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**OPTICAL**

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**SYSTEMS**

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**DESIGN**

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**OPERATOR MANUAL**

**OSD2155**

**10/100/1000BaseT ETHERNET MEDIA**

**CONVERTER CARD SUPPORTING**

**JUMBO FRAMES**



# OPTICAL SYSTEMS DESIGN

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## 1 TECHNICAL SUMMARY

### 1.1 BRIEF DESCRIPTION

#### 1.1.1 OVERVIEW

The OSD2155 is a 10/100/1000BaseT Ethernet Media Converter supporting Jumbo Frames. It has one RJ45 copper port and one SFP port which can be specified by the user for one or two fiber configuration.

The unit will operate on either singlemode or multimode fiber by use of the appropriate optical device.

A major benefit of the OSD2155 is its reliable operation over the -20°C to +75°C temperature range which allows it to be used in environments such as roadside cabinets, mine sites and factories.

The OSD2155 module is intended for isolated use and requires an external power source.

#### 1.1.2 APPLICATIONS

- ▲ Any network utilising a mix of copper and fiber
- ▲ Industrial IP communications
- ▲ Gigabit Ethernet networks

#### 1.1.3 FEATURES AND BENEFITS

- ▲ Complies with IEEE802.3i/802.3u/802.3ab 10/100/1000Base-T, IEEE802.3z 1000Base-Lx/Sx standards.
- ▲ Available for operation over 1 or 2 fibers.
- ▲ Supports network traffic of 100Mbps or 1000Mbps.
- ▲ Plugs into OSD's standard OSD350 and OSD370 3RU 19" rack mounting card frames.
- ▲ Has one fixed 10/100/1000Base-T copper port and one SFP port which can be 10/100/1000BaseT, 100Base-Fx or 1000BaseLx/Sx/Zx.
- ▲ Operates over the temperature range of -20 to +75°C.
- ▲ Auto MDI/MDIX.
- ▲ Advanced features like Link Loss Forwarding to detect the link status of link partners either on the fiber and/or copper port.
- ▲ Can be used with either singlemode or multimode fiber over a variety of link budgets
- ▲ Interoperates with all standard OSD and third parts GbE media converters and switches.
- ▲ Supports 10KB jumbo frames.
- ▲ SFP module sold separately.

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## 1.2 TYPICAL CONFIGURATION

Figure 1 below indicates the typical set-up for an OSD2155 system.

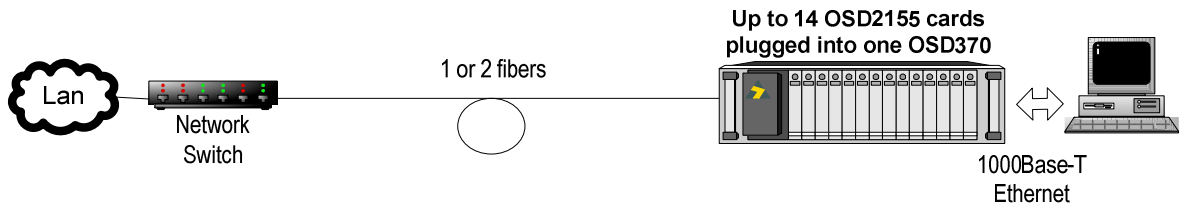


FIGURE 1: OSD2155 TYPICAL CONFIGURATIONS

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## 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 Rate	10, 100, 1000Mbps with energy detect, auto negotiate, auto MDIX
Jumbo Frame Support	10KB
Optical Data Interface	IEEE802.3z 1000Base-Lx/Sx or IEEE802.3u 100BaseFx
Optical Data Rate	100Mbps or 1000Mbps
Operating Mode	Half or full duplex for 10/100 Full duplex for 1000 Flow control
Electrical Data Connector	RJ45
Controls	Program 100 or 1000Mbps on fiber Link Loss Forwarding: On or Off Fault Detection: Fiber only or copper and fiber
Optical Port Connector	SFP
SFP Options	Short haul, long haul, single fiber operation, etc Please consult OSD datasheet #1021000XX or contact OSD
Operating Temperature	-20°C to +75°C
Relative Humidity	0 to 95% non-condensing
Power Requirements	+11V <sub>DC</sub> to +13V <sub>DC</sub> supplied via the card frame backplane
Dimensions (mm)	25W x 169D x 100H
Weight	0.2kg
Chassis Current Consumption (CCC)	0.25 Amp

102215502

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## 1.4 FRONT PANEL

The front panel consists of one fixed copper port for 10/100/1000Base-T, one SFP port, a 4-way DIP switch and a Mini USB port. The SFP device is sold separately giving the user choice to use either one or two fiber communications with various optical power outputs depending on the distance required. Each section will be described further throughout this manual.

