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**OPTICAL**

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**SYSTEMS**

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**DESIGN**

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**OPERATOR MANUAL**

**OSD1200 SERIES**

**INDUSTRIAL MODEMS**

**OSD1204 – MODICON MODBUS PLUS**

OPTICAL SYSTEMS DESIGN

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**INDUSTRIAL MODEMS**

**OSD1204 – MODICON MODBUS PLUS**

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# OPTICAL SYSTEMS DESIGN

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## 1 TECHNICAL SUMMARY

### 1.1 DESCRIPTION

The OSD1204 is a fibre optic modem compatible with the Modicom ModBus Plus. It allows for normal point-to-point and optional multidrop operation over common optical fibre sizes. The unit is industrially packaged as a stand alone unit and can be powered by a variety of sources eg

- ▲ 115VAC
- ▲ 230VAC
- ▲ 24VDC

This must be specified at time of order. It offers LED status indicators for easy visual inspection and a built in test mode for testing link integrity. The standard unit is capable of extending existing links to 5km over multimode fibre while still driving up to 500 metres of suitable twisted pair cable.

The singlemode version can operate over at least 40km of singlemode fibre.

### 1.2 BASIC OPERATION

The OSD1204 receives and transmits its electrical signals to attached equipment via a female DB9 connector.

The optical interface is via ST connectors on the rear of the modem. There are 2 (4 if the repeater module is installed) connectors, one for optical output and one for optical input.

The test function is activated through a DIP switch recessed in the rear panel.

Status indicators are all situated on the front panel.

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## 1.3 SPECIFICATIONS

Compatibility	Modicon ModBus Plus
Data Rate and Mode	1Mbps half duplex
Connector	Female DB9 connector
Maximum Twisted Pair Cable Length	500 metres
Coupled Transmitted Power	>-23dBm into 9.5/125um singlemode fibre 50/125um .2NA GI fibre >-19dBm (12uW) average into 62.5/125um .29NA GI fibre
Power Adjust Range (HI/LOW)	10dB nominal
Receiver Sensitivity	<-40dBm (100nW) average for $1 \times 10^{-9}$ BER
Optical Wavelength	850 $\pm$ 40nm 1300 $\pm$ 40nm (OSD1204L)
Optical Connector	Type ST standard - Others optional

### Physical

Power Requirements	100 to 120VAC or 200 to 260VAC at 5VA maximum (specified at time of order)
Fuse	100mA (250V) 250mA (115V)
Dimensions (mm)	215W x 210D x 55H Free standing, a 19" rack mounting adapter is available
Operating Temperature	0 to 60 deg C
Relative Humidity	0 to 95% non-condensing
Weight	1.4kg

## 2 INSTALLATION AND OPERATING INSTRUCTIONS

This section briefly outlines the steps required to install and operate the OSD1204 successfully. It should be studied carefully to avoid undue damage to the equipment and poor operation.

This equipment has been fully tested before 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 and packing to the supplier immediately.

### 2.1 MOUNTING

The unit is designed to rest on a flat surface such as a modem tray or bench top. Two units fit side by side on a 19" rack shelf. No mounting brackets are supplied.

### 2.2 POWER CONNECTION

Units are powered by 100-120VAC or 200-260 VAC via an IEC socket on the rear of the modem.

**WARNING** - Ensure that you are using the correct mains voltage!

Connect up the power but do not power up till remaining connections have been made. An On/Off switch is positioned next to the power socket. The fuse is held in the power socket.

### 2.3 SIGNAL CONNECTION

Refer for the terminal pinout. Data +, Data - and Cable Shield are supported via a female DB9 connector.

Note: The OSD1204 is not internally terminated therefore external terminations must be used in the system.

Cable Shield	Pin 1
Data +	Pin 2
Data -	Pin 3

### 2.4 DIP SWITCHES

The DIP switches should be in the up position for normal operation. The down position is for test mode. For a more detailed explanation refer to Section 2.8 "Built In Test Mode".

### 2.5 FIBRE OPTIC CABLE CONNECTION

The OSD1204 supports all commonly available multimode optical fibres with ST connectors. Remove the protective caps from the optical output and optical input ports.

Before inserting the optical connectors ensure they are free from any contamination. If they need cleaning use alcohol and lint free tissues. Connect the already terminated cables to the output/input ports. Ensure that the optical output port of one OSD1204 connects to the optical input port of an OSD1204 at the other end.

Remember that the optical transmit port of one modem connects to the optical receive port of the next one in the system and vice versa.

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Figure 2-3 shows the set up for a bus configured system and Figure 2-4 shows a star coupler based system.

## 2.6 OPTICAL POWER LEVEL

The optical power level has 2 user selectable settings. The switch between the optical connectors on the rear panel selects the desired level. The settings are high/low power. Table 1 should be used as a guide as to which setting to select. A separate switch exists for each fibre optic module if the repeater option is installed.

