



Haliplex
Communication Systems

HPX-1600 USER GUIDE

**Chapter 2-6:
HPX-IM-1601
Dual E&M IM**

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1. GENERAL CHARACTERISTICS

The Dual Ear and Mouth (E&M) Interface Module (IM) operates at 64kB/s and allows connection via an RJ-45. This IM supports dual E&M ports. The Ear and Mouth (E&M) Interface Module (IM) provides for two independent connections. The user can select impedance, coding, signalling, or interface parameters and 2 or 4-wire operation using software selection from the HPXView management station. Hardware straps are used to select some of the E&M connection types.

The Dual E&M IM is shown below in Figure 1.



Figure 1: Dual E&M IM

2. IM SETUP

E&M signalling types 1 through 5 are supported by the Dual E&M IM.

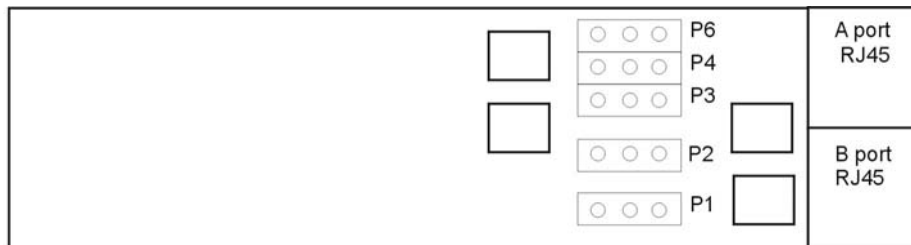


Figure 2: Dual E&M IM Hardware

Table 1 below shows the jumper settings for each signalling type.

Type I	Type II	Type III	Type IV	Type V

Table 1: Jumper Settings for Hardware Version 03

3. IM CONFIGURATION

The IM configuration dialog has configuration tabs as discussed below.

3.1. INTERFACE PARAMETERS

The interface parameters managed are;

- Companding type (μ -law, A-law)
- E&M Lead mapping (mapping of E and M lead to/from ABCD bits)
- 2 Wire line set up
- Enable 2 wire (either 2 or 4 wire)
- Transmit gain in dB (-30.0 to +6.0, nominally 0)
- Analog pad transmit gain -3.5dB, 0dB, +3.5dB (Hardware version 02)
- Receive gain in dB (-30.0 to +6.0 in steps of 0.5dB, nominally 0)
- Analog pad receive gain -3.5dB, 0dB, +3.5dB (Hardware version 02)
- Impedance
 - 600 Ω
 - 900 Ω
 - 600 Ω + 2.16 μ F
 - 900 Ω + 2.16 μ F
 - CTR21 (270 Ω + 750 Ω /150nF)
 - AUSTRALIA/NEW ZEALAND #1 (220 Ω + 820 Ω /120 nF)
 - SLOVAKIA/SLOVENIA/SOUTH AFRICA (220 Ω + 820 Ω /115nF)
 - NEW ZEALAND #2 (370 Ω + 620 Ω /310nF)

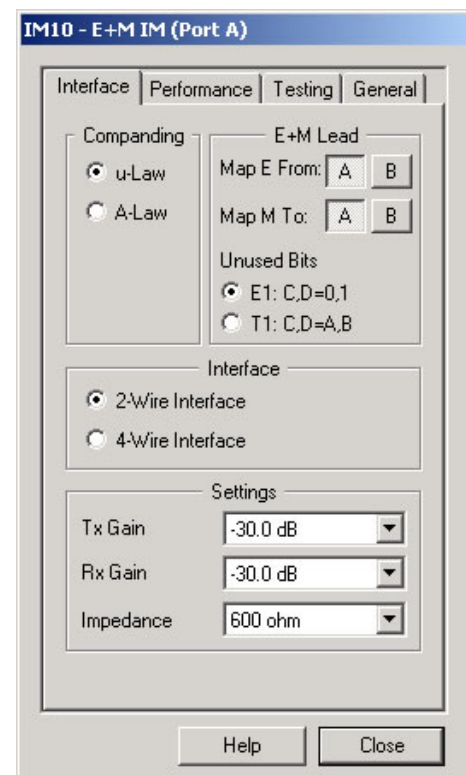


Figure 3: Dual E&M IM Configuration Dialog Interface Tab

3.2. PERFORMANCE PARAMETERS

These are not currently available.

