
OPTICAL

SYSTEMS

DESIGN

OPERATOR MANUAL

OSD2144A SERIES

5 PORT UNMANAGED

GIGABIT ETHERNET SWITCH

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1 TECHNICAL SUMMARY

1.1 BRIEF DESCRIPTION

1.1.1 OVERVIEW

The OSD2144A is designed to convert between 10/100/1000Base-T copper cabling and 1000Base-Lx fiber cabling. It has two fixed 10/100/1000Base-T RJ45 copper ports, and three SFP ports which can be specified by the user for 10/100/1000Base-T, 100Base-Fx or 1000Base-X. The same unit will operate on either singlemode or multimode fiber. Operation over at least 50km of singlemode fiber is possible by use of the appropriate optical devices. It normally requires two fibers but is optionally available for one fiber operation.

A major benefit of the OSD2144A is its reliable and consistent performance over the -20°C to +75°C temperature range which 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

1.1.3 FEATURES AND BENEFITS

- ▲ Complies with IEEE802.3i/802.3u/802.3ab 10/100/1000Base-T, 802.3u 100Base-Fx, 802.3z 1000Base-Lx/Sx standards.
- ▲ Has a total of five ports: two fixed copper ports for 10/100/1000Base-T and three SFP ports which may be either copper or fiber
- ▲ Supports network traffic of 1Gbps
- ▲ Can be used with either singlemode or multimode fiber over a variety of link budgets
- ▲ Available for operation over 1 or 2 fibers
- ▲ Automatic MDI/MDI-X: no need for crossover cables
- ▲ Auto Negotiation
- ▲ Powered by non critical 12V_{DC} supplies / Dual power supply inputs
- ▲ Operates over the temperature range of -20°C to +75°C
- ▲ SFP module sold separately
- ▲ Dual Power Supply Inputs

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1.2 TYPICAL CONFIGURATION

Figure 1 below indicates possible set-ups for an OSD2144A system.

