



# PAM-IP Range

The PAM-IP range from TSL is a fully comprehensive Audio Monitoring Solution designed for use in SMPTE 2110 and SMPTE 2022-6 environments.

Developed specifically to address the requirements of customers needing to monitor uncompressed SMPTE 2110 and SMPTE 2022-6 sources, the PAM-IP Range is equipped with 2 x 10Gig/E interfaces for direct connection into COTS IP fabrics.

Supporting IP control protocols such as NMOS and Ember+ allows for 'In-Band' control of the PAM-IP, offering tight integration with a variety of control systems

PAM-IP is available in 1RU or 2RU form-factors, and retaining the same front panel user interface and feature set from the already popular PAM-MK2 series means that Engineers and Operators familiar with traditional Audio Monitoring operation can now monitor uncompressed IP sources without having to re-train or adjust their workflows.

In addition to its IP interfacing the PAM-IP Range includes key monitoring features such as comprehensive loudness monitoring with histogram display, Dolby encoded audio monitoring (including metadata), and a video confidence display of both SDI and IP sources.

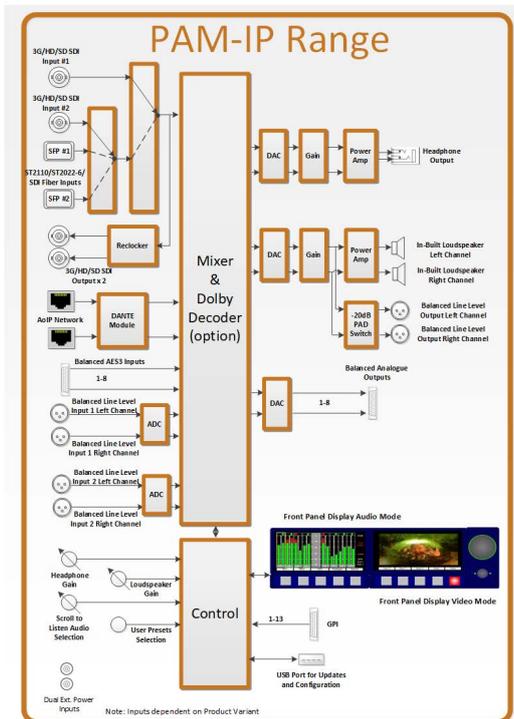
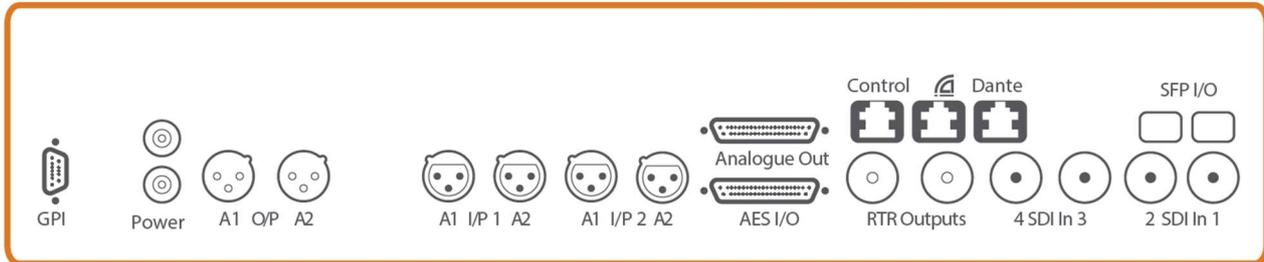
Audio over IP is also covered, with Primary and Redundant 1Gig/E Dante/AES67 ports, whilst the PAM-IP also maintains 3G/HD/SD-SDI, AES and Analogue I/O connectivity, helping customers transition to IP environments with ease.



## KEY FEATURES

- (>) Wide range of input signals supported including; SD/HD/3G-SDI with 16 channel audio de-embedding, balanced or unbalanced AES audio, balanced analog audio and 10GbE ST 2110 and ST 2022-6 IP streams
- (>) Dual High Resolution 3.4" LCD displays allow side-by-side viewing of video, audio and metadata information
- (>) ITU BS1770.71 Audio loudness measurement with Histogram display
- (>) Optional Dolby E, D and D+ decoding and Metadata display
- (>) Optional Monitoring of Dante/AES67 AoIP streams (Dante Domain Manager Compliant)
- (>) High quality internal loudspeaker system, and headphone alternative output with selectable loudspeaker muting behavior
- (>) Downmixing of discreet multichannel sources, plus Multichannel audio outputs suitable for external 2.0 and 5.1 loudspeaker systems
- (>) Remote monitoring of System Status and IP flow status from the built-in webpage
- (>) In band or out of band IP control options, with support for NMOS and Ember+ in band, and TSL Audio RESTful API out of band
- (>) User programmable Presets, and GPI control

