ALLEN HEATH AHM 16, AHM 32 Audio Matrix Processors User Guide

Contents

ALLEN&HEATH

ALLEN HEATH AHM 16, AHM 32 Audio Matrix Processors

IMPORTANT – Read before starting

Safety instructions
Before starting, read the Important Safety Instructions printed on the sheet supplied with the equipment. For your own safety and that of the operator, technical crew and performers, follow all instructions and heed all warnings printed on the sheet and on the equipment panels.
System operating firmware
The function of AHM processor is determined by the firmware (operating software) that runs it. Firmware is updated regularly as new features are added and improvements made.
Check **www.allen-heath.com** for the latest version of firmware.
Software licence agreement
By using this Allen & Heath product and the software within it you agree to be bound by the terms of the relevant End User Licence Agreement (EULA), a copy of which can be found at **www.allen-heath.com/legal**. You agree to be bound by the terms of the EULA by installing, copying, or using the software.
Further information
Please refer to the Allen & Heath website for further information, knowledgebase and technical support. For more information on AHM setup and functions please refer to the AHM System Manager Help.
Check for the latest version of this Getting Started Guide. **General precautions**

- Protect the equipment from damage through liquid or dust contamination.
- If the equipment has been stored in sub-zero temperatures allow time for it to reach normal operating temperature before use at the venue.
- Avoid using the equipment in extreme heat and direct sunlight. Make sure the ventilation slots are not obstructed and that there is adequate air movement around the equipment.
- Clean the equipment with a soft brush and dry lint-free cloth. Do not use chemicals, abrasives or solvents.
- It is recommended that servicing is carried out only by an authorised Allen & Heath agent. Contact details for your local distributor can be found on the Allen & Heath website. Allen & Heath do not accept liability for damage caused by maintenance, repair or modification by unauthorised personnel.

Register your product
Register your product online at **www.allen-heath.com/register.**

Packed items
Check you have received the following:

- AHM matrix processor
- This Getting Started Guide

- Safety Sheet
- IEC mains lead
- Phoenix connectors with strain relief – 1x 10-pin, 16x 3-pin (AHM-16), 24x 3-pin (AHM-32)

Introduction

AHM-16 and AHM-32 are audio matrix processors for sound management and installation. They are designed for audio distribution, paging, conferencing, speaker processing in a multitude of environments including corporate, hospitality, education, event and multi-purpose venues, retail, theatres, cruise ships, sports venues.
The AHM processor is complemented by an extended ecosystem of remote audio expanders, remote controllers, interfaces, apps and software. A family of portable, rack-mountable or wall-mount audio expanders is available with a choice of proprietary point-to-point Layer-2 or Dante transport protocols.
A range of IP remote controllers is available for volume control, music source selection, preset recall and more. AHM can also integrate with third party devices over GPIO, TCP/IP, or industry standard control systems. The Custom Control editor and app from Allen & Heath offer more control options and custom user interfaces for multiple users and device types, with kiosk and BYOD capability.

AHM-16 features

AHM-16 features at a glance:

- 6×16 processing matrix
- 8×8 local analogue I/O
- I/O Port for expansion or audio networking, up to 128×128
- Dante 96kHz optional cards (AES67 and DDM ready)
- 16 configurable processing outputs – up to 16 mono / 8 stereo zones
- Sound management tools
    - Automatic Mic Mixer
    - ANC (Ambient Noise Compensation)
    - Priority ducking
    - 8-band PEQ, dynamics and delay on every input and zone
    - Speaker processing with x-over filter, delay, limiter and PEQ
    - 96kHz FPGA core with ultra-low latency
- Compatible with Allen & Heath IP1, IP6, IP8 remote controllers
- 2×2 local GPIO plus networkable GPIO interface
- Front panel screen and 4x programmable SoftKeys
- 4 user profiles
- Event scheduler

