OPTICAL
SYSTEMS
DESIGN

OPERATOR MANUAL

OSD838

DIGITAL VIDEO, DATA AND ETHERNET

FIBER OPTIC TRANSMISSION SYSTEM

INDEX 1

1 TECHNICAL SUMMARY

1.1 PRODUCT DESCRIPTION

1.1.1 OVERVIEW

The OSD838 series is a high-quality fiber optic digital video and data transmission system. The system consists of the OSD838T and the OSD838R, 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 relay, three data channels and Ethernet.

The OSD838T accepts one analog composite video input signal along with three digital data channels, one relay contact channel and Ethernet channel. The video signal is converted to digital with 10-bit resolution to preserve the high quality of the input signals. The resulting digital signals are multiplexed and transmitted as a forward digital bitstream through the fiber. The OSD838T also includes an optical receiver section that decodes the digital signal transmitted by the OSD838R, to provide reverse data and relay output channels. Data can be RS232, TTL, RS422 on two channels operating from DC to 400kbps and RS232 on the 3rd channel operating from DC to 57.6kbps. RS485 data is available on channel 1 with user adjustable turnaround times. The relay channel is a full duplex contact input/relay output channel for control/alarm purposes. The Ethernet channel is auto-selected between 10 or 100Mb/s. The OSD838T control signal receiver provides adjustment free operation over the full optical range of the unit.

The OSD838R incorporates a high performance optical digital receiver for incoming video and data signals, and a transmitter that outputs a digital optical signal consisting of Ethernet and three data channels. The unit provides a constant video output level, which is independent of link loss, and data section of the OSD838R is also adjustment free over all link lengths. Data/Ethernet signal interface levels and impedances are the same as those of the OSD838T.

The OSD838T and OSD838R are available in two physical configurations: card and standalone case. The card versions are designed to fit the 3RU-high 19” OSD370 or OSD350 chassis, which allows multiple OSD card products to be conveniently powered from and located in the one chassis. The standalone case is intended for isolated use and requires an external power source.

The OSD838 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.

1.1.2 APPLICATIONS

- High quality CCTV networks requiring full duplex Ethernet and/or data transmission between cameras and either control centre
- Extremely high quality video conferencing.
- Broadcast television systems
- Transportation communication system

1.1.3 FEATURES AND BENEFITS

- One way optic transmission of PAL, NTSC or SECAM video plus full duplex transmission of
  - One 10/100 Base-T Ethernet channel
  - Three data channels
  - One relay contact channel
- Video bandwidth of 10MHz
- Remote control of Pan, Tilt and Zoom for video surveillance
- Transmission of alarm and control signals from the camera site
- Operating range of at least 3km on multimode fiber, depending on optical devices
- Video inputs have 3dB overload capability and can be equalized for up to 300m of coaxial cable.

1.2 TYPICAL CONFIGURATION

FIGURE 1 below shows a typical set-up for an OSD838 system.

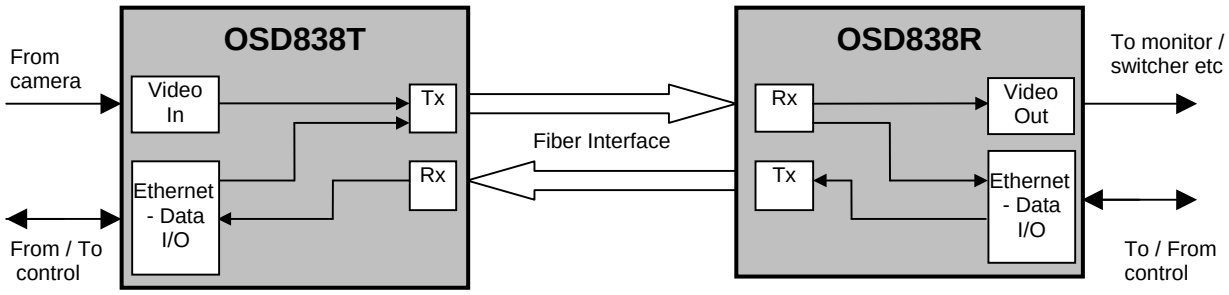


FIGURE 1: OSD838 CONFIGURATION

The OSD838T and OSD838R pair provides full duplex data/Ethernet transmission between camera (transmitter) and monitoring site (receiver).

