Innovation in the
Multi-Screen World

ADVANCED FIBRE INTERFACES

V1676/TT AND V1676/RR

USER INSTRUCTION MANUAL

1. Introduction

The V1676 Advanced Fibre Interfaces form part of the Vistek V1600 range of interface products. Based on a 3U-high baseboard, which is common to all members of the V1676 family, the board fits into a V1606 rack, from which it receives its power and control. The V1676 requires a passive rear module (V16FR3J) for all electrical and optical signal interconnections.

The V1676 class supports SDI/ASI data rates of up to 3.0 Gbps and is targeted for SD as well as for High Definition (HD) applications. The V1676 allows an easy migration from existing SD installations to future HD operation.

Due to the modular design, a wide variety of Transmitters or Receivers is available. Laser Transmitters can be offered with different wavelength options, which make the V1676 also a versatile solution for WDM (Wavelength Division Multiplexing) or CWDM (Coarse Wavelength Division Multiplexing) applications.

The V1676 baseboard layout can process two independent channels of SDI/ASI compatible serial data streams.

V1676 configuration options (dual channel assembly):

TT: Dual-channel Fibre Transmitter (Electrical-to-Optical Converter)

- For short, medium and long haul fibre links
- Wide range of laser wavelength available, ideal for WDM and CWDM applications
- Choice of reclocked or non-reclocked optical outputs
- Loop-through electrical outputs

RR: Dual-channel Fibre Receiver (Optical-to-Electrical Converter)

- Excellent sensitivity of optical input
- Dual electrical outputs per channel (both DVB-ASI compatible!)
- Choice of reclocked or non-reclocked electrical outputs

The V1676 baseboard is fully compatible with the Vistek DART remote system. DART compatible rack controllers, can read V1676 board status information.

1.1 Laser Safety

The V1676 TT is a Class 1 Laser Product under the Food and Drug Administration (FDA) / Center for Devices and Radiological Health (CDRH) regulation.

Under normal operating conditions (that is, intended use) the laser cannot emit a hazardous level of optical radiation. No warning label or control measures are required by the FDA/CDRH. The IEC (International Electrotechnical Commission) standard (Publication 60825-1) requires a warning label and specifies that classification be made under fault conditions. Therefore, systems that are Class 1 under FDA/CDRH rules may not necessarily be Class 1 under the IEC.

The V1676 TT Laser wavelengths can range from 1310nm to 1610nm. The average optical output power does not exceed 0dBm (1mW) under normal operating conditions. Unused optical outputs are automatically covered with a shutter and prevent direct exposure to the laser beam.

Even though the power of these lasers is low, the laser beam should be treated with caution and common sense because it is intense and concentrated. Laser radiation can cause irreversible and permanent damage of eyesight. Please read the following guidelines carefully:

- Make sure that a fibre is connected to the board’s fibre outputs before applying power. If a fibre cable (For example, patchcord) is connected to an output, make sure that the other end of the cable is connected before applying power to the board.
- Do not look in the end of a fibre to see if light is coming out. The laser wavelengths (most commonly 1310nm and 1550nm) are totally invisible to the human eye and can cause permanent damage. Always use optical instrumentation, such as an optical power meter, to verify light output.

1.2 Handling Fibre Optic Connections

Basic rules for proper handling of fibre optic connectors:

Do's

- Before attaching the connector, make sure that it is clean, and attach the connector immediately after cleaning.
- Cover unused connectors with dust protection caps.

Don'ts

- Never touch the end face of the fibre connectors.
- Do not leave the connector in a dusty environment.

For cleaning, use only lens-grade, lint-free tissue (For example, Kimwipes), saturated with 99.8+% pure, anhydrous Isopropyl Alcohol (Vistek P/N 950-1000), see chapter 5.

2. Installation

2.1 Rear Panel Connectors

Fig 1. shows the standard 3U rear panel options.

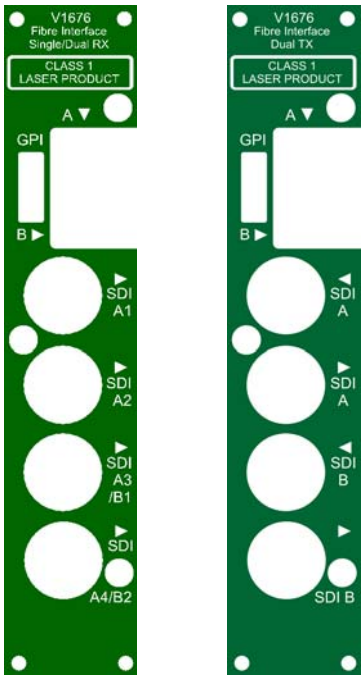

Fig 1. 3U Rear Panels

2.2 Markings

Electrical Outputs:	▶
Electrical Inputs:	◀
Optical Inputs and Outputs:	The connector shutter has a yellow LASER warning symbol: 
GPI Connector:	GPI (For pinouts, please see Chapter 2.3: GPI Connector)

Table 1. Markings

For boards that have at least one Laser Transmitter (TX), a label at the bottom of the panel shows the laser wavelength for each channel.

