
OPTICAL

SYSTEMS

DESIGN

OPERATOR MANUAL

OSD8817 SERIES

DIGITAL VIDEO AND DATA

FIBER OPTIC TRANSMISSION SYSTEM

OPTICAL SYSTEMS DESIGN

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1 TECHNICAL SUMMARY

1.1 BRIEF DESCRIPTION

1.1.1 OVERVIEW

The OSD8817 series is a high-quality fiber optic digital video and data transmission system. The system consists of the OSD8817T transmitter and any one of the OSD8817R/RC/R2 receivers, 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 and one forward contact closure channel.

The OSD8817T accepts one analog composite video input signal along with one digital data input signal and one contact closure input. The video signal is converted to digital with 10-bit resolution so as to preserve the quality of the input signals. The resulting digital signal is multiplexed and transmitted as a digital bit-stream through the fiber. The OSD8817T also includes an optical receiver section that decodes the digital signal transmitted by the OSD8817R, to provide data output signals. Data can be TTL, RS485 or RS422 31kHz Manchester or Bi-phase. The OSD8817T transmitter provides adjustment free operation over the full optical range of the unit.

The OSD8817R incorporates a high performance optical digital receiver for incoming video and data signals, a transmitter that outputs a digital optical signal consisting of one data channel and one contact closure output. The unit provides a constant video output level which is independent of link loss, and data section of the OSD8817R is also adjustment free over all link lengths. Data signal interface levels are the same as those of the OSD8817T.

The OSD8817T is available as a small elliptical case small enough to fit most camera housings. The OSD8817R are available in four physical configurations: card, module, 2-channel card and 2-channel module. The card versions are designed to fit the 3RU-high 19" OSD370N or OSD350N 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 OSD8817 system can be used with any standard singlemode or multimode optical fiber over a single fiber for transmission and reception.

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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 duplex transmission of one data channel and forward path transmission of a contact closure.
- ▲ Broadcast quality 10 bit video maintained over all link lengths.
- ▲ Video bandwidth of 8MHz
- ▲ Transmitter data interface configuration controlled by receiver
- ▲ Transmitter is a very compact design that fits into most camera housings
- ▲ Receiver available as a single channel card (OSD8817R) or module (OSD8817RC) or as a dual channel card (OSD8817R2)
- ▲ Optional network monitoring available
- ▲ Operates over either up to 3km of multimode fiber or up to 80km of singlemode fiber, depending on optical devices
- ▲ Single fiber operation

1.2 TYPICAL CONFIGURATION

Figure 1 below indicates two possible set-up configurations for an OSD8817 system.

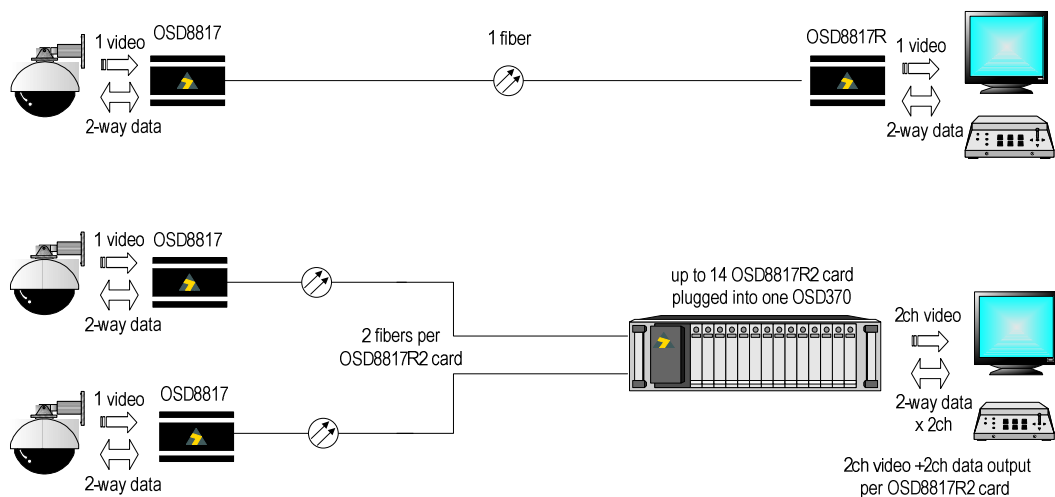


FIGURE 1: OSD8817 TYPICAL CONFIGURATIONS

The OSD8817T and OSD8817R pair can provide one forward video transmission, full duplex data transmission between camera (transmitter) and monitoring site (receiver), and one forward contact closure.

