



Haliplex
Communication Systems

HPX-1600 USER GUIDE

**Chapter 2-9:
HPX-IM-1680
STM-1 & OC-3 IM**

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RECORD OF CHANGES

4.05	Addition	Section 2	Automatic Laser Shutdown settings
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1. GENERAL CHARACTERISTICS

The STM-1 & OC-3 IM is only compatible with the HPX-1600-SS models. It allows the user to transmit up to 63/84 E1/T1 circuits over a high-speed fibre plant. It transmits at speeds up to 155Mb/s. Two modules can be installed for redundant link protection. This interface module is equipped as standard with two fibre optic transceivers for configuration in SNCP or UPSR protected ring topologies and Line Switched or MSP (1+1) protected linear network applications.

The fibre IM must be connected to a STM-1 or OC-3 interface supplied by Haliplex or other supplier. The standard module uses 1310nm and a FC/PC or SC/PC connector although there are many connection or transmission options.



Figure 1: STM-1/OC-3 IM

1.1. FIBRE INTERFACE OPTIONS

The STM-1 & OC-3 Fibre IM ships with a standard fibre optic interface that operates at 1310nm from a pair of FC/PC or SC/PC interface. There is a wide range of alternative fibre optic interfaces that are available 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		
Mult Mode	SC/PC	1310 Tx & Rx		-MM-SC

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

Configuration options for this interface module are hardware version dependent.

2.1.1. HARDWARE VERSION LESS THAN 04

There are no user configuration objects in the fibre optic interface module.

To determine fibre optic operational wavelength, hold the mouse over the “VSF” button.

2.1.2. HARDWARE VERSION EQUAL OR GREATER THAN 04

The following Interface and automatic Laser Shutdown options are available.

2.2. INTERFACE PARAMETERS

The interface tab allows the user to view the fibre optic transceiver configuration and to power off the transceiver.

If the port enable options are “greyed out” then this indicates that this hardware does not support this option.

The **Port Enable** section is used to turn the IM ON or OFF. When the IM is disabled, all front panel LED indicators are turned off. By default, the IM is set enabled.

The “On” position enables port to become active and all IM operations perform as normal.

Initially the IM is set to “Off” where the port is not active but can be configured. Switching to the “Off” position network traffic is ignored, no traffic will pass through the IM and therefore no statistics are kept, alarm monitoring will also be disabled.

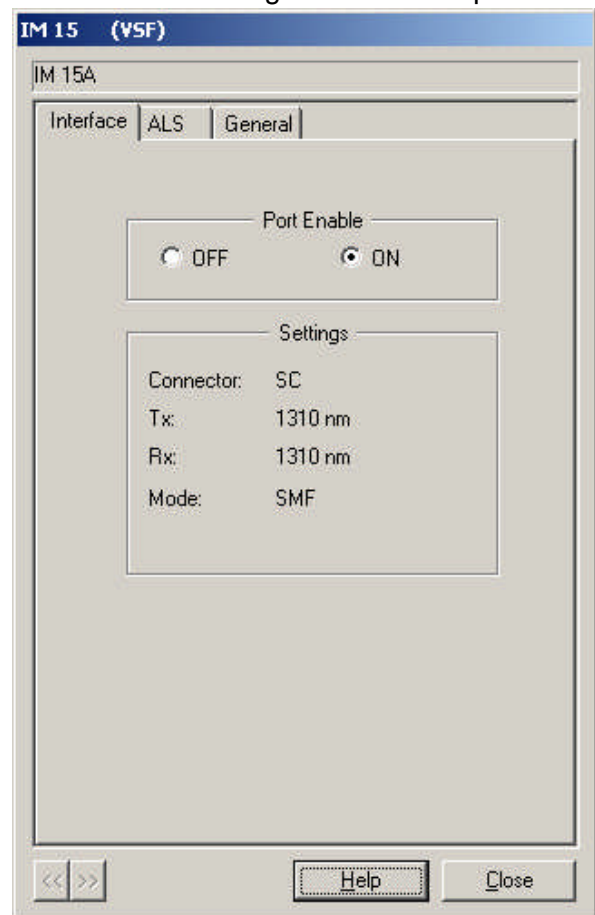


Figure 2 – STM-1 & OC-3 IM Configuration Dialog Interface Tab

2.3. AUTOMATIC LASER SHUTDOWN

The ALS tab allows the user to manage the Automatic Laser Shutdown feature. The STM-1 & OC-3 IM laser is classified as a safe Class One device and is not considered hazardous. The ALS function is provided to comply with the operating requirements of telecoms organisations, where required.

State controls the operational mode of the ALS feature. Default value is OFF. If “greyed out” then the ALS feature is not supported by this revision level of hardware.

The ALS feature automatically switches off the laser transmitter if the optic receiver detects a loss of received signal for a period of more than 500ms. The laser transmitter can be automatically or manually restarted.

The **Mode** controls Manual or Auto laser restart. In Manual mode the user clicks on the “**Manual Start**” button to initiate the start sequence. In “**Auto**” mode, the laser will be automatically started after a delay of 100seconds. The start sequence switches the laser transmitter on for the duration set by the Pulse Time control. If the optic receiver detects a received signal before expiration of the Pulse Time, then the laser transmitter resumes normal operation.

The **Pulse Time** control allows the laser transmission to be adjusted from 2seconds in increments of 1second up to 10 seconds. This complies with section 6.3 of the standard ITU-T G.664. In order to allow automatic restart of SDH systems with line amplifiers, which are in shutdown condition, it may be necessary to increase the restart pulse length (defined in section 6.2) beyond the maximum of 2.25s (to e.g. 9 ± 0.5s).

