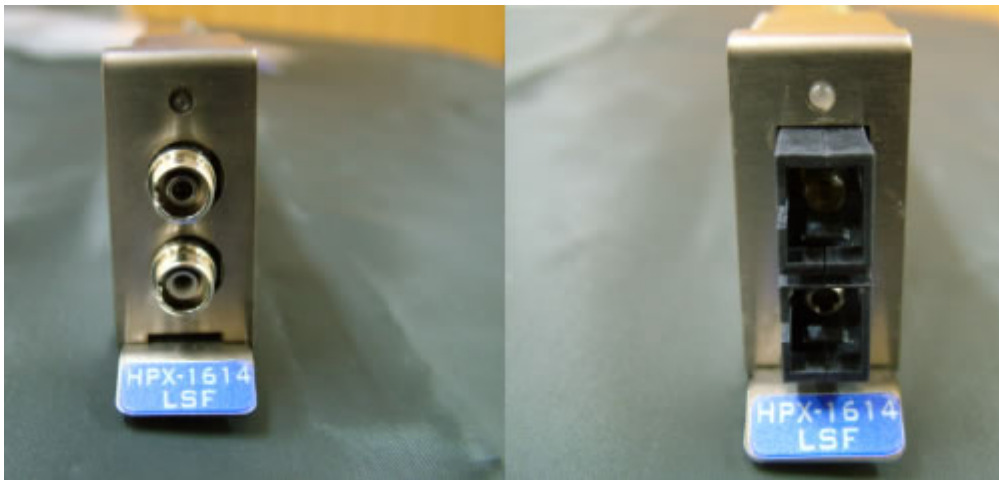


Figure 1: LSF interface module

1.1. FIBRE INTERFACE OPTIONS

The Low 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 |
| | SC/APC | 1310nm | 1550nm | -SM-SC-SF1 |
| | SC/APC | 1550nm | 1310nm | -SM-SC-SF2 |
| | SC/PC | 1550nm | 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

There are currently no configurable interface parameters.

The Transmit and Receive wavelengths are indicated.

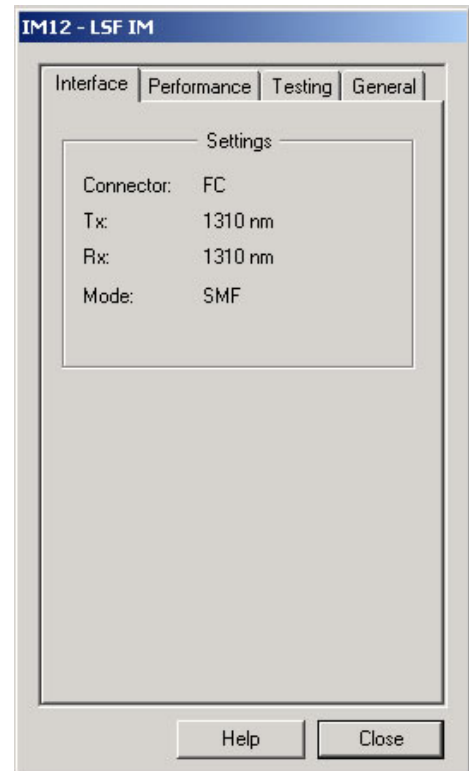
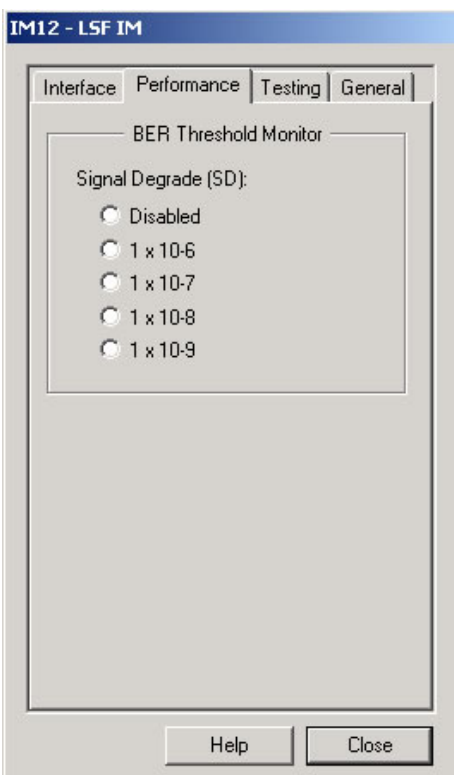


Figure 2: LSF IM Configuration Dialog Interface Tab

2.2. PERFORMANCE PARAMETERS

The performance tab allows the user to select BER test generation and monitoring thresholds.



This is used in association with the LSF High Bit Error Rate Alarm.

