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**OPTICAL**

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**SYSTEMS**

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**DESIGN**

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**OPERATOR MANUAL**

**OSD135**

**ASYNCHRONOUS FIBER**

**OPTIC RS422/TTL MODEM**

# OPTICAL SYSTEMS DESIGN

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## 1. TECHNICAL SUMMARY

### 1.1 BRIEF DESCRIPTION

#### 1.1.1 OVERVIEW

The OSD135 is a small high performance fiber optic modem capable of linking asynchronous RS422 and TTL signals (eg: signals from computers, terminals, test equipment, etc:) over distances of up to several kilometres at speeds ranging from DC to 1Mbps. Full duplex operation can be achieved over two fibers.

The OSD135 will operate with other OSD135 modems or with the OSD137 asynchronous RS422/TTL card.

The OSD135 is powered with 7.5V<sub>DC</sub> to 12V<sub>DC</sub> via the external power socket.

#### 1.1.2 APPLICATIONS

- ▲ Secure communications.
- ▲ Long distance RS422 links.
- ▲ Data transfer in hazardous environments.
- ▲ Industrial control links.

#### 1.1.3 FEATURES AND BENEFITS

- ▲ TTL or RS422 operation.
- ▲ Extends link lengths to 5km on multimode and 20km on singlemode fiber.
- ▲ Full duplex, asynchronous, DC to 1Mbps operation.
- ▲ More secure than copper cables.
- ▲ Plugs directly into 25 pin D connector on computers, multiplexers, PBX links etc. employing RS422 or TTL signals.
- ▲ Small size, low cost, robust and reliable.

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## 1.2 TYPICAL CONFIGURATION

Figure 1 below shows a typical OSD135 link set up.

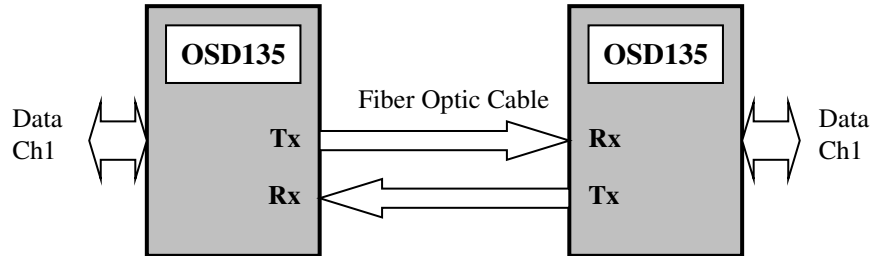


FIGURE 1: TYPICAL CONFIGURATION

It should be noted that the RS422 product has four wires per channel, an input + and - and an output + and - .

