



LA4 & LA8

AMPLIFIED CONTROLLERS



At the heart of the L-ACOUSTICS® integrated system approach, the LA4 and LA8 amplified controllers offer cutting edge loudspeaker amplification, DSP, network control, and comprehensive system protection in a single ergonomic package.

Based on similar platforms, the LA4 and LA8 units deliver high performance and dynamic range for live applications, combined with the best possible transducer protection.

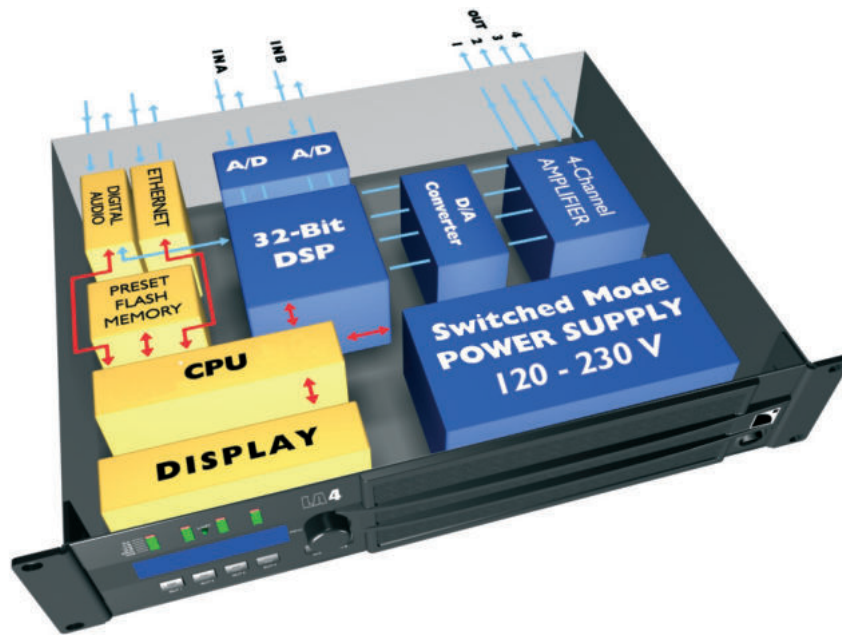
The LA4 and LA8 share the following characteristics:

- A 2U lightweight format for high amplifier density.
- A four-channel high efficiency amplifier section fed by two inputs.
- A DSP section featuring advanced filter algorithms and an exclusive L-DRIVE protection system for the transducers allowing optimum system performance.
- An on-board preset library to cover the L-ACOUSTICS® loudspeaker systems.
- An intuitive and ergonomic user interface, fully accessible from the front panel for standalone operation.
- Two I/O Ethernet ports for networking up to 253 LA4 and LA8 units, remote-monitored by PC-based LA NETWORK MANAGER software (Windows® compatible).

The specific features of each unit are the following:

- The LA4 delivers up to 4 x 1000 watts into 4 ohms.
- The LA8 delivers up to 4 x 1800 watts into 4 or 2.7 ohms.
- An AES/EBU input card is integrated to the LA8 for full digital signal chain. This feature is available as an option on the LA4.
- Each unit carries dedicated on-board preset library, relative to hardware requirements.
- The output connectors are SpeakON® for the LA4 and CA-COM®/SpeakON® for the LA8.

The unique ensemble of on-board features and the addition of peripherals are all offered in a secured and standardized environment. This approach simplifies system setting and operation with the benefit of superior and predictable audio results across the entire product range.

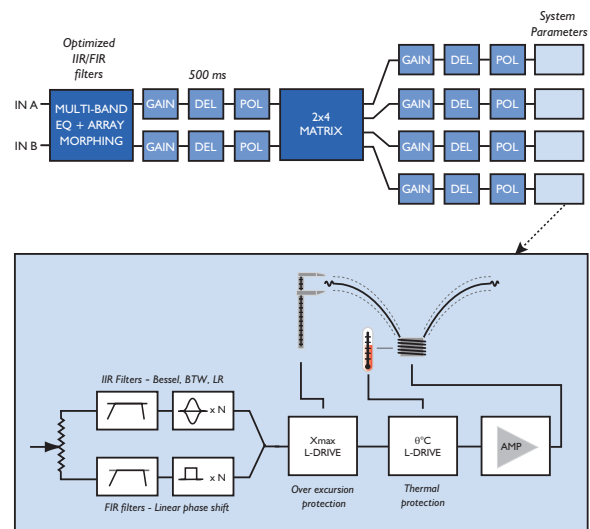


DSP

Proprietary algorithms are processed in a 32-bit floating point DSP engine at a 96 kHz sampling rate. A dedicated engineering approach combining IIR and FIR filters allows generating perfectly linearized phase curves and significantly improved impulse responses for an even more natural, transparent, and realistic sound experience. Two cascaded 24-bit A/D converters at the front-end yield a ground-breaking encoding dynamic of 130 dB.

The L-DRIVE protection system carries out a dual analysis of signal level in real-time and RMS. Under extreme conditions when component membranes reach the over-excursion zone or if the coil ensemble temperature reaches a critical point, L-DRIVE acts as a power regulator. As a result the amount of power delivered at any channel is adjusted to the dynamic and thermal capacity of each individual transducer. This optimizes the power resources while preserving the highest dynamic range.

With a complete preset library and the possibility of creating additional user presets, the engineer is offered fingertip access to all the usual L-ACOUSTICS® loudspeaker system configurations.



- Accessible via "LA NETWORK MANAGER" only
- Accessible via "LA NETWORK MANAGER" and front-panel user interface depending on preset type
- L-ACOUSTICS parameters

AMPLIFICATION

The four amplifier channels driven by two inputs provide optimum system flexibility. The LA4 and LA8 offer two specific power ranges (4 x 1000 watts into 4 ohms, and 4 x 1800 watts into 4 or 2.7 ohms, respectively) yielding perfect power matching to each individual L-ACOUSTICS® loudspeaker system.

The built-in technologies allow control of the very wide dynamic range found in live audio productions while the high-efficiency components offer superior reliability, all from a sleek ergonomic package with exceptional weight/size ratio.

USER INTERFACE

The front panel user interface features extremely fast access to edit the 2 input and 4 output settings. The encoder wheel gives instant access to the user menus and the LCD screen offers real time visualization of the system parameters.

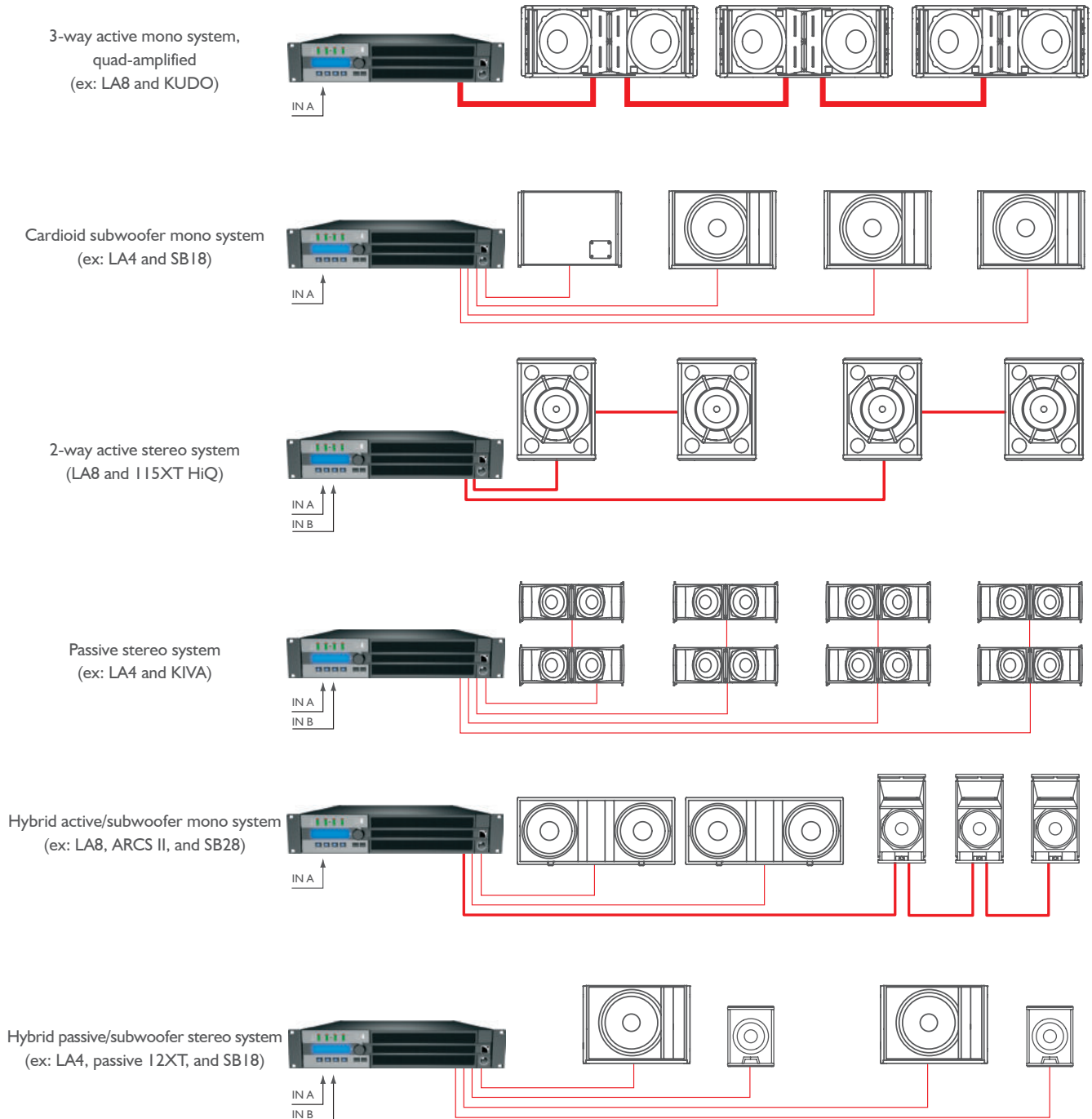
Command access includes mute, gain, preset selection, plus delay and polarity settings. Navigation through the menu pages is fast and intuitive. Beside the standard on-board preset library, the engineer can design and store his own settings (initialized from a standard preset template) in one of the 10 available user locations.

