



PROFESSIONAL
PRODUCTS LTD

V3

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 Bargraph	HD/SDI	AES	Analogue (Pair)	Line level fixed/variable	AES fixed/variable	Redclocked HD/SDI	Composite Video	Down Converted Video	Headphone	Integral Loudspeakers	Power Amplifier (Ext/LS)	User Configurable	Dolby D, D+ & E Decoding	Discrete Multichannel Audio	Loudness	Assign Matrix	Audio Delay	SMPTE 2020	Ethernet	Logging	Alarm Reporting	Mixer	Touchscreen	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
	PAM1-3G16	6	Y		16	2	4	2	F+V	F+V	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y						Y
	PAM1-3G16 ND	6	Y		16	2	4	2	F+V	F+V	Y	Y	Y	Y	Y		Y		Y	Y	Y	Y	Y						Y
	PAM2-3G16	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	5	Y		16	2	8	6	F+V	F+V	Y	Y	Y	Y	Y		Y		Y	Y	Y	Y	Y						Y
	PAM2-3G16 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			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	Y			Y
	PAM PiCo One	9		2	2		2	1									Y				Y								
	PAM PiCo Two	9		2	6		3	1									Y				Y								
	PAM PiCo Three	9		2	6	1	3	1			Loop						Y				Y								Y
AVM-T SERIES	AVM-T-MIX	7			22	1(2 option)	8	8	F+V	F+V	Y			Y	Y		Y		Y					Y	Y	Y	Y	Y	Y
	Touchmix Pilot	7			22	1(2 option)	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	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+	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														
	AMU2-GB4HD	n/a			2	1	2	2	F+V		Y	Y	Y	Y	Y														
AVMU SERIES	AVMU2-3G	13	Y		4	2	2	2	Y	F	Y	Y	Y	Y	Y														Y
	AVMU2-BHD+	13	Y		4	2	2	2	Y	F	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	8						1						Y	Y														
	MPA1-ASC	8						2	F+V					Y	Y														
	MPA1-ASC-8	8						8	F+V					Y	Y														
	MPA1-ASB	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						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



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/products.aspx or call +44 (0)1628 676221.

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
- Networked Systems

Drawing from almost 26 years worldwide experience of TSL's Systems Integration Group, TSL Professional Products Ltd 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 Ltd 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.



PAM2 MK2

The PAM2 MK2 represents the latest stage in the evolution of the award-winning PAM product family. PAM2 MK2 is equipped with an SDI output which exports the bargraph, data and Loudness Histogram displays to an external monitor (such as a multiviewer or video display) for 'at a glance' review of mission critical audio information.

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 DolbyE). The new module will enable 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.

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.

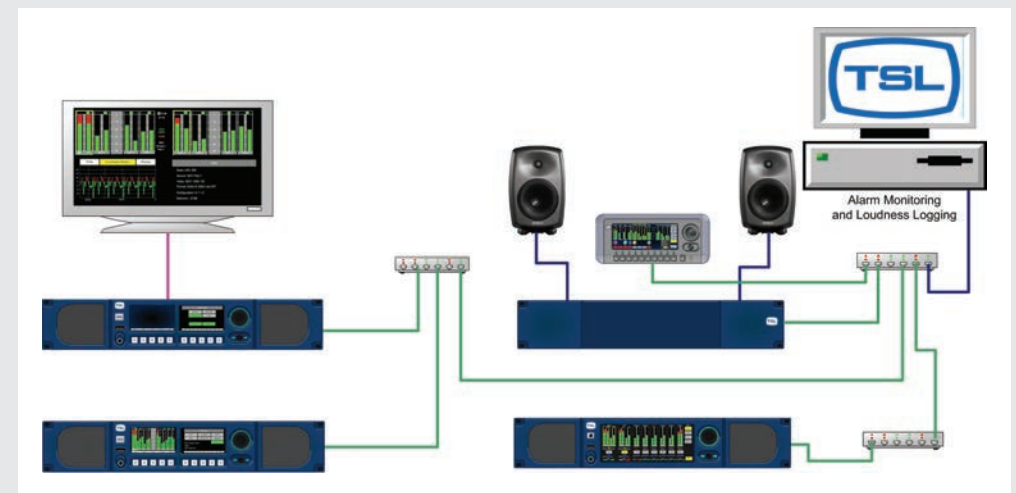
Configurable loudness information in full compliance with EBU R128 and ATSC A85 is one of the resident metering sets available both on-board the PAM2 MK2 and exportable to an external display from the SDI port. The established PAM Loudness Histogram provides a visual display of Loudness against time 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 is the latest TSL Audio Monitoring Unit to feature network integration.

