



PROFESSIONAL
PRODUCTS GROUP

Audio Monitoring Units (AMU)

Professional Audio Monitoring Solutions
A Smarter Choice in Audio Monitoring



Audio Monitoring Units – Product overview

		PAGE NO	DISPLAY			INPUTS			OUTPUTS								FEATURES							
			Video Monitoring	Meter Type Moving Coil	Meter Type Bar graph	HD/SDI	AES	Analogue (Pair)	Line level fixed/variable	AES fixed/variable	Reclocked HD/SDI	Composite Video	Down Converted Video	Metadata Display	Headphone	Power Amplifier	User Configurable	Dolby D&E Decoding	Discrete Multichannel Audio	Loudness	Assign Matrix	Audio Delay	SMPTE 2020	3G
PAM SERIES	PAM1-3G8	6	Y		8	2	4	2	F+V	F+V	Y	Y	Y	Y	Y		Y	Y	Y	Y		Y	Y	Y
	PAM1-3G8 ND	6	Y		8	2	4	2	F+V	F+V	Y	Y	Y	Y	Y		Y		Y	Y		Y	Y	Y
	PAM2-3G16	4 & 5	Y		16	2	8	6	F+V	F+V	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y
	PAM2-3G16 ND	4 & 5	Y		16	2	8	6	F+V	F+V	Y	Y	Y	Y	Y		Y		Y	Y	Y	Y	Y	Y
1 SERIES	AMU1-3G	9			2	2	4	2	F+V	F	Y	Y	Y	Y	Y			Y						Y
	AMU1-BHD+	13			2	2	4	2	F+V	F	Y	Y	Y	Y		Y				Y				
	AMU1-CHD+	9			2	2	4	2	F+V	F	Y	Y	Y	Y	Y									
	AMU1-BAS	10			2			6	F+V					Y	Y				Y					
2 SERIES	AMU2-8HD-3G	7			8	2	4	2	F+V	F	Y	Y	Y	Y		Y		Y	Y					Y
	AMU2-8HD+	7			8	2	4	2	F+V	F	Y	Y	Y	Y		Y		Y	Y					
	AMU2-BHD+	13			2	2	4	2	F+V	F	Y	Y	Y	Y		Y			Y					
	AMU2-2MHD+	13		2		2	4	2	F+V	F	Y	Y	Y	Y		Y								
	AMU2-2BHD	13			4	1	2	2	F+V		Y	Y	Y	Y		Y			Y	Y				
	AMU2-MAS	10		2				6	F+V					Y	Y									
	AMU2-GB4HD	n/a			2	1	2	2	F+V		Y	Y	Y	Y	Y									
AVMU SERIES	AVMU2-3G	8	Y		4	2	2	2	Y	F	Y	Y	Y	Y	Y									Y
	AVMU2-BHD+	8	Y		4	2	2	2	Y	F	Y	Y	Y	Y	Y									
AMUT SERIES	AMUT-BHD	11			2	1	2	4	Y		Y	Y	Y	Y		Y				Y				
	AMUT-2MHD	11		2		1	2	4	Y		Y	Y	Y	Y		Y								
	AMUT-2MA	11		2				4	Y					Y		Y								
MPA SERIES	MPA1-S	12						1							Y									
	MPA1-ASC	12						2						Y	Y									
	MPA1-ASB	12			2			2						Y	Y									
	MPA1-BA	12			2			2						Y	Y									
	MPA1-BD	12			2		2	2						Y	Y									
BBG SERIES	BBG-1	n/a			2		1	1											Y					

Symbols Key



TSL's professional audio monitors are installed at major broadcasters worldwide in positions throughout the broadcast chain

In line with users' needs for increasingly competent and intuitive products, our range continuously evolves by building on new enabling technologies and technical standards.

Whether you need critical level metering with hi-resolution bar graphs, the ability to monitor the integrity of your premium surround sound TV channels as it leaves for transmission, or to listen to a stage manager's cue in your dressing room, TSL has a product to support you. Just as the viewing public expect ever better quality pictures, so too has a demand developed for a more dynamic sound.

To meet the expectations of 5.1 audio, multi-language broadcasts, audio description channels and interactive features, the technology required to deliver audio has become increasingly complex. It is therefore vital that broadcasters have the tools to ensure that audio quality and fidelity are maintained at each stage of the broadcast chain.

In addition to the Audio Monitoring range, TSL Professional Products also specialise in Power Management, TallyMan systems and Custom Devices – thousands of which are in operation all over the world. For further information on our product range and expertise, visit www.tsl.co.uk or call +44 (0)1628 676200.

The key attributes of TSL's award winning product range are;

- Innovative solutions
- High quality sound reproduction
- Compact size
- Build quality and reliability
- Clear metering
- Ease of use
- A range of international scales and ballistics
- Loudness measurement
- Broad standards capability

Drawing from almost 25 years worldwide experience of TSL's Systems Integration Group, TSL Professional Products Group has unparalleled expertise in how to get the best results. What's more, we have a solution to all current and anticipated needs, drawing upon an ever-expanding, forward thinking and technically unrivalled team of experts.

