




# **Innova LINK series**

## **Digital Video Board**

### **USER MANUAL**


|   |                 |                              |               |            |             |
|---|-----------------|------------------------------|---------------|------------|-------------|
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# 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.

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## 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.

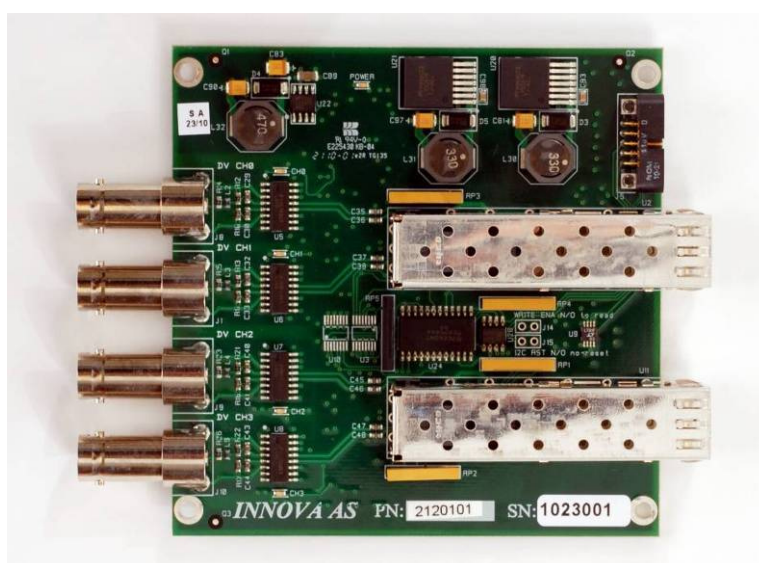


Figure 1, digital video input board.

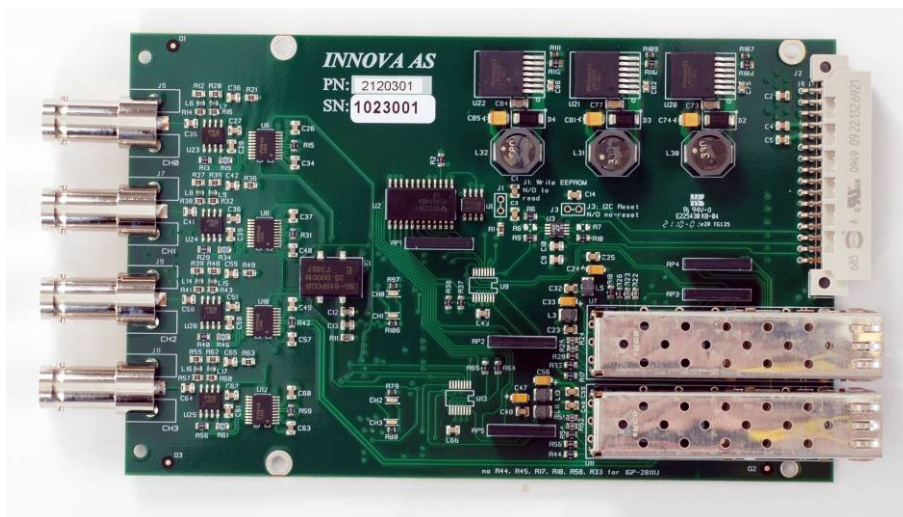



Figure 2, digital video output board.

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.

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### 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)

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## 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.

