OPTICAL
SYSTEMS
DESIGN

OPERATOR MANUAL

OSD870 SERIES

DIGITAL 4 CHANNEL

FIBER OPTIC VIDEO MULTIPLEXER

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1   TECHNICAL SUMMARY

1.1   BRIEF DESCRIPTION

1.1.1   OVERVIEW

The OSD870 is a high performance four channel digital video multiplexer.

Transmission is via a laser light source operating at 1310nm or at 1550nm. Various transmitter power levels are available, to provide cost effective operation over up to at least 100km of singlemode fiber when using the standard PIN photodiode receiver.

The receiver can be supplied with an Avalanche Photodiode detector (APD) for increased sensitivity and a system reach of up to 200km.

The unit is available as a card compatible with the OSD370 chassis, as a standalone externally powered unit or as a 1RU high 19" rack mounting enclosure.

The system is designed to operate with singlemode fiber but can be used with multimode fiber over less than 1km. Contact OSD for system design assistance for any such requirements.

For systems requiring audio, data or reverse video transmission, please consider our OSD880 or OSD890 systems which are by far the most flexible and highest performance four or eight channel multiplexers on the market.

1.1.2   APPLICATIONS

▲   CCTV networks

▲   Transportation networks

▲   Industrial monitoring systems

1.1.3   FEATURES AND BENEFITS

▲   Uncompressed 10 bit video encoding, giving studio quality transmission

▲   Fiber optic transmission of four PAL, NTSC or SECAM video signals on one fiber

▲   Range of up to 200km is possible with optional optical devices

▲   Operates on either singlemode or multimode fiber

▲   Video bandwidth in excess of 10MHz,

▲   SNR >67dB

▲   Immunity to electrical interference, with complete end-to-end isolation

▲   Video inputs have 3dB overload capability and can be equalised for long coaxial cables.

1.2 TYPICAL CONFIGURATION

OSD871   **OSD873**
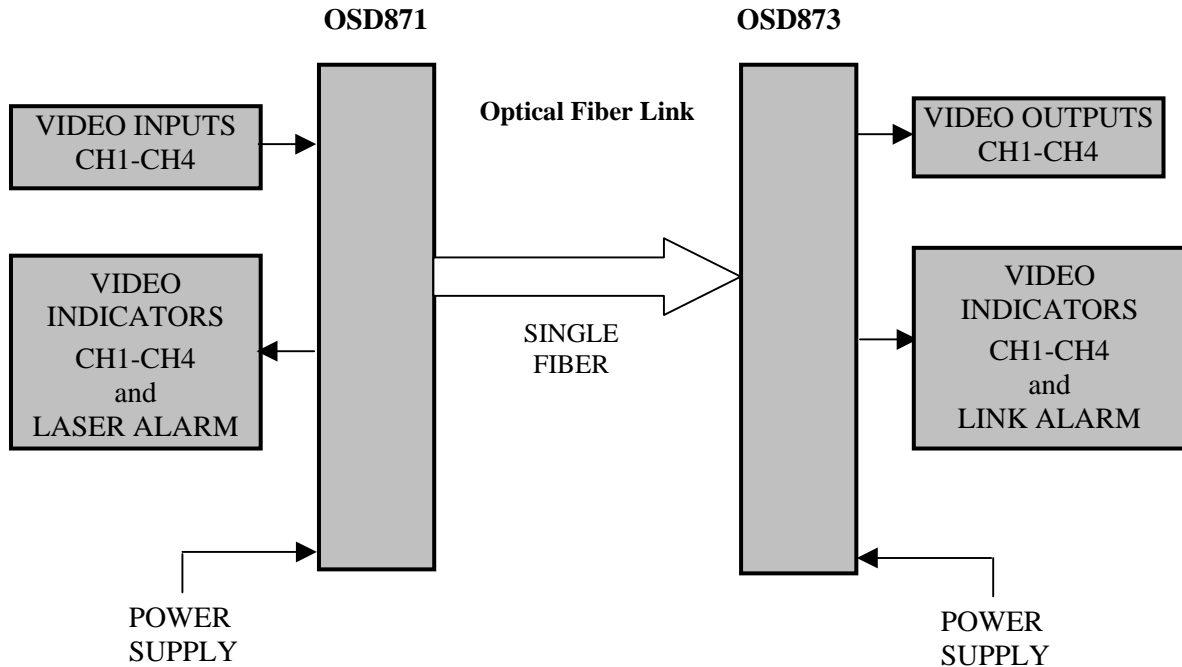
FIGURE 1: TYPICAL CONFIGURATION

