

# Audio Monitoring Units (AMU)

Professional Audio Monitoring Solutions



[www.tslproducts.com](http://www.tslproducts.com)

From Entry-level to Critical multi-channel monitoring, TSL Products has a solution to give confidence to every sound operator position along the broadcast chain whether in creative or technical engineering.



Audio Monitoring Units – Product overview.

TallyMan Controllers		Page No.	Display			Inputs				Outputs										Features												
			Video Monitoring	Meter Type Moving Coil	Meter Type Bargraph	HD/SDI	MADI	AES	Analogue (Pair)	Line level fixed/ variable	AES fixed/ variable	Reclocked HD/SDI	MADI	Composite Video	Down Converted Video	Headphone	Integral Loud speakers	Power Amplifier (Ext/LS)	User Configurable	Dolby D, D+&E Decoding	Discrete Multichannel Audio	Loudness	Assign Matrix	Audio Delay	Ethernet	Loudness Logging	Mixer	Touchscreen	3G	USB	SMPTE Timecode	
PAM Series	PAM1 MK2	4&5	Y		16	2		4	2	F+V	F+V	Y		Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y			Y	Y			
	PAM1 MK2 ND	4&5	Y		16	2		4	2	F+V	F+V	Y		Y	Y	Y	Y		Y		Y	Y	Y	Y	Y			Y	Y			
	PAM2 MK2	4&5	Y		16	2		8	6	F+V	F+V	Y		Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y			Y	Y			
	PAM2 MK2 ND	4&5	Y		16	2		8	6	F+V	F+V	Y		Y	Y	Y	Y		Y		Y	Y	Y	Y	Y			Y	Y			
	PAM PiCo One	9		Y	4			3	1			Loop							Y			Y	Y			Y			Y	Y	Y	
	PAM PiCo Two	9		Y	8			3	1			Loop							Y			Y	Y			Y			Y	Y	Y	
	PAM PiCo Five	9	Y	Y	16	1		3	1			Loop							Y			Y	Y			Y			Y	Y	Y	
SAM Series	SAM1-3GM	5			22	2		4	2	F+V	F+V	Y				Y	Y		Y		Y			Y		Y			Y	Y		
	SAM1-MADI	5			22	2	Y	4	2	F+V	F+V	Y	Y			Y	Y		Y		Y			Y		Y			Y	Y		
AMV-T Series	AVM-T-MIX	7			22	1(2)opt.		8	8	F+V	F+V	Y				Y	Y		Y		Y			Y		Y	Y	Y	Y	Y		
	Touchmix Pilot	7			22	1(2)opt.		8	8	F+V	F+V	Y				Y	Y		Y		Y			Y		Y	Y	Y	Y	Y		
	Touchmix Combo	7			22	1(2)opt.		8	8	F+V	F+V	Y				Y	Y		Y		Y			Y		Y	Y	Y	Y	Y		
1 Series	AMU1-3G	10			2	2		4	2	F+V	F	Y		Y	Y	Y	Y			Y									Y			
	AMU1-BHD+	11			2	2		4	2	F+V	F	Y		Y	Y	Y		Y			Y											
	AMU1-CHD+	10			2	2		4	2	F+V	F	Y		Y	Y	Y	Y															
	AMU1-BAS	12			2				6	F+V						Y	Y				Y											
2 Series	AMU2-8HD-3G	13			8	2		4	2	F+V	F	Y		Y	Y	Y		Y		Y	Y								Y			
	AMU2-8HD+	13			8	2		4	2	F+V	F	Y		Y	Y	Y		Y		Y	Y											
	AMU2-BHD+	11			2	2		4	2	F+V	F	Y		Y	Y	Y		Y			Y											
	AMU2-2MHD+	11		2		2		4	2	F+V	F	Y		Y	Y	Y		Y														
	AMU2-2BHD+	11			4	1		2	2	F+V		Y		Y	Y	Y		Y			Y	Y										
	AMU2-MAS	12		2					6	F+V						Y	Y															
AVMU Series	AVMU2-3G	13	Y		4	2		2	2	Y	F	Y		Y	Y	Y	Y			Y								Y				
AMUT Series	AMUT-BHD	12			2	1		2	4	Y		Y		Y	Y	Y		Y			Y											
	AMUT-2MHD	12		2		1		2	4	Y		Y		Y	Y	Y		Y														
	AMUT-2MA	12		2				4	Y							Y		Y														
MPA Series	MPA1-S	n/a							1								Y															
	MPA1-ASC+	8							2	F+V							Y	Y														
	MPA1-ASC-8	8			2				8	F+V							Y	Y														
	MPA1-ASC+	8			2				2	F+V							Y	Y														
	MPA1-ASB-8	8			2				8	F+V							Y	Y														
	MPA1-BA	8			2				2								Y	Y														
	MPA1-BD	8			2			2	2								Y	Y														
	MPA1-3G	8			2	1				F+V		Loop					Y	Y											Y			
BBG Series	BBG-1	n/a			2			1	1												Y											
Symbols Key																																
		Dolby Decoding	AES	Analogue	Auto-Sensing HD/SDI	Down Conversion	Video Display	HD 1080p	Active Speaker System	Audio Delay	Assign Matrix	Loudness	Ethernet	Logging	Alarms	Touchscreen	Mixer	MADI	USB													

