OPTICAL
SYSTEMS
DESIGN

OPERATOR MANUAL

OSD156

SYNCHRONOUS FIBER

OPTIC RS232 MODEM

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OPTIC RS232 MODEM

Document No. 10104401

OPTICAL SYSTEMS DESIGN

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OSD156 OPERATOR MANUAL

1. TECHNICAL SUMMARY

1.1 BRIEF DESCRIPTION

1.1.1 OVERVIEW

The OSD156 is a small, self-contained modem which can provide full duplex synchronous or asynchronous RS232 communications over duplex optical fiber cable. It incorporates a single chip multiplexer which handles clock and data signals and two handshake lines, operating at a rate of up to 300kbps. In synchronous mode the OSD156 operates with an external clock.

The unit may be used as an asynchronous modem for data rates between DC and 300kbps. It operates with all commonly available multimode fibers over distances of up to at least 5km.

Applications include any RS232 communications link which requires synchronous operation and/or handshake signals where distance, electrical noise and/or security considerations render conventional twisted pair RS232 links impractical.

While normally used as an RS232 modem the OSD156 can also be employed as a four channel multiplexer, with three channels operating from DC to 80kbps, and one from DC to 300kbps.

The OSD156 is optionally available to operate over singlemode fiber. This model is designated the OSD156L.

1.1.2 APPLICATIONS

▲ Secure communications.

▲ Links requiring transfer of control lines.

▲ Hazardous environments.

▲ Long distance synchronous or asynchronous RS232 links.

▲ Terminal cluster to computer.

1.1.3 FEATURES AND BENEFITS

▲ Full Duplex asynchronous trasmission of
  - 1 data signal at up to 300kbps
  - 3 control signals at up to 80kbps

▲ May be used as a 4 channel RS232 multiplexer.

▲ Safe transmission in hazardous environments.

▲ More secure than copper cables.

▲ Small EMI/RFI resistant metal enclosure that plugs onto the back of a computer or terminal.

▲ Small size, low cost, robust and reliable.

▲ No user adjustments required.

1.2 TYPICAL CONFIGURATION

Figure 1 below shows a typical OSD156 link set up.

(a)

(b)
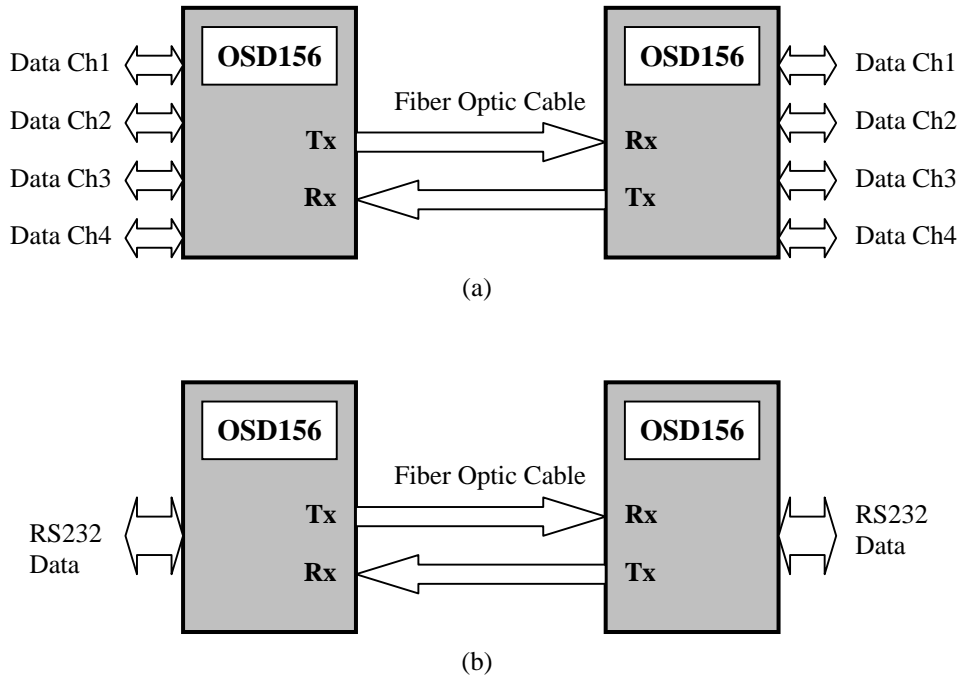
FIGURE 1: TYPICAL CONFIGURATION
(a) Asynchronous configuration, (b) Synchronous configuration