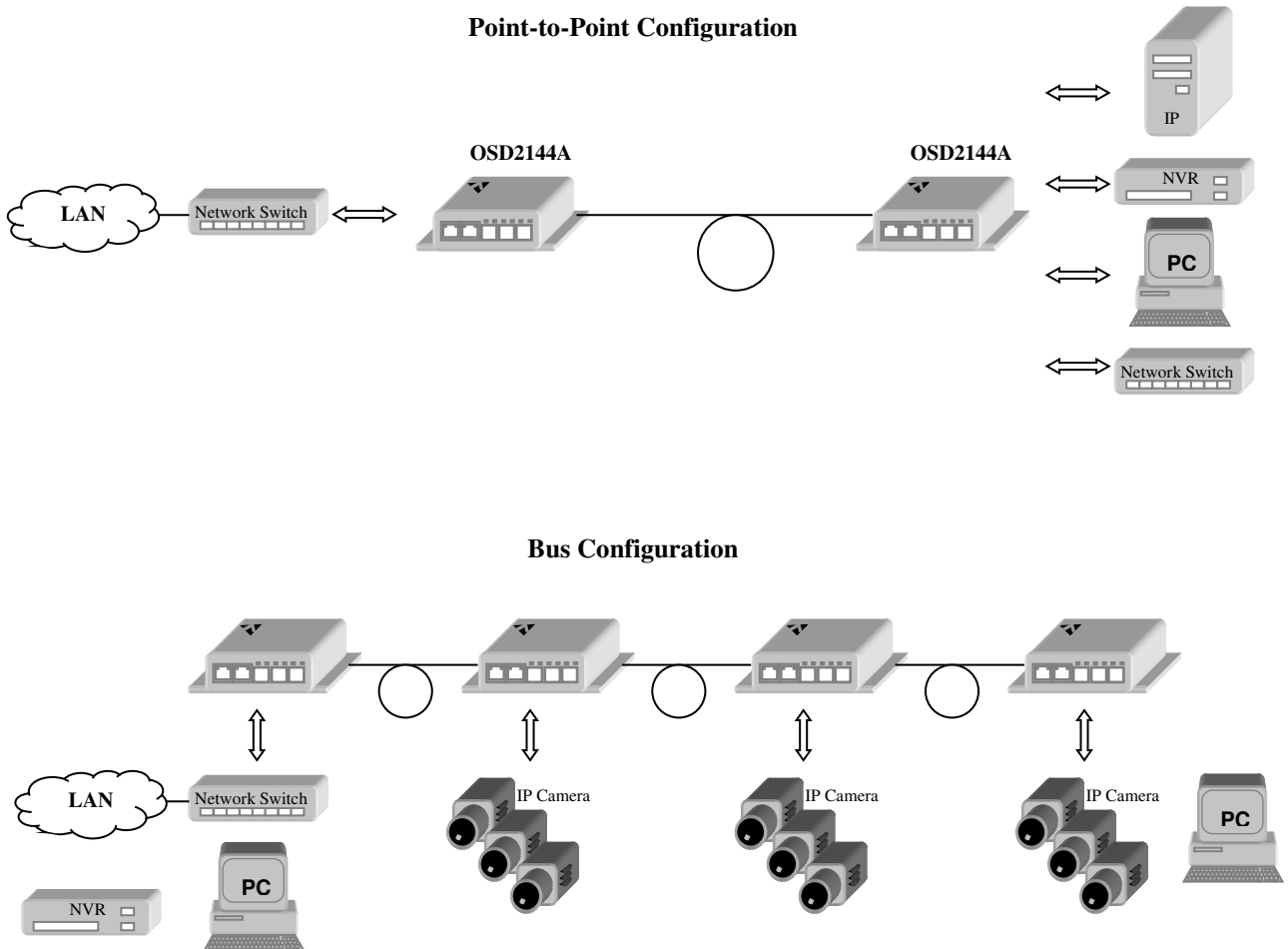


FIGURE 1: OSD2144A TYPICAL RING CONFIGURATION

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1.3 TECHNICAL SPECIFICATIONS

TABLE 1: TECHNICAL SPECIFICATIONS

SPECIFICATION	PERFORMANCE
Electrical Data Interface	IEEE802.3i 10Base-T, IEEE802.3u 100Base-T, 802.3ab 1000Base-T
Electrical Data Connector	RJ45 for fixed copper (ports 1 and 2) and SFP modules for port 3,4,5
Data Rates	10, 100, 1000Mbps for copper 100, 1000Mbps (dip-switch selectable) for fiber SFP modules (ports 3, 4, 5)
Operating Mode	Half or full duplex for 10/100 Full duplex for 1000 Pause frames based flow control
Ports 3, 4, 5	1000Base-Lx/Sx, 100Base-Fx, 10/100/1000Base-T
Optical Data Interface	IEEE802.3z 1000Base-Lx/Sx or IEEE802.3u 100Base-Fx
Transmitter Wavelength	1310nm \pm 30nm for 1000Base-Lx or 100Base-Fx 850nm \pm 40nm for 1000Base-Sx
Transmit Optical Power	>-10dBm to -4dBm (-5dBm and +2dBm @ 1310nm and 1550nm are optional)
Receiver Sensitivity	<-21dBm
Standard Optical Link Budget	>11dB: >800m on multimode fiber @ 1310nm (Fiber bandwidth limited) >20km on singlemode fiber @ 1310nm >40km on singlemode fiber @ 1550nm
Optional Optical Link Budget	>23dB: >100km on singlemode fiber with optional 1550nm devices
Indicators	1x Power 2x Copper Speed/Activity/Link on 2 x RJ45 2x Copper Duplex on 2x RJ45 3x SFP Speed/Activity/Link for copper or fiber
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} @ 10VA (with 3x SFPs loaded)
Operating Temperature	-20°C to +75°C
Relative Humidity	0 to 95% non-condensing
Chassis Current Consumption (CCC)	0.80 Amp when fully optioned

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1.4 OSD2144A FRONT AND REAR PANELS

There are two fixed copper ports for 10/100/1000Base-T and three optional SFP ports which can be either copper or fiber on the front panel. The rear panel of the module version consists of a 6-way terminal block power connector while the card version consists of a DB9 power connector which is supplied by the OSD370 (or OSD350) chassis. A 4-Way DIP switch and micro USB connector are also on the rear panel. Additionally there is an 8-Way DIP switch that is currently not used. Each section will be described further throughout this manual.