AHM-32 features

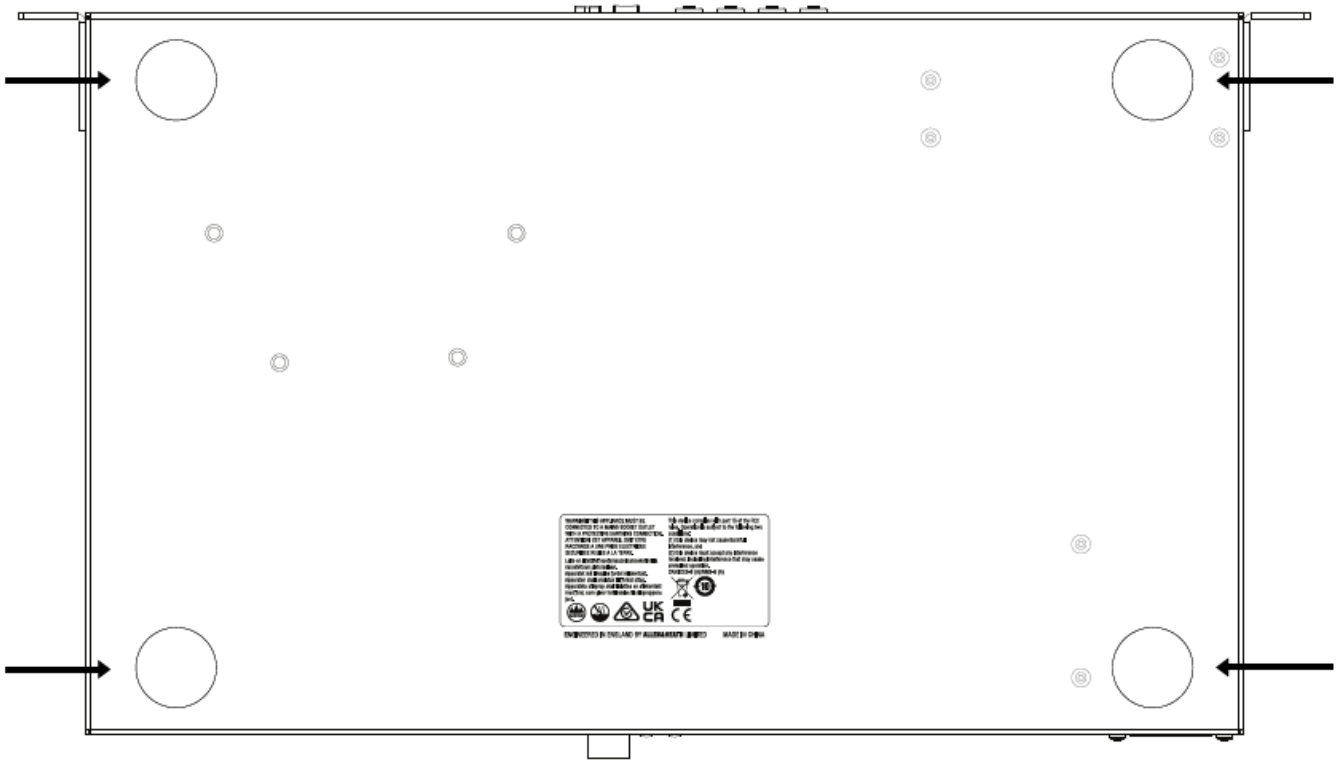
AHM-32 features at a glance:

- 32×32 processing matrix
- 12×12 local analogue I/O
- I/O Port for expansion or audio networking, up to 128×128
- Dante 96kHz optional cards (AES67 and DDM ready)

- 32 configurable processing outputs – up to 32 mono / 16 stereo zones
- Sound management tools
    - 4x Automatic Mic Mixer
    - AEC (Acoustic Echo Cancellation)*
    - ANC (Ambient Noise Compensation)
    - Priority ducking
    - 8-band PEQ, dynamics and delay on every input and zone
    - Speaker processing with x-over filter, delay, limiter and PEQ with optional module
- 96kHz FPGA core with ultra-low latency
- Compatible with Allen & Heath IP1, IP6, IP8 remote controllers
- 2×2 local GPIO plus networkable GPIO interface
- Front panel screen and 8x programmable SoftKeys
- 16 user profiles
- Event scheduler

Installing AHM-16 / AHM-32

Free standing



For free standing or shelf operation, apply the adhesive plastic feet to the positions indicated below.

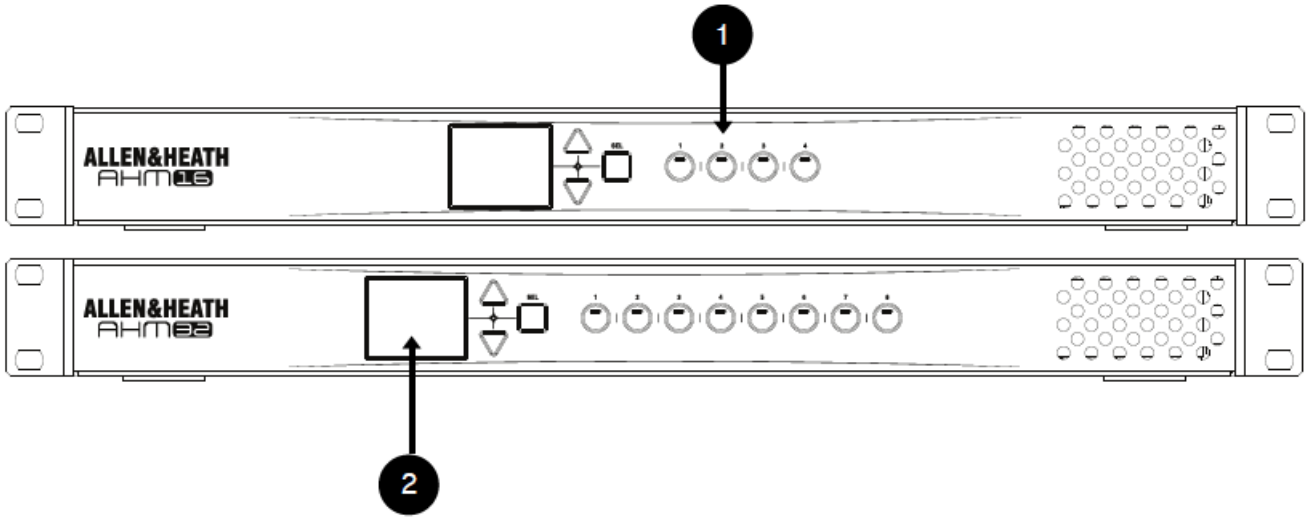
Ensure adequate air flow around the unit. It must not be covered in any way. Always stand the unit on a firm flat surface away from any soft furnishings or carpet.

Rack mounting

AHM-16 and AHM-32 are 19-inch rack mountable and occupy 1U of rack space. The plastic feet may need to be removed before rack mounting; retain them for future use.
Ensure natural convection of airflow around the unit by allowing good ventilation in front of and behind the unit.