Note: Laser wavelengths can vary and are subject to the order code.

2.3 User Configuration Options

2.3.1 Baseboard

A Baseboard is the basic board (motherboard) without any enhancements.

There are two user configuration options on the baseboard. One sets the operational mode of the reclocker chips, and the second sets the type of SFP (Small Form-factor Pluggable) fibre module.

A Reclocker chip is present in both channels. They can be either enabled or bypassed. Fig 2. shows the board profile and the location of links LK2 (Channel A) and LK3 (Channel B). The link positions are clearly marked on the board.

The factory default setting for both channels is ‘enabled’.

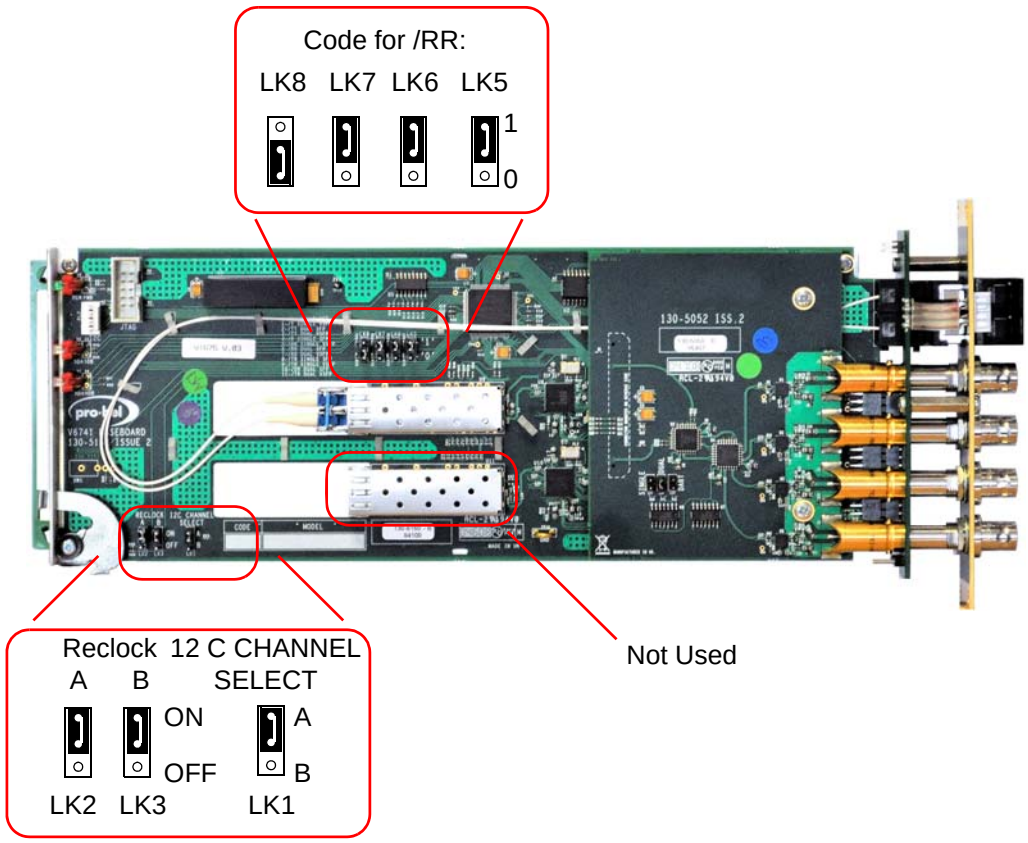

Fig 2. Jumper Locations

The V1676 baseboard can accommodate the SFP fibre modules. All types can have only one SFP module. **Note**: The design has changed slightly as the two, single-channel modules are now either a dual channel Transmitter/TT or a dual channel Receiver/RR.

To enable the I^2C comms channel, always set Link LK1 to “A”.

Both /TT and /RR types use the V1676 baseboard. Set links 5-8 to select the type of module attached to the baseboard. The link settings form a 4-bit binary code that corresponds to the module type. LK5 is the LSB, and LK8 is the MSB. Table 2. lists the module options. The options are also printed on the baseboard.

