
OPTICAL

SYSTEMS

DESIGN

OPERATOR MANUAL

OSD416 SERIES

VIDEO AND DATA

FIBER OPTIC TRANSMISSION SYSTEM

OPTICAL SYSTEMS DESIGN

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OPTICAL SYSTEMS DESIGN

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1 TECHNICAL SUMMARY

1.1 BRIEF DESCRIPTION

1.1.1 APPLICATIONS

- ▲ CCTV networks requiring only one way data transmission from the control center to the camera

1.1.2 FEATURES AND BENEFITS

- ▲ Fiber optic transmission of video and data signals from a CCTV camera and of data signals to the camera
- ▲ Remote control of Pan, Tilt and Zoom for video surveillance
- ▲ Transmission of alarm and control signals from the camera site
- ▲ Video bandwidth in excess of 6MHz
- ▲ Operating range of over 5km on multimode fiber and 50km on singlemode fiber with standard devices and greater than 100km with optional lasers.
- ▲ Immunity to electrical interference, low radiation with complete end-to-end isolation
- ▲ Safe transmission in hazardous environments
- ▲ Optional contact closure termination in lieu of data signaling

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1.1.3 PRODUCT DESCRIPTION

The OSD416 series is a fiber optic transmission system for CCTV quality video signals, and includes a Pan Tilt Zoom (PTZ) control signal return path, making it ideal for use in security monitoring systems. The OSD416 system is comprised of the OSD416T fiber optic video transmitter and the OSD416R fiber optic video receiver, which are designed to operate as a pair, forming the complete video and data transmission system.

The OSD416T transmitter unit consists of an optical transmitter section that transmits video and an optical receiver section that receives data signals to the camera for control purposes. The data can be RS232, TTL or RS422 at DC to 64kbps data rate. The control signal receiver section provides adjustment free operation over the full optical range of the unit.

The OSD416R receiver unit consists of a high-performance optical FM receiver for incoming video and a transmitter section for sending data control signals to the camera. The unit provides a constant video output level that is independent of link loss, while the data section is also adjustment free over all link lengths.

The OSD416T and OSD416R are available in three physical configurations: card, stand-alone case or a 1RU rack mount. The card versions are designed to fit the 3RU-high 19" OSD370 chassis, which allows multiple OSD card products to be conveniently powered from and located in the one chassis. The stand-alone case versions are intended for isolated use and require an external DC or AC power source. The 1RU version is an OSD416 unit containing a power supply that can be connected directly to mains power. The OSD416T is normally supplied in the standalone case configuration for mounting at each camera location, while the OSD416R is normally supplied as a card to allow multiple receiver units to be powered from and contained in the OSD370 chassis or 1RU case.

The OSD416 system can be used with any standard multimode optical fiber, and is available optionally for singlemode fiber use. A Wavelength Division Multiplexing version is also available to allow the use of a single fiber for transmission and reception.

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1.2 TYPICAL CONFIGURATION

FIGURE 1 below indicates a possible set-up for an OSD416.

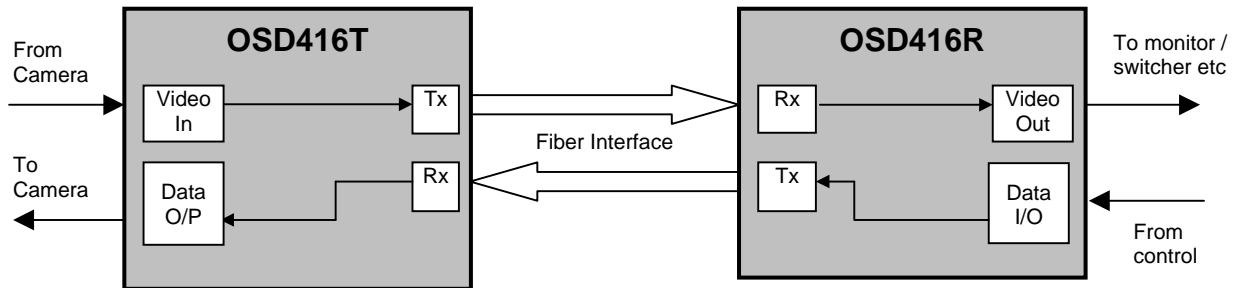


FIGURE 1: OSD416 CONFIGURATION

The OSD416T and OSD416R pair provide data transmission from the monitoring site (receiver) to the camera (transmitter) only.