Rack equipment known to produce a significant amount of heat should not be mounted directly above or below the unit. Forced convection by means of a rack mounted fan-tray may be desirable in situations where space is restricted, and the ambient air temperature is high.

Front Panel



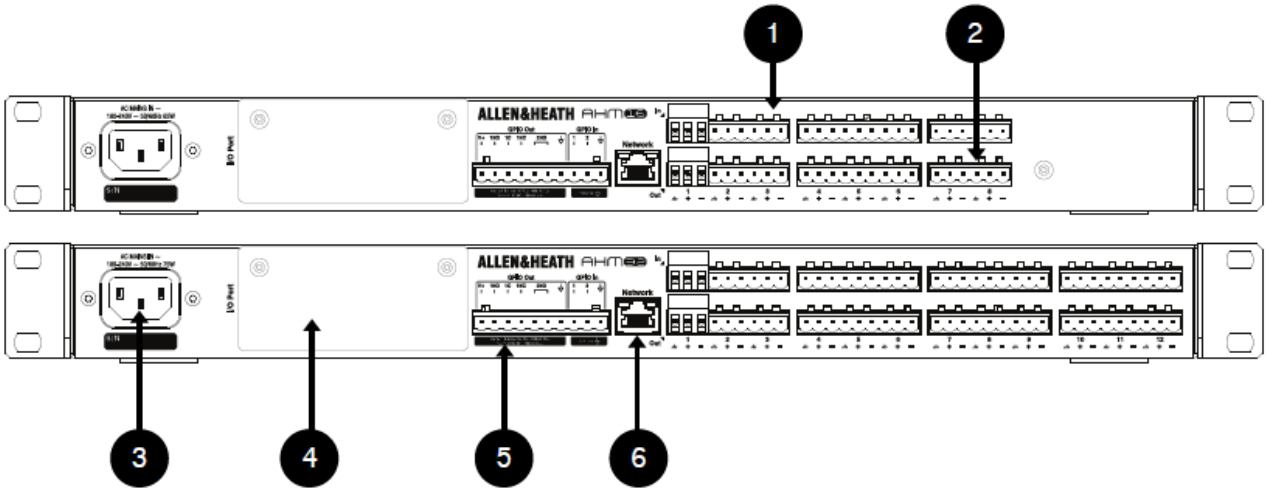
SoftKeys

Programmable SoftKeys for local user control. Functions are assigned by the AHM System Manager software and include Input / Zone / Crosspoint Mute, Level, Preset Recall, Preset Select, Paging, Zone Source Select.

LCD Screen and Select buttons

The LCD screen displays information about the unit or the function selected by the front panel SoftKeys.
A splash screen is displayed at power up. Use the arrow keys to sequence through information screens such as firmware version, network settings and diagnostics. This can be useful to identify the unit IP address before connecting.
Level When a front panel SoftKey assigned to a Level is pressed, the screen will display the Input / Zone name, level and meter. Use the arrow keys to control the level.
Source Select When a front panel SoftKey assigned to a Zone Source Selector is pressed, the screen will display a list of available sources as configured in AHM System Manager. Use the arrow keys to select the source and press Sel to confirm.
The screen will then display the active source and the Zone name, level and meter. Use the arrow keys to control the level of the Zone. Press Sel again to select another source. Press the SoftKey again to exit Source Select mode.
Preset Select When a front panel SoftKey assigned to Preset Select is pressed, the screen will display a list of available Presets as configured in AHM System Manager. Use the arrow keys to select the Preset and press Sel to recall.
The screen will then display the active Preset. Press Sel again to select another Preset. Press the SoftKey again to exit Preset Select mode.

Rear Panel



Mic/Line Inputs

Recallable preamps on Phoenix connectors, for balanced or unbalanced microphone and line level signals. Gain, Pad and 48V are digitally controlled within the preamp.
Any socket can be patched to any of the Input Channels.
Use the provided 3-pin Phoenix connectors with strain relief for optimal cable management.

Line Outputs

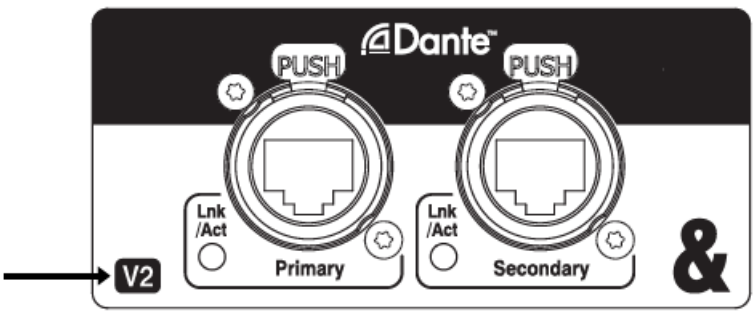
Assignable line level, balanced outputs on Phoenix connectors. Nominal level +4dBu. The outputs are relay protected to prevent power on or off thumps.
Use the provided 3-pin Phoenix connectors with strain relief for optimal cable management.

Mains

IEC inlet with universal power supply (100-240V AC, 50-60Hz).

I/O Port

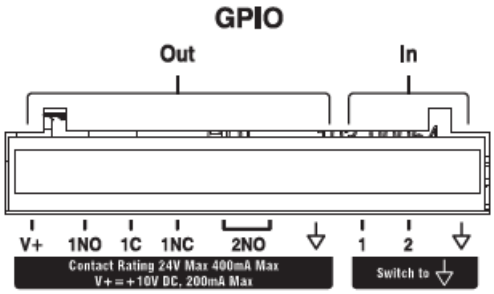
Audio interface port providing up to 128×128 I/O. Fit one of the option cards available for system expansion, distributed audio networking or system integration. Refer to www.allen-heath.com for a list of available option cards.
For Dante audio networking, use the M-SQ-DANT32 or M-SQ-DANT64 (SQ Dante V2) card, not the original M-SQ-DANTE card.



