OPTICAL SYSTEMS DESIGN

# OPERATOR MANUAL

## OSD840 SERIES

## DIGITAL VIDEO, ETHERNET, DATA AND AUDIO

## FIBER OPTIC TRANSMISSION SYSTEM

# INDEX 1

# INDEX OF TABLES AND FIGURES

# 1 TECHNICAL SUMMARY

## 1.1 BRIEF DESCRIPTION

### 1.1.1 OVERVIEW

The OSD840T modem consists of an optical transmitter section which transmits a video signal plus data, two audio and Ethernet signals in digital format as well as an optical receiver section for similar data, audio and Ethernet signals transmitted to the camera for control and communication purposes. The OSD840T control signal receiver provides adjustment free operation over the full optical range.

The OSD840R incorporates a high performance optical digital receiver for incoming video, data, two audio and Ethernet signals and a transmitter, which outputs a digital optical signal consisting of two audio signals and four data channels. It is designed to be used with the OSD840T. The OSD840R receiver provides a constant video output level, which is independent of link loss. The audio/data section of the OSD840R is also adjustment free over all link lengths. Audio and data signal interface levels and impedance's are the same as those of the OSD840T.

### 1.1.2 APPLICATIONS

- ▲ High quality CCTV networks requiring full duplex Ethernet, data and/or audio transmission between cameras and either control centre
- ▲ Extremely high quality video conferencing
- ▲ Broadcast television systems
- ▲ Transportation communication system

### 1.1.3 FEATURES AND BENEFITS

- ▲ One way optic transmission of PAL, NTSC or SECAM video plus full duplex transmission of
  - One 10/100 Base-T Ethernet channel
  - Two audio channels
  - Three data channels
  - One relay contact channel
- ▲ Studio quality 10 bit video and 24 bit audio
- ▲ Video bandwidth of 10MHz
- ▲ Remote control of Pan, Tilt and Zoom for video surveillance
- ▲ Transmission of alarm and control signals from the camera site
- ▲ Full duplex 2-wire audio intercom with 100Hz to 5kHz bandwidth and associated on hook/off hook signaling with industry standard RJ11 connector
- ▲ Operating range of at least 3km on multimode fiber, depending on optical devices
- ▲ Video inputs have 3dB overload capability and can be equalised for up to 300m of coaxial cable

## 1.2 TYPICAL CONFIGURATION

FIGURE 1 below indicates a typical set-up for an OSD840T and OSD840R.