1.3 PRODUCT OPTIONS

There are various options available for the OSD156. These options are identified in Table 1 below:

TABLE 1: PRODUCT OPTIONS

ITEM	DESCRIPTION
OSD156	SYNCHRONOUS FIBER OPTIC RS232 MODEM
OSD156/100	CARD VERSION
OSD156C	MODULE VERSION
OPTION L	SINGLEMODE OPTION FOR THE ABOVE
OSD156PP	PLUG PACK FOR THE OSD156
OSD156MB	MOUNTING BRACKET FOR THE OSD156

1.4 TECHNICAL SPECIFICATIONS

Table 2 below provides the Technical Specifications for the OSD156.

TABLE 2: TECHNICAL SPECIFICATIONS

NO:	SPECIFICATION	PERFORMANCE
1	Data supported	RS232
2	Data rate	DC to 300kbps on one data channel DC to 80kbps on three channels
3	Pulse distortion	<1us on Data signal <4us on each control signal
4	Optical transmit power	> -20dBm into 9/125 singlemode fiber (OSD156L) > -20dBm into 62.5/125 multimode fiber (OSD156)
5	Receiver sensitivity (for a BER of 1 x 10^{-9})	< -43dBm
6	Optical link budget	> 23dB (>5km of MM fiber, >40km of SM fiber with OSD156L)
7	Optical wavelength	850nm nominal (1300nm for OSD156L)
8	Optical connector	ST
9	Electrical connector	25 pin male D subminature
10	Indicator and alarm (pin 21)	Red indicator illuminates and pin 21 changes from +5v to 0v when optical power received is inadequate
11	Power	+8V DC to +13V DC @ 150mA supplied by external plug pack (OSD156PP), or via pin 9 of the D connector OR +4.75V DC to +5.25V DC supplied via pin 12 of the D connector
12	Power connector	1.3mm concentric power socket
13	Dimensions (mm)	15H X 44W X 80L (excluding optical connectors)
14	Operating temperature	-20 to +75°C
15	Relative humidity	0 to 95% non-condensing

1.5 PIN ASSIGNMENTS

Figure 2 below identifies the pin assignments of the 25 pin D Connector of the OSD156. The two male D Connectors represent two OSD156 modems that would be joined with a duplex fiber cable.

The + 8V to +13V External Power shown is where the 1.3mm power plug (OSD156) or 3 Term-Block (OSD156C) would be attached if an external OSD156PP power supply is used.

MALE D CONNECTOR   MALE D CONNECTOR

Tx DATA	2		2	Tx DATA
Rx DATA	3		3	Rx DATA
Tx CLK	15		15	Tx CLK
Rx CLK	17		17	Rx CLK
DTE Tx CLK	24		24	DTE Tx CLK
RTS	4		4	RTS
CTS	5		5	CTS
DCD	8		8	DCD
DTR	28		20	DTR
DSR	6		6	DSR
CASE GND	1		1	CASE GND
SIG QUAL	21		21	SIG QUAL
SIG GND	7		7	SIG GND
+9V POWER	9		9	+9V POWER
+5V POWER	12		12	+5V POWER

