OPTICAL
SYSTEMS
DESIGN

OPERATOR MANUAL

OSD818S SERIES

DIGITAL VIDEO AND DATA

FIBER OPTIC TRANSMISSION SYSTEM

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Document No. 101047 Revision 01

OPTICAL SYSTEMS DESIGN

INDEX 1

OSD818S OPERATOR MANUAL

1   TECHNICAL SUMMARY

1.1   BRIEF DESCRIPTION

1.1.1   OVERVIEW

The OSD818ST modem consists of an optical transmitter section which transmits a video signal plus one data signal in digital format as well as an optical receiver section for similar data signals transmitted to the camera for control and communication purposes. The OSD818ST control signal receiver provides adjustment free operation over the full optical range of the unit.

The OSD818SR incorporates a high performance optical digital receiver for incoming video, one data signal and a transmitter, which outputs a digital optical signal consisting of one data channel. It is designed to be used with the OSD818ST. The OSD818SR receiver provides a constant video output level, which is independent of link loss. The data section of the OSD818SR is also adjustment free over all link lengths. Data signal interface levels are the same as those of the OSD818ST.

1.1.2   APPLICATIONS

▲   High quality CCTV networks requiring full duplex or reverse data transmission between cameras and their control center

▲   Transportation communication systems

1.1.3   FEATURES AND BENEFITS

▲   One way optic transmission of PAL, NTSC or SECAM video plus either both way or reverse transmission of one data channel

▲   Transmission of alarm and control signals from the camera site

▲   Operating range of at least 3km on multimode fiber, depending on optical devices

▲   Broadcast quality 10 bit video maintained over all link lengths

▲   Video bandwidth of 10MHz

▲   Remote control of Pan, Tilt and Zoom for video surveillance

1.2   TYPICAL CONFIGURATION

FIGURE 1 below indicates a typical set-up for an OSD818S system. Figure 1(a) is a standard OSD818S system and 1(b) illustrates WDM single fiber versions of the OSD818S system.
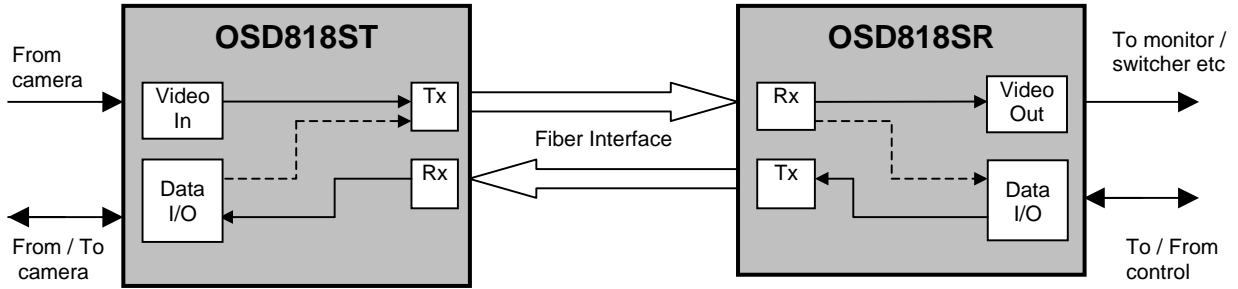
(a) OSD818ST to OSD818SR Two Fiber System
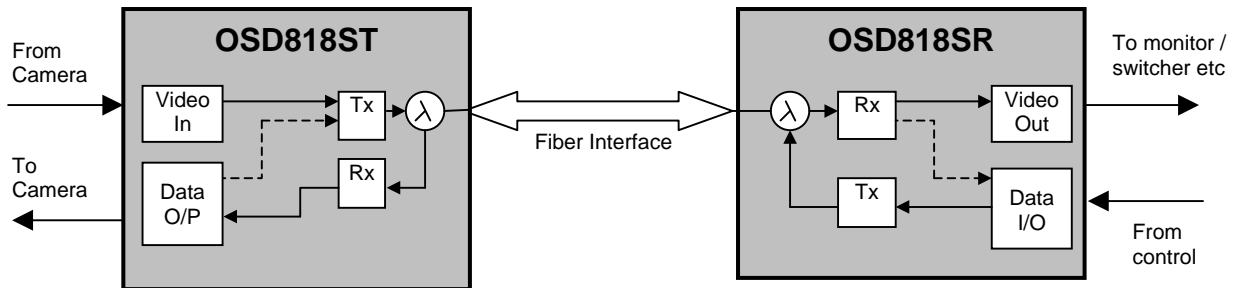
(b) OSD818ST to OSD818SR Single Fiber WDM Operation

