
OPTICAL

SYSTEMS

DESIGN

OPERATOR MANUAL

OSD435

FIBER OPTIC CCTV TRANSMISSION

SYSTEM

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FIBRE OPTIC CCTV TRANSMISSION

SYSTEM

101021 REV 03

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1 TECHNICAL SUMMARY

1.1 BRIEF DESCRIPTION

1.1.1 OVERVIEW

The OSD435 FM fiber optic video, audio and data modem pair, forms a high performance video transmission system capable of providing a two way CCTV or better quality video, duplex audio and duplex data over distances of at least 5km using standard low cost multimode optical cables or as much as 100km using optional lasers.

1.1.2 APPLICATIONS

- ▲ CCTV networks requiring full duplex video, audio and/or data transmission between cameras and control centre
- ▲ Distance learning
- ▲ Transportation communications systems
- ▲ Extremely high quality video conferencing

1.1.3 FEATURES AND BENEFITS

- ▲ Full duplex transmission of
 - One video channel
 - Two audio channels
 - Three data channels
 - One relay contact channel
- ▲ Transmission of alarm and control signals from the camera site.
- ▲ CD quality digital audio.
- ▲ Full duplex 2-wire audio intercom with 100Hz to 5KHz bandwidth and associated on hook/off hook signaling using an industry standard RJ11 connector.
- ▲ Safe transmission in hazardous environments.
- ▲ Operation range of at least 5km on multimode fiber and 50km on singlemode fiber with standard devices and greater than 100km with optional lasers.
- ▲ Video bandwidth of 10MHz.
- ▲ Remote control of Pan, Tilt and Zoom for video surveillance.

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1.2 TYPICAL CONFIGURATION

FIGURE 1 below indicates a typical set-up for an OSD435 pair.

