OPTICAL SYSTEMS DESIGN

OPERATOR MANUAL

OSD430AT AND OSD430AR

FIBER OPTIC CCTV TRANSMISSION SYSTEM

OSD430AT AND OSD430AR

FIBRE OPTIC CCTV TRANSMISSION SYSTEM

TABLE 1: REVISION STATUS

VERSION	DATE
04	19 December 2007

INDEX 1

INDEX OF TABLES AND FIGURES

1 TECHNICAL SUMMARY

1.1 BRIEF DESCRIPTION

1.1.1 OVERVIEW

The OSD430AT fiber optic video transmitter and the OSD430AR fiber optic video receiver together form a high performance video transmission system capable of providing one 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 singlemode cables.

1.1.2 APPLICATIONS

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

1.1.3 FEATURES AND BENEFITS

- One way optic transmission of video plus full duplex transmission of
  - Two audio channels
  - Three data channels
  - One relay contact channel
- CD quality digital audio.
- Safe transmission in hazardous environments.
- 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 using an industry standard RJ11 connector.
- Operation range of at least 5km on multimode fiber and 50km on singlemode fiber with standard devices and greater than 100km with optional laser device.

1.2 TYPICAL CONFIGURATION

FIGURE 1 below indicates a typical set-up for an OSD430 pair.