1.3 PRODUCTS AND OPTIONS

There are various options available for the OSD838 as identified in Table 1 below:

OSD 838 | T | R | 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
-	No relay output
R	Relay output option

❸

ITEM	DESCRIPTION
-	Multimode version
L	Singlemode version
LDN	1300nm and 1550nm LASER (where “N” indicates Laser type)

❹

ITEM	DESCRIPTION
-	Card version (3RU high chassis mount for OSD370)
C	Case version

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 OSD838.

TABLE 2: TECHNICAL SPECIFICATIONS

SPECIFICATION	PERFORMANCE
Video Input/Output Impedance	75Ω composite
Video Input/Output Levels	1Vpp nominal
Video Connectors	BNC
Video Bandwidth	5Hz to 10MHz (±1dB)
Signal to Noise Ratio (Weighted)	> 67dB at all receive levels over the unit's full dynamic range
Linearity	<0.5° Differential Phase (DP) <0.5% Differential Gain (DG)
Data Interface	TTL, RS232, RS422, RS485 31kHz Manchester or Biphase possible in either direction
Data Rates	DC to >400kbps on 3 data channels DC to >100bps on relay channel
Data Connectors	26 Pin female high density D connector
Ethernet Data Rate (auto select)	IEEE Ethernet standards at 10/100Mbps
Ethernet Connector	RJ45
Transmitter Wavelength	850nm (1310nm for OSD838TL or OSD838RL options)
OSD838T Transmitter Coupled Power	>-15 to -5dBm into multimode fiber >-15 to –3dBm into singlemode fiber (OSD838TL version only)
OSD838R Transmitter Coupled Power	>-20 to -14dBm into multimode fiber >-20 to –10dBm into singlemode fiber (OSD838RL version only)
OSD838R Receiver Sensitivity	<-29dBm
OSD838R Receiver Saturation	>-3dBm
OSD838T Receiver Sensitivity	<-37dBm
OSD838T Receiver Saturation	>-10dBm
Link Distances	>2km multimode for standard 850nm OSD838 link (fiber bandwidth limited) >3km multimode for optional 1310nm OSD838L link (fiber bandwidth limited) >30km singlemode for optional 1310nm OSD838L link (fiber loss limited)
Optical Connectors	ST standard, others optional
Dimensions (mm)	104W x 144D x 44H (case) 50W x 208D x 100H (card)
Weight	400g (case), 200g (card)
Power Requirements	+10 to 24V_{DC} @ 4VA
Operating Temperature	-20 to +75°C
Relative Humidity	0 to 95% non-condensing
Chassis Current Consumption (CCC)	0.35 Amp

10283805

NOTES:

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

1.5 PIN ASSIGNMENTS

1.5.1 PIN ASSIGNMENTS DB26 HIGH-DENSITY CONNECTOR

Pin assignment for the DB26 connector (Figure 2) is shown in Table 3.

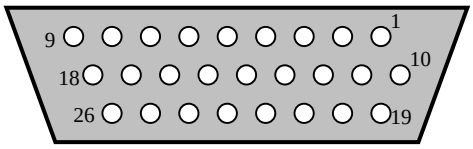


FIGURE 2: DB26 FEMALE HIGH DENSITY CONNECTOR

TABLE 3: PIN ASSIGNMENT

FUNCTION	PIN	FUNCTION	PIN
Data Ground	1,6	Data Output 1 + / 2W RS485+	2
Data Input 1 +	10	Data Output 1 - / 2W RS485-	11
Data Input 1 -	19	Data Output 2 +	12
Data Input 2 +	20	Data Output 2 -	21
Data Input 2 -	3	Relay Input	22
RS232 Input	4	Relay Output N.O.	5
RS232 Output	13	Relay Output N.C.	14
		Relay Output Common	23

NOTES:

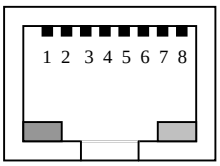
Two-wire RS485 is only available on Data Channel 1.
Data Channel 1 RS232 output is available on pin 2 when link LK6 has pins 1 and 2 connected.
Data Channel 2 RS232 output is available on pin 12 when link LK7 has pins 1 and 2 connected.
Data Channel 3 RS232 output is always on pin 13.

RS485 2-Wire half duplex is used to connect several devices to the same bus when only one unit transmits data at a time. All units are normally in high impedance receive mode waiting for data. When transmission of data is requested, the device waits for a protocol specific turn-around time delay before transmitting after which it returns to receive mode.