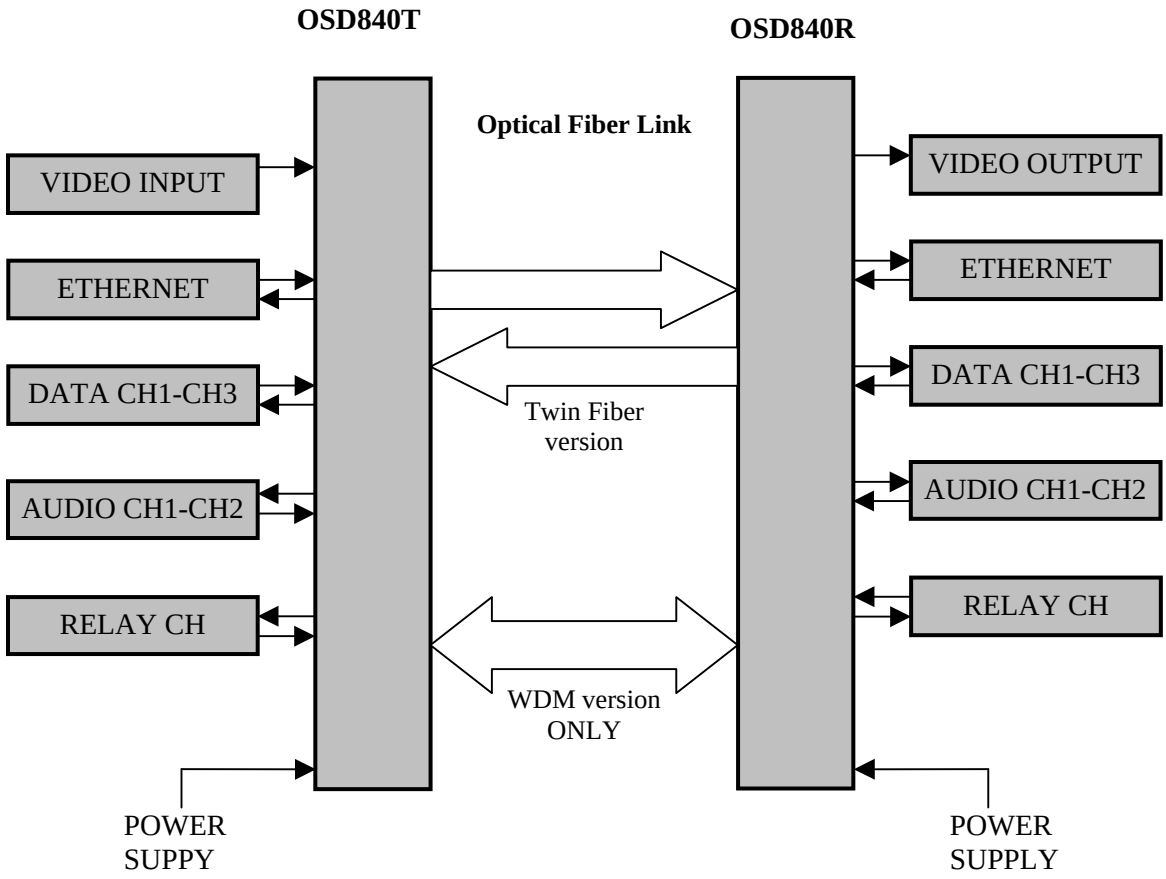


FIGURE 1: TYPICAL CONFIGURATION

## 1.3 PRODUCTS AND OPTIONS

There are various options available for the OSD840 as identified in Table 1 below:

TABLE 1: PRODUCTS AND OPTIONS

| ITEM | DESCRIPTION |
|---|---|
| OSD840AT | VIDEO TRANSMITTER WITH 1 ETHERNET, 2 DUPLEX AUDIO AND 4[*1] DUPLEX DATA CHANNELS |
| OSD840AR | VIDEO RECEIVER WITH 1 ETHERNET, 2 DUPLEX AUDIO AND 4[*1] DUPLEX DATA CHANNELS |
| **ITEM** | **DESCRIPTION** |
| OPTION C | MODULE VERSION |
| OPTION L | SINGLEMODE OPTION |
| OPTION LDN | 1300nm AND 1550nm LASER (where “N” indicates Laser type) |
| OPTION W | SINGLE FIBER OPERATION |

[*1] The 4 Data channels consist of 3 Data channels capable of DC to >400kbps, and 1 Relay channel up to 100bps.

## 1.4 TECHNICAL SPECIFICATIONS

TABLE 2: TECHNICAL SPECIFICATIONS

| SPECIFICATION | PERFORMANCE |
|---|---|
| Video Input/Output Impedance | 75Ω composite |
| Video Input/Output Levels | 1Vpp nominal |
| Video Connectors | BNC |
| Video Bandwidth | 5Hz to 10MHz (±1dB) |
| Signal to Noise Ratio (Weighted) | > 67dB at all receive levels over the unit's full dynamic range |
| Video Distortion | <0.5% Differential Phase (DP), <0.5° Differential Gain (DG) |
| Audio Input/Output Impedance | >10kΩ/200Ω Balanced/Unbalanced |
| Audio Bandwidth | 10Hz - 22kHz ± 1dB |
| Audio Input & Output Level | 0dBu ($0.775V_{rms}$) nominal, balanced or unbalanced |
| Audio Headroom | 20dB balanced, 15dB unbalanced |
| Audio Signal to Noise Ratio | >100dB (weighted at max level) |
| Audio Distortion | < 0.02% Total Harmonic Distortion (THD) |
| Data Interface | TTL, RS232, RS422 and RS485<br>31kHz Manchester or Biphase possible in either direction |
| Data Rates | DC to >400kbps on 3 data channels<br>DC to >100bps on relay channel |
| Ethernet | IEEE Ethernet standards at 10/100Mbps |
| Ethernet Connector | RJ45 |
| Audio and Data Connectors | 26 Pin female high density D connector, RJ11 for 2-wire intercom |
| Transmitter Wavelength | 850nm (1310nm for OSD840TL or OSD840RL options) |
| OSD840T Transmitter Coupled Power | >-15 to -5dBm into multimode fiber<br>>-15 to -3dBm into singlemode fiber (OSD840TL only) |
| OSD840R Transmitter Coupled Power | >-20 to -14dBm into multimode fiber<br>>-20 to -10dBm into singlemode fiber (OSD840RL only) |
| OSD840R Receiver Sensitivity | <-29dBm |
| OSD840R Sensitivity | >-3dBm |
| OSD840T Receiver Sensitivity | <-37dBm |
| OSD840T Sensitivity | >-10dBm |
| Link Distances | >2km multimode for standard 850nm OSD840 link (fiber bandwidth limited)<br>>3km multimode for optional 1310nm OSD840L link (fiber bandwidth limited)<br>>30km singlemode for optional 1310nm OSD840L link (fiber loss limited) |
| Optical Connectors | ST standard, others optional |
| Dimensions (mm) | 104W x 144D x 44H module<br>50W x 208D x 100H card |
| Weight | 400g (module), 200g (card) |
| Power Requirements | 12V to $24V_{DC}$ @ 300mA |
| Operating Temperature | -20 to +75°C |
| Relative Humidity | 0 to 95% non-condensing |
| Chassis Current Consumption | 0.40 Amp |

