
OPTICAL

SYSTEMS

DESIGN

OPERATOR MANUAL

OSD136

SYNCHRONOUS FIBER

OPTIC RS232 MODEM

OPTICAL SYSTEMS DESIGN

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1. TECHNICAL SUMMARY

1.1 BRIEF DESCRIPTION

1.1.1 OVERVIEW

The OSD136 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, all operating at a rate of up to 20kbps. In synchronous mode the OSD136 operates with an external clock.

The unit may be used as an asynchronous modem for data rates between DC and 20kbps. 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 OSD136 can also be employed as a four channel multiplexer, with all channels operating from DC to 20kbps.

The OSD136 is optionally available to operate over singlemode fiber. This model is designated the OSD136L.

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 synchronous or asynchronous data transmission at up to 20kbps.
- ▲ 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.

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1.2 TYPICAL CONFIGURATION

FIGURE 1 below shows a typical OSD136 link set up.

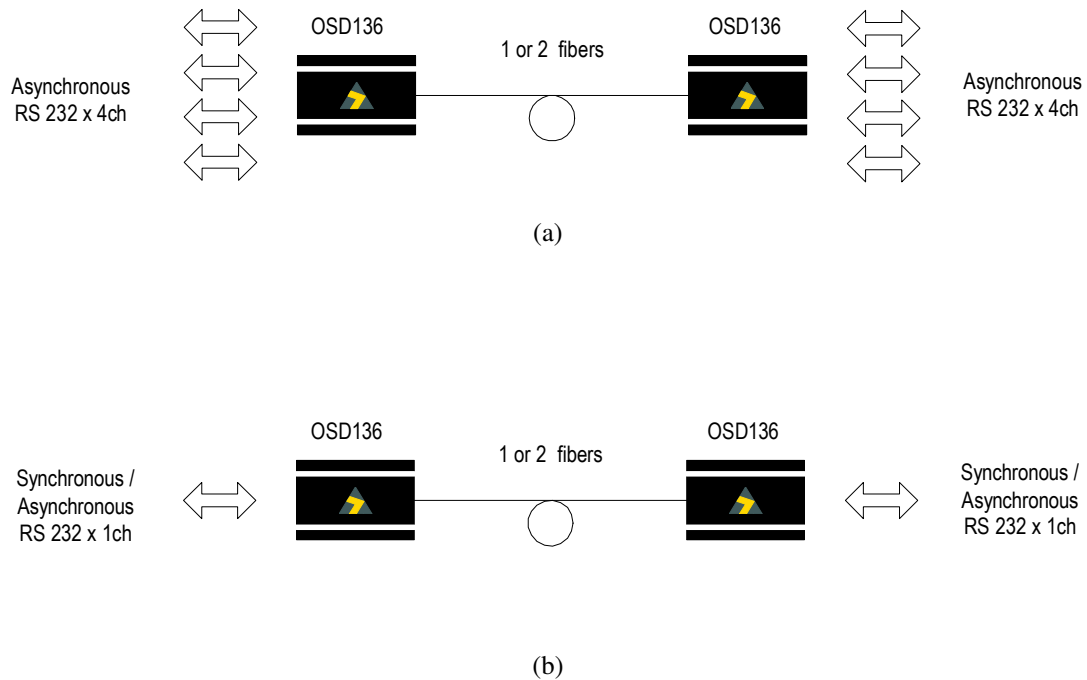


FIGURE 1: TYPICAL CONFIGURATION
(a) Multiplexed Asynchronous Configuration, (b) Synchronous Configuration

1.3 PRODUCT OPTIONS

There are various options available for the OSD136. These options are identified in TABLE 1 below:

TABLE 1: PRODUCT OPTIONS

ITEM	DESCRIPTION
OSD136	Fiber Optic RS32 Transceiver, small module
OSD136L	Singlemode Fiber Optic RS232 Transceiver, compact module
OSD136PP	Plug pack for the OSD136
OSD136MB	Wall mounting bracket for the small module
Option C	Wall mountable module (for 1-fiber versions only)
Option /100	Card Version
Option WA	Singlemode single fiber operation (Tx @ 1310nm, Rx @ 1550nm) (for option LC)
Option WB	Singlemode single fiber operation (Tx @ 1550nm, Rx @ 1310nm) (for option LC)
Option WA	Multimode single fiber operation (Tx @ 850nm, Rx @ 1310nm) (for option C)
Option WB	Multimode single fiber operation (Tx @ 1310nm, Rx @ 850nm) (for option C)

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1.4 TECHNICAL SPECIFICATIONS

TABLE 2 below provides the Technical Specifications for the OSD136.

