OPTIC▲L
SYSTEMS
DESIGN

OPERATOR MANUAL

OSD8838 SERIES

DIGITAL VIDEO AND DATA

FIBER OPTIC TRANSMISSION SYSTEM

INDEX 1

1 TECHNICAL SUMMARY

1.1 BRIEF DESCRIPTION

1.1.1 OVERVIEW

The OSD8838 series is a high-quality fiber optic digital video, data and Ethernet transmission system. The system consists of the OSD8838T and the OSD8838R which are designed to be used as a pair and provide one-way transmission of PAL, NTSC or SECAM video, full-duplex transmission of two data channels, one relay contact channel and one 10/100Base-T Ethernet channel.

The OSD8838T accepts one analogue composite video input signal, two digital data input signals, one contact relay signal and one Ethernet signal. The video signal is converted to digital with 9-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 OSD8838T also includes an optical receiver section that decodes the digital signal transmitted by the OSD8838R to provide data, contact relay and Ethernet signals. Data can be TTL, RS232, RS485 or RS422, 31kHz Manchester or Bi-phase. The OSD8838T receiver provides adjustment free operation over the full optical range of the unit.

The OSD8838R incorporates a high performance optical digital receiver for incoming video, data, contact relay and Ethernet signals. The OSD8838R also incorporates a transmitter that outputs a digital optical signal consisting of two data channels, one contact relay channel and one Ethernet channel. The unit provides a constant video output level that is independent of link loss and is adjustment free over all link lengths. Data signal interface levels are the same as those of the OSD8838T.

The OSD8838T and OSD8838R are available in two physical configurations: card or 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 versions are intended for isolated use and require an external power source.

The OSD8838 system can be used with any standard multimode optical fiber, and is available optionally for singlemode fiber use, over 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 their control centre

▲ Transportation communication systems

1.1.3 FEATURES AND BENEFITS

▲ One way optical fiber transmission of PAL, NTSC or SECAM video plus full duplex transmission of
  • One 10/100Base-T Ethernet
  • Two data channels
  • One relay contact channel

▲ Broadcast quality 9 bit video

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

▲ Transmission of alarm and control signals from the camera site

▲ Standard operation using multimode or singlemode fiber; no need to specify fiber type

▲ Single fiber operation

▲ Video bandwidth of 10MHz

▲ Operating range of at least 3km on multimode fiber and 100km on singlemode fiber, depending on optical devices

▲ Two duplex audio channels are optionally available

1.2   TYPICAL CONFIGURATION

Figure 1 below indicates the typical set-up for an OSD8838 system.
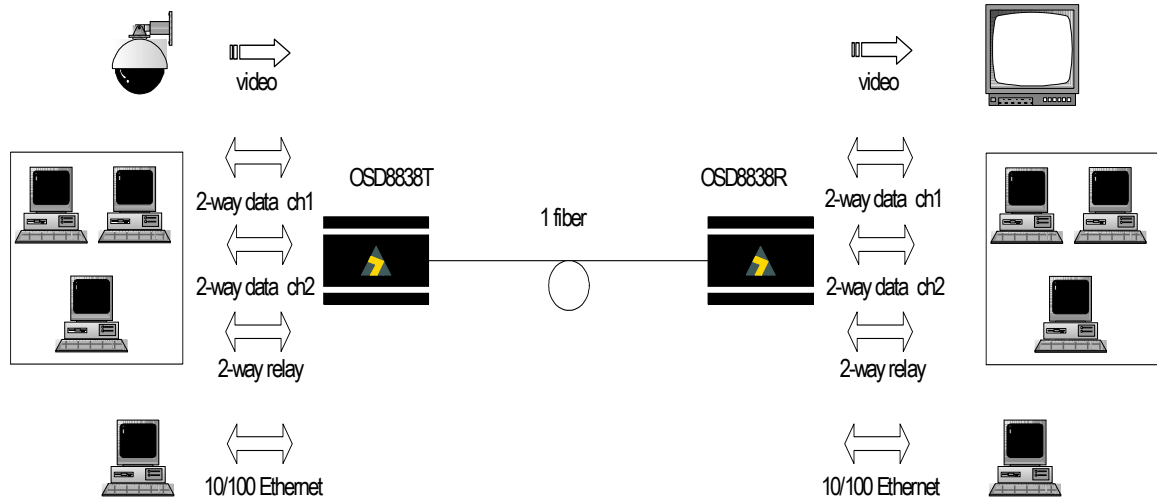
FIGURE 1: OSD8838 TYPICAL CONFIGURATION