Working with Dolby

TSL Professional Products Group is a Dolby E Partner, and its Systems Integration Group is an accredited Dolby Systems Integration Partner. Both TSL PPG and System Integration Groups work closely with Dolby Broadcast specialists to ensure that TSL personnel have an unparalleled understanding of Dolby technologies and customer requirements.

 **Dolby E**
PARTNER



The PAM2-3G16 is TSL's award winning flagship Dolby decoding multichannel audio monitoring unit

PAM2-3G16 simplifies monitoring of Dolby encoded and discrete multichannel audio using preset menus and shortcut keys for rapid and intuitive access to critical elements of complex broadcast audio systems. The flexibility offered in terms of user selectable scales, ballistics, range of standard input/output signals supported and the ability to intelligently dissect and monitor any multichannel audio signal structure from mixed mono, stereo and 5.1, make PAM2-3G16 the most advanced and intuitive product in its sector.



Innovative PAM2-3G16

The **PAM2-3G16's** reputation as one of the most comprehensive yet usable Broadcast Audio Monitors was cemented in November 2009 when the launch of the product was recognised by the Royal Television Society via an Innovation Award in the Hardware category. In making the presentation, RTS Innovation Awards chair Jeff Henry said: "The jury recognised that getting audio right these days is in many cases becoming more tricky than video and this new audio monitor brings real operational convenience to the increasingly hectic broadcast environment."

Since the product launch of **PAM2-3G16** the TSL development team has listened and reacted to customer comments and requests in a constant bid to evolve the PAM platform in accordance with user requirements. Today, **PAM2-3G16** and **PAM1-3G8** are complemented by an improved set of user tools designed to further enhance operation in the increasingly complex world of Broadcast Audio.

Additions to the latest software release include improved loudness measurement capability, user-assignable input matrix for non-SMPTE channel order, lip sync audio delay capability and improved data reporting.

Loudness Measurement

With loudness measurement and control such an important subject amongst programme creators and broadcasters, **PAM2-3G16** tackles the burgeoning issue of loudness regulation head-on with a set of tools which are both relevant and useable, giving constant analysis and instant feedback to engineers and operators alike. **PAM2-3G16's** new functionality anticipates the EBU and ATSC recommendations

and gives the user the power to configure their own target and measurement parameters whilst providing practical solutions for monitoring and reporting such as a time-versus-level histogram and 'over target' alarms.

Audio Delay

Another new feature is the ability to delay audio outputs (to internal or external loudspeakers) up to 250ms to compensate for video latency in displays and multiviewers. Audio delay settings can be configured on a 'preset' basis so that only sources with associated video are affected. When delaying audio decoded from a Dolby E or AC-3 the **PAM2-3G16** auto-compensates for the decoding latency to ensure that the output delay remains constant.

Assign Matrix

The unique User Assign Matrix is designed for use when embedded audio signals include components such as clean effects and multiple language commentaries. By enabling the user to assign non sequential channels to a user configurable 5.1 bargraph display, complicated multichannel delivery formats can be reconstructed and monitored using established **PAM2-3G16** monitoring functions such as 'Downmix' and 'All'.