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## 1.5 PRODUCT DESCRIPTION

The OSD840 series is a high-quality digital video, Ethernet, audio and data optical fiber transmission system. The system consists of the OSD840T and the OSD840R, which are designed to be used as a pair. The system provides one-way transmission of PAL, NTSC or SECAM video, plus full-duplex transmission of two audio, three data channels, one relay channel and a 10/100 Base-T Ethernet connection via the RJ45 connector.

The OSD840T accepts one analogue composite video input signal and two analogue audio input signals along with three digital data input signals, one relay contact signal and a 10/100 Base-T Ethernet connection. The video signal is converted to digital with 10-bit resolution, while the audio signals are converted using 24-bit resolution so as to preserve the quality of the input signals. The resulting digital signals are multiplexed and transmitted as a digital bit-stream through the fiber. The OSD840T also includes an optical receiver section that decodes the digital signal transmitted by the OSD840R, to provide audio, data and relay output signals including Ethernet. The audio channels can be balanced or unbalanced at 775mV nominal level and operate over a 22kHz bandwidth. The second audio channel can also be configured as a front-panel-accessible 2-wire intercom suitable for commissioning and servicing or for permanent use. The data channels can be RS232, TTL, RS422 or RS485 on one channel and RS232 on the other channel and may operate from DC to 400kbps. User adjustable turnaround times are provided for RS485. The fourth channel is a full duplex contact input/relay output channel for control/alarm purposes. The OSD840T control signal receiver provides adjustment free operation over the full optical range of the unit.

The OSD840R incorporates a high performance optical digital receiver for incoming video, audio, data and Ethernet signals, and a transmitter that outputs a digital optical signal consisting of two audio signal, three data channels, 1 relay channel and Ethernet. The unit provides a constant video output level which is independent of link loss, and the audio and data section of the OSD840R is also adjustment free over all link lengths. Audio and data signal interface levels and impedance's are the same as those of the OSD840T.

The OSD840T and OSD840R are available in two physical configurations: card or stand-alone case. 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 power source.

The OSD840 system can be used with any standard multi-mode optical fiber, and is available optionally for single-mode fiber use. A Wavelength Division Multiplexing version is also available to allow the use of a single fiber for transmission and reception.

## 1.6 PIN ASSIGNMENTS

Pin assignments for the “Audio/Data Input/Output” DB26 high-density connector (Figure 2) is shown in Table 3 below.

TABLE 3: PIN ASSIGNMENT

| FUNCTION | PIN | FUNCTION | PIN |
|---|---|---|---|
| Data ground | 1,6 | Relay input | 22 |
| Audio ground | 15,18 | Relay output n.o. | 5 |
| Data1 input + | 10 | Relay output n.c. | 14 |
| Data1 input - | 19 | Relay output common | 23 |
| Data1 output + | 2 | Audio1 input + | 24 |
| Data1 output - | 11 | Audio1 input - | 7 |
| Data2 input + | 20 | Audio1 output + | 16 |
| Data2 input - | 3 | Audio1 output - | 25 |
| Data2 output + | 12 | Audio2 input + | 8 |
| Data2 output - | 21 | Audio2 input - | 17 |
| RS232 input channel 3 | 4 | Audio2 output + | 26 |
| RS232 output channel 3 | 13 | Audio2 output - | 9 |

