



**Innova LINK series
Digital Video Board
USER MANUAL**

0	25.08.10	Original issue	JAT	TOB	KAN
Rev.	Date	Description/Reason for Issue	Made by	Checked by	Approved by

This document contains proprietary and confidential information which belongs to Innova AS. Reproduction, in whole or in part or use of this design or distribution of this information to others is not permitted without the express written consent of Innova AS. This document is to be returned to Innova AS upon request and in any event upon completion of the use for which it was obtained.

Document No.:	Project no:
604368-man-007	604368

	LINK Digital Video Board	<i>Date</i> 25.08.10
	USER MANUAL	<i>Page</i> 2 of 14
	<i>Project no:</i> 604368	<i>Document no:</i> 604368-man-007

Table of contents

1	GENERAL	3
1.1	SCOPE OF DOCUMENT	3
1.2	DEFINITIONS	3
1.2.1	<i>Abbreviations</i>	3
1.3	ESD PRECAUTIONS	3
2	GENERAL DESCRIPTION.....	4
3	FEATURES.....	5
4	FUNCTIONAL DESCRIPTION.....	6
4.1	GENERAL.....	6
4.1.1	<i>Camera control</i>	6
4.1.2	<i>SFP's.....</i>	6
4.1.3	<i>Diagnostics.....</i>	6
5	CONNECTIONS	7
5.1	CONNECTORS.....	7
5.1.1	<i>Input board.....</i>	7
5.1.2	<i>Output board.....</i>	7
5.2	POWER.....	8
5.3	DIAGNOSTICS.....	8
5.4	SUMMARY OF CONNECTOR PIN CONFIGURATIONS	8
5.4.1	<i>Mother board connections</i>	8
6	PHYSICAL LAYOUT	11
6.1	INPUT BOARD.....	11
6.2	OUTPUT BOARD	11
7	CONFIGURATION INSTRUCTIONS	12
8	SPECIFICATIONS	13
9	APPENDIX 1, PN NUMBERS INCLUDING RELATED PRODUCTS	14

Document Revision Index	
Revision	Comments
0	Original Issue

	LINK Digital Video Board	<i>Date</i> 25.08.10
	USER MANUAL	<i>Page</i> 3 of 14
	<i>Project no:</i> 604368	<i>Document no:</i> 604368-man-007

1 General

1.1 Scope of document

This document provides detailed information required for system integration of the INNOVA digital video 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)
HD-SDI	Signal for transmission of digital video signals
WDM	Wave Division Multiplexing
CWDM	Coarse Wave Division Multiplexing

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 digital video boards are members of the Innova LINK family of products for providing an optical link to a remote video system. The units are designed to transfer HD-SDI (SMPTE-292M, SMPTE-259M) signals from digital cameras with a resolution up to 1080 * 1920. The digital video transmission line consists of 2 boards. At the signal source end, the input board which is connected to the digital video source (camera) and converts this to an optical signal. At the receiver end the output board converts the optical signal back to an electrical HD-SDI signal.

Note that these boards can only be used with a digital HD-SDI (SMPTE-292M, SMPTE-259M) signal, it will not work with any type of analogue HD camera.

The pictures below show the 2 boards.



Figure 1, digital video input board.



Figure 2, digital video output board.

Each board has 4 channels, so up to 4 HD-SDI signals can be handled by a pair of boards. 1 optical fibre or 1 wavelength in a WDM system is required for each HD-SDI signal.

	LINK Digital Video Board	<i>Date</i> 25.08.10
	USER MANUAL	<i>Page</i> 5 of 14
	<i>Project no:</i> 604368	<i>Document no:</i> 604368-man-007

3 Features

Power supply: 6 - 12VDC

4 independent HD-SDI channels

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)

	LINK Digital Video Board USER MANUAL	Date 25.08.10
Project no: 604368	Document no: 604368-man-007	Page 6 of 14
		Rev. 0

4 Functional description

4.1 General

The units are designed to transfer HD-SDI signal from digital cameras with a resolution up to 1080 * 1920. The digital video transmission line consists of 2 boards. At signal source (camera) end the input board is connected to the digital video source and converts the electrical signal to an optical signal. At the other end the output board convert the optical signal back to an electrical HD-SDI signal.