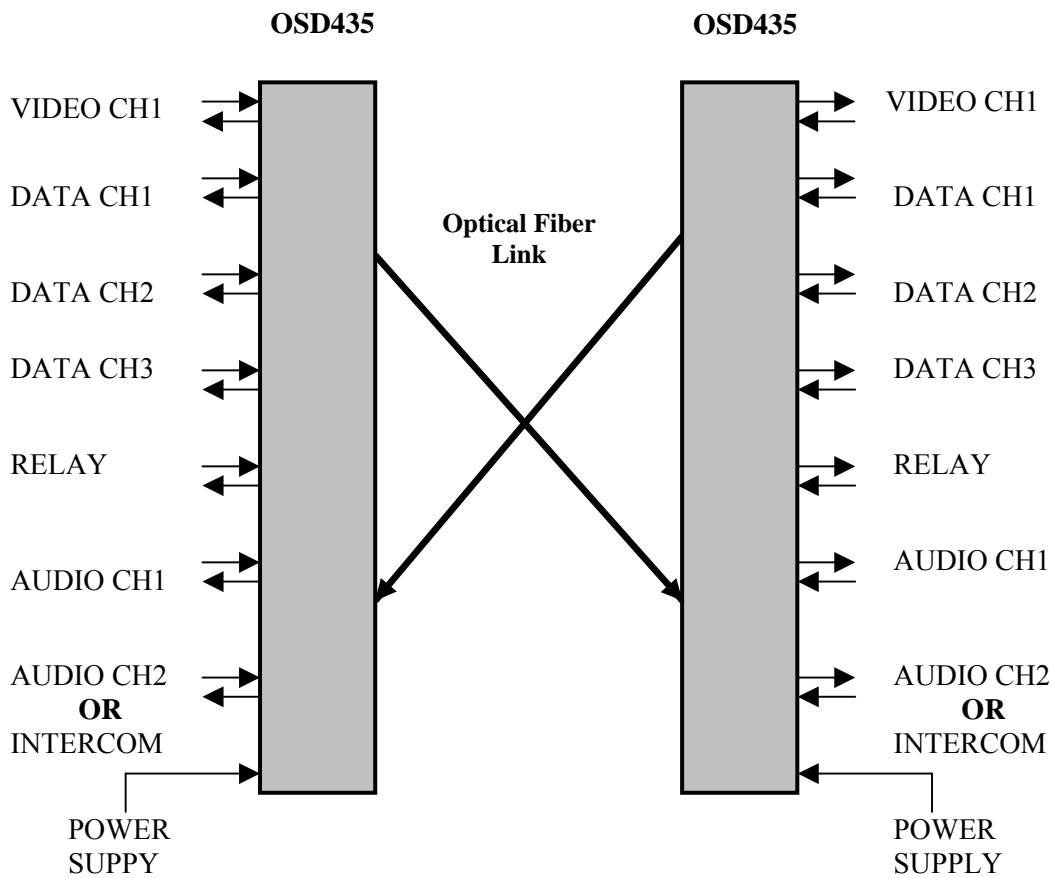


FIGURE 1: TYPICAL CONFIGURATION

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1.3 PRODUCTS AND OPTIONS

There are various options available for the OSD435 as identified in Table 2 below:

TABLE 1: PRODUCTS AND OPTIONS

ITEM	DESCRIPTION
OSD435	FULL DUPLEX VIDEO MODEM WITH 2 DUPLEX STEREO AUDIO AND 4 DUPLEX DATA CHANNELS
ITEM	DESCRIPTION
OPTION C	MODULE VERSION
OPTION L	1300nm OPERATION SINGLEMODE OR MULTIMODE
OPTION LDN	1300nm AND 1550nm LASER (where "N" indicates Laser type)
OPTION W	SINGLE FIBER OPERATION

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1.4 TECHNICAL SPECIFICATIONS

Table 3 below provides Technical Specifications for the OSD435.

TABLE 2: TECHNICAL SPECIFICATIONS

NO	SPECIFICATION	PERFORMANCE
1	Video Input/Output Impedance	75Ω
2	Video Input/Output Levels	1Vpp nominal
3	Video Bandwidth	5Hz to 10MHz (+1,-3dB)
4	Audio Input/Output Impedance	>5KΩ/200Ω
5	Audio Bandwidth	10Hz - 20kHz ±1dB
6	Audio Input & Output Level	200mV nominal, balanced or unbalanced
7	Audio Headroom	15dB
8	Audio Signal to Noise Ratio	>70dB at nominal level
9	Audio Distortion	< 0.1%
10	Data Interface	TTL, RS232, RS422 and RS485 (RS485 only on Ch1) 31KHz Manchester or Biphasic possible in either direction
11	Data Rates	DC to >100Kbps on 3 data channels DC to >100bps on relay channel
12	Video, Audio and Data Connectors	44 pin female subminiature high density D connector; RJ11 for 2-wire intercom
13	Weighted Video Signal to Noise Ratio	>60dB at -25dBm received optical power >50dB at -35dBm received optical power
14	Transmitter Wavelength	850 ± 30nm (1300nm for "L" option)
15	Transmitter Coupled Power	>-15dBm into 62.5/125um fiber >-15dBm into 9/125um fiber (OSD435L version only)
16	Receiver Sensitivity	<-35dBm for 50dB SNR
17	Receiver Saturation	>-12dBm
18	Receiver Operating Wavelength	800 to 900nm (1270 to 1580nm for OSD435L)
19	Optical Connectors	ST standard, others optional
20	Dimensions of Module (mm)	104W x 144D x 25H
21	Weight of Module (kg)	0.6
22	Dimensions of Card (mm)	25W x 208D x 100H
23	Weight of Card (kg)	0.25
24	Power Requirements	+12V to 24V AC or DC @ 300mA
25	Indicators	Laser OK Tx Video Present Rx Data Present Optical Signal OK

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1.5 PIN ASSIGNMENTS

Pin assignments for the “Audio/Data Input/Output” DB44 connector (Figure 2) is shown in Table 4 below.

