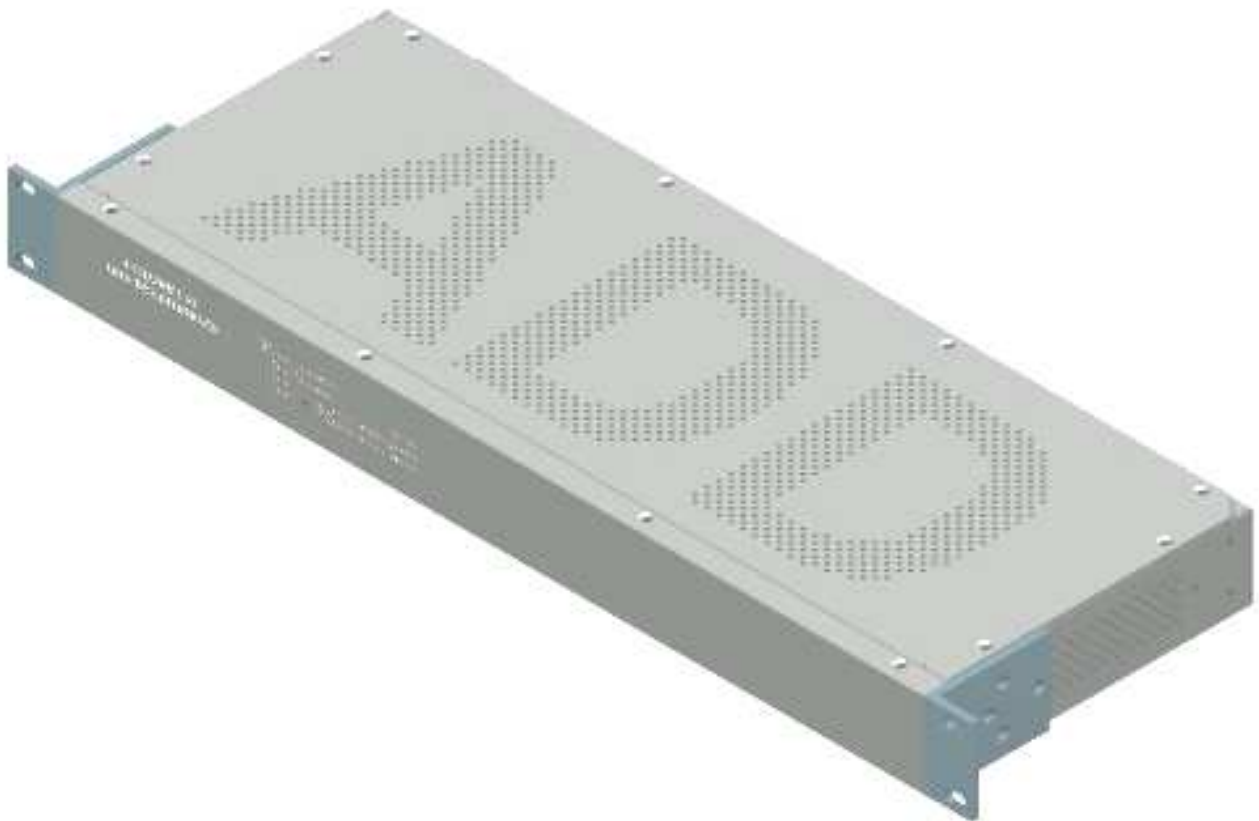


# User Manual For 4x E1 to Fibre Interface

## LL2004 – Desk Top Option & LL4004 – 19” Rack Mount Option



Model:..... Serial Number:..... Job Number:.....