SYSTEM CONFIGURATIONS

Driving four amplifier output channels through a DSP offers a wide range of options when it comes to system configuration. The LA4 and LA8 on-board preset libraries allow the sound engineer a high degree of flexibility in choosing the enclosure models and the system configuration for a specified application.

The LA4 factory preset library covers L-ACOUSTICS® loudspeaker systems that require up to 800 watts into 8 ohms and 1000 watts into 4 ohms. The LA8 factory preset library covers L-ACOUSTICS® loudspeaker systems that require up to 1100 watts into 8 ohms and 1800 watts into 4 or 2.7 ohms.

The factory preset libraries are derived from 6 basic system templates:



The illustrations above are connection templates and do not represent actual system configurations.

Refer to user manuals for product implementation.

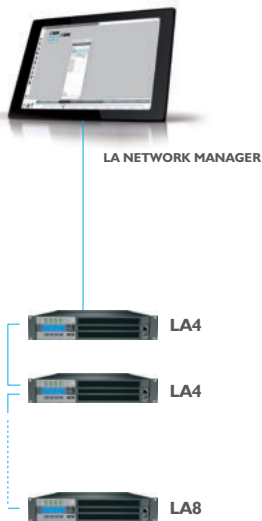
NETWORK ARCHITECTURE AND REMOTE CONTROL

The design of complex systems is made possible by the integration of the L-NET Ethernet-based network. Thanks to its high speed data transfer protocol of 100 Mbit/s, up to 253 units can be controlled and monitored in real-time by LA NETWORK MANAGER software.

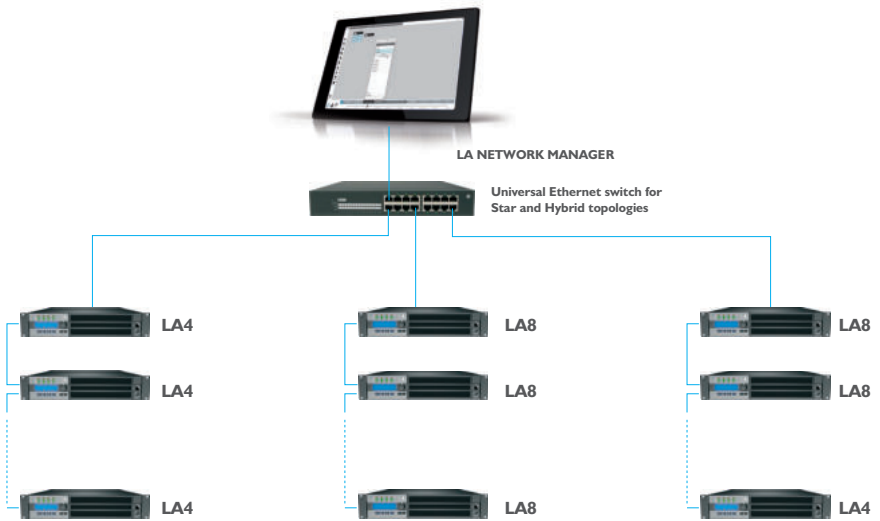
Multiple network topologies such as daisy-chain, star, and hybrid are quickly and easily configurable for full flexibility in the required system architecture. The PC running LA NETWORK MANAGER and the units are connected to each other by using industry standard CAT5e U/FTP cables fitted with RJ45 connectors.

Optimized for tablet PC use, LA NETWORK MANAGER relies on a purely graphical approach and allows placing units and groups in a workspace in a way that reflects their location in the field. It is designed to quickly take the user through the workflow steps of Setup, Tuning, and Live by implementing the tools required for each task into their dedicated page. An advanced network engine allows automatic discovery of connected units. Multiple-group assignation capability, comprehensive real-time monitoring of events with log file, as well as numerous productivity tools complete the characteristics of a remarkably practical and application-oriented network management software.

As a certified member of the CRESTRON® and AMX® partner programs, L-ACOUSTICS® provides software modules allowing control integration into their automation systems, for the convenience of ultimate technology lifestyle in cultural and event centers, universities, houses of worship, sport facilities...



Daisy chain topology



Hybrid topology



LA4X AMPLIFIED CONTROLLER



- 4,000 W @ 8 ohms with record hold times
- 4 in x 4 out architecture
- Universal SMPS with Power Factor correction
- Integrates new MILAN protocol from Avnu

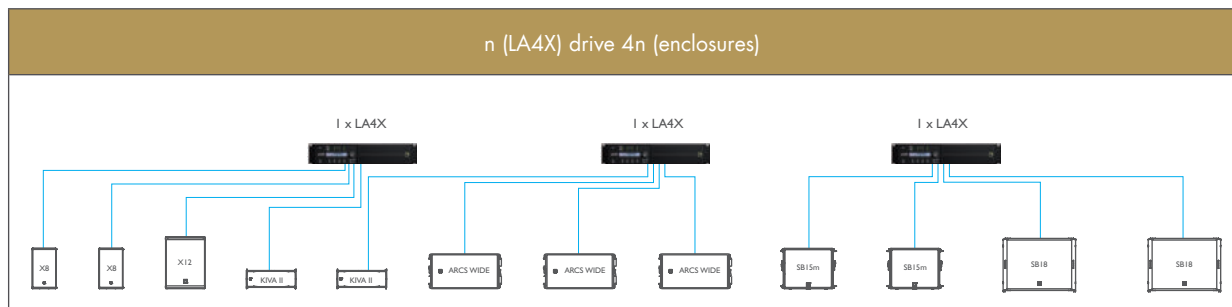


SELF-POWERED... OUT OF THE BOX

The LA4X is an amplified controller based on a 4-input by 4-output architecture and an exclusive green power module providing maximized efficiency. With LA4X, L-Acoustics® speakers can get all the benefits of self-powered speakers, while keeping the versatility of the separated amplification approach. The L-Acoustics systems can be operated in three connectivity modes, as described below.

“A LA CARTE”

The pool of four inputs and four amplification channels of the LA4X can be allocated “à la carte” to any passive speaker enclosures with a one-to-one link. This approach is cost effective for applications requiring a high count of independent sound sources such as stage monitors, multi-channel systems and multi-feed distributed systems.



The sound designer determines the number of LA4X amplifiers based on the quantum of enclosures divided by 4.

“FULLY ACTIVE”

In high-end installation projects, the LA4X can drive active systems, up to K2, for maximum power headroom and the best possible performances. With one transducer section per output channel and the independent DSP treatment of each loudspeaker enclosure, this approach brings maximum discretization with a one-to-one-to-one link, from input-to-processing-to-enclosure.

“CONVENTIONAL”

For applications requiring a high count of loudspeaker enclosures with optimized cost of amplification, the LA4X can efficiently operate as a conventional amplified controller driving speakers in parallel from its four amplification channels, with the added benefit of the 4 inputs when using passive loudspeaker enclosures.

GREEN POWER

LA4X is a “green” amplified controller that relies on a universal switched mode power supply suitable for mains from 90V to 265V. The SMPS features a Power Factor Correction (PFC) which maximizes the amplifier efficiency and takes advantage of nearly 100% of the electrical power available with a very high tolerance to unstable mains. The PFC allows the LA4X to deliver as much power from a 10A line as from a 16A line on a conventional amp. This represents a reduction of the electrical power requirements (cable gauge, power conditioning, etc...) for substantial savings. The Class D amplification circuits ensure the LA4X energy-efficiency for minimal heat dissipation. LA4X delivers 4 x 1000W RMS power at 8 Ω or 4 Ω with record hold times. Besides the high raw RMS power rating at 8 Ω, the ability to deliver energy (power x hold time) yields the best performance from loudspeaker systems, especially in LF reproduction.

I/O

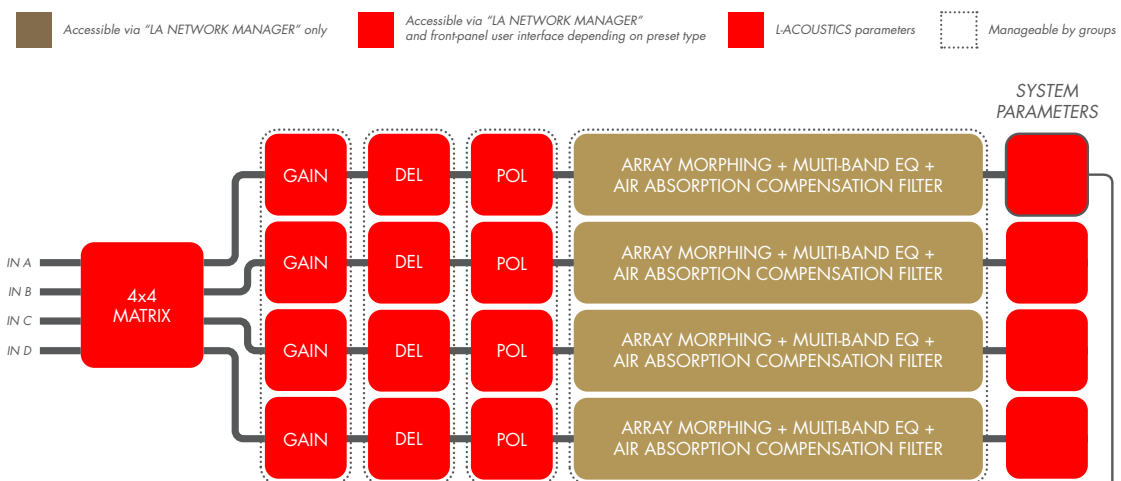
The four LA4X inputs are available in analogue, AES and AVB. Four cascaded 24-bit and 96 kHz A/D converters at the front-end yield an impressive encoding dynamic of 130 dB. AES/EBU digital inputs operate with sample rate converters from 44.1 kHz to 192 kHz. LA4X is an AVB listener capable of retrieving four audio channels from one stream that contains up to 16 channels at 48 kHz or 96 kHz. Automatic fallback functions make the creation of redundant audio paths possible with constant level.

