OPTICAL
SYSTEMS
DESIGN

OPERATOR MANUAL

OSD143/144

FIBER OPTIC ALARM

TRANSMISSION SYSTEM

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FIBER OPTIC ALARM

TRANSMISSION SYSTEM

Document No. 101051 Revision 02

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1 TECHNICAL SUMMARY

1.1 BRIEF DESCRIPTION

The OSD143 transmitter and OSD144 receiver provide an economical, high performance fiber optic alternative to multi-pair copper cables for the transmission of alarm, status or control signals.

The basic units support up to 20 alarms and can be expanded as necessary by the addition of 20-alarm extender cards allowing a maximum of 60 alarm states to be transmitted (or 120 using one extender chassis and three more extender cards).

While primarily intended to transfer relay contact information, this system's sampling rate of 25 kilosamples per second enables an OSD143/OSD144 pair with the DL (datalink) option to operate as a 20 to 120 channel TTL data multiplexer with each channel operating at up to 2.4kbps with less than 10% distortion.

The link will operate with a single optical fiber of commonly available multimode fiber over distances of up to 5km.

1.2 TECHNICAL SPECIFICATIONS

1.2.1 SYSTEM PERFORMANCE

Capacity (alarm channels): OSD143 to OSD144	20 channels
Data Channels:	20 channels with data link option DL
Sampling Rate:	25kHz
Indicators:	Power On Link Fail (OSD144 only) Bit Error Rate (OSD144 only)

1.2.2 ELECTRICAL

Input Interface (OSD143 Transmitter):	Buffered and protected, open/closed sensing, contact closure from IN to RTN will close alarm receiver N/O. (Max. 14VDC)
Input Loop Resistance:	External closed loop, 400Ω max. Each input RTN has 330Ω internal resistance to chassis ground
Output Interface (OSD144 Receiver):	Change over contacts (1 Amp 24VDC) Standard TTL levels with Option DL
Electrical Connections:	Barrier terminal blocks

1.2.3 OPTICAL

Optical Wavelength:	850 ± 40nm (1310nm for OSD143L and OSD144L)
Transmitter Optical Power:	>-16dBm average into 62.5/125μm multimode fiber >-20dBm average into 10/125μm singlemode fiber (OSD143L only)
Receiver Sensitivity:	<-38dBm for 1 x 10^{-9}BER
Optical Link Budget:	>22dB at 850nm (>6km of multimode fiber) >18dB at 1310nm (>40km of singlemode fiber)

Optical Connectors:	ST type standard

1.2.4 PHYSICAL

Power Requirements:	200V-260VAC (45-65Hz) at 15VA (Tx) 30VA (Rx) or 110V-130VAC (45-65Hz) at 15VA (Tx) 30VA (Rx)
Dimensions (mm):	430W x 240D x 44H (1RU 19" rack mount)
Weight:	3.2kg (Basic unit)
Operating Temperature:	0 to 60°C
Relative Humidity:	0 to 95% non condensing

2 INSTALLATION AND OPERATION

2.1 INTRODUCTION

This section outlines the methods required to install and operate the equipment 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 and packing to the supplier immediately.

2.2 INSTALLATION

2.2.1 PACKAGING

The OSD143 and OSD144 have been designed to be either freestanding or to be accommodated in a standard 19" rack mount enclosure. Access is required to both the front and rear panels.

2.2.2 POWER SUPPLY CONNECTIONS

The OSD143 and OSD144 will each operate from a mains source and is configured for your local supply voltage.

Although the equipment will operate over a variation in input voltage, it may not provide error free data for extended line dropouts. It is therefore recommended that in areas of high mains borne electrical noise or frequent supply interruptions, the OSD143 and OSD144 be powered by an uninterruptible power supply.

2.2.3 FIBER OPTIC CONNECTIONS

An ST type socket for the fiber optic connection is mounted on the left hand side of each of the OSD143's and OSD144's front panel. Ensure that the dust caps supplied with the modules are left covering the sockets until final installation.

The optical fiber must be terminated with an ST type 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.

2.2.2 ALARM CONNECTIONS

Also situated on the front panels of the OSD143 and OSD144 are barrier terminal blocks for the respective input and output alarm channel signal.

The OSD143 has two input connections per channel as described in the following diagram.

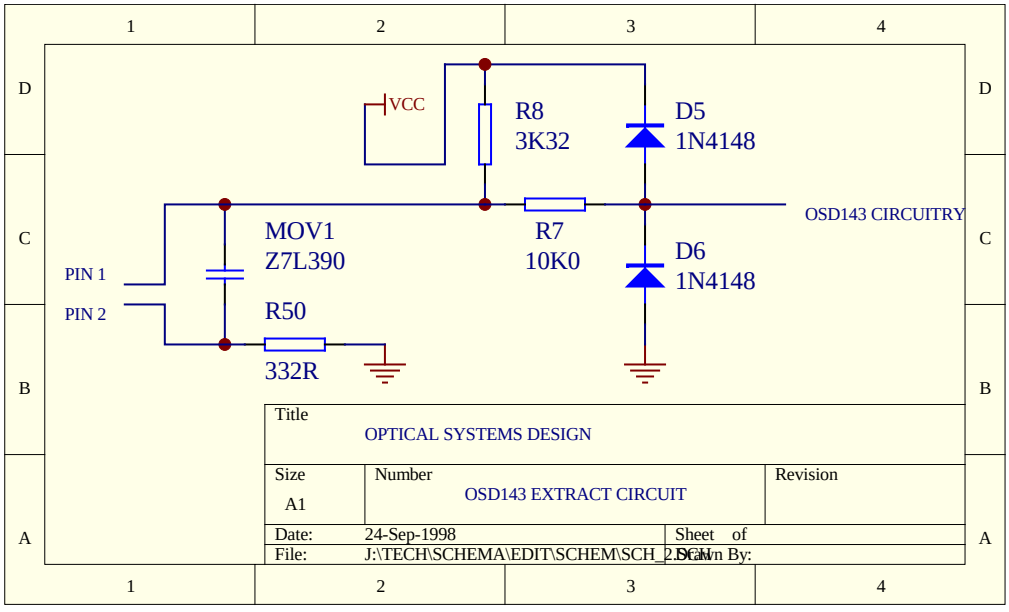
1	2	3	4	5	6	----	----	35	36	37	38	39	40
IN	RTN	IN	RTN	IN	RTN	----	----	IN	RTN	IN	RTN	IN	RTN
1		**2**		**3**		**-------**		**18**		**19**		**20**	