TABLE 2: TECHNICAL SPECIFICATIONS

SPECIFICATION	PERFORMANCE
Data Rate	DC to 20kbps asynchronous or synchronous
Optical Transmit Power	-20 to -14dBm into 62.5/125 multimode fiber -20 to -13dBm into singlemode fiber (OSD136L variants only)
Receiver Sensitivity	< -43dBm < -42dBm for WA or WB single fiber variants
Optical Link Budget	>23dB @ 850nm for standard OSD136 (>6km of multimode fiber) >23dB @ 1310nm for OSD136L (>60km of singlemode fiber) >22dB for WA or WB single fiber variants
Receiver Saturation	> -10dBm
Optical Transmitter Wavelength	850nm for OSD136 and OSD136C.WA 1310nm for OSD136L, OSD136LC.WA and OSD136C.WB 1550nm for the OSD136LC.WB
Optical Connector	ST standard
Signal Loss Indicator	LED is green with good signal and red with too low an optical signal
Electrical Connector	25 pin male D-subminiature
Power Connector	1.3mm socket on side of case 2-way terminal block on module
Power	+8V _{DC} to +13V _{DC} @ 150mA supplied by external power supply or via pin 9 of the D connector OR +4.75V _{DC} to +5.25V _{DC} supplied via pin 12 of the D connector
Dimensions (mm): Small Module Wall Mount Module	15H x 44W x 80D (excluding optical connectors) 25H x 104W x 144D
Operating temperature	-20 to +75°C
Relative humidity	0 to 95% non-condensing

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1.5 PIN ASSIGNMENTS

FIGURE 2 below identifies the pin assignments of the 25 pin D connector of the OSD136. The two male D connectors represent two OSD136 modems that would be joined with a duplex fiber cable. Shielded cables are recommended for all data wiring.

The + 8V to +13V external power shown is where the 1.3mm power plug would be attached if an external OSD136PP power supply is used.