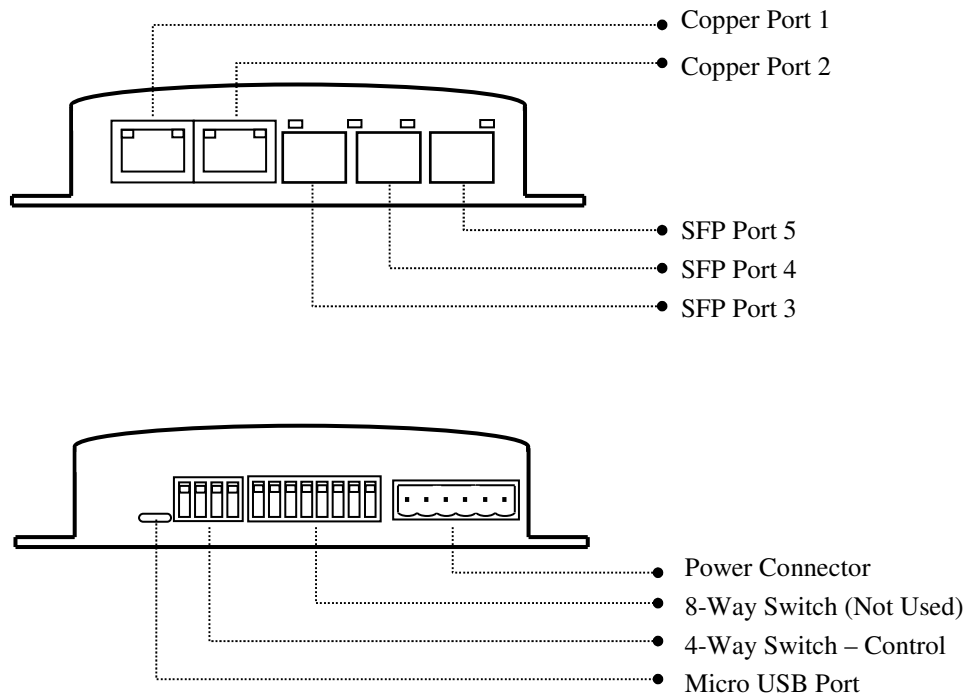


FIGURE 2: OSD2144A CONNECTORS

2 INSTALLATION AND OPERATION

2.1 INTRODUCTION

This section outlines the methods required to install and operate the OSD2144A 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

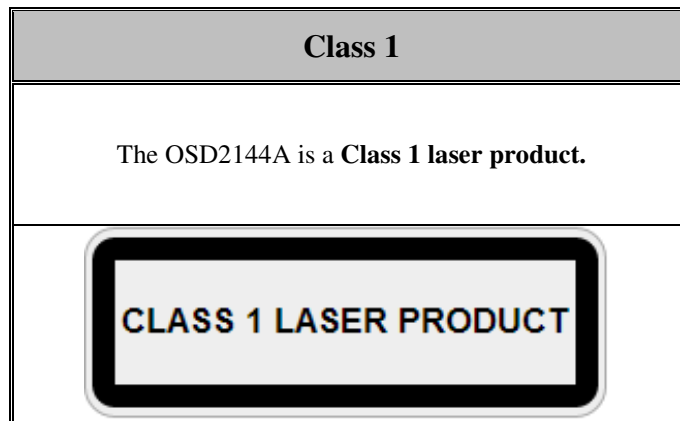
2.2.1 WARNING AND PRECAUTIONS

▲ 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.