Fig 1: Bar Graphs



Fig 2: Data



Fig 3: Loudness



Specification

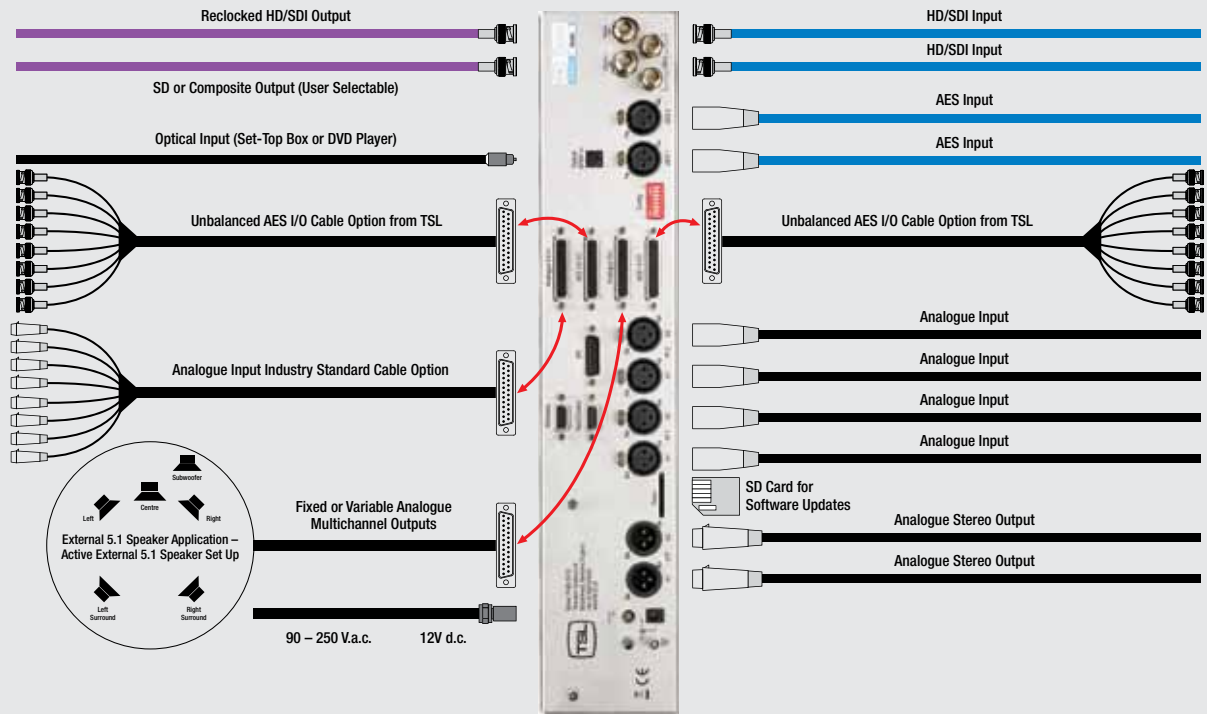
- Dual auto-sensing, 1080p (60, 59.94 and 50Hz), HD/SDI video inputs
- De-embedded audio monitoring from video (HD/SDI) with simultaneous display of up to sixteen channels (four groups)
- Re-clocked HD/SDI with down-converted SDI or composite (PAL/NTSC) video outputs (auto-sensing 1 frame delay compensation for Dolby E decoding on down-converted output)
- Dual high resolution OLED screens for bar graphs, video, setup and metadata displays
- Choice of user selectable bar graph scales (VU, Extended VU, BBC PPM, EBU PPM, EBU Digital, Nordic, DIN)
- User programmable presets. 8 by hardware buttons, GPI and up to 24 internal, accessible by high level menu selection
- Free 'life of product' software updates for standard product features
- ITU BS1770/71 loudness indication



Because the PAM2 is British made we also have professional, readily available backup from TSL should we ever need it, and that's vitally important because we rely more and more on backup from manufactures than our own people, who these days are often pushed to the limit. The bottom line allows us to focus on and manipulate any facet of a 16 channel signal while ensuring that it maintains its original quality.

Visions Head of Sound, Paul Fournier

- Optional Dolby E/AC-3/Dolby Digital Plus decoding from HD/SDI or AES
- Unique 'scroll to hear' function
- Downmix from Dolby encoded or discreet audio
- Assign Matrix
- Audio Delay (250ms)
- SMPTE 2020 Metadata
- Fixed or variable analogue audio multichannel outputs (8 monos)
- Fixed or variable AES multichannel outputs (8 pairs)
- Hi-Fi quality internal active loudspeaker system
- Control of external stereo or surround sound loudspeaker systems
- Serial remote control
- Headphone Output with LS Muting



TSL's family of Dolby and Discrete Surround Sound-enabled monitors are some of the world's most widely used multichannel audio solutions

With broadcast sound professionals learning to mix in 5.1 instead of just stereo, and often producing both formats simultaneously, products to monitor audio content have become necessarily more complex in design, but more simple and intuitive in operation.



PAM1-3G8

Precision Audio Monitoring Series

The **PAM1-3G8** is the world's most comprehensively equipped, straightforward and intuitive to use, dual input HD/SDI, 8 bar graph, Dolby decoding 1RU rack-mount audio monitoring unit.

By using a programmable library of instantly accessible factory presets, an operator can recall commonly used monitoring settings at the touch of a button (Fig 1). Additionally he/she can edit, name and save their own setups to a bank of 12 user definable memories (Fig 2).

PAM1-3G8 benefits from sharing a common code set with the **PAM2-3G16** and consequently a range of new features are now standard within **PAM1-3G8**. These include up to 250ms compensating **Audio Delay**, **SMPTE 2020** metadata display and **ITU-R BS1770 Loudness** measurement. Other more subtle improvements to the PAM family such as enhanced scrolling, data reporting and preset management are common to both platforms.

Designed with attention to detail the TSL **PAM1-3G8** offers arguably the best sound quality and level ever obtained from a 1U box.