1.3   PRODUCTS AND OPTIONS

There are various options available for the OSD8838 as identified in Table 1 below:

OSD8838   T   C   (example only)

            ❶   ❷

TABLE 1: PRODUCTS AND OPTIONS

❶

ITEM	DESCRIPTION
T	Transmitter
R	Receiver

❷

ITEM	DESCRIPTION
-	Card version (3RU high chassis mount for OSD370N or OSD350N)
A	Two duplex audio channel option
C	Stand-alone module version

1.4 TECHNICAL SPECIFICATIONS

Table 2 below provides Technical Specifications for the OSD8838.

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)	> 63dB at all receive levels over the unit's full dynamic range
Linearity	<0.7% Differential Phase (DP) <0.7° Differential Gain (DG)
Data Interface	One RS232 and one RS422 or 2-wire / 4-wire RS485. 31kHz Manchester or Biphase in either direction
Data Rates	DC to > 400kbps on two data channels DC to > 100bps on relay channel
Data Connectors	15 pin female subminature high density D connector
Ethernet	IEEE802.3 Ethernet standards at 10/100Mbps with Auto Negotiation
Ethernet link throughput	Up to 12.5Mbps
Ethernet Connector	RJ45
Number of fibers required	One only
Transmitter Wavelength	1310nm
OSD8838T Transmitter Coupled Power	-13 to -8dBm
OSD8838R Transmitter Wavelength	1550nm
OSD8838R Transmitter Coupled Power	-15 to -9dBm
OSD8838R Receiver Sensitivity	<-27dBm
OSD8838R Receiver Saturation	>-3dBm
OSD8838T Receiver Sensitivity	<-36dBm
OSD8838T Receiver Saturation	>-10dBm
Link Distances	>3km multimode (fiber bandwidth limited) >30km singlemode (fiber loss limited) >100km singlemode for OSD8838 link with high power devices
Optical Connectors	ST standard, others optional
Dimensions (mm)	114W x 105D x 31H (module) 25W x 208D x 100H (card)
Weight	0.4kg (module), 0.2kg (card)
Power Requirements	+9V to +35V$_{DC}$ or 22 to 28V$_{AC}$ @ 4VA
Operating Temperature	-20°C to +75°C
Relative Humidity	0 to 95% non-condensing
Chassis Current Consumption (CCC)	0.30 Amp

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1.5 PIN ASSIGNMENTS

Pin assignments for the "Data Input/Output" DB15F connector (Figure 2) is shown in Table 3 and 10/100Base-T Ethernet RJ45 connector is shown in Figure 3 below.