## REAR PANEL



## SPECIFICATIONS

HEIGHT	PAM1-IP 1RU PAM2-IP 2RU	SDI INPUTS	4 x 3G/HD/SD-SDI (SMPTE 424M, 292M, 259M)
DIMENSIONS	PAM1-IP 483mm x 45mm x 250mm PAM2-IP 483mm x 89mm x 250mm	SDI OUTPUTS	2 x 3G/HD/SD-SDI (SMPTE 424M, 292M, 259M)
POWER	100-240V ~ 50/60Hz, 2A Max	AoIP INPUTS	Dante, AES67
WEIGHT	4.9 kg	AES INPUTS	8 x AES3 or AES3id
DISPLAY	Audio Meters, Loudness, Dolby Metadata and Video	AES OUTPUTS	8 x AES3
AUDIO CHANNELS	16	ANALOGUE INPUTS	2 x >20k Ohms
UPGRADES	VIA USB	ANALOGUE OUTPUTS	8 x Balanced, Fixed or Variable Level
IP SFP CAGES	Non-MSA Embrionix modules	SIGNAL TO NOISE RATIO	-80dB
IP CONTROL	In Band NMOS, Ember+, Embrionix RESTful API	PEAK ACOUSTIC OUTPUT	>98dB @ 0.6m
UNIT CONTROL	RESTful API	FREQUENCY RESPONSE	70Hz to 20kHz

## WEB PAGE CONTROL AND MONITORING



PAM2-IP REMOTE ADMIN

**PTP Status**  
Monitor PTP lock status and the MAC address of your PTP sources.

**Senders**  
Wide, Narrow and Narrow Linear senders can all be monitored by the PAM-IP.

**Packet Counters**  
Rule out potential network issues when subscribing to ST-2022-6 and/or ST-2110 sources using the PAM-IP on-board packet counter.

**Status Monitoring**  
Customers can remotely monitor PAM-IP status, including the multicast addresses of all currently subscribed sources.

### IP Monitoring Tools

Alongside the ability to present Audio Levels, Dolby Metadata, Loudness Histograms and Video directly on the front panel, the PAM-IP-3G also includes diagnostic information to help troubleshoot issues when working with SMPTE 2022-6 and SMPTE 2110 uncompressed sources.

SVIP Preset Setup Menu

2022-6 Presets	2110 Video Essence Setup
2110 Presets	2110 Audio Essence Setup
	2110 Ancillary Essence Setup
	PTP Setup and Status
	2110 Global Options Setup

SVIP Setup Menu

SVIP Preset Setup Menu

Target SFP: SFP 1

Video Std: 1080i 30 YCbCr 422

Sender Type: Narrow

Multicast Filters: IP and Port

Line Offset: 31

SAVE UNDO

PTP Setup and Status

SFP1 Domain: 0 TAKE UNDO

SFP2 Domain: 0 TAKE UNDO

SFP1 PTP MAC is DO:A4:B1:FF:FE:00:08  
SFP1 PTP Line Locked

SFP2 PTP MAC is DO:A4:B1:FF:FE:00:08  
SFP2 PTP Line Locked

PTP Setup and Status Display

SVIP Statistics

SFP1 Packet Ctr: 1890362

SFP1 SDI Status: HD Interlaced 422 YCbCr

SFP1 SDI Format: SMPTE ST 274 1920x1080

SFP2 Packet Ctr: Waiting for comms...

SFP2 SDI Status:

IP Packet Counter and Video Format Display

### External Control

Support for control protocols such as Ember+ and NMOS allow for 'In-Band' control of the PAM-IP, offering tight integration with a variety control systems. 'Out of Band' control integration is also possible using TSL's RESTful API.