The I/O Port panel is also used to access DIP switch 6 for network reset of the unit to default settings. Reset occurs with switch 6 in the On position at power up. After 10 seconds, turn off the unit and move the switch back to the Off position. Do not alter the position of the other DIP switches.

GPIO

General purpose interface for control integration with third party hardware. Offers 2x inputs switching to ground, and 2x relay outputs on Phoenix connectors, in addition to a +10V DC output.
Maximum current drawn from the +10V supply for all outputs combined must not exceed 200mA Output 1 can be wired as normally closed or normally open. Output 2 is normally open.
For higher current or voltage applications, an external DC power supply may be used. This also provides total isolation between the AHM processor and external equipment.
Maximum external supply voltage must not exceed +24V DC. Maximum current sink through any open collector output must not exceed 400mA.



Use the provided 10-pin Phoenix connector with strain relief for optimal cable management.

Control Network

RJ45 Gigabit Ethernet port. Connect a laptop, wireless router or switch to use with the AHM System Manager, IP remote controllers, Custom Control app or TCP control. All devices on the network must have compatible IP addresses.
To reset the network settings to factory default, see DIP switch settings in the I/O Port paragraph above.

AHM-32 Processing Expansion Module

A processing expansion module can be fitted in the AHM-32 for applications like AEC (Acoustic Echo Cancelling). Refer to **www.allen-heath.com** for a list of available modules. Follow the fitting instructions of the optional module for installation.

Connections – Audio

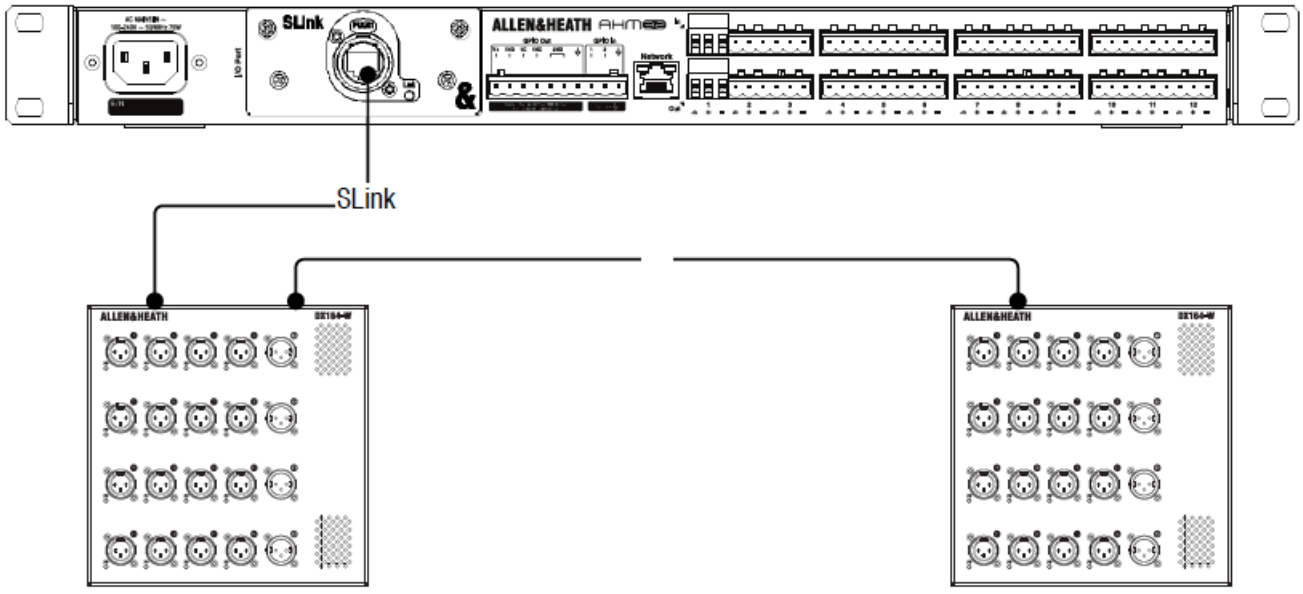
For all audio connections, use CAT5e (or higher specification) STP cables up to 100m long.
Refer to **www.allen-heath.com** for cable requirements, recommendations, and a list of CAT cables available to order.