FIGURE 1: OSD818S TYPICAL CONFIGURATIONS

The OSD818ST and OSD818SR pair can provide full duplex data transmission between camera (transmitter) and monitoring site (receiver) or one way data transmission from the monitoring site (receiver) to the camera (transmitter) only.

1.3 PRODUCTS AND OPTIONS

There are various options available for the OSD818S as identified in Table 1 below:

OSD818S | T | SFSW | L | C | W | (example only)
      ❶   ❷   ❸   ❹   ❺

TABLE 1: PRODUCTS AND OPTIONS

❶

ITEM	DESCRIPTION
T	Transmitter
R	Receiver

❷

ITEM	DESCRIPTION
-	Two Fiber System
SFSW	Single Fiber Single Wavelength System

❸

ITEM	DESCRIPTION
-	Multi-mode version
L	Single-mode version
LDN	1300nm AND 1550nm LASER (where "N" indicates Laser type)

❹

ITEM	DESCRIPTION
-	Card version (3RU high chassis mount for OSD370)
C	Stand-alone case version (clamshell case)

❺

ITEM	DESCRIPTION
-	Two optical fiber operation
W	Wavelength Division Multiplexed (WDM) single fiber operation

1.4   TECHNICAL SPECIFICATIONS

Table 2 below provides Technical Specifications for the OSD818S.

TABLE 2: TECHNICAL SPECIFICATIONS

NO	SPECIFICATION	PERFORMANCE
1	Video Input/Output Impedance	75Ω composite
2	Video Input/Output Levels	1.0 Vpp nominal
3	Video Connectors	BNC
4	Video Bandwidth	5Hz to 10MHz (±1dB)
5	Signal to Noise Ratio (Weighted)	> 63dB for 10-bit operation > 60dB for 9-bit operation
6	Linearity	<0.7% Differential Phase (DP) <0.7° Differential Gain (DG)
7	Data Interface	TTL, RS232 and RS422 31kHz Manchester or Biphase possible in either direction
8	Data Rates	DC to >400kbps
9	Data Connectors	8 Way terminal block with screw clamps
10	Transmitter Wavelength	850nm multimode 1310nm singlemode
11	OSD818ST Transmitter Coupled Power	>-15dB into multimode fiber >-10dB into singlemode fiber (OSD818STL version only)
12	OSD818SR Transmitter Coupled Power	>-20dB into multimode fiber >-20dB into singlemode fiber (OSD818STL version only)
13	OSD818SR Receiver Sensitivity	<-29dBm
14	OSD818SR Receiver Saturation	>-3dBm
15	OSD818ST Receiver Sensitivity	<-40dBm
16	OSD818ST Receiver Saturation	>-10dBm
17	Optical Connectors	ST standard, FC and SC are optional
18	Dimensions (mm)	104W x 104D x 25H (module) 25W x 208D x 100H (card)
19	Weight	0.4kg (module), 0.2kg (card), 2.6kg (1RU)
20	Power Requirements	+9V to +15V DC or AC @ 300mA
21	Operating Temperature	-20°C to +75°C
22	Relative Humidity	0 to 95% non-condensing

NOTES:

Many combinations of laser types and optical levels, receiver types and sensitivity levels are possible. Contact OSD for details.

1.5   PRODUCT DESCRIPTION

The OSD818S series is a high-quality fiber optic digital video and data transmission system. The system consists of the OSD818ST and the OSD818SR, which are designed to be used as a pair, and provide one-way transmission of PAL, NTSC or SECAM video, plus full-duplex transmission of one data channel.