Dual 10Gig/E interfaces on SFP+

## PAM-IP VERSIONS

### GENERAL DESCRIPTION

1RU or 2RU Precision Audio Monitor. 2 x Front Panel LCD Displays, providing 16 Channel Audio Monitoring with simultaneous Video Confidence Monitoring. 2 x 3G/HD/SD-SDI Inputs, 4 x AES Inputs, 2 x Stereo Analogue Inputs, 2 x External SDI Monitoring Outputs, EBU-R128 Loudness Monitoring with Histogram Display, Audio and Video Metadata Monitoring, 5.1 Monitoring Output, Remote Control and Configuration via Web-Browser Support for PAM and 3rd Party Control Protocols, 1 x External P.S.U. (optional redundant power supply also available). Options available for DOLBY, DANTE, ST-2110 and ST-2022-6 Monitoring.

Version	Order Code	Description	Why Choose This Monitor
PAM1-IP-3G	PAM1-IP-3G-ND	PAM1-IP-3G 1RU Precision Audio Monitor.	Compact, fully comprehensive Audio Monitoring Solution designed for use in hybrid baseband and IP environments enabling audio to be monitored from either IP, SDI or direct audio signals.
PAM1-IP + Dolby	PAM1-IP-3G	PAM1-IP-3G 1RU Precision Audio Monitor. Includes DOLBY E, DOLBY D and DOLBY DD+ decoding and Monitoring	Compact, fully comprehensive Audio Monitoring Solution ideal for monitoring both compressed and uncompressed audio sources
PAM1-IP + Dante	PAM1-IP-3G-ND-DNT	PAM1-IP-3G 1RU Precision Audio Monitor. Includes DANTE/AES67 Audio Monitoring option, Dante Domain Manger Compliant.	Compact, fully comprehensive Audio Monitoring Solution useful when needing to handle a wide variety of uncompressed audio sources including Dante.
PAM1-IP + Dante & Dolby	PAM1-IP-3G-DNT	PAM1-IP-3G 1RU Precision Audio Monitor. Includes DOLBY E, DOLBY D and DOLBY DD+ decoding and Monitoring, and DANTE/AES67 Audio Monitoring option, Dante Domain Manger Compliant	Compact, fully comprehensive Audio Monitoring Solution designed for use in hybrid baseband and IP environments needing to handle both compressed and uncompressed audio sources from either IP, SDI or direct audio signals.
PAM2-IP-3G	PAM2-IP-3G-ND	PAM2-IP-3G 2RU Precision Audio Monitor.	High quality, fully comprehensive Audio Monitoring Solution designed for use in hybrid baseband and IP environments enabling audio to be monitored from either IP, SDI or direct audio signals.
PAM2-IP + Dolby	PAM2-IP-3G	PAM2-IP-3G 2RU Precision Audio Monitor. Includes DOLBY E, DOLBY D and DOLBY DD+ decoding and Monitoring	High quality, fully comprehensive Audio Monitoring Solution ideal for monitoring both compressed and uncompressed audio sources
PAM2-IP + Dante	PAM2-IP-3G-ND-DNT	PAM2-IP-3G 2RU Precision Audio Monitor. Includes DANTE/AES67 Audio Monitoring option, Dante Domain Manger Compliant.	High quality, fully comprehensive Audio Monitoring Solution useful when needing to handle a wide variety of uncompressed audio sources including Dante
PAM2-IP + Dante & Dolby	PAM2-IP-3G-DNT	PAM2-IP-3G 2RU Precision Audio Monitor. Includes DOLBY E, DOLBY D and DOLBY DD+ decoding and Monitoring, and DANTE/AES67 Audio Monitoring option, Dante Domain Manger Compliant	High quality, fully comprehensive Audio Monitoring Solution designed for use in hybrid baseband and IP environments needing to handle both compressed and uncompressed audio sources from either IP, SDI or direct audio signals.
Spare PSU	PSU-PAMIP-11A	Redundant power supply for use with PAM1-IP-3G and PAM2-IP-3G Precision Audio Monitoring Units.	Cost effective monitoring solution using single SDI sources with embedded audio for live monitoring applications.
ST2022-6 option	PAM-IP-HBR6-10G-OPTION	Single ST-2022-6 10GbE multi-mode fiber SFP Module for use with PAM1-IP-3G and PAM2-IP-3G (Field upgradeable, with a maximum installation of 2 SFP modules).	Enables audio monitoring in IP environments.
ST2110 option	PAM-IP-2110-10G-NMOS PAM-IP-2110-10G-EMBER+	Single ST-2110-6 10GbE multi-mode fiber SFP Module for use with PAM1-IP-3G and PAM2-IP-3G, including NMOS or Ember + management support options (Field upgradeable, with a maximum installation of 2 SFP modules).	Enables audio monitoring in IP environments.