OPTICAL
SYSTEMS
DESIGN

OPERATOR MANUAL

OSD2138 SERIES

UNMANAGED 3-PORT SWITCH WITH

2 DUPLEX CONTACT CLOSURE CHANNELS

INDEX 1

1 TECHNICAL SUMMARY

1.1 BRIEF DESCRIPTION

1.1.1 OVERVIEW

The OSD2138 is an unmanaged 3-port switch with 2 duplex contact closure channels. It has two 10/100/1000Base-T RJ45 copper ports and one SFP port which can be specified by the user for 100Base-Fx/1000Base-Lx/Sx fiber mode or as 10/100/1000Base-T RJ45 copper.

The unit will operate on either singlemode or multimode fiber. Operation over at least 50km of singlemode fiber is possible by use of the appropriate SFP optical devices. It normally requires two fibers but is optionally available for one fiber operation.

A major benefit of the OSD2138 is its reliable and consistent performance over the -20°C to +75°C temperature range that allows it to be used in uncontrolled environments such as roadside cabinets, mine sites and factories.

1.1.2 APPLICATIONS

- Any network utilising a mix of copper and fiber
- Industrial IP communications
- Gigabit backbone networks
- IP cameras with tamper alarms and/or washer/wiper controls

1.1.3 FEATURES AND BENEFITS

- Complies with IEEE802.3i/802.3u/ 802.3ab 10/100/1000Base-T, IEEE802.3u 100Base-Fx, IEEE802.3z 1000Base-Lx/Sx standards.
- Has a total of three ports: two fixed copper ports for 10/100/1000Base-T and one SFP port which may be either copper or fiber
- Supports network traffic of 1000Mbps
- Can be used with either singlemode or multimode fiber over a variety of link budgets
- Available for operation over 1 or 2 fibers
- Automatic TP setup: no need for crossover cables
- Auto TP sensing of half or full duplex operation in 10/100 mode
- Powered by non critical $12V_{DC}$ or $24V_{AC}$ supplies
- Operates over the temperature range of -20°C to +75°C
- Duplex transmission of two alarm signals
- SFP module sold separately
- Dual power supply inputs

1.2 OSD2138 CONFIGURATION

1.2.1 OSD2138 UNIT

FIGURE 1: OSD2138 UNIT

1.2.2 TYPICAL CONFIGURATION

Figure 2 below indicates a possible set-up for an OSD2138 system.