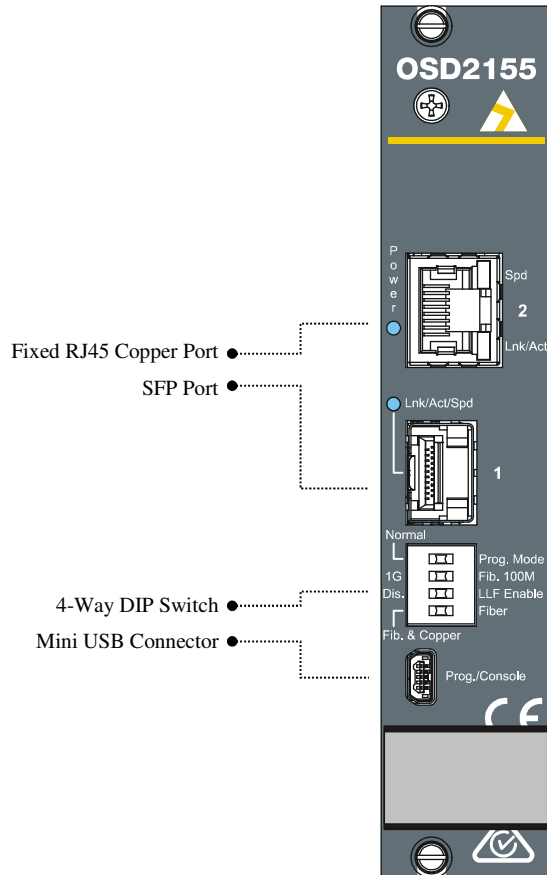


FIGURE 2: OSD2155 CONNECTORS



## 2 INSTALLATION AND OPERATION

### 2.1 INTRODUCTION

This section outlines the methods required to install and operate the OSD2155 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

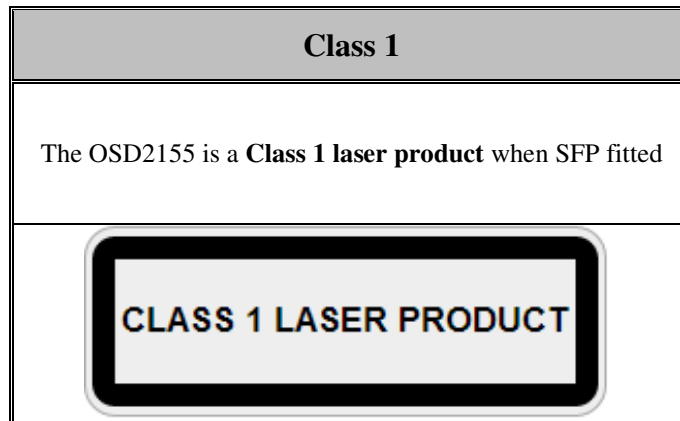
#### 2.2.1 WARNING AND PRECAUTIONS

##### ▲ 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 60825-1:2014 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 OSD2155 DRAWINGS AND DIMENSIONS

The standard OSD2155 is designed to be mounted and powered from either the OSD350 or OSD370 19" 3RU Chassis.