EXTERNAL POWER 8-13V   EXTERNAL POWER 8-13V
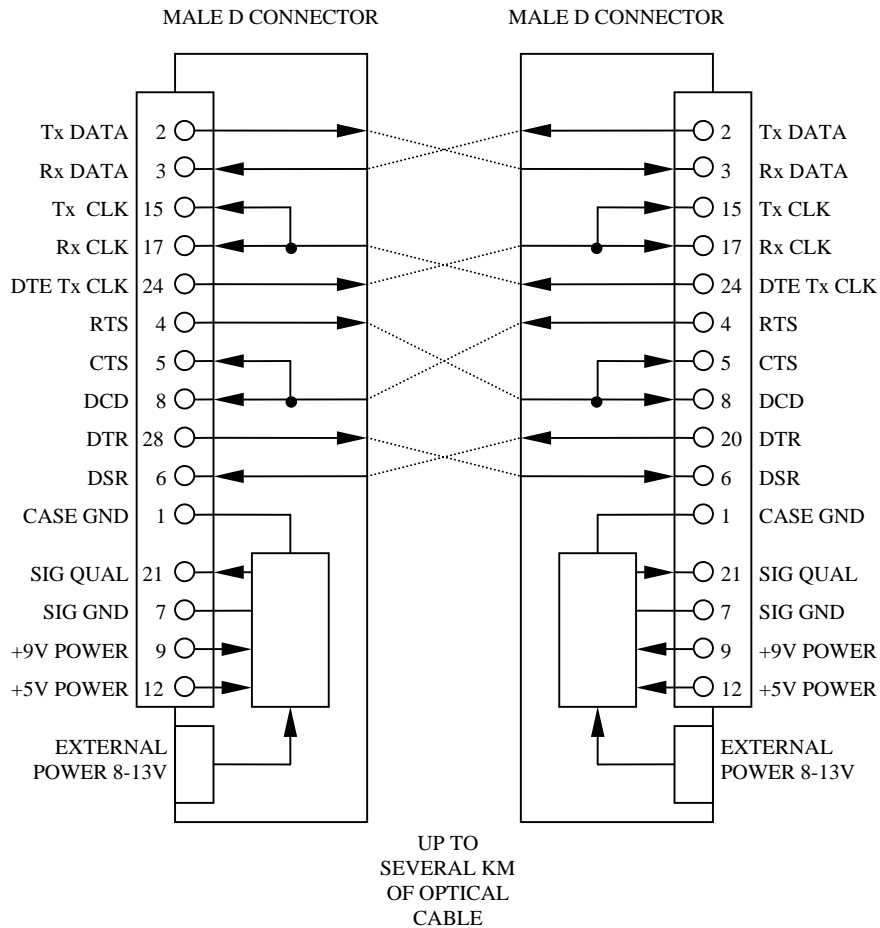
UP TO
SEVERAL KM
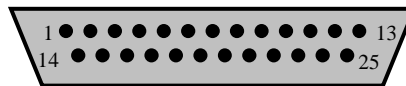OF OPTICAL
CABLE

FIGURE 2: D CONNECTOR PIN ASSIGNMENTS

FIGURE 3: D CONNECTOR PINOUT CONFIGURATION.

NOTE;   Data CH1 I/P Pin 2 and O/P Pin 3 has DC to 300kbps capabilities
Data Ch2, Ch3 and Ch4 I/P Pins 4, 20, 24; O/P Pins 5/8, 6, 15/17 has DC to 80kbps.

2. **INSTALLATION AND OPERATION**

2.1 INTRODUCTION

This section outlines the methods required to install and operate the OSD156 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 present, return the unit with the packing to the supplier immediately.

