



HPX-1600 USER GUIDE

**Chapter 2.21:
HPX-IM-1636-MM-ST-08
HPX-IM-1636-SM-SC-13
TeleProtection Fibre IM**

TABLE OF CONTENTS

1. INTRODUCTION..... 1

2. IM CONFIGURATION 3

 2.1. INTERFACE PARAMETERS..... 3

 2.2. PERFORMANCE PARAMETERS 4

 2.3. TESTING PARAMETERS 4

3. IM TESTING..... 5

4. IM ALARMS 6

5. IM INDICATORS 7

6. INTERFACE SPECIFICATIONS..... 8

7. INTERNATIONAL COMPLIANCES 9

 7.1. ELECTROMAGNETIC COMPATIBILITY (EMC) 10

 7.2. SAFETY 10

 7.3. IMMUNITY 10

TABLE OF FIGURES

FIGURE 1 HPX-IM-1636-MM-ST-08 WITH ST CONNECTOR 1

FIGURE 2 HPX-IM-1636-MM-ST-13 WITH SC CONNECTOR 1

FIGURE 3: HPX-1600-SS WITH TPF IM CONNECTED TO TELEPROTECTION SWITCH 2

FIGURE 4: TPF IM CONFIGURATION DIALOG INTERFACE TAB 3

FIGURE 5: TPF IM CONFIGURATION DIALOG PERFORMANCE TAB 4

FIGURE 6 TPF IM CONFIGURATION DIALOG TESTING TAB 4

FIGURE 7: TPF IM LOOP-BACK OPTIONS 5

FIGURE 8: STM-1 & STS-3 IM ALARM MONITOR SETUP WINDOW 6

LIST OF TABLES

TABLE 1: TPF IM LED INTERPRETATIONS 7

TABLE 2 HPX-IM-1636-MM-ST-08 INTERFACE SPECIFICATIONS 8

TABLE 3 HPX-IM-1636-MM-ST-13 INTERFACE SPECIFICATIONS 8

TABLE 4 GENERAL INTERFACE SPECIFICATIONS 8

Revision	Date	Description
4.05	26-06-08	Product now available as variants: <ul style="list-style-type: none"> • HPX-IM-1636-MM-ST-08. • HPX-IM-1636-SM-SC-13 Update contains information on both.

1. INTRODUCTION

The TeleProtection Fibre (TPF) Interface Module (IM) is available as two variants:

- **HPX-IM-1636-MM-ST-08** with *ST interface connectors*.
- **HPX-IM-1636-SM-SC-13** with *SC interface connectors*.

The TeleProtection Fibre (TPF) Interface Module (IM) allows connection via ST and SC Connectors (Tx & Rx) with a bandwidth of 2.048 Mbps.

Multimode fibre cables at 830nm are used with the HPX-IM-1636-MM-ST-08.

Single mode fibre cables at 1310nm are used with the HPX-IM-1636-SM-SC-13.

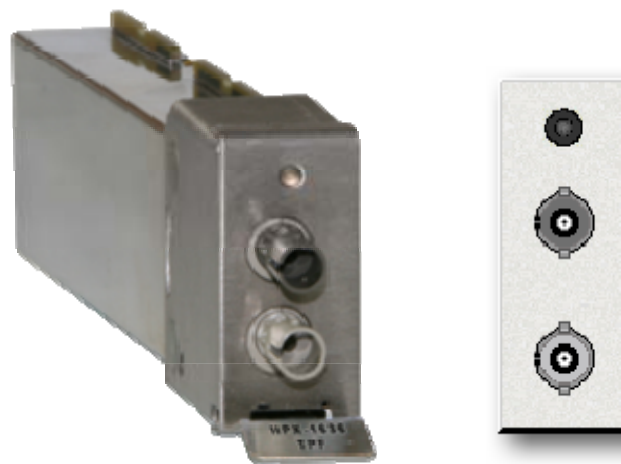


Figure 1 HPX-IM-1636-MM-ST-08 with ST connector

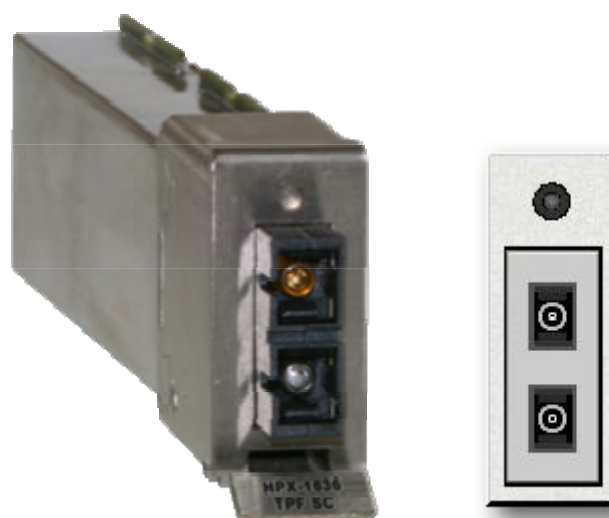


Figure 2 HPX-IM-1636-SM-SC-13 with SC connector

This TPF tributary interface module conforms to the IEEE C37.94 standard for nX 64Kbps (nxDS0) optical fibre interfaces between TeleProtection and Multiplexer equipment and it supports direct connections from the HPX-1600 to power utilities' switching equipment, refer to Figure 1. Multimode or single mode fibre cables are used with a length of up to 2km.

