INNOVA

Innova LINK series
PECL Board
USER MANUAL

0	**28.02.11**	**Original issue**	**JAT**	**EME**	**KAN**
Rev.	Date	Description/Reason for Issue	Made by	Checked by	Approved by

Document No.:	Project no:
604368-man-009	**604368**

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1 General

1.1 Scope of document

This document provides detailed information required for system integration of the INNOVA PECL boards. These boards are part of the Innova LINK series of products for transfer electrical signals over optic fibre. The information aims to provide a clear understanding of the features of the device as well as the operation limits and interface requirements.

1.2 Definitions

1.2.1 Abbreviations

ESD	Electro Static Discharge
PCB	Printed Circuit Board
MUX	Multiplexer
SFP	Small Form-factor Pluggable (electrical to optical converter module)
WDM	Wave Division Multiplexing
CWDM	Coarse Wave Division Multiplexing
PECL	Positive Emitter Coupled Logic

1.3 ESD precautions

The unit contains components that are sensitive to the high voltages that can be generated by the human body due to static charges. To prevent ESD damage, the unit should be stored in anti static packing and be handled in an environment protected from static electricity. Use grounded wrist band while handling the unit.

2 General description

The PECL boards are members of the Innova LINK family of products for providing an optical link to a remote system utilising communication with PECL levels. The units are designed to transfer PECL signals, such as used by multi beam echo sounder from Kongsberg Maritime and Reson. The transmission line consists of 2 boards. At the remote end, the input board is used to convert the PECL signals to optical signals. At the local end the output board converts the optical signals back to electrical PECL. The 2 boards are functionally identically, the difference lies in the physical layout. The pictures below show the 2 boards.

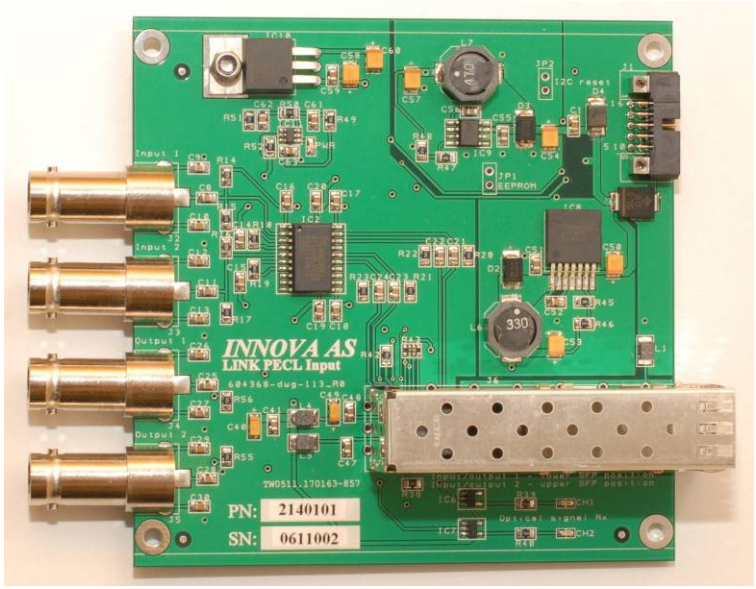

Figure 1, PECL input board.

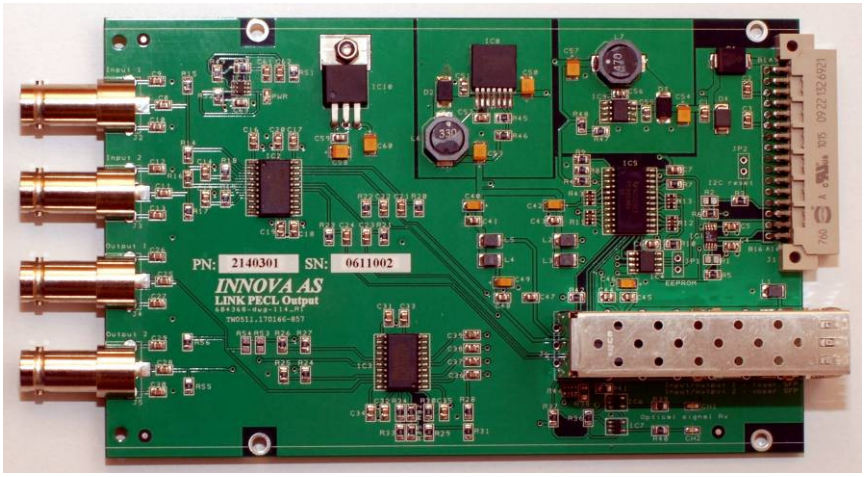

Figure 2, PECL output board.