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1.3 PRODUCTS AND OPTIONS

There are various options available for the OSD8817 as identified in Table 1 below:

OSD8817 T 2 C N (example only)

1 2 3 4

TABLE 1: PRODUCTS AND OPTIONS

1	ITEM	DESCRIPTION
	T	Transmitter
	R	Receiver

2	ITEM	DESCRIPTION
	-	Single channel
	2	2-Channel version

3	ITEM	DESCRIPTION
	-	Card version (3RU high chassis mount for OSD370N or OSD350N)
	C	Stand-alone module version
	RvCC	Reverse Contact Closure

4	ITEM	DESCRIPTION
	-	Standard
	N	Network Management option

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1.4 TECHNICAL SPECIFICATIONS

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 8MHz (+1dB, -3dB)
Signal to Noise Ratio (Weighted)	> 65dB at all receiver levels over full dynamic range
Linearity	<0.8% Differential Phase (DP) <0.8° Differential Gain (DG)
Data Interface	TTL, RS422 and RS485. 31kHz Manchester or Biphase possible in either direction
Contact Transmission (from OSD8817T to OSD8817R only)	Buffered input at OSD8817T, MOSFET output at OSD8817R
Data Rates	DC to > 500kbps at less than 15% pulse width distortion
Data Connectors	6-way RJ12
Number of Fibers Required	One
OSD8817TL Transmit Wavelength	1310nm
OSD8817TL Transmit Coupled Power	-10 to -5dBm into multimode fiber -13 to -8dBm into singlemode fiber
OSD8817RL Transmit Wavelength	1550nm
OSD8817RL Transmit Coupled Power	-12 to -7dBm into multimode fiber -15 to -10dBm into singlemode fiber
OSD8817R Receive Sensitivity	<-27dBm
OSD8817R Receive Saturation	>-3dBm
OSD8817T Receive Sensitivity	<-32dBm
OSD8817T Receive Saturation	>-3dBm
Optical Connectors	ST standard. Contact OSD for others.
Optical Link Budget and distances	>16dB: >3km on multimode fiber @ 1310nm (fiber bandwidth limited) >14dB: >30km on singlemode fiber @ 1310nm (fiber loss limited) >30dB: >80km on singlemode fiber @ 1310nm with high power devices*
Dimensions (mm)	40W x 25H x 55L (8817T) 60W x 26H x 93L (8817RC module – excluding flanges and connectors) 25W x 208D x 100H (8817R card)
Weight	50g (8817T), 0.25kg (module), 0.2kg (card), 0.25kg (R2 card)
Power Requirements	+9 to 35V _{DC} or 20 to 28V _{AC} @ 3VA (8817T, 8817R and 8817RC) +9V to 35V _{DC} or 20 to 28V _{AC} @ 5VA (8817R2 card)
Operating Temperature	-20°C to +75°C
Relative Humidity	0 to 95% non-condensing
Chassis Current Consumption (CCC)	0.25 Amp for 8817R, 0.40 Amp for 8817R2

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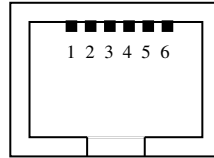
NOTES:

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

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1.5 PIN ASSIGNMENTS

Pin assignments for the “Data Input/Output” 6-way RJ12 connector) is shown in Table 3 below.



- 1: Data I/P-
- 2: Data I/P +
- 3: Contact Closure
- 4: Data I/O-
- 5: Data I/O +
- 6: Ground

FIGURE 2: RJ12 PIN CONNECTOR

Pin Number	Function
1	Data Input -
2	Data Input +
3	Contact Closure
4	Data Output -/ RS485 2W I/O-
5	Data Output +/ RS485 2W I/O+
6	Ground

TABLE 3: PIN ASSIGNMENT

RS422 / 4W RS485

Pin	Connection
1	Rx -
2	Rx +
4	Tx -
5	Tx +
6	Ground

2W RS485

Pin	Connection
4	I/O -
5	I/O +
6	Ground

*4 Contact Closure Input (8817T only)

Pin	Connection
3	Contact Input
6	Ground

Output (OSD8817R only)

Pin	Connection
3	Contact Output
6	Ground

See Section 2.3.2 and 2.3.3

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.

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1.6 DATA MODE SWITCH SETTINGS

The data mode is controlled by a 2-way switch on the OSD8817RC or a 4-way switch on the OSD8817R and OSD8817R2. Data mode is set and controlled at the receiver end. The OSD8817 will automatically set itself to the appropriate data setting as set out on the OSD8817 receiver end.

Note: On the OSD8817R version SW3 and SW4 are not used.