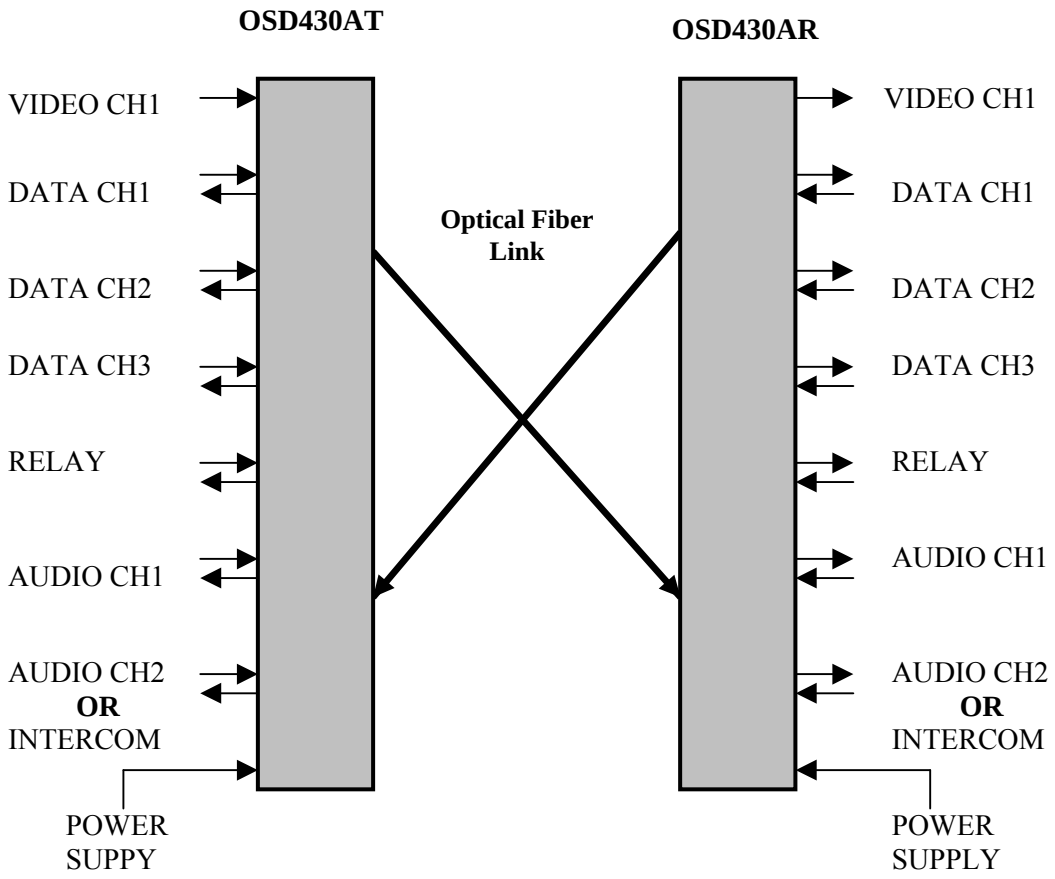


FIGURE 1: TYPICAL CONFIGURATION

1.3 PRODUCTS AND OPTIONS

There are various options available for the OSD430 as identified in Table 2 below:

TABLE 2: PRODUCTS AND OPTIONS

ITEM	DESCRIPTION
OSD430AT	VIDEO TRANSMITTER WITH 2 DUPLEX STEREO AUDIO AND 4 DUPLEX DATA CHANNELS
OSD430AR	VIDEO RECEIVER WITH 2 DUPLEX STEREO AUDIO AND 4 DUPLEX DATA CHANNELS
OSD430BT	VIDEO TRANSMITTER WITH 2 DUPLEX AUDIO AND 4 DUPLEX DATA TO CAMERA
OSD430BR	VIDEO RECEIVER WITH 2 DUPLEX AUDIO AND 4 DUPLEX DATA TO CAMERA
ITEM	**DESCRIPTION**
OPTION C	MODULE VERSION
OPTION L	1300nm SINGLEMODE OPTION FOR THE ABOVE
OPTION LDN	1300nm AND 1550nm LASER (where “N” indicates Laser type)
OPTION W	SINGLE FIBER OPERATION

1.4 TECHNICAL SPECIFICATIONS

Table 3 below provides Technical Specifications for the OSD430AT and OSD430AR.

TABLE 3: TECHNICAL SPECIFICATIONS

NO	SPECIFICATION	PERFORMANCE
1	Video Input/Output Impedance	75Ω
2	Video Input/Output Levels	1Vpp nominal
3	Video Connector	BNC
4	Video Bandwidth	5Hz to 10MHz (+1,-3dB)
5	Audio Input/Output Impedance	>5KΩ/200Ω
6	Audio Bandwidth	10Hz - 20kHz ±1dB
7	Audio Input & Output Level	200mV nominal, balanced or unbalanced
8	Audio Headroom	15dB
9	Audio Signal to Noise Ratio	>70dB at nominal level.
10	Audio Distortion	< 0.1%
11	Data Interface	TTL, RS232, RS422 and RS485 (RS485 only on Ch1) 31KHz Manchester or Biphase possible in either direction