Date: 2011/02/02

Advanced Digital Devices a div of Intervid Technologies (Pty)Ltd

# Contents

<b>1</b>	<b>INTRODUCTION.....</b>	<b>3</b>
1.1	FEATURES.....	3
1.2	ORDERING INFORMATION.....	3
1.3	PACKAGE ITEMS.....	4
<b>2</b>	<b>SYSTEM COMPONENT DESCRIPTION.....</b>	<b>5</b>
2.1	ENCLOSURE BASE.....	5
2.2	ENCLOSURE TOP.....	5
2.3	RACK MOUNTING BRACKET.....	5
2.4	75Ω BNC CONNECTOR MODULE.....	6
2.5	120Ω SCREW TERMINAL MODULE.....	6
2.6	120Ω RJ45 MODULE.....	7
2.7	DC PSU CONNECTION MODULE.....	7
<b>3</b>	<b>INSTALLATION PROCEDURE.....</b>	<b>8</b>
3.1	UNPACKING.....	8
3.2	POWER CONNECTION.....	8
3.3	FIBRE CONNECTION.....	8
3.4	E1 CONNECTION.....	8
3.5	INSTALLATION TEST.....	9
<b>4</b>	<b>MAINTENANCE PROCEDURE.....</b>	<b>10</b>
4.1	FAULTFINDING AND CORRECTION GUIDE.....	10
4.1.1	<i>Power</i> .....	10
4.1.2	<i>Traffic in Fail</i> .....	10
4.1.3	<i>Loopback</i> .....	11
4.1.4	<i>Demux</i> .....	12
4.1.5	<i>Nosig</i> .....	12
4.1.6	<i>CMI En/Decoder</i> .....	12
4.1.7	<i>No Error indication but not operating properly</i> .....	12
<b>5</b>	<b>SPECIFICATIONS.....</b>	<b>13</b>
<b>6</b>	<b>CONTACT DETAILS.....</b>	<b>14</b>
<b>7</b>	<b>NOTES.....</b>	<b>15</b>
<b>8</b>	<b>TEST CERTIFICATE.....</b>	<b>16</b>
<b>9</b>	<b>PACKING CHECKLIST.....</b>	<b>16</b>

# 1 Introduction

## 1.1 Features

- 4 x E1 - ITU G.703 Recommendation
- ITU G.742 Multiplexing Format
- E1 Connector Options
- No External Framing Required
- Potential Free Alarm Contact
- Encoded High Speed Fibre Link
- 1U 19" Rack Mountable
- Local and Remote Loopback + Indication
- Status Indication on Frontpanel
- Internal Power Supply

## 1.2 Ordering Information

This unit must be ordered by using the following Order Number Selection table. Replace the 'X', in the left hand column, with the appropriate option selected to get the correct Order Number for the equipment required.

X	Select Text	<b>75Ω</b>	75Ω BNC Connector Module	E1 Connector Selection
		<b>120Ω</b>	120Ω Screw Terminal Module	
		<b>120Ω RJ45</b>	120Ω RJ45 Connector Module	
X	U	Universal 85-250VAC/ 110-220VDC PSU		Power Supply Option
	I	12VDC PSU		
	G	24VAC PSU		
	F	110VDC PSU		
	E	220/110VAC PSU		
	D	24VDC PSU		
	C	48VDC PSU		
	B	110VAC PSU		
	A	220VAC PSU		
X	C	FC/PC Optic Connection		Optic Connector Option
	B	SMA Optic Connection		
	A	ST Optic Connection		
X	C	1300nm Optic Wavelength, Single Mode		Optic Wavelength Option
	B	1300nm Optic Wavelength, Multi Mode		
	A	850nm Optic Wavelength, Multi Mode		
<b>104</b>	4 x E1 Interface			
X	4	19" Rack Mountable Enclosure		Enclosure Option
	2	Table Top Enclosure		
<b>OS</b>	Optic Solutions			

Example: **OS4104ABA 120Ω** - 4 Channel E1 Interface in a **Rack Mountable Enclosure with 850nm Optics with ST Connectors with 220VAC PSU**.

## 1.3 Package Items

When the box is opened make sure of the contents by checking it using the Order Number and Table provided below.