Also available

The **AMU1-3G** is a compact 1U HD 1080p and Dolby D/E decoding audio monitor specified as per the **PAM1-3G8** but with dual 28 segment bar graph displays. For more information visit www.tsl.co.uk

Specification

- Dual auto-sensing, 1080p (60, 59.94 and 50Hz), HD/SDI video inputs
- De-embedded audio monitoring from video (HD/SDI) with intuitive selection from up to sixteen channels (four groups)
- ITU BS1770/71 loudness indication
- Dolby E and D decoding from HD.SDI signal sources
- Video confidence monitoring
- Re-clocked HD/SDI with down converted SDI or composite (PAL.NTSC) video outputs selected via rear panel config.
- Dual hi-resolution OLED screens for 8 bar graphs, setup and metadata display
- Choice of user selectable bar graph scales (BBC PPM, EBU PPM, EBU Digital, Nordic and DIN)

- User programmable presets. 3 by hardware buttons, 7 GPI and up to 24 internal, accessible by high level menu selection
- Fixed or variable analogue multichannel outputs (8 monos)
- Fixed or variable AES multichannel outputs (4 pairs)
- Variable stereo analogue outputs
- High quality internal full range loudspeaker system
- Dual 12V DC inputs
- Serial remote control
- Headphone output with LS muting
- Compact 1RU case, 320mm deep



Fig 1



Fig 2



We are currently using the PAM1-3G8 in a satellite uplink truck for 'The BBC Proms', the world's largest classical music festival. The PAM1 unit is very simple to use, and after a quick installation and a few button pushes it immediately gives me the greatest confidence that I am transmitting good audio and video. I have other good analysis tools that can tell me if I've had a car crash, but the PAM1-3G8 can tell me that it's coming. In short, the entire unit is very well conceived and user friendly.

SIS Live Outside Broadcasts' Communications Engineer, David Crownshaw

TSL's family of Dolby-enabled monitors also includes the acclaimed AMU2-8HD Range; one of the world's most widely used Dolby solutions



AMU2-8HD+

Designed to operate in the digital domain the **AMU2-8HD+** adds a second auto sensing HD/SDI input and now includes 4 pairs of AES outputs which can be configured to operate in fixed or variable modes. The multichannel analogue audio outputs can also be configured as fixed or variable for 5.1 loudspeaker control or integration with 3rd party audio equipment. The **AMU2-8HD+** has 2 stereo analogue inputs.

AMU2-8HD-3G

The ultimate expression of the 8HD range. Similar to the **AMU2-8HD+** but with the ability to decode High Definition video up to and including 1080p60. The **AMU2-8HD-3G** is one of the most comprehensive multichannel audio monitoring tools available.

For more information visit:
www.tsl.co.uk/products_audio.aspx

Flexible monitoring of non-Dolby 5.1 Audio

Both the **AMU2-8HD+** and **3G** models have expanded features to help make monitoring discrete embedded 5.1 audio straightforward. With the demand for simultaneous stereo and 5.1 audio, broadcasters have been using different techniques for embedding mixed stereo and surround PCM bitstreams.

The 6 channels of a surround sound signal embedded within an HD video bitstream can be multiplexed into any of the four groups (A, B, C or D).

By using the 'ALL' function key and by selecting the bar graph pair which corresponds with the start (Left and Right) of the surround sound audio, the monitoring matrix will route the adjacent 'stems' to the AES and Analogue multichannel output connectors.

The output can then be used to feed a set of 5.1 monitoring loudspeakers. Once the embedded 5.1 tracks have been defined, the Lt Rt downmix button can be used to select a stereo fold-down.

Monitoring of non-Dolby 5.1 audio is now as flexible and intuitive as that of Dolby E and D encoded signals.



Specification

- Dual auto-sensing, 1080p (60, 59.94 and 50Hz), HD/SDI video inputs. (MK3 single HD/SD Input)
- De-embedded audio monitoring from video (HD/SDI) with intuitive selection from up to sixteen channels (four groups)
- Dolby E and D decoding from HD/SDI signal sources
- 2 x balanced stereo analogue inputs (4 x for the Mk3)
- LCD Dolby Metadata display
- Comprehensive audio monitoring selection, including Lt/Rt, Stereo, mono or solo individual Dolby Surround stems
- Re-clocked HD/SDI with down converted SDI or composite (PAL/NTSC) video outputs selected via rear panel configuration switch
- 8 x hi-resolution 53 segment bar graph displays with stereo phase correlation
- Choice of bar graph scales (BBC PPM, EBU PPM, EBU Digital, Nordic and DIN)
- Fixed or variable analogue multichannel outputs (8 monos)
- Fixed or variable 4 AES multichannel outputs
- Variable stereo analogue outputs
- Full Dolby surround sound monitoring capability (using external amplifier)
- Stereo 15W amplifier and headphone jack
- AC and 12V DC inputs
- Serial remote control
- Compact 2RU case, 310mm deep

Flexible audio/video monitoring solutions available in a choice of input formats to suit most applications

With dual HD/SDI auto sensing inputs, built in audio de-embedding and a comprehensive set of display features, the **AVMU2-3G** is a compact and cost effective solution to combined AV monitoring.