TABLE 4: DATA MODE SWITCH SETTINGS

OSD8817 RC Version

SWITCH	STATE	POSITION	FUNCTION	DEFAULT
T1	OFF	DOWN	4-Wire Operation	default*
	ON	UP	2-Wire Operation	
T2	OFF	DOWN	RS422	default*
	ON	UP	RS485	

OSD8817R Version

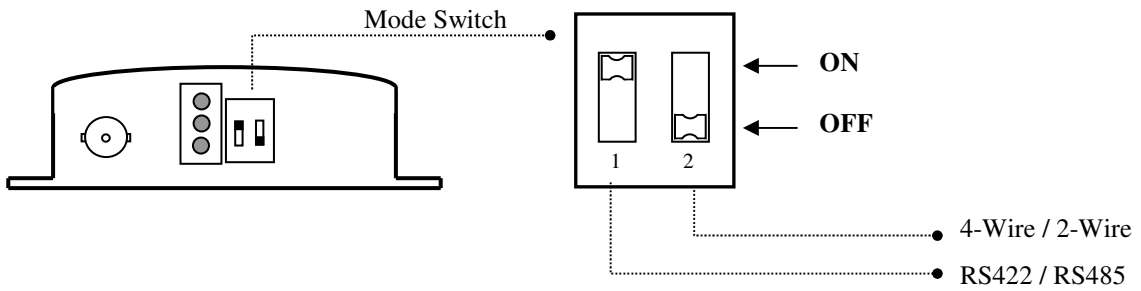
SWITCH	STATE	POSITION	FUNCTION	DEFAULT
T1	OFF	DOWN	4-Wire Operation	default*
	ON	UP	2-Wire Operation	
T2	OFF	DOWN	RS422	default*
	ON	UP	RS485	
T3	OFF	DOWN	Not Used	default*
	ON	UP		
T4	OFF	DOWN	Not Used	default*
	ON	UP		

OSD8817R2/R2C Version

SWITCH	STATE	POSITION	FUNCTION	DEFAULT
Ch1	T1	OFF	4-Wire Operation	default*
		ON	2-Wire Operation	
	T2	OFF	RS422	default*
		ON	RS485	
Ch2	T3	OFF	4-Wire Operation	default*
		ON	2-Wire Operation	
	T4	OFF	RS422	default*
		ON	RS485	

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OSD8817 RC Version



OSD8817R/R2/R2C Version

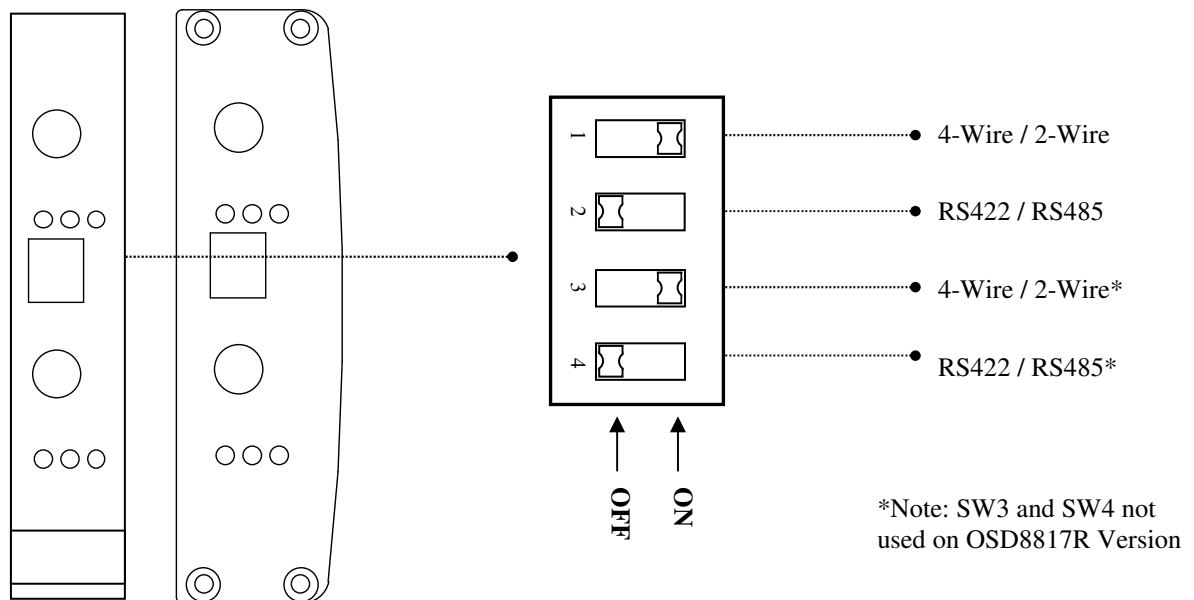


FIGURE 3: DATA SWITCH DIAGRAMS

2 INSTALLATION AND OPERATION

2.1 INTRODUCTION

This section outlines the methods required to install and operate the OSD8817T and OSD8817R 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 CABLING

Shielded cables should be used on all cabling to provide protection from external electrical events such as lightning, and switching transients etc. which may cause damage to the unit. All cable shielding must be grounded at a convenient ground point.