DSP

Operating at 96 kHz with 32 bit float precision, the DSP combines IIR and FIR filters to generate perfectly linearized phase curves and significantly improved impulse responses for an even, more natural, transparent and realistic sound experience.

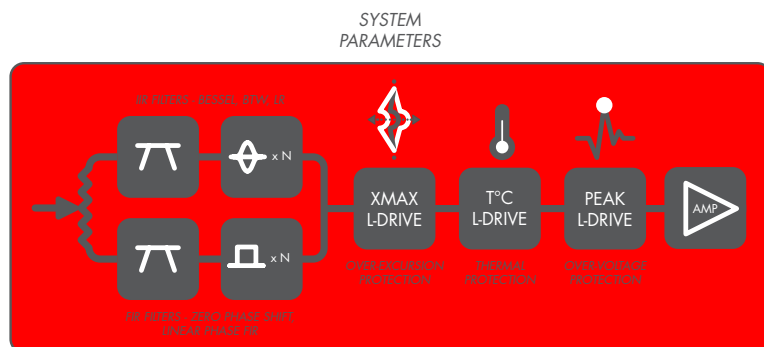
Engineer Workflow Tools

Positioned after the DSP block dedicated to gain, delay and polarity adjustment of the system, the advanced DSP tools can be used along the live engineering workflow, comprising three steps from overall system settings to specific adjustments: First, setting the frequency response of the line source with Array Morphing: the System Engineer can easily achieve the same tonal balance for different geometry line source arrays and combine different line source speakers in the same installation while offering the same sonic signature. Second, ensuring the linearization of HF using plateau FIR filters and the air absorption compensation filter. In long throw applications, high frequency propagation can be strongly affected by air absorption. Compensation of this phenomenon re-establishes the original frequency response of loudspeaker enclosures, up to a limit dictated by the need to preserve a maximum of the driver resources. Third, tweaking the system response (EQ station features) using the pool of 8 IIR filters to fine tune the system within its environment and notch out frequencies.

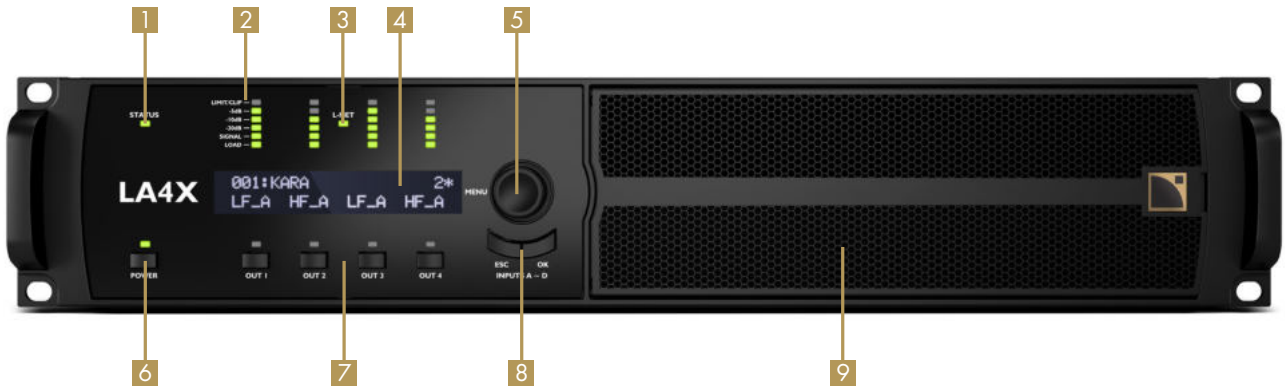


System Protection

The latest L-DRIVE protection system carries out an advanced analysis of signal level. When transducers operate in the nonlinear domain, either at high excursion, high temperature or high voltage, L-DRIVE acts as a smart power regulator to extend the component durability, while maintaining the highest dynamic range. The L-DRIVE circuit has been designed to preserve the sonic transparency of the system.



USER INTERFACE



- 1 Status LED
- 2 LOAD/SIGNAL/LIMIT/CLIP LEDS
- 3 L-NET control network LED
- 4 2 x 24 char. LCD display
- 5 Navigation/Edition rotary encoder
- 6 Power/Standby button and LED
- 7 Channel selection/mute key
- 8 Menu keys
- 9 Anti-dust cover



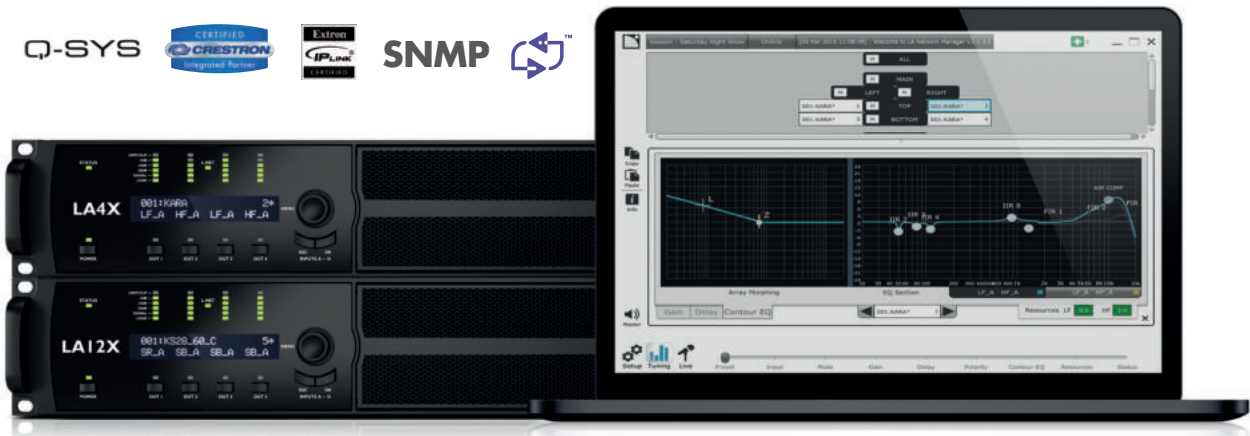
- 10 PowerCON 20 A power supply inlet
- 11 Fan grill
- 12 SpeakON output connector
- 13 XLR analog or AES/EBU input connector
- 14 XLR analog or AES/EBU link connector
- 15 EtherCON 1 Gbit Ethernet connector

ASSOCIATED ENCLOSURES

Systems	Preset families	Max number of connections per channel (*)	Max number of enclosures per controller
Point sources	5XT	4	16
	X8	2	8
	X12	1	4
	X15 HiQ	1	2
Colinear source	Syva	1	4
Constant curvature line sources	ARCS WiFo	1	4
	ARCS II	1	2
Variable curvature line sources	Kiva II	2	8
	Kara	2	4
	K2	1	1
Subwoofers	Syva Sub	1	4
	Syva Low	1	4
	SB15m	1	4
	SB18	1	4

* The number of connections corresponds either to the number of passive enclosures or the number of sections for active speakers.

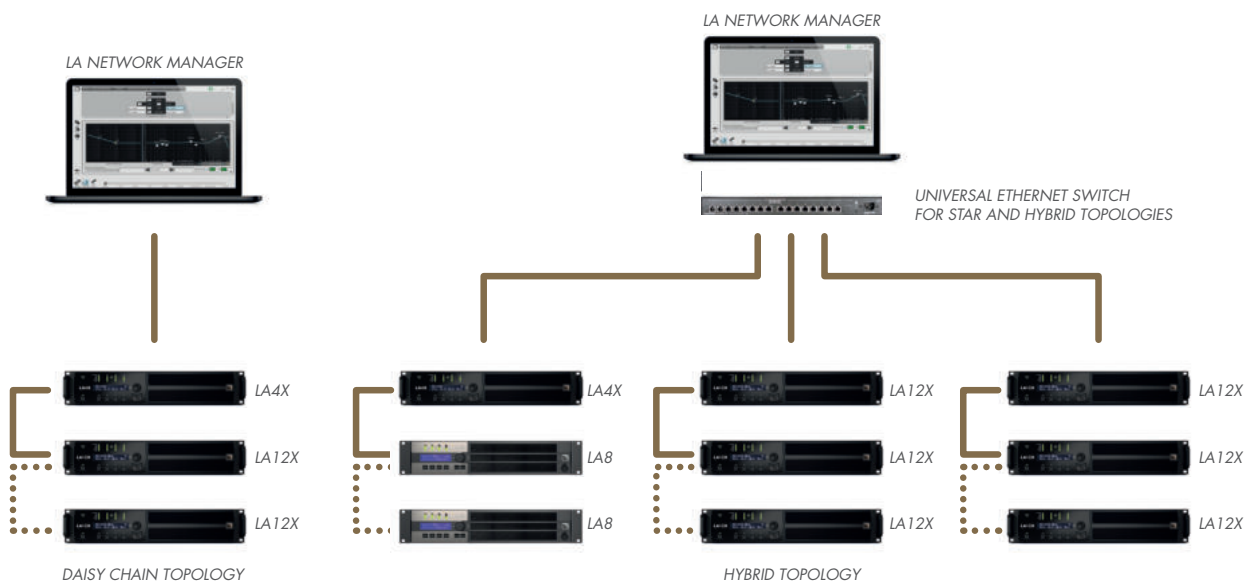
SOFTWARE AND NETWORK



The design of complex systems is made possible by the integration of the L-NET Ethernet-based network. Thanks to its high speed data transfer protocol of 1 Gbit/s, up to 253 units can be controlled and monitored in real-time by the LA Network Manager software. Multiple network topologies such as daisy-chain, star, and hybrid, are quickly and easily configurable for full flexibility in the required system architecture. The computer running LA Network Manager and the units are connected to each other by using industry standard CAT5e U/FTP fitted cables.