The units contain 4 independent channels and standard SFP's are employed for the fibre optic interface. This allows for easy customisation of the fibre optic link characteristics, including wavelengths and optic budget. 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).

4.1.1 Camera control

Cameras are typically controlled via a serial link (RS232 / RS485). Note that the digital video boards do not provide a transmission channel for this. The control link must be provided by other means, for instance by the Innova analogue video board with serial extension board(s).

4.1.2 SFP's

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

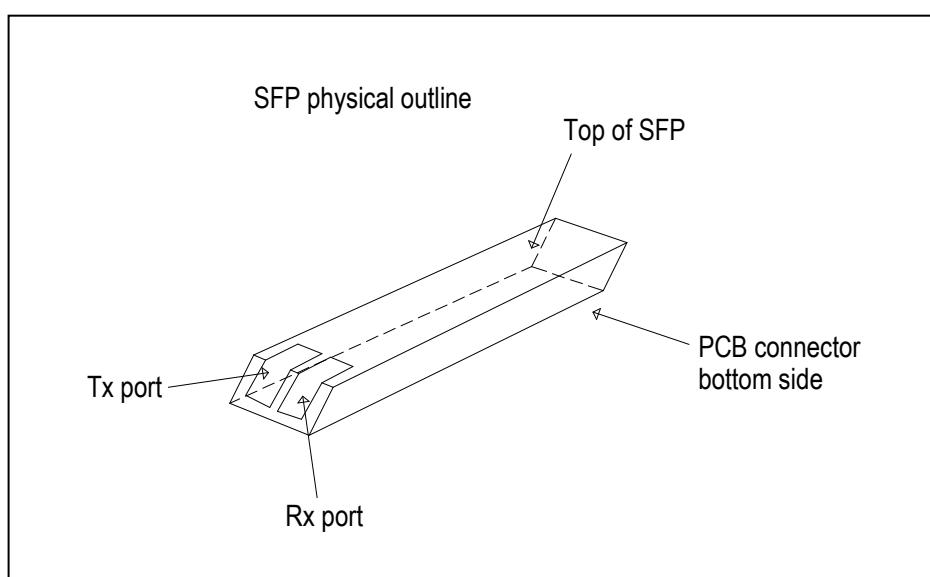


Figure 3, SFP layout.

4.1.3 Diagnostics

A diagnostic port is available on the mother board connector. Diagnostics data is read by the analogue video board and made available on a serial port on the output side. 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.

5 Connections

5.1 Connectors

5.1.1 Input board

Mother board	Nicomatic 222C10M16
Video inputs	BNC
Optic output (from SFP)	LC

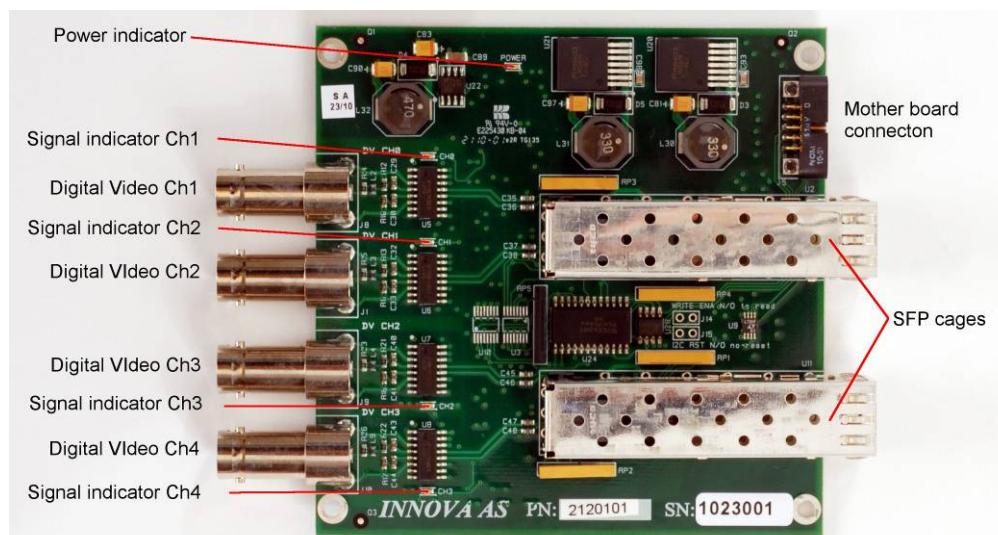


Figure 4, Input board layout.