2.2.2 WARNING AND PRECAUTIONS

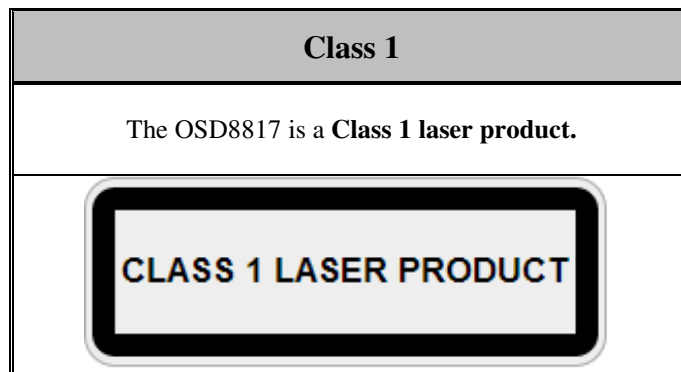
ELECTROMAGNETIC COMPATIBILITY

▲ 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

WARNING: Laser Safety: Class 1 Laser Product per IEC/EN 60825-1:20011 standard.



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.

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2.2.3 OSD8817 DRAWINGS AND DIMENSIONS

The OSD8817RC are designed to be mounted on an even surface and to be secured by means of M4 or smaller screws. The OSD8817R card versions are designed to be inserted into a chassis and secured by means of captive screws.