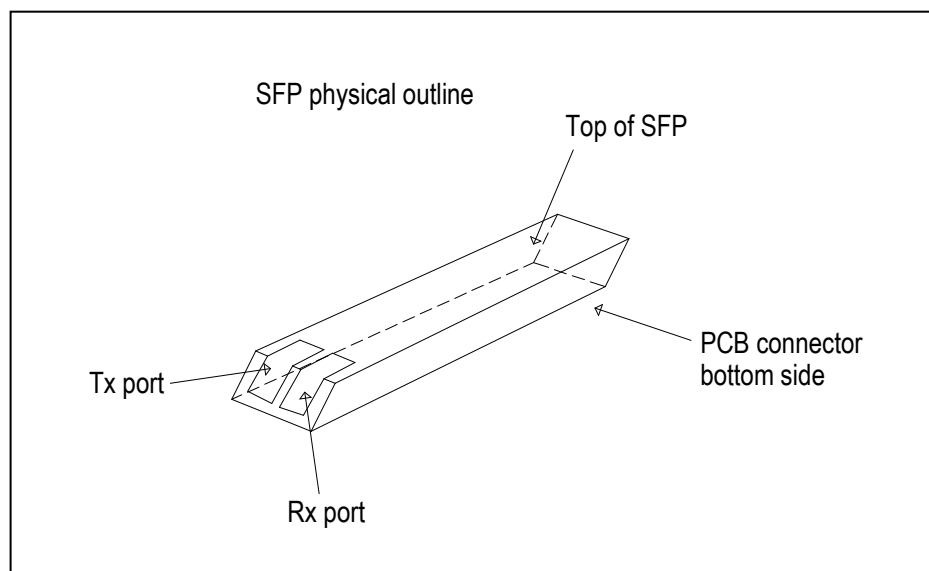



Figure 3, SFP layout.

#### 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.



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## 5 Connections

### 5.1 Connectors

#### 5.1.1 Input board

Mother board                      Nicomatic 222C10M16

Video inputs                      BNC

Optic output (from SFP)        LC

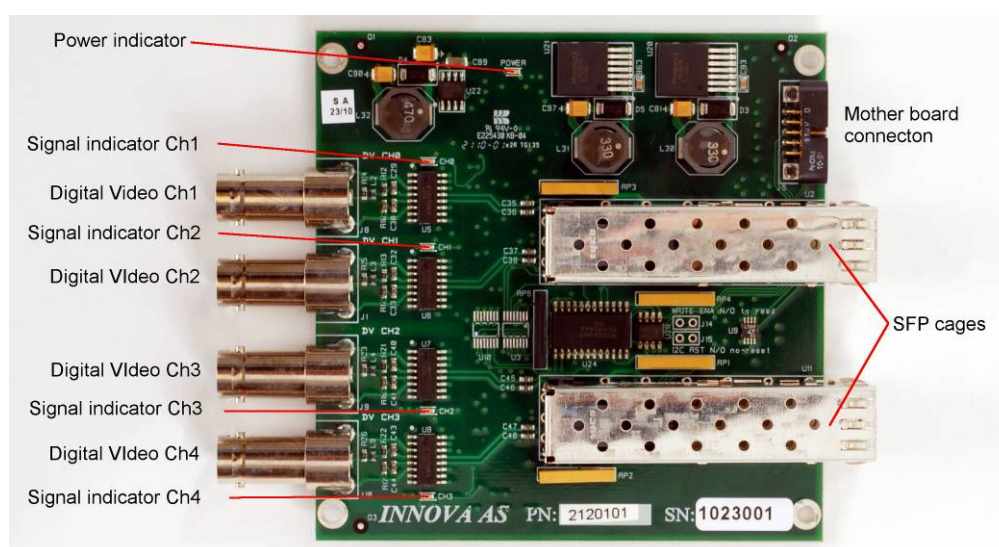


Figure 4, Input board layout.

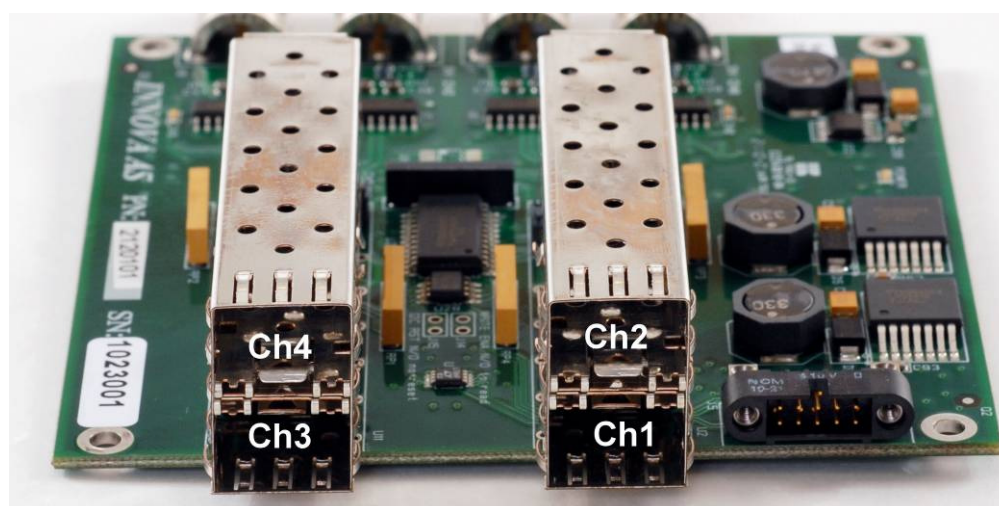



Figure 5, Input board SFP numbering.