The OSD818ST accepts one analog composite video input signal along with one digital data input signal. The video signal is converted to digital with 10-bit[*1] resolution so as to preserve the quality of the input signals. The resulting digital signal is multiplexed and transmitted as a digital bitstream through the fiber. The OSD818ST also includes an optical receiver section that decodes the digital signal transmitted by the OSD818SR, to provide data output signals. Data can be TTL, RS232, quasi RS485 or RS422 31kHz Manchester or Biphase on one channel. The OSD818ST control signal receiver provides adjustment free operation over the full optical range of the unit.

The OSD818SR incorporates a high performance optical digital receiver for incoming video and data signals, and a transmitter that outputs a digital optical signal consisting of one data channel. The unit provides a constant video output level which is independent of link loss, and data section of the OSD818SR is also adjustment free over all link lengths. Data signal interface levels are the same as those of the OSD818ST.

The OSD818ST and OSD818SR are available in two physical configurations: card or module. The card versions are designed to fit the 3RU-high 19" OSD370 chassis, which allows multiple OSD card products to be conveniently powered from and located in the one chassis. The module case versions are intended for isolated use and require an external power source.

The OSD818S system can be used with any standard multimode optical fiber, and is available optionally for singlemode fiber use. A Wavelength Division Multiplexing version is also available to allow the use of a single fiber for transmission and reception.

[*1]   Video resolution can be either 10-bit with reverse data only, or 9-bit with duplex data (i.e. forward data). See section 1.6 for further details

1.6   PIN ASSIGNMENTS

Pin assignments for the "Data Input/Output" 8 way terminal block connector (Figure 2) is shown in Table 3 below.

TABLE 3: PIN ASSIGNMENT

FUNCTION	PIN	FUNCTION	PIN
Data Input +	1	Data Output -	5
Data Input -	2	RS232 Data Output	6
Reserved	3	Data Ground	7
Data Output +	4	Mode: N/O[*2] – 10-bit video, reverse data only N/C [*3] – 9-bit video, duplex data	8

NOTES:

[*2]   10-bit video resolution and reverse data only when pin 8 is left Normally Open (N/O)

[*3]   9-bit video resolution and full duplex (or forward) data, only when pin 8 is connected to ground pin 7

Quasi RS485 Data Output is available on pins 4 and 5 when link LK2 has pins 2 and 3 connected.
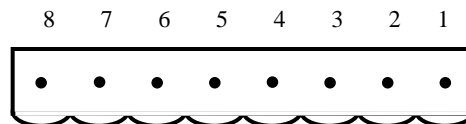
```
8   7   6   5   4   3   2   1
•   •   •   •   •   •   •   •
```

FIGURE 2: 8 WAY TERMINAL BLOCK CONNECTOR

2   INSTALLATION AND OPERATION

2.1   INTRODUCTION

This section outlines the methods required to install and operate the OSD818ST and OSD818SR successfully. It should be studied carefully if damage to the equipment or poor results are to be avoided.

This equipment has been fully tested prior to dispatch and is ready for immediate operation. However it is advisable to check for external transportation damage before operation. If damage is evident, return the unit with the packaging to your supplier immediately.
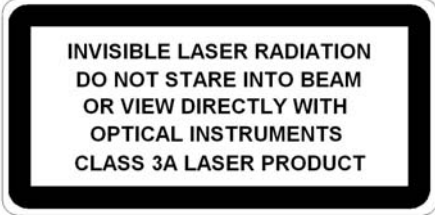
2.2   INSTALLATION

2.2.1   WARNING AND PRECAUTIONS

ELECTROMAGNETIC COMPATIBILITY

WARNING: This is a **Class A product**. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

OPTICAL OUTPUT OPERATION

Class 1	Class 3A
The multimode version of the OSD818S is a **Class 1 LED product**. Wavelength of 850nm and <-8dBm power output.	The singlemode and WDM versions of the OSD818S are **Class 3A laser products.** Wavelength of 1310nm and <+5dBm power output or wavelength of 1550nm and <+7dBm power output.
	INVISIBLE LASER RADIATION DO NOT STARE INTO BEAM OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS CLASS 3A LASER PRODUCT

PRECAUTIONS

▲   All service personnel should be provided training as to the hazards of direct viewing of laser radiation and of the precautionary measures during servicing of equipment

▲   Areas where laser products are installed should be restricted in access to trained service personnel only and appropriate warning signs posted in the work area.