TSL Products’ 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, TSL Products continuously evolves its product portfolio by building on new enabling technologies and technical standards.

Whether you need critical level metering with hi-resolution bargraphs, 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 Products has a solution 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.

The key attributes of TSL Products’ award winning audio monitoring 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 over 25 years worldwide experience of TSL’s Systems Integration Group, TSL Products 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.

In addition to the Audio Monitoring range, TSL Products also specializes in SoundField Surround Sound, Power Management and Broadcast Control Systems - thousands of which are in operation across the globe. Visit: [www.tslproducts.com](http://www.tslproducts.com) or call +44 (0)1628 676221

**Working with Dolby**

TSL Products has been a Dolby E Partner since the programmes inception. TSL works closely with Dolby Broadcast specialists to ensure that TSL personnel have an unparalleled understanding of Dolby technologies and customer requirements.

**Dolby E**  
**PARTNER**



# PAM2 MK2 & PAM1 MK2.

The flagship Precision Audio Monitor series from TSL Products is arguably the most comprehensively enabled confidence monitoring system available today. Equally adept in stereo, multichannel, multi-language or surround sound environments, both PAM1 and PAM2 MK2 provide the user with a highly sophisticated yet intuitive solution to the challenge presented by modern broadcast sound workflow.

## Innovative

The **PAM2 MK2** is one of the first audio monitoring solutions to feature Dolby's CAT1100 module (as an option), a new platform for comprehensive decoding and monitoring of Dolby audio formats that are used throughout the HD broadcast chain (Dolby Digital Plus, Dolby Digital and Dolby E). The new module enables the PAM2 MK2 to perform Dolby E decoding and external speaker monitoring, as well as Dolby Digital Plus with surround descriptive audio and stream mixing, which will evolve to 7.1 as broadcasters adopt the full cinematic experience.

Additional features which the CAT1100 card brings to the PAM2 MK2 include;

- Dialogue Intelligence
- Loudness Measurement
- Simultaneous Multichannel and Stereo outputs
- Selectable error concealment

This ensures that PAM2 MK2 maintains its reputation as the world's leading Dolby 'loaded' audio monitoring unit.

## Features

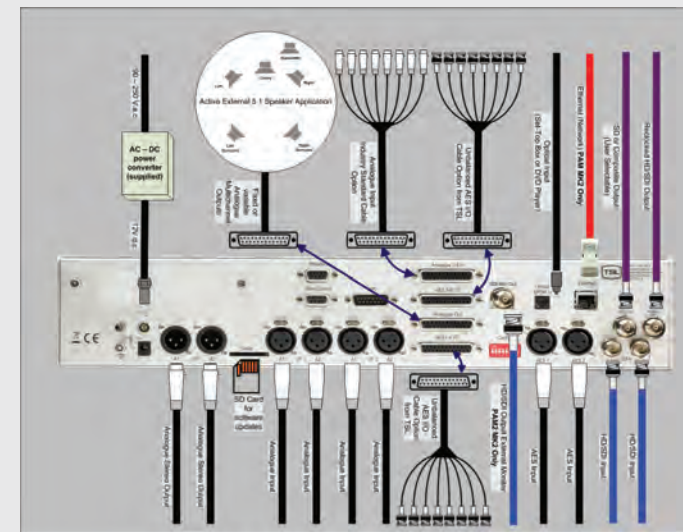
- 8 AES (8 Pairs/16 channel) Inputs – 110 Ohm. Balanced or 75 Ohm unbalanced via optional CAB-D25-BNC cable
- 6 Analogue Stereo Inputs
- User programmable presets, 8 by hardware buttons, GPI and 24 internal, accessible by high level menu selection
- Factory preset recall – 5 presets selecting SD1, SD2, AES, and Analogue and Optical Inputs
- Fixed or variable AES multichannel outputs for external loudspeaker and system integration (8 pairs/16 channels)
- Compact, lightweight (5.1Kg), 2RU case, 320mm deep

## Loudness Measurement

Loudness measurement is now an important subject amongst programme creators and broadcasters, especially as the world embraces regional, national and local recommendations and legislation such as the CALM act in the U.S.