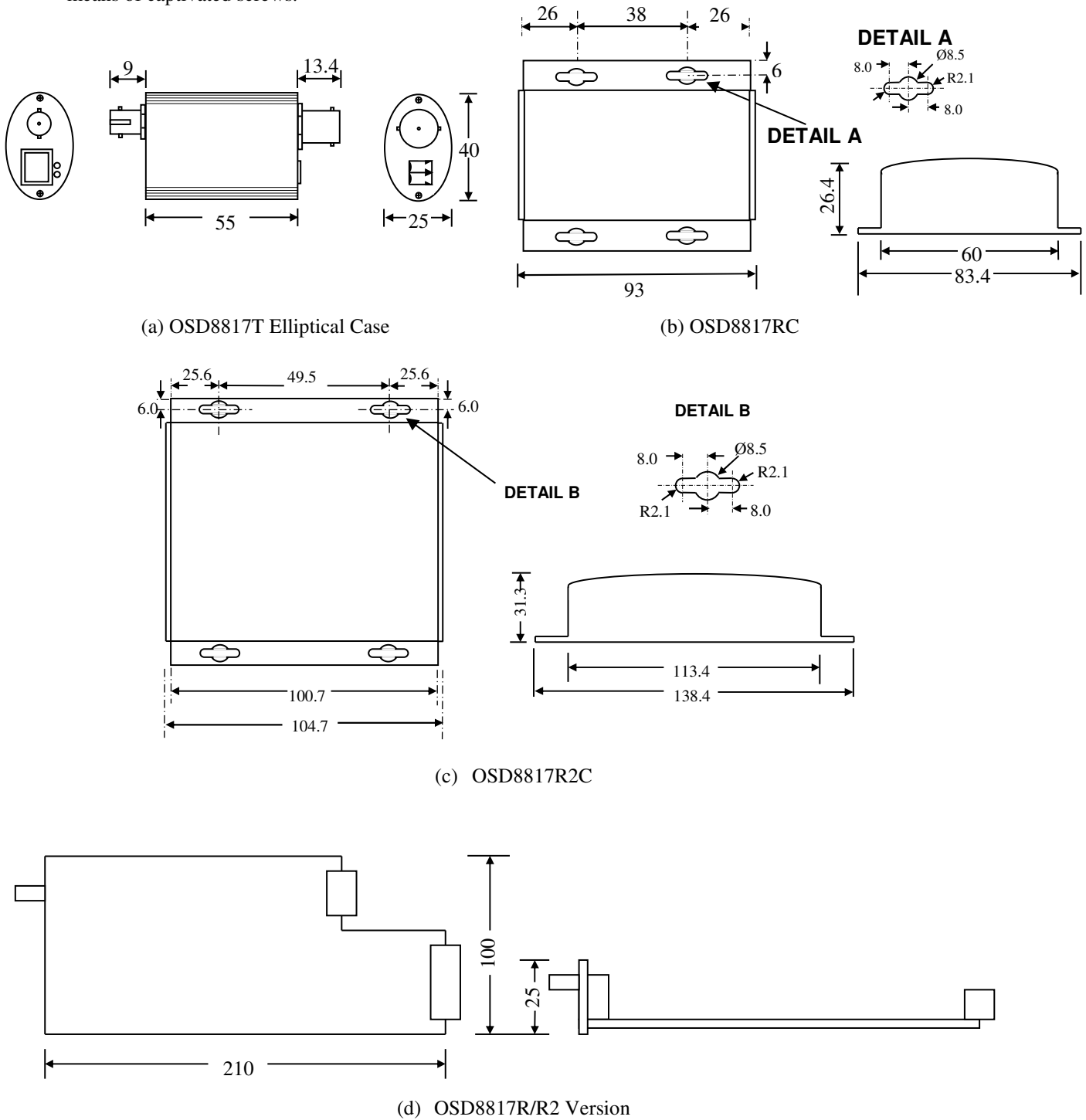


FIGURE 4: OSD8817 MOUNTING DIMENSIONS

OPTICAL SYSTEMS DESIGN

2.2.4 POWER SUPPLY CONNECTIONS

The OSD8817R/R2 card versions are powered from the OSD370N or OSD350N chassis. DC power on the OSD8817R/R2 card versions are connected via a DB9 connector and should be fixed into the OSD370N (or OSD350N) chassis using the captivated screws. The cards can be plugged in or out of the OSD370N (or OSD350N) chassis with power on or off.

The OSD8817T and OSD8817RC/R2C modules require external DC or AC power. The voltage range of the OSD8817T, OSD8817R and OSD8817RC is +9V_{DC} to +35V_{DC} or 20 to 28V_{AC} @ 3VA (5VA for OSD8817R2/R2C). Power should be connected to the power socket located on the side of the units. DC power should be connected as indicated below;

TABLE 5: OSD8817T DC OR AC POWER CONNECTION

External Power Pin	Specification
Pin 1	Ground or 0V
Pin 2	+9V to 35V DC or 20 to 28V AC

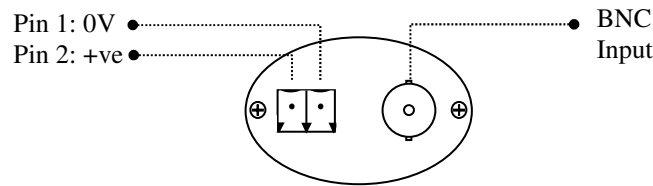


FIGURE 5: OSD8817T POWER SUPPLY CONNECTIONS

TABLE 6: OSD8817RC DC OR AC POWER CONNECTION

External Power Pin	Specification
Pin 1	+9V to 35V DC or 20 to 28V AC
Pin 2	Ground or 0V