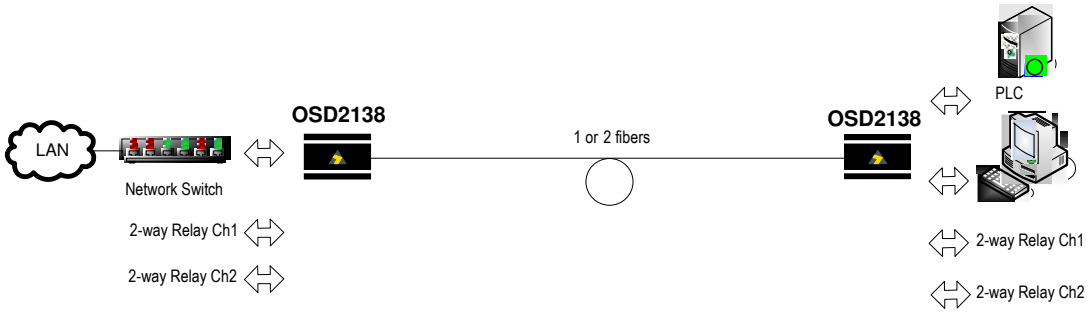

FIGURE 2: OSD2138 TYPICAL POINT-POINT CONFIGURATION

1.3 TECHNICAL SPECIFICATIONS

TABLE 1: TECHNICAL SPECIFICATIONS

SPECIFICATION	PERFORMANCE
Electrical Data Interface	IEEE802.3i/802.3u/802.3ab, 10/100/1000Base-T Ethernet
Electrical Data Connector	RJ45 for fixed copper ports (Ports 1 and 2) and for copper SFP module
Ports 1 and 2 Data Rates	10, 100, 1000Mbps with energy detect, auto negotiate, auto MDIX
Operating Mode	Half or full duplex for 10/100 Full duplex for 1000 Pause frames for flow control
Contact Closure Transmission	Buffered input, optically isolated MOSFET output (120mA @350V(max))
Contact Closure Connector	8 way terminal block
Optical Port Connector	SFP
Various SFP Options Possible	Short haul, long haul, single fiber operation, etc. Please consult OSD DATASHEET #1002100006 or contact OSD
Indicators	1x Power 2x Copper Speed/Activity/Link on 2 x RJ45 2x Copper Duplex on 2x RJ45 1x SFP Speed/Activity/Link for copper or fiber 1x SFP port speed
Dimensions (mm)	114W x 173D x 31H (module) 25W x 208D x 100H (card)
Weight	0.5kg (module), 0.3kg (card)
Power Requirements	+8V to +35V_{DC} or 22 to 28V_{AC} @ 8VA (with 1 SFP loaded)
Power Connector	6 way terminal block
Operating Temperature	-20°C to +75°C
Relative Humidity	0 to 95% non-condensing
Chassis Current Consumption	0.8 Amp when fully optioned

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1.4 OSD2138 FRONT AND REAR PANELS

There are two fixed copper ports for 10/100/1000Base-T, one SFP port which can be either copper or fiber and a 2 channel duplex contact closure 8 way terminal block on the front panel. The rear panel consists of a 6-way terminal block power connector and a 4-Way DIP switch. The Type-A USB connector and Type-B USB connector are not used.

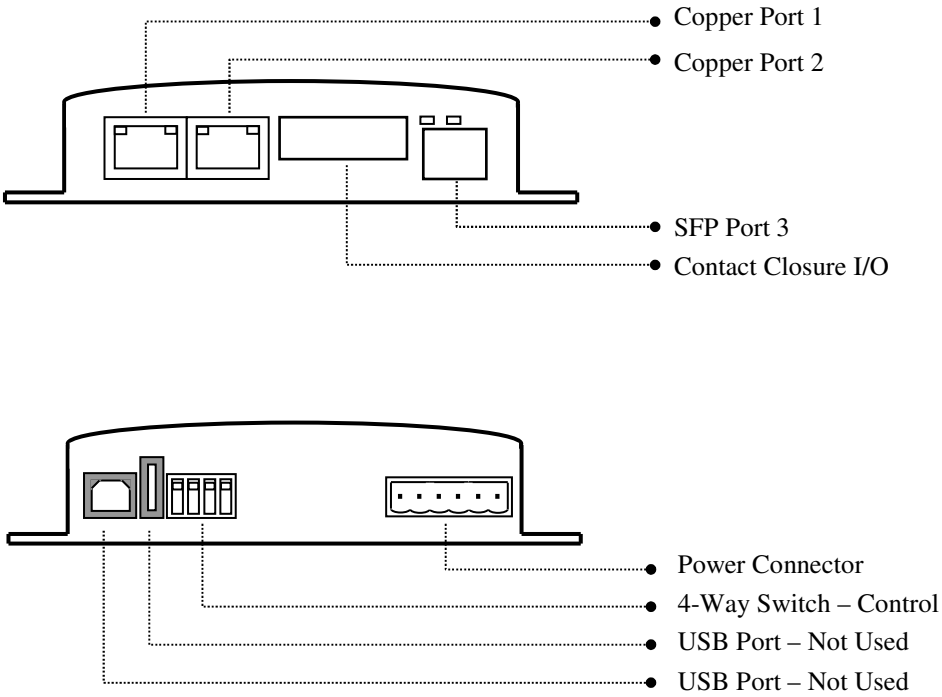


FIGURE 3: OSD2138 CONNECTORS

2 INSTALLATION AND OPERATION

2.1 INTRODUCTION

This section outlines the methods required to install and operate the OSD2138 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.