Manual Restart for test as defined in the standard is supported by configuring the ALS feature OFF, which will permanently switch the laser transmitter on.

The current transmit status of the laser is reported as ON or OFF.

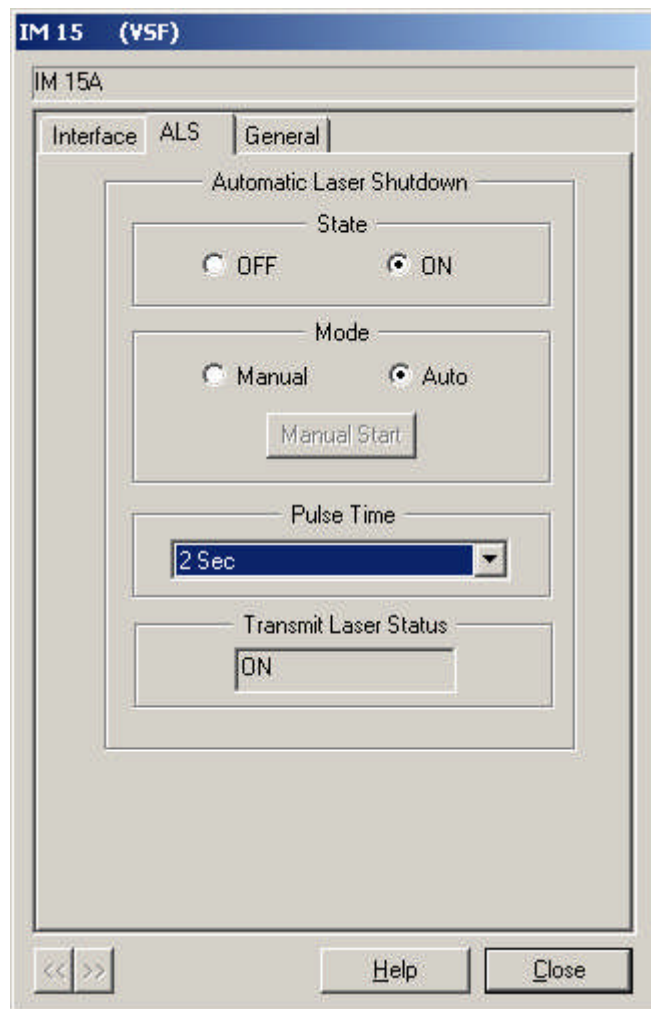


Figure 3 – STM-1 & OC-3 IM Configuration Dialog ALS Tab

3. IM ALARMS

The STM-1 & OC-3 IM has a Loss of Carrier alarm that can be configured and monitored via the IM alarm monitor setup window.

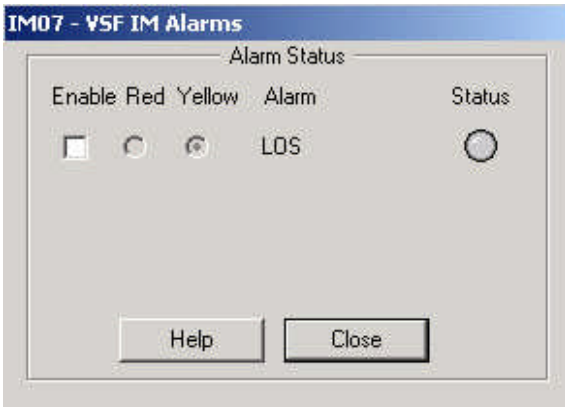


Figure 4: STM-1 & OC-3 IM Alarm Monitor Setup Window

4. IM INDICATORS

The STM-1 & OC-3 IM has a single LED, which alights in green or red. The state of the LED indicates the presence of a carrier signal and when a transmit or receiver buffer overflow is occurring.

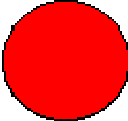
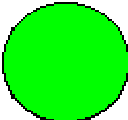
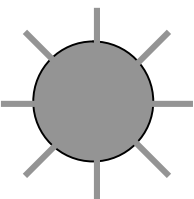
	<p>Red Steady LED: Indicates that the carrier signal is not present.</p>
	<p>Green Steady LED: Indicates that the carrier signal is present and normal data transmission is occurring.</p>
	<p>Flashing LED: Indicates that the transmit or receive buffer has overflowed.</p>

Table 3: STM-1 & OC-3 LED Interpretations

5. IM CABLES

The Fibre Optic IM is available in several variants of bandwidth and termination connector. Check the model number for details. Connectors may be either SC-APC or FC-PC. All 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

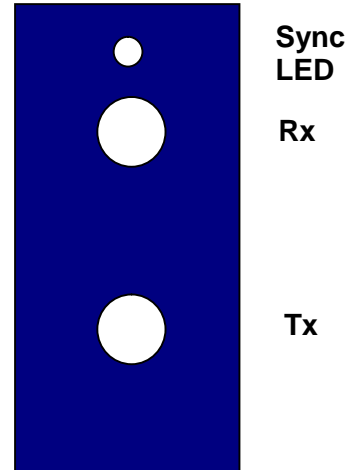


Figure 5: Fibre Optic IM

6. INTERFACE SPECIFICATIONS

Bit Rate	155 Mbps
IM Connector	FC SC
Fibre Size	core: 9µm cladding: 125µm
Power Consumption	Max 1.1W
Alarm Monitoring	Loss of incoming signal (LOS)
Bit Rate	155 Mbps
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
Minimum optical receiver sensitivity	-36dBm
Minimum optical receiver overload	0dBm
Transmitter Power	0 to -5dBm
Automatic Laser Shutdown	Complies with ITU-T G.664

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