Audio expanders with SLink card fitted

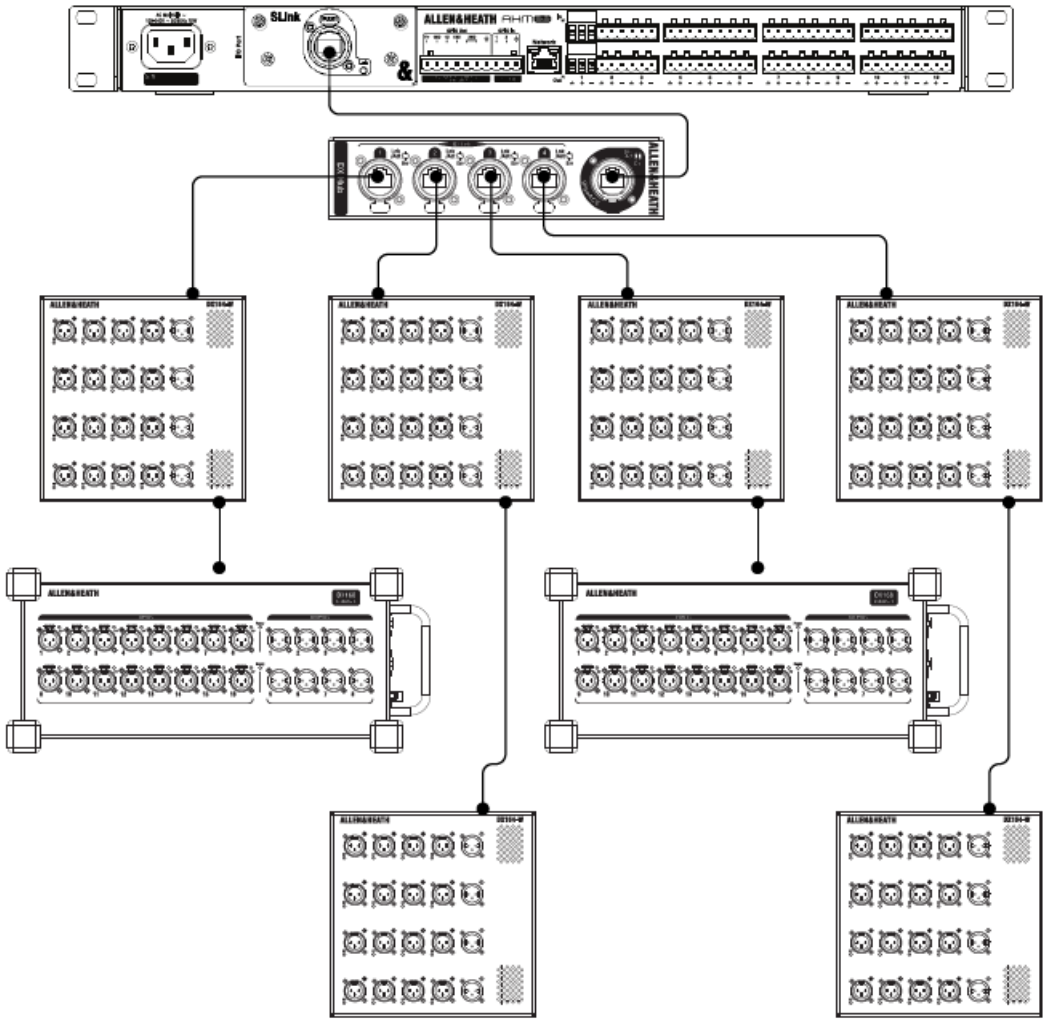
When an audio expander is connected, the SLink card detects the type of device and automatically switches to the relevant Allen & Heath protocol, sample rate and Ethernet speed. The table below lists compatible audio expanders. Visit **allen-heath.com/everything-io/** for more information on our range of expansion options.

	Sample Rate	Inputs	Outputs	Connection	Protocol	Ethernet speed
GX4816	96kHz	48	16	SLink port	gigaACE	Gigabit
DX32	96kHz	<32		SLink port or DX Hub	DX	Fast Ethernet
DX168	96kHz	16	8	SLink port or DX Hub	DX	Fast Ethernet
DX164-W	96kHz	16	4	SLink port or DX Hub	DX	Fast Ethernet
DX012	96kHz	0	12	SLink port or DX Hub	DX	Fast Ethernet
DX Hub	96kHz	128	128	SLink port	gigaACE	Gigabit
AR2412	48kHz	24	12	SLink port	dSnake	Fast Ethernet
AR84	48kHz	8	4	Slink port	dSnake	Fast Ethernet
AB168	48kHz	16	8	Slink port	dSnake	Fast Ethernet

At connection or power up, the AHM processor will check the firmware version of the expander device and upgrade or downgrade the device to match the main unit firmware.
Up to 2x dSnake 48kHz expanders can be daisy-chained over SLink, provided the first expander is an AR2412 or AB168, and the second expander is an AB168 or AR84. Connection of 2x AR2412 is not supported.
Up to 2x DX168, DX164-W, DX012 expanders in any combination can be daisy-chained over SLink. AHM processors do not support redundant connection to DX expanders.



A DX Hub can be connected to the SLink card for further expansion with up to 8 DX expanders. It also enables a single cable link to the AHM processor in cases where multiple expanders are located on a different floor, area or building.