Each board has facilities to transfer up to 2 separate PECL signals in both directions. The board uses 1 SPF for each PECL channel used, it is only necessary to install SFP's for the used PECL ports. 2 optical fibres (one in each direction) or 2 wavelengths in a WDM system are required for each bidirectional PECL. A board set up for 2 bidirectional PECL will thus require 4 optical fibres or 4 wavelengths in a WDM system. When communicating in only 1 direction, only 1 fibre (or 1 wavelength) is required for each PECL channel.

3 Features

Power supply: 6 - 12 VDC

2 bidirectional PECL

Speed up to 600 Mbps

Diagnostics interface (requires an Analogue Video board in the system)

Size of input board: 100 * 100 mm

Size of output board: 100 * 160 mm (Euro card)

4 Functional description

4.1 General

The units are designed to transfer PECL signals typically used by some models of multi beam echo sounders from Kongsberg Maritime and Reson. At the remote end, the input board is used to convert the electrical signals to optical signals. At the local end the output board converts the optical signals back to electrical signals.

The units utilise standard SFP's for the fibre optic interface. This allows for easy customisation of the fibre optic link characteristics, including wavelengths and optic budget. Each PECL channel is converted to optic signals independent of the other channel. Each PECL channel has a dedicated SPF for the optical signals. Only the used PECL channels on the board need to have SFP's installed. If using PECL signals in 1 direction only, 1 fibre is required (Tx at the signal source end and Rx at the receiver end). Single mode fibre is typically used with these boards. Multi mode fibre can also be supported, but at drastically reduced optical distance (typically less than 1 km).

4.2 SFP's

SFP's are bi-directional devices and care must be taken to ensure the correct optical port (Rx or Tx) is used. See the figure below for the physical outline of an SFP.

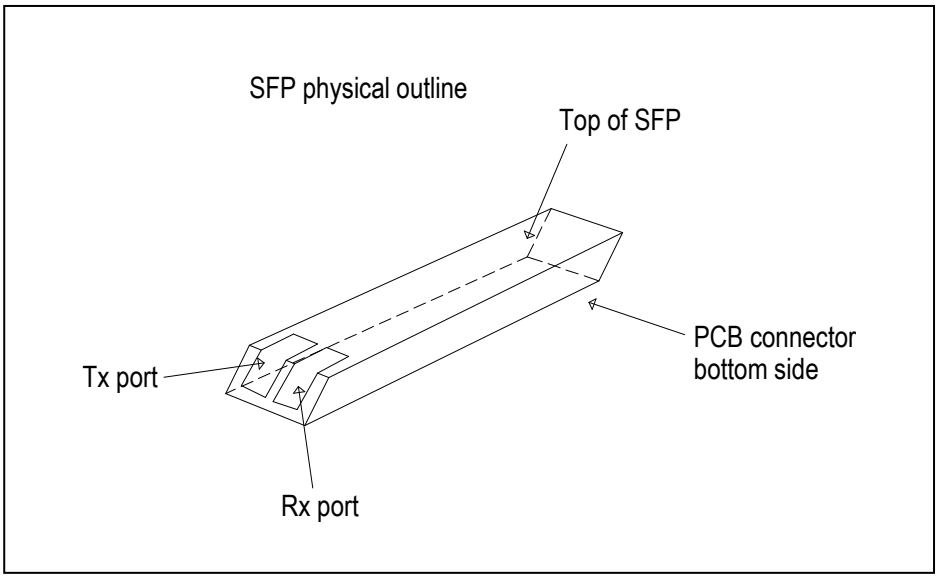

Figure 3, SFP module.

PECL channel 1 is plugged into the lower port in the SFP cage.