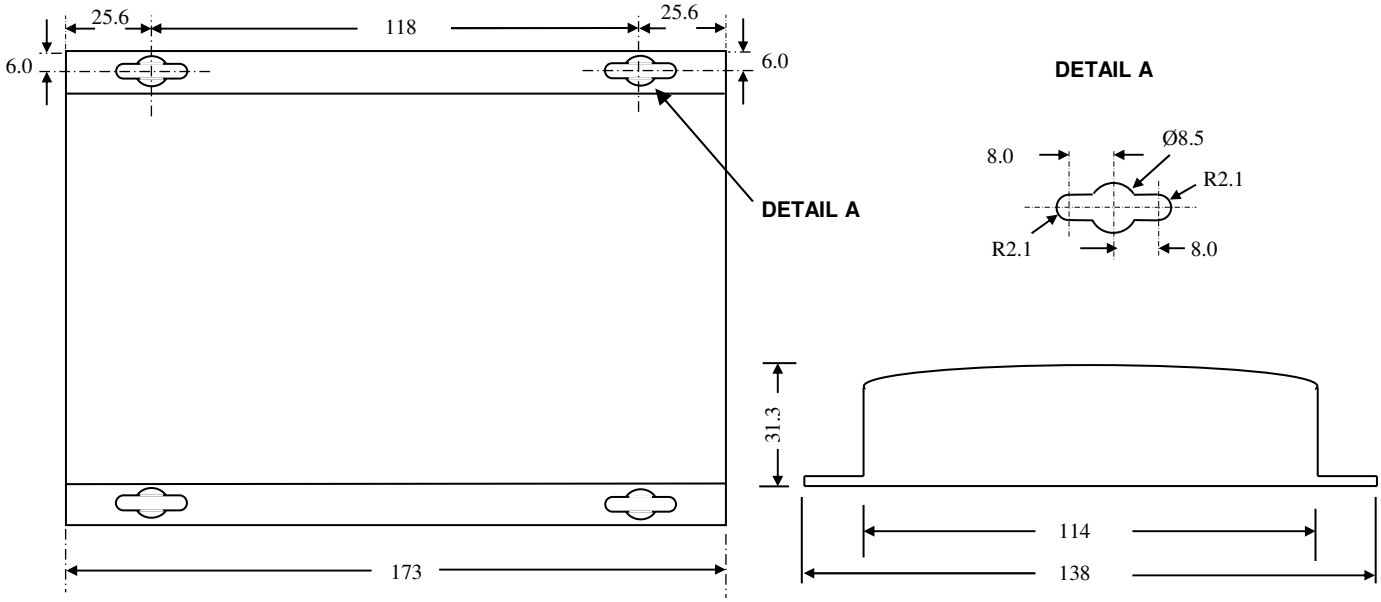
Class 1
The OSD2138 is a **Class 1 laser product.**


PRECAUTIONS

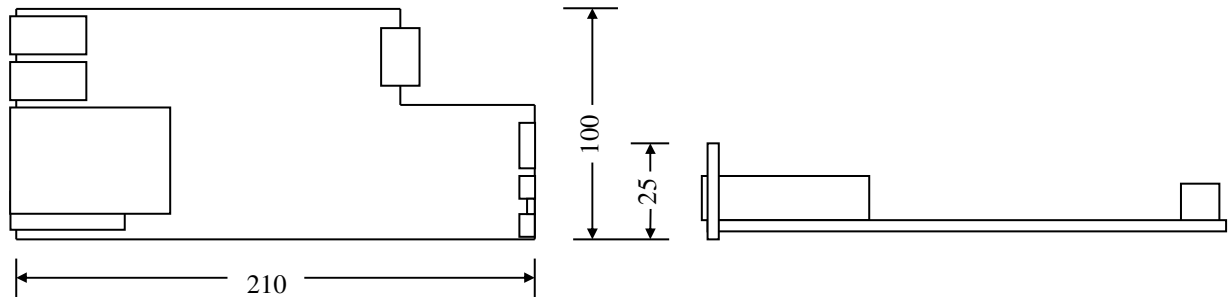
- ▲ All service personnel should be provided training as to the hazards of direct viewing of laser radiation and of the precautionary measures during servicing of equipment
- ▲ Areas where laser products are installed should be restricted in access to trained service personnel only and appropriate warning 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.

2.2.2 OSD2138 DRAWINGS AND DIMENSIONS

The OSD2138 standalone module is designed to be mounted on an even surface and to be secured by means of M4 or smaller screws. The OSD2138 card version is designed to be inserted into a chassis and secured by means of captivated screws.