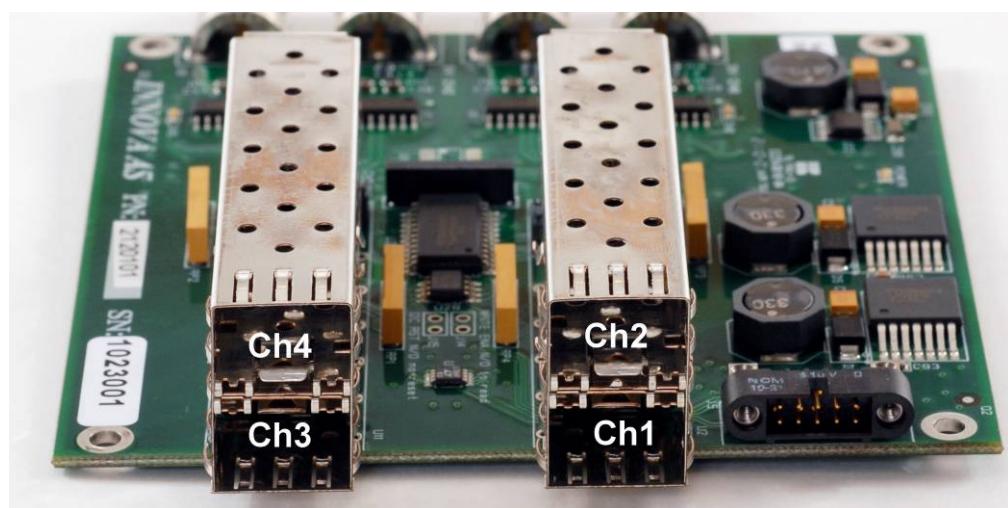


Figure 5, Input board SFP numbering.

5.1.2 Output board

Mother board	DIN B/2
Video output	BNC

Optic input (to SFP) LC

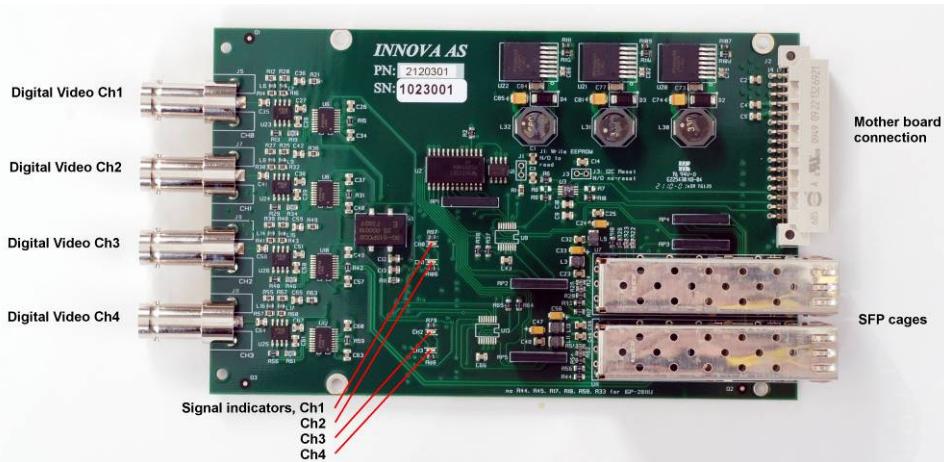


Figure 6, Output board layout.