12	Data Rates	DC to >100Kbps on 3 data channels DC to >100bps on relay channel
13	Audio and Data Connectors	26 pin female subminiature high density D connector; RJ11 for 2-wire intercom
14	Weighted Video Signal to Noise Ratio	>60dB at -25dBm received optical power >50dB at -35dBm received optical power
15	Transmitter Wavelength	850 ± 30nm (1300nm for "L" option)
16	OSD430T Transmitter Coupled Power	>-15dBm into 62.5/125µm fiber >-15dBm into 9/125µm fiber (OSD430TL version only)
17	OSD430R Transmitter Coupled Power	>-20dBm into 62.5/125µm fiber >-20dBm into 9/125µm fiber (OSD430RL version only)
18	Receiver Sensitivity for audio SNR and 1 x 10^{-9} BER	<-40dBm
19	OSD430R Receiver Saturation	>-12dBm
20	Receiver Operating Wavelength	800 to 900nm (1270 to 1580nm for OSD430TL and OSD430RL)
21	Optical Connectors	ST standard, others optional
22	Dimensions of Module (mm)	104W x 144D x 25H
23	Weight of Module (kg)	0.6
24	Dimensions of Card (mm)	25W x 208D x 100H
25	Weight of Card (kg)	0.25
26	Power Requirements	+12V to 24V AC or DC @ 350mA
27	Indicators	Laser OK Tx Video Present (OSD430T) Rx Data Present Optical Signal OK Laser OK Rx Video Present (OSD430R) Rx Data Present Optical Signal OK

1.5 PIN ASSIGNMENTS

Pin assignments for the "Audio/Data Input/Output" DB26 connector (Figure 2) is shown in Table 4 below.