2.2 INSTALATION

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

Class 1	Class 3A
The multimode version of the OSD156 is a **Class 1 LED product**. Wavelength of 850nm and <-8dBm power output.	The singlemode and WDM versions of the OSD156 are **Class 3A laser products.** Wavelength of 1310nm and <+5dBm power output or wavelength of 1550nm and <+7dBm power output.
	INVISIBLE LASER RADIATION DO NOT STARE INTO BEAM OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS CLASS 3A LASER PRODUCT

▲ 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 PACKAGING

The OSD156 and OSD156C is housed in a metal case and is designed to be placed on a table or similar surface or to be mounted directly on the host equipment's 25 pin D connector. Figure 4 (i) and (ii) below provides the outer dimensions of the unit. The OSD156/100 is installed and powered by the OSD370 chassis that can hold up to 14 OSD156/100 units.
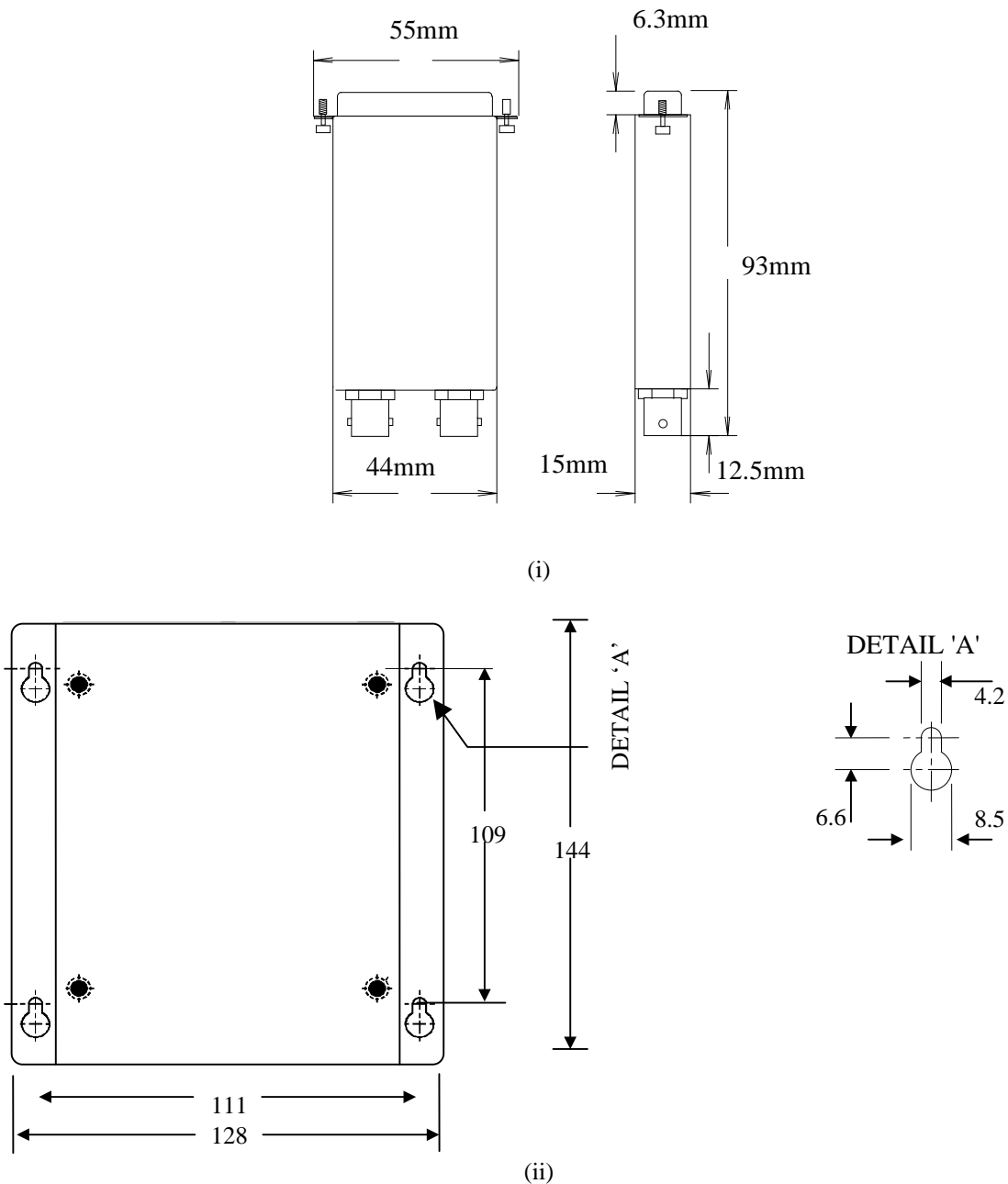

(i)

(ii)

FIGURE 4: DIMENSIONS
(i) OSD156, (ii) OSD156C

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2.2.3 POWER SUPPLY CONNECTIONS

These options are available for powering the unit.

