OPTICAL
SYSTEMS
DESIGN

OPERATOR MANUAL

OSD8817 SERIES

DIGITAL VIDEO AND DATA

FIBER OPTIC TRANSMISSION SYSTEM

(Potted Version)

INDEX 1

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.POT 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.POT is a 2-wire RS485 data modem. 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.POT is a bare pcb (no casing) unit with a pigtailed optical connector which is designed to be potted by the end user.

The OSD8817 system can be used with any standard singlemode or multimode optical fiber over a single fiber for transmission and reception.

Refer to the standard OSD8817 user manual for connections and operations to the OSD8817R/R2/RC.

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.

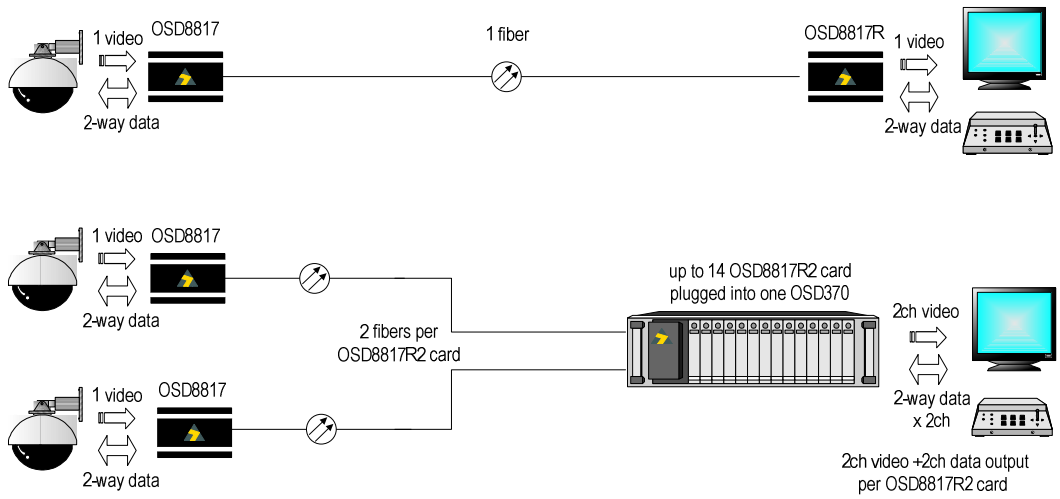

FIGURE 1: OSD8817 TYPICAL CONFIGURATIONS

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.

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)

❶ ❷ ❸ ❹

TABLE 1: PRODUCTS AND OPTIONS

❶

ITEM	DESCRIPTION
T	Transmitter
R	Receiver

❷

ITEM	DESCRIPTION
-	Single channel
2	2-Channel version

❸

ITEM	DESCRIPTION
-	Card version (3RU high chassis mount for OSD370N or OSD350N)
C	Stand-alone module version
POT	Potted Version (no case, pigtailed fiber)

❹

ITEM	DESCRIPTION
-	Standard
N	Network Management option

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

102881710

NOTES:

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

1.5 PIN ASSIGNMENTS

Pin assignments for the "Data Input/Output connections are shown in Table 3 below.

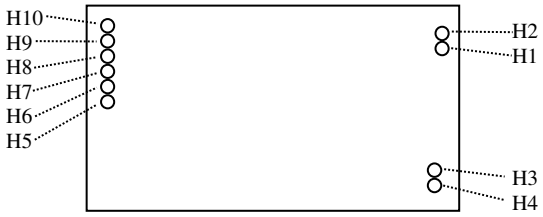

FIGURE 2: DATA CONNECTIONS

Specification	Pin Number	Function
Data and CC	H10	Not Used
	H9	Not Used
	H8	Data Output -/ RS485 2W I/O-
	H7	Data Output +/ RS485 2W I/O+
	H6	Contact Closure
	H5	Ground
Video	H4	Video Ground
	H3	Video Input
Power	H2	Power Input
	H1	Power 0V

TABLE 3: PIN ASSIGNMENT

2W RS485

Pin	Connection
H8	I/O -
H7	I/O +
H5	Ground

[*4] **Contact Closure**
Input (8817T.POT only)

Pin	Connection
H6	Contact Input
H5	Ground

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.

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.

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 lighting, 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**

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.

Class 1
The OSD8817T.POT is a **Class 1 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.

2.2.3 OSD8817T.POT DIMENSIONS

The OSD8817T.POT is designed to be potted by the end user.

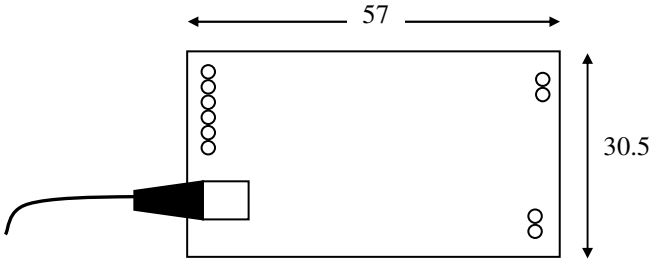

FIGURE 3: OSD8817T.POT DIMENSIONS

2.2.4 POWER SUPPLY CONNECTIONS

The OSD8817T.POT requires external DC or AC power. The voltage range of the OSD8817T.POT, is +9V_{DC} to +35V_{DC} or 20 to 28V_{AC} @ 3VA (5VA for OSD8817R2). Power should be connected to the H1 and H2 pins located on the top right hand side of the unit. *NOTE:* ***Thermal Fuses TF1 and TF2 are connected in series and both need to be fitted***. DC power should be connected as indicated below;