TABLE 4: 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

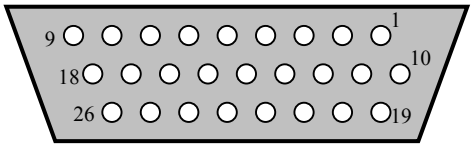


FIGURE 2: DB26 FEMALE HIGH DENSITY CONNECTOR

2 INSTALLATION AND OPERATION

2.1 INTRODUCTION

This section outlines the methods required to install and operate the OSD430AT and OSD430AR 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 OSD430 is a **Class 1 LED product**. Wavelength of 850nm and <-8dBm power output.

CLASS 1 LED PRODUCT

Class 3A

The singlemode and WDM versions of the OSD430 are **Class 3A laser products.** Wavelength of 1310nm and <+5dBm power output or wavelength of 1550nm and <+7dBm power output.

2.2.2 PACKAGING

The OSD430ATC and OSD430ARC are 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 OSD430 case version.

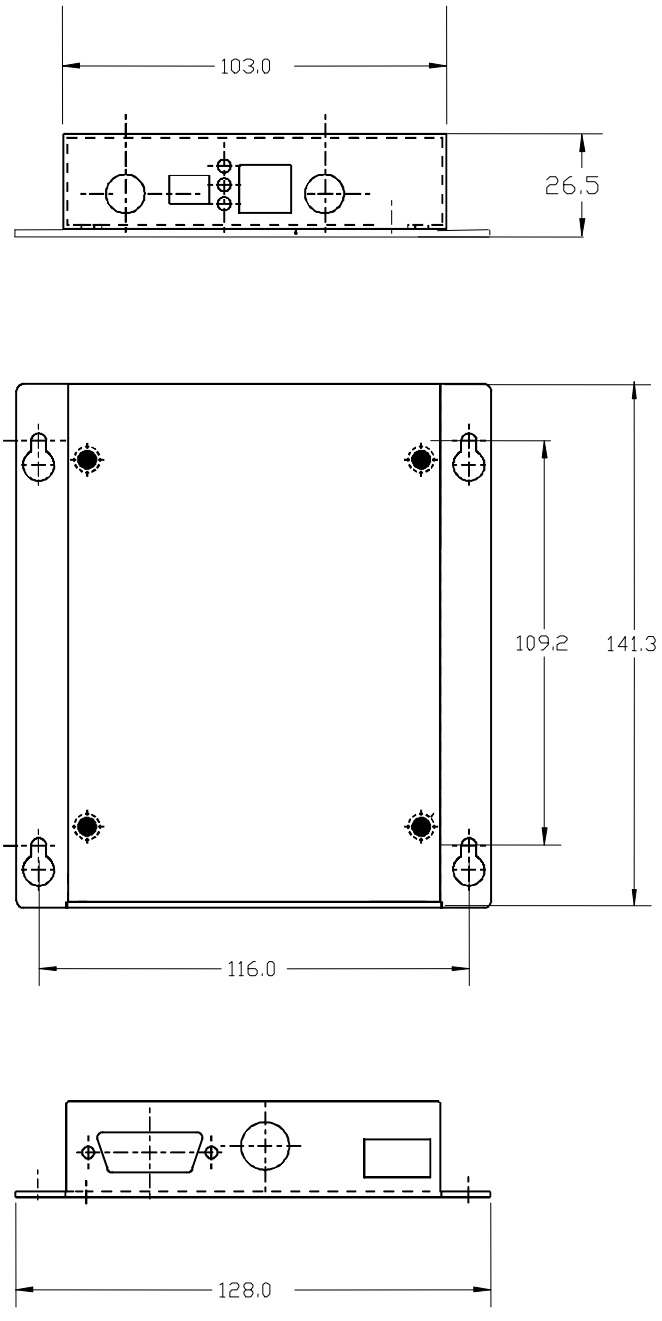


FIGURE 3: OSD430 CASE MOUNTING DIMENTIONS

2.2.3 POWER SUPPLY CONNECTIONS

The OSD430 requires external DC or AC power. The voltage range of the OSD430 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 OSD430 card version is connected via a DB9 connector. Power is supplied by the chassis.

TABLE 5: 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

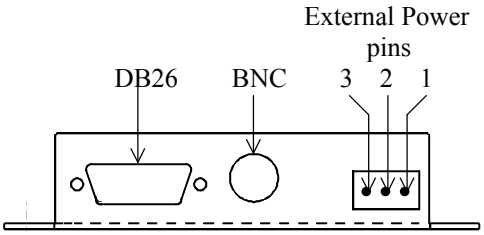


FIGURE 4: OSD430 POWER SUPPLY CONNECTION

NOTE:

1. The card version of the OSD430AT and OSD430AR should be fixed into the OSD370 chassis using the captivated screws

2. Either card 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 video input BNC connector on the OSD430AT. The video output signal (eg. to monitor) is connected from the video output BNC connector on the OSD430AR.

All Data, Audio and Relay signals are connected to the DB26 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.

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.

Both the OSD430AT and the OSD430AR 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 6: OSD430AT AND OSD430AR 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.

2.3 OPERATION

2.3.1 OSD430AT

Figure 5 and Figure 6 are block diagram representations of the OSD430AT.

When using the OSD430AT 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 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 OSD430AR 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 4.