1.3 PRODUCTS AND OPTIONS

There are various options available for the OSD870 as identified in Table 1 below:

TABLE 1: PRODUCTS AND OPTIONS

ITEM	DESCRIPTION
OSD871/13-7	Transmitter with –7dBm 1310nm FP laser
OSD871/13+2	Transmitter with +2dBm 1310nm FP laser
OSD871/15-7	Transmitter with –7dBm 1550nm DFB laser
OSD871/15+2	Transmitter with+2dBm 1550nm DFB laser
OSD873	Receiver
OSD873A	APD Receiver
Option C	Module Version
Option U	1RU Version

1.4 TECHNICAL SPECIFICATIONS

SPECIFICATION	PERFORMANCE
CHANNEL AVAILABILITY	
Number of video channels	4 one way, 8 optinal with WDM
ELECTRICAL	
Input/Output Impedance	75Ω composite video
Input/Output Level	1.0Vpp nominal
Bandwidth	5Hz to 10.0MHz ± 1dB
Weighted Signal to Noise Ratio	>67dB over the full dynamic range of the receiver
Differential Gain	<0.5%
Differential Phase	<0.5°
Video Connectors	BNC
Alarms	Laser Fail on OSD871 Low Received Optical Power on OSD873
Alarm Connector	Female 9-pin D connector
OPTICAL	
Transmitter wavelength	1310nm or 1550nm
Transmitter coupled power	Several options are available between –7 to +6dBm
Receiver sensitivity	<-24dBm (PIN) <-34dBm (APD)
Receiver saturation	>0dBm (PIN) >-5dBm (APD)
Link budget	From 17dB to 40dB at 1310nm or 1550nm
Operating distance	From 30km to over 200km, depending on optical devices used
Optical Connectors	ST standard, FC is optional
Optical line rate	1.35Gbps
PHYSICAL	
Power Requirements	+9V to 35V_{DC} or 22V to 28V_{AC} @ 10VA for card or module 90 to 265 V_{AC} @ 15VA for 1RU case version
Dimensions (mm)	25W x 208D x 100H card 104W x 104D x 25H module 483W x 210D x 44H 1RU case
Weight	0.4kg (card) 1.0kg (module) 2.2kg (1RU case)
Operating Temperature	-20 to +75°C
Relative Humidity	0 to 95% non-condensing
Chassis Current Consumption	0.80 Amp

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1.5 PRODUCT DESCRIPTION

The OSD870 series is a high-quality digital video optical fiber transmission system. The system consists of OSD871 transmitter and OSD873 receiver units, which are designed to be used as a pair, and provide forward transmission of up to four channels of PAL, NTSC or SECAM video channels.

The OSD871 accepts up to four analog composite video input signals. The video signals are converted to digital with true10-bit resolution which are multiplexed and transmitted as a digital bitstream through the fiber.

The OSD873 incorporates a high performance optical receiver for the incoming digital bitstream. The received digital signal is then decoded into video signals, which are available at the unit's outputs.

The OSD871 and OSD873 are available in three physical configurations: card, stand-alone modem case and 1RU rack mounting chassis. 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 AC/DC power source. The 1RU rack mounting chassis is a fully independent mains powered unit.

The OSD870 system can be used with any standard singlemode optical fiber, and is available optionally for multimode fiber use.

2   INSTALLATION AND OPERATION

2.1   INTRODUCTION

This section outlines the methods required to install and operate the OSD870 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.

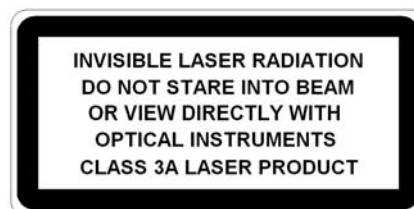### 2.2   INSTALLATION

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.

LASER OPERATION

> **Class 3A**
>
> The singlemode and WDM versions of the OSD870 are **Class 3A laser products.** Wavelength of 1310nm and <+5dBm power output or wavelength of 1550nm and <+7dBm power output.

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INVISIBLE LASER RADIATION
DO NOT STARE INTO BEAM
OR VIEW DIRECTLY WITH
OPTICAL INSTRUMENTS
CLASS 3A LASER PRODUCT
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- ▲ 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.

2.2.2 DRAWINGS AND DIMENSIONS

There are three types of packaging of the OSD870, the "CARD" version, "MODULE " version and "1RU " version as shown in Figure 2.

