



**AMU2-2BHD**  
**Audio monitoring**  
**Unit**

***Handbook***

**TSL**  
**Vanwall Road, Maidenhead, Berkshire, SL6 4UB**  
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## **SAFETY**

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### **Installation.**

Unless otherwise stated TSL equipment may be installed at any angle or position within an operating temperature range of 5° - 30° C .

All TSL equipment conforms to the EC Low Voltage Directive:

EC Low Voltage Directive (73/23/EEC)(OJ L76 26.3.73)(LVD). Amendment: (93/68/EEC) (OJ L220 30.8.93).
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In all cases, the frame of the equipment must be earthed on installation.

The earth pin on the IEC mains inlet connector is connected to the metal frame of the equipment, to 0 volts on the internal DC PSU and to signal ground, unless otherwise stated. All metal panels are bonded together.

Due consideration for cooling requirements must be given when mounting the equipment. Ideally 1RU of rack space should be left above and below the unit.

Check that the fuse rating is correct for the local power (mains) supply. Replacement fuses must be of the same rating and type for continued protection against fire risk.

Do not switch on until all connections are made.

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## **WARRANTY, MAINTENANCE AND REPAIR**

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All TSL equipment is guaranteed for one year from the date of delivery to the customer's premises. If the equipment is to be stored for a significant period, please contact TSL concerning a possible extended warranty period.

### **Failure during warranty**

If any TSL product should fail or become faulty within the warranty period, first please check the PSU fuses.

All maintenance work must be carried out by trained and competent personnel.

### **Technical support information**

E-Mail address: [support@tsl.co.uk](mailto:support@tsl.co.uk)

Telephone Support Number for the UK and Europe: +44 (0) 1628 670000

Telephone Support Number for the USA only: 1 877 591 2108

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## **TSL Returns Procedure**

Please telephone +44 (0)1628 676200 (Fax: +44 (0)1682 676299) and ask for Sales who will provide a Returns Number. This will enable us to track the unit effectively and will provide some information prior to the unit arriving.

For each item, this unique Returns Number must be included with the Fault Report sent with the unit.

A contact name and telephone number are also required with the Fault Report sent with the unit.

### **Fault report details required.**

- Company:
- Name:
- Address:
- Contact Name:
- Telephone No:
- Returns Number:
- Symptoms of the fault (to include switch setting positions, input signals etc):

### **Packing**

Please ensure that the unit is well packed as all mechanical damage is chargeable. TSL recommends that you insure your equipment for transit damage.

The original packaging, when available, should always be used when returning equipment.

**If returned equipment is received in a damaged condition, the damage should be reported both to TSL and the carrier immediately.**

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## Contents

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- 1.0 Introduction
- 2.0 Front Panel Controls
  - 2.1 Input and Meter Selection Buttons
  - 2.2 Output Switching
- 3.0 Pin-out Details
  - 3.1 Analogue XLR Connectors
  - 3.2 AES/EBU XLR Connectors
  - 3.3 Audio Input/Output Connector – D37 Plug/Socket Pinout
  - 3.4 Control Connector - D9 Socket
  - 3.5 External Connector - D15 Plug
- 4.0 LS Output
- 5.0 General Notes
- 6.0 Specification
- 7.0 Front and rear view
- 8.0 Block Schematic

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## AMU2-2BHD AUDIO MONITORING UNIT

### 1.0 Introduction

The AMU2-2BHD is a full rack, 2RU x 280mm deep Audio Monitoring Unit with two TSL Bargraphs.

The following features are standard:

- Two TSL bargraphs.
- One switch selectable quad analogue input.
- Two pairs of AES/EBU inputs.
- One HD/SDV auto sensing input.
- Audio-present indication.
- Phase reverse switch.
- Out-of-phase error indication.
- Re clocked output of either HD or SDV
- Decoded PAL/NTSC composite
- Optional additive output switch selection.
- Additional SDV output if SDV is used on input
- Headphone outputs with LS muting.
- Fixed and variable stereo line outputs.

