



**AMU1-BHD**  
**Audio monitoring**  
**Unit**

***Handbook***

**TSL**  
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## SAFETY

### **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

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@televisionssystemsltd.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**
    - 2.1.1 Bargraph set up menu**
  - 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 – D25 Plug/Socket Pinout**
  - 3.4 External Connector - D15 Plug**
  - 3.5 Configuration Switch Functions (from S/W Release Z07)**
- 4.0 LS Output**
- 5.0 General Notes**
- 6.0 Specification**

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## AMU1-BHD AUDIO MONITORING UNIT

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### 1.0 Introduction

The AMU1-BHD is a full rack 1RU x 350mm deep Audio Monitoring Unit with a TSL Bargraph.

The following features are standard:

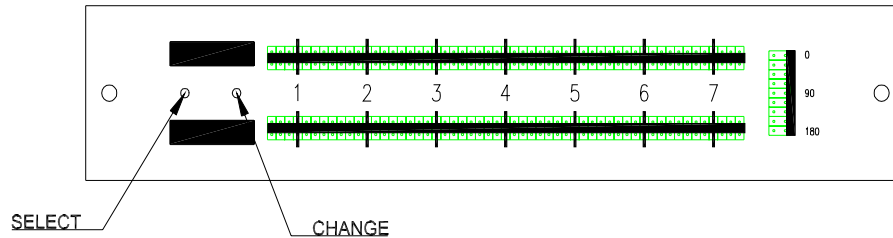
- One HD/SDV auto sensing input.
  - Two AES/EBU inputs.
  - Four switch selectable stereo analogue inputs.
  - One TSL Stereo High resolution 106 segment Bargraph Meter..
  - Phase reverse switch.
  - Phase correlation bargraph.
  - Re clocked output of either HD or SDV
  - Decoded PAL/NTSC composite (SDV only)
  - 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>1 – 4</b>	Analogue I/Ps. A1 (Left Channel) is fed to the top bargraph and A2 (Right Channel) is fed to the bottom bargraph.
<b>AES1/2</b>	Selects one of two AES signals to the bargraph.
<b>S/HD</b>	Selects A1/A2 or A3/A4 from the de-embedded HD or SD to the bargraph.
<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.



## 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.

- 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.

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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. (10mA,VU, 10mB)

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.

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.

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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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## 2.2 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 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-

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### 3.3 Audio Input connector D25, Input Channels 3-4.

<b>D 25 SOCKET ON AMU</b>	<b>AUDIO INPUTS</b>	<b>D 25 SOCKET ON AMU</b>	<b>AUDIO INPUTS</b>
<b>PIN NO</b>		<b>PIN NO</b>	
1	Chassis		
2	Aux Ch3 Left +	14	Aux Ch3 Left -
3	Aux Ch3 Right -	15	Aux Ch3 Left Scrn
4	Aux Ch3 Right Scrn	16	Aux Ch3 Right +
5	Aux Ch4 Left +	17	Aux Ch4 Left -
6	Aux Ch4 Right -	18	Aux Ch4 Left Scrn
7	Aux Ch4 Right Scrn	19	Aux Ch4 Right +
8		20	
9		21	
10		22	
11		23	
12		24	
13		25	

**Auxiliary Connector - D25 Plug**

<b>D 25 SOCKET ON AMU PIN NO</b>	<b>AUDIO OUTPUTS</b>	<b>D 25 SOCKET ON AMU PIN NO</b>	<b>AUDIO OUTPUTS</b>
1	GND		
2	ADX Ch1+	14	ADX Ch1 -
3	ADX Ch2 -	15	GND
4	GND	16	ADX Ch2 +
5	ADX Ch3+	17	ADX Ch3 -
6	ADX Ch4 -	18	GND
7	GND	19	ADX Ch4 +
8	NC	20	NC
9	RS232 Rx	21	NC
10	RS232 Tx	22	NC
11	ADX Aes1+	23	ADX Aes1 -
12	ADX Aes2-	24	GND
13	GND	25	ADX Aes2 +

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### 3.4 Serial, A1 & A2 Output – D15 Plug.

<b>D15 PIN</b>	<b>EXTERNAL FUNCTION</b>
1	AGND
2	A1-
3	A2+
4	N/U
5	TX-
6	RX+
7	0V
8	Chassis
9	A1+
10	AGND
11	A2-
12	N/U
13	TX+
14	RX-
15	0V

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

SWITCH SECTION	FUNCTION
1	Not Used
2	Digital Settings (see table below)
3	Digital Settings (see table below)
4	Digital Settings (see table below)
5	Digital Settings (see table below)
6	Not Used
7	Not Used
8	Not Used

SW2	SW3	SW4	SW5	FUNCTION
DN	<b>UP</b>	<b>UP</b>	DN	-24dBFS
<b>UP</b>	DN	<b>UP</b>	DN	-23dBFS
DN	DN	<b>UP</b>	DN	-22dBFS
<b>UP</b>	<b>UP</b>	DN	DN	-21dBFS
DN	<b>UP</b>	DN	DN	-20dBFS
<b>UP</b>	DN	DN	DN	-19dBFS
DN	DN	DN	DN	-18dBFS
<b>UP</b>	<b>UP</b>	<b>UP</b>	<b>UP</b>	-17dBFS
DN	<b>UP</b>	<b>UP</b>	<b>UP</b>	-16dBFS
<b>UP</b>	DN	<b>UP</b>	<b>UP</b>	-15dBFS
DN	DN	<b>UP</b>	<b>UP</b>	-14dBFS
<b>UP</b>	<b>UP</b>	DN	<b>UP</b>	-13dBFS
DN	<b>UP</b>	DN	<b>UP</b>	-12dBFS

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#### **4.0 LS Output**

This is a bridged amplifier therefore neither side may be connected to ground.

#### **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

**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 AMU1-BHD Technical Specifications

### Power Supply

Supply Voltage	12 Volts DC
Power Consumption	35 watts Max.

### Physical Dimensions

Height	88mm (2RU)
Width	483mm
Depth	280mm
Weight	3.5Kg

### Analogue Input 1 & 2

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 $\Omega$

### Analogue Inputs 3 & 4

Connector Type	D25
Signal	Balanced line level audio.
Frequency Response	30Hz to 25kHz $\pm$ 1dB
Impedance	>20k $\Omega$

### Inputs AES 1 & AES2.

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

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**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

**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 RMS /Ch into 4Ω,

**HD Standards Supported**

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