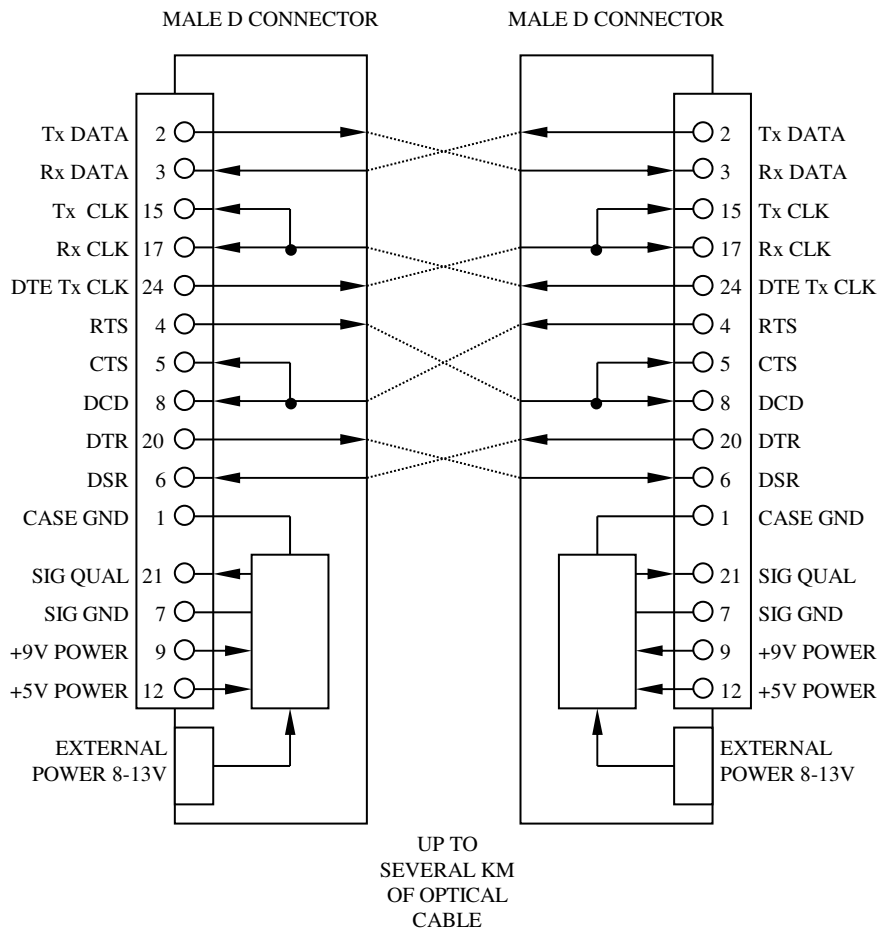


FIGURE 2 A) SYNCHRONOUS DATA TRANSFER

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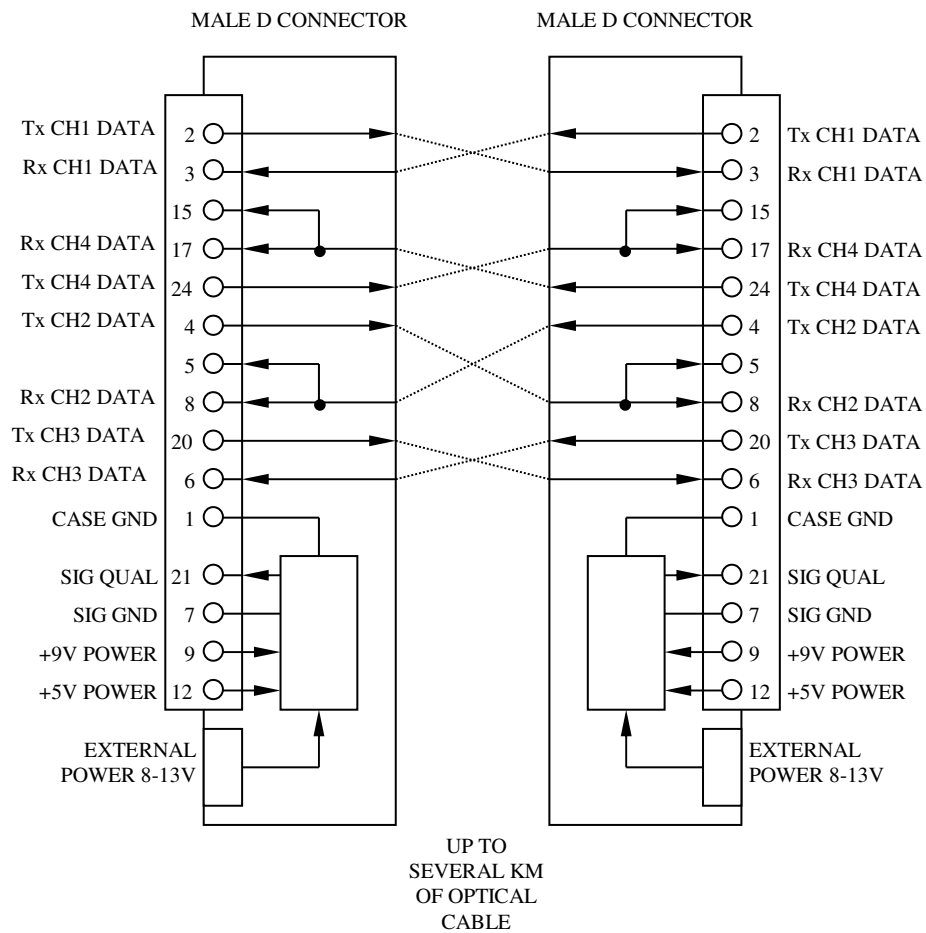


FIGURE 2 B) FOUR CHANNELS ASYNCHRONOUS DATA TRANSFER

FIGURE 2: D CONNECTOR PIN ASSIGNMENTS

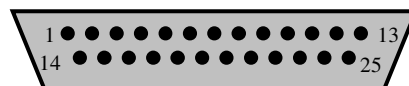


FIGURE 3: D CONNECTOR PINOUT CONFIGURATION.