Designed for use anywhere in an HD broadcast chain, the AVMU2-3G is capable of decoding all standards up to and including 1080p 60/59.94/50Hz.

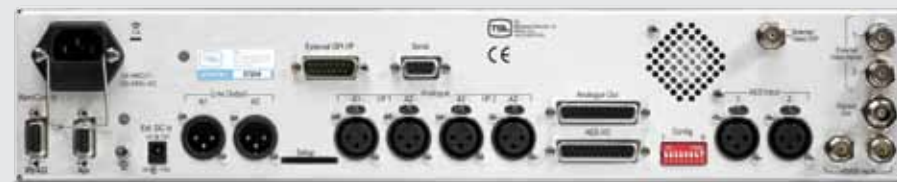
The provision of a 16:9 LCD display and built in loudspeakers ensures the **AVMU2-3G** is equally at home in the racks room, ingest position, transfer suite or outside broadcast vehicle.

The **AVMU2-3G** can de-embed and decode any one of four embedded audio groups from the selected HD/SD video source, displaying the levels on the 53 segment vertical bar graphs. The unit also provides eight fixed and variable analogue outputs on XLR and D-sub plus front mounted headphone socket for discrete monitoring. The AES and analogue outputs can be used to feed other professional hardware such as Waveform Monitors, Rasterisers or Oscilloscopes.

The **AVMU2-3G's** partner, the **AVMU2-BHD+** is an HD/SDI audio video monitor designed to allow operators to view an HD video source up to and including 1080i in 16:9 widescreen.

Specification

- Dual auto-sensing HD/SDI video inputs
- SMPTE 259M, 296M, 274M for 720p/1080i at 525/625 frame rates
- 4.5" (16.9) LCD video monitor with two external composite video inputs
- De-embedded audio monitoring from digital video source
- Re-clocked digital video and composite (PAL/NTSC) video outputs
- Four 53 segment hi-resolution tri-colour bar graph displays
- PPM, EBU Digital scales available
- Two balanced AES and two stereo analogue audio inputs
- Phase correlation
- RS422 and GPI remote control of dim and cut functions



The AVMU-BHD+ is a very successful multi-format unit and is particularly suitable for use in outside broadcast environments. When you find something that works as well as this product, you owe it to your clients to include it whenever possible, hence our decision to include them as standard in relevant proposals.

Vislink's Project Engineer, Adam Simmonds

Comprehensive and compact audio monitoring solutions in 1ru

The AMU1-CHD+ is one of TSL's best-selling products. Designed for use in environments where simple monitoring of stereo embedded audio is required, the AMU1-CHD+ provides instant access and Hi Fi quality audio monitoring of any pair from an SDI audio signal at the turn of a switch.



AMU1-CHD+

Simple and straightforward to operate, the **AMU1-CHD+** is the ideal choice for any operational position where stereo audio monitoring from an embedded source is mandated. With the same high quality sound reproduction as the **PAM1-3G8** and the accuracy of a 26 element bar graph display, the **AMU1-CHD+** has become the product of choice for literally hundreds of broadcasters throughout the world.

Whether used in a racks area, Ingest desk, Master Control or any technical monitoring position, the **AMU1-CHD+** delivers pristine audio derived from either SDI, AES or Analogue audio inputs. The rotary selectors on the front panel are clear and concise thus ensuring that an operator unfamiliar with the **AMU1-CHD+** will be able to use it immediately and with the addition of a new audio monitoring selector control borrowed from sister product, the **AMU1-3G**, mono, dual mono and stereo signals alike, may be checked for integrity prior to broadcast.

Specification

- 2 x HD/SDI inputs, 4 x AES inputs, 2 x Stereo Analogue inputs
- SMPTE 259M, 296M, 274M for 720P/1080i at 525/625 frame rates
- 4 x decoded AES outputs
- De-embedded audio monitoring from a digital video source
- Re-clocked digital video HD/SDI output
- Composite (PAL/NTSC) video output
- Dual 26 segment tri-colour bar graph display
- PPM and EBU digital ballistics
- Hi Fi internal active loudspeaker monitoring system
- Out of phase indicator



AMU1-3G

Although deceptively similar to the **AMU1-CHD+**, the **AMU1-3G** is available with 3G de-embedding and Dolby E/AC-3 decoding as standard. A Dolby status LED located between the stereo bar graph pair provides the user with an indication of the status of an incoming Dolby signal and the monitoring selector control enables the user to select to listen to individual components of a decoded Dolby signal as well as the ability to reproduce an Lt Rt or Lo Ro Downmix to check stereo compliance.