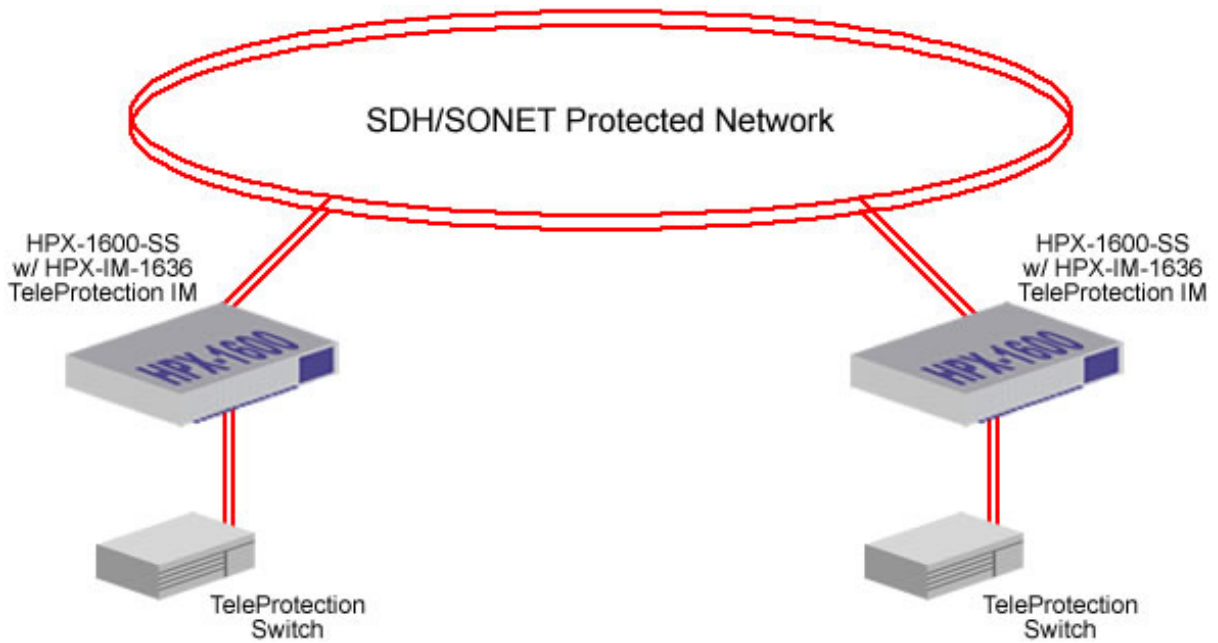


Figure 3: HPX-1600-SS with TPF IM Connected to TeleProtection Switch

2. IM CONFIGURATION

The IM configuration dialog has configuration tabs as discussed below.

2.1. INTERFACE PARAMETERS

The interface tab allows the user to set the number of timeslots for the overhead of the transmitted data. Number of timeslots range from 1 (default): 12. The Received Overhead data is a reading of the timeslots accepted. The user can refresh this count.

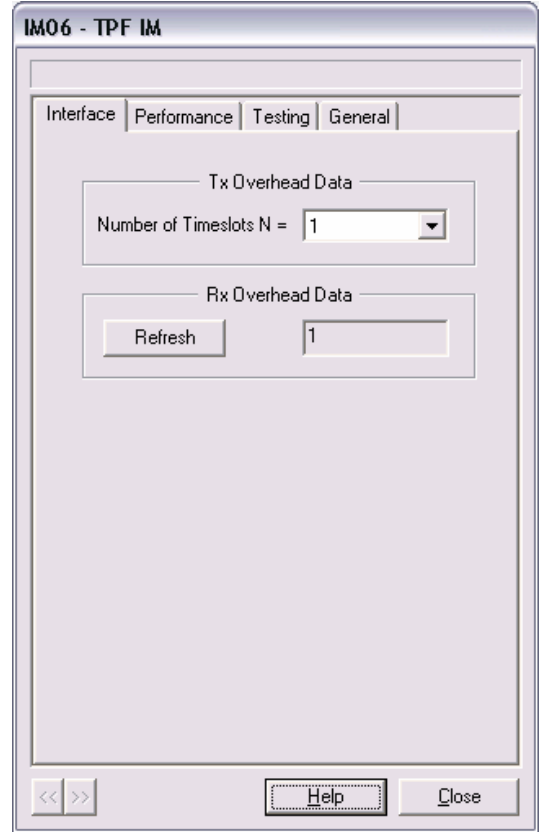


Figure 4: TPF IM Configuration Dialog Interface Tab

2.2. PERFORMANCE PARAMETERS

There are no configurable parameters at this stage.