(a) Module Version



(b) Card Version

FIGURE 4: OSD2138 MOUNTING DIMENSIONS

2.2.3 POWER SUPPLY CONNECTIONS

The OSD2138 card version is powered from the OSD370N or OSD350N chassis. DC power on the OSD2138 card version is connected via the DB9 connector. The card version of the OSD2138 should be fixed into the OSD370N (or OSD350N) chassis using the captivated screws. The card can be plugged in or out of the OSD370N (or OSD350N) chassis with power on or off.

The OSD2138 module requires external 8 to $35V_{DC}$ or 22 to $28V_{AC}$ @ 10VA. The OSD2138 features a second input voltage channel for redundant power operation. Power should be connected to the power socket located at the back of the case as indicated in Table 2.

TABLE 2: DC OR AC POWER CONNECTION

External Power Pin	Specification
Pin 1 and/or 5	$+8V_{DC}$ to $+35V_{DC}$ or 22 to $28V_{AC}$ @ 10VA
Pin 2 and/or 6	Ground – 0V
Pin 3 & 4	Not Used

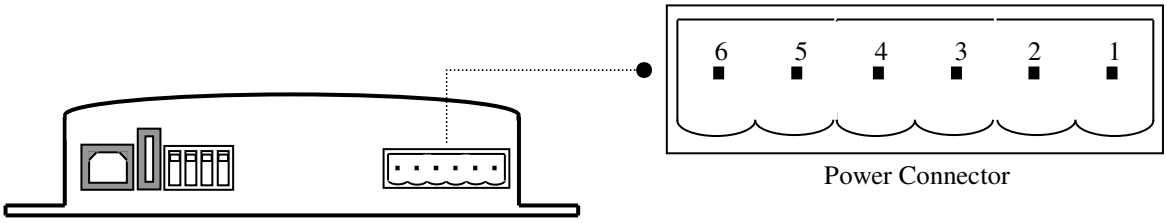
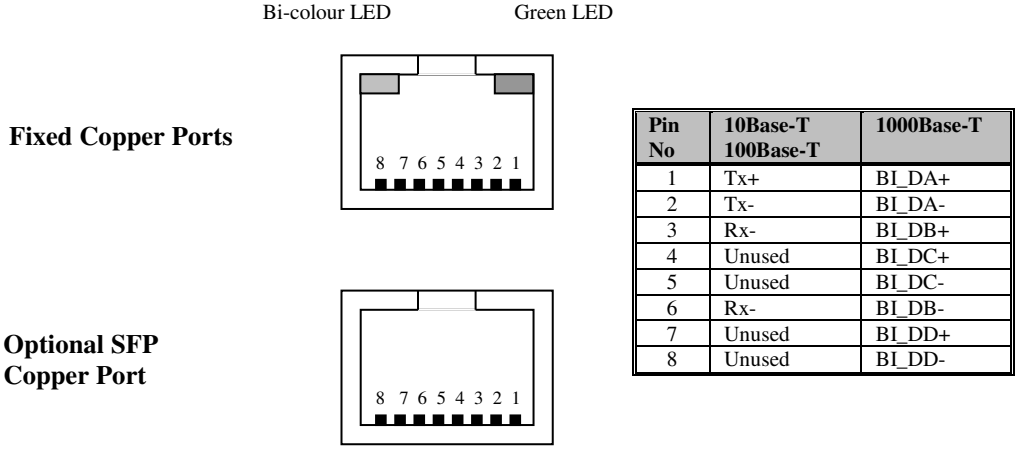


FIGURE 5: 2138 POWER SUPPLY CONNECTIONS

2.2.4 RJ45 COPPER PIN ASSIGNMENTS

Figure 6 shows the pin configuration for both the fixed copper ports or the optional SFP ports fitted with RJ45 copper port



Pin No	10Base-T 100Base-T	1000Base-T
1	Tx+	BI_DA+
2	Tx-	BI_DA-
3	Rx-	BI_DB+
4	Unused	BI_DC+
5	Unused	BI_DC-
6	Rx-	BI_DB-
7	Unused	BI_DD+
8	Unused	BI_DD-

FIGURE 6: FIXED 10/100/1000BASE-T ETHERNET RJ45 CONNECTORS

2.2.5 CONTACT CLOSURE I/O

The OSD2138 has 2 duplex contact closure channels located on the front panel via a 8 way terminal block. The contact closure inputs (Ch1 Pin1: Ch2 Pin5) is driven high. To operate the contact closure, the input should be switched to ground (see Figure 8). The contact closure common output (CH1 Pin2: Ch2 Pin6) while the normally open contact is connected to Ch1 Pin3: Ch2 Pin7 of the 8 way terminal block connector. Maximum ratings the OSD2138 relay can drive is 120mA @ 350V$_{(max)}$. Pin 4 and Pin8 are connected to Ground.