TABLE 3: PIN ASSIGNMENT

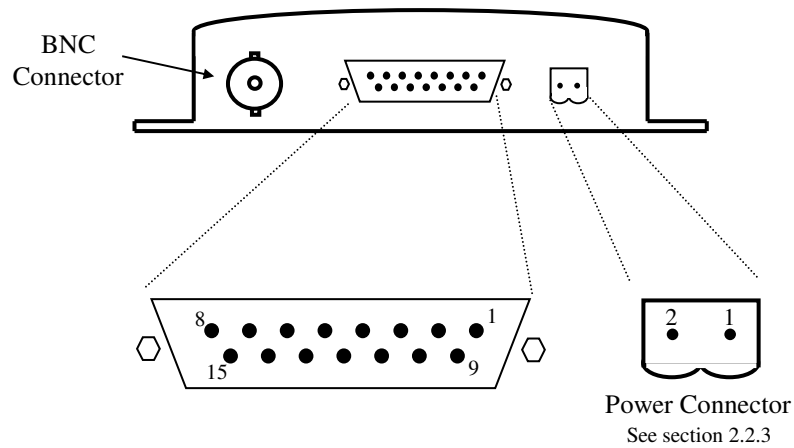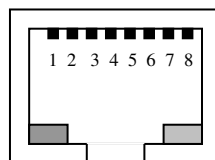| Pin Number	Function	Pin Number	Function
1	RS422/RS485 Input +	9	RS422/RS485 Input -
2	Relay Input	10	Ground
3	Ground	11	RS422/RS485 Output -
4	RS422/RS485 Output +	12	Common Output
5	Normally Open Output	13	Ground
6	Not Connected	14	RS232 Output
7	Ground	15	Not Connected
8	RS232 Input	-	-

FIGURE 2: DB15F CONNECTOR AND POWER CONNECTOR

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

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

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1.6   CONTROL SWITCH SETTINGS

There are two control switches located on the front panel; a 2-way Ethernet control switch and a 3-way data control switch. The 2-way Ethernet control switch has an Ethernet reset switch and Ethernet speed setting switch. The 3-way switches SW1, SW2 and SW3 are used for setting the Data Mode Options.

Note: For correct operation, ensure that both OSD8838T and OSD8838R have the switch settings in the same modes.

TABLE 4: ETHERNET SWITCH SETTINGS

SWITCH	STATE	POSITION	FUNCTION
SW1	Not Used (No Function)		
SW2[*1]	OFF	DOWN	Full Duplex
	ON	UP	Half Duplex

[*1] Note: Full Duplex mode is default setting.

TABLE 5: DATA MODE SWITCH SETTINGS

SWITCH	STATE	POSITION	FUNCTION
SW1	OFF	DOWN	RS422
	ON	UP	RS485
SW2	OFF	DOWN	4-Wire Operation
	ON	UP	2-Wire Operation
SW3[*2]	OFF	DOWN	10-Bit Video Mode
	ON	UP	9-Bit Video + Data Mode

[*2] Note: In 10-bit video mode only reverse data is enabled. Forward data, relay and Ethernet is disabled and will not function.

Example only

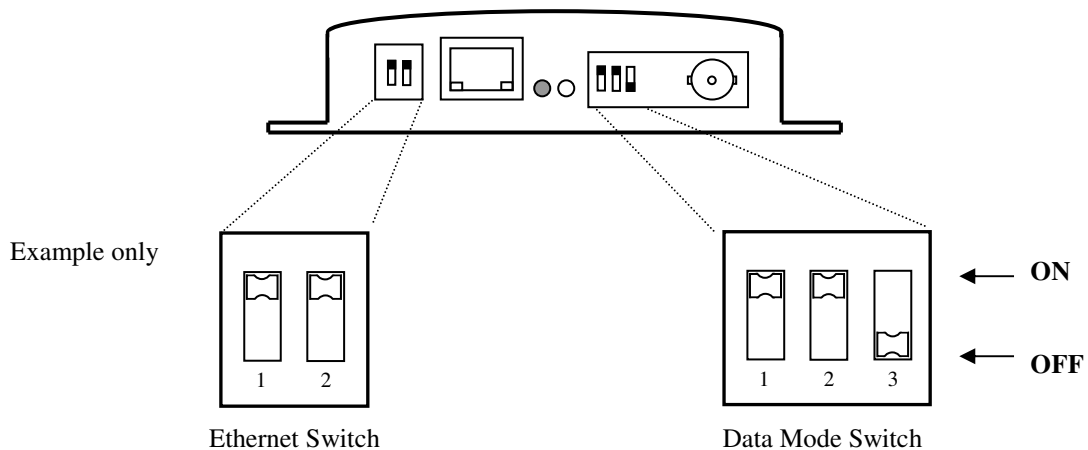Ethernet Switch   Data Mode Switch

FIGURE 4: DATA SWITCH DIAGRAMS

2   INSTALLATION AND OPERATION

2.1   INTRODUCTION

This section outlines the methods required to install and operate the OSD8838T and OSD8838R 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**