<b>Main</b>		<ul style="list-style-type: none"> <li>• Enclosure Base (MD311)</li> <li>• Enclosure Top (MD312)</li> <li>• Main PCB (AU916E) - Installed</li> <li>• Indication PCB (AU3011) - Installed</li> <li>• 12 x Black M3 Countersink Screws</li> </ul>
<b>Enclosure Option</b>	<b>Table Top</b>	<ul style="list-style-type: none"> <li>• 4 x Rubber Feet</li> </ul>
	<b>19" Rack Mountable</b>	<ul style="list-style-type: none"> <li>• 2 x 19" Rack Mountings (MD313)</li> <li>• 6 x Black M3 Countersink Screws</li> </ul>
<b>E1 Connector Options</b>	<b>75Ω BNC</b>	<ul style="list-style-type: none"> <li>• 75Ω Connector Module – Installed</li> <li>• 26Way Connector Cable – Installed</li> <li>• 2 x Black M3 Countersink Screws - Installed</li> </ul>
	<b>120Ω Screw Terminal</b>	<ul style="list-style-type: none"> <li>• 120Ω Screw Terminal Connector Module – Installed</li> <li>• 26Way Connector Cable – Installed</li> <li>• 2 x Black M3 Countersink Screws - Installed</li> </ul>
	<b>120Ω RJ45</b>	<ul style="list-style-type: none"> <li>• 120Ω RJ45 Connector Module – Installed</li> <li>• 26Way Connector Cable – Installed</li> <li>• 2 x Black M3 Countersink Screws - Installed</li> </ul>
<b>PSU Option</b>	<b>220VAC 50Hz</b>	<ul style="list-style-type: none"> <li>• 3Way Socket – Installed</li> <li>• 3Way Cord</li> </ul>
	<b>48-110VDC</b>	<ul style="list-style-type: none"> <li>• DC PSU Cover Plate (MD317) – Installed</li> <li>• 2 x DC Screw Terminals – Installed</li> <li>• 2 x Black M3 Countersink Screws - Installed</li> </ul>
		<ul style="list-style-type: none"> <li>•</li> </ul>
		<ul style="list-style-type: none"> <li>•</li> </ul>

Also check for damage during shipping. The manufacturer checked all equipment before packing and packed it in protective packaging and thus cannot be held responsible for damage during shipment.

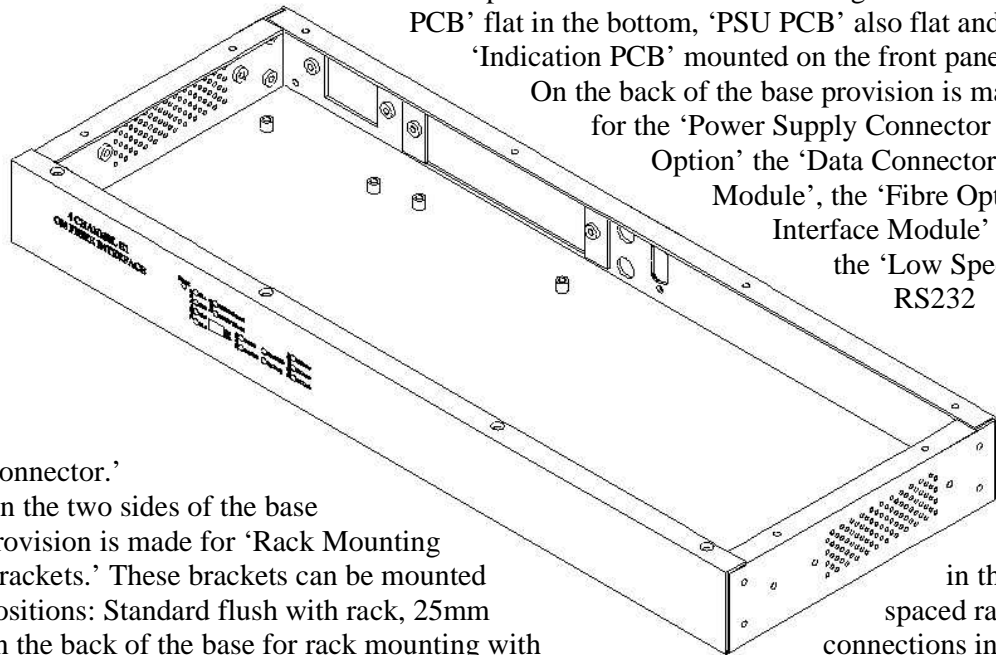
## 2 System Component Description

### 2.1 Enclosure Base

The base of the system is made out of aluminium to make the system as light as possible.

In the base provision is made for mounting of the 'Main PCB' flat in the bottom, 'PSU PCB' also flat and the 'Indication PCB' mounted on the front panel.

On the back of the base provision is made for the 'Power Supply Connector Option' the 'Data Connector Module', the 'Fibre Optic Interface Module' and the 'Low Speed RS232



Connector.'

On the two sides of the base provision is made for 'Rack Mounting Brackets.' These brackets can be mounted in three positions: Standard flush with rack, 25mm on the back of the base for rack mounting with front.