NOTES:

- 2-wire RS485 is available on pins 2 and 11
- Data channel 1 RS232 output is available on pin 2 when link LK6 has pins 1 and 2 connected
- Data channel 2 RS232 output is available on pin 12 when link LK4 has pins 1 and 2 connected

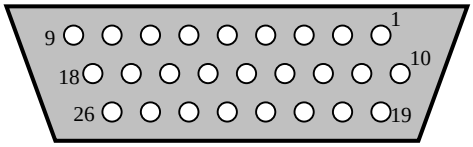



FIGURE 2: DB26 FEMALE HIGH DENSITY CONNECTOR

**RS485 2-Wire** half duplex is used to connect several devices to the same bus when only one unit transmits data at a time. All units are normally in high impedance receive mode waiting for data. When transmission of data is requested, the device waits for a protocol specific turn-around time delay before transmitting after which it returns to receive mode.

**RS485 4-Wire** full duplex is used for master/slave arrangement. Devices are polled and respond faster with no turn-around time delay required between request/response. The receiver is always enabled allowing the devices to receive data even while responding to a request.

**Note:** If a link doesn't seem to be working correctly, try swapping the polarity of the data lines on both ends. Some devices are marked opposite the RS485 standard.

# 2 INSTALLATION AND OPERATION

## 2.1 INTRODUCTION

This section outlines the methods required to install and operate the OSD840T and OSD840R 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 OSD840 is a **Class 1 LED product**. Wavelength of 850nm and <-8dBm power output. | The singlemode and WDM versions of the OSD840 are **Class 3A laser products.** Wavelength of 1310nm and <+5dBm power output or wavelength of 1550nm and <+7dBm power output. |
|  |   |

**PRECAUTIONS**

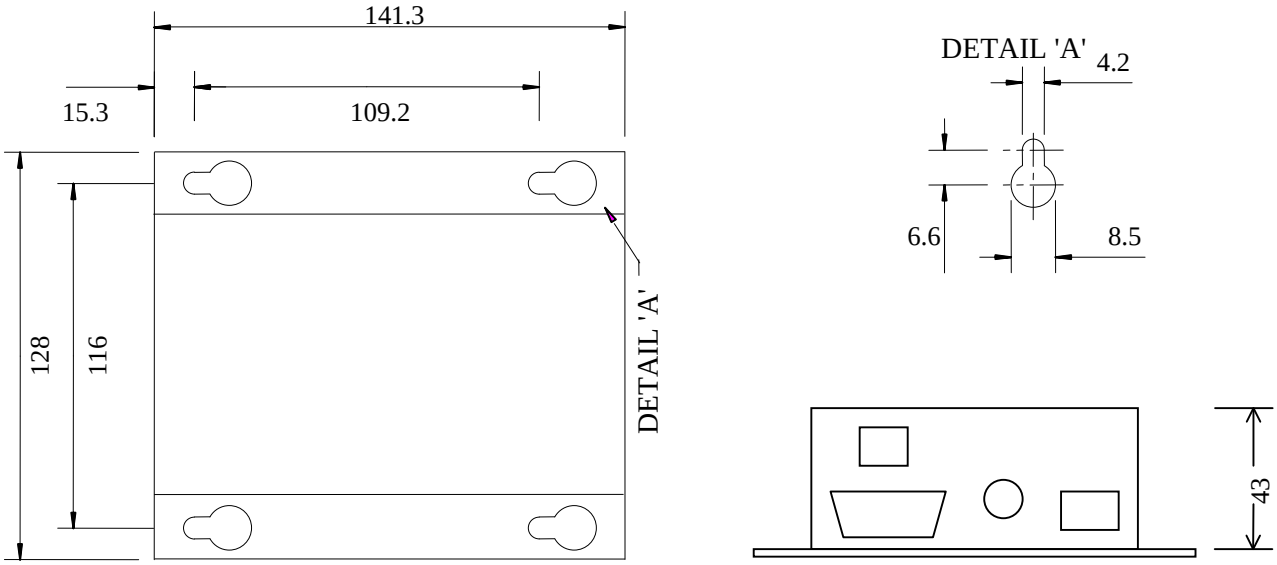
- ▲ All service personnel should be provided training as to the hazards of direct viewing of laser radiation and of the precautionary measures during servicing of equipment
- ▲ Areas where laser products are installed should be restricted in access to trained service personnel only and appropriate warning 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