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

| Class 1 |
|---|
| The OSD8838 is a **Class 1 laser product.** |
| CLASS 1 LASER PRODUCT |
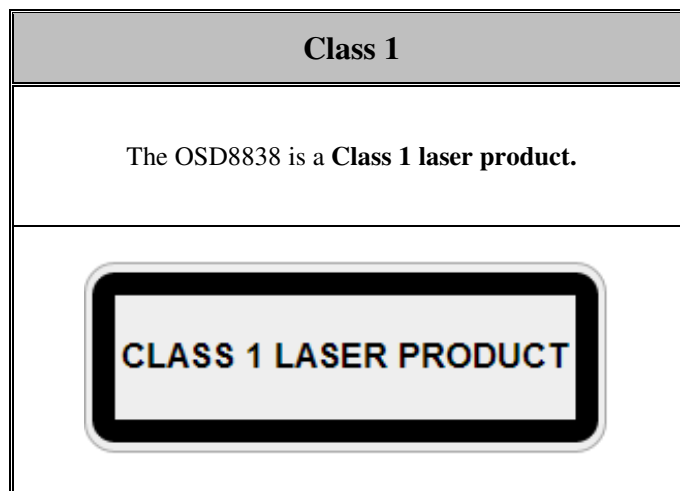
PRECAUTIONS

▲ 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.
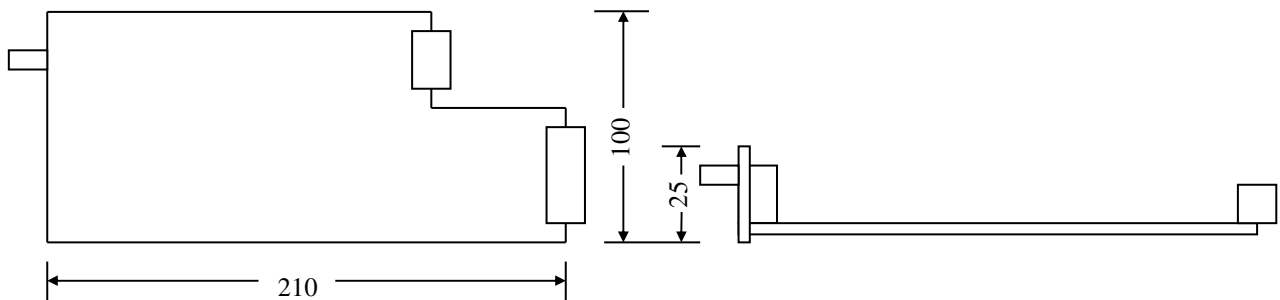
2.2.2   OSD8838 DRAWINGS AND DIMENSIONS