▲   All laser apertures should be covered by protective covers when not connected to optical fibers. Never leave outputs uncovered.

▲   Laser equipment should be positioned above or below eye level where possible. Apertures should be positioned away from personnel.

▲   Protective eyewear should be worn in the vicinity of laser equipment.

2.2.2   OSD818S DRAWINGS AND DIMENSIONS

The OSD818STC and OSD818SRC are designed to be mounted on an even surface and to be secured by means of M4 or smaller screws. The OSD818ST and OSD818SR card versions are designed to be inserted into a chassis and secured by means of captivated screws.
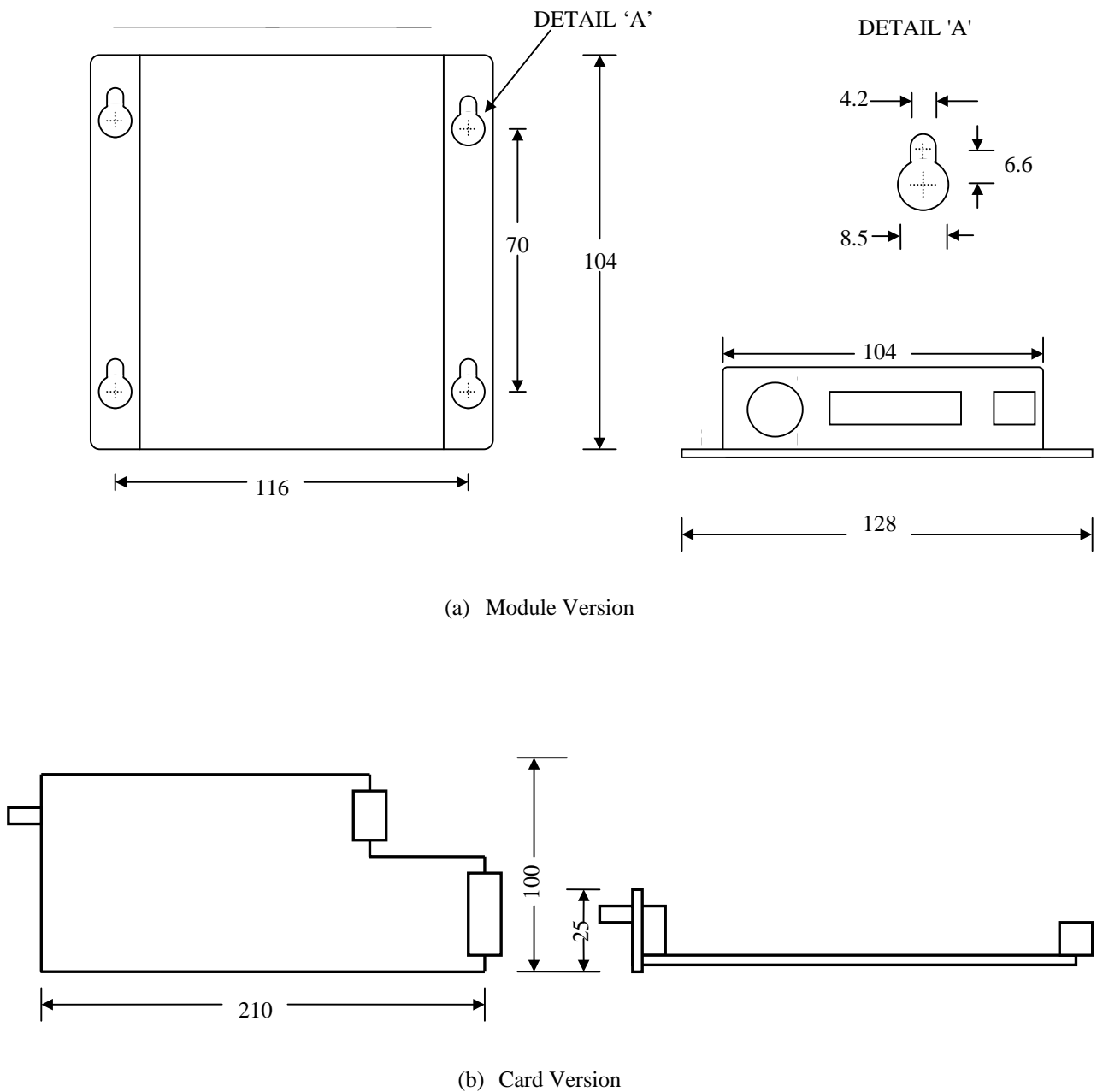