Specification

- Compact 1RU case
- DUAL auto-sensing, 1080p (50Hz), HD/SDI video inputs
- De-embedded audio monitoring from video (HD/SDI) with intuitive selection from upto sixteen channels (four groups)
- Dolby E and D decoding from HD/SDI signal sources
- Re-clocked HD/SDI with optional down-converted SDI and composite (PAL/NTSC) video outputs
- Dual 26 segment tri-colour bar graph display (EBU digital or PPM scales, user selectable)
- High-quality internal active loudspeaker system
- Balanced AES and Analogue Audio Inputs
- Dual 12V DC inputs
- Out of phase indicator
- Headphone Output with LS Muting



Stereo Analogue Audio Monitoring

The AMU1-BAS and AMU2-MAS feature 6 stereo inputs of audio monitoring and a choice of high resolution bar graphs and PPM / VU moving coil meters with integral confidence quality loudspeaker listening.



AMU1-BAS

Compact and cost-effective high-resolution bar graph audio monitoring unit with monitoring output selection, line level outputs and internal loudspeakers.

Specification

- 106 segment high resolution bar graph display
- Six switch selectable stereo inputs
- Internal communication quality loudspeakers
- Fixed line outputs
- Available with all international scales (UK PPM, EBU
- PPM, VU, NORDIC, DIN and EBU DIGITAL)
- Dim and cut facility
- Headphone output with automatic loudspeaker muting
- Loudness indication



AMU2-MAS

Stereo moving coil audio monitoring unit with a phase correlation bar graph, monitoring output selection, line level outputs and internal loudspeakers. It also offers a Dim/Cut function.

Specification

- Six switch selectable stereo inputs
- Audio presence indication
- Internal communication quality loudspeakers
- Fixed line outputs
- Two moving coil meters – option of VU or PPM
- Headphone output with automatic loudspeaker muting



TSL's AMUT ("T Series") family of audio monitoring units are designed to sit conveniently next to Tektronix™, VideoTek™ and Leader™ style 3RU half width units in any rack or desk environment

The AMUT family provides stereo audio monitoring from HD, SDI, AES and analogue sources; 106-segment, tri-colour bar graph and moving coil metering options; comprehensive audio monitoring outputs; variable and fixed level, stereo and multichannel, plus headphones.

The AMUT range is an elegant way to ease the migration to HD in a convenient sized chassis.

Benefits

Seamless compatibility with leading test and measurement devices.

Features

Stereo audio monitoring from HD, SDI, AES and analogue sources in a practical ½ rack width 'TEK' package plus comprehensive audio monitoring outputs; variable and fixed level, stereo and multi-channel.

The **AMUT-2MA** is an analogue stereo audio monitor in 3RU half rack width chassis.

Specification

- Auto-sensing HD/SDI video input
- 2 x AES, 6 x stereo analogue inputs (XLR and D-Sub)
- SMPTE 259M, 296M, 274M for 720P/1080i at 525/625 frame rates
- De-embedded audio monitoring from HD or SD video
- Re-clocked HD/SD with optional down converted SD and composite (PAL/NTSC) video
- Dual 106 segment hi-resolution tri-colour bar graph display or 2 x Sifam type 22 AF meters
- Internal 2 x 15W power amplifier
- Fixed and variable analogue outputs
- RS422 and GPI remote control

AMUT-BHD



AMUT-2MHD



The Monitor Plus range of audio monitoring solutions are designed for use in any broadcast application

It offers units with both passive and full range active loudspeakers, analogue or AES inputs and confidence monitoring on clear dual 26 segment bar graph displays. Designed by one of the UK's leading audio engineering houses, the MPA range delivers comprehensive audio monitoring confidence in a small package.

The Monitor Plus Audio (MPA) family consists of four rack mount confidence monitors with passive, active, analogue and AES digital options.

Benefits

Designed by one of the UK's leading audio engineering houses to deliver 1RU class leading audio performance in a compact 200mm deep chassis.

Features

Separate HF and LF drive units with linear phase time accurate active crossover, which ensures superb sound quality.

MPA1-ASC

NEW MP Series Audio monitoring unit, 1RU, 2 x stereo analogue inputs, internal stereo loudspeakers, individual volume controls, external PSU.



MPA1-BD

Monitor Plus audio monitor, 1RU, 2 switch selectable analogue inputs, 2 switch selectable AES digital inputs, internal speakers, dual 26 segment bar graphs, EBU Digital and UK PPM selectable scales, Phase indication, Peak hold.



MPA1-BA



Monitor Plus audio monitor, 1RU, analogue inputs, internal speakers, dual 26 segment bar graphs, 2 switch selectable analogue inputs, EBU PPM and UK PPM selectable scales, Phase indication, Peak hold.



MPA1-S



Monitor Plus audio monitor, 1RU, passive internal speakers.



MPA1-ASB



NEW MP Series Audio monitoring unit, 1RU, 2 x stereo analogue inputs, internal stereo loudspeakers, 2 x 12 segment bar graphs, individual volume controls, external PSU.