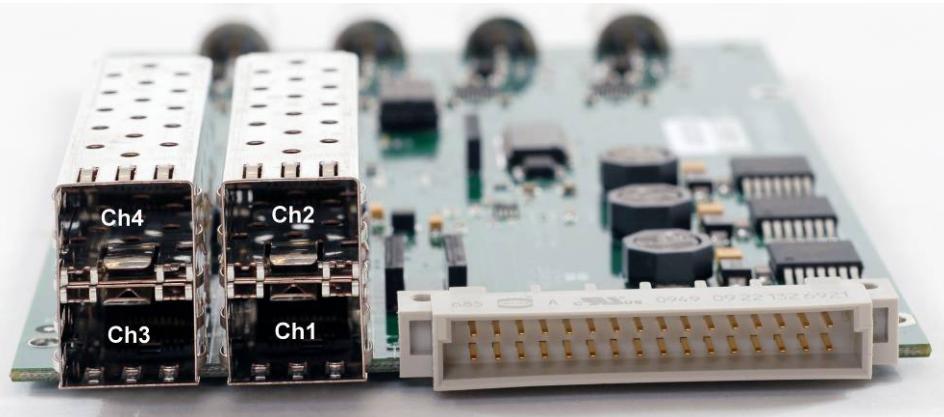


Figure 7, Output board SFP numbering.

5.2 Power

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

5.3 Diagnostics

The diagnostics data are available on the mother board connector on the analogue video output board. This board has 2 RS232 ports, one for diagnostics for the input boards and one for diagnostics for the outputs boards.

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. But in a system with a single board or very few boards the preferred solution may be to wire up power etc. to the

**LINK Digital Video Board
USER MANUAL**Project no: **604368**Document no: **604368-man-007**Date **25.08.10**Page **9 of 14**Rev. **0**

board(s) directly without the mother board. The pin out of the mother boards connectors are given in the tables below.

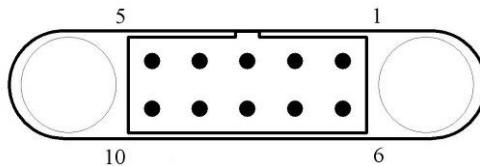


Figure 8, Input board back plane connector pin configuration.

Input board, mother board connector	
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	
Pin #	Function
a1	0V
a2	0V
a3	0V
a4	0V
a5	0V
a6	0V
a7	NC
a8	NC
a9	NC
a10	NC
a11	NC



LINK Digital Video Board
USER MANUAL

Project no: **604368**

Document no: **604368-man-007**

Date **25.08.10**

Page **10 of 14**

Rev. **0**

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	MUXRST
b14	A0
b15	A1
b16	A2

	LINK Digital Video Board	<i>Date</i>	25.08.10
	USER MANUAL	<i>Page</i>	11 of 14
	<i>Project no:</i> 604368	<i>Document no:</i>	604368-man-007

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 suitable filtering of power and signals must be applied.

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

 INNOVA	LINK Digital Video Board USER MANUAL	<i>Date</i> 25.08.10
		<i>Page</i> 12 of 14
	<i>Project no:</i> 604368	<i>Document no:</i> 604368-man-007

7 Configuration instructions

There are no user configurations on these units.

	LINK Digital Video Board	<i>Date</i> 25.08.10
	USER MANUAL	<i>Page</i> 13 of 14
	<i>Project no:</i> 604368	<i>Document no:</i> 604368-man-007

8 Specifications

Power supply voltage: 6 - 12 VDC

Supported video signal standards: SMPTE-292M, SMPTE-259M

Maximum number of video channels: 4

Maximum data rate between boards over each optic link: 1.485 Gbps

Power consumption will vary slightly with SFP type used. The table below gives typical values with 26 dB SFP's.

Number of active video links (SFP's installed only for used channels)	Input board, Current consumption @ 12 V	Output board, Current consumption @ 12 V
1	152mA	256mA
2	206mA	295mA
3	260mA	333mA
4	315mA	375mA



9 Appendix 1, PN numbers including related products

Description	PN
LINK Motherboard Input	2100101
LINK Motherboard connector Input	2101101
LINK Motherboard Output	2100301
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