(a) Module Version

(b) Card Version

FIGURE 3: OSD818S CASE MOUNTING DIMENSIONS

2.2.3   POWER SUPPLY CONNECTIONS

The OSD818S card version is powered from the OSD370 chassis. DC power in the OSD818S card version is connected via a DB9 connector. The card version of the OSD818ST and OSD818SR should be fixed into the OSD370 chassis using the captivated screws. Either card can be plugged in or out of the OSD370 chassis with power on or off.

The OSD818S module requires external DC or AC power. The voltage range of the OSD818S is +9V to +15V with maximum current output of 300mA. Power should be connected to the power socket located at the back of the case. DC or AC power should be connected as indicated in Table 4.

TABLE 4: DC OR AC POWER CONNECTION

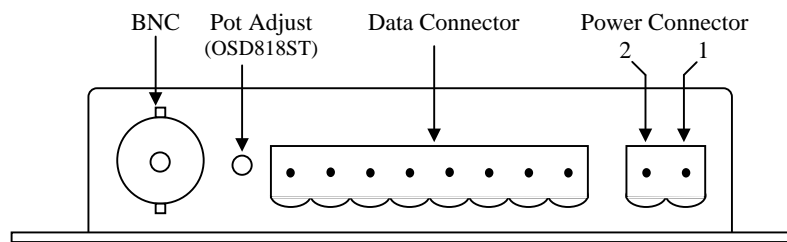| External Power Pin	Specification
Pin 1	+9V to +15V DC or AC
Pin 2	DC $\rightarrow$ Ground AC $\rightarrow$ AC (see NOTE)

FIGURE 4: OSD818STC AND OSD818SRC POWER SUPPLY CONNECTIONS

NOTE:
    For AC supplies the polarity is not applicable, but Pin 2 **must not** be grounded. The module versions have a full bridge rectifier circuit, grounding Pin 2 will short half the bridge circuit (Figure 5) and damage the product!
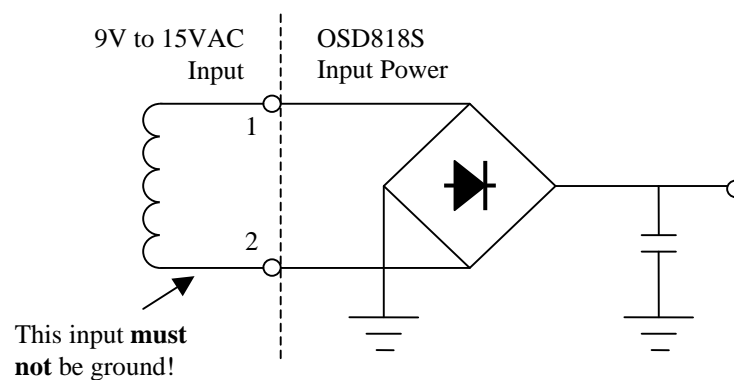

FIGURE 5: AC INPUT VOLTAGE DIAGRAM

2.2.4   OTHER CONNECTIONS

The video-input signal (eg. from camera) is connected to the video input BNC connector on the OSD818ST. The video output signal (eg. to monitor) is connected from the video output BNC connector on the OSD818SR.