FIBER TYPE	HIGH	LOW
9.5/125um (OSD1204L only)	5 to 20km	0 to 10km
50/125um	2 to 5km	0 to 3km
62.5/125um	2 to 5km	0 to 3km

## 2.7 INDICATOR LIGHTS

"Power" LED (green)	indicates power supplied to the unit.
"TX" LED (yellow)	indicates data received from the electrical side is being transmitted out the optical output(s).
PORT 1 or PORT 2	
"Mode" LED (green)	constantly on indicates normal operation mode. Flashing on/off at the rate of approximately 1sec indicates test mode.
"RX" LED (yellow)	indicates receiving data on the optical input port.

## 2.8 BUILT IN TEST MODE

The built in test mode transmits a constant square wave onto the fibre optic link. In this mode the modem can be used as a light source in conjunction with a power meter to obtain loss measurements of the link or self testing of link integrity.

The test mode is selected by the DIP switches recessed in the rear panel.

### 2.8.1 LINK TEST CONFIGURATION

When the modem at the other end of the link is also in test mode the RX indicator can be used to determine the integrity of the link. The "RX" indicator on the modem will reflect the state of the link. If it does not illuminate then the optical receiver is not receiving sufficient power for link integrity.

### 2.8.2 LIGHT SOURCE CONFIGURATION

To use the modem as a light source select the channel to be used and switch it to test mode. Be sure not to have any active system connected at the other end of the fibre. The test mode will jam up a network. The optical output of the OSD1204 is now transmitting a constant output. This can be used to calibrate a power meter. An accurate measurement of the optical link loss can be made by then connecting the optical cable and measuring the optical power at the remote end.

## 3 MAINTENANCE

The following section briefly outlines the fault finding procedures for the OSD1204 modem. Please take note of the following:

Personnel without considerable technical training should not attempt any maintenance other than 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 running are taken carefully, as some of the components are extremely expensive and can be damaged by failure of any part of their support circuitry.

### 3.1 EXTERNAL INSPECTION

Visually check the following:

Check that the power leads are correctly terminated and that the correct power source has been selected.

Check that the Modicon ModBus Plus network has been correctly terminated.

Check that the status LEDs illuminate properly.

Check that the correct optical power level has been selected.

Inspect the optical connectors and give them a clean before reinsertion.

### 3.2 ROUTINE MAINTENANCE

No routine maintenance is required for this equipment.