RS485 4-Wire full duplex is used for master/slave arrangement. Devices are polled and respond faster with no turn-around time delay required between request/response. The receiver is always enabled allowing the devices to receive data even while responding to a request.

Note: If a link doesn't seem to be working correctly, try swapping the polarity of the data lines on both ends. Some devices are marked opposite the RS485 standard.

1.5.2 RJ45 CONNECTOR (10/100 BASE-T ETHERNET)



Green LED:
LINK

Yellow LED:
ACTIVITY

1: Tx+
2: Tx-
3: Rx+
4: Not Used
5: Not Used
6: Rx-
7: Ground
8: Ground

FIGURE 3: 10/100 BASE-T ETHERNET RJ45 CONNECTOR

2 INSTALLATION AND OPERATION

2.1 INTRODUCTION

This section outlines the methods required to install and operate the OSD838T and OSD838R 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 OSD838 is a **Class 1 LED product**. Wavelength of 850nm and <-8dBm power output.	The singlemode and WDM versions of the OSD838 are **Class 3A laser products.** Wavelength of 1310nm and <+5dBm power output or wavelength of 1550nm and <+7dBm power output.
	

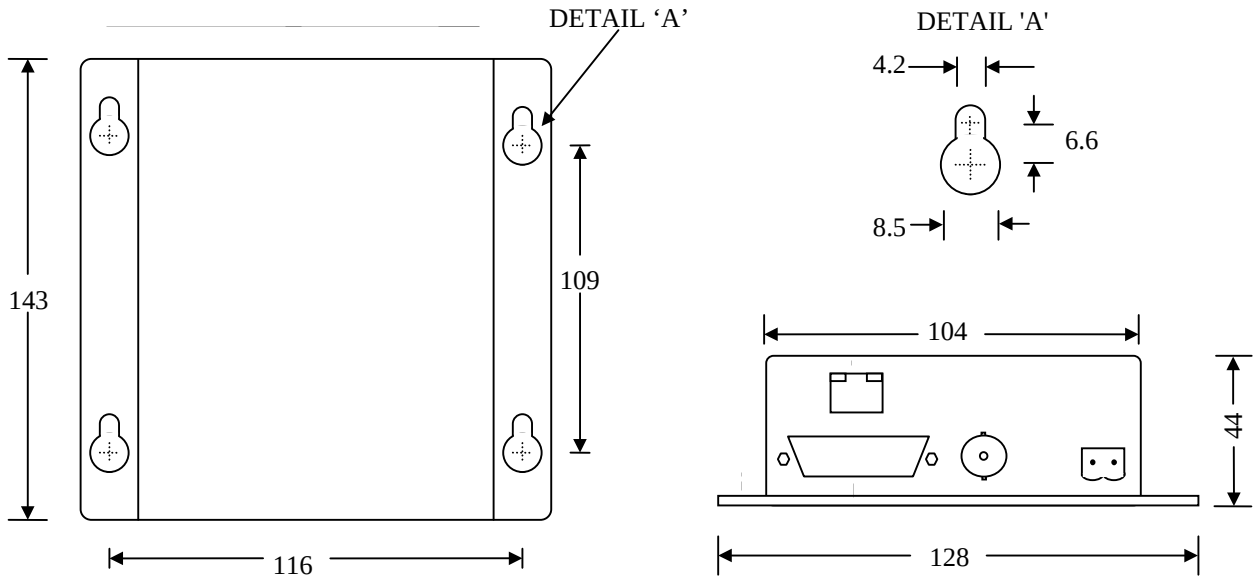
PRECAUTIONS

- ▲ 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.