The OSD8838TC and OSD8838RC are designed to be mounted on an even surface and to be secured by means of M4 or smaller screws. The OSD8838T and OSD8838R card versions are designed to be inserted into a chassis and secured by means of captivated screws.
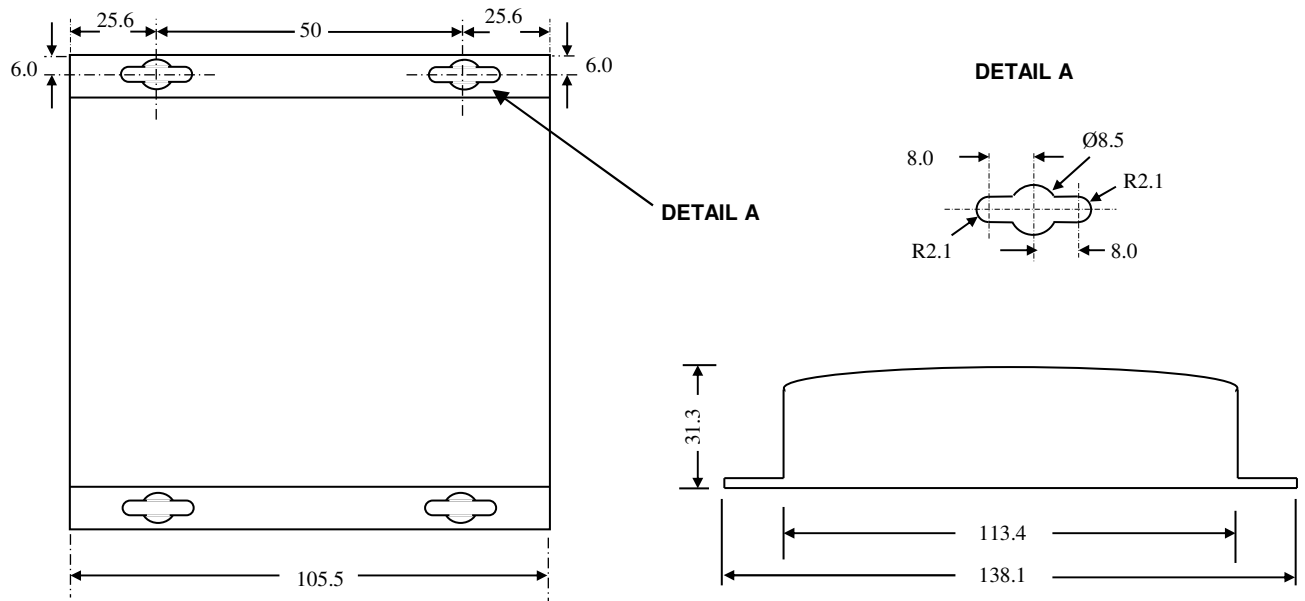
(a) Module Version

(b) Card Version

FIGURE 5: OSD8838 MOUNTING DIMENSIONS

2.2.3   POWER SUPPLY CONNECTIONS

The OSD8838 card version is powered from the OSD370N or OSD350N chassis. DC power on the OSD8838 card version is connected via the DB9 connector. The card version of the OSD8838T and OSD8838R should be fixed into the OSD370 (or OSD350) chassis using the captivated screws. Either card can be plugged in or out of the OSD370 (or OSD350) chassis with power on or off.

The OSD8838 module requires external DC or AC power. The voltage range of the OSD8838 is $+9V_{DC}$ to $+35V_{DC}$ or $22V_{AC}$ to $28V_{AC}$ @ 4VA. Power should be connected to the power socket located at the back of the case as indicated in Table 6.

TABLE 6: DC OR AC POWER CONNECTION

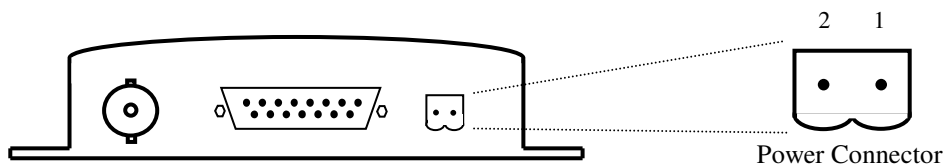| External Power Pin	Specification
Pin 1	$+9V_{DC}$ to $+35V_{DC \ or}$ $22V_{AC}$ to $28V_{AC}$
Pin 2	Ground – 0V

FIGURE 6: OSD8838C POWER SUPPLY CONNECTIONS

2.2.4   OTHER CONNECTIONS

The video-input signal (eg. from camera) is connected to the video input BNC connector on the OSD8838T. The video output signal (eg. to monitor) is connected from the video output BNC connector on the OSD8838R.

