
OPTICAL

SYSTEMS

DESIGN

OPERATOR MANUAL

OSD137

FIBER OPTIC RS422/TTL/RS232

MODEM

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1 TECHNICAL SUMMARY

1.1 BRIEF DESCRIPTION

1.1.1 OVERVIEW

The OSD137 is a high performance fibre optic modem capable of linking asynchronous RS422, TTL and RS232 signals (e.g. from computers, terminals, test equipment, etc) over distances of several kilometres at speeds ranging from DC to 1Mbps.

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

The OSD137E is a lower speed (150kbps), more sensitive (-47dBm) version of the standard OSD137, which is compatible with the OSD139 RS232 modem.

It is an OSD standard format card (ie modified Eurocard) designed to plug into the OSD350, OSD370 or OSD320 3RU high 19" rack mounting chassis.

1.1.2 APPLICATIONS

- ▲ Links requiring a module at one end and a card at the other end.
- ▲ Distance learning RS422 links
- ▲ Secure, noise immune government and industrial communications.

1.1.3 FEATURES AND BENEFITS

- ▲ TTL, RS422 or RS232 operation
- ▲ ST optical connectors standard
- ▲ Extends link lengths to 5km
- ▲ More secure than copper cables
- ▲ Full duplex, asynchronous, DC to 1Mbps
- ▲ Operation range of at least 5km on multimode fiber and up to at least 10km on singlemode fiber.
- ▲ Plugs directly into the OSD370 standard chassis
- ▲ Safe transmission in hazardous environments

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1.2 TYPICAL CONFIGURATION

Figure 1 below indicates a possible set-up for an OSD137.