2.2.2 PACKAGING

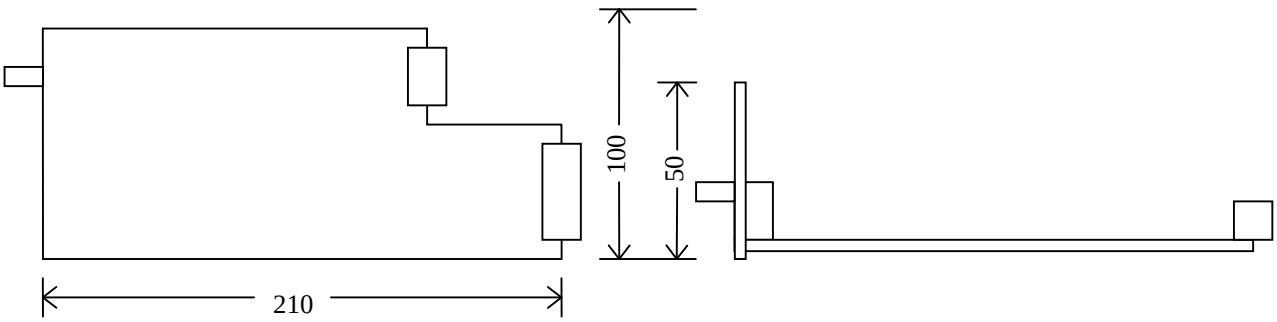
The OSD840TC and OSD840RC are designed to be mounted on an even surface and to be secured by means of M4 or smaller screws.

The OSD840T and OSD840R card versions are designed to be inserted into a chassis and secured by means of captivated screws.

FIGURE 3(a) provides an outer case drawing and mounting dimensions of the OSD840 case version. FIGURE 3(b) provides a drawing and dimensions of the OSD840 card version




**(a)**




**(b)**

FIGURE 3: OSD840 CASE MOUNTING DIMENTIONS

### 2.2.3 POWER SUPPLY CONNECTIONS

The OSD840 requires external DC power. The voltage range of the OSD840 is +12V to +24V. This is connected to the power socket located at the back of the case. DC power should be connected as indicated in Table 4.

DC power in the OSD840 card version is connected via a DB9 connector. Power is supplied by the chassis and should be fixed into the OSD370 chassis using the captivated screws. The card can be plugged in or out of the OSD370 chassis with power on or off.

TABLE 4: POWER CONNECTION

| External Power Pin | Specification |
|---|---|
| Pin 1 | 12V-24V DC |
| Pin 2 | Ground |

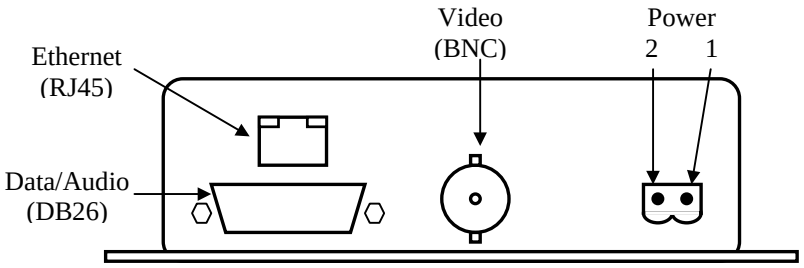



FIGURE 4: OSD840TC AND OSD840RC POWER SUPPLY CONNECTIONS

### 2.2.4 OTHER CONNECTIONS

The video-input signal (e.g. from camera) is connected to the video input BNC connector on the OSD840T. The video output signal (e.g. to monitor) is connected from the video output BNC connector on the OSD840R.

All Data, Audio and Relay signals are connected to the DB26 connector as set out in Table 3.

The 10/100 Base-T Ethernet signals are connected to the RJ45 connector on the rear of the unit. Figure 7 shows pin out configuration for the RJ45 connector.

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 LINK SETTINGS

Link settings are shown in Table 5, and can be configured to suit user requirements. Link settings are factory preset as per requirements. **Only Optical Systems Design or its nominated authorized representative should change internal link settings if required.**

Both the OSD840T and the OSD840R have 7 user configurable links labeled as LK1-LK7 on the PCB. Table 5 below lists the links and settings. Links labeled LK8-LK12 are factory set. Do not touch. Permanent damage may occur and/or void warranty.