Optimized for Mac® and Windows® platforms, LA Network Manager relies on a purely graphical approach and allows amplified controller units and groups to be dragged and dropped in a workspace that reflects their location in the field. It is designed to quickly take the user through the workflow process of Setup, Tuning, and Live by implementing the tools required for each task into the dedicated page for each process. An advanced network engine allows automatic discovery of connected units. Multiple-group assignment capability, comprehensive real-time monitoring with event logging, as well as numerous productivity tools underpin the remarkably practical and application oriented network management software.

For third party management solutions, L-Acoustics provides SNMP support to facilitate the integration via third party control and monitoring systems. As a certified member of the QSC®, CRESTRON® and EXTRON® partner programs, L-Acoustics also provides software modules allowing control integration into their automation systems, for ultimate convenience in cultural and event centers, universities, houses of worship, sport facilities, etc.



AMPLIFIED CONTROLLERS – THE RANGE

L-Acoustics amplified controllers offer high performance and efficient loudspeaker amplification, digital signal processing and comprehensive system protection in a single ergonomic package. The onboard preset library allows for rapid system optimization with minimum EQ correction and delivers a unique sonic signature across all L-Acoustics systems.

LA4X: Amplified controller with DSP

4 x 1000 W @ 8 ohms
4 inputs x 4 outputs architecture



LA8: Amplified controller with DSP

4 x 1800 W @ 4 ohms
2 inputs x 4 outputs architecture



LA12X: Amplified controller with DSP

4 x 3300 W @ 2.7 ohms
4 inputs x 4 outputs architecture



L-CASE



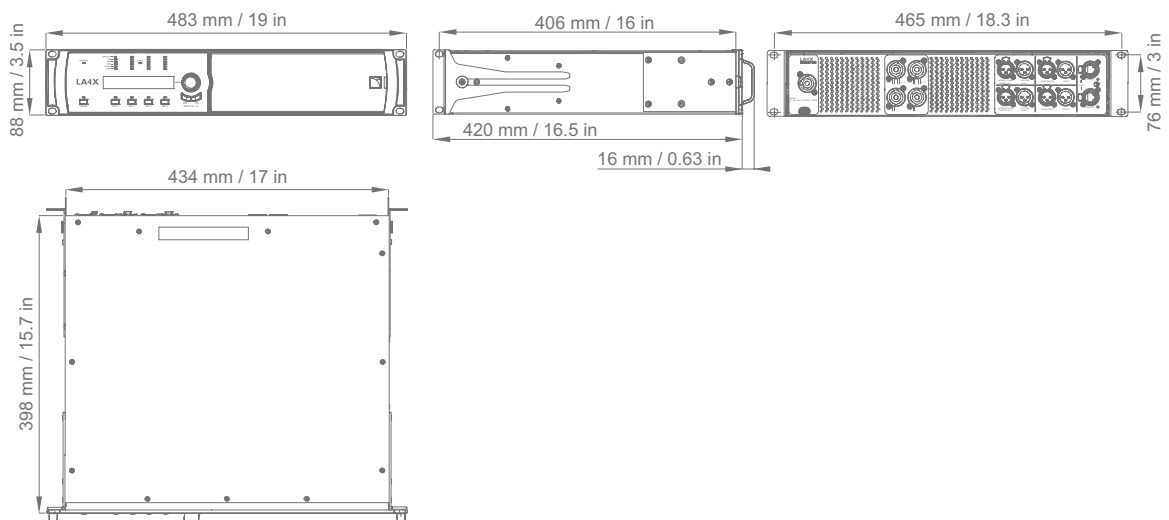
L-CASE is designed to offer a high level of protection against shocks, vibration, water and dust to 2U L-Acoustics electronics during their transport, storage and operation. It offers easy and comfortable handling.

Multiple L-CASE units can be individually identified and conveniently stacked on top of each other. Access to the electronics panels and cables is possible during operation.

L-CASE can be quickly and securely flown with a safety sling passing through the handle and connected to the electronics chassis.



DIMENSIONS



SPECIFICATIONS

Operating conditions

Temperature	Room temperature (from 0° C / 32° F to +50° C / 122° F)
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Amplification and power supply

Amplification class	Class D
Output power EIA (1% THD, 1 kHz, all channels driven)	4 x 1000 W RMS (at 8 Ω) 4 x 1000 W RMS (at 4 Ω)
Power supply model	Universal Switched Mode Power Supply (SMPS) with Power Factor Correction (PFC)
Power factor	> 0.9 (4 Ω full power)
Mains rating	100 - 240 V~ ±10%, 50-60 Hz
Nominal current requirements	20 A for 100-120 V, 10 A for 200-240 V

Audio specifications

Frequency response 20 Hz - 20 kHz	± 0.25 dB at 8 Ω
Distortion THD+N (20 Hz - 10 kHz)	< 0.05% , at 8 Ω, 11 dB below rated power
Noise level (20 Hz - 20 kHz, 8 Ω, A-weighted)	-71 dBV
Channel separation (at 1 kHz , 8 Ω)	> 80 dB
Latency (for both analog and digital inputs)	Standard operating mode: 3.84 ms Low latency operating mode: 0.76 ms

DSP

Digital Signal Processor (DSP)	SHARC 32 bit, floating point, 96 kHz sampling rate
I/O routing	Flexible 4x4 routing matrix
Per output channel	Built-in EQ station with 8 IIR, 3 FIR EQ filters Array morphing (LF contour, zoom factor) Air absorption compensation filters Internal IIR and FIR EQ algorithms for speaker phase linearization and improved impulse responses L-DRIVE protection (excursion, temperature and over-voltage)
Output delay	0 ms to 1000 ms
Transducers protection	L-DRIVE: excursion / temperature / over-voltage

Circuits protection

Mains and power supply	Over and under voltage / over temperature / overcurrent (inrush current protection)
Power outputs	Over current / short circuit / over temperature
Cooling	Cooling fans with temperature control speed

Inputs

Analog: 4 balanced analog line inputs with passively connected link

A/D conversion	4 cascaded 24-bit analog/digital converters (130 dB dynamic range)
Input impedance	22 kΩ (balanced)
Max. input level	22 dBu (balanced, THD 1%)

Digital: 2 AES/EBU inputs (4 channels) with electronically buffered link and failsafe relay

Standard	AES/EBU (AES3)
Sampling frequency (Fs)	44.1, 48, 64, 88.2, 96, 128, 176.4 or 192 kHz
Word length	16, 18, 20 or 24 bits
Synchronization	Signal resampled to internal clock at 96 kHz
Sampling frequency	96 kHz (SRC referenced to the amplified controller internal clock)
Dynamic range	140 dB
Distortion (THD+N)	< -120 dBfs
Bandpass ripple	± 0.05 dB (20 Hz - 40 kHz, 96 kHz)
Fallback mode	AB to CD: digital to analog / digital to digital
Switchover conditions	No clock, loss of lock, CRC error, bipolar encoding error or data slip
Constant delay	Independent of input Fs
Constant level	Upon user setting of AES/EBU gain, independent of input Fs
Input gain	-12 dB to +12 dB, 0.1 dB steps

AVB inputs

Stream capacity	One class A stream
Latency	2 ms (typical, depends on talker) format IEC 61883-6 AM824 at 48 kHz or 96 kHz
Channel count	4 channels from one stream that may contain up to 8 channels
Clock	Synchronized on clock of the connected AVB input stream (upsampling at 96 kHz in case of stream at 48 kHz)

Remote control and monitoring

Network connection	Dual-port Ethernet Gigabit interface, Avnu certified bridge forwarding up to 32 streams
L-Acoustics remote control software	LA Network Manager
Third-party management solutions	QSC® / SNMP / Extron® / Crestron®

Physical data

Height	2U
Weight	11.3 kg / 24.9 lb
Protection rating	IP3x

LA 12X AMPLIFIED CONTROLLER



- 12,000 W with record hold times
- DSP controlled universal SMPS
- Advanced Power Factor Correction
- 4 in x 4 out architecture
- Boosted DSP resources
- Integrates new MILAN protocol from Avnu



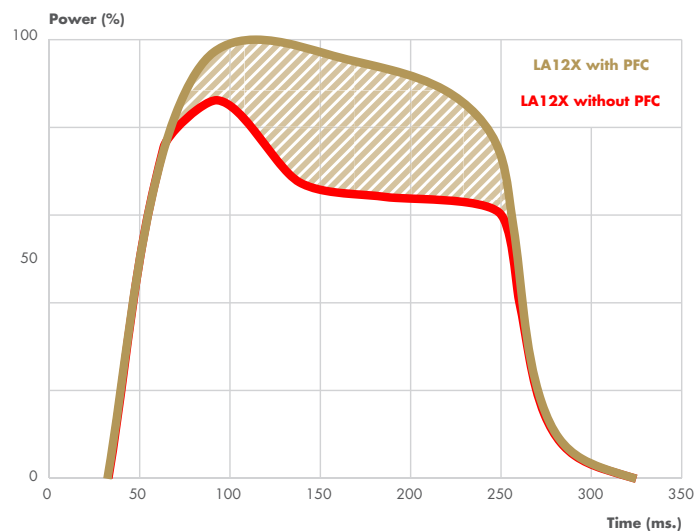
POWER SUPPLY

The LA12X relies on a proprietary switch mode power supply (SMPS) equipped with a DSP-controlled PFC, capable of delivering 12,000 W regardless of mains voltages (from 240 V down to 100 V.)