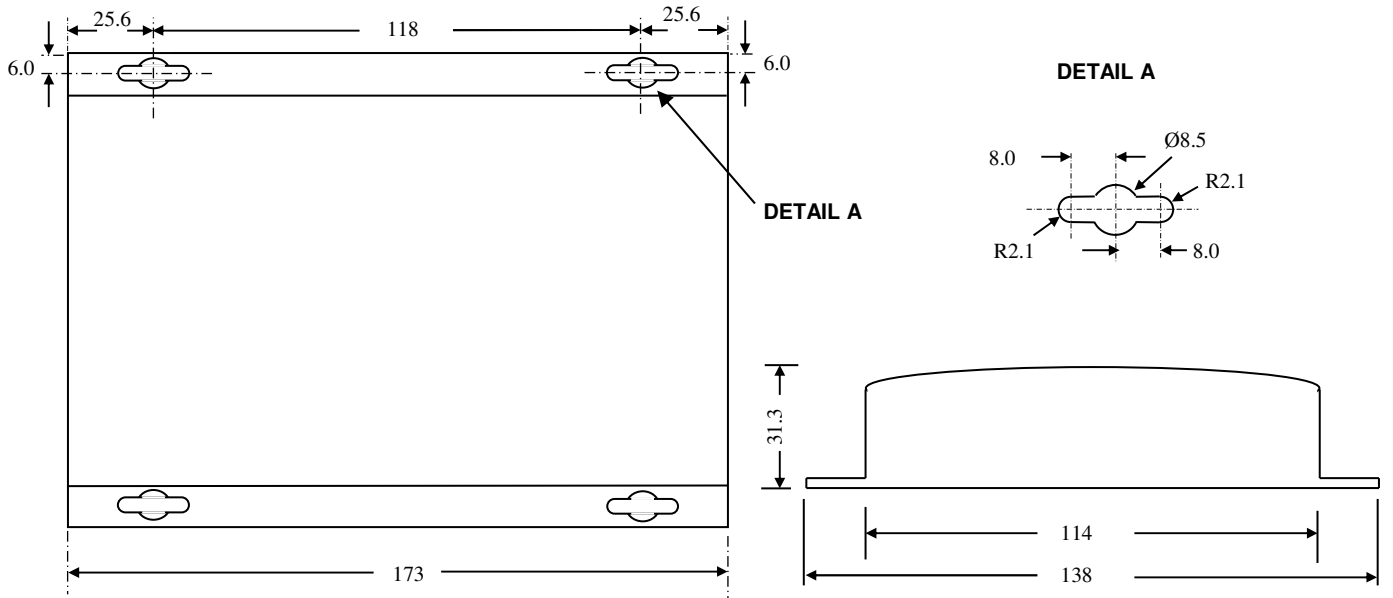
PRECAUTIONS

- ▲ 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.

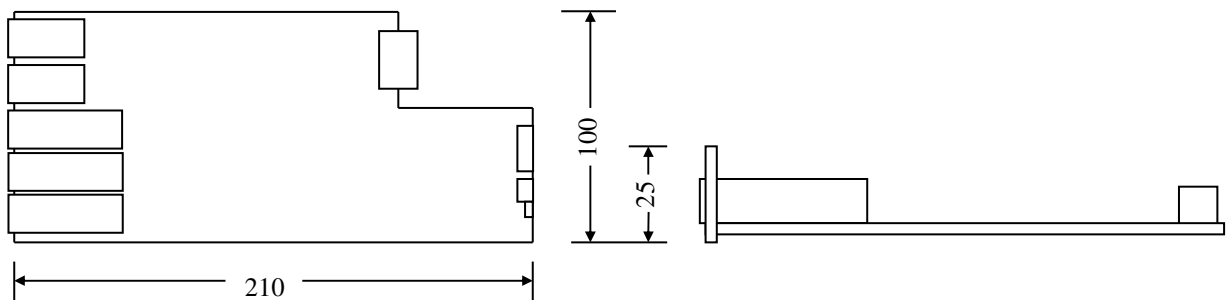
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2.2.2 OSD2144A DRAWINGS AND DIMENSIONS

The OSD2144A standalone module is designed to be mounted on an even surface and to be secured by means of M4 or smaller screws. The OSD2144A card version is designed to be inserted into a chassis and secured by means of captivated screws.