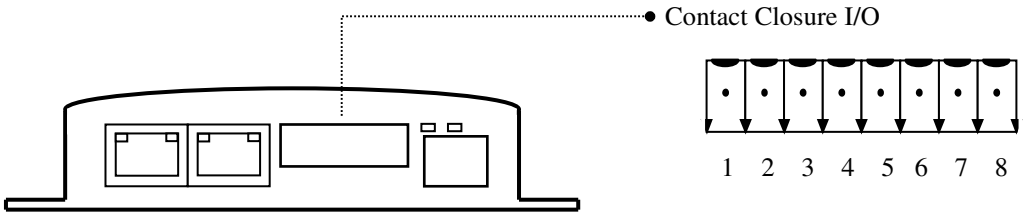


FIGURE 7: CONTACT CLOSURE CONNECTIONS

TABLE 3: CONTACT CLOSURE CONNECTIONS

Contact Closure Channel	Pin No	Description
Ch1	1	CC Input
	2	Normally Open Output
	3	Common Output
	4	Ground
Ch2	5	CC Input
	6	Normally Open Output
	7	Common Output
	8	Ground

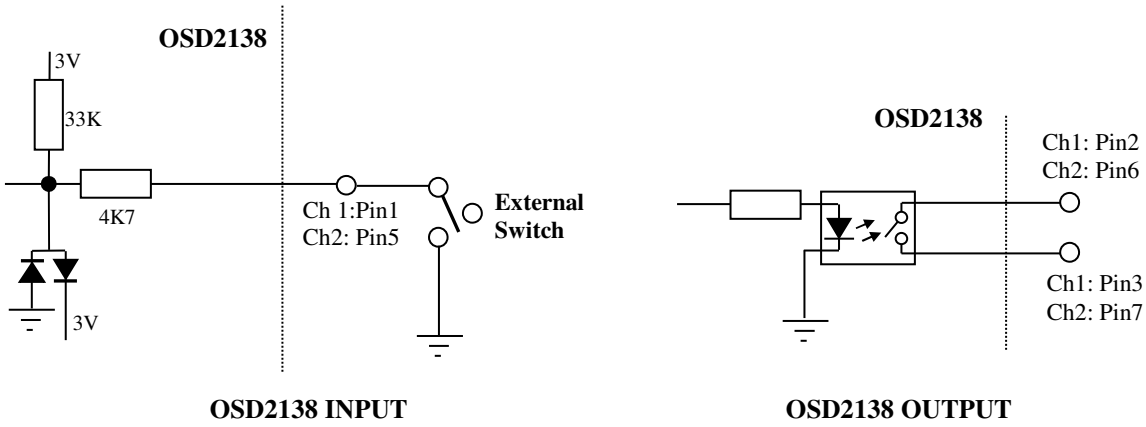


FIGURE 8: CONTACT CLOSURE INPUT AND OUTPUT

2.2.6 TYPE B USB CONNECTOR

The OSD2138 has a USB – Type B connector located on the rear of the unit that is not currently used.

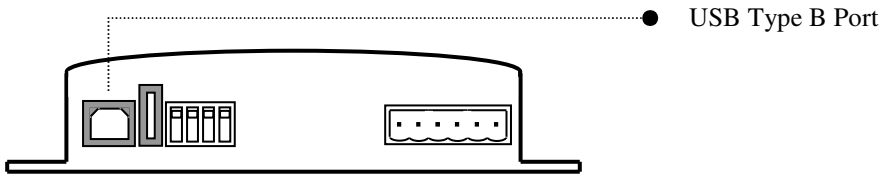


FIGURE 9: USB TYPE B PORT

2.2.7 TYPE A USB CONNECTOR

All OSD2138 units are shipped with the latest firmware already installed. The Type- A USB port is used for uploading firmware and is not used by the end user.