(a)

(b)

(c)
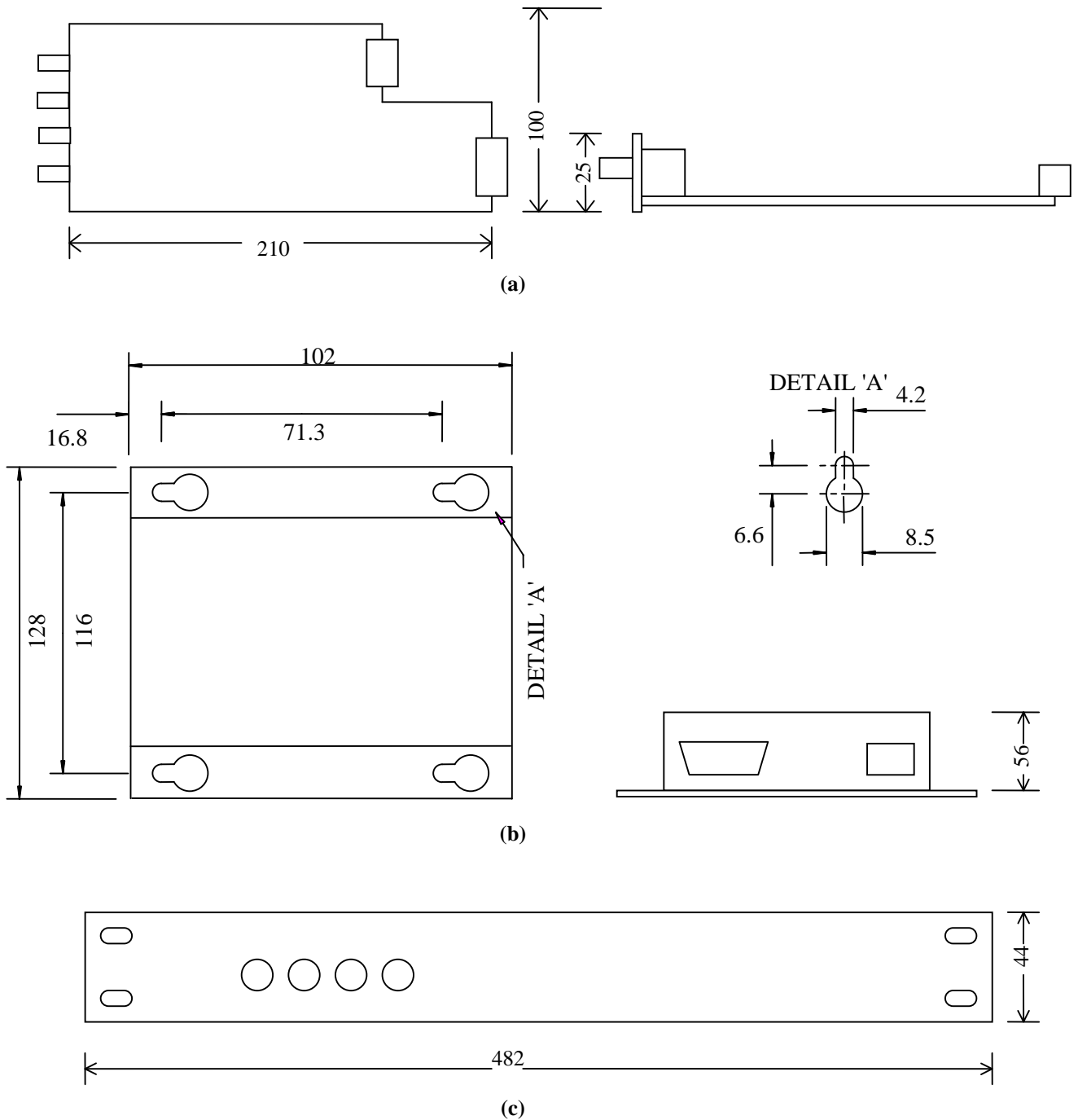
(a) Card Version (b) Module Version (c) 1RU Version
FIGURE 2: OSD870 DIMENSIONS

2.2.3 POWER SUPPLY CONNECTION

The OSD870 requires external DC or AC power and should be connected as indicated in Table 2. The OSD870 card version should be fixed into the OSD370 chassis using the captivated screws. The cards can be plugged in or out of the OSD370 chassis with power on or off.

