



**AMU2-BHD+**  
**Audio monitoring**  
**Unit**

***Handbook***

**TSL Products**  
**Units 1-2, First Avenue, Globe Park, Marlow, Bucks, SL7 1YA**  
**Telephone +44 (0)1628 564610**

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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).

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@tslproducts.com  
Telephone Support Number: +44 (0) 1628 564610

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## **TSL Returns Procedure**

Please telephone +44 (0)1628 564610 and ask for Support 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 Analogue Output Connector – D25 Socket Pinout**
  - 3.4 AES Input/Output Connector – D25 Socket Pinout**
  - 3.5 Control Connector - D9 Socket**
  - 3.6 External Connector - D15 Plug**
  - 3.7 Configuration Switch Functions**
- 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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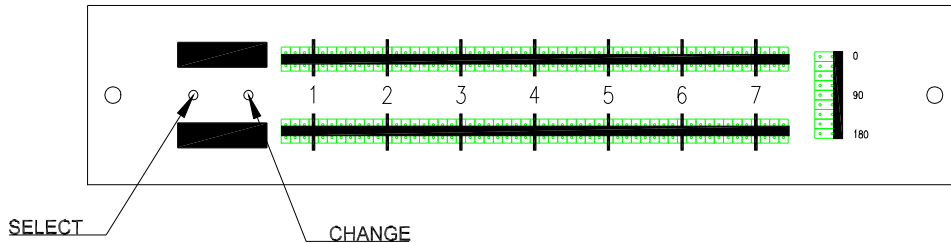
## AMU2-BHD+ AUDIO MONITORING UNIT

### 1.0 Introduction

The AMU2-BHD+ is a full rack 2RU x 310mm deep Audio Monitoring Unit with a 106 segment bargraph.

The following features are standard:

- Two HD/SDV auto sensing input with Group select.
- Four AES/EBU inputs.
- Two switch selectable stereo analogue inputs.
- One TSL bargraph.
- Phase reverse switch.
- Phase correlation bargraph.
- 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.
- Variable stereo line output.



## 2.1.1 TSL Bargraph

### Set-up Menus.

These are accessed via the select & change buttons located between the two alphanumeric displays to the left of the unit (see diagram above). The top display shows the function & the bottom gives the state.

These are accessed via the select & change buttons located between the two alphanumeric displays to the left of the unit (see diagram above). The top display shows the function & the bottom gives the state.

- 1) Pressing select once gives:

P	E	A	K
H	D		0

The zero toggles between 0 , 1 and 2 when the change button is pressed. 0 is off, and 1 is on and the highest level point is displayed. HD 2 operates only in the PPM mode and displays the level numerically with the reference marker. With HD 0 selected the alphanumeric display is off.

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2) Pressing select a second time gives:

D	I	S	P
B	A	R	

All the LEDs are lit up to the highest level displayed.

Pressing the change button gives:

D	I	S	P
D	O	T	

Only the highest level LED is lit.

3) Pressing select a third time gives:

R	S	P	N
1ms			

Pressing the change button gives:

.1ms			

This changes the response for the relevant scales.  
(0.1ms, 1ms, 5ms 10ms, and VU integration times.)

4) Pressing select a fourth time gives:

I	D		0
O	N		

This enables the unit to display the reference markers which are nominally set to 0dB. These are set as follows for the appropriate scales fitted: PPM 4 for UK, TEST for EBU, - 4 for VU, - 6 for DIN, 0 or Test for Nordic, -18dB or - 20 dB for Digital.

When the change button is depressed the markers are not displayed and an OFF indication is displayed in the lower display.



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5) Pressing select for a fifth time gives:

B	R	G	T

Depressing the change button changes the brightness or intensity of the display. Successive presses decrease brightness.

6) Pressing select for a sixth time gives:

I	/	P	:
A	n	I	g

Depressing the change button changes the input from Analogue to digital (AES).

7) Pressing select for a seventh time gives:

S	C	L	E
E	B	U	

Depressing the change button defines which scale is in use. (EBU, DIN, PPM, Nordic or VU.)

8) Pressing select for a eighth time gives:

0	R	E	F
	-	1	8

Depressing the change button selects the digital reference. (- 18 or -20)

9) Pressing select for a ninth time gives:

L	O	U	D
O	N		

Depressing the change button turns the loudness indication on or off.

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## 2.0 Front Panel Controls

### 2.1 Input and Meter Selection Buttons

<b>S/HD 1&amp;2 Pair 1, 2</b>	Selects A1/A2 or A3/A4 from the de-embedded HD or SD to the meters.
<b>Group Select</b>	Toggles to decode the required group within the embedded audio signal.
<b>AES1, 2, 3 &amp; 4</b>	Selects one of four AES signals to the meters.
<b>Analogue 1 – 2</b>	Analogue I/Ps. A1 (Left Channel) is fed to the left meter and A2 (Right Channel) is fed to the right meter.
<b>Ø Rev (Function)</b>	Momentary phase reverse between A1 and A2.
<b>Error LED</b>	Reports red when either of the AES inputs is not connected.

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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:

- 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 when Digital I/P 1 (SDV/AES) is selected on the input.

### **DIM**

Approximately 16dB of attenuation is switched into the audio path and is effective on the loudspeaker and variable line outputs. The fixed line outputs are unaffected.

### **CUT**

The front panel button cuts the signal to the loudspeaker and variable line outputs. The fixed line outputs are unaffected.