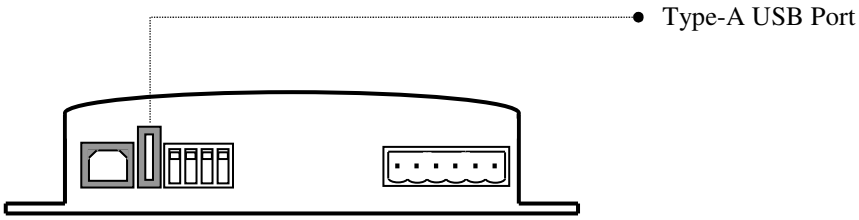


FIGURE 10: OSD2138 USB CONNECTOR

2.2.8 PORT ALLOCATION AND LED INDICATORS

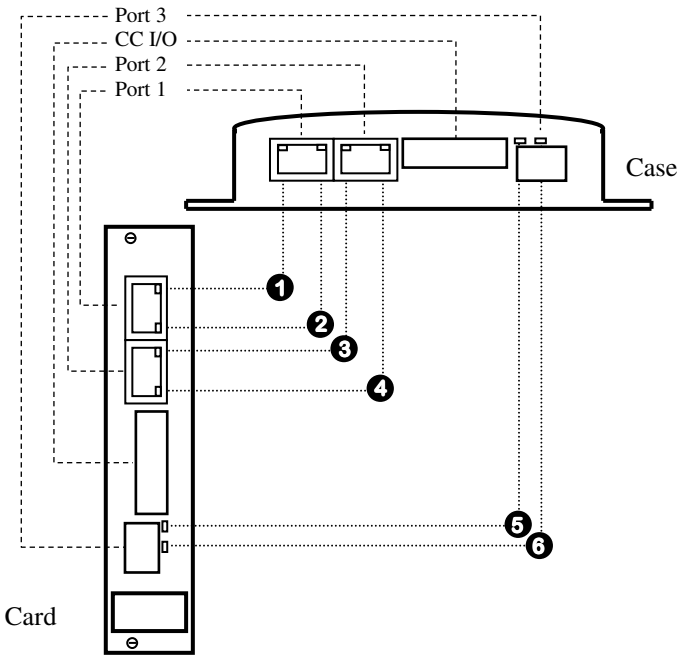


FIGURE 11: PORT/LED

TABLE 4: LED FUNCTION

* Note On LED could be either Green or Amber

No	Function			LED Colour Function		
	On	Blink	Off	Green	Gr/Am	Amber
❶	No Activity	Activity	No Link	1Gbps	100Mbps	10Mbps
❷	Full Duplex	-	Half Duplex	On*	-	On*
❸	No Activity	Activity	No Link	1Gbps	100Mbps	10Mbps
❹	Full Duplex	-	Half Duplex	On*	-	On*
❺	Power On	-	Power Off	On	-	-
❻	No Activity	Activity	No Link	1Gbps	-	100Mbps

2.2.9 CONTROLS

The OSD2138 has a 4-way DIP switch to control a number of functions. Table 5 outlines the function of each switch.