TABLE 5: OSD840T AND OSD840R LINKS CONFIGURATION

| LK | No. of Pins | FUNCTION | SETTING |
|---|---|---|---|
| 1 | 2 | 600R termination audio channel 1 | ON/OFF |
| 2 | 2 | 600R termination audio channel 2 | ON/OFF |
| 3 | 3 | Sets RS232 at output1 to normal phasing | 1,2 |
| | 3 | Sets RS232 at output1 to reversed phasing | 2,3 |
| 4 | 3 | Sets RS232 at output2 to normal phasing | 1,2 |
| | 3 | Sets RS232 at output2 to reversed phasing | 2,3 |
| 5 | 3 | Sets RS232 at RS232 O/P to normal phasing | 1,2 |
| | 3 | Sets RS232 at RS232 O/P to reversed phasing | 2,3 |
| 6 | 3 | Links RS232 channel 1 to output 1+ | 1,2 |
| | 3 | Links RS422 channel 1 to output 1+ | 2,3 |
| 7 | 3 | Links RS232 channel 2 to output 2+ | 1,2 |
| | 3 | Links RS422 channel 2 to output 2+ | 2,3 |

NOTES:

- Audio Channel 2 is only active when there is no intercom phone connected to the RJ11 connector.
- “Normal phasing” refers to RS232 signal being passed through the link with the same phase at the output as at the input.
- “Reverse phasing” refers to the output phase being opposite to that of the input. This is useful in converting from RS422 at the input of the link to RS232 at the output.

## 2.3 OPERATION

### 2.3.1 OSD840T OPERATION

When using the OSD840T for the first time, check that the unit is 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 (OSD840C) 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.

If RS485 data is required set the RS422/485 Mode switch to the “On” position, i.e. down (which is the 1st switch of the 4way DIPswitch. It is located on the Front Panel of Card Version and on the front of the box in Case Version). Then toggle switches 2, 3 and 4 to set the RS485 Turnaround Delay to the value appropriate to your system. If you are not sure of the correct value, leave all Turnaround Delay switches “Off”, i.e. up. Refer to Table 6 for delay selection. As described in Table 3, RS485 is available on Pins 2 (RS485+) and 11 (RS485-). If RS485 is not required, keep all four switches in the “Off” position, i.e. up.

All ‘two wire’ RS485 devices are by default in receive mode, and only change to transmit mode for data transmission. All RS485 protocols use a transmit delay to ensure successful transmissions to the ends of the network. The delay is data rate and protocol dependent.

If RS485 is not required, keep all four switches in the “Off” position, i.e. up.

To connect a video signal, connect a BNC terminated coaxial cable from the camera to the unit. If the camera is operational, the "Video Present" indicator should change from Red to Green.

Finally, plug in the optical connectors of the optical cable. If the remote OSD840R is connected, the "Data Link" LED will change from Red to Green.

Plug the digital signal source and/or audio signal into the 26-pin D connector (DB26) on the rear of the module.

Ensure that the correct signals are connected to the correct pins of Audio/Data Input/Output connector as specified in Table 3.

TABLE 6: OSD840T/R RS-485 TIMING DELAYS

| **SWITCH COMBINATIONS** | | | | **FUNCTION** | **DELAY** |
|---|---|---|---|---|---|
| **1** | **2** | **3** | **4** | | **(± 1%)** |
| 0 | 0 | 0 | 0 | RS-422 | N/A |
| | | | | | |
| 1 | 1 | 1 | 1 | RS-485 | 30us |
| 1 | 0 | 1 | 1 | RS-485 | 100us |
| 1 | 1 | 0 | 1 | RS-485 | 300us |
| 1 | 0 | 0 | 1 | RS-485 | 1ms |
| 1 | 1 | 1 | 0 | RS-485 | 3ms |
| 1 | 0 | 1 | 0 | RS-485 | 10ms |
| 1 | 1 | 0 | 0 | RS-485 | 30ms |
| 1 | 0 | 0 | 0 | RS-485 | 100ms |

NOTE: Data Control Switch Settings for RS485 (0 = off, 1 = on)