The PFC offers high immunity to unstable mains and lowers typical power consumption by up to 40% for the same usage conditions i.e., more power is available to the output stages from a given circuit (16 A at 230 V mains, 30 A at 120 V mains).

In addition to the high raw RMS power rating, the ability to deliver energy (power x hold time) yields the best performance from loudspeaker systems, especially in LF reproduction.

RMS output power of LA12X with and without PFC



I/O

The four LA12X inputs are available in analogue, AES and AVB. Four cascaded 24-bit and 96 kHz A/D converters at the front-end yield an impressive encoding dynamic of 130 dB. AES/EBU digital inputs operate with sample rate converters from 44.1 kHz to 192 kHz. Automatic fallback functions make the creation of redundant audio paths possible with constant delay and constant level.

DSP

Operating at 96 kHz with 32 bit float precision, the DSP combines IIR and FIR filters to generate perfectly linearized phase curves and significantly improved impulse responses for an even, more natural, transparent and realistic sound experience.

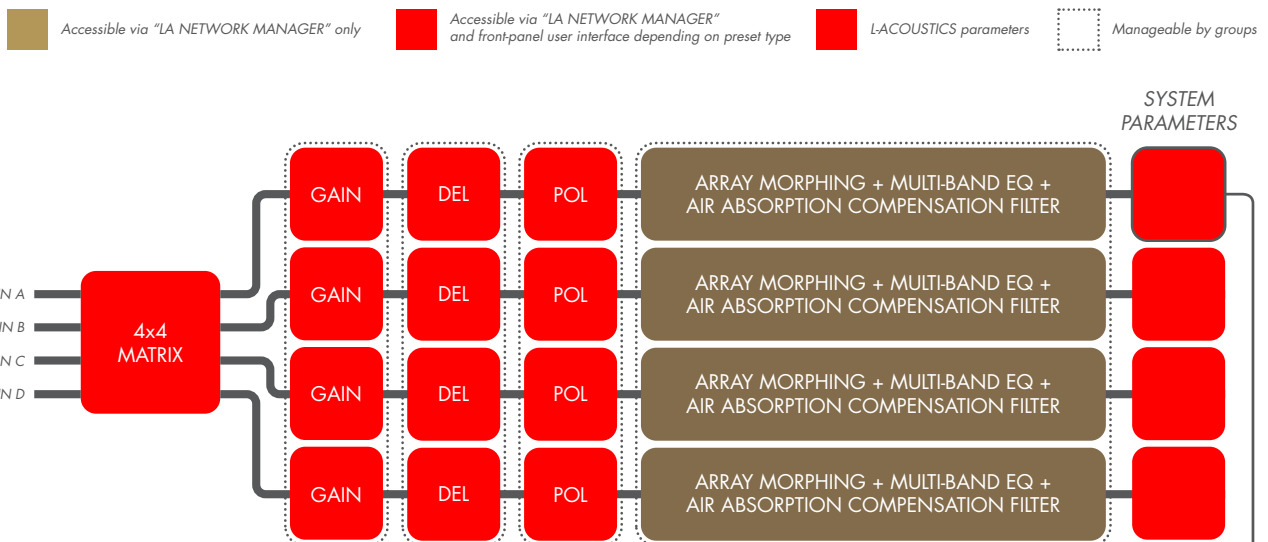
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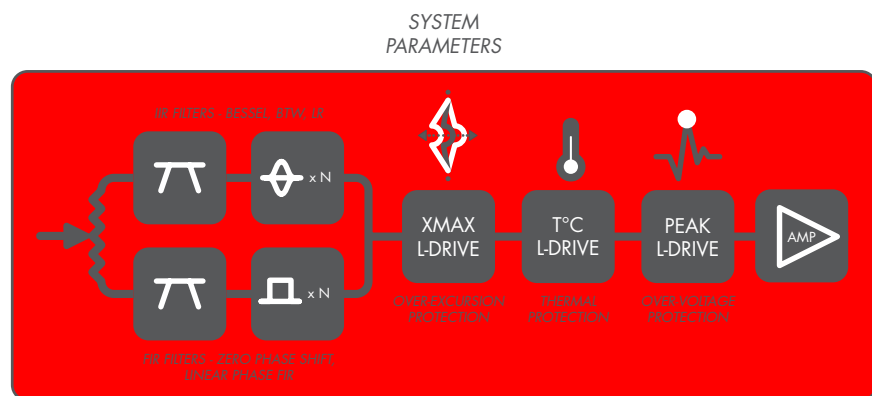
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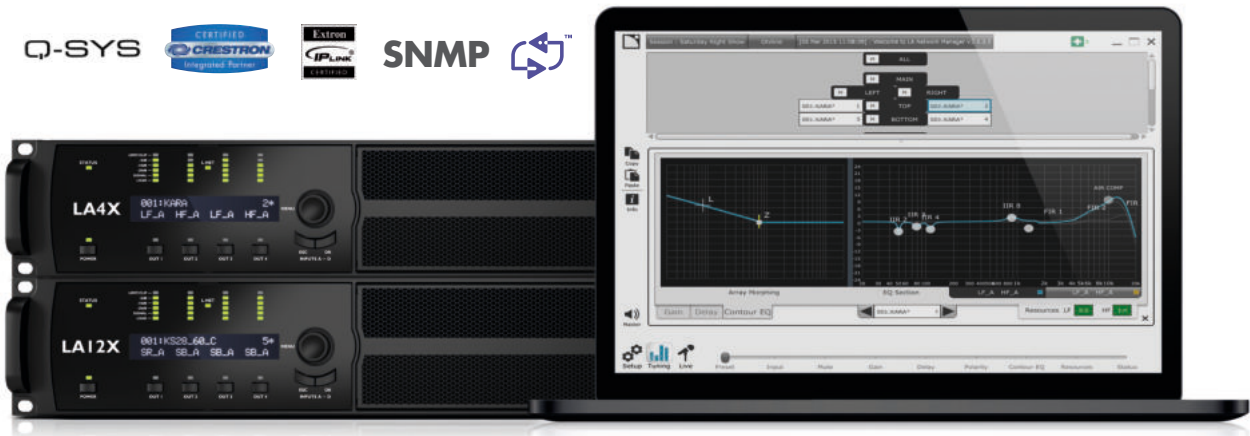
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ASSOCIATED ENCLOSURES

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Coaxials	5XT	6	24
	X8	3	12
	X12	3	12
	X15 HiQ	3	6
Constant Curvature Line sources	ARCS WIFO	3	12
	ARCS II	3	6
Variable Curvature Line sources	KIVA II	6	24
	KARA	3	6
	K2	3	3
	K1	2	2
Colinear source	SYVA	3	12
Subwoofers	SB15m	3	12
	SB18 (i/m)	3	12
	K1-SB	1	4
	SB28	1	4
	SYVA LOW	2	6
	SYVA SUB	3	12
	KS28	1	4

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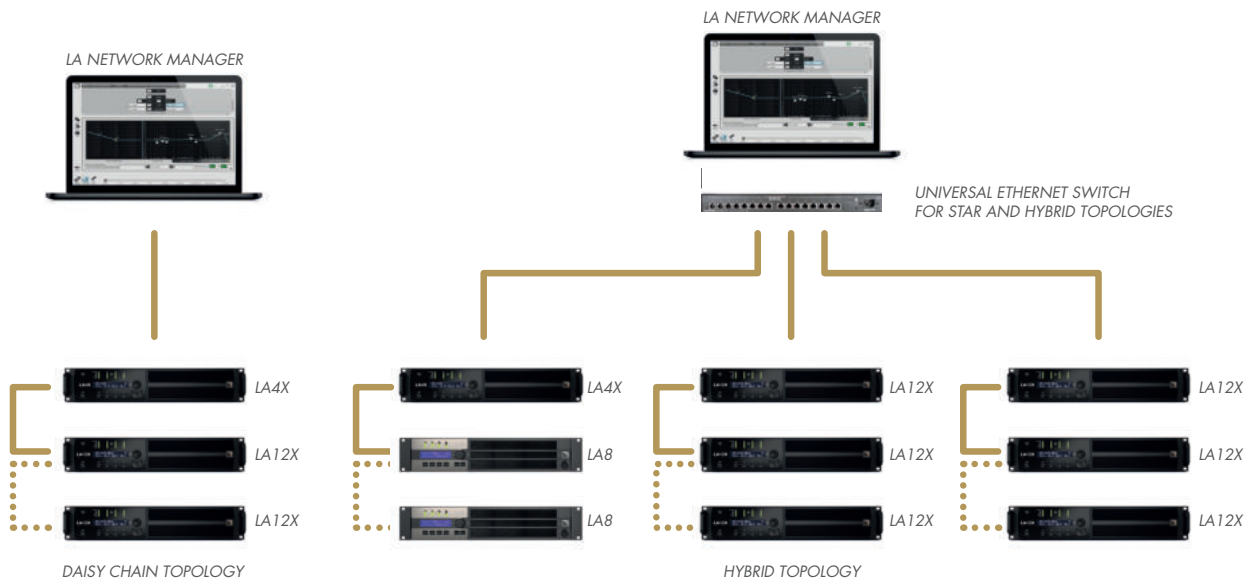
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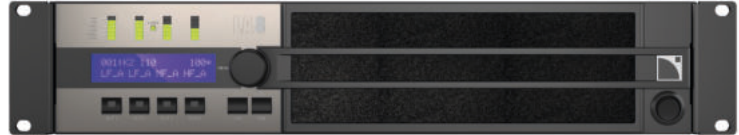
LA4X: Amplified controller with DSP