2. INSTALLATION AND OPERATION

2.1 INTRODUCTION

This section outlines the methods required to install and operate the OSD136 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 INSTALLATION

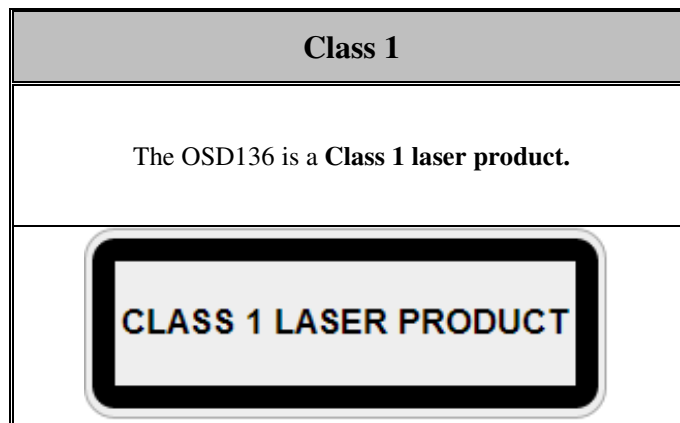
2.2.1 WARNING AND PRECAUTIONS

▲ ELECTROMAGNETIC COMPATIBILITY

This is a Class B product.

▲ OPTICAL OUTPUT OPERATION

WARNING: Laser Safety: Class 1 Laser Product per IEC/EN 60825-1:2014 standard.



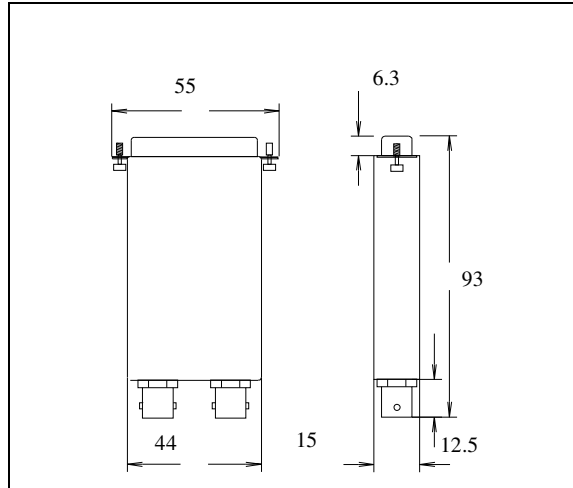
PRECAUTIONS

- ▲ 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.

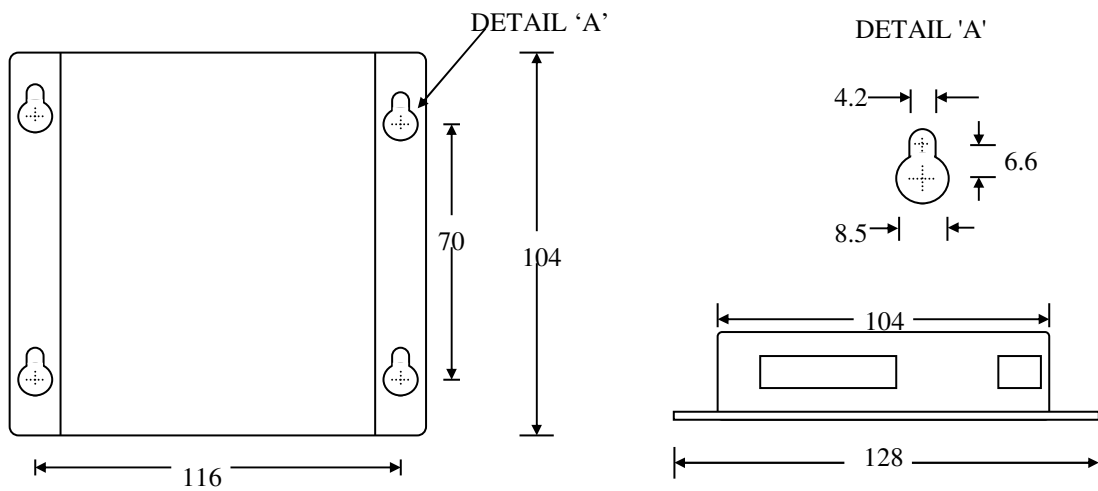
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2.2.2 PACKAGING