Configurable loudness information in full compliance with EBU R128 and ATSC A85 is one of the resident metering sets available both onboard the PAM2 MK2 and exportable to an external display from the SDI port. The established PAM Loudness Histogram provides a visual display of Loudness against time and with the addition of real-time logging over Ethernet, PAM2 MK2 gives you the confidence that the audio leaving you is compliant.

As a practical benefit for field operations, the SDI bargraph feed from a truck, for example, can be sent over a reserve circuit back to master control for accurate compliance and confidence monitoring of remote broadcast sources, thereby verifying the integrity of the signal chain between outside broadcast and the host.



PAM2-MK2  
Hook-up

## Common Features

- Dual auto-sensing, 1080p (60, 59, 94 and 50Hz) HD SDI video inputs
- HD SDI Bargraph / Data / Metadata External Screen Display Output
- Ethernet connectivity for TSL Audio Remote System Control Application (Future)
- De-embedded audio monitoring from video (HD/SDI) with intuitive selection from up to sixteen channels (four groups)
- 'Scroll To Hear' – top level bargraph navigation using rotary encoder
- Downmix of discrete multichannel audio to stereo for compatibility monitoring
- Multichannel audio outputs for external stereo or 5.1 loudspeaker system integration
- Hotkey preset recall with instant save feature
- EBU, ATSC and user configurable loudness measurement and Histogram
- User Programmable 'Assign Matrix'
- Audio Output Delay for video screen latency compensation
- Dolby E, Dolby Digital and Dolby Digital Plus decoding from HD SDI and AES signal sources
- Dolby Digital Plus with surround descriptive audio and stream mixing. Programmable conditional mode switching depending on input signal type – HD / SD / PCM / Dolby
- Lt Rt and Lo Ro Downmixing of Dolby signals
- Hi Resolution Video confidence monitoring
- Re-clocked HD/SDI with down converted SDI or composite (PAL/NTSC) video outputs selected via rear panel Config. Switch
- Choice of user selectable bargraph scales (BBC PPM, EBU PPM, EBU Digital, Nordic, VU and DIN)
- Fixed or variable analogue multichannel outputs for external loudspeaker and system integration (8 mono)
- Variable stereo analogue outputs
- High quality internal full range loudspeaker system
- Variable LED screen brightness control
- Dual 12V DC inputs
- Headphone output with LS muting



## PAM1-MK2

The **PAM1 MK2** is an evolutionary step up from the original PAM1-3G8, offering an improved feature set and user interface, upgraded integrated speaker system, larger screens and a full set of functions carried over from the flagship PAM2 MK2 Precision Audio Monitor.

PAM1 MK2 enables instant direct access to the most important user screens such as Data, Video Confidence, Loudness and Metadata. Favourite views and modes can be saved with a single push of a Hotkey preset button

Dolby encoded, multi-language, 5.1 audio and loudness compliance measurement features are packaged in a space-efficient 1RU chassis that has been reduced in depth as well as featuring an improved internal speaker system. The PAM1 MK2 is suitable for a broad range of operational users throughout the TV production environment from ingest to transmission, including post production and all types of studio facilities. The unit is compatible with Dolby E, Dolby Digital and Dolby Digital Plus decoding from HD, SDI and AES signal sources with Lt Rt and Lo Ro Downmixing of Dolby Signals.

## Features

- 8 AES (4 Pairs/8 channel) Inputs – 110 Ohm. Balanced or 75 Ohm unbalanced via optional CAB-D25-BNC cable
- 2 Analogue Stereo Inputs
- User programmable presets, 5 by hardware buttons, GPI and 24 internal, accessible by high level menu selection
- Factory preset recall – 4 presets selecting SD1, SD2, AES, and Analogue Inputs
- Fixed or variable AES multichannel outputs for external loudspeaker and system integration (4 pairs/8 channels)
- Compact, lightweight (3.6Kg), 1RU case, 280mm deep



# Studio Audio Monitoring.



## SAM1-3GM

The **SAM1-3GM** provides broadcasters and content producers with an agile and intuitive operating system, designed for use in the dynamic world of live television production. With the increasing diversity of broadcast audio signals demanding seamless and unobtrusive solutions, operators need tools to hand that can react in an instant and adapt to whatever challenge is thrown their way.

A revolution in usability within a 1RU format, the SAM1-MADI provides instant visual feedback from any HD-SDI, AES, analogue or MADI input source channel. Operators can tailor their monitoring systems to meet their exact needs and streamline workflow practices.