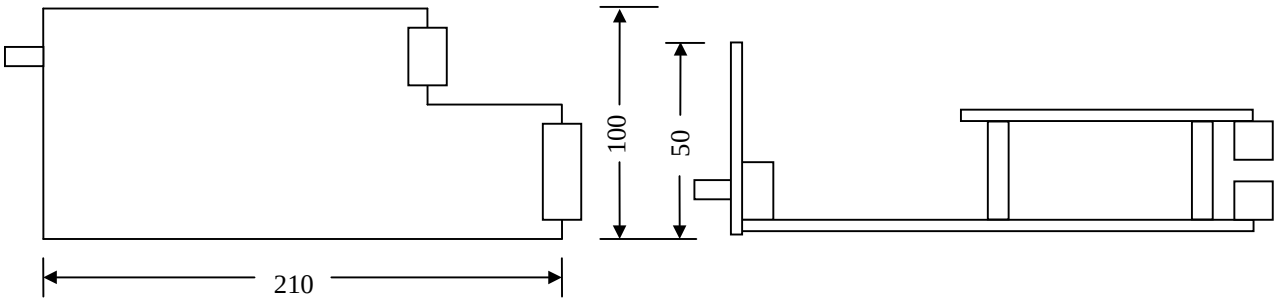
2.2.2 OSD838 DRAWINGS AND DIMENSIONS

The OSD838T and OSD838R card versions are designed to be inserted into an OSD370 or OSD350 chassis and secured by means of captivated screws.

The OSD838TC and OSD838RC case versions are designed to be mounted on an even surface and to be secured by means of M4 or smaller screws.



(a) Case Version



(b) Card Version

FIGURE 4: OSD838 MOUNTING DIMENSIONS

2.2.3 POWER SUPPLY CONNECTIONS

The OSD838 card version is powered from the OSD370 or OSD50 chassis while the OSD838 case version uses power as specified in Table 4.

NOTES:

1. The card version of the OSD838T and OSD838R should be fixed into the OSD370 or OSD350 chassis using the captivated screws

2. Either card can be plugged in/out of the OSD370 or OSD350 chassis with power on or off.

TABLE 4: DC POWER CONNECTION

External Power Pin	Specification
Pin 1	$+10V_{DC}$ to $+24V_{DC}$ @ 4VA
Pin 2	0V

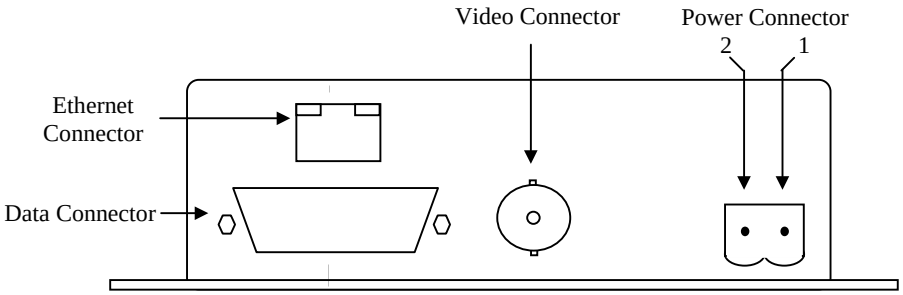


FIGURE 5: OSD138C POWER SUPPLY CONNECTIONS

2.2.4 OTHER CONNECTIONS

The video input signal (e.g. from camera) is connected to the video input BNC connector on the OSD838T. The video output signal (e.g. to monitor) is connected from the video output BNC connector on the OSD838R.

All Data and Relay signals are connected to the DB26 connector as set out in Table 3.

The Ethernet must be connected to the RJ-45 socket using CAT 5 UTP cable.

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 LINK SETTINGS

Link settings are shown in Table 5, and can be configured to suit user requirements. To gain access to the Jumper Links in the Case Version**,** the case must be opened using the following method. *Note: Observe ESD precautions when removing the case.* Disconnect power connection. Remove BNC connector nut and washer, D-Type connector female screw locks and Base Plate countersink screws. Remove the base plate then slide the board out of the cover.

Extra care must be taken not to damage internal fiber pigtail with WDM units and fiber pigtail devices. The board must be removed gently to gain access to internal WDM connector. Unscrew or unplug this connection, then remove board. Set the Jumper Links to the appropriate links as set out in Table 5.

To re-assemble, reverse the above process, taking care not to damage internal optical fibers.

Both the OSD838T and the OSD838R have 7 user configurable links labeled as LK1-LK7 on the PCB. Table 5 lists the links and settings. Links labeled LK8-LK12 are factory set. Do not touch. Permanent damage may occur and/or void warranty.