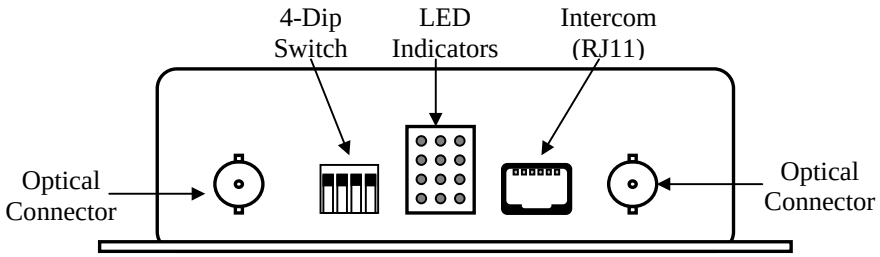



FIGURE 5: OSD840TC AND OSD840RC SIDE VIEW

### 2.3.2 OSD840R OPERATION

When using an OSD840R for the first time check that the unit is in good condition with no visible damage.

If a card version (OSD840R) is used, insert it in an appropriate slot on the OSD chassis and check that the indicators illuminate accordingly. If a module version (OSD840RC) is used, connect the unit to an appropriate power source and check that the indicators illuminate accordingly.

The “Laser OK” indicator LED should be green in both Card and Case Versions, if the LED is red there may be a problem with the laser. Disconnect power and have the Laser checked as soon as possible.

If RS485 data is required set the RS422/485 Mode switch to the “On” position, i.e. down (which is the 1st switch of the 4way DIP switch. It is located on the Front Panel of Card Version and on the front of the box in the Case Version). Then toggle switches 2, 3 and 4 to set the RS485 Turnaround Delay to the value appropriate to your system. If you are not sure of the correct value, leave all Turnaround Delay switches “Off”, i.e. up. Refer to Table 6 for delay selection. As described in Table 3, RS485 is available on Pins 2 (RS485+) and 11 (RS485-). If RS485 is not required, keep all four switches in the “Off” position, i.e. up.

All ‘two wire’ RS485 devices are by default in receive mode, and only change to transmit mode for data transmission. All RS485 protocols use a transmit delay to ensure successful transmissions to the ends of the network. The delay is data rate and protocol dependent.

Connect a BNC terminated coaxial cable between the BNC socket on the rear of the module and the video monitor or switcher.

Connect the optical cable: if adequate optical power is received and signal is locked the “Data Link" 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’.

Plug the digital signal source and/or audio signal into the 26-pin D connector (DB26) on the rear of the module. Ensure that the correct signals are connected to the correct pins of Audio/Data Input/Output connector as specified in Table 3.

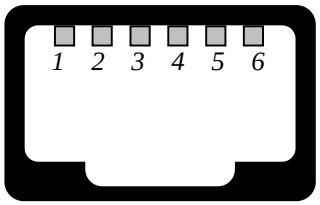
### 2.3.3 INTERCOM FUNCTION

This section applies to both the OSD840T and OSD840R.

The Intercom makes use of Audio Channel 2. The Intercom is connected via the RJ11 6-pin socket on the front panel or case. When a 2-wire phone handset is connected to the RJ11 connector, Audio Channel 2 is automatically reconfigured to the Intercom function. The phones may be ‘hot plugged’.

While the Intercom is enabled Audio Channel 2 cannot be used for any other purpose. When a handset is connected at one end of the link only, it may be used to *page* the opposite end of the link if an appropriate amplifier and speaker are connected.

When a handset is connected to each of the OSD840T and OSD840R, a conventional Intercom circuit is established. If one handset is in the "OFF HOOK" state, a tone is emitted from the ‘ON HOOK’ handset at the opposite end of the link, provided they were both ‘ON HOOK’ to start with. When both handsets are ‘OFF HOOK’, the phone link may be used. When one phone handset is returned to the ‘ON HOOK’ state, it does not cause a tone at the opposite end, and may again be taken ‘OFF HOOK’ to re-establish the connection. Both phone handsets must be returned to the ‘ON HOOK’ state for tone signaling to be re-enabled. Pin 5 of RJ11 is connected to an open collector NPN transistor that is turned on when remote end is signaling. Pin 2 of RJ11 is connected to +9V via a 100Ω current limiting resistor. The RJ11 connections can be used to power an external sonalert.