LK8	LK7	LK6	LK5	Binary Code	SFP Module	
0	0	0	0	0	/T	Single SFP
0	0	0	1	1	/T	Single VSFP
0	0	1	0	2	/TT	Dual SFP
0	0	1	1	3	/TT	Dual VSFP
0	1	0	0	4	R	Single SFP
0	1	0	1	5	/R	Single VSFP
0	1	1	0	6	/RR	Dual SFP
0	1	1	1	7	/RR	Dual VSFP
1	0	0	0	8	/TR	Single SFP
1	0	0	1	9	/TR	Single VSFP
1	0	1	0	10	/TR	Dual SFP
1	0	1	1	11	/TR	Dual VSFP

Table 2. Links to set the Module Type

Note: The V1676 can be used for non-SDI/ASI data rates and formats. SFP refers to non SDI/ASI types. VSFP refers to “Video” SFP types. That is, intended for use with SDI/ASI data rates.

2.4 SFP Sub-modules

The V1676/TT is a dual transmitter, and the V1676/RR is a dual receiver. Transmitter and Receiver sensitivity ratings depend on the type of SFP module attached, see chapter 6.

3. Operation

3.1 Front Panel Indicators

Fig 3. shows the available V1676 front panels:

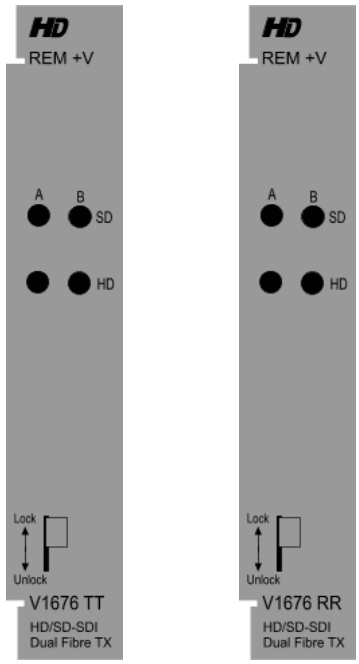

Fig 3. Front Panels

3.1.1 Remote Control Access and Power Indicators

The green +V LED is lit when the unit's on-board power supply is delivering voltage. The yellow REM LED indicates with short blinks that the unit is accessed by the DART controller.

The LEDs do not indicate that the unit is in remote control mode.

If the rack frame does not have a Rack Controller fitted, then the yellow LED does not blink.

3.1.2 SDI Standard / Input Present / Laser Failure Indicators

The LEDs indicate:

- The presence of a valid SDI input signal (electrical or optical).
- The data rate range of the incoming SDI signal (SD or HD).

Both channels (A and B) behave in the same manner:

LED 'Off':	No signal or no valid SDI signal
LED 'GREEN':	Input Signal present (electrical or optical)

4. Dart Interface

The V1676 baseboard is a Class 4 DART module with a serial EEPROM for reading and writing card details through the DARTbus. The unit has several read-only status ports that can provide the board's operational status.

4.1 DART Status Bits

Table 3. lists all available Status Bits:

Bit	Description	
0	Channel A – Rx/Tx Mode Configuration	0: Receiver 1: Transmitter
1	Channel A – Reclocker Configuration	0: Enable 1: Bypass
2	Channel A – Input Status	0: No Input Signal 1: Input Signal Present
3	Channel A – Laser Diode Status (Tx mode only)	0: Laser Diode Failure 1: Laser Diode ok
4	Channel A – Reclocker Format Bit SS0	000: 143 Mb/s 001: 177 Mb/s 010: 270 Mb/s 011: 360 Mb/s 100: 540 Mb/s 101: 1483.5/1485 Mb/s
5	Channel A – Reclocker Format Bit SS1	
6	Channel A – Reclocker Format Bit SS2	
7	Channel A – Reclocker Lock Detect	0: PLL is unlocked 1: PLL is locked
8	Channel B – Rx/Tx Mode Configuration	0: Transmitter 1: Receiver
9	Channel B – Reclocker Configuration	0: Enable 1: Bypass
10	Channel B – Input Status	0: No Input Signal 1: Input Signal Present
11	Channel B – Laser Diode Status (Tx mode only)	0: Laser Diode Failure 1: Laser Diode ok
12	Channel B – Reclocker Format Bit SS0	000: 143 Mb/s 001: 177 Mb/s 010: 270 Mb/s 011: 360 Mb/s 100: 540 Mb/s 101: 1483.5/1485 Mb/s
13	Channel B – Reclocker Format Bit SS1	
14	Channel B – Reclocker Format Bit SS2	
15	Channel B – Reclocker Lock Detect	0: PLL is unlocked 1: PLL is locked
16 to 31	Not used	

Table 3. DART Status Bits

5. Cleaning Instructions

To maintain the performance of optical interconnections, before attaching, you must clean the fibre optic connectors. A single-mode fibre's core diameter is only 8-9 µm; dust particles anywhere from 9 µm down to 1 µm in diameter can significantly decrease the system performance due optical loss.