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## 2.0 Front Panel Controls

### 2.1 Input and Meter Selection Buttons

<b>Analogue Input</b>	Quad analogue I/P. A1 (Channel 1) is fed to the top bargraph and A2 (Channel 2) is fed to the bottom bargraph of the upper display. A3 (Channel 3) is fed to the top bargraph and A4 (Channel 4) is fed to the bottom bargraph of the lower display.
<b>AES1/2</b>	Selects one of two AES pairs to the bargraphs.
<b>S/HD</b>	Selects A1/A2 or A3/A4 from the de-embedded SDV to the bargraph.
<b>Group Select</b>	Toggles to decode the required group within the embedded audio signal.
<b>Letterbox</b>	Shows the composite output as 16:9 aspect ratio. (HD only)
<b>Ø Rev (Function)</b>	Momentary phase reverse between A1 and A2. N.B. This functions on the variable and loudspeaker outputs only and not on the meters.
<b>Bargraph Features</b>	
<b>Alpha numeric display</b>	To turn this display on the bargraph on press phase reverse and S/HD1 pr1 buttons.
<b>Brightness</b>	To increase the brightness of the bargraph display Press phase reverse and A1L. To decrease the Brightness press phase reverse and A2L.
<b>Reference Marker</b>	To turn the reverence marker on and off press phase Reverse and the CUT button.

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## 2.2 Output Switching

### **A1/A2**

These buttons select either:

- the Analogue Left or Right signals of the metered Input,
- the AES/EBU Input 1 Left or Right signals or
- the selected SDV group A1 & A2 decoded outputs to the Left or Right Output Channels.

The buttons toggle. Additive mixing is possible if two or more buttons are selected together.

### **A3/A4**

These buttons select either:

- Analogue Left or Right I/P 8 signals,
- the AES/EBU Left or Right signals of Input 2 or,
- the selected SDV group A3 & A4 decoded outputs to the Left or Right Output Channels.

The buttons toggle. Additive mixing is possible if two or more buttons are selected together.

### **DIM**

Approximately 16dB of attenuation is switched into the audio path

### **CUT/MUTE**

The front panel button **CUT**(s) the signal to all O/Ps. Remote Mute of either or both of the LS O/Ps and Variable Line O/Ps are possible via a rear connector. A ground is required on the appropriate pin to activate the **MUTE** condition.

### **VOLUME**

The Headphones O/P and the Variable Line O/P may be varied.

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### 3.0 Pin-out Details

#### 3.1 Analogue Input Channel 1L & 1R XLR Sockets

<b>XLRS</b>	<b>PIN</b>	<b>FUNCTION</b>
ANALOG 1	1	GND
ANALOG 1	2	1 IN+
ANALOG 1	3	1 IN-
ANALOG 2	1	GND
ANALOG 2	2	2 IN+
ANALOG 2	3	2 IN-

#### Analogue Output L & R XLR Plugs

<b>XLRS</b>	<b>PIN</b>	<b>FUNCTION</b>
ANALOG 1	1	GND
ANALOG 1	2	1 IN+
ANALOG 1	3	1 IN-
ANALOG 2	1	GND
ANALOG 2	2	2 IN+
ANALOG 2	3	2 IN-

#### 3.2 AES/EBU XLR Connectors

<b>XLRS</b>	<b>PIN</b>	<b>AES FUNCTION</b>
AES 1	1	AES GND
AES 1	2	AES 1 IN+
AES 1	3	AES 1 IN-
AES 2	1	AES GND
AES 2	2	AES 2 IN+
AES 2	3	AES 2 IN-
AES 3	1	AES GND
AES 3	2	AES 1 IN+
AES 3	3	AES 1 IN-
AES 4	1	AES GND
AES 4	2	AES 2 IN+
AES 4	3	AES 2 IN-

### 3.3 D37 Socket, Input connector (lower)

D 37 CONNECTOR ON AMU			AUDIO INPUTS	FUNCTION
PIN NO	PIN NO			
HOT +	COLD -			
1	20		1	A1L (A1)
2	21		2	A1R (A2)
3	22		3	A2L (A3)
4	23		4	A2R (A4)
19,36,37			Screen	A Ground

### D37 Plug, Output connector (Upper)

D 37 CONNECTOR ON AMU			AUDIO OUTPUTS	FUNCTION
PIN NO	PIN NO			
HOT +	COLD -			
1	20		A1	VAR MON O/P
2	21		A2	VAR MON O/P
3	22		A1	FIXED MON O/P
4	23		A2	FIXED MON O/P
5	24	(AES pairs1/2 or SD/HD pairs 1/2)	A1	Sel. Digital ch
6	25	(AES pairs1/2 or SD/HD pairs 1/2)	A2	Sel. Digital ch
7	26	(AES2 or SD/HD pair 2)	A3	Sel. Digital ch
8	27	(AES2 or SD/HD pair 2)	A4	Sel. Digital ch
9	28			
10	29			
11	30			
12	31			
19,36,37			Screen	A Ground

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### 3.4 Control Connector - D9 Socket

This is wired for RS422.