4 x 1000 W @ 8 ohms
4 inputs x 4 outputs architecture



LA8: Amplified controller with DSP

4 x 1800 W @ 4 ohms
2 inputs x 4 outputs architecture



LA12X: Amplified controller with DSP

4 x 3300 W @ 2.7 ohms
4 inputs x 4 outputs architecture



ACCESSORIES

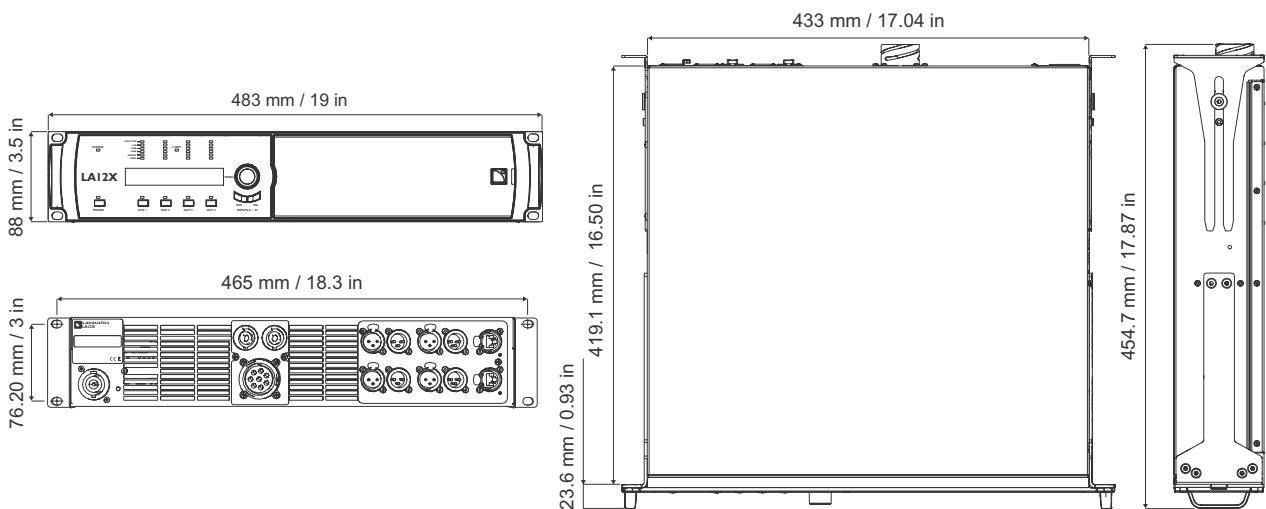


LA-RAK II: Touring rack
with three LA12X, with power, audio
and network distribution



**L-CASE: Transport and
operation case for electronics**
Capacity: single 2U amplified
controller

DIMENSIONS



SPECIFICATIONS

Operating conditions

Temperature	Room temperature from 0° C / 32° F to +50° C / 122° F
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Amplification and power supply

Amplification class	Class D
Output power CEA-2006 / 490A (1% THD, 1 kHz, all channels driven)	4 x 1400 W RMS (at 8 Ω) 4 x 2600 W RMS (at 4 Ω) 4 x 3300 W RMS (at 2.7 Ω)
Power supply model	Universal Switched Mode Power Supply (SMPS) with Power Factor Correction (PFC)
Power factor	> 0.9
Mains rating	100 V - 240 V ~ ±10%, 50-60 Hz
Nominal current requirements	30 A for 100-120 V, 16 A for 200-240 V

Audio specifications

Frequency response	20 Hz - 20 kHz, ± 0.1 dB (at 8 Ω, 60 W output power) 20 Hz - 20 kHz, ± 0.1 dB (at 4 Ω, 120 W output power)
Distortion THD+N (20 Hz - 10 kHz)	< 0.05% (at 8 Ω, 60 W output power) < 0.1% (at 4 Ω, 120 W output power)
Output dynamic range (20 Hz - 20 kHz, 8 Ω, A-weighted)	> 114 dB
Noise level (20 Hz - 20 kHz, 8 Ω, A-weighted)	< -72 dBV
Channel separation (at 1 kHz, 4 Ω)	> 85 dB
Latency (for both analog and digital inputs)	Standard operating mode: 3.84 ms Low latency operating mode: 0.76 ms

DSP

Digital Signal Processor (DSP)	2 x SHARC 32-bit, floating point, 96 kHz sampling rate
I/O routing	Flexible 4x4 routing matrix
Per output channel	Built-in EQ station with 8 IIR, 3 FIR EQ filters Array morphing (LF contour, zoom factor) Air absorption compensation filters Internal IIR and FIR EQ algorithms for speaker phase linearization and improved impulse responses L-DRIVE protection (excursion, temperature and over-voltage)
Output delay	0 ms to 1000 ms
Transducers protection	L-DRIVE: excursion / temperature / over-voltage

Circuits protection

Mains and power supply	Over and under voltage / over temperature / overcurrent (fuse protection, and inrush current protection)
Power outputs	Over current / DC / short circuit / rail over and under voltage / over temperature
Cooling	Cooling fans with temperature control speed

Inputs

Analog: 4 balanced analog line inputs with passively connected link

A/D conversion	4 cascaded 24-bit analog/digital converters (130 dB dynamic range)
Input impedance	22 kΩ (balanced)
Max. input level	22 dBu (balanced, THD 1%)

Digital: 2 AES/EBU inputs (4 channels) with electronically buffered link and failsafe relay

Standard	AES/EBU (AES3)
Sampling frequency (Fs)	44.1, 48, 88.2, 96, 176.4 or 192 kHz
Word length	16, 18, 20 or 24 bits
Synchronization	Signal resampled to internal clock at 96 kHz
Sampling frequency	96 kHz (SRC referenced to the amplified controller internal clock)
Dynamic range	140 dB
Distortion (THD+N)	< -120 dBfs
Bandpass ripple	± 0.05 dB (20 Hz - 40 kHz, 96 kHz)
Fallback mode	AB to CD: digital to analog / digital to digital
Switchover conditions	No clock, loss of lock, CRC error, bipolar encoding error or data slip
Constant delay	Independent of input Fs
Constant level	Upon user setting of AES/EBU gain, independent of input Fs
Input gain	-12 dB to +12 dB, 0.1 dB steps
Revert to AES/EBU	Upon manual user selection

Remote control and monitoring

Network connection	Dual-port Ethernet Gigabit interface
LA Acoustics remote control software	LA Network Manager 2
Third-party management solutions	QSC® / SNMP / Extron® / Crestron®

Physical data

Height	2U
Weight	14.5 kg / 32 lb
Protection rating	IP2X

PRELIMINARY

LA2Xi AMPLIFIED CONTROLLER FOR INSTALL



- **4 x 4 architecture in AVB, AES, Analog**
- **Milan seamless redundancy**
- **Compact (1U)**
- **Matched power for small loudspeakers**
- **Reduced power for larger loudspeakers**
- **Bridge mode at full power for larger loudspeakers**



LA2Xi is a four-channel amplified controller dedicated to permanent installations. It is primarily designed to power L-Acoustics small-format loudspeakers. LA2Xi also supports larger loudspeakers in applications that require lower sound pressure levels (SPL) in a 4 x 4 single-ended mode or full SPL capacity in 4 x 3, 4 x 2 or 4 x 1 bridged modes.

Packaged in a 1U chassis for efficient use of rack space, LA2Xi incorporates features tailored for integration applications. Its streamlined and elegant front panel hides the same DSP engine as the flagship LA12X amplified controller, with features for loudspeaker management, protection and monitoring as well as a comprehensive set of tools for system adjustment and calibration. The Milan-certified LA2Xi offers AVB inputs with seamless redundancy as well as analog and AES inputs. The rear panel offers terminal connectors for AES and analog inputs, loudspeakers outputs as well as 4 GPIO and a 24 V DC backup power for the DSP card, enabling external control and monitoring, and ensuring fast recovery in case of power loss. LA2Xi is remotely controlled and monitored by LA Network Manager.

The flexible LA2Xi is ideal for background music systems in leisure venues, distributed fills, studio monitors and private auditorium systems.

I/O

LA2Xi provides four analog inputs, four AES inputs with active links and failsafe relay on terminal connectors and one AVB input stream with up to 8 channels on etherCON™. Automatic fallback functions from AVB to AES and AES to analog make the creation of redundant audio paths possible.

LA2Xi enables AVB seamless redundancy according to the Milan protocol. In case of connection loss on the primary network, audio will pass automatically on the secondary network without any audible artefact.

Routing inputs to outputs is done within LA Network Manager.

With a flexible output channel architecture, LA2Xi adapts to the needs of various applications, allowing for a 4, 3, 2 or 1 output channel configuration. The single-ended mode provides matched power for smaller loudspeakers and scaled power for larger loudspeakers, while the bridge mode offers maximum SPL capabilities for all supported loudspeakers.