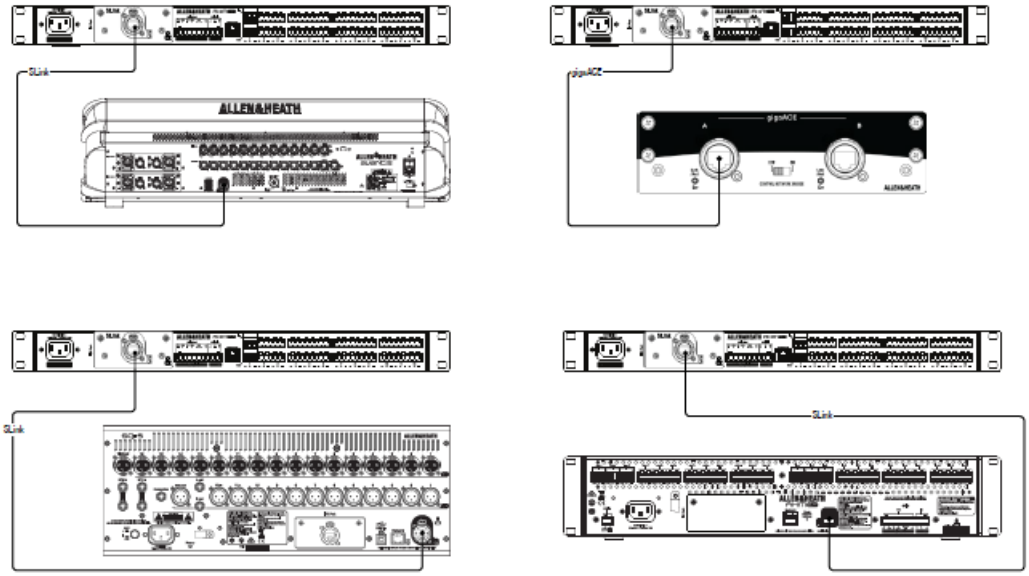


Audio expanders and Ethernet

All protocols listed above are point-to-point connections, Ethernet Layer 2 compliant. gigaACE operates at Gigabit Ethernet speed (1000BASE-T, IEEE 802.3ab). DX and dSnake operate at Fast Ethernet speed (100BASE-TX, IEEE 802.3u).
Layer 2 network devices and media converters can be used, provided they support the correct link speed. Typical applications include conversion to fibre optic for longer cable runs, or integration within an existing Ethernet infrastructure. Refer to the following guidelines and always test the network for functionality and reliability before putting into service. Further advice and notes on VLANs, TCP ports and bandwidth are available on the online Allen & Heath Knowledgebase and website. and Broadcast Storm Protection can cause interruption to audio data or audible clicks. Smart / managed switches may allow turning off Layer 3 or 4 functions, but as a general rule we recommend using Layer 2 devices only. Snake or DX audio. Parallel connection of multiple expanders on the same switch is not possible.

Other SLink connections

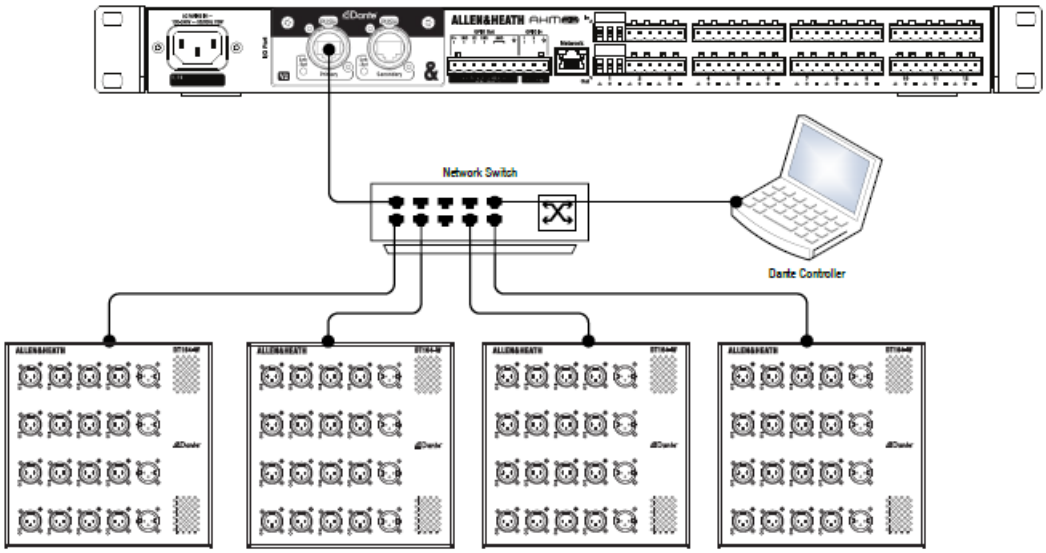
The SLink card can be connected directly to another AHM processor, an SLink enabled Allen & Heath mixer such as SQ or Avantis, or a dLive system fitted with a gigaACE card. This connection enables 128×128 channels of audio.



Set the Audio Sync options so that one device is the clock leader (set to ‘Internal) and the other device is a dock follower (sync from SLink or I/O Port as appropriate).
OThe SLink port does not tunnel control network data. Use the Network port to connect multiple AHM processors or other Allen & Heath mixers for control purposes, for example for Embedded Scene Recalls or System Manager operation.

Dante expanders with Dante card fitted

Control of the DT168 or DT164-W expanders requires an M-Sa-DANT32 or M-SQ-DANT64 (SQ Dante v2) card fitted in the I/O Port.
Use Dante Controller to patch signals between Dante devices. When a valid DT168 or DT164-W socket is routed to the AHM processor, and patched to an Input channel, System Manager will present preamp gain, +48V and Pad controls for the socket.
DT expanders should always be clock followers on the Dante network, with the AHM-64 processor typically set to Preferred Leader and ‘Enable Sync to External’.
Refer to the DT expander Getting Started Guide at www.allen-heath.com for further information.



Connections Control

A computer, wireless router or switch can be connected to the Network port to use with the AHM System Manager, IP remote controllers, Custom Control app or TCP control.

For all connections, use CAT5e (or higher specification) cables up to 100m long.
Refer to **www.allen-heath.com** for cable requirements, recommendations, and a list of CAT cables available to order.
AHM processors communicate over TCP/IP. All devices on the network must have compatible IP addresses.
Factory detaults tor AHM-16and AHM32 are:
Address
192.168.1.91 Subnet Mask 255.255.255.0 Gateway 192.168.1.254
DAHM processors Support upto T m Cootrol instance. More controller, GPIO interfac stem Manage information is available on the online Allen & Heath Knowledgebase.