TABLE 3: PIN ASSIGNMENT

FUNCTION	PIN	FUNCTION	PIN
Video input	16	Data 1 input +	20
Video input ground	1	Data 1 input -	35
Video output	30	Data 1 output +	6
Video output ground	15	Data 1 output -	21
Audio 1 input +	40	Data 2 input +	36
Audio 1 input -	11	Data 2 input -	7
Audio 1 output +	26	Data 2 output +	22
Audio 1 output -	41	Data 2 output -	37
Audio 2 input +	12	RS232 input	8
Audio 2 input -	27	RS232 output	23
Audio 2 output +	42	Relay input	38
Audio 2 output -	13	Relay N.O. output	9
Audio ground	2,14	Relay N.C. output	24
Audio ground	17,25	Relay common output	39
Audio ground	28,29,31	Digital ground	5,10
Audio ground	32,43,44		

NOTES:

2-wire RS485 is available on pins 6 and 21

Data channel 1 RS232 output is available on pin 6 when link LK6 has pins 1 and 2 connected

Data channel 2 RS232 output is available on pin 22 when link LK4 has pins 1 and 2 connected

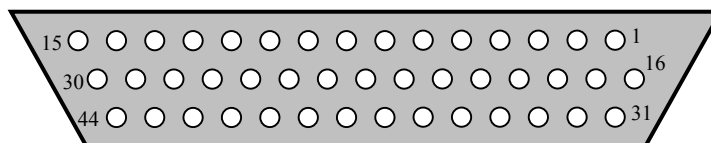


FIGURE 2: DB44 FEMALE HIGH DENSITY CONNECTOR

2 INSTALLATION AND OPERATION

2.1 INTRODUCTION

This section outlines the methods required to install and operate the OSD435 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

Class 1

The multimode version of the OSD435 is a **Class 1 LED product**. Wavelength of 850nm and $<-8\text{dBm}$ power output.

CLASS 1 LED PRODUCT

Class 3A

The singlemode and WDM versions of the OSD435 are **Class 3A laser products**. Wavelength of 1310nm and $<+5\text{dBm}$ power output or wavelength of 1550nm and $<+7\text{dBm}$ power output.



2.2.2 PACKAGING

The OSD435C is designed to be mounted on an even surface and to be secured by means of M4 or smaller screws.

FIGURE 3 provides an outer case drawing and mounting dimensions of the OSD435 case version.

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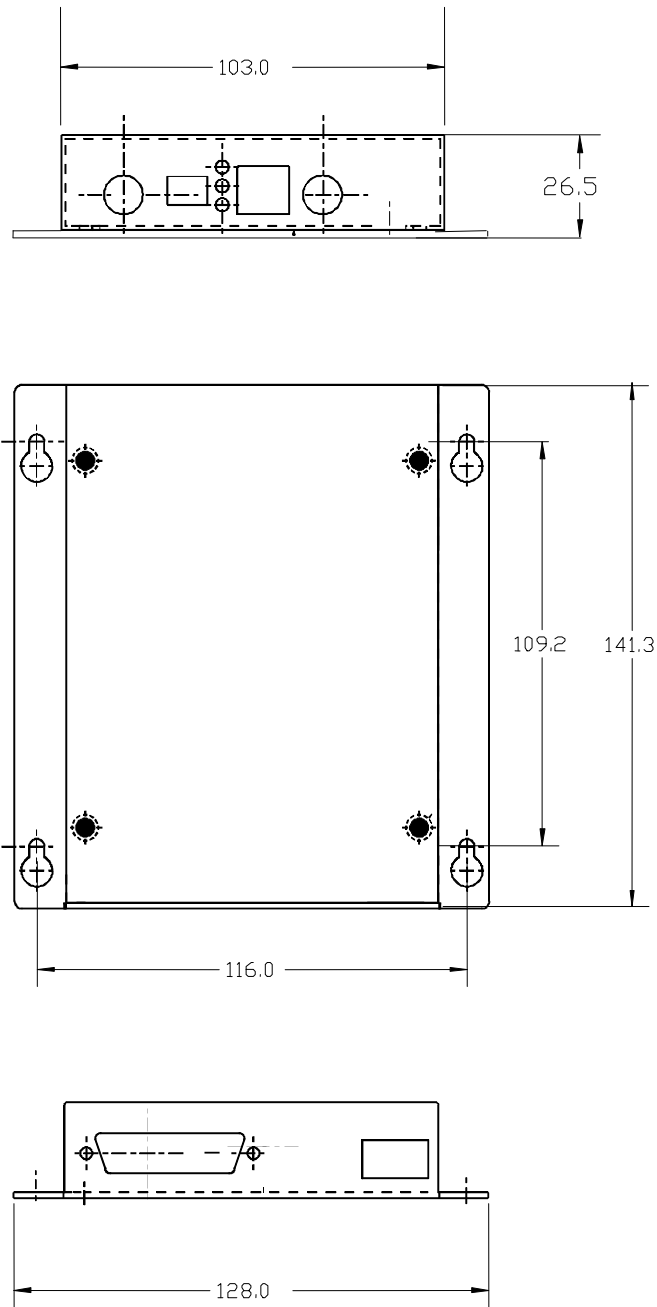