4.3 LEDs

The PECL boards have 3 LEDs. The 'PWR' led indicate that the board is powered up. LEDs 'CH1' and 'CH2' indicate reception of optical signal on the corresponding channel (it does not indicate that there is a valid PECL signal present), refer to Figure 4 and Figure 5 for details.

4.4 Diagnostics

A diagnostic port is available on the mother board connector. Diagnostics data is read by the LINK analogue video board and made available at the local end of the system (where the output boards are). Thus the analogue video board is required to access the diagnostics data.

The diagnostics data contains information about the board (PN, SN) as well as SFP data for all the boards connected to the analogue video board.

5 Connections

5.1 Connectors

5.1.1 Input board

Mother board	Nicomatic 222S10M16
Mother board mating connector	Nicomatic 222C10M16 (cable connector)
PECL	4 * BNC (2 signal input and 2 signal output)
Optic (to / from SFP)	2 * LC

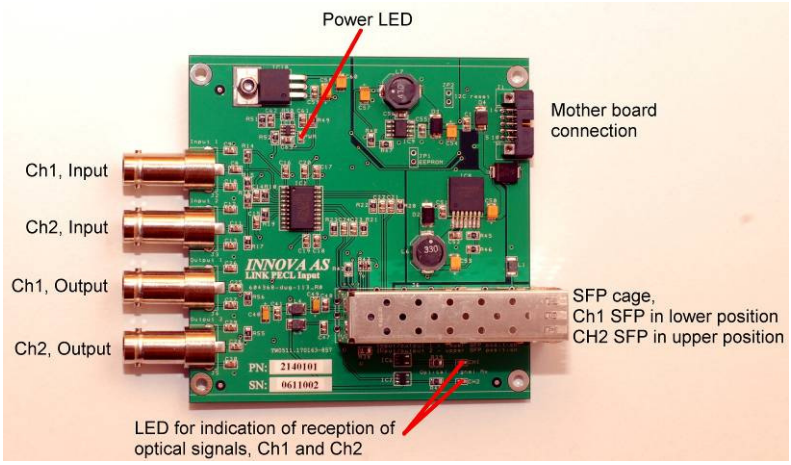

Figure 4, Input PCB layout.

5.1.2 Output board

Mother board	DIN B/2
PECL	4 * BNC (2 signal input and 2 signal output)
Optic (to / from SFP)	2 * LC

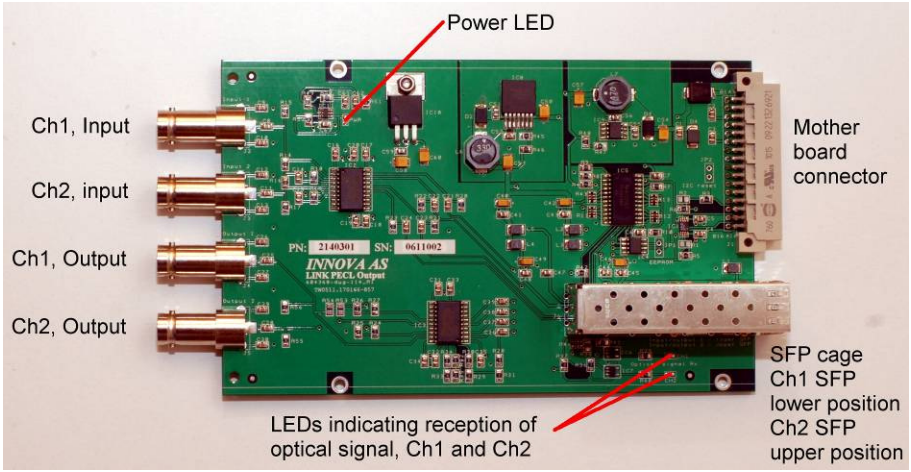

Figure 5, Output PCB layout.

5.2 Power

The unit requires 6 - 12 VDC power connected to the mother board connector.

5.3 Diagnostics

A diagnostic port is available on the mother board connector. Diagnostics data is read by the LINK analogue video board and made available at the local end of the system (where the output boards are). Thus the analogue video board is required to access the diagnostics data.