For cleaning, use only lens-grade, lint-free tissue (For example, Kimwipes), saturated with 99.8+% pure, anhydrous Isopropyl Alcohol. Vistek recommends the use of pre-saturated wipes. One sachet (containing a pre-saturated wipe) is included with each board.

5.1 Cleaning Technique:

Note: Pre-saturated wipes dry out very quickly, therefore use them only once.

1. Place the connector ferrule in the wipe and press the wipe firmly against the sides of the ferrule. Rotate the ferrule several times to remove possible contamination from the ferrule sides.
2. Press a clean part of the wipe against the end of the connector ferrule. Thoroughly clean the end of the connector.
3. Attach the connector immediately.

Basic rules for proper handling of fibre optic connectors:

Do's

- Before attaching the connector, make sure that it is clean, and attach the connector immediately after cleaning.
- Cover unused connectors with dust protection caps.

Don'ts

- Never touch the end face of the fibre connectors.
- Do not leave the connector in a dusty environment.

6. Specifications

6.1 SDI Inputs

SDI Inputs	Dual TX = 2 (1 per Transmitter) Dual RX = 0
Standards	Compliant with: SMPTE 259M (SD) SMPTE 292M/424M (HD) DVB-ASI
Connectors	BNC
Impedance	75 Ohms
Return Loss	<15dB (5MHz to 1.5GHz) <10dB @ 3GHz
Max. Cable Receive Length	SD-SDI/ASI 250m (Belden 8281) HD-SDI (292M) 100m (Belden 1694A) HD-SDI (424M) 60m (Belden 1694A)
Data Rates	270Mb/s, 1.485Gb/s, 2.97Gb/s

6.2 SDI Outputs

SDI Outputs	Dual TX = 2 (1 per Transmitter) Dual RX = 4 (2 per Receiver)
Standards	As SDI Inputs
Connectors	BNC
Impedance	75 Ohms
Return Loss	<15dB (5MHz to 1.5GHz) <10dB @ 3GHz
Amplitude	800mV +/- 5% pk/pk terminated
DC Offset	0V +/- 0.5V
Min. Cable Drive Length	SD-SDI/ASI 250m (Belden 8281) HD-SDI (292M) 100m (Belden 1694A) HD-SDI (424M) 60m (Belden 1694A)
Data Rates	As SDI Inputs

6.3 Optical Inputs

Optical Inputs	Dual TX = 0 Dual RX = 2 (1 per Receiver)
Standards	Compliant with: SMPTE 297-2006/259M (SD) SMPTE 297-2006/292M/424M (HD) DVB-ASI

Connectors	SC/PC with Shutter
Receiver Type	SFP ROSA PIN+TIA
Wavelength	1260-1620nm
Sensitivity	-20dB typical @3Gb/s (max. -18dB)
Optical	Dependant on Tx type/data rate
Receive Length	>10km worst case @ 2.97Gb/s using ‘Pathological Test Signal’
Data Rates	270Mb/s, 1.485Gb/s, 2.97Gb/s

6.4 Optical Outputs

Optical Outputs	Dual TX = 2 (1 per Transmitter) Dual RX = 0
Standards	As Optical Inputs
Connectors	SC/PC with Shutter
Laser Type	SFP TOSA FP (Fabry-Perot)
Wavelength [1]	1310nm (nominal)
Output Power	-2dB typical (min. -5dB, max. 0dB)
Extinction Ratio	7.5dB typical (min. 5dB)
Optical	SD-SDI/ASI 30km max. (Single-Mode)
Drive Length	HD-SDI 20km max. (Single-Mode) >10km worst case @ 2.97Gb/s using ‘Pathological Test Signal’
Data Rates	As Optical Inputs

[1] Other Wavelengths available on request

6.5 GPI Connector

The GPI (General Purpose Interface) connector provides (independently for Channel A and B) error indication by driving the corresponding GPI pin low (0V) when there is no input signal.

The normal operation state of the GPI pins is ‘high’ (VOH min = 2.4V with RLOAD > 1k?)

The GPI connector is a 2.5mm pitch, 4 way, single row, straight pin header from JST (P/N: B4B-EH-A). The corresponding Crimp Socket Housing is of type JST HER-4 and must be used in connection with Crimp Contacts JST BEH-001T-P0.6.

Pin	Signal
1	Channel A
2	Ground (0V)
3	Ground (0V)
4	Channel B

Table 4. GPI Connector Pinout

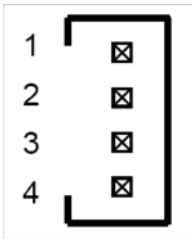

Fig 4. GPI Connector