### Features for SAM1-3GM & SAM1-MADI

- MADI capable (SAM1-MADI only)
- Hot Source List (SAM1-MADI only)
- Freely assignable 20 channel bargraph display capable of reporting audio signal activity from any HD-SDI, AES, analogue or MADI (SAM1 MADI only) source
- Scroll to Hear channel selection
- Individual channel 'trim', 'balance/pan' levels
- Master output volume with cut/dim
- 'Solo' button mutes all but the selected channel
- Colour coded Channel Format defines selected pair as being Stereo, Mono for 5.1 downmix instantly
- Menu level to select scales, reference, ballistics and hands-on channel naming
- Menu level used for IP setups
- Menu level used to manage onboard preset memories and USB save/recall
- Menu level used to manage software updates
- TSL dashboard control system compatible (future capability)
- Menu selection of auxiliary channels 1 and 2 from analogue and AES inputs
- A Dolby encoded source is muted when selected



## SAM1-MADI

**SAM1-MADI** - ideal for both fixed and mobile broadcast facilities, or any users who have embraced MADI as the backbone of their facility's audio infrastructure.

The SAM1-MADI is a sophisticated device that provides multichannel monitoring of up to 20 channels of audio from MADI, embedded HD-SDI, AES and analogue sources. Via user-configurable screen, SAM1-MADI offers immediate access to any combination of formats, delivering comprehensive visual and audio feedback for confidence monitoring in a compact 1RU unit.

With the SAM1-MADI, the user can create a tailor-made monitoring panel that gives them access to the channels that they need via a simple rotary control. Channels can be defined as being mono, stereo or 5.1 downmixed group via a single button press with a simple colour scheme for instant user recognition of the channel configuration. Furthermore, the operator can mix multiple signals together and adjust individual mix levels, if required, to create a personal monitoring environment that meets their exact requirements.

The unique **'HOT SOURCE LIST'** is a configurable subset of all 92 available inputs and can be programmed by the user to contain as many or as few of those most commonly used ensuring that navigation and operation is both simple and intuitive.

The SAM1-MADI features dual auto-sensing at 1080p resolution (60, 59, 94 and 50Hz) through HD/SDI video inputs for maximum flexibility in any facility. De-embedded audio monitoring is possible from the video HD/SDI data stream with intuitive selection from up to 16 audio channels in four groups. MADI connectivity is through a single 54/64 channel MADI input/output with coax connections and single-mode or multi-mode fibre option. The unit additionally offers 54/64 channel MADI 'reclocked' loop output via coax connection. Dedicated audio inputs include four AES (4 Pairs/8 Channel) and two analogue stereo inputs. The unit also provides Ethernet capabilities for network connectivity, a USB connector and SD card slot for system updates and preset save/recall. Dual high resolution 2.4-inch screens for 20 bargraphs, setup and metadata display are provided with a generous range of user-selectable bargraph scales including BBC PPM, EBU PPM, EBU Digital, Nordic, VU and DIN.

# Audio Monitoring at your fingertips.

Available in two formats; rackmount and desktop, the Touchmix (AVM-T-MIX) is the worlds first Touchscreen based audio monitor. Designed for use in creative operational locations throughout the TV Station or Outside Broadcast Truck; with a Touchmix close at hand, Producers, Directors, Editors, VT Operators, Production Assistants, Journalists and even Presenters have instant access to the audio they need the moment they need it.



## Touchmix (AVM-T-MIX)

A typical Broadcast TV production workflow often demands that operators have the ability to hear audio from diverse sources such as routers, VTR/Servers, Talent, and of course, communications. The format of incoming audio signals may vary considerably from SDI embedded to AES and analogue with channel configurations in surround sound, stereo, mono, with multiple languages, clean FX channels and multiple programme mixes further complicating the situation. When signals vary dynamically during a production or setups alter completely from show to show programme makers need audio monitoring which can adapt and is simple to use.

**Touchmix** provides a unique solution to the problem described. In live operation the Touchmix user simply touches the audio channel they wish to hear, adjusts individual levels of each incoming source and can even mix signals together if required.

### Introducing

## Touchmix Pilot and Touchmix Combo



A brand new concept in audio monitoring and mixing the Touchmix Pilot remote desktop and rackmount host empowers creative users with 'lean back' operation whilst maintaining the same functionality of the rackmount Touchmix. The Touchmix Pilot comprises a Desktop Remote panel with rack-mount host unit, providing one-touch access to any analogue, AES or SDI embedded audio source material in mono, stereo or surround formats. The remote control allows for the adjustment of individual levels, balance and pan control and lets users mix together multiple sources for diverse monitoring and mixing applications throughout the creative production process.