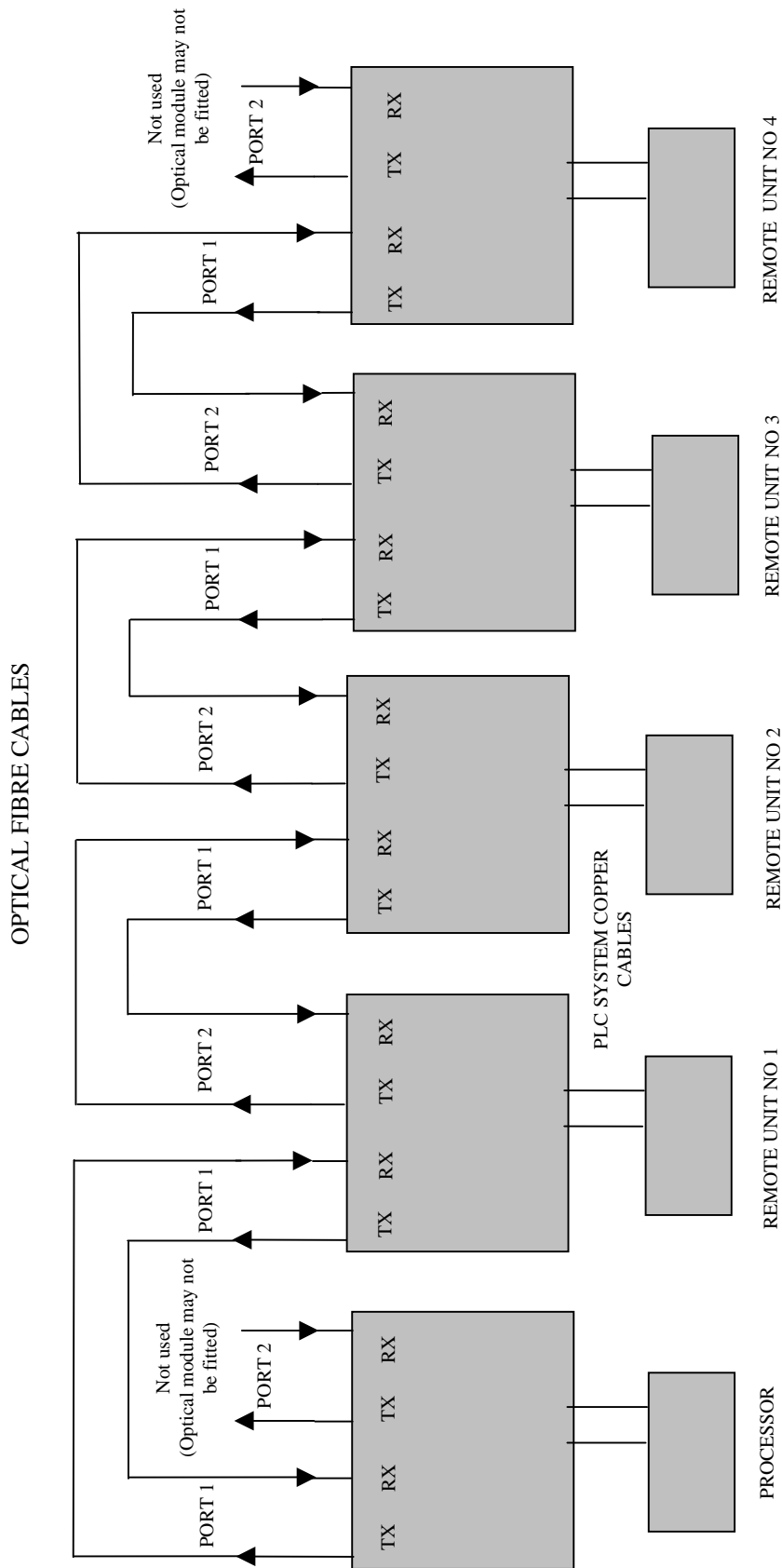


FIGURE 2-3 CONNECTION FOR BUS TOPOLOGY

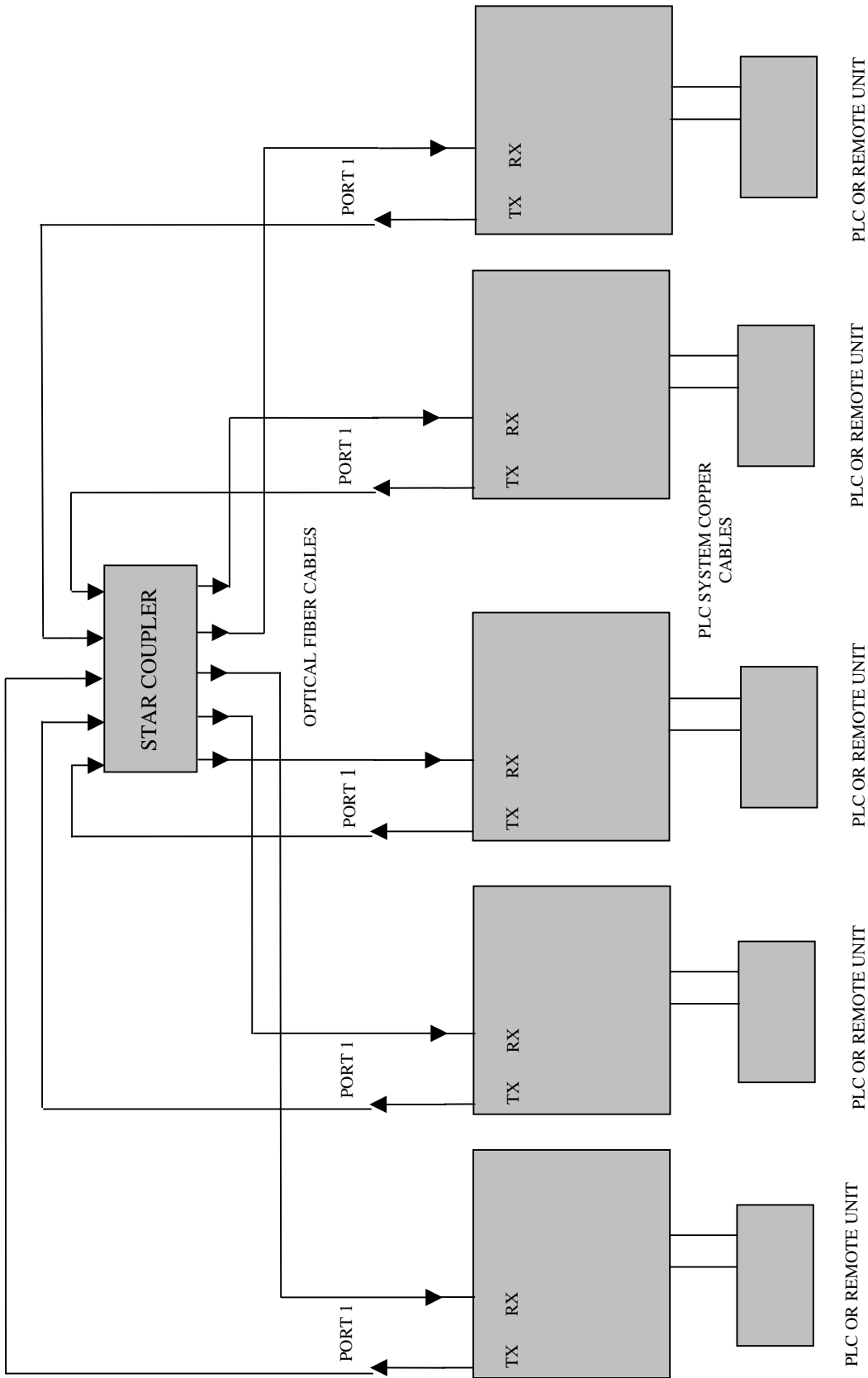


FIGURE 2-4 CONNECTION FOR STAR TOPOLOGY

## 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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