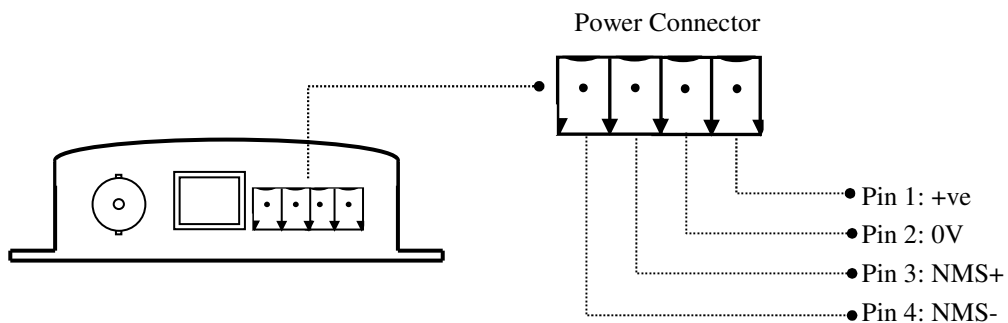


FIGURE 6: OSD8817C POWER SUPPLY CONNECTIONS

OPTICAL SYSTEMS DESIGN

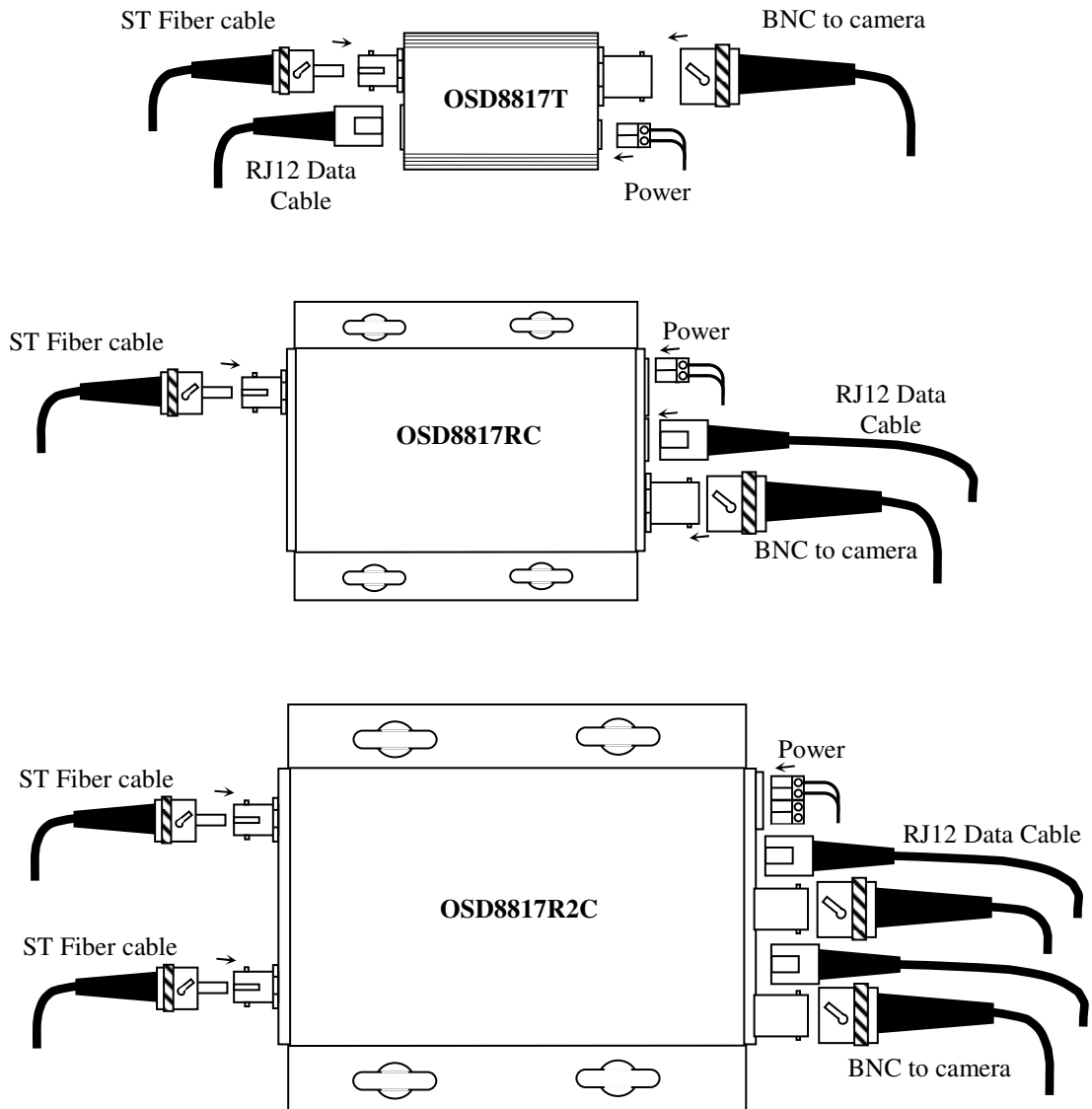
2.2.5 OTHER CONNECTIONS

The video-input signal (eg. from camera) is connected to the video input BNC connector on the OSD8817T. The video output signal (eg. to monitor) is connected from the video output BNC connector on the OSD8817RC/R/R2.

Data signals are connected to the RJ12 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.



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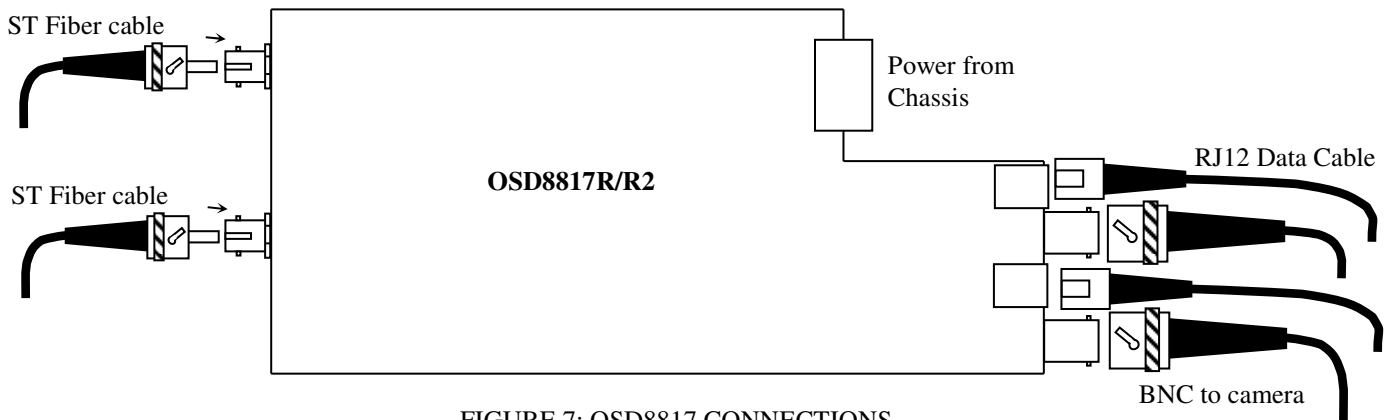