RTN - return

This input interface is buffered and protected open/closed sensing. Therefore the contact closed from IN to RTN will activate (close) the N/O contact on the alarm receiver. The maximum external closed loop resistance is 400Ω and the maximum input voltage is 14VDC.

Please Note: On the input RTN, each channel has a 330Ω terminal resistor to chassis ground to avoid ground loop and alarm crosstalk problems. **DO NOT** connect all RTNs in common.

The following is the circuit diagram of a terminal block connection of the input interface of the OSD143.



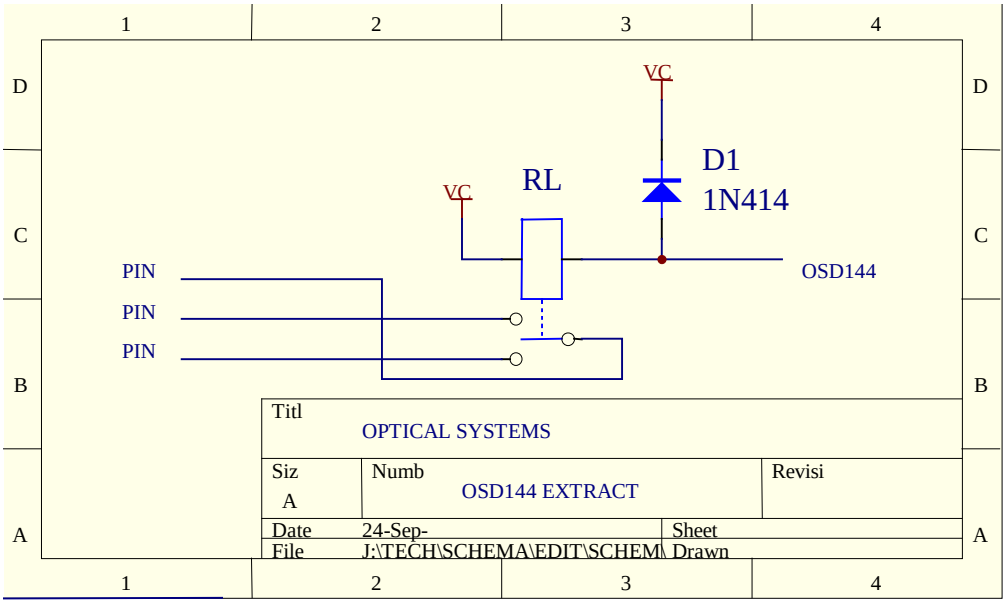
The OSD144 has three output connections per channel as described in the following diagram.

1	2	3	4	5	6	-------	58	59	60
⊖ C	N/O	N/C	C	N/O	N/C	--------	C	N/O	N/C
1			**2**			**-------**	**20**		

C - Common
N/C - Normally Closed
N/O - Normally Open

The changeover contacts are rated at 1 amp and 24VDC.

The following is the circuit diagram of a terminal block connection of the output interface of the OSD144.



2.3 OPERATION

2.3.1 CONTROLS

The OSD143 has a "HIGH/LOW" switch, which controls the level of optical power output of the module.

Optical Power Level	**Distance**
LOW	0 - 3km
HIGH	2km - 5km (for 62.5/125μm fiber)

Both the OSD143 and OSD144 also have an "ON/OFF" power switch on their back panels.

2.3.2 INDICATORS

The following is a description of the indicator lights found on the OSD143 and OSD144.

Indicators	**Description**
"POWER"	Unit receiving power (both OSD143 and OSD144)
"LINK"	Link failure (OSD144 only)
"BER"	Bit Error Rate exceeded (OSD144 only)

During normal operation the BER indicator is off, the POWER indicator is on and the LINK alarm is green. During link failure the LINK alarm is red and the BER indicator is red.
It is possible that the optical power received at the OSD144 receiver will drop either gradually with time or perhaps in a near catastrophic manner due to accidental damage to the cable. This can lead to several possibilities.

BER on, LINK alarm green

Indicates marginal received optical power levels. This may be due to the OSD143 transmitter optical output power dropping or some cable or connector damage. If possible, measure optical power levels in the link to check where the problem lies. Carefully inspect and clean all connectors in series and reconnect the link.
If there is little or no improvement in performance contact your supplier.

BER on, LINK alarm red

This indicates that the optical power received by the OSD144 is too low for correct operation. Check that the OSD143 transmitter is turned on and that the optical link is in good condition.

3 MAINTENANCE

3.1 INTRODUCTION

The following section outlines the fault-finding procedure for the OSD451/453 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 (ES) sensitive and Electrostatic Discharge (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 OSD143/144 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 OSD143/144

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 Authorization" (RMA) form and number before returning goods.
Goods must be returned in adequate packing material to Optical Systems Design, Warriewood or its nominated authorized 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's 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 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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