Data signals are connected to the 8 way terminal block connector as set out in Table 3.

The optical fiber cable must be terminated with the appropriate optical connector. Before connection, inspect the ends of the connectors to ensure that no dust or dirt is present as it could contaminate the modem connector and result in poor performance.

If it is necessary to clean the cable connectors, use isopropyl alcohol and lint free tissue to remove contamination.

2.2.5   QUASI RS485 SETTINGS

Link settings are shown in Table 5, and can be configured to suit user requirements. Link settings are factory preset as per requirements. **Only Optical Systems Design or its nominated authorized representative should change internal link settings if required.**

Both the OSD818ST and the OSD818SR have configurable links on the PCB.

TABLE 5: OSD818ST AND OSD818SR RS485 LINK CONFIGURATION

LK	No. of Pins	FUNCTION	SETTING
2	3	Sets RS422 output on data output (default)	Pins 1-2
		Sets Quasi RS485 output on data output	Pins 2-3

2.3   OPERATION

2.3.1   OSD818ST OPERATION

When using the OSD818ST for the first time, check that the unit is in good condition with no visible damage.

If a card version is used, insert it in an appropriate slot on the OSD chassis and check that the indicators illuminate accordingly on power up. If a module version (OSD818SC) is used, connect the unit to an appropriate power source and check that the indicators illuminate accordingly on power up.

In either case take special note of the "Laser" indicator, it should be illuminated 'green'. If it is 'red' there may be a problem with the laser. Disconnect power and have the unit checked as soon as possible.

To connect a video signal, connect a BNC terminated coaxial cable from the camera to the unit. If the camera is operational, the "Video Present" indicator should illuminate 'amber'.

Finally, plug in the optical connectors of the optical cable. If the remote OSD818SR is connected, the "Link OK" LED will change from 'red' to 'green'.

Plug the digital signal source (data) into 8 way terminal block connector on the rear of the module.

Ensure that the correct signals are connected to the correct pins of Data Input/Output connector as specified in Table 3.
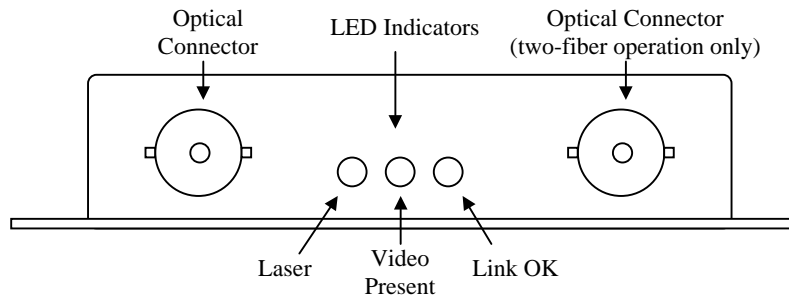

FIGURE 6: OSD818STC AND OSD818SRC FRONT SIDE VIEW

2.3.2   OSD818SR OPERATION

When using an OSD818SR for the first time check that the unit is in good condition with no visible damage.

If a card version (OSD818SR) is used, insert it in an appropriate slot on the OSD chassis and check that the indicators illuminate accordingly. If a module version (OSD818SRC) is used, connect the unit to an appropriate power source and check that the indicators illuminate accordingly.

The "Laser" indicator LED should be 'green' in both card and case versions, if the LED is 'red' there may be a problem with the laser. Disconnect power and have the unit checked as soon as possible.

Connect a BNC terminated coaxial cable between the BNC socket on the rear of the module and the video monitor or switcher.

Connect the optical cable: if adequate optical power is received and signal is locked the "Link OK" indicator will illuminate 'green'. If a video signal is being received the "Video Present" indicator should be 'green'; if no video signal is being received this indicator will be 'red'.