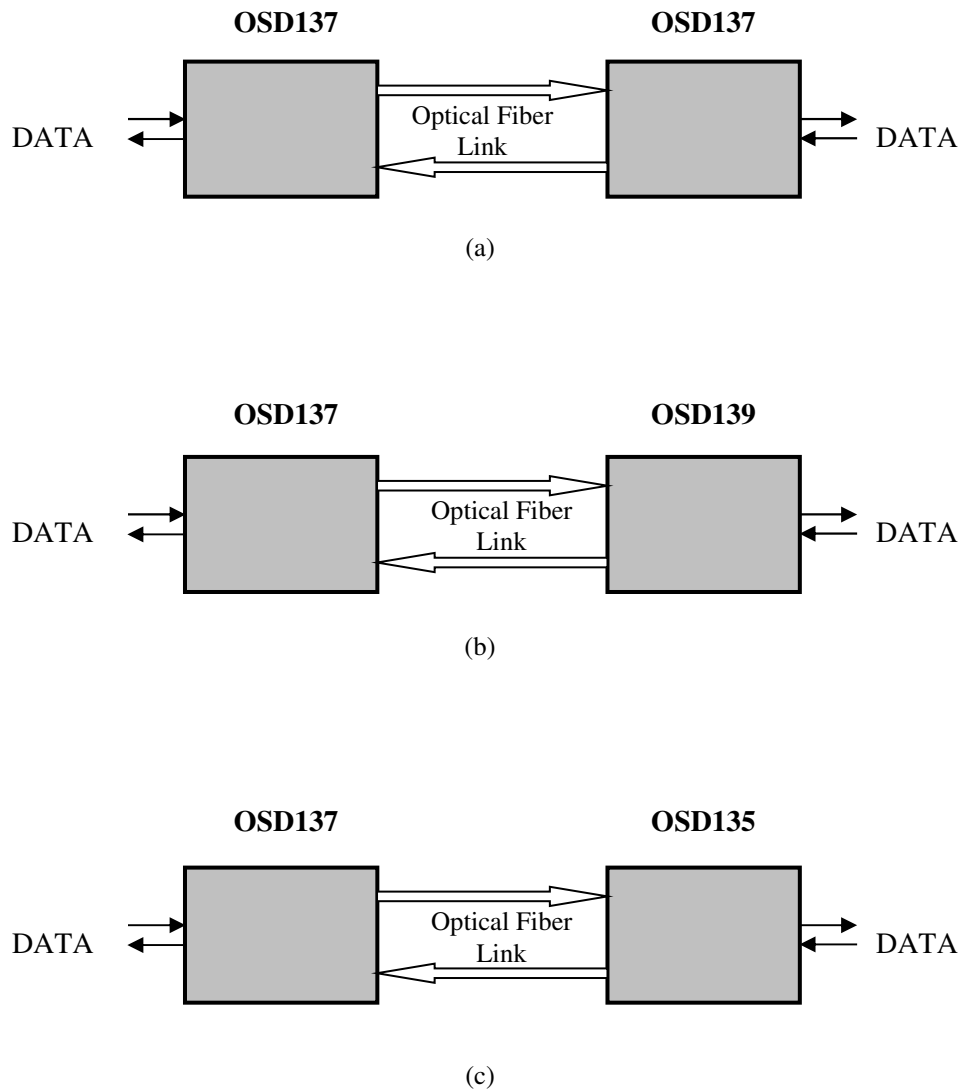


FIGURE 1: POSSIBLE CONFIGURATIONS
(a) OSD137 to OSD137, (b) OSD137 to OSD139, (c) OSD137 to OSD135

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1.3 PRODUCTS AND OPTIONS

There are various options available for the OSD137 as identified in Table 1 below:

TABLE 1: PRODUCTS AND OPTIONS

ITEM	DESCRIPTION
OSD137	850nm MULTIMODE OPERATION
OSD137 L	1300nm SINGLEMODE OPERATION
OSD137 E	850nm MULTIMODE OSD139 COMPATABLE VERSION
OSD137 LE	1300nm SINGLEMODE OSD139 COMPATABLE VERSION

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1.4 TECHNICAL SPECIFICATIONS

Table 2 below provides Technical Specifications for the OSD137.

TABLE 2: TECHNICAL SPECIFICATIONS

NO	SPECIFICATION	PERFORMANCE
1	Data Rate	DC to 1Mbps NRZ DC to 120kbps NRZ (OSD137E only)
2	Pulse Distortion and Jitter	< ± 0.3µsec over full dynamic range < ± 3.0µsec over full dynamic range (OSD137E only)
3	Transmitter Wavelength	850 ± 30nm (1300nm for the OSD137L)
4	Transmitter Coupled Power	>-15dBm peak into 62.5/125µm multimode fiber >-23dBm peak into 10/125µm singlemode fiber (OSD137L only)
5	Receiver Sensitivity	<-37dBm peak for 1 x 10 ⁻⁹ BER <-43dBm peak for 1 x 10 ⁻⁹ BER (OSD137E only)
6	Receiver Operating Wavelength	800 to 900nm (1270 to 1580nm for OSD137L)
7	Optical Link Budget	>22dB at 850nm (>5km of multimode fiber for OSD137) >14dB at 1300nm (>30km of singlemode fiber for OSD137L) >28dB at 850nm (>8km of multimode fiber for OSD137E) >20dB at 1300nm (>40km of singlemode fiber for OSD137LE)
8	Receiver Saturation	>-20dBm
9	Input	User selectable between RS422 levels, or TTL on the + input with - input floating or RS232 levels
10	Input Selection	A 3 pin header on the board selects either RS422 or RS232 input
11	Input / Output Polarity	Two 3 Pin headers select logical polarity of both optical input and optical output
12	Optical Connectors	ST standard, others optional
13	Electrical Connectors	DB9 Male Connector for Power DB9 Female Connector for Data
14	Operating Temperature	-20 to 75°C
15	Relative Humidity	0 to 95% non-condensing
16	Dimensions (mm)	208D x 25W x 100H
17	Weight of Module (kg)	0.15
18	Power Requirements	+11V _{DC} to +16V _{DC} at less than 150mA -11V _{DC} to -16V _{DC} at less than 150mA

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1.5 PIN ASSIGNMENTS

Pin assignments for the “Data Input/Output” DB9 connector (Figure 2a) and “Power” DB9 connector (Figure 2b) is shown in Table 3 below.