On the sides of the unit staggered 3mm grids of 2mm holes are provided for ventilation. Provision is made for the 'Top' to fit flush with the front of the base.

in three spaced rack or connections in

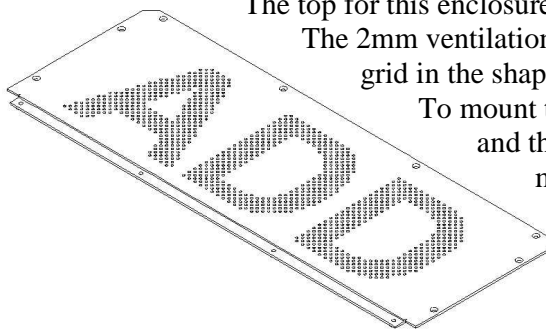
### 2.2 Enclosure Top

The top for this enclosure is also made of aluminium.

The 2mm ventilation holes on the top are placed on a 3mm grid in the shape of the manufacturing companies initials.

To mount the top the front lip must be inserted first and then the rest can be aligned with the mounting holes. The twelve M3

countersink screw can now be fitted making the top flush with the front of the base.

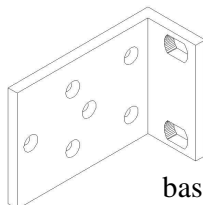


### 2.3 Rack Mounting Bracket

If the requirement is to mount the system in a 19" rack a set of two 'Rack Mounting Brackets' would be supplied.

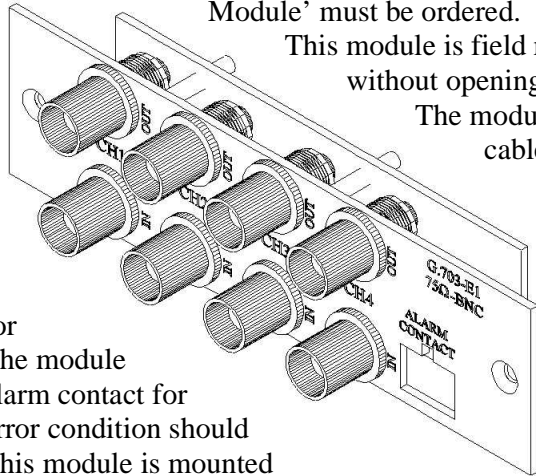
These brackets can be mounted as indicated in Enclosure Base description above.

The brackets are mounted by aligning them with the holes in the base using three M3 countersink screws per bracket.



## 2.4 75Ω BNC Connector Module

When a 75Ω BNC connection is required for the E1 data connection the '75Ω BNC Module' must be ordered.

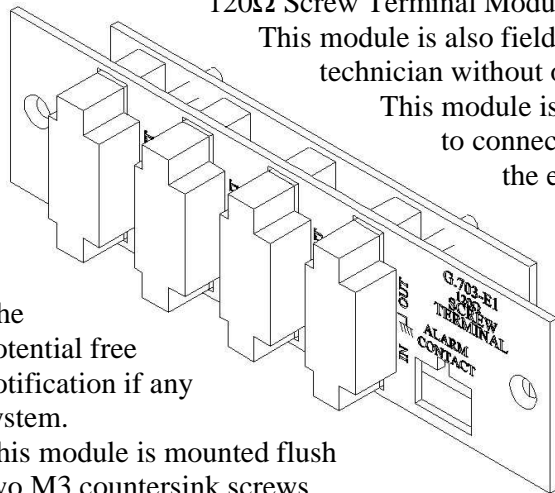


This module is field replaceable by a field installation technician without opening the enclosure top.  
The module is equipped with a 26way connection cable to connect the module to the 'Main PCB' inside the enclosure.  
The module is equipped with eight 75Ω BNC connectors, one input connector and one output connector each of the four channels.  
The module is also equipped with a potential free external alarm notification if any arise inside the system.  
This module is mounted flush on the back of the enclosure by using two M3 countersink screws

for  
The module  
alarm contact for  
error condition should  
This module is mounted  
using two M3 countersink screws

## 2.5 120Ω Screw Terminal Module

When a 120Ω Screw Terminal connection is required for the E1 data connection the '120Ω Screw Terminal Module' must be ordered.

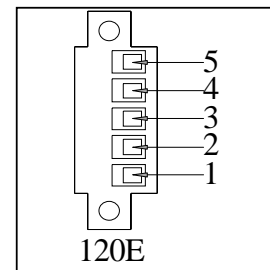


This module is also field replaceable by a field installation technician without opening the enclosure top.  
This module is equipped with a 26way connection cable to connect the module to the 'Main PCB' inside the enclosure.  
The module is equipped with four screw terminal connectors, one for each channel.  
The module is also equipped with an alarm contact for external alarm error condition should arise inside the system.  
This module is mounted flush on the back of the enclosure by using two M3 countersink screws.