FIGURE 7: OSD8817 CONNECTIONS

2.3 OSD8817 OPERATION

2.3.1 OSD8817T AND OSD8817R OPERATION

When using the OSD8817 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 OSD370N or OSD350N chassis and check that the indicators illuminate accordingly on power up. If a module version (OSD8817T or OSD8817RC) is used, connect the unit to an appropriate power source and check that the indicators illuminate accordingly on power up.

To connect a video signal, connect a BNC terminated coaxial cable from the camera to the OSD8817T.

Connect a BNC terminated coaxial cable between the BNC socket on the OSD8817R/RC/R2 and the video monitor or switcher.

Plug in the optical connectors of the optical cable. If the set-up is connected correctly, the OSD8817R/RC/R2 "Remote Rx Sync OK" and "Local Rx Sync OK" LEDs will change from 'Red' to 'Green'. If a video signal is being received the "Video Present" indicator on the OSD8817R/RC/R2 should be 'Green'; if no video signal is being received this indicator will not be illuminated.

Plug the digital signal source (data) into the RJ12 connector on the units.

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

Ensure that the OSD8817R/RC/R2 switch settings are set to the required data type (see Table 4).

OPTICAL SYSTEMS DESIGN

2.3.2 CONTACT CLOSURE CONNECTIONS

The standard OSD8817 pair has one forward contact closure channel. The contact closure input at the OSD8817T (Pin 3 on the RJ12 connector) is driven high. To operate the contact closure, the input should be switched to ground (see Figure 8).

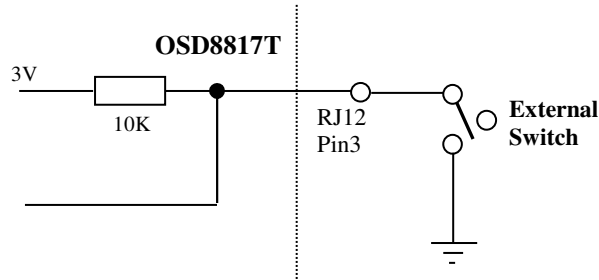


FIGURE 8: OSD8817T CONTACT CLOSURE INPUT

The contact closure output at the standard OSD8817R/RC/R2 (Pin 3 on the RJ12 connector) is to be connected to the relay coil. Maximum ratings the OSD8817R can drive is 1.5A @ 24V_(max).

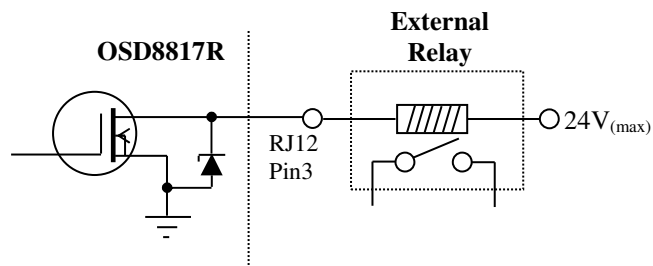


FIGURE 9: OSD8817R/RC/R2 CONTACT CLOSURE OUTPUT

2.3.3 REVERSE CONTACT CLOSURE VERSION

The Reverse Contact Closure versions are factory set and designated the RvCC suffix in the product description. The Reverse Contact Closure (RvCC) versions operate identical to the standard version (ie video and data) but have the Contact Closure operating in the opposite direction ie CC input at the receiver end and the CC output at the transmitter end. Pin connections are identical to that described in section 1.5 and 2.3.2