The diagram below shows how PAM2 MK2, AVM-T-MIX and AVM-T-MIX Pilot can be integrated as part of a network audio management system controlled by the forthcoming TSL audio system dashboard application.



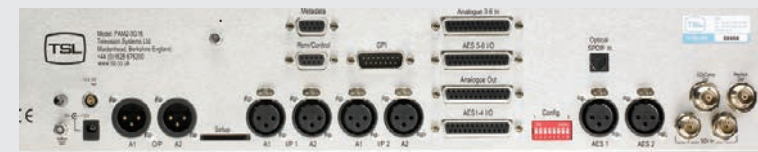
Specification

- 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 networked audio system management with Alarm Monitoring/Loudness Logging
- De-embedded audio monitoring from video (HD/SDI) with intuitive selection from up to sixteen channels (four groups)
- 8 AES (8 Pairs/16 Channel) Inputs – 1100hm Balanced or 750hm unbalanced via optional CAB-D25-BNC cable
- SPDIF Optical Input
- 6 Analogue Stereo Inputs
- ‘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
- EBU, ATSC and user configurable loudness measurement and Histogram
- User Programmable ‘Assign Matrix’
- Audio Output Delay
- Dolby E, Dolby Digital and Dolby Digital Plus decoding from HD/ SDI and AES sources
- Dolby Digital Plus with surround descriptive audio and stream mixing
- Automatic mode switching – depending on signal type
- Energy Saver Screen mode
- 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
- Dual high resolution OLED screens for 16 bargraphs, setup and metadata display
- Choice of user selectable bargraph scales (BBC PPM, EBU PPM, EBU Digital, Nordic, VU and DIN)
- User programmable presets. 8 by hardware buttons, GPI and 24 internal, accessible by high level menu selection
- Factory preset recall – 5 presets selecting SDI1, SDI2, AES, Analogue and Optical Inputs
- Fixed or variable analogue multichannel outputs (8 mono)
- Fixed or variable AES multichannel outputs (8 pairs/16 channels)
- Variable stereo analogue outputs
- High quality internal full range loudspeaker system
- Variable LED brightness control
- Dual 12V DC inputs
- Serial remote control
- Headphone output with LS muting
- Compact, lightweight (5.1kg) 2RU case, 320mm deep



PAM2-3G16

The **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 one of the most advanced and intuitive products in its sector.



We tried out a variety of audio monitoring solutions, and the PAM2-3G16 was by far the most sleek, intuitive and comprehensive model on the market. It allows quick and dynamic control in a multichannel environment, and has proven extremely fluid under pressure in a live broadcast situation. Pre-sales and after-sales care from TSL has also been of a very high standard. This model knocks the socks off all comparable units on the market right now.

Jonathan Morley MCR Manager at Globecast

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

The natural evolution of the award winning PAM1-3G8, this new addition to the PAM product family combines the size and convenience of the original 1RU multichannel audio monitor with a full 16 bargraph display and many of the advanced features from the multi-award winning PAM2-3G16.



PAM1-3G8 also available

PAM1-3G16

Designed for use throughout the entire broadcast facility, the latest addition to the Precision Audio Monitoring series delivers the performance of a **PAM2-3G16** in a compact and intuitive package. Featuring OLED display technology, optional multi-format Dolby signal decoding and the unique 'scroll to hear' user interface, the PAM series has become the world's favourite rackmount multichannel audio monitoring solution. Available now and featuring free 'life of product' software updates direct from TSL, the **PAM1-3G16** ships with dual 1080p 60Hz auto sensing HD/SDI inputs, multichannel AES and analogue I/O and a complete set of the features, all as standard. Class leading sound reproduction from its custom designed 3 way internal loudspeaker system, headphone output and the ability to control external stereo or surround speaker setups ensure that the **PAM1-3G16** is ready for use wherever you need uncompromising audio monitoring.

Loudness.

PAM1-3G16s equipped with a comprehensive set of ITU-R BS1770 Loudness Measurement tools. These are designed for universal use and adopt the parameters recommended by both the EBU and ATSC whilst giving the user power to configure their own variations where appropriate.