The module is equipped with four screw terminal connectors, one for each channel.  
The module is also equipped with an alarm contact for external alarm error condition should arise inside the system.  
This module is mounted flush on the back of the enclosure by using two M3 countersink screws.

The Connection for the screw terminal is described in the following description:

Screw Terminal Connection Configuration	
1	RX Tip (Input)
2	RX Ring (Input)
3	Shield
4	TX Tip (Output)
5	TX Ring (Output)



## 2.6 120Ω RJ45 Module

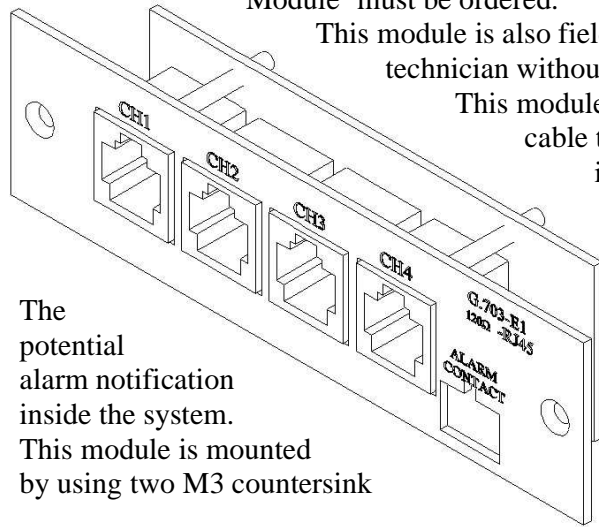
When a 120Ω RJ45 connection is required for the E1 data connection the ‘120Ω RJ45 Module’ must be ordered.

This module is also field replaceable by a field installation technician without opening the enclosure top.

This module is equipped with a 26way connection cable to connect the module to the ‘Main PCB’ inside the enclosure.

The module is equipped with four RJ45 connectors, one for each channel. The module is also equipped with a free alarm contact for external

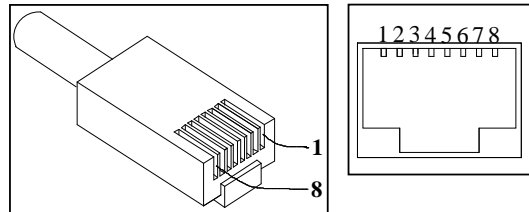
notification if any error condition should arise flush on the back of the enclosure screws.



The potential alarm notification inside the system. This module is mounted by using two M3 countersink

The connection pin configuration for the RJ45 connector is described in the following description:

RJ45 NT Cable Configuration	
1	TX Tip (Data Out)
2	TX Ring (Data Out)
3	TX Shield
4	RX Tip (Data In)
5	RX Ring (Data In)
6	RX Shield
7,8	Not Used



## 2.7 DC PSU Connection Module

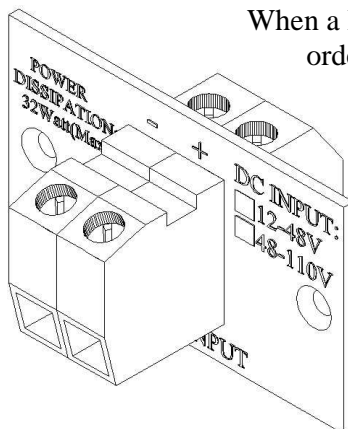
When a DC Power Supply is required a DC PSU Option must be ordered. With this PSU the ‘DC Connection Module’ will be supplied.

Open the top of the enclosure and install the PSU on the mountings provided.

Connect the module to the PSU.

Make sure of the polarity of the connection.

After connecting the module mount it on the mounting holes in the base by using two M3 countersink screws.



## 3 Installation Procedure

### 3.1 Unpacking

The system is factory tested and packed in protective packaging. Inspect the packaging for any visual damage.

The manufacturer is not liable for damage during shipment.

Use the checklist in Section 1.3 and make sure everything ordered are supplied.

### 3.2 Power Connection

Before connecting the power to the unit make sure of the ordered power option. Connection of the wrong input power to the unit may damage the power supply installed in the unit.