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1.3 PRODUCTS AND OPTIONS

There are various standard configuration options available for the OSD416 system as identified in Table 1 below.

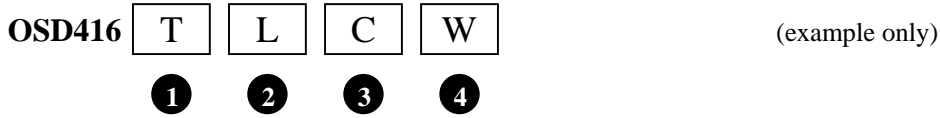


TABLE 1: PRODUCTS AND OPTIONS

	ITEM	DESCRIPTION
1	T	Transmitter
	R	Receiver
2	-	Multi-mode version
	L	Single-mode version
	LD1	-10dBm 1310nm laser version
	LD2	-5dBm 1310nm laser version
3	-	Card version (3RU high chassis mount for OSD370)
	C	Stand-alone case version (clamshell case)
	U	1RU version
4	-	Two optical fiber operation
	W	Wavelength Division Multiplexed (WDM) single fiber operation

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1.4 TECHNICAL SPECIFICATIONS

Table 2 below provides Technical Specifications for the OSD416.

TABLE 2: TECHNICAL SPECIFICATIONS

NO	SPECIFICATION	PERFORMANCE
1	Input Impedance	75Ω
2	Input Level	1V _{p-p}
3	Video Connector	BNC Socket
4	Bandwidth	5Hz to 10MHz +1/-3dB
5	Weighted Signal to Noise Ratio	>60dB at -25dBm received optical power >50dB at -35dBm received optical power
6	Data Interface	TTL, RS232, RS422 31kHz Manchester or Biphas
7	Data Rates	DC to >64kbps
8	Data Connector	4 way terminal block
9	Power Connector	2 way terminal block
10	Transmitter Wavelength	850 ± 30nm (multimode) 1300 ± 30nm (optional singlemode)
11	OSD416T Transmitter Coupled Power	>-15dBm peak into 62.5/125um multimode fiber >-20dBm peak into 9/125um singlemode fiber (OSD416TL only)
12	OSD416R Transmitter Coupled Power	>-20dBm peak into 62.5/125um multimode fiber >-20dBm peak into 9/125um singlemode fiber (OSD416RL only)
13	OSD416R Receiver Saturation	>-10dBm
14	Receiver Operating Wavelength	800 to 900nm (1270 to 1580nm for OSD416TL and OSD416RL)
15	OSD416R Sensitivity	<-35dBm for >50dB video SNR
16	Transmission Distance	>5km for multimode, >40km for singlemode
17	OSD416T Received Data Sensitivity	<-40dBm for BER of <1 x 10 ⁻⁹
18	Optical Connectors	ST standard, others optional
19	Power Requirements	+9V to +20V DC or AC at 200mA max
20	Dimensions of Module (mm)	100W x 100D x 25H (excludes flanges and optical connectors)
21	Weight of Module (kg)	0.4
22	Dimensions of card (mm)	25W x 210D x 100H (excludes flanges and optical connectors)
23	Weight of Card (kg)	0.2
24	Dimensions of 1RU (mm)	482W x 215D x 44H (excludes flanges and optical connectors)
25	Weight of 1RU (kg)	2.6
26	Operating Temperature	-20 to 75°C
27	Relative Humidity	0 to 95% non-condensing

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1.5 PIN ASSIGNMENTS

Pin assignments for the “Data Input/Output” connector (Figure 2) are shown in Table 3 below.

TABLE 3: OSD416 PIN ASSIGNMENT

PIN NUMBER	FUNCTION	
	OSD416T	OSD416R
1	RS422 OUT +	RS422 IN +
2	RS422 OUT -	RS422 IN -
3	RS232 OUT	RS232 IN
4	Ground	Ground

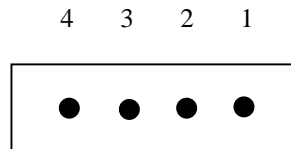


FIGURE 2: 4 PIN DATA CONNECTOR

2 INSTALLATION AND OPERATION

2.1 INTRODUCTION

This section outlines the methods required to install and operate the OSD416 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

Class 1	Class 3A
The multimode version of the OSD416 is a Class 1 LED product . Wavelength of 850nm and <-8dBm power output.	The singlemode and WDM versions of the OSD416 are Class 3A laser products . Wavelength of 1310nm and <+5dBm power output or wavelength of 1550nm and <+7dBm power output.
	