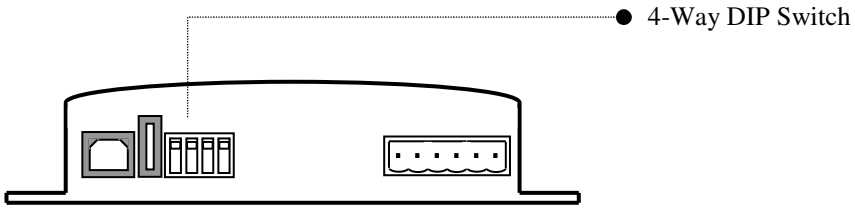


FIGURE 12: OSD2138 CONTROLS

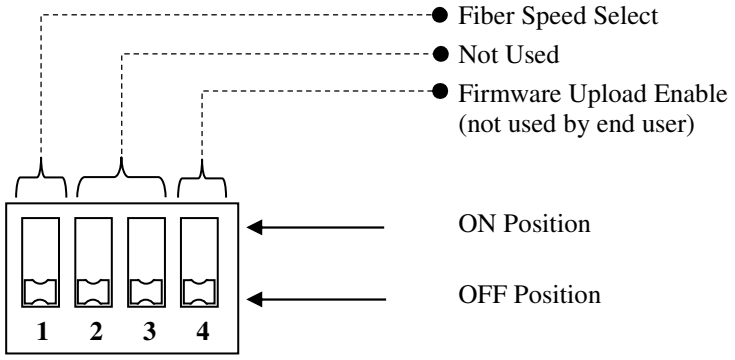


FIGURE 13: OSD2138 4-WAY DIP SWITCH

TABLE 5: OSD2138 4-WAY DIP SWITCH SETTINGS

SWITCH NUMBER	DESCRIPTION	FUNCTION	SWITCH POSITION
1	Port 3 Fiber Speed	1000Mbps 100Mbps	OFF* ON
2	Not Used	-	-
3	Not Used	-	-
4	Firmware Upload	Not Used	OFF*

* Default settings. Firmware update switch should remain in OFF position.

2.2.10 FITTING SFP CONNECTORS

Care should be taken when inserting/removing the SFP connectors from SFP port 3,4 and 5 as SFP modules are Electrostatic (ES) sensitive and Electrostatic Discharge (ESD) precautions should be taken when installing. Ensure that the SFP is fully engaged and latched into position.

Inserting SFP – Ensure that the SFP lever is in the locked position and insert into appropriate SFP port. Gently push the SFP until it locks into place. Remove plastic/rubber dust cap and fit fiber cable or RJ45 plug.

Removing SFP – Remove fiber connector or RJ45 plug. Pull the SFP lever down to unlock SFP from housing. Using the lever, gently pull the SFP out.