## 1.3 BLOCK DIAGRAM

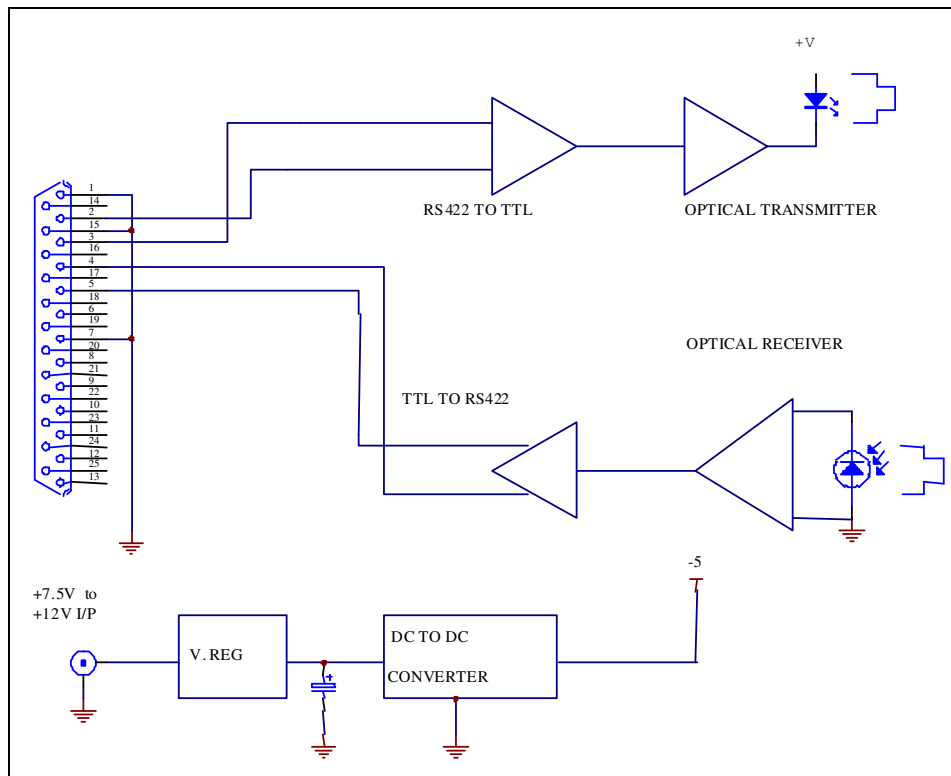


FIGURE 2: BLOCK DIAGRAM

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## 1.4 TECHNICAL SPECIFICATION

Table 1 below provides the Technical Specifications for the OSD135.

TABLE 1: TECHNICAL SPECIFICATIONS

SPECIFICATION	PERFORMANCE
Data rate	DC to 1Mbps NRZ
Pulse Distortion and Jitter	<±0.2µS over full dynamic range
Input	RS422 levels, or TTL on the + input with – input floating
Output	RS422 levels. Zero optical input produces logical LOW at output
Optical Wavelength	850nm nominal (1310nm for OSD135L)
Optical Transmit Power	> -16 to -13dBm peak into multimode fiber > -16 to -13dBm peak into singlemode fiber (OSD135L only)
Receiver Sensitivity	< -33dBm peak for a BER of $1 \times 10^{-9}$
Optical Link Budget	> 17dB at 850nm (>5km of multimode fiber) > 17dB at 1310nm (>20km of singlemode fiber)
Receiver Saturation	< -15dBm peak
Electrical Connector	25 pin female D connector for data
Power	1.3mm socket on side of case
Optical Connector	ST standard
Operating Temperature	-20 to +75°C
Relative Humidity	0 to 95% non-condensing
Power Requirements	7.5V <sub>DC</sub> to 12V <sub>DC</sub> via external power socket
Weight	100g
Dimensions (mm)	15H x 44W x 80D excluding D connector flange and optical connectors

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## 1.5 PIN ASSIGNMENTS

### 1.5.1 ELECTRICAL IN/OUT SIGNAL

TABLE 2: INPUT/OUTPUT SIGNALS

<b>Input signal</b>	RS422 levels or TTL on the + data input with the - data input floating.
<b>Output signal</b>	RS422 levels. Zero optical input produces a logical low at the output.

### 1.5.2 D CONNECTOR PIN ASSIGNMENTS

Table 3 below identifies the pin assignments for the 25 pin D connector.

TABLE 3: D CONNECTOR PIN ASSIGNMENTS

PIN	NAME	FUNCTION
1	Protective ground	Ground
2	Transmit data +	Modem accepts data
3	Transmit data -	Modem accepts data
4	Receive data +	Modem outputs data
5	Receive data -	Modem outputs data
7	Shield ground	Ground
9	Power	Supplies power to the unit

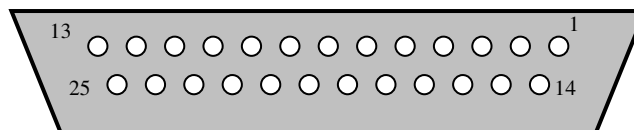


FIGURE 3: D CONNECTOR PINOUT CONFIGURATION

## 2. INSTALLATION AND OPERATION

### 2.1 INTRODUCTION

This section outlines the methods required to install and operate the OSD135 successfully. This information 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 prior to operation. If damage is detectable, return the unit and the packaging to the supplier.