TABLE 3: PIN ASSIGNMENT

DB9F DATA CONNECTOR	PIN	DB9 POWER CONNECTOR	PIN
Protective Ground	1	Not Used	1
RS422 Transmit Data + (to OSD137)	2	Not Used	2
RS422 Transmit Data – (to OSD137)	3	+11V _{DC} to +16V _{DC}	3
RS422 Receive Data + (from OSD137)	4	-11V _{DC} to -16V _{DC}	4
RS422 Receive Data – (from OSD137)	5	Not Used	5
Not Used	6	Ground	6
Shield ground	7	Ground	7
RS232 Transmit Data	8	Ground	8
RS232 Receive Data	9	Not Used	9

NOTE:

1) For TTL operation use Pin 2 for input data signal and pin 4 for output data signal. Pins 3 and 5 are to be left as ‘floating’ input/outputs.



FIGURE 2: DB9 CONNECTORS
(a) Female Data Connector, (b) Male Power Connector

2 INSTALLATION AND OPERATION

2.1 INTRODUCTION

This section outlines the methods required to install and operate the OSD137 system 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

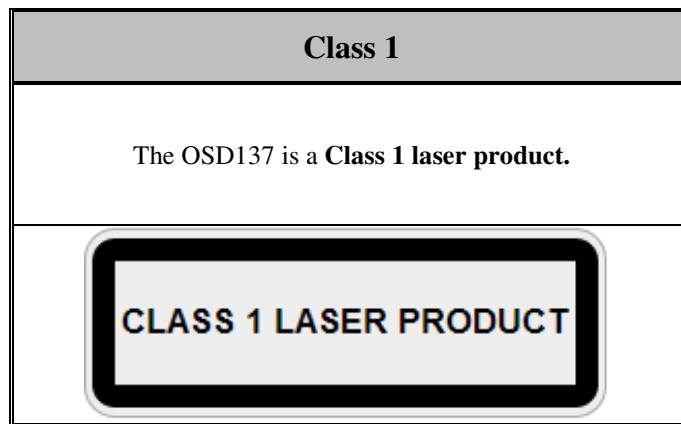
2.2.1 WARNING AND PRECAUTIONS

▲ 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 PACKAGING

The unit is a modified Eurocard and is intended to be installed in the OSD320, OSD350 or OSD370 3RU high 19" rack mounting chassis.

2.2.3 POWER SUPPLY CONNECTIONS

The OSD137 requires external DC power, which is supplied from the OSD320, OSD350 or OSD370 3RU high 19" rack mounting chassis. The voltages required by the OSD137 are +11V_{DC} to +16V_{DC} and -11V_{DC} to -16V_{DC}. Pin out configuration for the DB9M is as indicated on Table 3.

NOTE:

1. The OSD137 should be fixed into the chassis using the captivated screws.
2. It can be plugged in or out of the chassis with power on or off.

2.2.4 SIGNAL CONNECTIONS

The RS422, TTL or RS232 signal is connected to or from external equipment by the 9 pin D connector (DB9F). See Table 3 for pin-out configuration.

The optical fiber cable must be terminated with the appropriate optical connector. Before connection, inspect the ends 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 lint free tissue to remove contamination.

2.2.5 LINK SETTINGS

The OSD137 has three user configurable links labeled as LK1 to LK3 on the PCB. Table 4 below lists the links and settings.

TABLE 4: OSD137 LINKS CONFIGURATION

LK	No. of Pins	FUNCTION	LINK SETTING
1	3	RS422 Operation RS232 Operation	1-2 2-3
2	3	Inverted RS232 output Non-Inverted RS232 output	1-2 2-3
3	3	RS422 Operation Inverted RS232 input Non-Inverted RS232 input	2-3 2-3 1-2

NOTES:

For OSD135 (RS422) compatibility, set LK1 to 1-2, LK2 off, LK3 2-3.

For OSD139 (RS232) compatibility, set LK1 to 2-3, LK2 1-2, LK3 2-3.

For TTL operation use only single ended input/outputs i.e. use only the positive input/output connections.