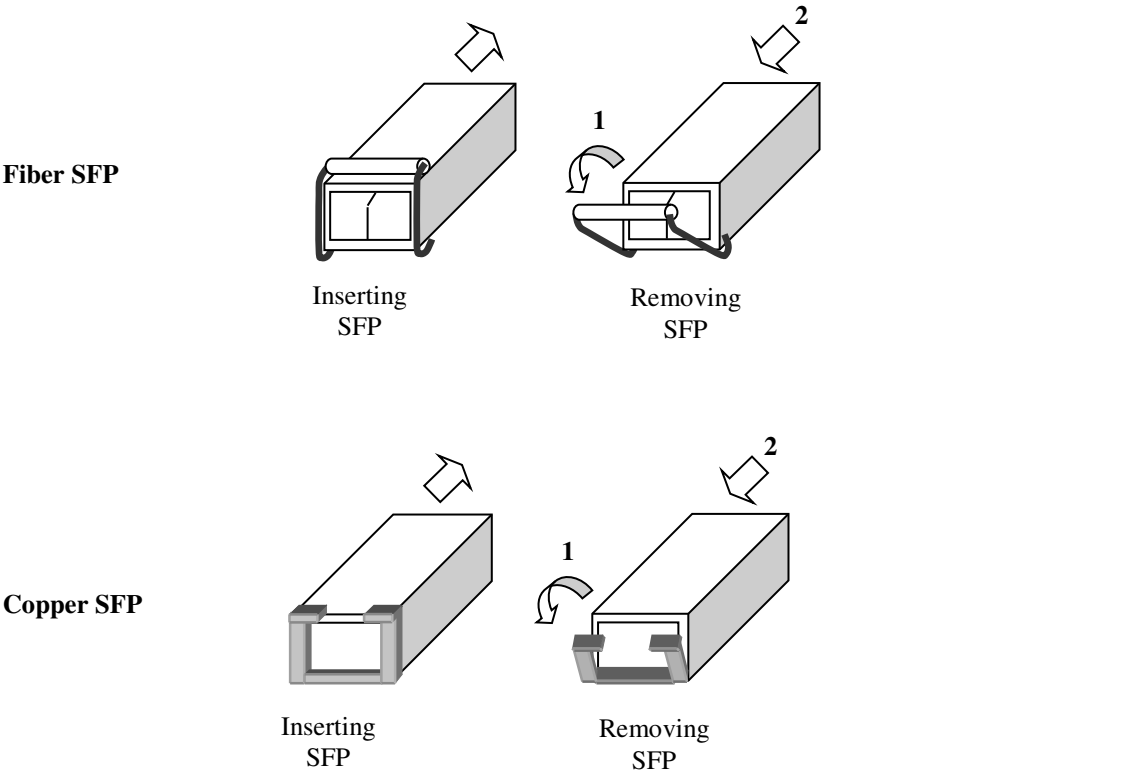


FIGURE 14: FITTING/REMOVING SFP CONNECTORS

2.3 OSD2138 CONNECTIONS

When using the OSD2138 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 4). If a module version (OSD2138C) is used, connect the unit to an appropriate power source and check that the indicators illuminate accordingly on power up (see Table 4).

For RJ45 connection use Category 5 (CAT5) or higher. Length should be no more than 100 meters.

For singlemode fiber connections, fiber used must be 9/125µm singlemode fiber.

For multimode fiber connections, fiber used must be 50 or 62/ 125µm multimode fiber.

Plug in the appropriate connectors for system configuration;

- RJ45 cable to fixed copper ports (port 1 and 2) and copper SFP modules
- LC fiber cable to fiber SFP modules.
- 3.5mm 8 way terminal block for the 2 channel relay (supplied)
- 5.0mm 6 way terminal block for power connection (supplied)

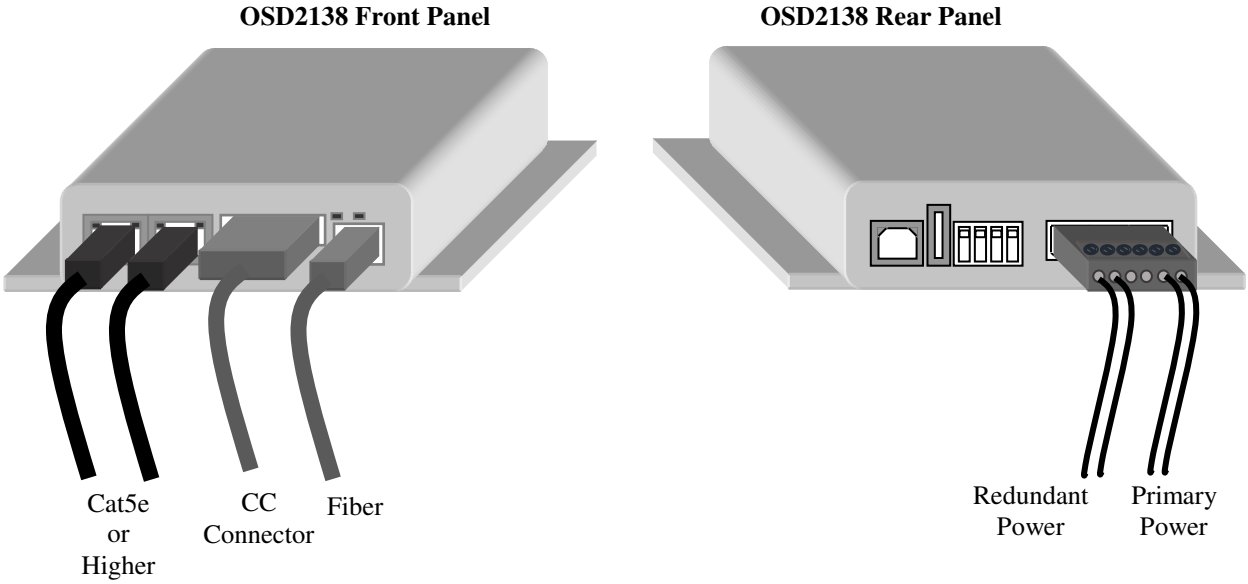


FIGURE 15: OSD2138 CONNECTIONS

3 MAINTENANCE

3.1 INTRODUCTION

The following section outlines the fault-finding procedure for the OSD2138 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 Ethernet cables are connected to the modem correctly and that the distant OSD2138 modem has been connected correctly to any external equipment.
- Inspect the optical connectors (for fiber SFP option) for any contamination and clean using isopropyl alcohol and a lint free tissue if any contamination is detected.

3.3 ROUTINE MAINTENANCE

- There is no routine maintenance required with the OSD2138.

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 contact 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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