### 2.2 INSTALLATION

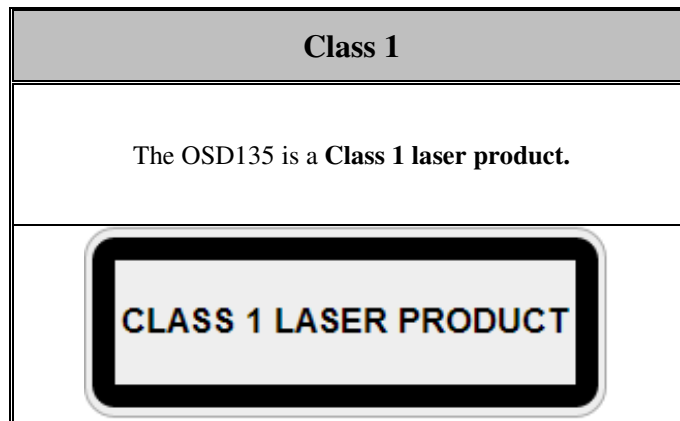
#### 2.2.1 WARNING AND PRECAUTION

##### ▲ 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 PACKAGING

The OSD135 is designed to be placed on a bench or to be mounted directly on the host equipment 25 Pin male D Connector. Figure 3 below provides the outside dimensions of the OSD135.

OSD can provide a mounting bracket (OSD135MB) as an accessory if required.

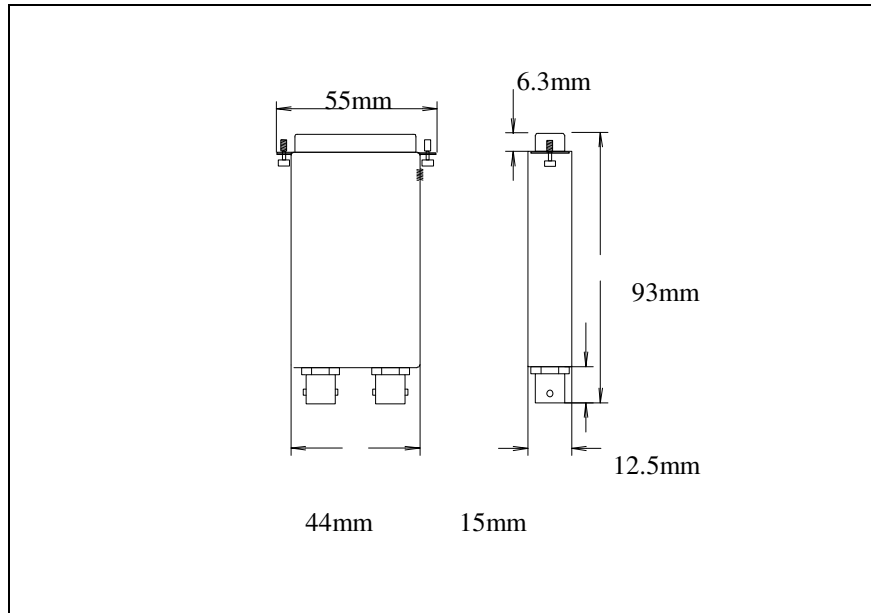


FIGURE 4: DIMENSIONS

## 2.2.3 POWER SUPPLY CONNECTIONS

External DC power in the range  $+7.5V_{DC}$  to  $+12V_{DC}$  is 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 4). The external power source can be a plug pack type unit such as the OSD135PP.

Note that the ring of the jack is connected to both circuit and chassis ground.

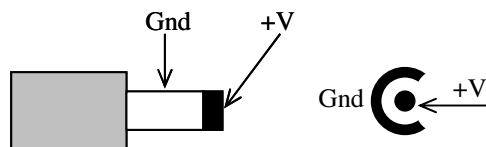


FIGURE 5: POWER SOCKET CONNECTION DIAGRAM

## 2.2.4 OTHER CONNECTIONS

The RS422 or TTL signal is connected to or from external equipment by the 25 Pin D connector.

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.

## 3. MAINTENANCE

### 3.1 INTRODUCTION

The following section outlines the fault-finding procedure for the OSD135 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 the 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:

- ▲ Inspect the power leads are terminated correctly and that the correct power source is selected if being powered by an external source.
- ▲ Ensure that the Data signal is correctly connected to the modem and that the far end OSD135 has been correctly connected to the external equipment.
- ▲ Inspect the optical connectors for any contamination and clean using isopropyl alcohol and a lint free tissue if any contamination is detected.

### 3.3 ROUTINE MAINTERNANCE

There is no routine maintenance required with the OSD135.

## 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.

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