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2.3 OPERATION

Figure 5 is a block diagram representation of the OSD137.

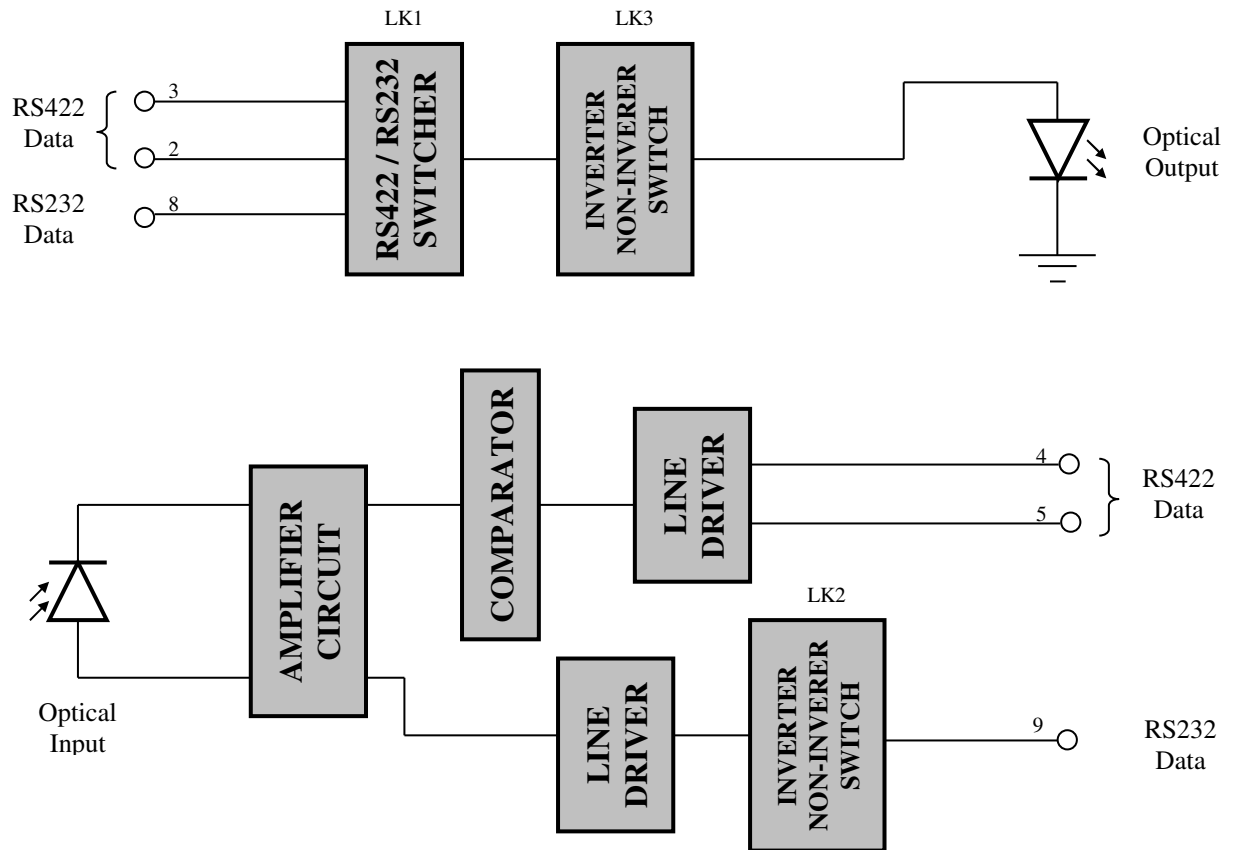


FIGURE 3: OSD137 BLOCK DIAGRAM

3 MAINTENANCE

3.1 INTRODUCTION

The following section outlines the fault-finding procedure for the OSD137 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 ES 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 is connected to the power socket.
- ▲ Check that the data signals are connected to the modem correctly and that the distant 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.

3.3 ROUTINE MAINTENANCE

- There is no routine maintenance required with the OSD137.

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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A.B.N. 83 003 020 504

Printed in Australia