FIGURE 3: OSD435 CASE MOUNTING DIMENTIONS

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2.2.3 POWER SUPPLY CONNECTIONS

The OSD435 requires external DC or AC power. The voltage range of the OSD435 is +12V to +24V. This is connected to the power socket located at the back of the case. DC or AC power should be connected as indicated in Table 5.

DC power in the OSD435 card version is connected via a DB9 connector. Power is supplied by the chassis.

TABLE 4: DC OR AC POWER CONNECTION

External Power Pin	Specification
Pin 1	15V-24 DC or AC
Pin 2	12V-15V DC or AC
Pin 3	Ground

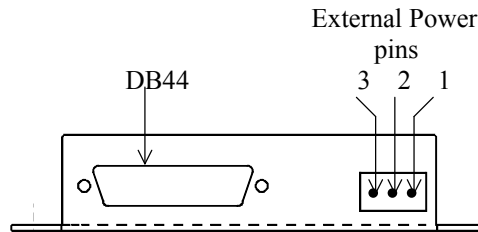


FIGURE 4: OSD435 POWER SUPPLY CONNECTION

NOTE:

1. The card version of the OSD435 should be fixed into the OSD370 chassis using the captivated screws.
2. It can be plugged in or out of the OSD370 chassis with power on or off.

2.2.4 OTHER CONNECTIONS

The video-input signal (eg. from camera) is connected to the DB44 video input connection on the OSD435. The video output signal (eg. to monitor) is connected from the DB44 video output connection on the OSD435. See Table 4 for pin-out configuration.

All Data, Audio and Relay signals are connected to the DB44 connector as set out in Table 4.

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.

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2.2.5 LINK SETTINGS

Link settings are shown in TABLE 6, and can be configured to suit user requirements. To gain access to the Jumper Links in the Case Version, the case must be opened using the following method. *Note: Observe ESD precautions when removing the case.* Disconnect power connection. Remove BNC connector nut and washer, D-Type connector female screw locks and Base Plate countersink screws. Remove the base plate then slide the board out of the cover.

Extra care must be taken not to damage internal fiber pigtail with WDM Units and Fiber pigtail devices. The board must be removed gently to gain access to internal WDM connector. Unscrew or unplug this connection, then remove board. Set the Jumper Links to the appropriate links as set out in TABLE 6.

To re-assemble, reverse the above process, taking care not to damage internal optical fibers.