### **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 XLR Connectors

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

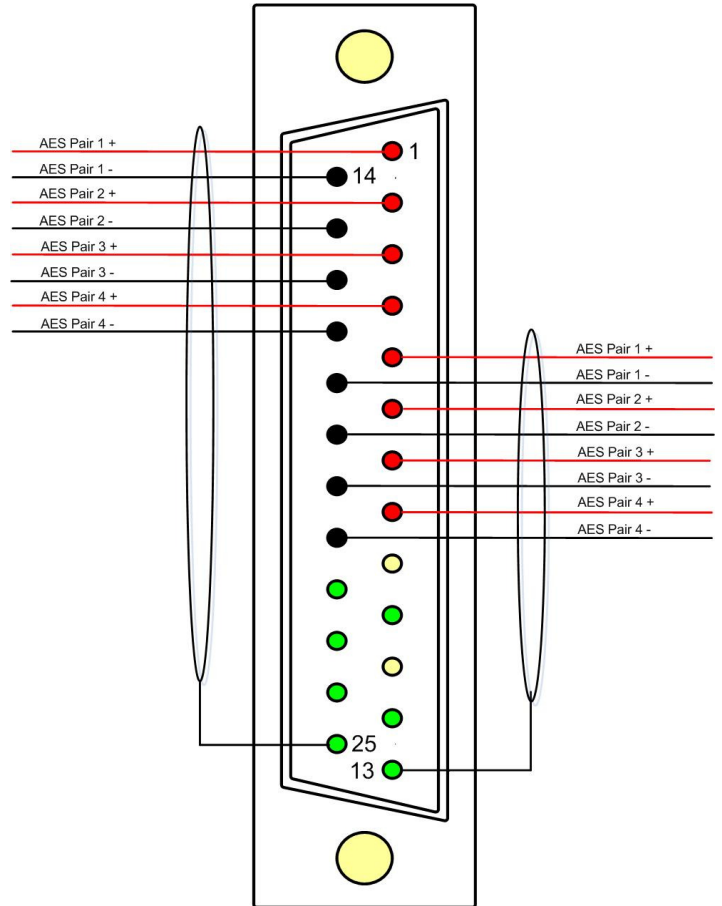
#### 3.2 AES/EBU XLR Connectors

<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-



### 3.4 AES Input/Output Connector – D25 Socket Pinout

D 25 SOCKET ON AMU	AES INPUTS/OUTPUTS
PIN NO	FUNCTION
1	Ch1&2 Input 1+
14	Ch1&2 Input 1-
2	Ch3&4 Input 2+
15	Ch3&4 Input 2-
3	Ch5&6 Input 3+
16	Ch5&6 Input 3-
4	Ch7&8 Input 4+
17	Ch7&8 Input 4-
5	Ch1&2 Output 1+
18	Ch1&2 Output 1-
6	Ch3&4 Output 2+
19	Ch3&4 Output 2-
7	N/C
20	N/C
8	N/C
21	N/C
9	N/C
22	Ground
10	Ground
23	Ground
11	N/C
24	Ground
12	Ground
25	Ground
13	Ground



**N.B.** The digital channel outputs referred to are converted analogue outputs of the digital channel.

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### 3.5 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

### 3.6 External Connector – D15 Plug.

D15 PIN	EXTERNAL FUNCTION
1	GPI 1
2	GPI 2
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

GPI 1 &2 - Remote Dim and Cut.

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### 3.7 Configuration Switch Functions (from S/W Release X06)

A)

SWITCH SECTION	FUNCTION
1	Not Used
2	Not Used
3	Speaker Mute Up
4	Digital Settings (see table below)
5	Digital Settings (see table below)
6	Digital Settings (see table below)
7	Not Used
8	Composite out-Up/SDI /Down

B)

SW4	SW5	SW6	FUNCTION
UP	UP	DN	-24dBFS
DN	UP	DN	-22dBFS
UP	DN	DN	-20dBFS
DN	DN	DN	-18dBFS
UP	UP	UP	-15dBFS
DN	UP	UP	TBD
UP	DN	UP	TBD
DN	DN	UP	TBD

### 4.0 LS Output

This is a bridged amplifier therefore neither terminal should be grounded.

### 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 line-up: -20 dBu

The LF Adjust potentiometer is non functional.

**All audio monitoring Calibration procedures are factory Set.**



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**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-BHD+ Technical Specifications

### Power Supply

Supply Voltage	100 -240V AC @ 50Hz/60Hz or 12V DC
Power Consumption	35W.
Fuse Rating	T2A

### Physical Dimensions

Height	88mm (2RU)
Width	483mm
Depth	310mm
Weight	3.5Kg

### Analogue Input 1 & 2

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

### Inputs AES 1 & 2

Connector Type	XLR (F) 3 pin. Pin 1 Gnd, Pin 2 hot, and Pin 3 cold
Standard	AES3 (1994) 32, 44.1, 48, 96 KHz
Impedance	Balanced 110 Ohm. (BNC unbalanced 75 Ohm option)

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

AES I/O, 25 way D type (See section 3.4 for details)

### Input, 1 & 2 HDV/SDV (auto sensing)

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

### Re clocked Output

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

### Variable Line Output.

Connector	XLR 3 pin Male (variable line out A1 &A2)
Impedance	50 $\Omega$
Output Levels	Through level control with 0dB gain.

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**Outputs AES 1, 2, 3 & 4** AES I/O, 25 way D type See section 3.4 for details

**Noise** Better than -60dB (22Hz to 22 KHz)

**Headphone Output.**

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

**Loudspeaker Outputs.**

Connectors 4mm Binding Posts  
Output rating Max 15W /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