- ▲ 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 OSD416 DRAWINGS AND DIMENSIONS

The OSD416 stand-alone version should be mounted on an even surface and secured by means of M4 or smaller screws. Figure 3(a) is an outer case drawing showing the required mounting dimensions.

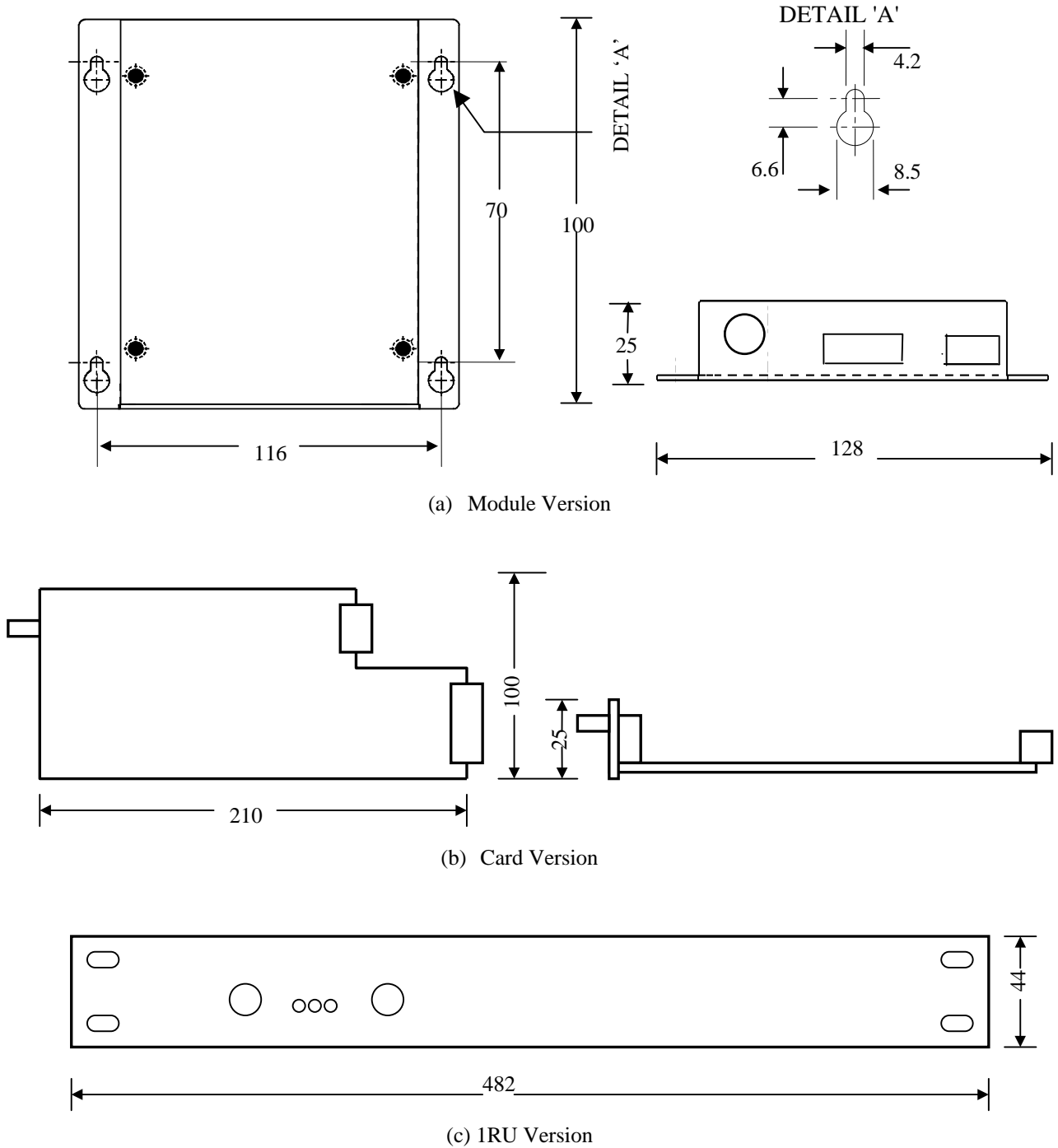


FIGURE 3: OSD416 DIMENSIONS

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2.2.3 POWER SUPPLY CONNECTIONS

The OSD416 card version is powered from the OSD370 chassis.

The OSD416 1RU version uses an IEC connector for mains power.

It is important to read the following information for proper operation and avoid damage to the unit.