(a) Module Version



(b) Card Version

FIGURE 3: OSD2144A MOUNTING DIMENSIONS

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2.2.3 POWER SUPPLY CONNECTIONS

The OSD2144A card version is powered from the OSD370 or OSD350 chassis. DC power on the OSD2144A card version is connected via the DB9 connector. The card version of the OSD2144A should be fixed into the OSD370 (or OSD350) chassis using the captivated screws. The card can be plugged in or out of the OSD370 (or OSD350) chassis with power on or off.

The OSD2144A module requires external 8 to 35V_{DC} or 22 to 28V_{AC} @ 10VA. The OSD2144A 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

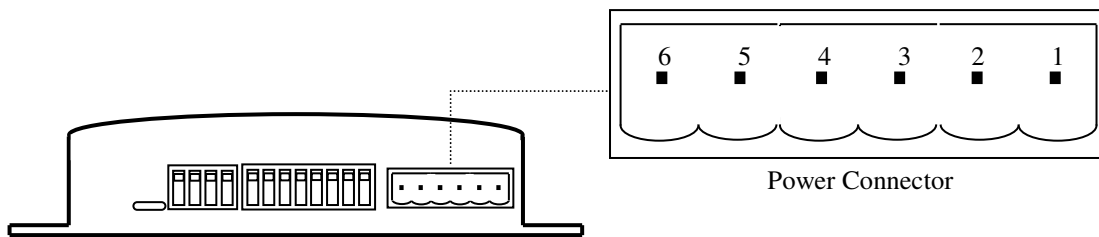


FIGURE 4: 2144A POWER SUPPLY CONNECTIONS

2.2.4 RJ45 COPPER PIN ASSIGNMENTS

Figure 5 shows the pin configuration for both the fixed copper ports or the optional SFP ports fitted with RJ45 copper port

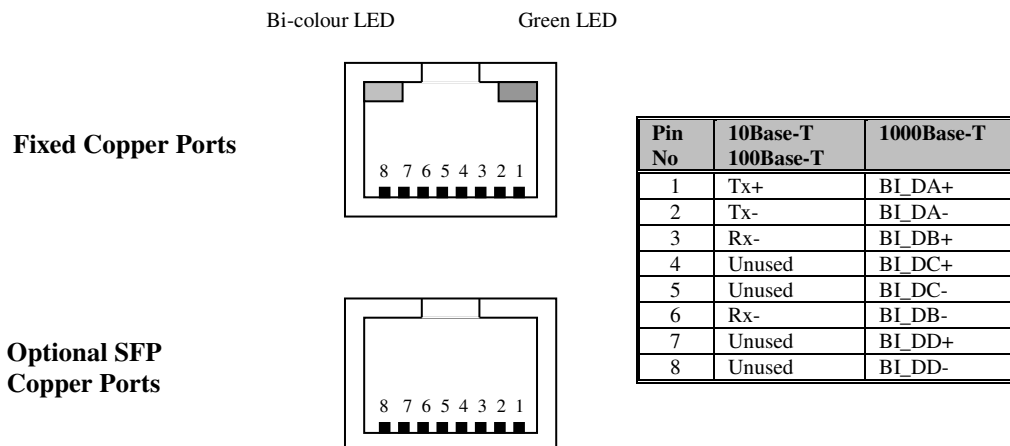


FIGURE 5: FIXED 10/100/1000BASE-T ETHERNET RJ45 CONNECTORS

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2.2.5 PORT ALLOCATION AND LED INDICATORS