Assign Matrix.

PAM1-3G16 is equipped with a user configurable routing system called the Assign Matrix. A 16 x 6 exclusive routing matrix enables the operator to re-assign the channel order of the incoming signal to the multichannel or stereo output busses. A typical application would be an international broadcast where a 4.0 surround FX mix is defined within the embedded audio signal and multiple mono languages carried within the remaining channels. Multiple Assign Matrix configurations can be saved to user preset locations for instant recall during live operation.

Auxiliary Input Mixer.

Working environments such as OB Trucks and Off-Tube voice over booths, where headphones are often worn, require system designers to integrate external mixers to audio monitoring and intercom signals so that users can hear content and direction simultaneously. The **Aux Input Mixer** means that operators using **PAM1-3G16** wearing headphones can hear Talkback or Cue audio signals without the need for hardware.

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 16 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
- Four balanced AES input pairs with unbalanced option
- Two stereo analogue audio inputs



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

Audio Monitoring at your fingertips

Available in two formats; rackmount and desktop, the **AVM-T-MIX** or **Touchmix** is the worlds first Touchscreen based audio monitor. Designed for use in creative operational locations throughout the TV Station or Outside Broadcast Truck; with an **AVM-T-MIX** 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



AVM-T-MIX (Touchmix)

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.

AVM-T-MIX 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 AVM-T-MIX Touchmix Pilot



A brand new concept in audio monitoring and mixing the AVM-T-MIX Pilot remote desktop and rackmount host empowers creative users with 'lean back' operation whilst maintaining the same functionality of the rackmount AVM-T-MIX. 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.

Designed to empower the operator with a unique 'lean back' audio monitoring solution the Touchmix Pilot improves the desk ergonomics of the broadcast workspace from small edit suites to large studio galleries particularly within fast-paced environments where production staff need instant control and monitoring at their fingertips



Specification

AVM-T-MIX 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

AVM-T-MIX 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 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 2012 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 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

Available in two versions (with and without bargraph indication) 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 11 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.

MPA1-3G



MPA1-ASC



MPA1-ASB



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

09

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

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, 2 x AES Inputs (4 x audio channels) or 1 x AES Input (2 x audio channels) + 1 x Analogue Pair and USB power (PSU supplied)

PiCo Two – Master 5.1 Surround Meter, 3 x AES Inputs (6 audio channels) + 1 x Analogue Pair and USB power (PSU supplied)

PiCo Three – Master 5.1 Surround Meter, 3G HD-SDI (auto-sensing with loop through) 16 channel audio de-embedder (simultaneous display of any 8 channels), and USB power (PSU supplied)



HD SDI (PAM PiCo Three Only)



HD SDI Loop Out



3 x AES (PAM PiCo One (2) and Two)



USB For Power and Update



Analogue Audio via D-Sub Connector (PAM PiCo One and Two)

* AES and USB Cable Supplied.

The latest member of the TSL Precision Audio Monitor (PAM) product family, 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 recommendations
- Audio de-embedding from SDI input, maximum 16 channels (PiCo 3 only)
- AES and analogue audio inputs
- USB Powered (plug top PSU included)
- Stereo metering with EBU Digital, BBC and EBU PPM, DIN, Nordic, VU and many other regional and international scales
- Moving Coil Meter emulation
- LKFS or LUFS loudness scales
- Sliding Loudness Histogram display
- Phase indication bargraph
- StarFish™ display
- Numerical indication of Loudness & loudness range - LR
- Adjustable reference level
- User selectable bargraph colours and indication
- Variable gate settings
- Loudness Reclaim value
- True Peak display (flying peak & numerical display)
- Simple and intuitive front panel controls
- Online upgrade and update capability via PC (USB connection)
- Desk or rack mount

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
- 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.

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



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



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")

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-2MHD



AMUT-BHD



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

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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



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.tsl.co.uk/products_audio.aspx

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.



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
- 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 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 **PAM1-3G16** 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.

Production personnel use the **AVM-T-MIX** to give immediate 'at a glance' access to incoming and internal Comms feeds. The second channel of the **AVM-T-MIX** is also used to provide reverse cue audio to contribution circuits.

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 **PAM1-3G16** 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 **PAM1-3G16** will be ready.