TABLE 5: OSD838T AND OSD838R LINKS CONFIGURATION

LK	No. of Pins	FUNCTION	SETTING
1	2	Not Used	ON/OFF
2	2	Not Used	ON/OFF
3	3	Sets RS232 at output 1 to normal phasing	1,2
		Sets RS232 at output 1 to reversed phasing	2,3
4	3	Sets RS232 at output 2 to normal phasing	1,2
		Sets RS232 at output 2 to reversed phasing	2,3
5	3	Sets RS232 at RS232 O/P to normal phasing	1,2
		Sets RS232 at RS232 O/P to reversed phasing	2,3
6	3	Links RS232 channel 1 to output 1+	1,2
		Links RS422 channel 1 to output 1+	2,3
7	3	Links RS232 channel 2 to output 2+	1,2
		Links RS422 channel 2 to output 2+	2,3
8	3		**"For Factory Use Only - Do Not Touch"**
9	3		
10	2		
11	2		
12	2		

NOTES:

"Normal phasing" refers to RS232 signal being passed through the link with the same phase at the output as at the input.

"Reverse phasing" refers to the output phase being opposite to that of the input. This is useful in converting from RS422 at the input of the link to RS232 at the output.

2.3 OPERATION

2.3.1 OSD838T AND OSD838R OPERATION

When using the OSD838 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 (OSD838C) 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 OK” indicator, it should be green. If it is red there may be a problem with the laser. Disconnect power and have the Laser checked as soon as possible.

Plug in the optical connectors of the optical cable. If the remote OSD838R is connected, the "Link/Video " LED will change from red to amber.

To connect a video signal, connect a BNC terminated coaxial cable from the camera to the OSD838T. If the camera is operational, the "Link/Video " indicator should change from amber to green. Connect a BNC terminated coaxial cable between the BNC socket on the rear of the OSD838R to the video monitor or switcher.

Plug the digital signal source into the 26-pin D connector (DB26) 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.

If RS485 data is required set the RS422/485 Mode switch to the “on” position, i.e. down (which is the 1st switch of the 4 way DIP switch. It is located on the front panel of card version and on the front of the box in case version). Then switch 2, 3 and 4 to set the RS485 turnaround delay to the value appropriate to your system. If you are not sure of the correct value, leave all turnaround delay switches “off”, i.e. up. Refer to Table 6 for delay selection. As described in Table 3, RS485 is available on pins 2 (RS485+) and 11 (RS485-). If RS485 is not required, keep all four switches in the “off” position, i.e. up.

All ‘two wire’ RS485 devices are by default in receive mode, and only change to transmit mode for data transmission. All RS485 protocols use a transmit delay to ensure successful transmissions to the ends of the network. The delay is data rate and protocol dependent.

If RS485 is not required, keep all four switches in the “off” position, i.e. up.

TABLE 6: OSD838T/R RS-485 TIMING DELAYS

SWITCH COMBINATIONS				**FUNCTION**	**DELAY**
1	**2**	**3**	**4**		**(± 1%)**
0	0	0	0	RS-422	N/A
1	1	1	1	RS-485	30us
1	0	1	1	RS-485	100us
1	1	0	1	RS-485	300us
1	0	0	1	RS-485	1ms
1	1	1	0	RS-485	3ms
1	0	1	0	RS-485	10ms
1	1	0	0	RS-485	30ms
1	0	0	0	RS-485	100ms

NOTE: Data Control Switch Settings for RS485 (0 = off, 1 = on)

2.3.2 CONTROLS

The OSD838T and OSD838R each have a 4-way DIP switch (located at the front panel for card version and front of box for case versions), which is used to select RS422 or RS485 mode, with different RS485 turnaround delay settings from 30uSec to 80mSec (see Table 6).

There are 7-User link settings available for setting up desired output configurations for RS232 & RS422 outputs (see Table 5).