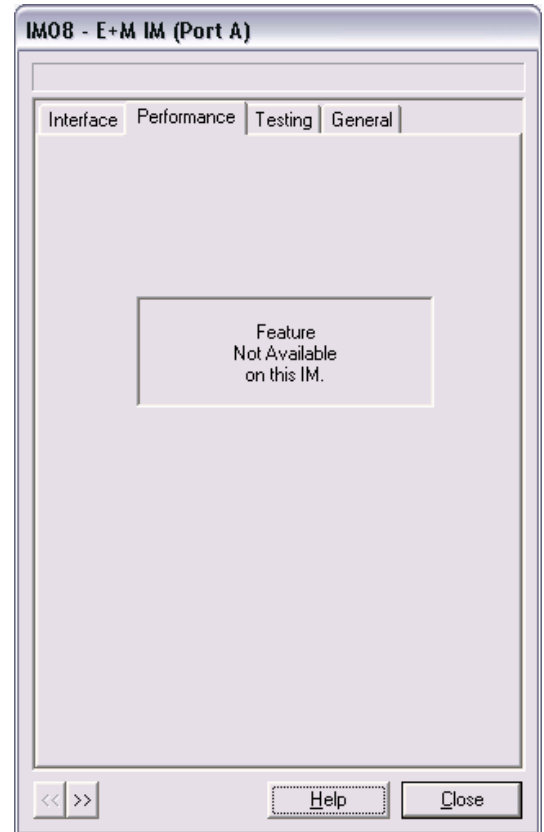


Figure 4: Dual E&M IM Configuration Dialog Performance Tab

3.3. TESTING PARAMETERS

3.3.1. LOOPBACK MODE

Currently, IM connector loopback is available for testing the Dual E&M IM.

For more information on testing options, refer to section 4.

3.3.2. LAUNCH TEST

The user is able to launch a 1kHz tone at 0dBm into the transmit and receive paths of the circuit, channel and interface respectively.

This is done by an oscillator which is switched into the transmit and receive paths.

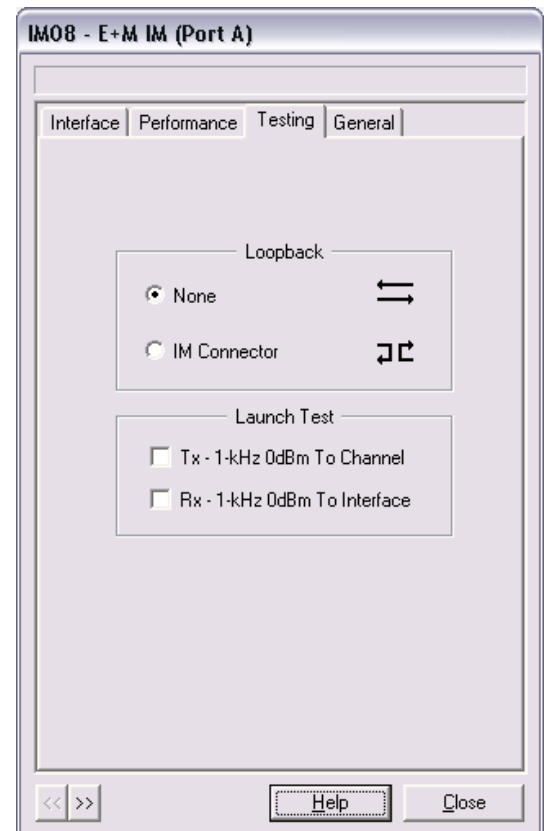


Figure 5: Dual E&M IM Configuration Dialog Testing Tab

4. IM TESTING

The following test is available to the user via the Testing tab of the IM Configuration Dialog;

Digital Loopback

- IM Connector loopback, towards DACS & LIU (1)

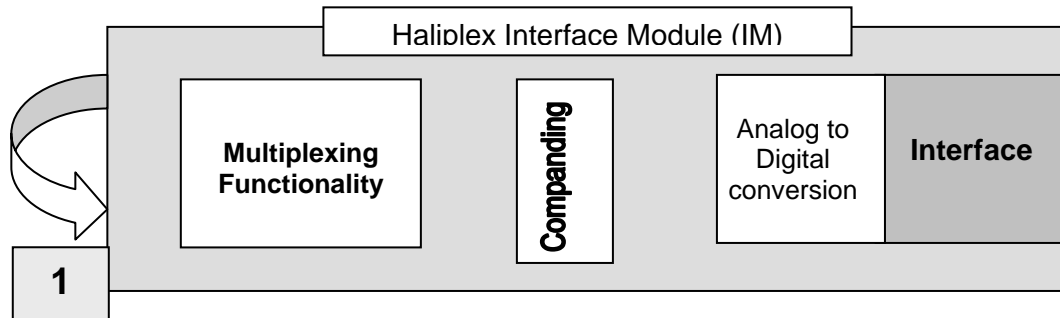


Figure 6: Dual E&M MUX IM loopback options

5. IM ALARMS

In the event of the connection to the remote end of the digital voice stream being disconnected or failing, the E&M IM can detect all 1's. In response to the All 1's AIS alarm, the E-lead output can be set to idle and is off or it can be set to busy and is on.

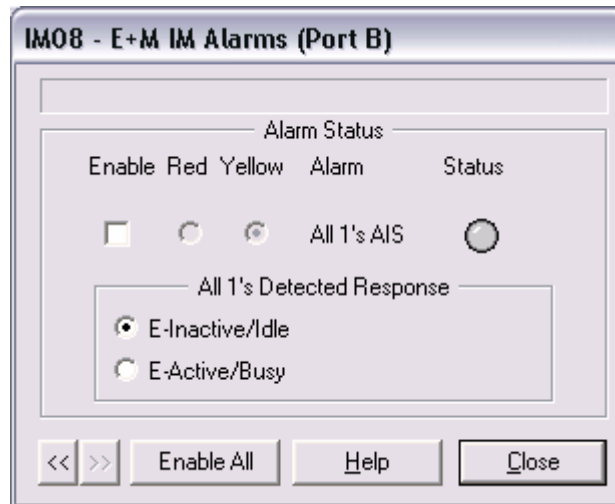


Figure 7: Dual E&M IM Alarm Monitor Setup Window

6. IM INDICATORS

LEDs on the front panel of the E&M IM are used to indicate IM status. The LED interpretations are shown below in Table 2.