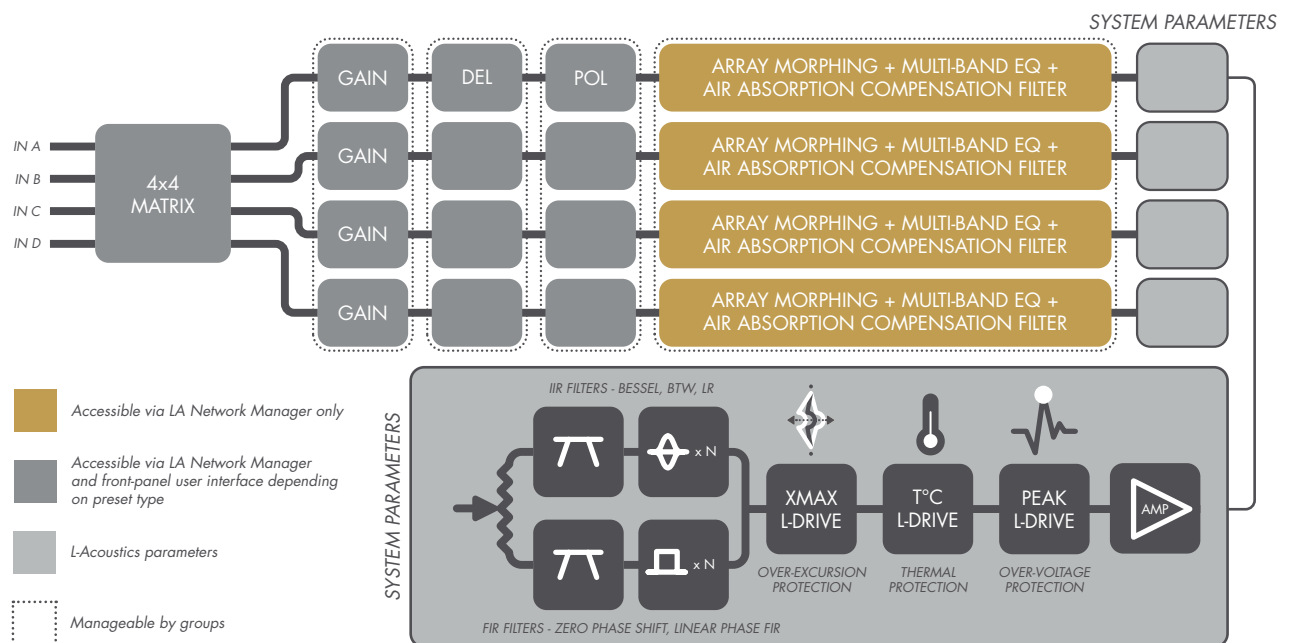
DSP

All L-Acoustics amplified controllers integrate powerful DSP resources gathering loudspeaker management, loudspeaker and amplified controller protection, and a comprehensive set of tools for system adjustments to create a natural, transparent and realistic sound experience. The DSP engine is divided into three blocks.

System alignment: The first block provides tools to create a coherent system by setting optimal summation of each element of the system. Gain, delay up to 1 second and polarity settings are available for each output channel.

System tonal balance: The second block provides advanced tools to maintain a consistent sonic signature between arrays in the system and a consistent sound from one venue to another. Array Morphing is used to adjust the tonal balance of line sources, regardless of the geometry of the array. A set of adjustable IIR and phase linear FIR filters are used to fine-tune the system to a specific venue or configuration. The Air Compensation tool is used to adjust the system response in regards to atmospheric conditions while preserving driver resources.

System performance: The third block is the system parameters that unify loudspeaker response and system protection through specific loudspeaker presets developed in-house. It integrates the proprietary L-DRIVE protection system to maximize output power and minimize nonlinearities. L-DRIVE optimum protection ensures durable performance and preserves sonic transparency in the linear and nonlinear domains.



SYSTEM MONITORING

L-Acoustics amplified controllers integrate supervision functionalities to check amplifiers and loudspeakers status, behavior and continuity. The amplified controllers can monitor input and output signal integrity, levels, temperature and voltage values as well as a power amplifier failure. Any malfunction is reported in real-time within LA Network Manager control software.

A combination of real-time load presence tests with periodic silent tests monitors output circuits. The Load checker functionality verifies the output cabling and the number of enclosures in parallel and validates that the preset loaded matches the connected enclosures.

In case of input signal fault, the fallback modes automatically and instantaneously switch from the primary signal type over to the fallback inputs (AVB to AES and/or AES to Analog). The amplified controllers support dual network redundancy following the Milan protocol. Two AVB networks run simultaneously, and the amplified controllers switch seamlessly to the secondary network in case of failure on the primary network.

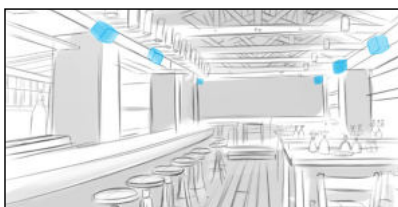
GREEN POWER

The latest generation of L-Acoustics amplified controllers relies on universal switch-mode power supplies (SMPS) for mains voltage from 100 V to 240 V +/- 10% (50 - 60 Hz). The SMPS is equipped with a power factor correction (PFC) to maximize the amplifier efficiency taking advantage of nearly 100% of the electrical power available with a very high tolerance to unstable mains. The combination of PFC and class D amplification leads to high energy-efficiency, low heat dissipation and electrical power requirements (cable gauge, power conditioning, etc...).

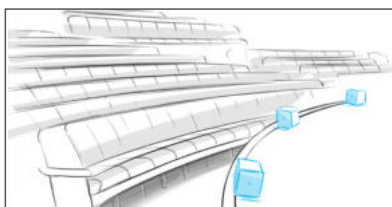
From a single 10 A line LA2Xi delivers 4 x 640 W RMS power at 4 Ω with record hold times. L-Acoustics amplified controllers are designed to hold high power over a long period of time, typically 200 ms, yielding the best performance to loudspeaker systems, especially in the low frequency domain.

APPLICATIONS

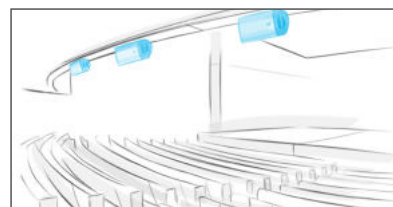
LA2Xi supports a wide variety of near-field installed applications, powering main or fill systems in theaters, studios, private auditoriums, conference halls and other leisure venues.



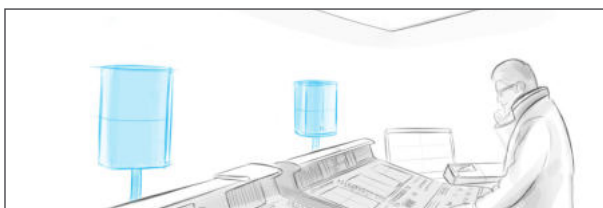
Background music in restaurant with X4i



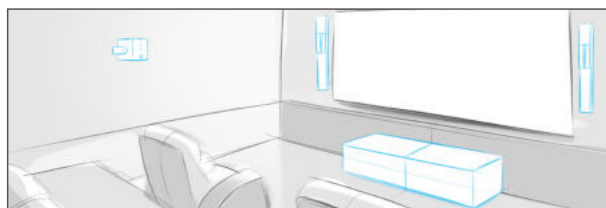
Front fills with 5XT



Under balcony fills with X8



Studio monitors with X8 - Bridged mode



Private auditorium with Syva and Syva Sub

ENCLOSURE DRIVE CAPACITY

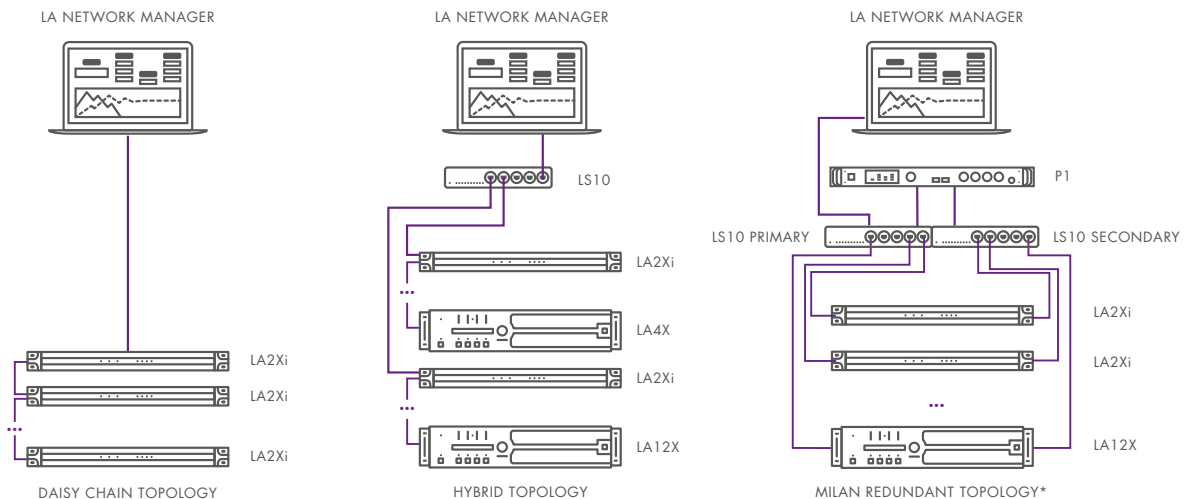
Categories - Series	Reference	Single ended mode		Bridge mode (Max SPL)
		nb of enclosure per LA2Xi	Max SPL reduction (dB)	nb of enclosure per LA2Xi
Short throw X Series	X4i	16	0	-
	5XT	16	0	-
	X8	8	-4	2
	X12	4	-5	2
	X15 HiQ	2	-5	-
Medium throw S Series	Syva	4	-7	2
	Syva - Syva Low	4	-6	-
	Syva Low	4	-6	-
	Syva Sub	4	-5	2
Medium throw A Series	A10(i) Wide/Focus	8	-4	2
	A15(i) Wide/Focus	4	-5	2
Long throw - K Series	KIVA II	8	-5	4
	KARA II(i)	4	-5	-
	K3(i)	-	-	-
	K2	-	-	-
	K1	-	-	-
	K1-SB	-	-	-
Subwoofers	SB15m	4	-6	2
	SB18(i/m)	4	-5	2
	SB28	4	-6	1
	KS21 (i)	4	-7	2
	KS28	4	-7	1

SOFTWARE AND NETWORK



LA Network Manager is designed to efficiently take users through the workflow process of Setup, Tuning, and Live. The tools required for each task are available in the dedicated page for each step of the control and supervision process. An advanced network engine allows automatic discovery of connected units, multiple-group assignment, real-time monitoring with event logging, and includes numerous productivity tools.

L-Acoustics amplified controllers are controlled using a proprietary Ethernet-based network L-NET. Thanks to its high-speed data transfer protocol of 1 Gbit/s, up to 253 units can be controlled and monitored in real-time by LA Network Manager, a proprietary software available on both Windows and Mac operating systems. All amplified controllers are fitted with two Ethernet ports allowing daisy-chain topologies, star topologies or a hybrid of the two, using standard CAT5e U/FTP cables.