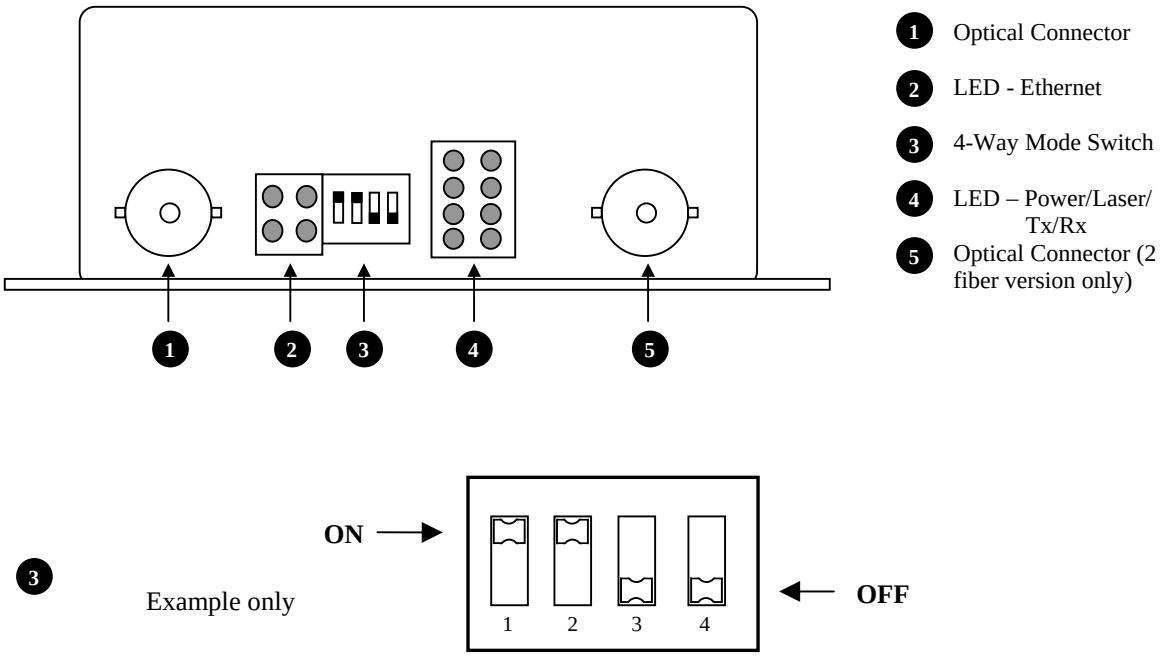


FIGURE 4: OSD838 FRONT VIEW / DIP SWITCH

2.3.3 OSD838T AND OSD838R INDICATORS

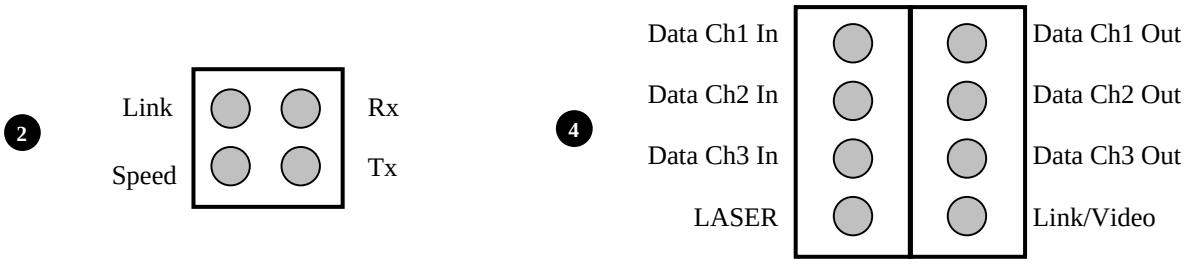


FIGURE 5: OSD838T AND OSD838R LED INDICATORS

TABLE 7: OSD838T AND OSD838R INDICATOR FUNCTION

INDICATOR	PARAMETER	COLOUR	FUNCTION
Link	Ethernet Link Established		
Speed	10/100		
Rx	Receive Traffic		
Tx	Transmit Traffic		
CH1 IN	Data Input Ch 1	Green Red	Present Not Present
CH2 IN	Data Input Ch 2	Green Red	Present Not Present
CH3 IN	Data Input Ch 3	Green Blank	Present Not Present
LASER	Optical Output	Green Red	OK Fail
CH1 OUT	Data Output Ch 1	Green Red	Present Not Present
CH2 OUT	Data Output Ch 2	Green Red	Present Not Present
CH3 OUT	Data Output Ch 3	Green Blank	Present Not Present
LINK/VIDEO	Data Link/Video Present	Green Amber Red	Link/Video OK Link OK Link Fail

NOTE:

"Link" Indicator refers to the received data stream. It is 'amber' ("green" if video transmitted or received) after the optical link is established and the receiver is locked onto the incoming data stream. It will indicate 'red' if receiver does not lock onto incoming signal.

3 MAINTENANCE

3.1 INTRODUCTION

The following section outlines the faultfinding procedure for the OSD838T and OSD838R 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 OSD838T or OSD838R 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 OSD838T and OSD838R.

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 Authorization" (RMA) form and number before returning goods.
Goods must be returned in adequate packing material to Optical Systems Design, Warriewood or its nominated authorized 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, and 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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