Production staff such as the Director, PA and Editor use the **AVM-T-MIX** to monitor programme, contribution and Comms circuits.

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 **PAM1-3G16**

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

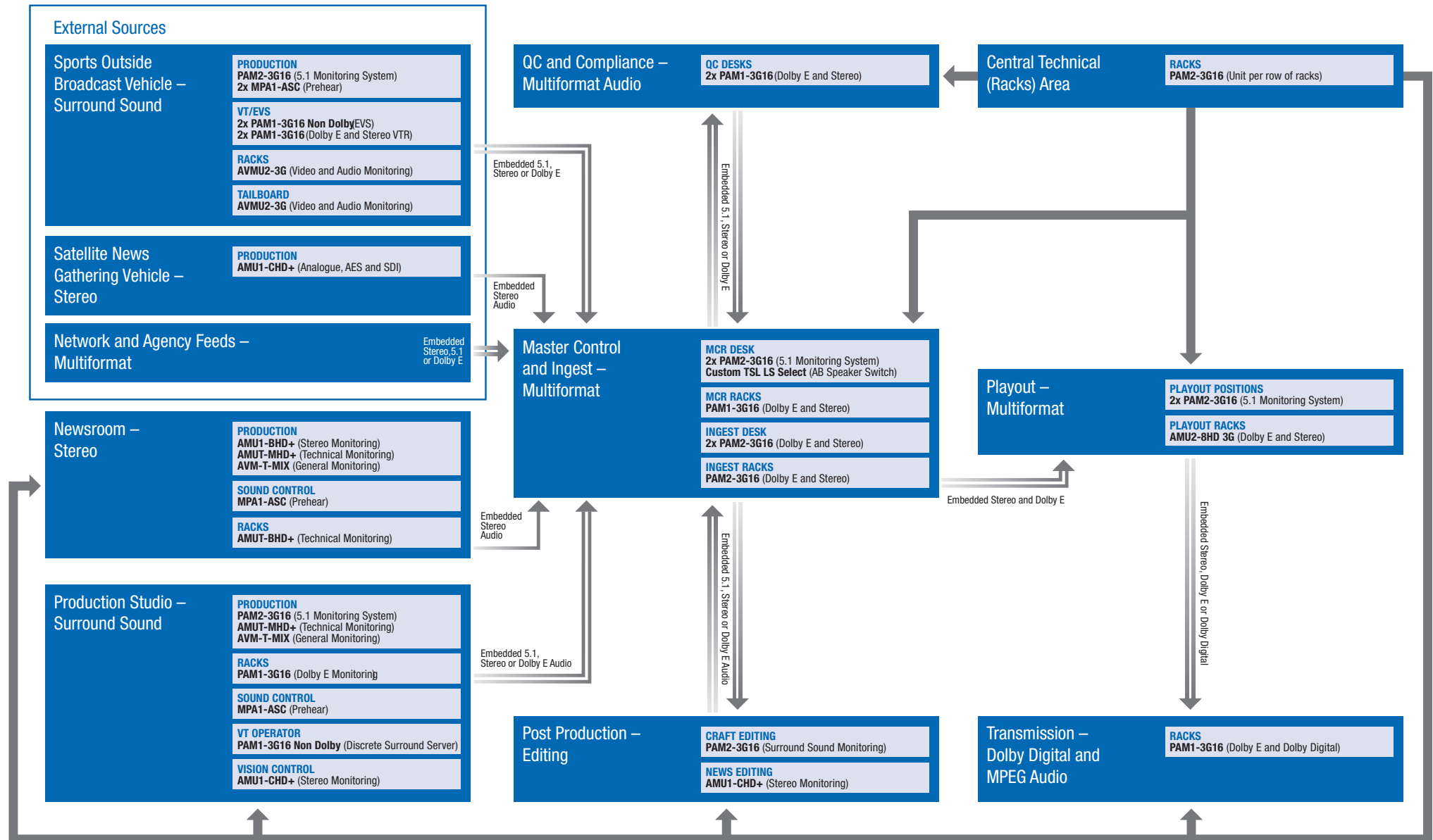
The loudness measurement feature on the **PAM1-3G16** is essential to ensure compliance with increasingly strict local regulations and the **SMPTE2020** Metadata measurement feature will ensure that the audio monitoring units are ready when the station adopts the new standard.

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 **PAM1-3G16** 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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