Data and relay signals are connected to the DB15F connector as set out in Table 3. Connect the Ethernet cable to the RJ45 connector located on the front of the OSD8838. It is recommended that shielded cables be used.

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   CONTACT CLOSURE CONNECTIONS

The OSD8838T and OSD8838R have one contact closure channel. The contact closure input (Pin 2 on the DB15F connector) is driven high. To operate the contact closure, the input should be switched to ground (see Figure 7).
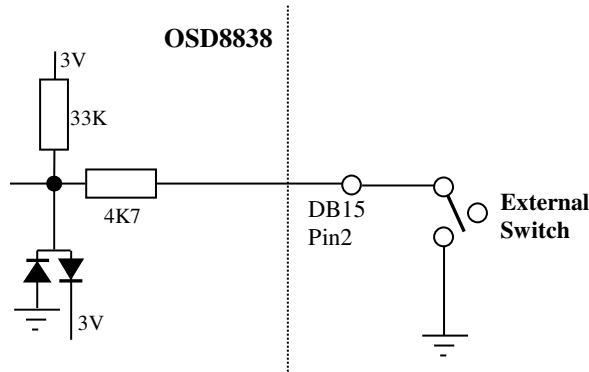

FIGURE 7: CONTACT CLOSURE INPUT

The contact closure common output is on pin12 while the normally open contact is connected to pin5 of the DB15F connector. Maximum ratings the OSD8838 relay can drive is 120mA @ $350V_{(max)}$.
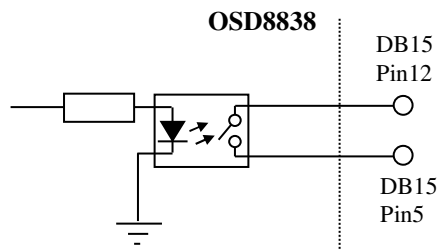

FIGURE 8: CONTACT CLOSURE OUTPUT

2.3   OSD8838 OPERATION

2.3.1   OSD8838T AND OSD8838R OPERATION

When using the OSD8838 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 (see Table 7). If a module version (OSD8838C) is used, connect the unit to an appropriate power source and check that the indicators illuminate accordingly on power up (see Table 7).

To connect a video signal, connect a BNC terminated coaxial cable from the camera to the OSD8838T. If the camera is operational, the "Video Present" indicator should illuminate 'Amber'.

Connect a BNC terminated coaxial cable between the BNC socket on the rear of the OSD8838R and the video monitor or switcher.

Plug in the optical connectors of the optical cable. If the set-up is connected correctly, the OSD8838R "Link OK" LED will change from 'Red' to 'Green'. If a video signal is being received the "Video Present" indicator on the OSD8838R should be 'Amber'; if no video signal is being received this indicator will not be illuminated.

Plug the digital signal source (data) into DB15F connector on the rear of the module. Connect the Ethernet cable to the RJ45 connector located on the front of the OSD8838 unit.

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

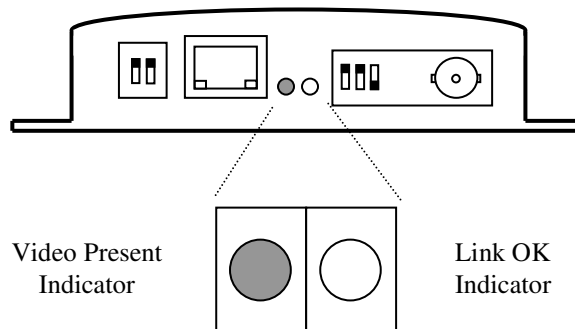Ensure that both OSD8838T and OSD8838R switch settings are in the same modes (see Table 5).