Figure 3: LSF IM Configuration Dialog Performance Tab

2.3. TESTING PARAMETERS

The testing tab allows the user to select either equipment loopback or no loopback. Refer to section 3 for further explanation of loopback options.

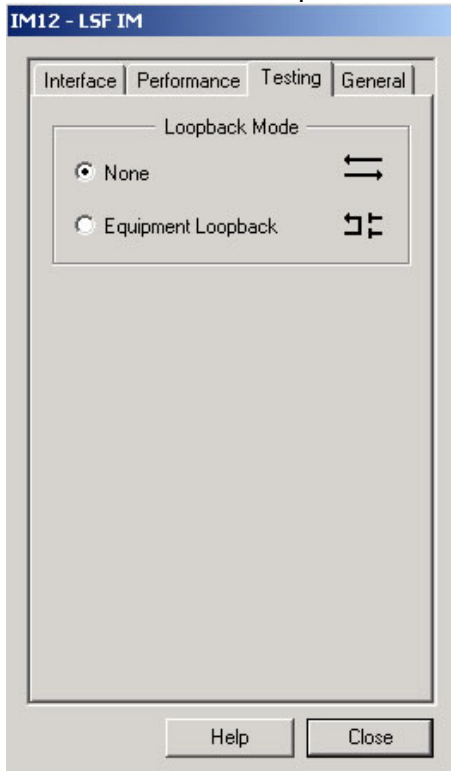


Figure 4: LSF IM Configuration Dialog Testing Tab

3. IM TESTING

The user has the option of selecting equipment loopback (1), which connects the transmitter to the receiver, as though an external loopback cable were fitted.

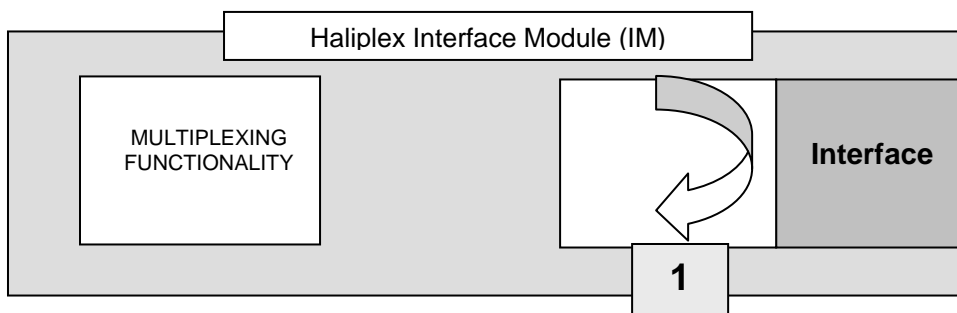


Figure 5: Loop back option for Low Speed Fibre IM

4. IM ALARMS

The alarms available on the LSF IM are;

- Signal Degrade (SD)
- Loss of Sync (LOS)
- Loss of Frame (LOF)

These can be configured in the IM Alarm Monitor Setup Window shown in Figure 6.

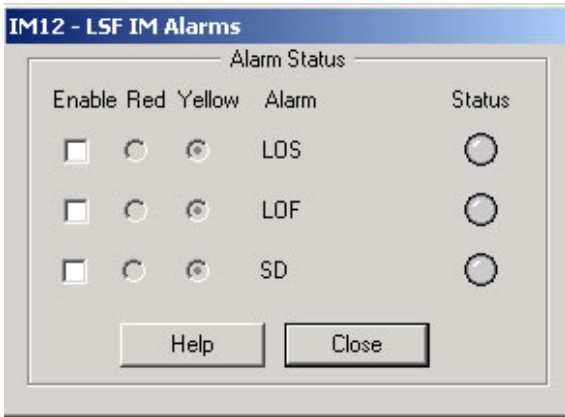


Figure 6: Low Speed Fibre IM Alarm Monitor Setup Window

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 below shows the LSF LED interpretations.

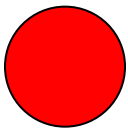
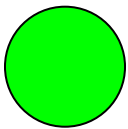
| | |
|---|--|
|  | Red LED steady or flashing: Loss of signal Loss of synchronisation |
|  | Green LED Steady = Optic Fibre Trunk is synchronised with peer system interface Flashing = Receiver Synchronised, but slipping |

Table 3: LSF IM LED interpretations

6. 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 | Equipment Loopback None |
| Minimum optical receiver sensitivity | -36dBm |
| Minimum optical receiver overload | 0dBm |
| Transmitter Power | 0 to -5dBm |

Table 4: Interface Specifications

7. 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.*

7.1. ELECTROMAGNETIC COMPATIBILITY (EMC)

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

7.2. SAFETY

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

This is a;

CLASS 1 LASER PRODUCT

7.3. IMMUNITY

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