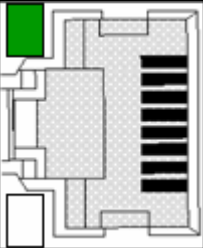
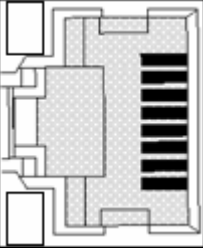
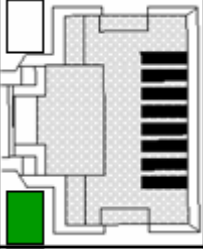
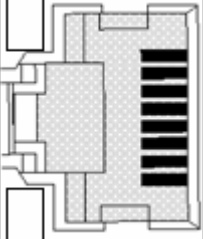
E&M IM: RJ45 LED Status		Intepretation	
	LED	Colour	
Top LED		Green	M-Lead "Off Hook"
		None	M-Lead "On Hook"
Bottom LED		Green	E-Lead "Off Hook"
		None	E-Lead "On Hook"

Table 2: E&M IM LED Interpretations

7. INTERFACE SPECIFICATIONS

IM Connector	Dual RJ-45 Connector
Operation	Available in 2 & 4 wire
Interface Types	Types I through V are supported
Trunk Speed	64kbs
Power Consumptions	< 3W
Alarm Monitoring	none
Indicator LED's	Constant Green Top: M-Lead Off Hook Constant Green Bottom: E-Lead Off Hook
Standards	ITU-T G.711, G.712, Belcore TR-NWT00005712
ABCD Signalling	- A & B E Mapping - A & B M Lead Mapping
Level Adjustment	-30dB to + 6dB
Maximum Level	
- Rx	+4dBm
- Tx	+4dBm
Impedence (AC resistance)	2 Wire - 600Ω - 900Ω - 600Ω + 2.1μF - 900Ω + 2.1μF - 270Ω + 750Ω 150nF (TBR21) - 220Ω + 820Ω 120nF (Australia/New Zealand #1) - 220Ω + 820Ω 115nF (Slovenia/Slovakia/South Africa) - 370Ω + 620Ω 310nF (New Zealand #2) 4 Wire - 600Ω
Companding	μ-law, A-law
Loopback	Bi-directional - Line & Equipment

Table 3: Interface Specifications

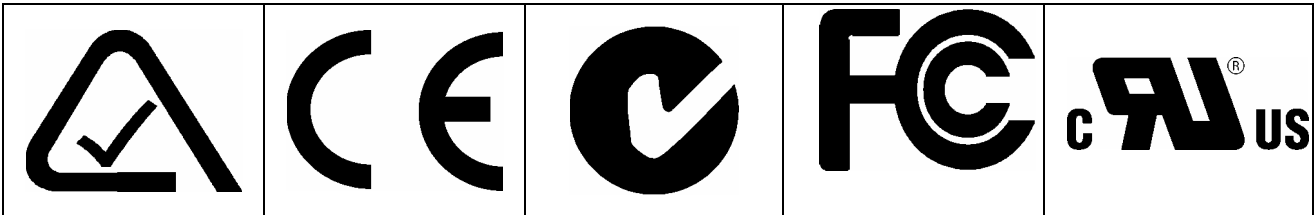
The E&M IM has two ports, each terminated in an RJ45 socket. E & M or "Ear and Mouth" is a signalling technique for connecting telephone and trunk services to telephone exchanges and related equipment such as remote radio transmitters. The voice circuit may be two wire, or full duplex, four wire and will be defined by the exchange equipment interface. The table below describes the pin usage for each mode of operation.

P1&P2 RJ45	Signal Name	2 Wire Operation					4 Wire Operation					Signal Description
		E&M Type					E&M Type					
		1	2	3	4	5	1	2	3	4	5	
1	SB		SB	SB	SB			SB	SB	SB		-48VDC
2	M-Lead	M	M	M	M	M	M	M	M	M	M	Signalling in
3	R						R	R	R	R	R	Ring Audio
4	R or R1	R	R	R	R	R	R1	R1	R1	R1	R1	Ring Audio
5	T or T1	T	T	T	T	T	T1	T1	T1	T1	T1	Tip Audio
6	T						T	T	T	T	T	Tip Audio
7	E-Lead	E	E	E	E	E	E	E	E	E	E	Signalling out
8	SG		SG	SG	SG			SG	SG	SG		Sig. Ground

Table 4 : E&M RJ45 pinouts

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

8.3. IMMUNITY

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

8.4. PERFORMANCE

- AC/ACIF S003:2001