#### 5.1.2 Output board

Mother board                      DIN B/2

Video output                      BNC

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Optic input (to SFP)

LC

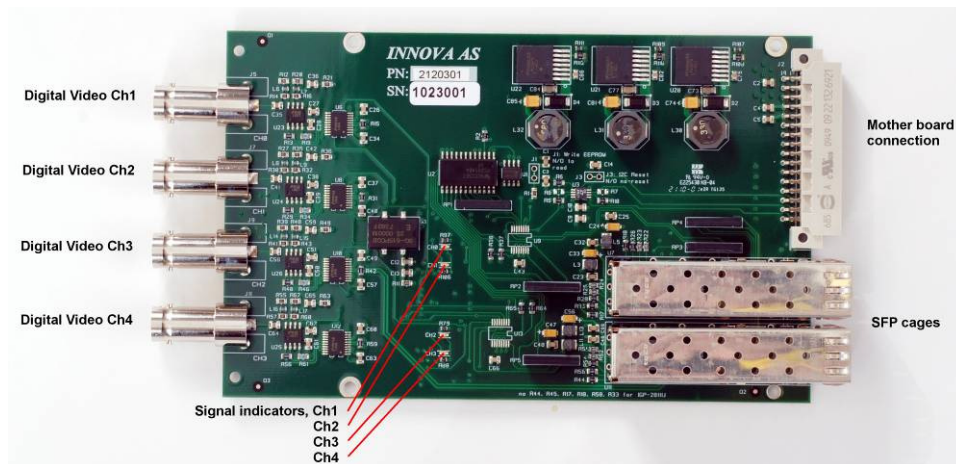


Figure 6, Output board layout.

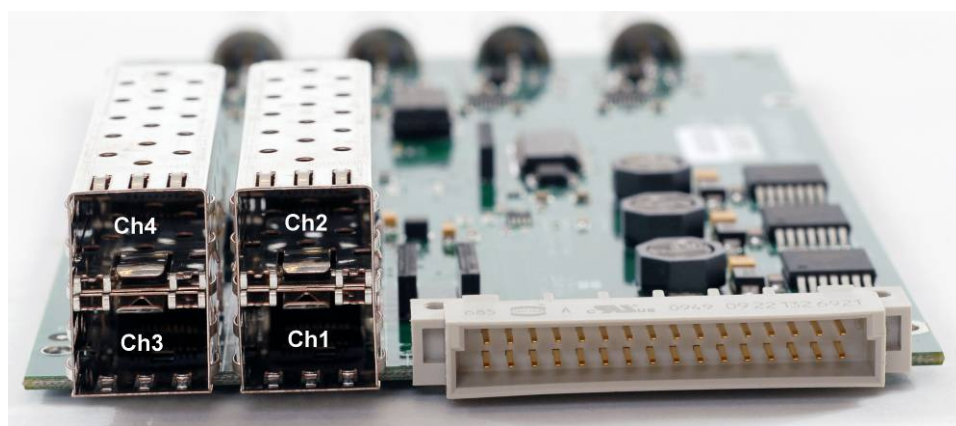


Figure 7, Output board SFP numbering.

## 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



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

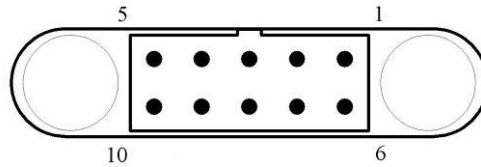




Figure 8, Input board back plane connector pin configuration.

| 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       |

|   |   |                                    |      |                 |
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|     |         |
|-----|---------|
| 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      |

|   |   |                                    |                      |
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## 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                           |

|   |   |   |                             |
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## 7 Configuration instructions

There are no user configurations on these units.

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## 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.

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

|   |   |                                    |                      |
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## 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 |