For a mains power option a 3pin socket would be mounted in the supply connection opening.

For a DC power option a 2pin screw terminal on a DC connector plate would be mounted in the supply connection opening. This enclosure would be appropriately marked for the input parameters.

For earthing of the unit an earth connection point is supplied just below the power connector.

The indicators must be in the following state: Power, Traffic Fail, Mux FLOS, Opt Nosig, RX Error must be on and the rest must be off.

### 3.3 Fibre Connection

Before trying to connect the fibre make sure of the fibre and connector option ordered. The fibre transceiver module is factory fitted and tested.

Make sure the fibre is of a good quality and the loss over the fibre is within specification of the equipments power budget.

When mounting the fibres make sure not to bend the fibre to sharply.

Connect the outgoing fibre to the TX optic connection and the incoming fibre to the RX optic connection.

The RX Error, Mux FLOS and Opt Nosig indication must go off and the RX Lock indicator must go on when the fibre is installed.

### 3.4 E1 Connection

To connect the E1 data to the unit, use the ordered "Connector Option Module" as described in Section 2.1.

To mount the module, if not factory mounted, use the following procedure:

- Use the 26way ribbon cable, already connected on the main board inside the unit, to connect the module to the main board.

#### 4 Channel E1 on Fibre Interface

- Align the module with the mounting holes in the main enclosure and use the M3 countersunk mounting screws to mount the module to the main enclosure.

Before connecting the data lines to the unit make sure of the connection configuration as described in Section 2.1 for each connector option.

Connect the E1 connector to the connection module using the appropriate connector and channel on the unit.

The appropriate channels traffic fail indicator should go off when that channels connector is inserted. The status of all the other indicators should stay the same.

### 3.5 Installation Test

The best way to test the link is by using the Loopback features provided.

**To test the Line Interface Units** that interfaces the E1 G.703 signals, use the Local Loopback by following the procedure.

- Connect the G.703 tester or data equipment to all the channels.
- Switch the dipswitch marked “LLB” on the Frontpanel to the on position.
- The indicator marked “LLOOP Selected” should go on.
- All the data is now looped back to the same input connectors output.
- The tester should show that the communication is operational without the fibre connected.
- To set the link back to normal operation the dipswitch must be returned to the off position.

**To test the local Line Interface Units, Fibre link and remote MUX**, use the Remote Loopback by following the procedure.

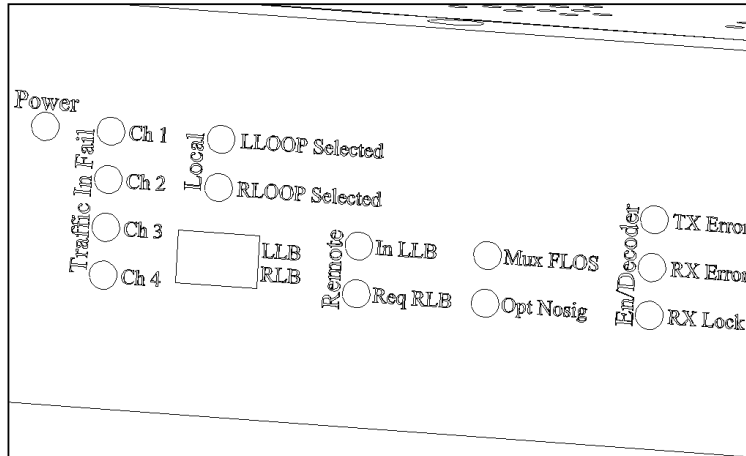
- Connect the G.703 tester or data equipment to all the channels.
- Switch the dipswitch marked “RLB” on the Frontpanel to the on position.
- The indicator marked “RLOOP Selected” should go on.
- The data is now going through the LIU, the MUX, the Encoder, over the Fibre. On the remote unit through the Decoder, the MUX and at the LIU it is looped back and through the whole circuit again, then out on the same input connectors output.
- The tester should show that the communication is operational without any data connected on the remote unit.
- To set the link back to normal operation the dipswitch must be returned to the off position.

If these test results were done without errors the link should be ready to function without any problems.

## 4 Maintenance Procedure

No routine maintenance is required on this equipment.

### 4.1 Faultfinding and correction guide



Using the following steps you can determine the possible origin of the fault in the system by looking at the indication.

This indication is situated on the front of the unit as shown on the illustration.

By following the steps you can determine and possibly correct the fault on the system.