TSL's range of monitoring products are suitable for every eventuality, especially when space is at an absolute premium

AMU1-BHD+ / AMU2-BHD+



1RU rack mounted audio monitor with DUAL HD/SDI video inputs, AES and Analogue audio inputs and hi-resolution 106 segment bar graph display.

Available in both 1RU and 2RU versions the **AMU-BHD+** is a hi-resolution stereo audio monitoring tool for use throughout the Broadcast facility

Specification

- 2 x auto sensing HD/SD video inputs, 2 x Stereo inputs
- 4 x AES inputs, 4 x Decoded AES outputs
- Full access to group monitoring
- SMPTE 259M, 296M, 274M for 720P/1080i at 525/625 frame rates
- Re-clocked digital video and composite (PAL/NTSC) video outputs
- User selectable alpha-numeric indication of level, accurate to 0.1db
- Scales available: UK PPM, EBU PPM, VU, Nordic, DIN, EBU Digital
- Loudness indication (ISO 226)
- Peak hold, 0db marker
- Phase correlation bar graph
- Select multiple audio inputs for 1:1 mix comparison



AMU2-2BHD



Compact 4 channel audio monitoring when embedded in a digital video source.

Specification

- Auto sensing HD/SD input
- 1 x quad analogue input, 2 x AES/EBU inputs
- SMPTE 259M, 296M, 274M for 720P/1080i at 525/625 frame rates
- 4 x hi-resolution 106 segment tri-colour bar graph displays
- Scales available: UK PPM, EBU PPM, VU, Nordic, DIN, EBU Digital
- Selectable bar graph loudness indication
- RS422 and GPI remote control of Dim and Cut functions
- Phase correlation bar graph



AMU2-2MHD



Monitoring audio embedded in digital video sources using familiar moving coil meters, or for 2 x 106 segment bar graph format please see **AMU2-BHD+**.

Specification

- 2 x auto sensing HD/SD video inputs, 2 x Stereo inputs
- 4 x AES inputs, 4 x Decoded AES outputs
- SMPTE 259M, 296M, 274M for 720P/1080i at 525/625 frame rates
- PPM and VU moving coil meter options
- Re-clocked digital video and composite (PAL/NTSC) video outputs
- Select multiple audio inputs for 1:1 mix comparison
- RS422 and GPI remote control of Dim and Cut functions
- Phase correlation bar graph
- Comprehensive stereo audio monitoring outputs
- For analogue only version please see the AMU2-2MA



From live sport production at an Outside Broadcast, through to 24 Hour News, Post Production, Master Control and finally to Playout and Transmission, TSL has a product for every application

The complex nature of multichannel and multi-format audio systems within today's broadcast facility can demand some versatile solutions for monitoring.

Outside Broadcast

The OB Truck produces High Definition programmes with multiple 5.1 and stereo audio mixes. The production areas need to check the integrity of the different mixes and use **PAM2-3G16** to control their loudspeakers, monitor loudness and check **Dolby E** parameters. Slo-Mo and VT Operators use the versatility of the **PAM1-3G8** to monitor the multichannel stems of their media as they cut it for playback.

An **AVMU2-3G** is used to check video and audio circuits within the racks area and at the tailboard.

The **MPA1-ASC** is used to monitor prehear and Comms within the production environment using the dual-mono volume control.

Newsroom

The Newsroom produces 'fast turnaround' 24 hour news in HD/Stereo. Established products like the **AMU1-BHD+** and **AMUT-MHD+** are used to

monitor the audio for level and technical compliance in production and the racks room. Presenters prehear and Comms circuits are monitored via the **MPA1-ASC**.

Out in the field, the News Channel has a fleet of SNG Vehicles relying on their **AMU1-CHD+** to ensure that location reports are heard loud and clear.

Production Studio

Live and recorded magazine programmes, drama and Light Entertainment are produced in the studios. Content varies from HD to SD, Stereo to 5.1 and features and flexibility of the **PAM2-3G16** and **PAM1-3G8** ensure that programme content is ready for transmission. When the studio adopts the new **SMPTE2020** standard for transporting **Dolby** Metadata in the VANC, the **PAM2-3G16** and **PAM1-3G8** will be ready. Surround sound productions output discrete multichannel material for non-live applications

and **Dolby E** versions for live transmission, the **AMU2-8HD+** in production checks the integrity of both outputs.

Master Control, Ingest and QC

Master Control manages incoming and outgoing lines, working in conjunction with Ingest and QC to check technical compliance; this is arguably the most technically demanding part of the TV Station.

The main monitoring in MCR is provided by the **PAM2-3G16**. A pair of these units (one for each of the two operators) are installed, and with features like downmixing, the **Assign Matrix**, **Loudness** measurement and **Audio Delay** for checking **Lip Sync**, the **PAM2-3G16** is a comprehensive toolbox for analysing whatever audio format enters or exits the facility.