The OSD416 module requires external DC or AC power. The acceptable DC voltage range is +9 to +20V DC or AC, with maximum current output of 200mA. Power should be connected to the 2 way socket located at the back of the case. Take care to connect DC power with the correct polarity: Pin 2 is 0V and Pin 1 is positive for DC power.

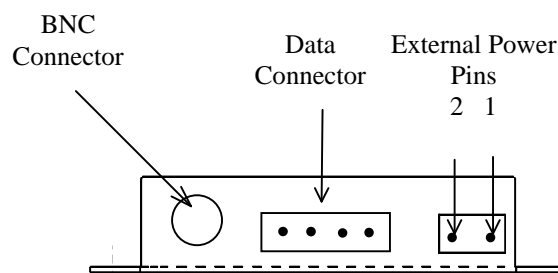


FIGURE 4: OSD416 2 PIN POWER SUPPLY CONNECTION DIAGRAM

For AC supplies the polarity is not applicable. NOTE: For AC power, Pin 2 **must not** be grounded. The OSD416 has a full bridge rectifier circuit, grounding Pin 2 will short half the bridge circuit (Figure 5) and damage the product!

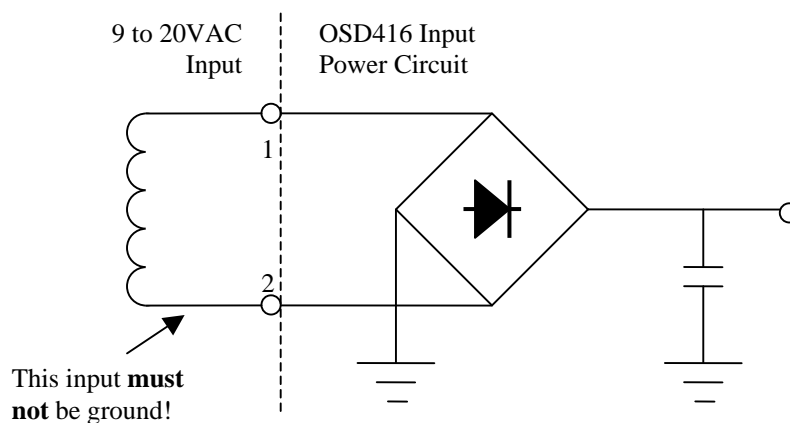


FIGURE 5: OSD416 AC INPUT VOLTAGE DIAGRAM

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2.2.4 OSD416T CONNECTIONS

For the stand-alone version, connect the OSD416T to an appropriate power source. For card versions, install the unit into the OSD370 chassis. Once the power source is switched on, check that the indicators illuminate. Check that the "Laser" indicator is illuminated green. If it is red, there may be a problem with the unit and it should not be used.

For RS232 use, connect RS232 data to the positive data input (pin 3) and data input ground (pin 4). Refer to Figure 2.

The RS422 outputs can be used in quasi-RS485 mode by changing the link setting LK3. In quasi-RS485 mode the data outputs are tri-stated when no data is available.

Note that accessing LK3 requires disassembly of the OSD416T, which should not be attempted unless absolutely necessary and by qualified technical staff only.

See Table 6 for link settings and Table 3 for data pinouts.

Connect a BNC terminated RG59 cable from the camera to the OSD416T. If the camera is operating properly the "Video Present" indicator should change from red to green.

Connect the optical plugs on the optical cable to the receptacles located on the side of the case or on the front panel of the card version. When the remote OSD416AR is connected the "Link OK" indicator should change from red to green.

Connect the data signal pins of the 4-way connector to your equipment via a suitable cable. Ensure that the correct signals are connected to the correct pins – refer to Table 3 on page 9 for pin assignments.

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 unit's 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.

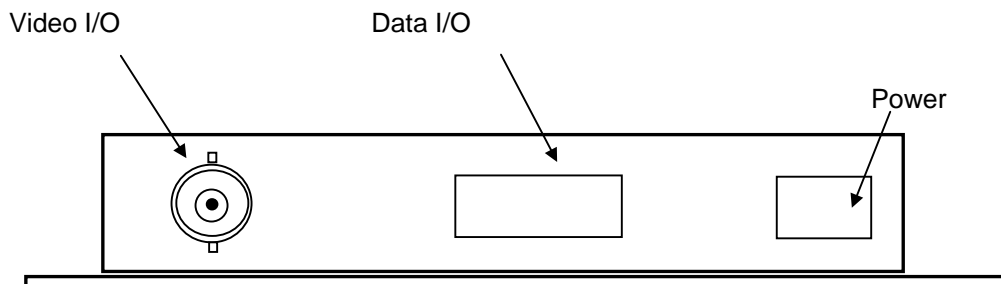


FIGURE 6: OSD416 STANDALONE REAR VIEW

2.2.5 OSD416R CONNECTIONS

For the stand-alone version, connect the OSD416R to an appropriate power source. For card versions, install the unit into the OSD370 chassis. Once the power source is switched on, check that the indicators illuminate. Check that the "Laser" indicator is illuminated green. If it is red, there may be a problem with the unit and it should not be used.