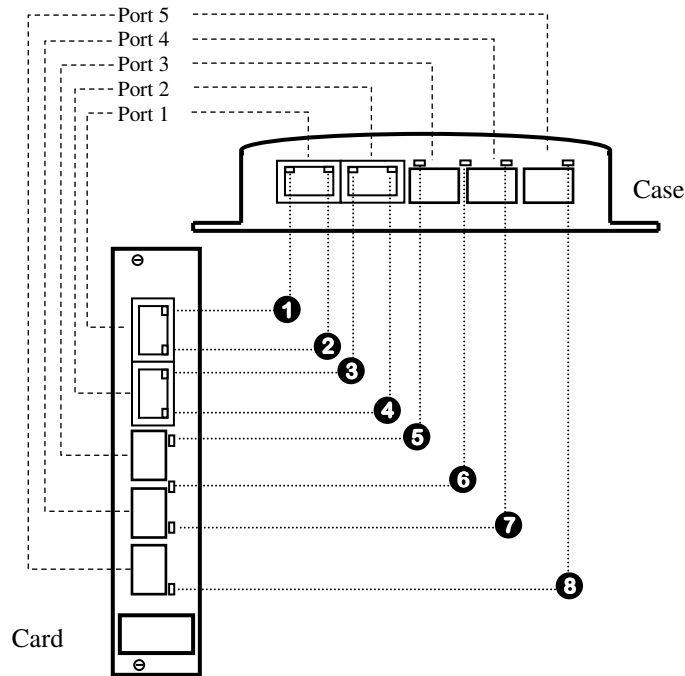


FIGURE 6: PORT/LED

TABLE 3: 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	-
❼	No Activity	Activity	No Link	1Gbps	100Mbps	-
❽	No Activity	Activity	No Link	1Gbps	100Mbps	-

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2.2.6 CONTROLS

The OSD2144A has a 4-way DIP switch to control a number of functions. Table 4 outlines the function of each switch. *Note: The 8-way DIP switch is not used.*

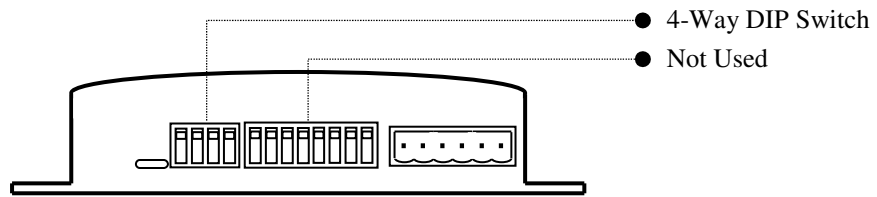


FIGURE 7: OSD2144A CONTROLS

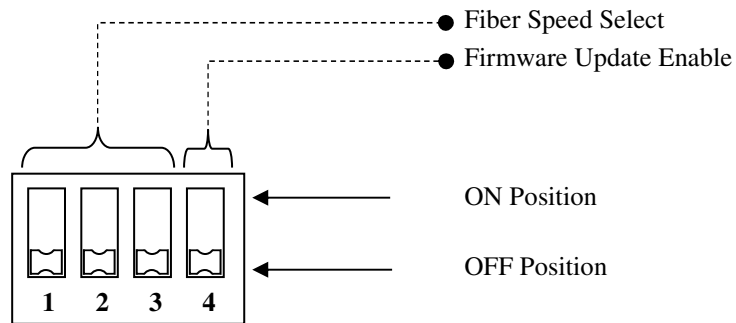


FIGURE 8: OSD2144A 4-WAY DIP SWITCH

TABLE 4: OSD2144A 4-WAY DIP SWITCH SETTINGS

SWITCH NUMBER	DESCRIPTION	FUNCTION	SWITCH POSITION
1	Port 5 Fiber Speed	1000Mbps 100Mbps	OFF* ON
2	Port 4 Fiber Speed	1000Mbps 100Mbps	OFF* ON
3	Port 3 Fiber Speed	1000Mbps 100Mbps	OFF* ON
4	Firmware Update	Disable Enable	OFF* ON

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

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2.2.7 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.