Software and apps

For direct, wired laptop connection using System Manager or the Custom Control editor, set the laptop to a static, compatible IP address, for example 192.168.1.10.
For LAN or wireless connections, incuding Custom Control apps, set the router / access point to a compatible IP address, for example 192.168.1.254, and its DHCP range to a compatible range of addresses, for example 192.168.1.100 to 192.168.1.200. Set any laptop, tablet or moDile device to DHCP/ODtain an IP address automatically.

IP Controllers

AHM processors are compatible with the emote controllers and GPIO intertaces listed below. All devices Isted here can be set to DHP f required.

	Description	**Default IP**	**PoE**
IP1	Wallmount remote controller with dual-function rotary encoder.	192.168.1.74	802.3af
IP6	Remote controller with 6 push-and-turn rotary encoders.	192.168.1.72	802.3af
IP8	Remote controller with 8 motorised faders.	192.168.1.73	802.3at
GPIO	8×8 general purpose interface for control integration.	192.168.1.75	802.3af

The function of the IP controllers and GPIO is configured via the AHM System Manager. At connection or power up, the AHM processor will check the firmware version of the IP controllers and GPIO and upgrade or downgrade the device to match the main unit firmware.

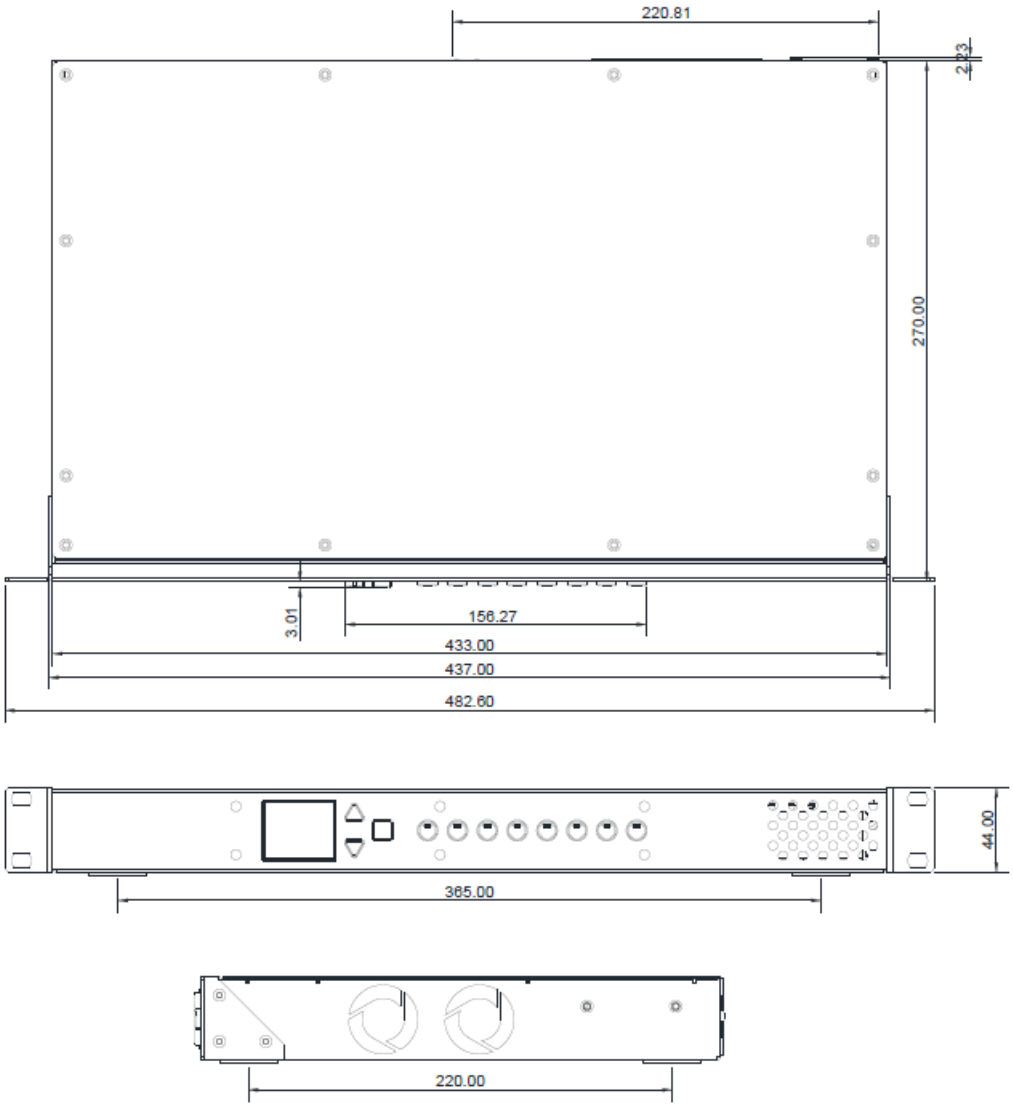
Connection over WAN

For connection of System Manager or Custom Control over a WAN, TCP port 51321 and UDP port 51324 should be forwarded by the NAT to the IP address of the AHM processor.
We strongly recommend usinga secure VPN to access the local network. When connecting directly over the Internet, use a good quality firewall and NAT to block ports when not in use.