▲   OSD156 external DC power in the range $+8V_{DC}$ to $+13V_{DC}$ may be connected via the 1.3mm concentric power socket located on the side. The internal pin is the positive connection and the outer connection is Ground (see Figure 5). The external power source can be a plug pack type unit such as the OSD156PP.

▲   OSD156C external DC power in the range $+8V_{DC}$ to $+13V_{DC}$ may be connected via the 3-Term Block located on the side. The top pin is the positive connection and the middle connection is Ground (see Figure 6). The external power source can be a plug pack type unit such as the OSD156PP.

▲   OSD156/100 power is supplied by the OSD370 Chassis.

▲   +8V DC to +13V DC may be supplied via pin 9 of the 25 pin D connector (OSD156 Only).

▲   +4.75V DC to +5.25V DC may be supplied via pin 12 of the 25 pin D connector (OSD156 Only).

In all cases the most negative side of the supply is connected to signal ground (pin 7 of the 25 pin D connector).
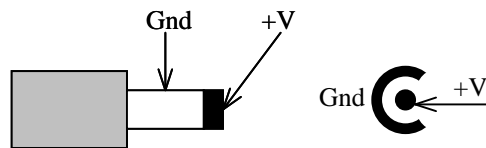

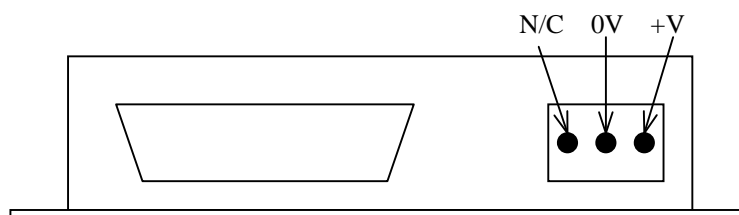FIGURE 5: OSD156 POWER SOCKET CONNECTION DIAGRAM

FIGURE 6: OSD156C POWER SOCKET CONNECTION DIAGRAM

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2.2.4 OTHER CONNECTIONS

The RS232 signals are connected to or from external equipment by the 25 pin D connector according to Figure 2.

Note the Signal Quality signal is at TTL levels and is normally High (>3.5V) with a good optical input and goes Low (<0.5V) when the input is too low.

The optical fiber must be terminated by the appropriate optical connector. Before connection, inspect the end 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 a lint free tissue to remove contamination.

2.2.5 CONTROLS

The OSD156 has no controls.

2.2.6 INDICATORS

The OSD156 has a red "Link Fail" indicator located between the optical connectors. It illuminates when the received optical power level is too low for reliable operation.