### Features

#### Touchmix Features

- Single or Optional Dual (2SD Only) Auto-sensing, 1080p (60, 59, 94 and 50Hz), HD/SDI video input
- De-embedded audio monitoring from video (HD/SDI) with intuitive selection from up to sixteen channels (SDI 1 only), and eight channels (SDI 2 Group 1 and 2 only)
- 8 AES (8 Pairs/16 Channel) or 4 AES (4 Pairs/8 Channel – 2SD Only) Inputs– 110 Ohm Balanced or 75 Ohm unbalanced via optional CAB-D25-BNC cable
- 8 Analogue Stereo Inputs
- Identical twin audio mixers
- 10 stereo/ 20 dual mono assignable input channels per mixer
- Downmix of discrete multichannel audio to stereo for compatibility monitoring
- Re-clocked HD/SDI video output.
- Choice of user selectable bargraph scales (BBC PPM, EBU PPM, EBU Digital, Nordic, VU and DIN)
- 18 User programmable presets.
- 'Home' button for instant recall of default operating condition
- Manage, recall and save favourite configurations via USB stick or SD card
- Fixed or variable analogue stereo outputs (mixer 1 and 2)
- Fixed or variable AES stereo outputs (mixer 1 and 2)
- Variable stereo analogue outputs (Monitor Buss)
- High quality internal full range loudspeaker system
- Dual 12V DC power
- Serial remote control
- Headphone output with LS muting
- Compact, lightweight (5.1Kg) 2RU case, 320mm deep

#### Touchmix Pilot Features

- Host replicates rear panel functionality of rackmount AVM-T MIX Touchmix Pilot
- Pilot remote replicates front panel functionality of rackmount AVM-T-MIX
- 6.2" Touchscreen Display with bargraph, monitoring and mix functions
- Ethernet connectivity to single or multiple Host devices
- Serial remote control
- User assignable monitor mode switch panel
- Dual 12V DC power
- Local GPI
- Headphone output with LS muting
- Desktop or recessed mounting



## The Monitor Plus range of audio monitoring solutions (MPA) is designed for use in any broadcast application.

The MPA product family now offers 3G HD-SDI inputs as well as analogue and AES with product variants including 12 and 26 segment bargraphs, balance control and multiple stereo inputs. The 2013 MPA1 also boasts improved speaker design and up-rated amplification for uncompromising audio quality in a compact audio confidence monitor.

### Monitor Plus Audio Family (MPA)

The Monitor Plus Audio (MPA) family consists of eight rack mount confidence monitors with active loudspeakers, HD-SDI, analogue and AES audio input options.

### Benefits

Loudspeaker system designed by one the of the UK's leading audio engineering houses to deliver IRU class leading audio performance in a compact 200mm deep chassis.

### Features

- Separate HF and LF drive units with linear phase correlation
- Time accurate active crossover, which ensures superb sound quality.
- Balanced stereo analogue inputs (XLR and D-25)
- Balanced stereo analogue outputs (ASC, ASB and 3G models)
- Balanced AES inputs (XLR)
- Auto-sensing 3G HD-SDI inputs (3G models only)
- Output balance control (ASC, ASB and 3G models)
- Fixed or variable line level external analogue output (ASC, ASB and 3G models)
- Headphone output
- DC power supply (included) with locking Lemo input connector

### NEW MPA1-3G

The MPA1-3G features a single HD-SDI input with front panel selection of any pair from 16 de-embedded audio channels. Features also include stereo line outputs (fixed or variable) and output balance control



### NEW MK2 MPA1-ASC+ and MPA1-ASC-8

Available in dual stereo and eight stereo input versions the new MPA1-ASC has undergone a complete redesign and features up rated speakers for improved audio reproduction as well as stereo line outputs (fixed or variable) and balance control

### NEW MK2 MPA1-ASB+ and MPA1-ASB-8

Available in dual stereo and eight stereo input versions the new MPA1-ASB is identical to the MPA1-ASC but features the addition of an 12 segment bargraph display



### 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.



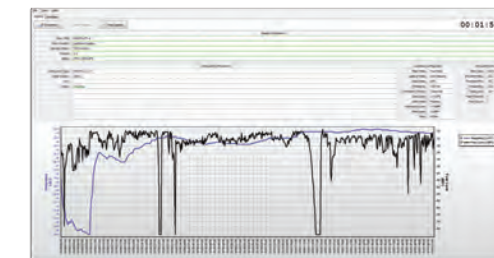
### MPA1-BA

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.



## PAM PiCo – Audio and Loudness Meter.

Both simple and easy to configure, PAM PiCo puts high quality metering within easy reach of anyone involved in sound production, from broadcast operators, music studio technicians and record producers.