D9	CONTROL
1	0V
6	0V
2	TX-
7	TX+
3	RX+
8	RX-
4	0V
9	0V
5	N/C

### 3.5 External Connector – D15 Plug (This connector is not activated)

D15 PIN	EXTERNAL FUNCTION
1	GPI
2	GPI
3	GPI
4	GPI
5	GPI
6	GPI
7	N/C
8	N/C
9	N/C
10	N/C
11	N/C
12	N/C
13	N/C
14	+5V
15	0V

### 4.0 LS Output

This is a single ended amplifier therefore one side may be connected to ground.

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## 5.0 Notes

0 dBm = 0.775V into 600Ω i.e. 1mW power dissipation.

0 dBu = 0.775V rms = PPM 4.

Nominally, -18 dB ref 0FS = 0 dBu output.

European line up: -18 dBu

American lineup: -20 dBu

All audio monitoring Calibration procedures are factory Set.

**5.1 Please note that some American equipment has the function of the XLR pins 2 & 3 reversed.**

**TSL product is wired to the European standard**

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## 6.0 AMU2-2BHD Technical Specifications

### Power Supply

Supply Voltage	100 -240V AC @ 50Hz/60Hz +/- 10%
Power Consumption	60W

### Physical Dimensions

Height	88mm (2RU)
Width	225mm
Depth	280mm
Weight	3700gm

### Inputs 1.

Connector Type	XLR 3 pin. Pin 1 Gnd, Pin 2 hot, Pin 3 cold.
Signal	Balanced line level audio.
Frequency Response	30Hz to 25kHz
Impedance	>20k $\Omega$

### Inputs 1 – 4

Connector Type	D37 (XLR Input 1, in parallel)
Signal	Balanced line level audio.
Frequency Response	30Hz to 25kHz $\pm$ 1dB
Impedance	>20k $\Omega$

### Inputs AES 1,2 ,3 & 4

Connector Type	XLR (F) 3 pin. Pin 1 Gnd,Pin 2 hot,Pin 3cold
Standard	AES3 (1994) 32, 44.1, 48, 96 KHz
Impedance	Balanced110 Ohm. (BNC unbalanced 75 Ohm option)

### Input, HDV/SDV (auto sensing)

Connector Type	BNC.
Standard	SMPTE 259M 4:2:2 component 525/60 or 625/50 with embedded 48kHz audio. HDSDI (SMPTE 292M) – 720P & 1080i @ 50, 59.94 & 60Hz
Impedance	75ohm
Return Loss	<-20dB to 1.5GHz

### Down converted Output

Return Loss	$\geq$ 8bit processing. <-16.5dB to 1.5GHz
Connector	BNC Note: Video monitoring point only. If SDV is used on input, this connector Also gives a re clocked output.

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**Re clocked Output**

Return Loss < -15dB up to 1.5GHz  
Connector BNC

**Line Output.**

Connector XLR 3 pin Male (variable line out A1 &A2)  
Impedance 50Ω  
Output Levels Through level control with 0dB gain.  
Connector D37  
Impedance >20kΩ  
Output Levels Fixed (+ and – 1dB) and Variable.

**Noise**

Better than -70 dB (22Hz to 22 KHz)

**Headphone Output.**

Connector Stereo Jack socket type A  
Impedance 50Ω  
Output Levels Through level control with 0dB gain.