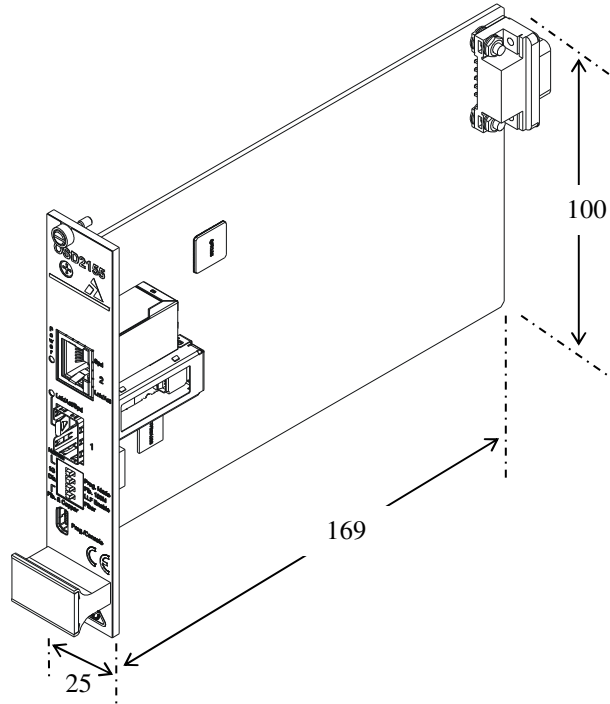


FIGURE 3: DIMENSIONS

## 2.2.3 POWER SUPPLY CONNECTIONS

The OSD2155 requires external DC power. The voltage range of the OSD2155 is  $+11V_{DC}$  to  $+13V_{DC}$ . Which is powered from the OSD370 or OSD350 chassis. DC power is connected via the DB9 connector. The OSD2155 should be fixed into the chassis using the captivated screws. The OSD2155 can be plugged in or out of the chassis with power on or off.

TABLE 2: POWER SUPPLY PINOUT

OSD370 or OSD350 Power Pin	Specification
Pin 3	$+12V_{DC} (\pm 1V)$ – supplied by OSD921
Pin 6,7	0V

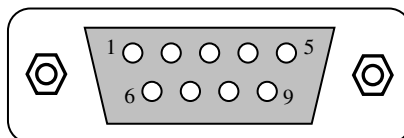


FIGURE 4: POWER SUPPLY CONNECTIONS

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## 2.2.4 LOCATION

As with any electrical device, the OSD2155 together with the OSD370/OSD350 chassis should be placed where the unit will not be subjected to extreme temperatures, humidity, or electromagnetic interference. Specifically, the site selected should meet the following requirements:

- The ambient temperature should be between -20°C to 75°C (-4°F to 167°F).
- The relative humidity should be less than 95 percent, non-condensing.
- Surrounding electrical devices should not exceed the electromagnetic field (RFC) standards.
- Make sure that the switch receives adequate ventilation. Do not block or obstruct the ventilation holes on the chassis.

## 2.2.5 FIXED RJ45 COPPER PORT PIN ASSIGNMENTS

Figure 5 shows the pin configuration for the fixed RJ45 copper port.

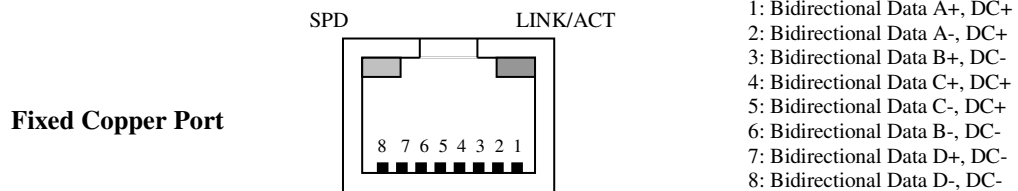


FIGURE 5: FIXED RJ45 ETHERNET CONNECTORS

## 2.2.6 FITTING SFP CONNECTORS

Care should be taken when inserting/removing the SFP connectors from the SFP port 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 appropriate fiber cable.