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For RS232 use, connect RS232 data to the positive data input (pin 3) and data input ground (pin 4). Refer to Figure 2.

The polarity of the received data can be inverted via link option LK3 on the board.

Note that accessing LK3 requires disassembly of the OSD416R, which should not be attempted unless absolutely necessary and by qualified technical staff only.

See Table 7 for link settings and Table 3 for data pinouts.

Connect a BNC terminated RG59 cable from the OSD416R to the video monitor/switcher.

Connect the optical plugs on the optical cable to the receptacles located on the side of the case or on the front panel of the card version. If the received optical power is sufficient the "Link OK" indicator will change from red to green. If a video signal is being received the "Video Present" indicator should be green; if no video signal is being received this indicator will be red.

Check that you have wired the data signal source to the correct pins of the 4-way plug (refer to Table 3 on page 9). Plug this connector into the OSD416R Data I/O socket and connect the other end(s) to your equipment as required.

2.2.6 INDICATORS

The indicator function of the OSD416 system is summarized in Table 4 and Table 5. Figure 7 shows the LED allocation and their display function.

TABLE 4: OSD416T INDICATOR FUNCTION

OSD416T	INDICATOR COLOR	
INDICATOR NAME	GREEN	RED
Laser	Normal Laser Operation	Laser or Laser Driver Fault
Video Present	Video Input Signal Detected	No Video Input Signal Detected
Link OK	Optical power O.K.	Low Optical power

TABLE 5: OSD416R INDICATOR FUNCTION

OSD416R	INDICATOR COLOR	
INDICATOR NAME	GREEN	RED
Laser	Normal Laser Operation	Laser or Laser Driver Fault
Video Present	Received Video Signal Detected	No Received Video Signal Detected
Link OK	Optical power O.K.	Low Optical power

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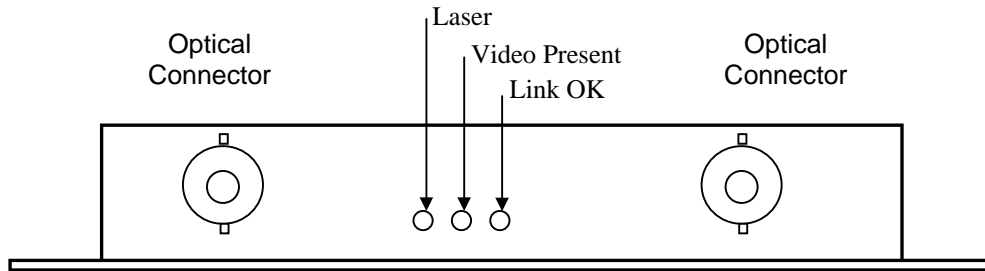


FIGURE 7: OSD416 INDICATORS

2.2.7 LINK SETTINGS

Both the OSD416T and the OSD416R has one internal user configurable link labeled as LK3 (OSD416T) and LK3 (OSD416R). Table 6 and Table 7 below lists the links and settings. All other Links are factory set and must not be touched. Permanent damage may occur and/or void warranty.

TABLE 6: OSD416T LINK SETTINGS

LK	No. of Pins	FUNCTION	SETTING
3	3	Sets RS422 mode (default)	1,2
3	3	Sets Quasi-RS485 mode	2,3

TABLE 7: OSD416R LINK SETTINGS

LK	No. of Pins	FUNCTION	SETTING
3	3	Sets data output to normal phasing (default)	1,2
3	3	Sets data output to reversed phasing	2,3

3 MAINTENANCE

3.1 INTRODUCTION

The following section outlines the fault-finding procedure for the OSD416 transceivers. Please take note of the following:

- ▲ Personnel without appropriate training should not attempt any maintenance except that outlined in Section 3.2.
- ▲ 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 unit correctly and that the distant OSD416 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 OSD416.

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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