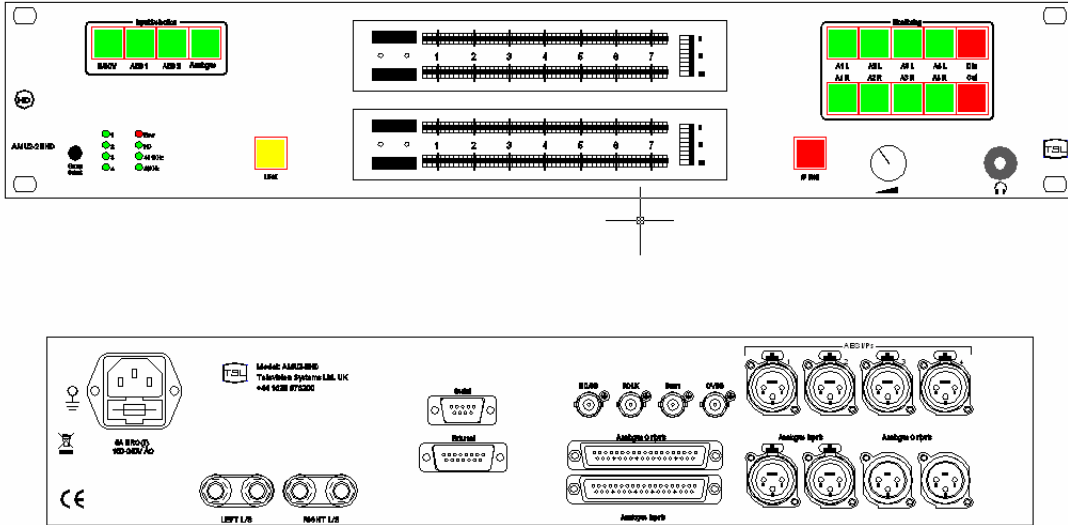
**Loudspeaker Output.**

Connectors 4mm Binding Posts  
Output rating Max 15W RMS /Ch into 4Ω,

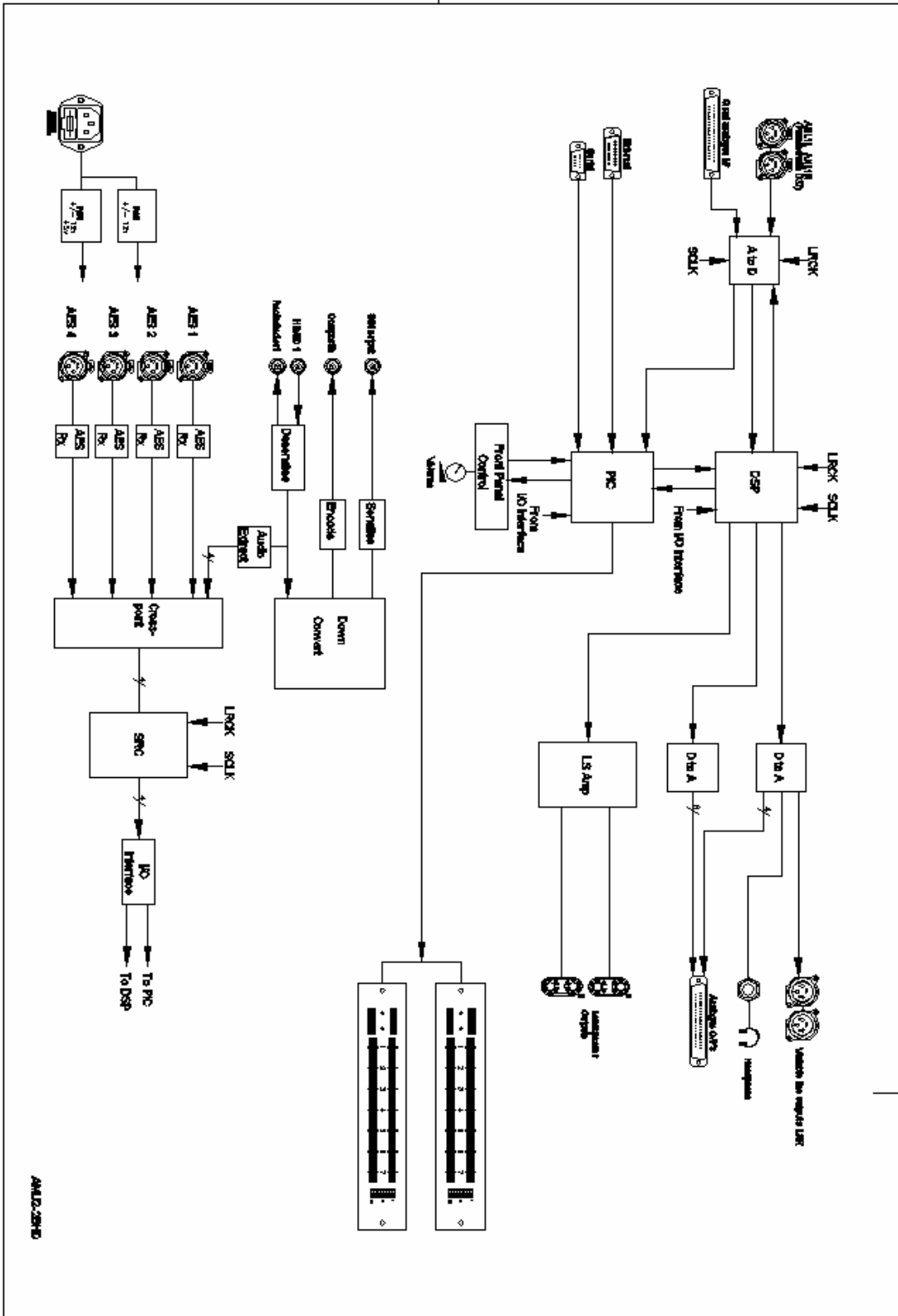
**HD Standards Supported**

1080i/50  
1080i/59.94  
1080i/60  
720p/50  
720p/59.94  
720p/60

## 7.0 Front and rear view



## 8.0 Block Schematic



AMU2-2BHD