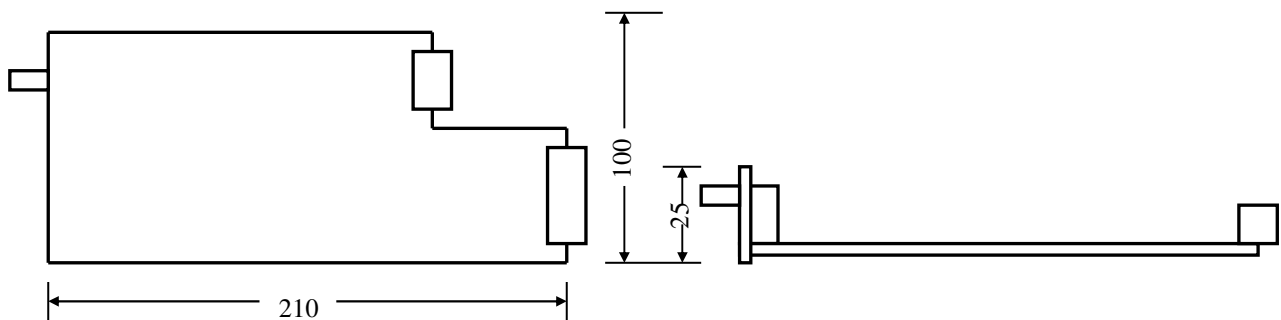
OSD136 is available in three different packages. All packages are shown in FIGURE 4. Dimensions in the pictures are in mm.



a) small module version



b) module version



c) 5T card version

FIGURE 4: DIMENSIONS

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2.2.3 POWER SUPPLY CONNECTIONS

SMALL MODULE VERSION

Three options are available for powering the unit.

- ▲ 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 OSD136PP.
- ▲ $+8V_{DC}$ to $+13V_{DC}$ may be supplied via pin 9 of the 25 pin D connector.
- ▲ $+4.75V_{DC}$ to $+5.25V_{DC}$ may be supplied via pin 12 of the D connector.

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

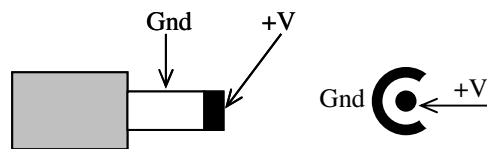


FIGURE 5: POWER SOCKET CONNECTION DIAGRAM

MODULE VERSION

For OSD136 module version there are two types of the power supply connectors used. The first version is the three pin connector shown on FIGURE 6 where pins 2 and 3 are ground connections and pin 1 is $+V_{DC}$ ($+8V$ to $+13V$).

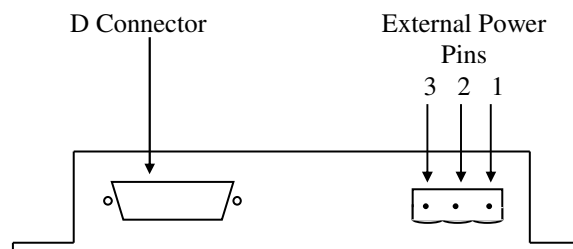


FIGURE 6: OSD136C WITH 3 PIN POWER SUPPLY CONNECTION

The second version is with a two pin connector shown on FIGURE 7. Pin 2 is the ground connection and pin 1 is $+V_{DC}$ ($+8V$ to $+13V$).

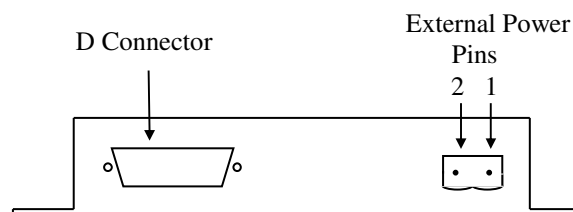


FIGURE 7: OSD136C WITH 2 PIN POWER SUPPLY CONNECTION

CARD VERSION

The OSD136 card version is powered from the OSD370 or OSD350 chassis. DC power is connected via a DB9 connector. The card version of the OSD136 should be fixed into the OSD370 (or OSD350) chassis using the captivated screws. The card can be plugged in or out of the chassis with power on or off.

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 good optical input and Low (<0.5V) when the optical 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 lint-free tissue to remove contamination.