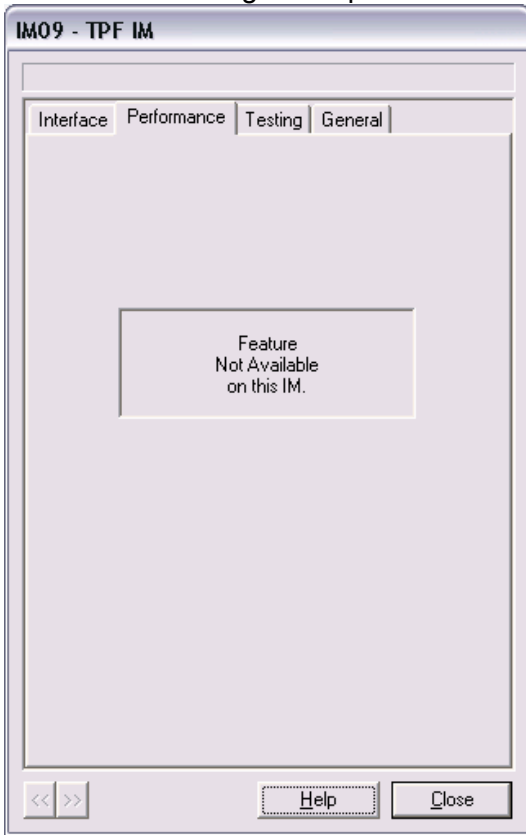


Figure 5: TPF IM Configuration Dialog Performance Tab

2.3. TESTING PARAMETERS

The testing tab allows the user to select a loop-back mode for testing.

For more information on the loop-back options available, refer to section 3.

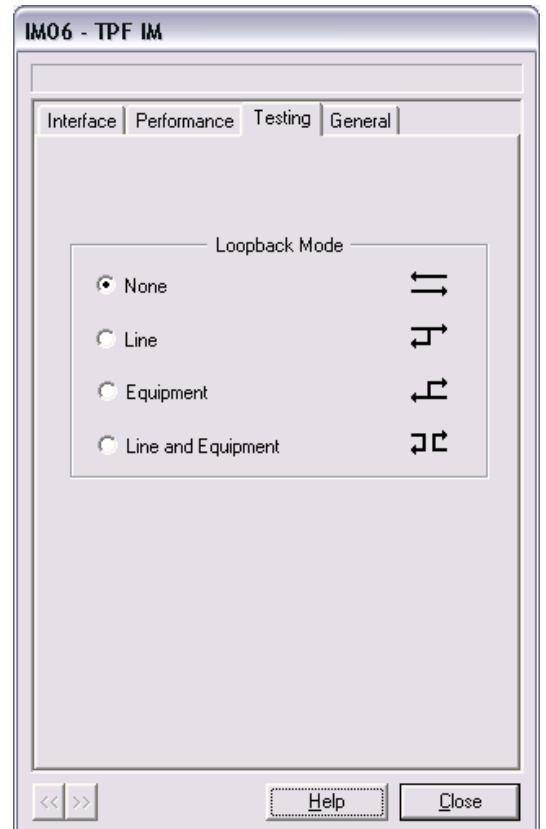


Figure 6 TPF IM Configuration Dialog Testing Tab

3. IM TESTING

The TPF IM has no loop-back selected as the default setting for normal IM operation. No Loop-back data flows through the IM connectors to the backplane. However, for testing purposes, one of three loop-back options can be set. The three available loop-back options are illustrated below in Figure 5.

- Line loop-back(1): 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 (2): 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 loop-back (3): 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.