TABLE 2: POWER CONNECTION

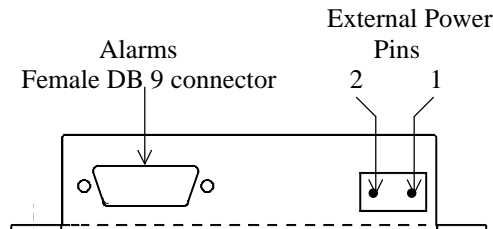| OSD870 Version	Specification		Connection
Card	$12V_{DC}$	Supplied by OSD370 Chassis	DB9 Male
Module Card	9V to $35V_{DC}$ 22V to $28V_{AC}$	Supplied Externally	2-Pin TermBlock Pin 1 (+), Pin 2 (Gnd)
1RU	$90V_{AC}$ to $265V_{AC}$ @ 20VA	Mains Power	IEC mains plug

FIGURE 3: OSD870 MODULE CARD VERSION POWER SUPPLY CONNECTION

2.2.4 VIDEO CONNECTION

The video-input signals (eg. from cameras) are connected to the video input BNC connectors on the OSD871. The video output signals (eg. to monitors) are connected from the video output BNC connectors on the OSD873. Each input channel number corresponds with the same output channel number.

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 ALARM CONNECTION

There is provision for alarm supervisory functions through a 9-pin D-type connector.
Currently this function is not used and all pins are reserved for future use.

2.2.6 LINK SETTINGS

The OSD870 does not have any user configurable links on the PCB. All the links are factory set and should not be touched as permanent damage may occur and/or void warranty.

2.3   OSD870 OPERATION

When using the OSD870 link for the first time, check that the units are in good condition with
no visible damage.

If a card version is used, insert it in an appropriate slot on the OSD chassis and check that the indicators
illuminate accordingly on power up. If a module version or 1RU version is used, connect the unit to an
appropriate power source and check that the indicators illuminate accordingly on power up.

In either case take special note of the "Laser OK" indicator, it should be green. If it is red there may be
a problem with the laser. Disconnect power and have the Laser checked as soon as possible by OSD or
its authorized service centre.

To connect video signals, connect BNC coaxial cables (RG59) from the camera to the unit. If
the camera is operational, the "Video Present" indicator should illuminate amber directly
under the corresponding BNC connector.

Finally, plug in the optical connectors of the optical cable. If the remote OSD873 is connected, its
"Link OK" LED will change from Red to Green if optical level is adequate.

2.3.1   OSD871 CABLE EQUALIZATION

For fine adjustment of the video quality, cable equalization can be adjusted to compensate for high
frequency roll-off due to long video cables.
Long cables may result in ringing which may be visible as ghosting of edges of sharp transitions within
a picture for example. The pots can be adjusted to improve the picture quality.
This is done via trim pots (RV2, RV4, RV6, RV8) directly from the top of the module case or card, or
by removing the cover in the 1RU case. A non-conducting trimmer screw driver should be used.
The adjustment must only be made by qualified personnel as dangerous high voltages are present inside
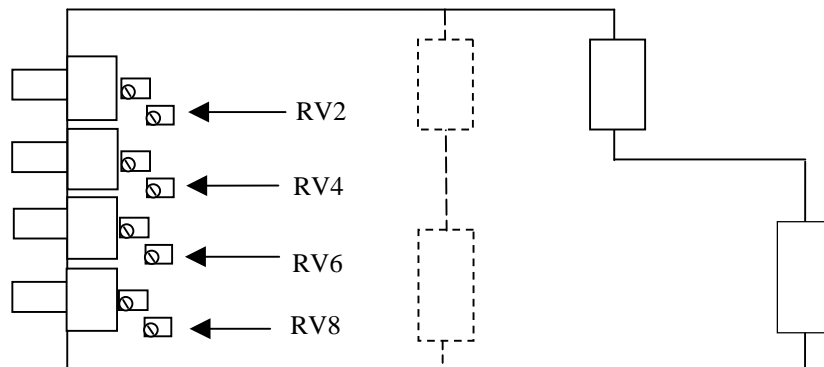the 1RU case.

FIGURE 4: OSD871 CABLE EQUALIZATION POT ADJUSTMENT

2.3.2   INDICATORS

TABLE 3: OSD870 INDICATORS

INDICATOR	COLOUR	FUNCTION
Laser OK	Green Red	OK Fail
Link OK	Green Red	OK Fail
Video Present (x4)	Amber Off	Video Signal No video signal

NOTE: "Link OK" Indicator refers to the received video stream. It is 'green' after the optical link is established and the receiver is locked onto the incoming stream.

3   MAINTENANCE

3.1   INTRODUCTION

The following section outlines the fault-finding procedure for the OSD870 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 OSD870 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 OSD870.

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 labels is evident.

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