The OSD435 have 7 user configurable links labeled as LK1-LK7 on the PCB. Table 6 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: OSD435 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	3	Sets RS232 at output1 to reversed phasing	2,3
4	3	Sets RS232 at output2 to normal phasing	1,2
4	3	Sets RS232 at output2 to reversed phasing	2,3
5	3	Sets RS232 at RS232 O/P to normal phasing	1,2
5	3	Sets RS232 at RS232 O/P to reversed phasing	2,3
6	3	Links RS232 channel 1 to output 1+	1,2
6	3	Links RS422 channel 1 to output 1+	2,3
7	3	Links RS232 channel 2 to output 2+	1,2
7	3	Links RS422 channel 2 to output 2+	2,3
8	3		“For Factory Use Only - Do not Touch”
9	3		
10	2		
11	2		
12	2		

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.

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2.3 OPERATION

Figure 5 and Figure 6 are block diagram representations of the OSD435.

When using the OSD435 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 (OSD435C) 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, ie 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 switch 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", ie up. Refer to TABLE 7 for delay selection.

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, ie up.

To connect a video signal, connect a terminated coaxial cable from the camera to the 44-pin D connector (DB44). 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 OSD435 is connected, the "Data Link" LED will change from red to green.

Plug the digital signal source and/or audio signal into the 44-pin D connector (DB44) 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 4.

TABLE 6: OSD435 RS-485 TIMING DELAYS

SWITCH COMBINATIONS				FUNCTION	DELAY
1	2	3	4		
OFF	OFF	OFF	OFF	RS-422	N/A
ON	ON	ON	ON	RS-485	30uS
ON	OFF	ON	ON	RS-485	100uS
ON	ON	OFF	ON	RS-485	300uS
ON	OFF	OFF	ON	RS-485	1mS
ON	ON	ON	OFF	RS-485	3mS
ON	OFF	ON	OFF	RS-485	10mS
ON	ON	OFF	OFF	RS-485	30mS
ON	OFF	OFF	OFF	RS-485	80mS

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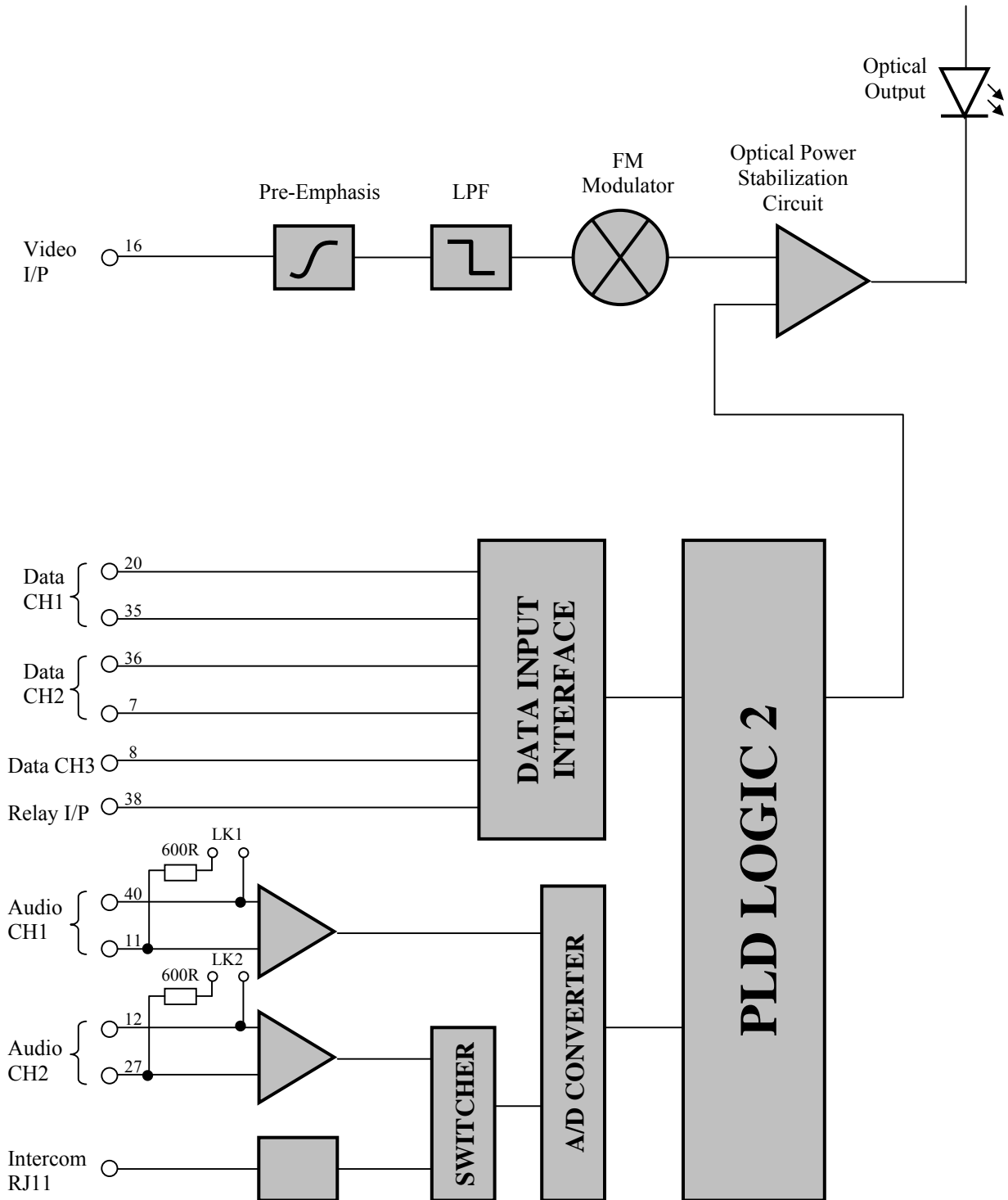