The diagnostics data contains information about the board (PN, SN) as well as SFP data for all the boards connected to the analogue video board.

5.4 Summary of connector pin configurations

5.4.1 Mother board connections

In a system with several boards it is natural to use the mother boards (back plane) to connect power to the boards. This also connects the diagnostics bus between the boards. In a system with a single board or very few boards the preferred solution may be to wire up power etc. to the board(s) directly without the mother board. The pin put of the mother boards connectors are given in the tables below.

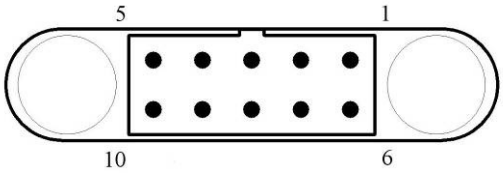

Figure 6, Input board mother board connector pin configuration (face view).

Input board, mother board connector J5	
Pin #	**Function**
1	0V
2	0V
3	A0
4	A1
5	A2
6	SCL
7	SDA
8	3V3
9	Vin
10	Vin

Output board, mother board connector J1	
Pin #	**Function**
a1	0V
a2	0V
a3	0V
a4	0V
a5	0V
a6	0V
a7	NC
a8	NC
a9	NC
a10	NC
a11	NC
a12	NC
a13	NC
a14	RST
a15	SCL
a16	SDA
b1	Vin
b2	Vin
b3	3V3
b4	3V3
b5	3V3 SFP
b6	3V3 SFP
b7	NC
b8	NC
b9	NC
b10	NC
b11	NC
b12	NC
b13	NC
b14	A0
b15	A1
b16	A2

5.4.2 Signal connections

All PECL signal connections are via BNC connectors. PECL input is connected to J2 (ch 1) and J3 (ch 2). PECL output is connected to J4 (ch 1) and J5 (ch 2).

6 Physical layout

The units must be mounted inside a suitable enclosure to protect it against dust and moisture. To comply with EMC regulation a metal enclosure will be required and filtering of power and signals may be necessary depending on application.

6.1 Input board

Size	100x100x28mm (LxWxH).
Mounting	By 4 holes for M3 bolts, 1 in each corner 3.5mm from the edges with the connections and 5.5mm from the 2 other edges.
Housing	None

6.2 Output board

Size	160x100x28mm (LxWxH).
Mounting	Rail mounting in DIN sub-rack.
Housing	None

7 Configuration instructions

There are no user configurations on these boards.

8 Specifications

Power supply voltage: 6 - 12 VDC

Maximum number of separate bidirectional PECL: 2

Maximum speed: 600 Mbps

Operating temperature range: -20 - 70 °C (SFP temperature range may be different)

Power consumption will vary slightly with operating conditions and SFP types used. Typical power consumption: 1 channel: 230 mA @ 12V

2 channels: 300 mA @ 12V

9 Appendix 1, PN numbers including related products

Description	PN
AV 6 ch Input	2110101
Ext 2 ch AV Input	2111101
Ext 12 ch RS232 Input	2112101
Ext 12 ch RS-422/485 FD Input	2113101
Ext 12 ch RS-422/485 HD Input	2114101
AV 6 ch PR Input	2110201
Ext 2 ch AV PR Input	2111201
Ext 12 ch RS232 PR Input	2112201
Ext 12 ch RS-422/485 FD PR Input	2113201
Ext 12 ch RS-422/485 HD PR Input	2114201
AV 6 ch Output	2110301
Ext 2 ch AV Output	2111301
Ext 12 ch RS232 Output	2112301
Ext 12 ch RS-422/485 FD Output	2113301
Ext 12 ch RS-422/485 HD Output	2114301
DV HD-SDI 4 ch Input	2120101
DV HD-SDI 4 ch PR Input	2120201
DV HD-SDI 4 ch Output	2120301
Ethernet Base-T 4 ch Input	2130101
Ethernet Base-T 4 ch PR Input	2130201
Ethernet Base-T 4 ch Ouput	2130301
PECL Bi-dir 2ch Input	2140101
PECL, Bi-dir 2ch PR Input	2140201
PECL Bi-dir 2ch Output	2140301
TTL -> RS232 Trigger converter, 2ch	2199001