Loudness Logging Application

Like the award winning PAM series of audio monitoring units, PAM PiCo includes Loudness measurement as standard and recognises the many international recommendations and mandates, including ITU, EBU and ATSC.

### A model to suit every application

**PAM PiCo is available in three versions:**

**PiCo One** – Master Stereo Meter, 4 channel bargraph display, 2 x AES Inputs (4 audio channels) + 1 Analogue Pair and USB power (PSU and universal mounting bracket supplied).

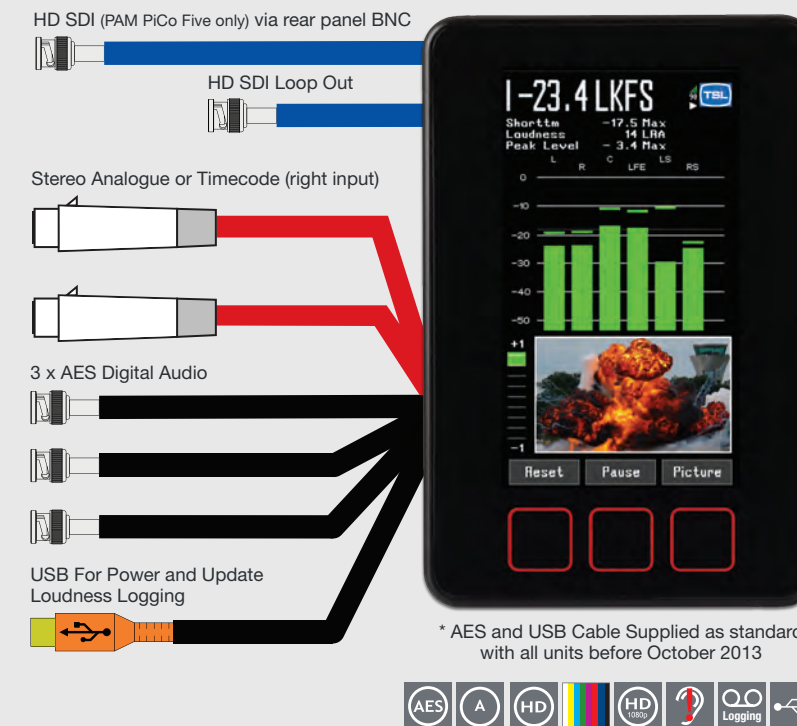
Featuring Landscape mode, FFT spectrum analyser, SMPTE Timecode, Screen Grabber and Loudness Logging.

**PiCo Two** – NEW - Master 5.1 Surround Meter, 8 channel bargraph display, 3 x AES Inputs (6 audio channels) + 1 Analogue Pair and USB power (PSU and universal mounting bracket supplied)

Featuring Landscape mode, FFT spectrum analyser, SMPTE Timecode, Screen Grabber and Loudness Logging.

**PiCo Five** – NEW - Master 5.1 Surround Meter, 16 channel bargraph display, 3G HD-SDI (auto-sensing with loop through), 16 channel audio de-embedder, 3 AES Inputs (6 audio channels) + 1 Analogue Pair and USB power (PSU and universal mounting bracket supplied).

Featuring Video Preview, Landscape mode, FFT spectrum analyser, SMPTE Timecode, Screen Grabber and Loudness Logging



PAM PiCo is a compact yet comprehensively equipped standalone audio and Loudness meter featuring the revolutionary StarFish™ display and designed to be used wherever 'at a glance' audio metering is required.

Available in three formats the PAM PiCo can display stereo, multichannel and surround sound audio from analog, AES or embedded SDI signal sources and measure Loudness to most known International standards and recommendations including ITU, EBU and ATSC

### PAM PiCo Features

- Loudness measurement to EBU, ITU and ATSC and many other recommendations
- Audio de-embedding from SDI input, maximum 16 channels (PAM PiCo Five only)
- AES and analogue audio inputs
- USB Powered (plug top PSU included)
- EBU Digital, BBC and EBU PPM, DIN, Nordic, VU and many other regional and international scale options
- Moving Coil Meter emulation including M/S
- LKFS or LUFS loudness scales
- Sliding Loudness Histogram display
- Video Preview (SDI model only)
- Phase indication bargraph
- StarFish™ display (Surround Sound Applications)
- Numerical indication of loudness and loudness range – LRA
- Adjustable reference level
- User selectable bargraph colours and indication
- Variable gate settings
- Loudness Reclaim value
- True Peak display (flying peak and numerical display)
- Simple and intuitive front panel controls
- Online upgrade and update capability via PC (USB connection)
- Desk or rack mount
- User selectable Landscape mode
- Screen Grab application and FFT spectrum analyser
- Loudness Logging Application – free download

## 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 to configure 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.