FIGURE 5: OSD435 TRANSMITTER SECTION BLOCK DIAGRAM

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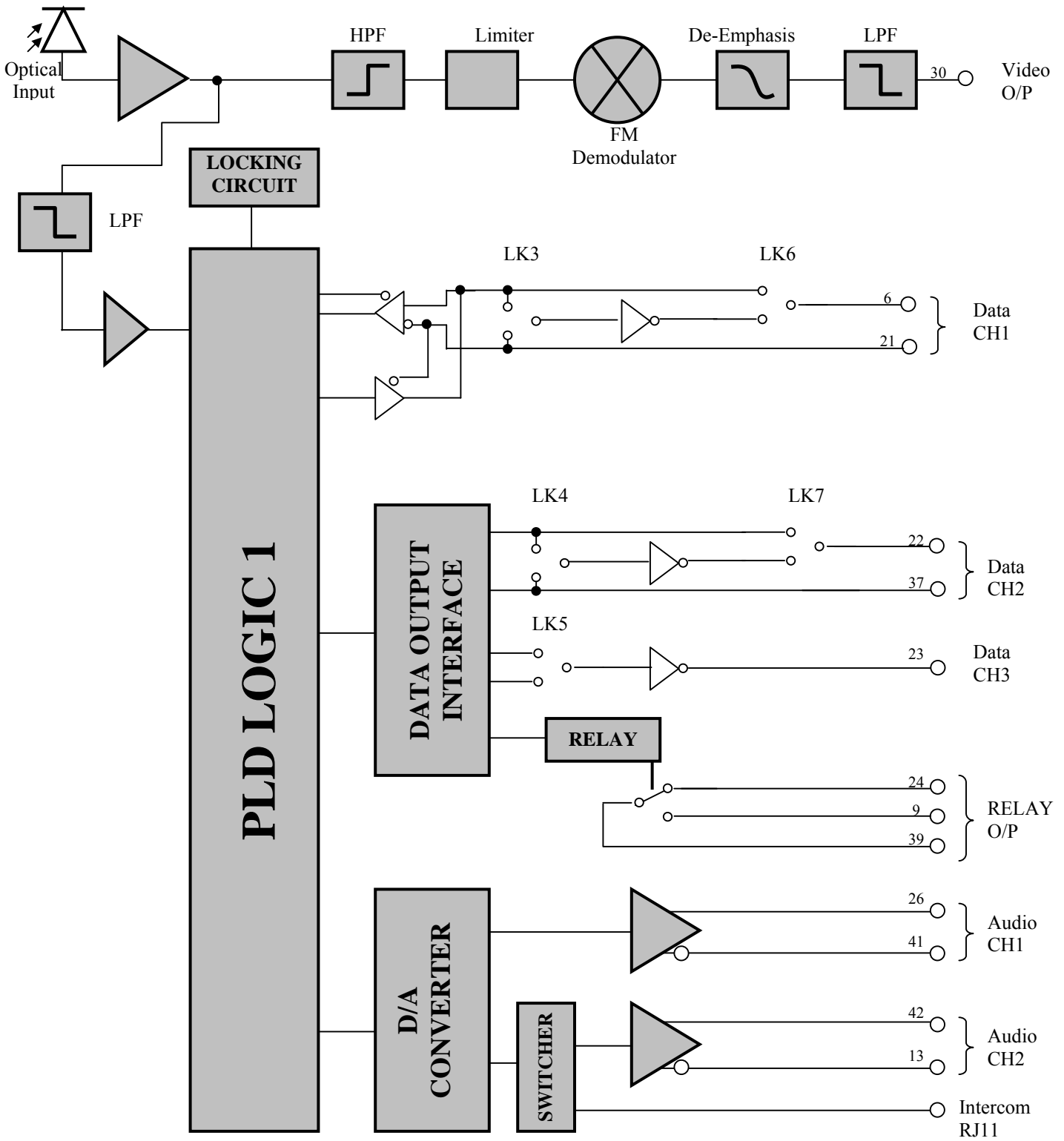