TABLE 7: OSD430AT/R 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

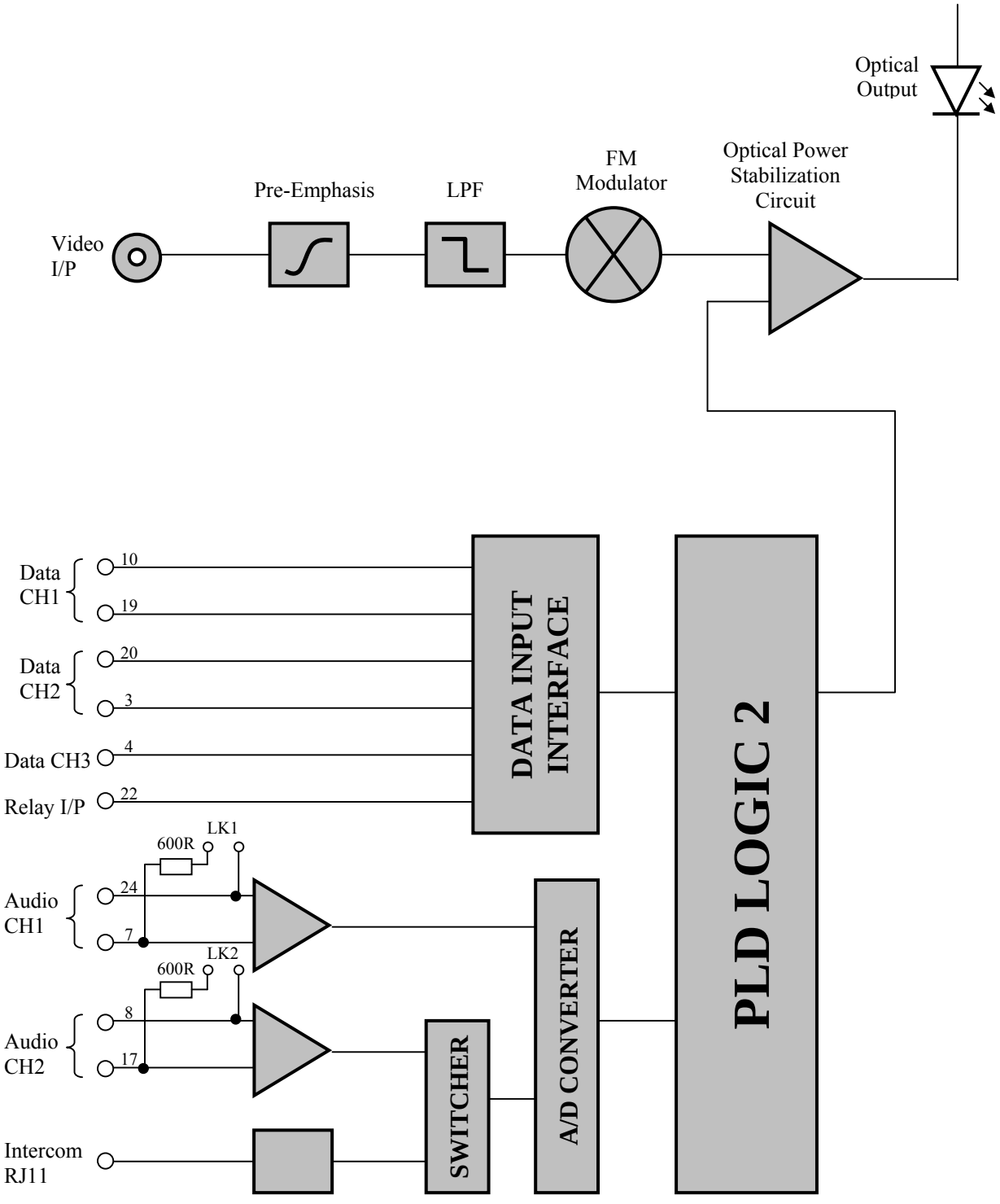


FIGURE 5: OSD430AT TRANSMITTER SECTION BLOCK DIAGRAM

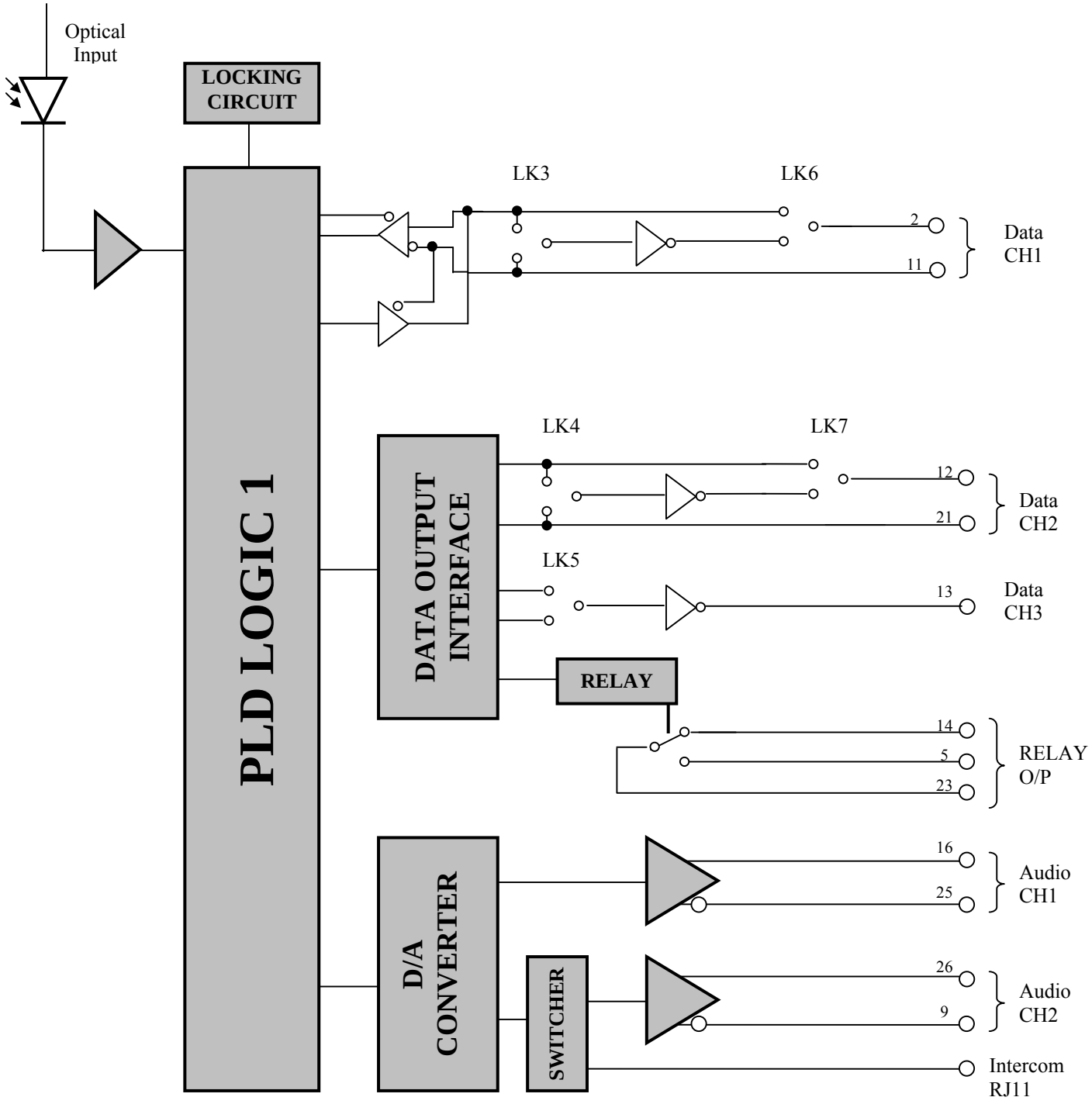


FIGURE 6: OSD430AT RECEIVER SECTION BLOCK DIAGRAM

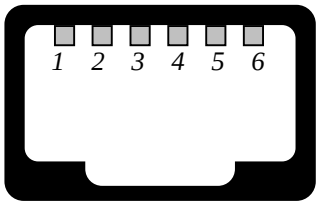
2.3.2 OSD430T INTERCOM

This section applies to both the OSD430AT and OSD430AR.

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 OSD430AT and OSD430AR, 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 signalling 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 7: RJ11 PINOUT CONFIGURATION

2.3.3 OSD430AR

Figure 8 and Figure 9 are block diagram representations of the OSD430AR.

When using an OSD430AR for the first time check that the unit is in good condition with no visible damage.

If a card version (OSD430AR) is used, insert it in an appropriate slot on the OSD chassis and check that the indicators illuminate accordingly. If a module version (OSD430ARC) 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 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", i.e. up.

Refer to TABLE 7 for delay selection. As described in Table 4, 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 4.

2.3.4 OSD430R INTERCOM

The OSD430AR Intercom function description and operation is identical to the OSD430AT. Refer to page 17 in the OSD430AT Intercom section for more information.

2.3.5 CONTROLS

The OSD430AT and OSD420AR each has 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.