#### Features

- 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
- Four balanced AES input pairs with unbalanced option
- Two stereo analogue audio inputs



### AMU1-3G

Although incredibly 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.

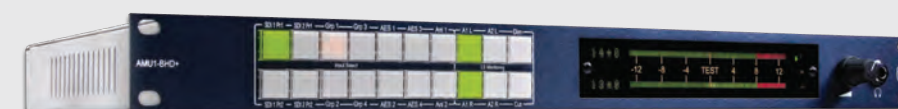
#### Features

- 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



TSL Products' range of monitoring solutions 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

#### Features

- 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.

#### Features

- 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+.

#### Features

- 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





## Stereo Analogue Audio Monitoring. TSL Products' AMUT ("T Series").

The AMU1-BAS and AMU2-MAS feature 6 stereo inputs of audio monitoring and 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.



### 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.



#### Features

- 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

#### Features

- 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

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 multichannel

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

#### Features

- 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
- Internet 2 x 15W power amplifier
- Fixed and variable analogue outputs
- RS422 and GPI remote control

### AMUT-2MHD



### AMUT-BHD



## 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 combine AV monitoring.

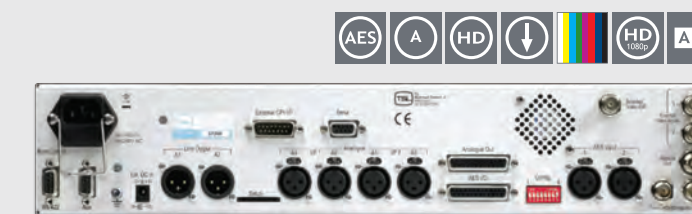


**Designed for use anywhere in an HD broadcast chain, the AVMU2-3G is capable of decoding all standards up to and including 1080p 60/59.94/50Hz.**

The provision of a 16:9 LCD display and built in loudspeakers ensures the AVMU2 3G is equally at home in the rack 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.

#### Features

- 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



### AMU2-8HD+ and 3G

Both 1.5G (8HD+) and 3G (8HD 3G) decoding versions of the AMU2-8HD platform feature dual auto sensing SDI de-embedder, AES and analogue audio inputs, multichannel audio outputs and 'button per function' controls. Designed for use as part of a surround sound or stereo control and monitoring system the AMU2-8HD is at the heart of hundreds of broadcast installations throughout the world.

**For more information visit:**  
[www.tslproducts.com](http://www.tslproducts.com)

#### Flexible monitoring to suit your needs

Whether used to monitor Dolby encoded or discrete multi-channel audio, the AMU2-8HD provides the operator with the tools to isolate and output the audio content they need to hear when they need to hear it. The AMU2-8HD can route stereo or full 5.1 audio to your loudspeaker system, solo individual channels and downmix decoded Dolby or discrete stems for compliance checking using simple and intuitive pushbutton menus. At the heart of your monitoring system, AMU2-8HD audio output levels are managed by the onboard volume and cut/dim controls whilst the source and monitoring selection removes the need for external loudspeaker audio controllers.



#### Features

- 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
- AC and 12V DC inputs
- Serial remote control
- Compact 2RU case, 310mm deep
- 4 x balanced AES input pairs with unbalanced option



From live sport production at an Outside Broadcast, through to 24 Hour News, Post Production, Master Control and finally to Playout and Transmission, TSL Products has a solution 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 MK2** to control their loudspeakers and check Dolby E parameters where used. Since the audio levels within the truck also include a MADI monitoring router, the Slo-Mo and VT Operators use the versatility of the **SAM1-MADI** to monitor the multichannel stems of their media as they cut it for playback.

While Sound Control have faith in their large format digital audio console they have employed a **Touchmix Combo** monitoring unit as a back-up in the unlikely event that their main mixer should fail.

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

The **MPA1-ASC 8** 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. Products like the **MPA1 3G** 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 8**.

Out in the field, the News Channel has a fleet of SNG Vehicles relying on their versatile **SAM1-3GM** 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 **AVM-T-MIX** ensure that programme content is ready for transmission. A **PAM PiCo 5** is used to check Loudness levels of the outgoing audio content and the logging software application records a permanent record.



Sound Control has also employed a **Touchmix Combo** monitoring unit as a back-up in the unlikely event that their main mixer should fail.

All 5.1 and stereo formats are embedded discrete signals however occasional legacy Dolby E content is decoded and played into the studio. A Dolby decoder equipped **PAM1 MK2** is installed in the Racks room to check the process when necessary.