A custom **TSL LS** selector means that either of the **PAM2-3G16** can output 5.1 audio to a set of full-range surround sound speakers at the flick of a switch. QC and Ingest rely on their **PAM1-3G8**

units to ensure that material is compliant and fit for transmission.

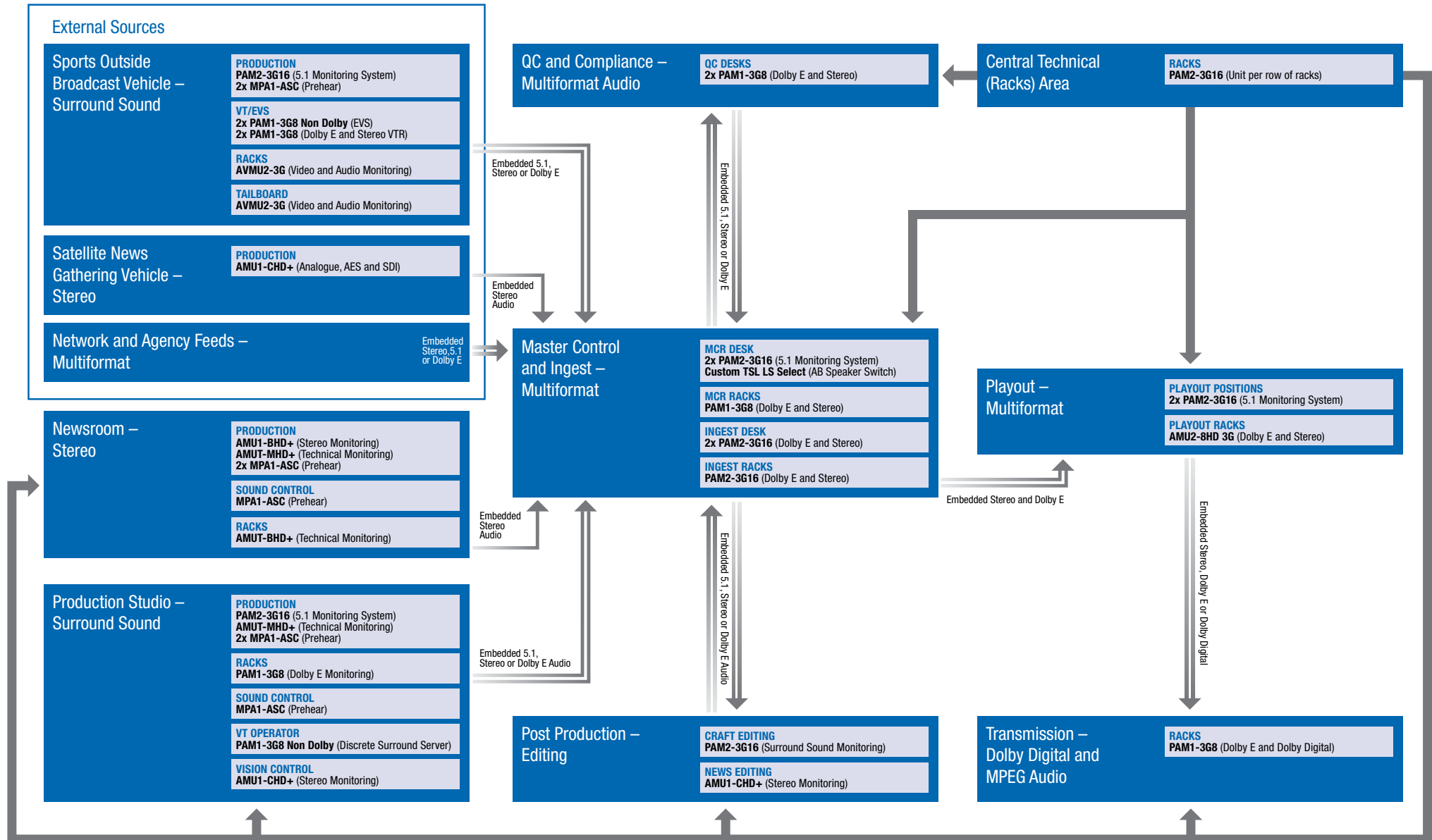
The loudness measurement feature on the **PAM1-3G8** is essential to ensure compliance with increasingly strict local regulations and the **SMPTE2020** Metadata measurement feature will ensure that the audio monitoring units are ready when the station adopts the new standard.

Playout and Transmission

The stations HD and SD transmission channels use a mix of **Dolby E** and Stereo PCM audio, the Playout Technicians use class leading **PAM2-3G16** to listen to the outputs through their full range loudspeaker system. In the Transmission area, a **PAM1-3G8** provides the final check, monitoring the outgoing Dolby Digital content emitted on the HD channels. With in-built **Dolby Digital Plus** decode capability the stations proposed move to the new **Dolby** format will not require reinvestment in Audio Monitoring equipment.



An example of a typical HDTV Station showing the varying audio formats being used within each department.





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