2.3.6 INDICATORS

OSD430AT INDICATORS

TABLE 8: OSD430AT INDICATORS

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

OSD430AR INDICATORS

TABLE 9: OSD430AR INDICATORS

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

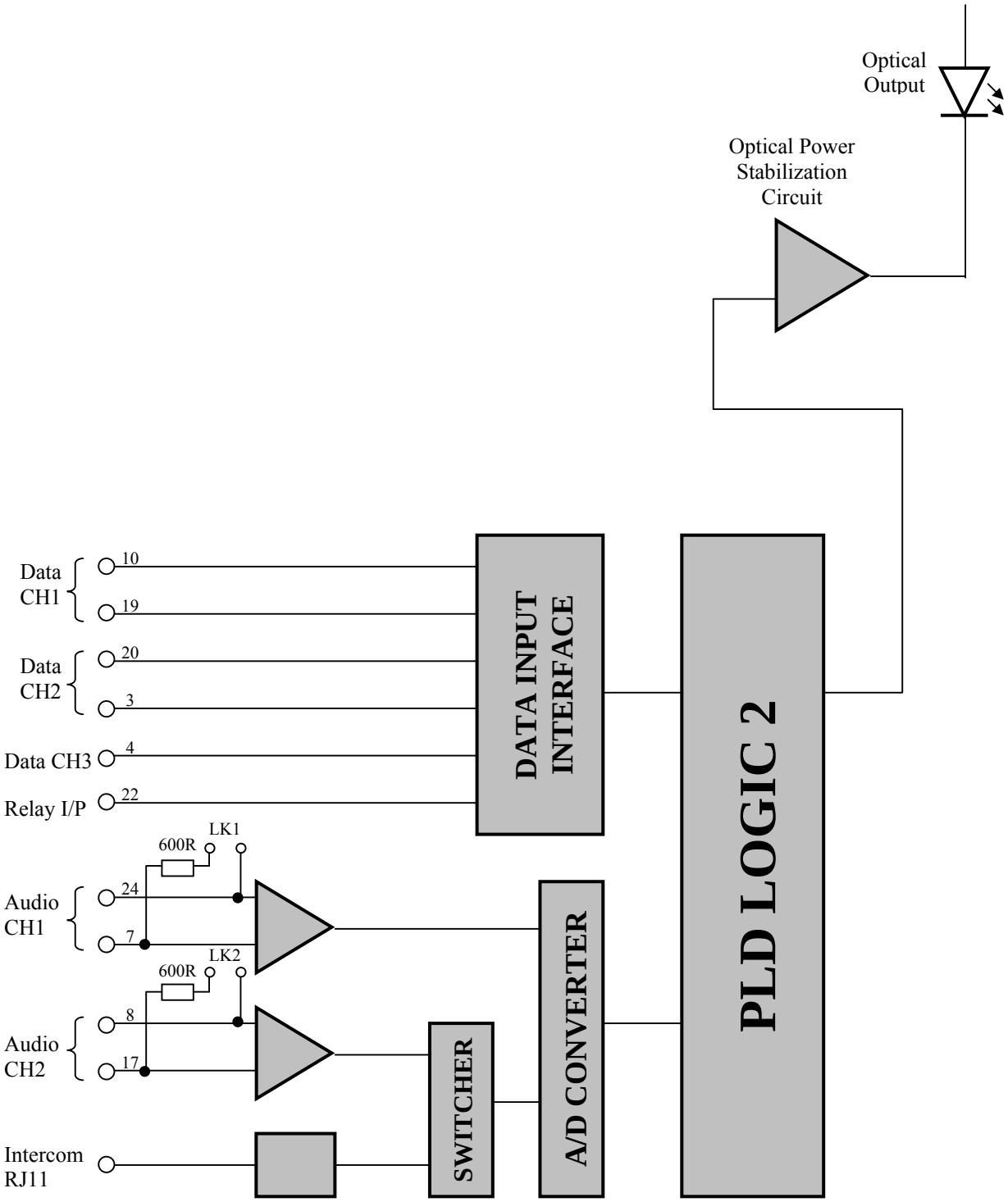


FIGURE 8: OSD430AR TRANSMITTER SECTION BLOCK DIAGRAM

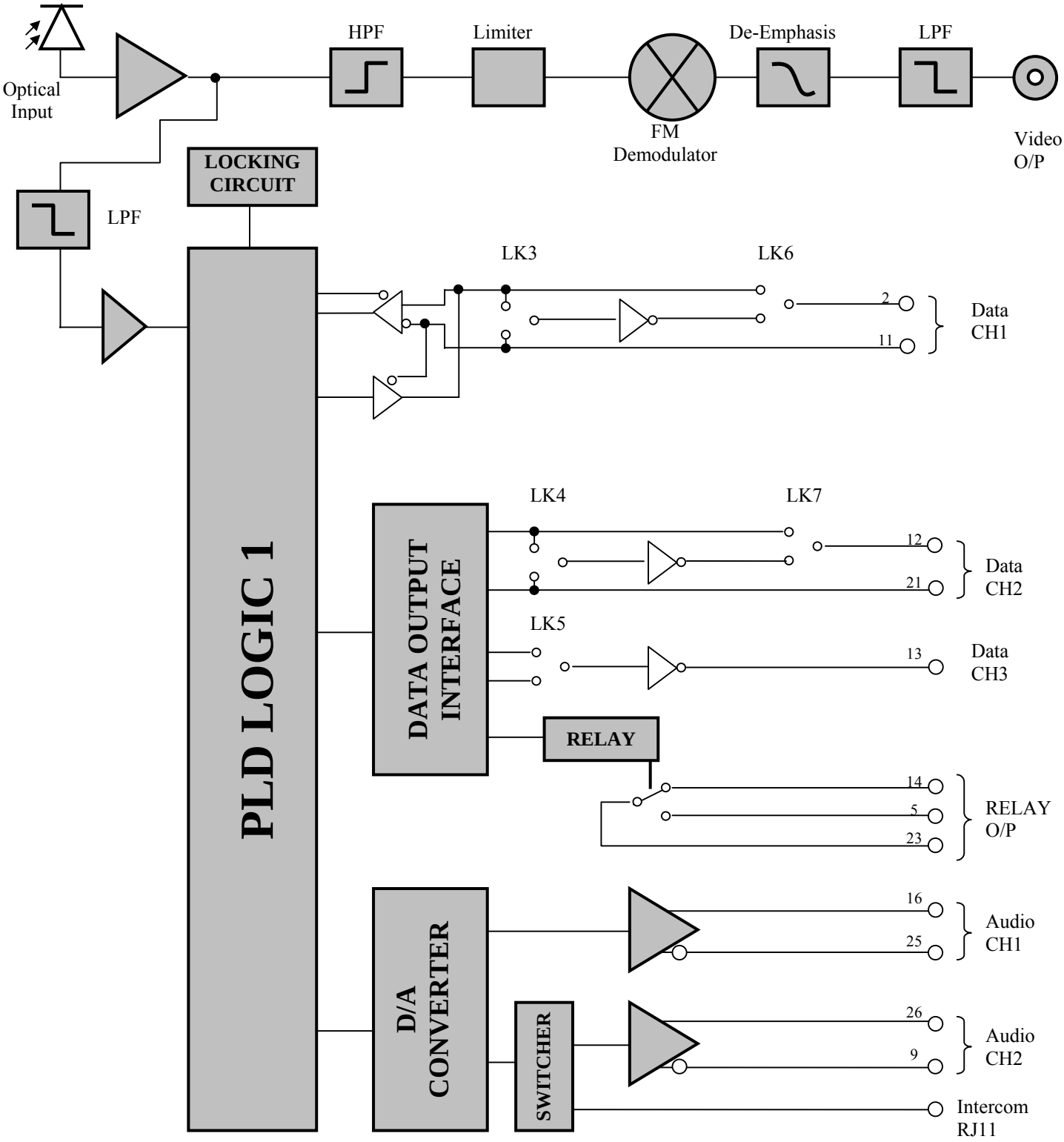


FIGURE 9: OSD430AR RECEIVER SECTION BLOCK DIAGRAM

3 MAINTENANCE

3.1 INTRODUCTION

The following section outlines the fault-finding procedure for the OSD430AT and OSD430AR 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 OSD430AT or OSD430AR 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 OSD430AT and OSD430AR.

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.