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

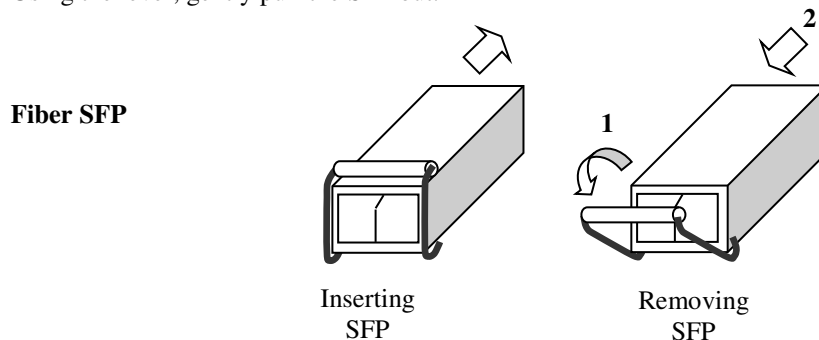


FIGURE 6: FITTING/REMOVING SFP CONNECTORS

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## 2.2.7 LED INDICATORS

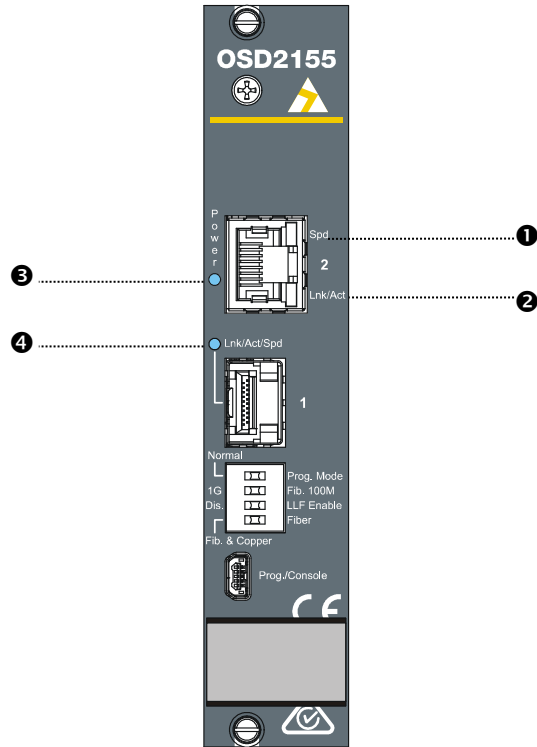


FIGURE 7: LED INDICATORS

TABLE 3: LED FUNCTION

FUNCTION						
Indicator	On	LED Colour	Off	Blinking		
❶	Spd	Copper Speed	1Gbps	Green	10/100Mbps	-
❷	Lnk/Act	Copper Link Activity		Amber	No Copper Link	Activity
❸	Power	Power On		Green	Power Off	-
❹	Lnk/Act/Spd	Fiber Speed	100Mbps	Amber	No Optical Link	Activity
			1Gbps	Green		

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## 2.2.8 CONTROLS

The OSD2155 has a 4-way DIP switch to control a number of functions. Figure 8 outlines the function of each switch. For correct operation, set the required switch settings before powering the unit. The OSD2155 also has a reset switch located on the rear panel. Press this button momentarily to reset the unit.

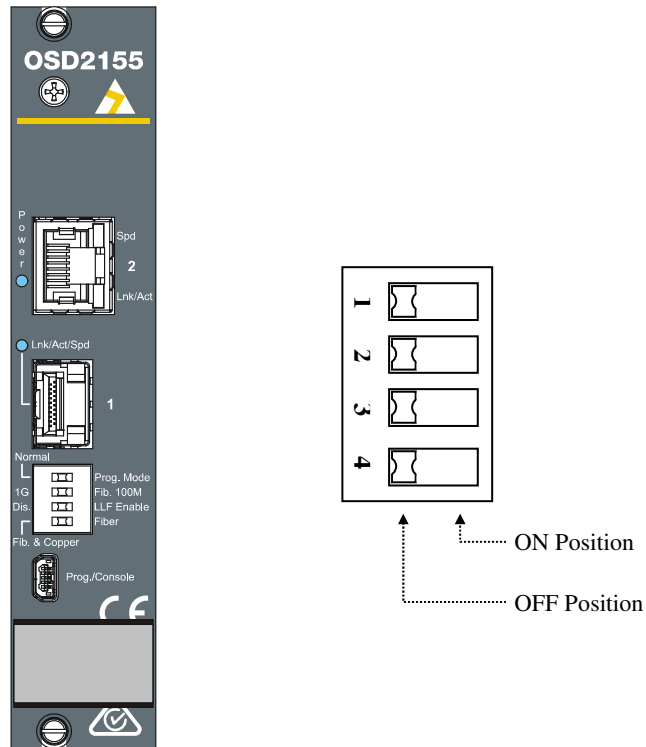


FIGURE 8: OSD2155 3-WAY DIP SWITCH

TABLE 4: 4-WAY DIP SWITCH SETTINGS

SWITCH NUMBER	DESCRIPTION	SWITCH POSITION	FUNCTION
1	Function	OFF	User Mode*
		ON	Programming Mode
2	Optical Port Speed	OFF	1000BASE-X*
		ON	100BASE-X
3	LLF Enable/Disable	OFF	LLF Disable*
		ON	LLF Enable
4	LLF Detection	OFF	Fiber and Copper*
		ON	Fiber Only

\* Default settings.