FIGURE 6: OSD435 RECEIVER SECTION BLOCK DIAGRAM

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2.3.1 INTERCOM

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 both ends of the OSD435 pair, 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 100 Ω current limiting resistor. The RJ11 connections can be used to power an external sonalert.

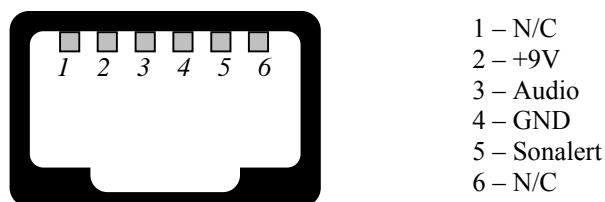


FIGURE 7: RJ11 PINOUT CONFIGURATION

2.3.2 CONTROLS

The OSD435 have a 4-way DIP switch located at the front panel for Card Version and front of box for Case Version, which is used to select RS422 or RS485 mode, with different RS485 Turnaround Delay settings from 30uSec to 80mSec. See TABLE 7.

There are 7-User link settings available for setting up desired output configurations for AUDIO, RS232 & RS422 outputs. See TABLE 6.

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2.3.3 INDICATORS

TABLE 7: OSD435 INDICATORS

INDICATOR	COLOUR	FUNCTION
Laser OK	Green Red	OK Fail
Rx Video Present	Green Red	OK Fail
Tx Video Present	Green Red	OK Fail
Data Link OK	Green Red	OK Fail

NOTE: "Data Link OK" 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 OSD435 modems. Please take note of the following:

- σ Personnel without appropriate training should not attempt any maintenance except that outlined below.
- σ 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.
- σ 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:

- σ Check that the correct power source is connected to the power socket.
- σ Check that the data signals are connected to the modem correctly and that the distant OSD435 modem has been terminated correctly to any external equipment.
- σ Inspect the optical connectors for any contamination and clean using isopropyl alcohol and a lint free tissue if any contamination is detected.
- σ Check that any external termination resistors are connected if the system configuration requires them.

3.3 ROUTINE MAINTENANCE

- σ There is no routine maintenance required with the OSD435.

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.