Plug the digital signal source signal into the 8 way terminal block connector on the rear of the module. Ensure that the correct signals are connected to the correct pins of Data Input/Output connector as specified in Table 3.

2.3.3   VIDEO CONTROLS

The OSD818STC has a trimpot located on the side rear between the BNC connector and the 8 way terminal block connector (see Figure 4). Its function is to correct drop of higher frequencies due to extent length of coaxial cable between camera and unit. By default, it is set to minimum (which means that no correction is in place). If needed, adjust level of correction by turning trimpot counterclockwise.

2.3.4   OSD818ST AND OSD818SR INDICATORS

TABLE 6: OSD818ST AND OSD818SR INDICATOR FUNCTION

INDICATOR	PARAMETER	COLOUR	FUNCTION
Laser	Laser Status	Green Red	Laser OK Laser Not OK
Video Present	Video Input Status	Green (Amber OSD818ST) Red (Off OSD818ST)	Present Not Present
Link OK	Link Status	Green Red (Off OSD818SR)	Locked Not Locked

NOTE:

"Link OK " Indicator refers to the received data stream. It is 'green' after the optical link is established and the receiver is locked onto the incoming data stream and detected a low Bit Error Rate. It will indicate 'red' after the Bit Error Rate reaches an unacceptable level and before the number of bit errors has reduced to a low rate.

3   MAINTENANCE

3.1   INTRODUCTION

The following section outlines the fault-finding procedure for the OSD818ST and OSD818SR modems. Please take note of the following:

▲   Personnel without appropriate training should not attempt any maintenance except that outlined below.

▲   If further maintenance is attempted you are warned that every care should be taken to ensure that internal measurements made while the equipment is operational are taken carefully as some components within the unit are expensive and may be damaged by failure of any portion of their support circuitry.

▲   Some components within the unit are Electrostatic (ES) sensitive and Electrostatic Discharge (ESD) precautions should be taken when performing maintenance upon the unit.

3.2   EXTERNAL INSPECTION

Visually check for the following:

▲   Check that the correct power source is connected to the power socket.

▲   Check that the data signals are connected to the modem correctly and that the distant OSD818ST or OSD818SR modem has been terminated correctly to any external equipment.

▲   Inspect the optical connectors for any contamination and clean using isopropyl alcohol and a lint free tissue if any contamination is detected.

▲   Check that any external termination resistors are connected if the system configuration requires them.

3.3   ROUTINE MAINTENANCE

▲   There is no routine maintenance required with the OSD818ST and OSD818SR.

4 WARRANTY

Thank you for purchasing equipment designed, manufactured and serviced by Optical Systems Design (OSD). OSD warrants that at the time of shipment, its products are free from defects in material and workmanship and conforms to specifications. Our Warranty conditions are outlined below:

4.1 WARRANTY PERIOD

For warranty period, please call your local OSD distributor.

4.2 REPAIRS

Optical Systems Design reserves the right to repair or replace faulty modules/units. Please obtain a "Return Material Authorisation" (RMA) form and number before returning goods.
Goods must be returned in adequate packing material to Optical Systems Design, Warriewood or its nominated authorised representative, for all repairs.

4.2.1 WARRANTY REPAIRS

Return shipments to OSD shall be at customer's expense and freight back to the customer will be at OSD expense.

4.2.2 OUT-OF-WARRANTY REPAIRS

OSD reserves the right to repair or replace any faulty goods. Freight costs and insurance for both journeys are met by the user. All equipment repaired by OSD will have a 3-Month Warranty from the date of dispatch.

4.2.3 SITE REPAIRS

By agreement site repairs may be undertaken for which out of pocket, hotel and travel expenses will be charged.

4.2.4 EXCLUSIONS

This warranty does not apply to defects caused by unauthorized modifications, misuse, abuse or transport damage to the equipment. All modifications to OSD's standard product will need written authorization and will be charged at normal repair rates. All modifications are to be carried out by OSD Technicians. Warranty is void if unauthorized removal and/or tampering with serial number and/or repair labels is evident.

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