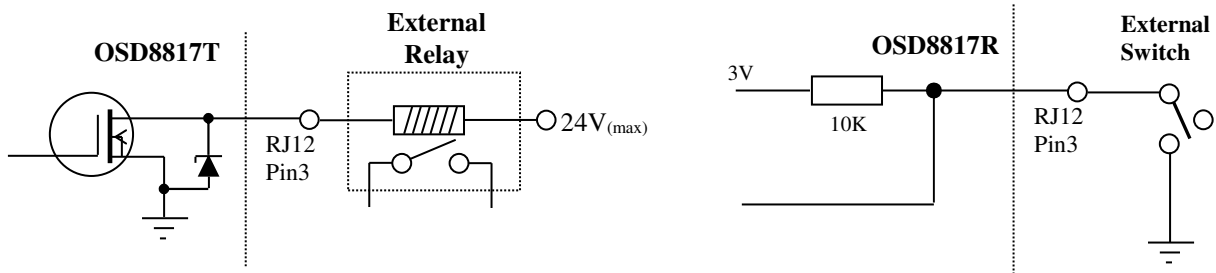
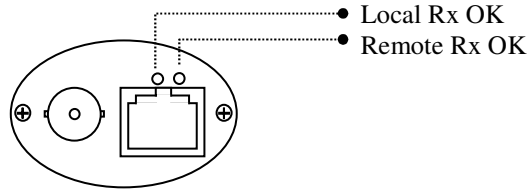


FIGURE 10: OSD8817/RVCC REVERSE CONTACT CLOSURE

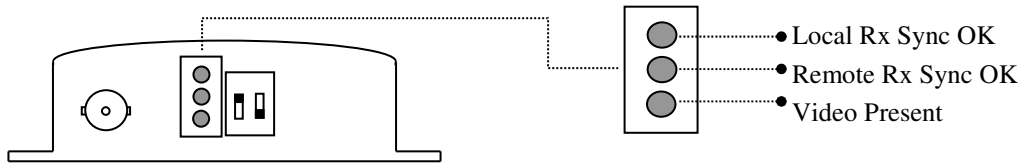
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2.3.4 OSD8817T AND OSD8817R/RC/R2 INDICATORS

OSD8817T



OSD8817RC



OSD8817R/R2

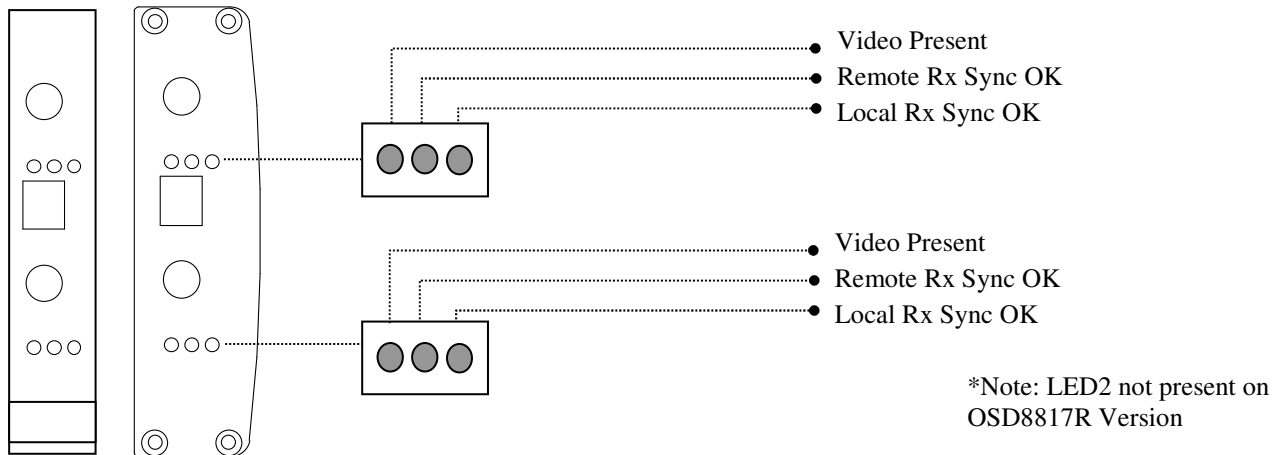


FIGURE 11: OSD8817TC AND OSD8817RC LED INDICATORS

TABLE 7: OSD8817 INDICATOR FUNCTION

INDICATOR	PARAMETER	COLOUR	FUNCTION
Local Rx OK	Transmit Sync	Red	No Transmit signal
		Green	Transmit signal present
Remote Rx OK	Receive Sync	Red	No Received signal
		Green	Received signal
Video Present (only OSD8817R/RC/R2)	Video present	Off	No video signal present
		Green	Video signal present

3 MAINTENANCE

3.1 INTRODUCTION

The following section outlines the fault-finding procedure for the OSD8817T and OSD8817R 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 OSD8817T or OSD8817R 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 OSD8817T and OSD8817R.

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 labels is evident.

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