### 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 MK2**. 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 MK2** is a comprehensive toolbox for analysing whatever



audio format enters or exits the facility and the ability to connect an external screen ensures that operators have precise visual feedback as part of their monitor stack.

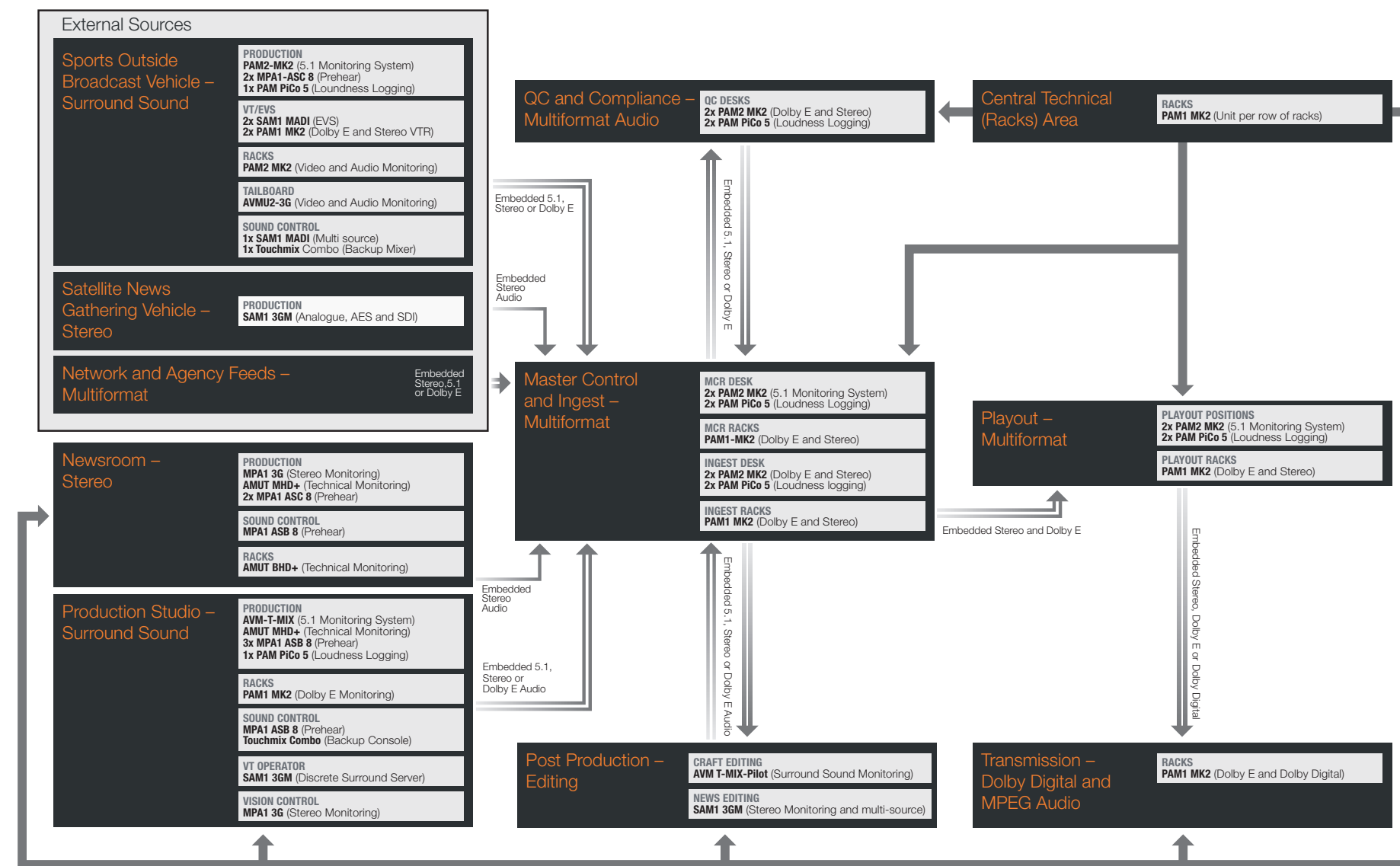
QC and Ingest rely on their **PAM1 MK2** units to ensure that material is compliant and fit for transmission. **PAM PiCo 5** is used to check Loudness levels of the outgoing audio content and the logging software application records a permanent record.

### 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 MK2** to listen to the outputs through their full range loudspeaker system. In the Transmission area, a **PAM1 MK2** 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.





# Multichannel Monitoring

# Dolby Decoding

# Stereo Monitoring

# Loudness Measurement & Logging

# Audio Compliance



TSL Products has a network of distributors supporting our products all over the world.  
For further details about our product range and where to buy please visit [www.tslproducts.com](http://www.tslproducts.com)

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