Video Present Indicator   Link OK Indicator

FIGURE 9: OSD8838TC AND OSD8838RC FRONT SIDE VIEW

2.3.2   OSD8838T AND OSD8838R INDICATORS

TABLE 7: OSD8838 INDICATOR FUNCTION

| INDICATOR	PARAMETER	COLOUR	FUNCTION
VIDEO PRESENT	Video Input Status	Off	No video signal present
		Amber	Video signal present
LINK OK	Link Status	Red	No optical signal received
		Green	Optical Signal received

NOTE:

"Link OK " Indicator refers to the received data stream. LED is 'green' after the optical link is established and the receiver is locked onto the incoming data stream and detects a low Bit Error Rate. LED will indicate 'red' after the Bit Error Rate reaches an unacceptable level or when there is no optical link established.

TABLE 8: OSD8838 ETHERNET INDICATOR FUNCTION

LED	INDICATOR	FUNCTION
Green	On	Link OK/Idle
	Off	No Link
	Blink	Tx/Rx activity
Amber	On*	100Base-T
	Off	10Base-T

*LED on when no RJ45 cable with valid link partner is connected
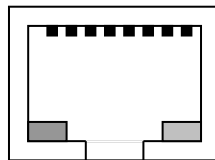
Green LED: Amber LED:
LINK/ACT   LINK SPEED

FIGURE 10: ETHERNET INDICATOR

3   OPTIONAL AUDIO VERSION

The OSD8838 is also optionally available with two duplex audio channels. The 2 audio input/outputs are located on the front panel via the 3.5mm jack connector.

3.1   AUDIO SPECIFICATIONS

TABLE 9: AUDIO SPECIFICATIONS

| SPECIFICATION	PERFORMANCE
Number of Channels	2 in each direction
Audio Bandwidth	10Hz to 20kHz +1,-2dB
Audio Input / Output Impedance	>10KΩ / <200Ω
Audio Input Level	200mVrms nominal
Audio Output Level	200mVrms nominal
Audio Headroom	18dB
Audio Weighted Signal to Noise Ratio	> 90dB at maximum level
Audio Distortion	< 0.05%
Audio Connectors	3.5mm stereo socket

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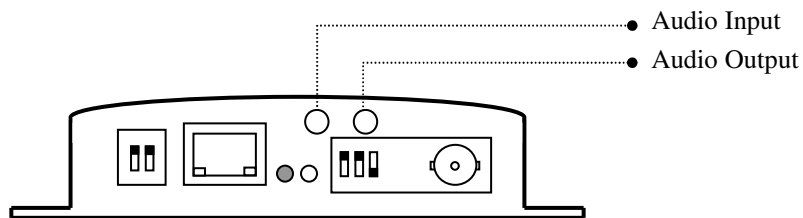
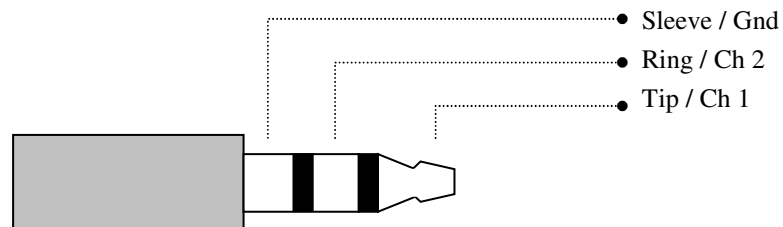FIGURE 11: AUDIO OPTION FRONT PANEL

FIGURE 12: 3.5MM STEREO JACK CONNECTIONS

4   MAINTENANCE

4.1   INTRODUCTION

The following section outlines the fault-finding procedure for the OSD8838T and OSD8838R 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.

4.2   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 OSD8838T or OSD8838R 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.

4.3   ROUTINE MAINTENANCE

▲   There is no routine maintenance required with the OSD8838T and OSD8838R.

5 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:

5.1 WARRANTY PERIOD

For warranty period, please call your local OSD distributor.

5.2 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.

5.2.1 WARRANTY REPAIRS

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

5.2.2 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.

5.2.3 SITE REPAIRS

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

5.2.4 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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