1 – N/C
2 – +9V
3 – Audio
4 – GND
5 – Sonalert
6 – N/C

FIGURE 6: RJ11 PINOUT CONFIGURATION

### 2.3.4 CONTROLS

The OSD840T and OSD420R each has a 4-way DIP switch (located at the front panel for Card Version and front of box for Case Version – see Figure 6) which is used to select RS422 or RS485 mode, with different RS485 Turnaround Delay settings from 30uSec to 80mSec. See Table 6.

There are 7 link settings available for setting up desired output configurations for AUDIO, RS232 & RS422 outputs. Refer to section 2.2.5.

### 2.3.5 ETHERNET CONNECTION

The OSD840 also includes a 10/100 Base-T Ethernet connection via the RJ45 connector. Figure 7 shows the pin-out configuration for the RJ45 connector located on the rear of the OSD840 unit (see Figure 4). The green LED indicates that an Ethernet link has been established. The amber LED indicates the link speed. If the LED is not illuminated, the link speed is 10Mbps. If the amber LED is illuminated, the link speed is 100Mbps.

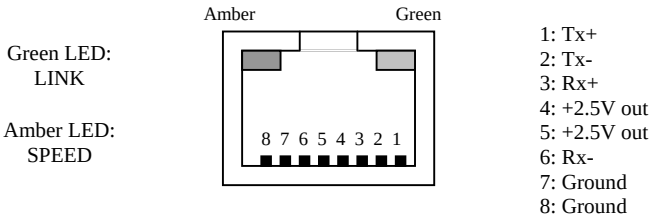



FIGURE 7: 10/100 BASE-T ETHERNET RJ45 CONNECTION

### 2.3.6 OSD840T AND OSD840R INDICATORS

The LED indicators are located on the front of the OSD840 unit (see Figure 5). Figure 8 shows the LED orientation, while Table 7 describes the function of each LED indicator.

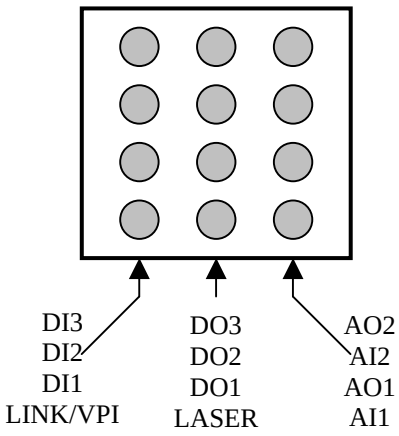



FIGURE 8: OSD840T AND OSD840R LED INDICATORS

TABLE 7: OSD840T AND OSD840R INDICATOR FUNCTION

| INDICATOR | PARAMETER | COLOUR | FUNCTION |
|---|---|---|---|
| DI3 | Data Input Ch 3 | Green | Present |
| | | Red | Not Present |
| DI2 | Data Input Ch 2 | Green | Present |
| | | Red | Not Present |
| DI1 | Data Input Ch 1 | Green | Present |
| | | Red | Not Present |
| VIDEO/LINK | Video Input/LINK | Green | OK |
| | | Red | Fail |
| DO3 | Data Output Ch3 | Green | Present |
| | | Red | Not Present |
| DO2 | Data Output Ch2 | Green | Present |
| | | Red | Not Present |
| DO1 | Data Output Ch1 | Green | Present |
| | | Red | Not Present |
| LASER | Optical Output | Green | OK |
| | | Red | Fail |
| AO2 | Audio Output Ch 2 | Green | Present |
| | | Red | Not Present |
| AI2 | Audio Input Ch 2 | Green | Present |
| | | Red | Not Present |
| AO1 | Audio Output Ch 1 | Green | Present |
| | | Red | Not Present |
| AI1 | Audio Input Ch 1 | Green | Fail Present |
| | | Red | Not Present |

NOTE: “Link” Indicator refers to the received data stream. It is ‘green’ after the optical link is established and the receiver is locked onto the incoming data stream and detected a low Bit Error Rate. It will indicate ‘red’ after the Bit Error Rate reaches an unacceptable level and before the number of bit errors has reduced to a low rate.

# 3 MAINTENANCE

## 3.1 INTRODUCTION

The following section outlines the fault-finding procedure for the OSD840T and OSD840R 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 OSD840T or OSD840R 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 OSD840T and OSD840R.

# 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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