2.2.5 CONTROLS

The OSD136 has no controls.

2.2.6 INDICATORS

The OSD136 has a bi-colour LED indicator located between the optical connectors. The LED colour conditions are as follows;

- RED - Received optical power level too low for reliable operation *or* no fiber link established.
- GREEN – Fiber link established *and* received optical signal from the transmitted signal.

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2.3 OPERATION

2.3.1 BLOCK DIAGRAM

FIGURE 8 below is a simple block diagram of the OSD136.

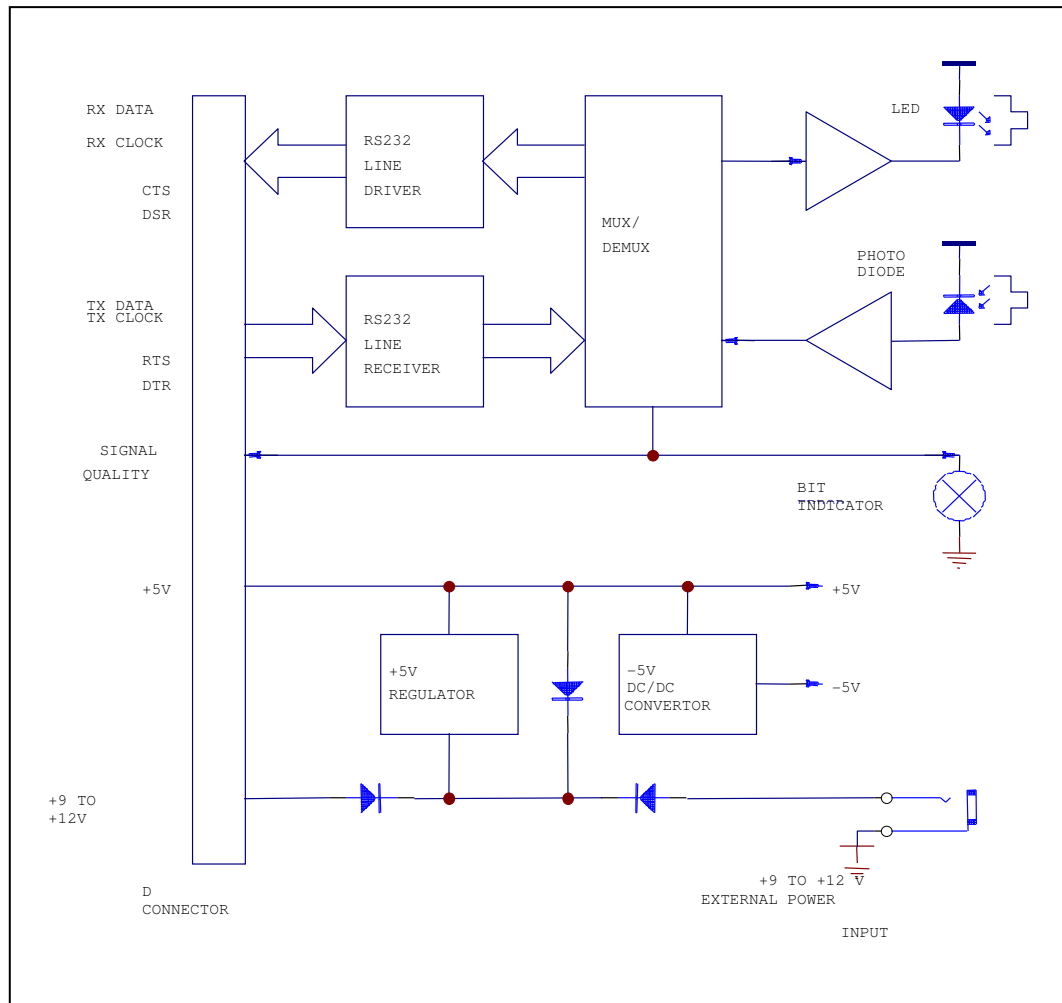


FIGURE 8: BLOCK DIAGRAM

3. MAINTENANCE

3.1 INTRODUCTION

The following section outlines the fault-finding procedure for the OSD136 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 (OSD136PP) is connected to the power socket.
- ▲ Check that the data signals are connected to the modem correctly and that the distant OSD136 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 OSD136.

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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