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## 2.2.9 BASIC CONNECTIONS

Figure 10 shows basic user connections to the OSD2155.

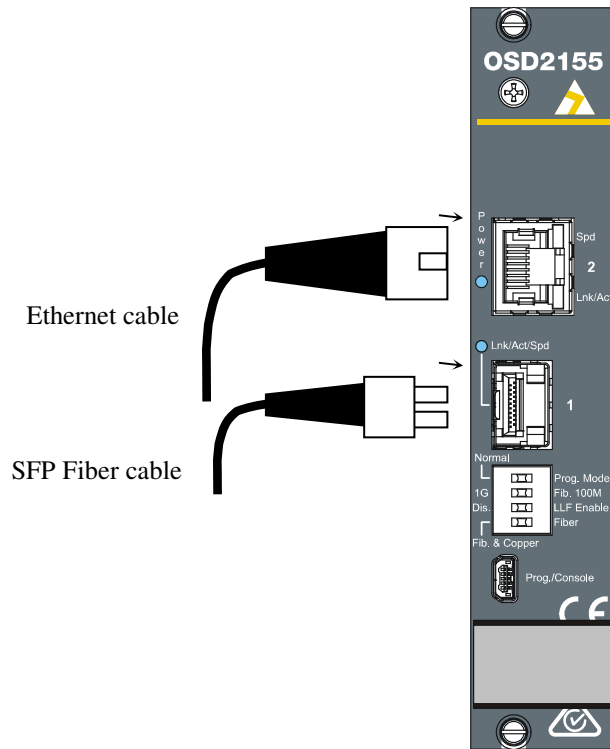


FIGURE 9: BASIC CONNECTIONS

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## 2.3 LINK LOSS FORWARDING

Figure 10 is a flow chart of the OSD2155 Link Loss Forwarding (LLF) function and operation.

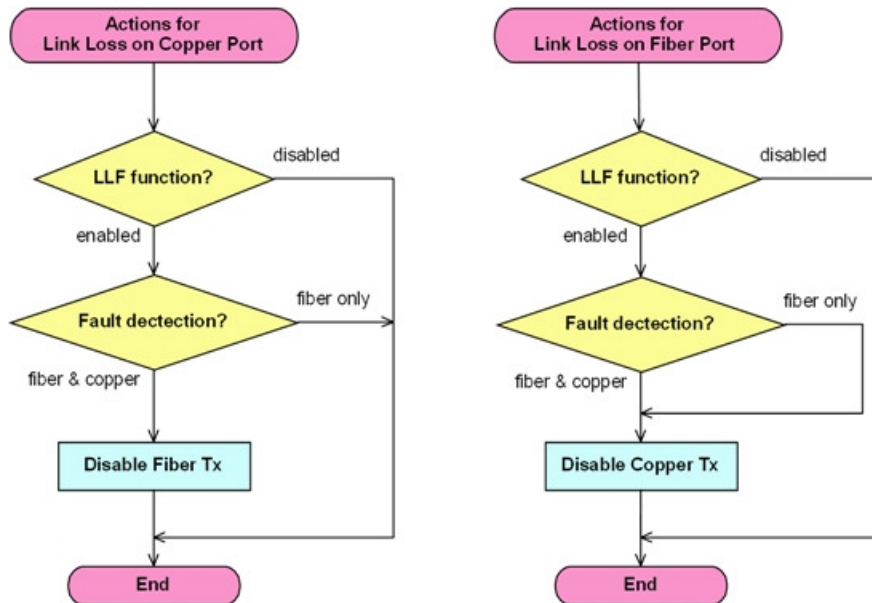


FIGURE 10: LINK LOSS FORWARDING FUNCTION

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The following tables outline the recommended switch settings for the OSD2155. Any changes in switch settings require power up to take effect.