#### 4.1.1 Power

Take a look at the unit's top left indicator with the text "**Power**" written above it. If this indicator is lit the power is present on the unit, if not follow the correction procedure.

To correct this problem, take a look at the back of the unit. You would find the power input on the right hand side.

On the backplate the input voltage should be indicated.

Make sure the actual input voltage meets the specification indicated on the unit.

Check the input fuse on the back of the unit (not on all power supply options).

Replace this fuse only with one of the same rating.

If the input voltage is present and within specification and the power indicator is still off the internal power supply may already be damaged.

In this instance the supplier must be notified.

#### 4.1.2 Traffic in Fail

Take a look at the indicators marked "**Traffic In Fail**".

If any of the indicators are lit the incoming data on the corresponding channel is not present.

If this indicator is lit with a data line connected to it follow the correction procedure.

To correct this problem, take a look at the corresponding input channel on the back of the unit.

Make sure the connector is properly inserted and the cables are connected.

By swapping the suspect channels data connection with one of the other channels that is working you can determine if the fault is with the connecting cable or with the internal circuitry.

#### 4 Channel E1 on Fibre Interface

If this makes no difference to the indicator status the problem is most probably with the internal circuitry. In this case the supplier must be notified.

If this test corrects the indicator status the fault lies with the connection configuration or with the data equipment.

Check the configuration by using the connector configuration supplied in Section 2.1 for each of the connector options.

If the channel is still not responding and the external data equipment is operational the supplier must be notified.

### 4.1.3 Loopback

#### 4.1.3.1 Local

The two indicators marked “**Local**” is for the loop status of the local unit.

The top indicator marked “**LLOOP Selected**” indicates that the local Loopback dipswitch on the local unit is on. This would Loopback all the data into the unit at the E1 level resulting in a feedback of all the data back to their individual outputs.

The bottom indicator marked “**RLOOP Selected**” indicates that the Remote Loopback dipswitch on the local unit is on. This action would request a remote Loopback from the remote unit resulting in a Loopback of all the high-speed data transmitted to the remote unit.

To correct this the dipswitches on the unit must be off to switch off the indication for the unit to function properly. If the dipswitches are all switched to off and the indicators are still lit the supplier must be notified.

#### 4.1.3.2 Remote

The two indicators marked “Remote” are for the loop status of the remote unit.

The top indicator marked “**In LLB**” indicates that the remote unit’s local Loopback dipswitch is on, resulting in all data fed from external data equipment being looped back to the equipment.

The bottom indicator marked “**Req RLB**” indicates that the remote unit’s remote Loopback dipswitch is on resulting in a remote Loopback activation in the local unit. This causes the high-speed data received by the local unit to be looped back to the remote unit.

To correct this the remote indicators on the local unit must be off for the unit to function properly, to accomplish this the dipswitches on the remote unit must be switched off.

#### 4.1.4 Demux

The next indicator marked “**FLOS**” indicates that the E2 to E1 decoder detected a frame loss on the incoming high-speed data.

This could be caused by an error condition on the incoming high-speed data on the CMI decoder.

To correct this problem, look at Section 3.1.5 and Section 3.1.6.2.

#### 4.1.5 Nosig

Look at the indicator marked “**Opt Nosig.**”

If this indicator is lit the incoming high-speed data from the decoder is not present.

To correct this problem, look at Section 3.1.6.2.

#### 4.1.6 CMI En/Decoder

##### 4.1.6.1 Encoder

On the right-hand side the last row of indicators are marked “**En/Decoder.**”

These indicators are for the high-speed data encoder for outgoing data and for the decoder for incoming data.

##### 4.1.6.2 Decoder

The next indicator marked “**RX Error**” indicates that an error occurred in the incoming demultiplexing of the high-speed data.

This error would arise when the incoming data from the fibre is not present or if the CMI encoding of the high-speed data is corrupt.

To correct this problem make sure the fibre is connected, otherwise make sure the losses on the fibre are within the power budget for the equipment.

If these parameters are within specification and the problem persists the supplier must be notified.

The last indicator marked “**Lock**” indicates that the local units demultiplexed data is locked with the remote units high-speed data.

#### 4.1.7 No Error indication but not operating properly

If the indication shows that the system is ok but the data link is not operational, follow the steps as described in Section 3.5.

If these faults persist the supplier must be notified.