TCP Protocol

A TCP Protocol for control and interrogation of AHM parameters is available and documented at Clients should be cofigured to use TCP port 51325 (unsecured) or the TLS/TCP port 51327 depending on the External Control security options set with AHM System Manager.
for drivers or project templates for leading control systems such as Crestron or AMX.

Dimensions



Technical specs

Inputs		**System**	
Mic/Line Inputs	Balanced, +48V phantom power	Measured balanced XLR in to XLR out, 20-20kHz, +5 dB Gain, Pad out, signal @ 0dB (meter)	
Mic/Line Preamp	Fully recallable	Dynamic Range	108dB
Input Sensitivity	-60 to +15dBu	System Signal to Noi se	-92dB
Analogue Gain	+5 to +60dB, 1dB steps	Frequency Response	20Hz – 20kHz +0/-0.5dB
Pad	-20dB Active PAD	THD+N (analogue in to out)	0.005% @ +16dBu output, 1k Hz +5dB gain

Maximum Input Level	+30dBu (PAD in)	Headroom	+18dB
Input Impedance	>3kΩ (Pad out), >8kΩ (Pad in)	Sampling Rate	96kHz +/- 20 PPM
Mic EIN	-127dB with 150Ω source		
Outputs			
Analogue Outputs	Balanced, Relay protected		
Output Impedance	<75Ω		
Nominal Output	+4dBu = 0dB meter reading	**Playback**	
Maximum Output Level	+21dBu	Internal Storage	~2.6GB
Residual Output Noise	-92dBu (muted, 22-22kHz)	File types	Mono/stereo .WAV (16/24bit, 44.1/48/96kHz), MP3
Dimensions and Weights			
Unboxed	Width x Depth x Height x Weight	Operating Temperature Range	0 deg C to 40 deg C (32 deg F to 104 deg F)
AHM-32	482.6mm x 270mm x 44mm x 4kg (19” x 10.6” x 1.7” x 8.8lbs)	Mains Power (AHM-32)	100-240V AC, 50-60Hz, 70W max
AHM-16	482.6mm x 270mm x 44mm x 3.8kg (19” x 10.6” x 1.7” x 8.4lbs)	Mains Power (AHM-16)	100-240V AC, 50-60Hz, 65W max
Boxed			
AHM-32	555 x 405 x 150 mm x 5.65kg (21.8” x 15.9” x 5.9” x 12.5lbs)		
AHM-16	555 x 405 x 150 mm x 5.45kg (21.8” x 15.9” x 5.9” x 12lbs)		

Processing specs

Input Processing		**Zone Processing**	
16/32 Input Channels	Configurable mono or stereo	Up to 16/32 Zones	Configurable mono or stereo
Trim	+/-24dB digital trim	**Source Selector**	Up to 20 sources, variable level, Fade In and Fade Out time <20s
Polarity	Normal/Reverse	**Insert**	In/Out, +4dBu/-10dBV level

Stereo Width Control	L/R, R/L, L -Pol/R, R -Pol/L, Mono, L/L, R,R, M/S	**GEQ**	28 bands 31Hz -16kHz, +/-12dB, constant-Q
Gate		**PEQ**	See Input Processing
Sidechain	Self-key or source selectable, with 12dB/octave Lo-Pass and Hi-Pass	**Compressor**	See Input Processing
Threshold	-72dBu to +12dBu	**Delay**	Up to 683ms
Depth	0 to 60 dB	**ANC**	
Attack	50us to 300ms	Ambient Level	Selectable source and metering point, Gain Differential -18dB to 40dB
Hold	10ms to 5s	Gap	Selectable source and metering point, Threshold -62dB to -20dB, Time 0- 5000ms
Release	10ms to 1s	Gain Element	Min / Max Gain, Rate 0-30dB/s
Insert	In/Out, +4dBu/-10dBV level	**Limiter**	Variable Threshold, Attack and Release
PEQ			
Type	8-Band fully parametric, +/-15dB	**Speaker Processing**	
Band 1 – 8	Selectable LF/HF Shelving, Bell (variable or constant Q), Hi-Pass / Lo- Pass	**Crossovers**	Configurable 2, 3, 4 way
Bell Width	0.50 – 6.00 Q	**Filters**	Asymmetrical, selectable 1st order, Butterworth 12/18/24 db/octave, LR 12/24 dB/octave
Shelving Type	Classic Baxandall	**EQ**	4-Band fully parametric, or 28 band GEQ
Hi-Pass, Lo-Pass Filter	12dB/octave	**Delay**	Up to 683ms
Compressor	Peak or RMS sensing	**Limiter**	See Zone Processing
Sidechain	Self-key or source selectable, with 12dB/octave Lo-Pass and Hi-Pass		
Threshold	-46dBu to 18dBu	**AMM**	
Compressor parameters	Threshold, Ratio, Attack, Release	Channels (AHM-16)	1×16
		Channels (AHM-32)	1×32, 2x 16 or 4x 8
Delay	Up to 683ms	Modes	D-Classic gain sharing or NOM

Documents / Resources

	**ALLEN HEATH AHM 16, AHM 32 Audio Matrix Processors** [pdf] User Guide AHM 16 AHM 32 Audio Matrix Processors, AHM 16, AHM 32, AHM 16 Audio Matrix Processors, AHM 32 Audio Matrix Processors, Audio Matrix, Audio Matrix Processors, Audio Processors, Matrix Processors, Processors

References

- & Everything I/O | Allen & Heath
- heath.com domain name may be for sale
- heath.com domain name may be for sale
- & Allen & Heath | World-Class Mixing
- & Legal | Allen & Heath