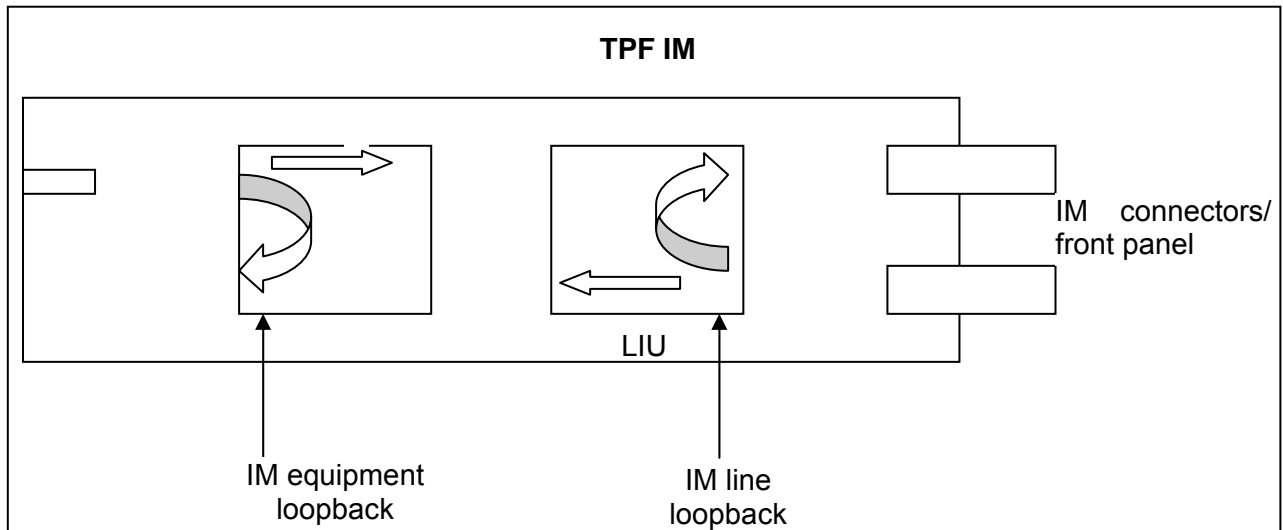


Figure 7: TPF IM loop-back options

4. IM ALARMS

The TPF IM has alarms that can be configured and monitored via the IM alarm monitor setup window.

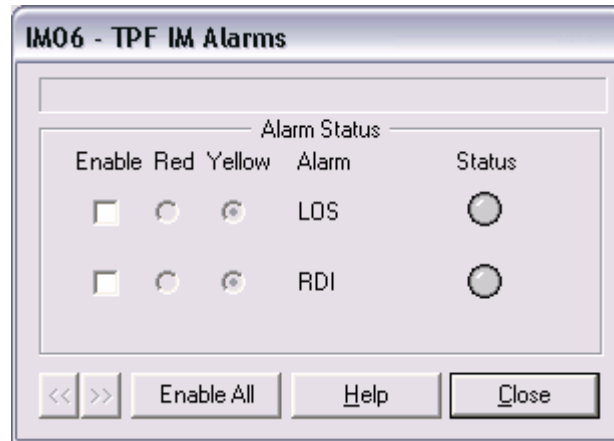


Figure 8: STM-1 & STS-3 IM Alarm Monitor Setup Window

LOS: Loss of Signal, the signal level has been lost.

RDI: The Remote Defect Identification (RDI) alarm is sent downstream from the node that detects a LOS. RDI equates to the IEEE C37.94 terminology "Path Yellow" (Far-End in Alarm).

5. IM INDICATORS

The TPF IM front panel has a single LED displaying the status of the connection. When the IM is connected to the TeleProtection Switch the LED is illuminated Green. A 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 1 below shows the LSF LED interpretations.

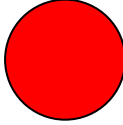
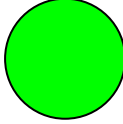
	Red LED steady or flashing: Loss of signal
	Green LED No Loss of signal

Table 1: TPF IM LED interpretations

6. INTERFACE SPECIFICATIONS

IM Connector:	SC connectors RX and TX
Fibre Type:	Multimode 50/125um and 62.5/125um @ 830nm
Bandwidth	2.048 Mbps +/- 100ppm
Extinction Ratio	Min 10dB
Mean Optical Power	-32dBm to -11dBm with BER of < 1E-9
Mean optical power into 50 µm fibre	-18.0 dBm
Mean optical power into 62.5 µm fibre:	-14.0 dBm

Table 2 HPX-IM-1636-MM-ST-08 Interface Specifications

IM Connector:	SC connectors RX and TX
Fibre Type: HPX-IM-1636-MM-ST-08	Multimode 9/125um @ 1310nm
Bandwidth	2.048 Mbps +/- 100ppm
Extinction Ratio	Min 10dB
Optical Power	-5dBm with BER of < 1E-9

Table 3 HPX-IM-1636-MM-ST-13 Interface Specifications

Alarm Monitoring	Loss of incoming signal (LOS) Remote Defect Identification (RDI) (Path Yellow)
Indicator LED's	Green: No LOS Red: LOS
Loop-back	- Line - Equipment - Line and Equipment Loop-back
Standards	IEEE C37.94-2002, ITU-T G.704, ITU-T G.706, ITU-T G.775

Table 4 General 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