## 5 Specifications

Power Supply	220VAC 50Hz	Connector	3Pin Mains Socket
		Supply Voltage	200 to 250VAC 50Hz
		Max Supply Current	175mA Max
		Power Dissipation	34Watt
	48-110VDC	Connector	2Pin Screw Connector
		Supply Voltage	36 to 135VDC
		Max Supply Current	600mA Max
		Power Dissipation	22Watt
Data Specifications	Connector Options	75Ω Option	75Ω BNC Connector
		120Ω Screw Option	5Way Screw Terminal
		120Ω RJ45 Option	8Way RJ45 Connector
	Specifications	E1 Specification	ITU G.703 Recommendation
		E2 Frame Format	ITU G.742 Multiplexing Format
		E2 Encoding Format	CMI (Code Marked Inversion)
Optical Characteristics	Connector Options		ST or SMA
	Transmission Wavelength		850nm to 1310nm
	Reception Wavelength		850nm to 1310nm
	Responsivity		7mV/μW Typically or 13mV/μW
	Fibre Compatibility		50/125 μm diameter
	Minimum Receive Level		-30dB
Physical Characteristics	Unit Dimensions (Depth, Width, Height)	Table Top Enclosure	187 x 434 x 44mm
		19" Rack Mountable	187 x 483 x 44mm
	Unit Weight		1.7kg
	Packaging Dimensions (Depth, Width, Height)		230 x 530 x 95mm
	Packed Unit Overall Weight		2.3kg

## 6 Contact Details

Email: [support@addvid.co.za](mailto:support@addvid.co.za)

Web: [www.addvid.co.za](http://www.addvid.co.za)

**Manufactured by: Advanced Digital Devices**  
**Unit 17 Bond Street Business Park**  
**Co Bond and Kent**  
**Randburg**  
**Johannesburg**  
**South Africa**

**P.O. Box 2549**  
**Randburg 2125**  
**Johannesburg**  
**South Africa**

**Tel: +27 11 789-4420**

**Fax: +27 11 789-4422**

## 7 Notes

## 8 Test Certificate

<b>Unit Serial Number:</b>		<b>Model:</b>	
<b>Tested By:</b>		<b>Date:</b>	
<b>Measurement Test</b>	<b>Criteria</b>	<b>Result</b>	
<b>Power Supply</b>	+12V, +5V, -12V @±0.2V		
<b>VCXO Centre Freq</b>	16.896MHz ±10Hz		
<b>PLL Voltage</b>			
<b>Jitter Acceptance</b>	5UI @ 100Hz		
<b>Frequency Tolerance</b>	80 PPM		
<b>R.E.R</b>	No Errors in 8 Mins		
<b>Optic TX Level</b>	- dB		
<b>Optic RX Level</b>	- dB		
<b>Power Budget</b>	dB		
<b>Functional Tests</b>	<b>Criteria</b>	<b>Results</b>	
<b>Traffic Indication</b>	Light up with no Traffic In		
<b>Loopback Indication</b>	Light up with appropriate selection		
<b>Mux &amp; Decoder Indication</b>	MUX FLOS, Opt Nosig and RX Error Light up with no Fibre		
<b>E1 I/O</b>	E1 Connection Functional		
<b>Optic Link</b>	Lock between Local & Remote Unit		
<b>Alarm Contact</b>	Contact Closes on All Errors		

## 9 Packing Checklist

<b>Main</b>	• Enclosure Base (MD311)	
	• Enclosure Top (MD312)	
	• Main PCB (AU916E)	
	• Indication PCB (AU3011)	
	• 26Way Connection Cable – Indication	
	• 12 x Black M3 Countersink Screws	
<b>Enclosure Option</b>	4 x Rubber Feet for Table Top	
	2 x 19” Rack Mountings (MD313) for 19” Rack Mountable	
	• 6 x Black M3 Countersink Screws for 19” Rack Mountable	
<b>Connector Option</b>	• Connector Module (75E, 120E Screw or 120E RJ45)	
	• 26Way Connector Cable – Connector Board	
	• 2 x Black M3 Countersink Screws	
<b>PSU Option</b>	220VAC 3Way Socket	
	220VAC 3Way Power Cord	
	DC PSU Cover Plate (MD317)	
	2x DC Screw Terminals	
	2x Black M3 Countersink Screws	
<b>Packaging</b>	Box	
	Protective Cushion	
<b>Manual</b>	Users Manual	