TABLE 5: CONFIGURATION WITH LLF ENABLED

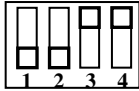
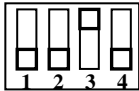
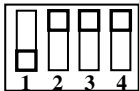
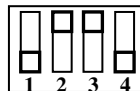
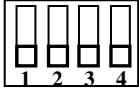
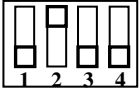
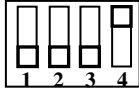
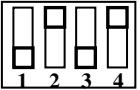
Configurations		Case1	Case2	Case3	Case4
Switch Setting					
Configurations		1. LLF detects fiber & copper 2. LLF is enabled 3. Fiber port is 100BASE-X	1. LLF detects fiber & copper 2. LLF is enabled 3. Fiber port is 1000BASE-X	1. LLF detects fiber only 2. LLF is enabled 3. Fiber port is 100BASE-X	1. LLF detects fiber only 2. LLF is enabled 3. Fiber port is 1000BASE-X
Fiber link loss	Response Action	Disable Tx of copper port		Disable Tx of copper port	
	Restore Sequence	1. Fix fault and reconnect 2. Wait for link to be reestablished		1. Fix fault and reconnect 2. Wait for link to be reestablished	
Copper link loss	Response Action	Disable Tx of fiber port		NULL	
	Restore Sequence	1. Fix fault and reconnect 2. Wait for link to be reestablished		NULL	

TABLE 6: CONFIGURATION WITH LLF DISABLED

Configurations		Case1		Case2	
Switch status					
Configurations of SIP switch		1. Invalid 2. LLF is disabled 3. Fiber port is 1000BASE-X	1. Invalid 2. LLF is disabled 3. Fiber port is 1000BASE-X	1. Invalid 2. LLF is disabled 3. Fiber port is 100BASE-X	1. Invalid 2. LLF is disabled 3. Fiber port is 100BASE-X
Fiber link loss	Response Action	NULL		NULL	
	Restore Sequence	NULL		NULL	
Copper link loss	Response Action	NULL		NULL	
	Restore Sequence	NULL		NULL	



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## Examples

Figure 11 is an example of a copper connection loss. The OSD2155 will detect that there is no copper connection received and then disable the transmission to the fiber port. The 1000Base-X switch will thus be notified that there has been a copper link loss.

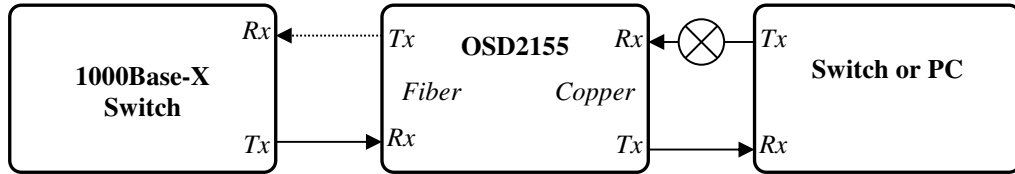


FIGURE 11: COPPER CONNECTION LOSS

Figure 12 is an example of a fiber connection loss. If the OSD2155 does not receive a valid optical signal from the switch, transmission to copper port will be disabled.

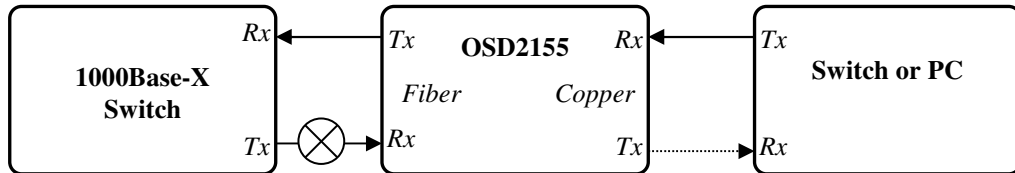


FIGURE 12: FIBER CONNECTION LOSS

## 3 MAINTENANCE

### 3.1 INTRODUCTION

The following section outlines the fault-finding procedure for the OSD2155 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 PSE power requirements do not exceed the OSD2155 modems maximum PD power.
- ▲ Inspect the optical connectors (fiber SFP) 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 OSD2155.

## 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 repair labels is evident.

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