2.3 OPERATION

2.3.1 BLOCK DIAGRAM

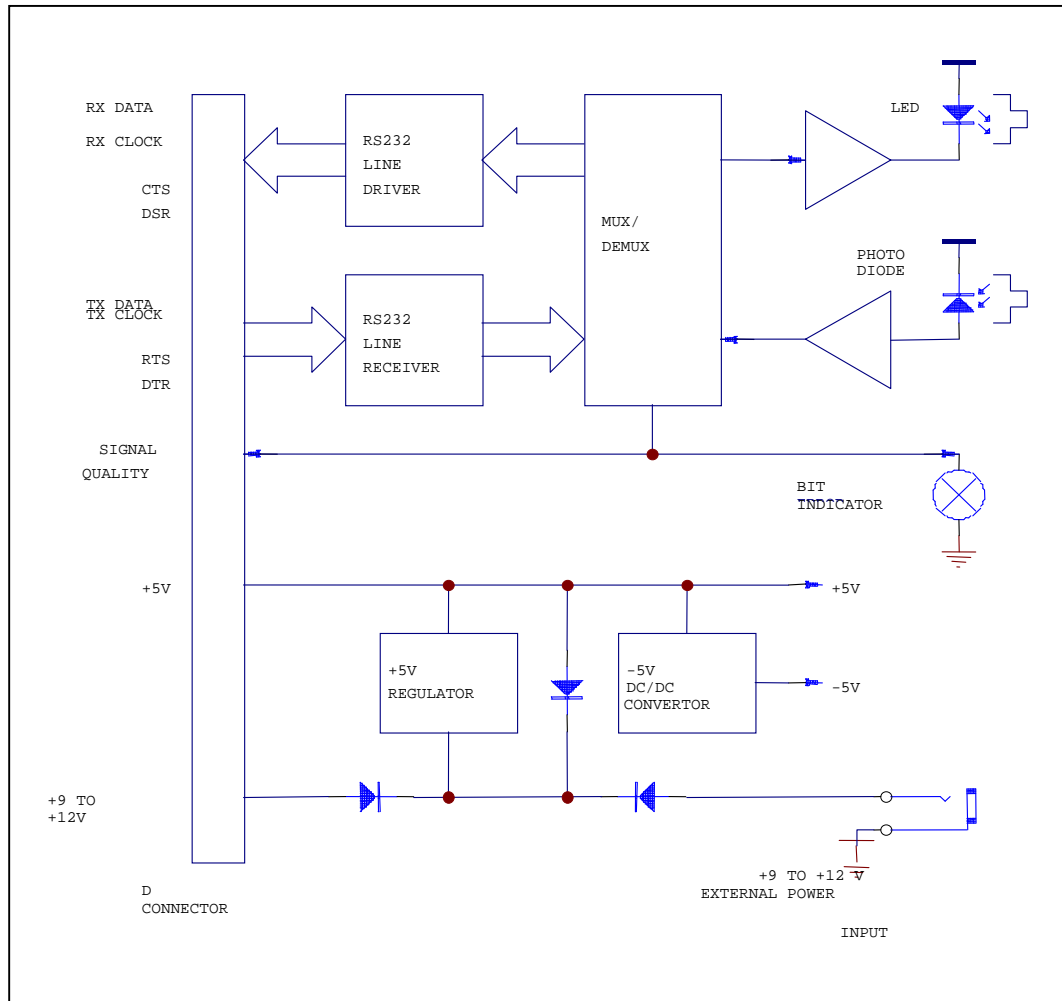Figure 6 below is a simple block diagram of the OSD156.

FIGURE 7: BLOCK DIAGRAM

3. **MAINTENANCE**

3.1 INTRODUCTION

The following section outlines the fault-finding procedure for the OSD156 modem. 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 sensitive and 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 (OSD156PP) is connected to the power socket.

▲   Check that the data signals are connected to the modem correctly and that the distant OSD156 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 in.

3.3 ROUTINE MAINTENANCE

There is no routine maintenance required with the OSD156.

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 ALL REPAIRS

Optical Systems Design reserves the right to repair or replace faulty modules/units. Please obtain a "Return Material Authorisation" number form and number before returning goods.
Goods must be returned to Optical Systems Design, Warriewood or its nominated authorised representative, for all repairs in adequate packing material.

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.

4.3 EXCLUSIONS

This warranty does not apply to defects caused by unauthorised modifications, misuse, abuse or transport damage to the equipment. All modifications to OSD's standard product will need written authorisation and will be charged at normal repair rates. All modifications are to be carried out by OSD Technicians. Warranty will lapse if unauthorised removal and/or tampering with serial number and/or repair labels occurs.