TABLE 4: OSD8817T DC OR AC POWER CONNECTION

External Power Pin	Specification
Pin H1	Ground or 0V
Pin H2	+9V to 35V DC or 20 to 28V AC

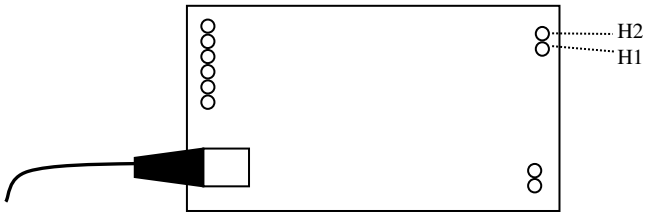

FIGURE 4: OSD8817T POWER SUPPLY CONNECTIONS

2.2.5 OTHER CONNECTIONS

The video-input signal (eg. from camera) is connected to the video input connections H3 and H4 on the OSD8817T.POT. Twisted pair wiring is recommended.

Data signals are connected to the H5-H10 connections 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.

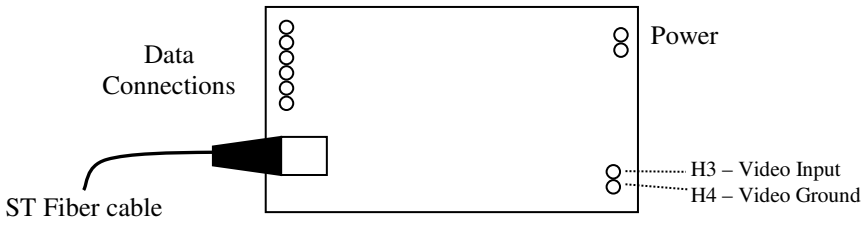

FIGURE 5: OSD8817T.POT CONNECTIONS

2.3 OSD8817 OPERATION

2.3.1 OSD8817T.POT OPERATION

When using the OSD8817 for the first time, check that the unit is in good condition with no visible damage.

Connect a video signal to the twisted pair cable from the camera to the OSD8817T.POT.

Plug in the optical connectors of the optical cable. If the set-up is connected correctly, the OSD8817T.POT "Remote Rx Sync OK" and “Local Rx Sync OK” LEDs will change from ‘Red’ to ‘Green’.

Connect the digital signal source (data) into the H5-H10 connections on the units, ensuring 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 **Error! Reference source not found.**).

2.3.2 CONTACT CLOSURE CONNECTIONS

The OSD8817 pair has one forward contact closure channel. The contact closure input at the OSD8817T.POT (H6 on the data connections) is driven high. To operate the contact closure, the input should be switched to ground (see Figure 6).

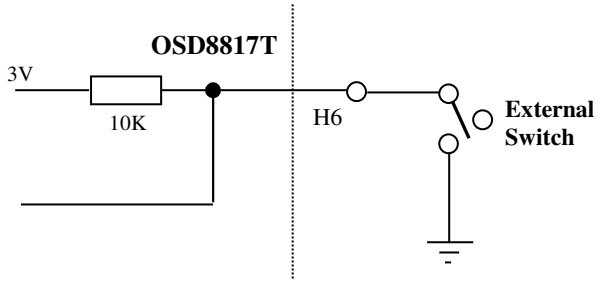

FIGURE 6: OSD8817T.POT CONTACT CLOSURE INPUT

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 @ $24V_{(max)}$.

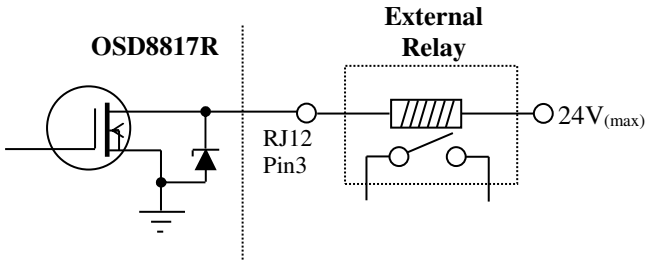

FIGURE 7: OSD8817R/RC/R2 CONTACT CLOSURE OUTPUT

2.3.3 OSD8817T.POT INDICATORS

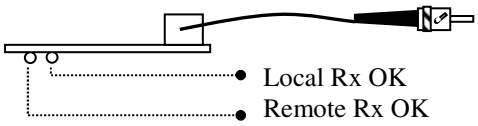

FIGURE 8: OSD8817T.POT LED INDICATORS

TABLE 5: 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

3 MAINTENANCE

3.1 INTRODUCTION

The following section outlines the fault-finding procedure for the OSD8817T.POT 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.POT.

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.

Optical Systems Design Pty. Ltd.
7/1 Vuko Pl. Warriewood 2102
P.O. Box 891 Mona Vale
N.S.W. Australia 2103
Telephone: +61 2 9913 8540
Facsimile: +61 2 9913 8735
Email: sales@osd.com.au
Web Site: www.osd.com.au

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DESIGN

PTY LTD A.B.N. 83 003 020 504

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