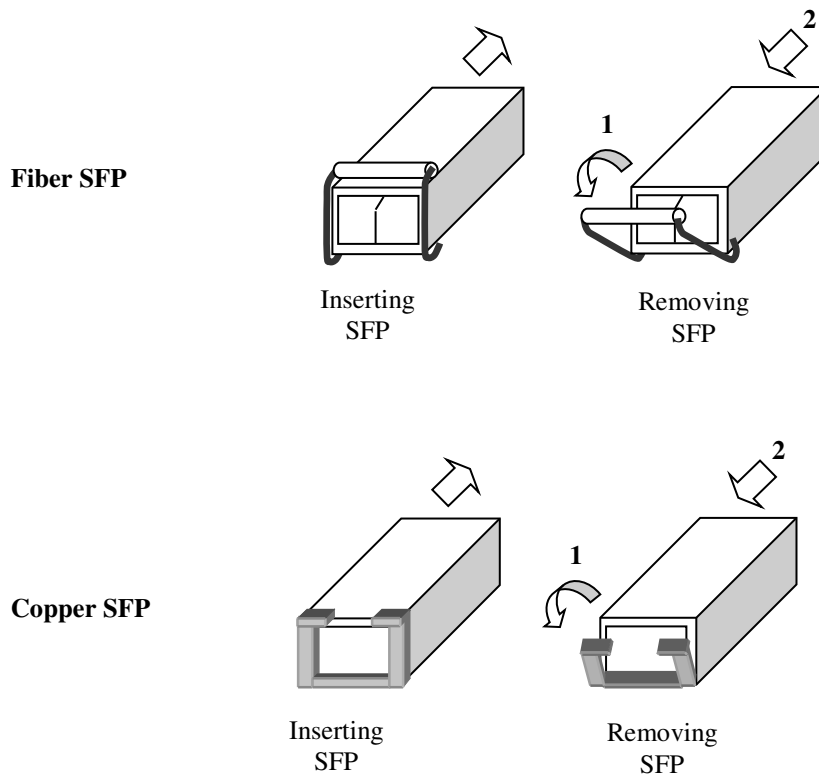


FIGURE 9: FITTING/REMOVING SFP CONNECTORS

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2.3 OSD2144A OPERATION

When using the OSD2144A 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 OSD370 or OSD350 chassis and check that the indicators illuminate accordingly on power up (see Table 3). If a module version (OSD2144AC) is used, connect the unit to an appropriate power source and check that the indicators illuminate accordingly on power up (see Table 3).

2.3.1 CONNECTIONS

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 9/125 μ m singlemode fiber.

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

2.4 FIRMWARE UPDATES

All OSD2144A units will be shipped with the latest firmware already installed. The USB port is used for any firmware updates. To enable the OSD2144A for firmware updates, switch 4 will need to be toggled to the 'on' position before unit is powered on. Upon completion of firmware updating, toggle switch 4 to the 'off' position and power the unit on again.

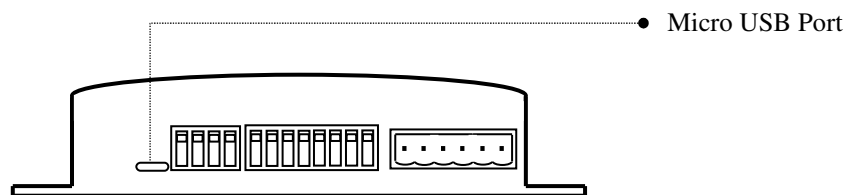


FIGURE 10: OSD2144A USB CONNECTOR

3 MAINTENANCE

3.1 INTRODUCTION

The following section outlines the fault-finding procedure for the OSD2144A 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 OSD2144A 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 OSD2144A

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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Printed in Australia