*Milan redundant topology is not available for LA4X.

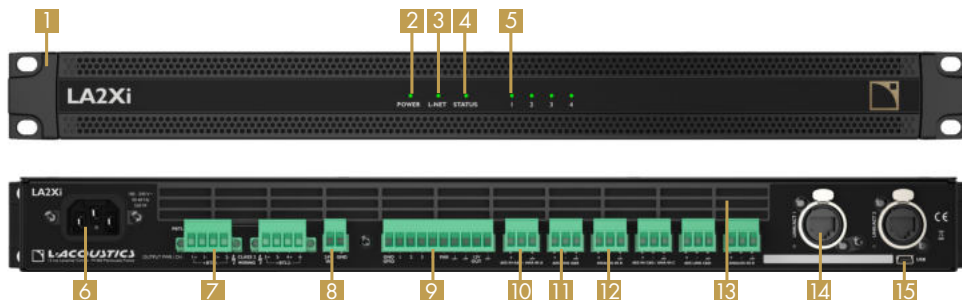
Milan is the application layer based on AVB that ensures true interoperability between any Milan-certified devices. AVB is an evolution of the legacy Ethernet that was designed for media transport. AVB is the only protocol that guarantees a deterministic and synchronous network behaviour for the transmission of time-sensitive data. But AVB is a network layer technology that does not define an implementation strategy at the application layer. Milan takes care of that.



As an initiative of the Avnu alliance that was developed by leading members of the industry, including L-Acoustics, Milan is an open solution, independent from any private entity. The Milan initiative developed agreed-upon standards for media stream format, media clocking, seamless redundancy, and more so that no network expertise is required to set up a reliable and deterministic AVB network with Milan-certified devices.

Milan takes the burden of creating and managing IT networks and let users focus on creating amazing audio experiences.

USER INTERFACE

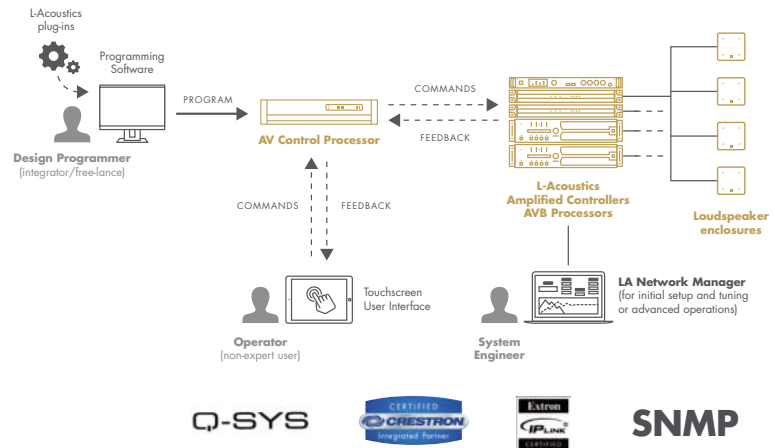


- | | | |
|-----------------------------|--|--|
| 1 1U chassis | 6 IEC V-Lock compatible power supply inlet | 11 AES/EBU terminal link connector |
| 2 Power LED | 7 Loudspeaker outputs on 4-point terminal blocks | 12 Analog terminal input connector |
| 3 L-NET control network LED | 8 24 V DC External DSP backup voltage input | 13 Fan grill |
| 4 Status LED | 9 General Purpose I/O (GPIO) | 14 1 Gb/s Ethernet etherCON connector |
| 5 Signal, limit, clip LEDs | 10 Analog or AES/EBU terminal input connector | 15 USB port for IP address configuration |

THIRD PARTY INTEROPERABILITY

To facilitate the integration of L-Acoustics solution with media control systems, several modules and plug-ins have been developed to interface with popular control environments. Interoperability between L-Acoustics ecosystem and media control systems allows to centralize the management of L-Acoustics electronic devices with other types of devices through a customized interface and to monitor the PA system for voice alarm continuous capability.

L-Acoustics developed plug-ins and modules for integration with the following manufacturer's control systems:



AMPLIFIED CONTROLLERS – THE RANGE

All members of the latest generation of amplified controllers share similar architecture with extremely powerful DSP. The main differentiators between amplified controllers are gathered in the following table:

Specifications	LA2Xi	LA4X	LA12X
Install / Touring	Install	Install / Touring	Install / Touring
In x Out	4 x 4 / 4 x 3 / 4 x 2 / 4 x 1	4 x 4	4 x 4
Output power Sine burst, 1 kHz, 200 ms, < 1% THD, all channels loaded	4 x 190 W RMS (at 16 ohms) 4 x 360 W RMS (at 8 ohms) 4 x 640 W RMS (at 4 ohms)	4 x 1000 W RMS (at 8 ohms) 4 x 1000 W RMS (at 4 ohms)	4 x 1400 W RMS (at 8 ohms) 4 x 2600 W RMS (at 4 ohms) 4 x 3300 W RMS (at 2.7 ohms)
Nominal power requirements for 200 - 240 V	10 A	10 A	16 A
Nominal power requirements for 100 - 120 V	20 A	20 A	30 A
input channels	4 x Analog / 4 x AES / 4 x AVB*	4 x Analog / 4 x AES / 4 x AVB*	4 x Analog / 4 x AES / 4 x AVB*
Noise level (20 Hz - 20 kHz, 8 Ω, A-weighted, digital input)	< -78 dBV	< -71 dBV	< -72 dBV
Front panel	No screen, no buttons	LCD display with rotary encoder, power and mute keys	LCD display with rotary encoder, power and mute keys
Height	1U	2U	2U
Weight	4.4 kg / 9.7 lb	11.3 kg / 24.9 lb	14.5 kg / 32 lb

* 4 channels from one AVB stream of up to 8 channels

PRELIMINARY

LA2Xi AMPLIFIED CONTROLLER



LA2Xi is a four-channel amplified controller dedicated to permanent installations. Designed to match the power of small-format loudspeakers, LA2Xi can also be used to support larger loudspeakers at lower SPL capability (4 x 4 single-ended mode) or at full SPL capability (4 x 3, 4 x 2 or 4 x 1 bridge mode).

The streamlined and elegant 1U front panel hides a powerful DSP engine with features for loudspeaker management, protection and monitoring as well as a comprehensive set of tools for system adjustment and calibration. In addition to analog and AES, LA2Xi integrates AVB signal inputs with Milan seamless network redundancy. Four GPIO and a 24 V DC backup power for the DSP card offer external control and improved reliability. The flexible LA2Xi is ideal for background music systems in leisure venues, distributed fills, studio monitors and private auditorium systems.

SPECIFICATIONS

Amplification and power supply					
Amplification class	High-efficiency class D				
Output power, all channels loaded	4 channels at 4 Ω	4 channels at 8 Ω	4 channels at 16 Ω	2 channels at 8 Ω	1 channel at 4 Ω
Peak output power 12 dB Crest Factor, Sine burst, 1 kHz, 2 ms	710 W	370 W	190 W	1400 W	2750 W
Output power 200 ms, Sine burst, 1 kHz, 200 ms, < 1 % THD	640 W	360 W	190 W	1260 W	2550 W
Power supply model	Universal Switched Mode Power Supply (SMPS) with Power Factor Correction (PFC)				
Mains rating	100 V - 240 V ~ ±10%, 50-60 Hz				
Audio specifications					
Frequency response (20 Hz - 20 kHz, 8 Ω load, 60 W output power)	± 0.25 dB				
Distortion THD+N (20 Hz - 10 kHz, 8 Ω load, 60 W output power)	< 0.1%				
Output dynamic range (20 Hz - 20 kHz, 8 Ω, A-weighted, Digital input)	> 113 dB				
Noise level (20 Hz - 20 kHz, 8 Ω, A-weighted, Digital input)	< -78 dBV				
DSP					
Digital Signal Processor (DSP)	Gen.4 Dual SHARC 32-bit, floating point, 96 kHz sampling rate				
I/O routing	4x4 routing and summation matrix				
Per output channel	Built-in EQ station with 8 IIR, 3 FIR EQ filters Array morphing (LF contour, zoom factor), Air absorption compensation filters Internal IIR and FIR EQ algorithms for speaker phase linearization and improved impulse responses L-DRIVE advanced system protection (excursion, temperature and over-voltage) Output delay from 0 to 1000 ms				
Circuits protection					
Mains and power supply	Over and under voltage / over temperature / overcurrent (fuse protection, and inrush current protection)				
Power outputs	Overcurrent / DC / short circuit / over temperature				
Inputs / Outputs					
Analog input	4 channels on 4 male 3-point terminal blocks				
AES / EBU input	4 channels (2 x AES3) on 2 male 3-points terminal blocks (44.1 - 192 kHz sampling rate) With active link and bypass relay				
AVB input with support of Milan seamless dual networking	4 channels 48 kHz / 96 kHz from 1 stream of up to 8 channels				
Loudspeaker output	2 female 4-point terminal blocks				
Remote control and monitoring					
Network connection	Dual-port Ethernet Gigabit interface				
General Purpose Inputs / Outputs (GPIO)	4 GPIO, isolated optocoupler inputs, isolated relays contacts				
External DSP backup voltage input	24 V DC / 0.5 A on 2-point terminal block				
Third-party management solutions	QSC® / SNMP / Extron® / Crestron®				
Operating conditions					
Temperature	Room temperature from -5° C / 23° F to +50° C / 122° F				
Physical data					
Dimensions W x H x D	483 x 44.45 x 265 mm / 19 x 1.75 x 10.4 in				
Weight	4.4 kg / 9.7 lb				



PRELIMINARY

LA-RAK II AVB TOURING RACK



- 12 channels of high power amplification
- AVB, AES, Analog inputs
- Milan seamless dual network redundancy
- Unified and plug-and-play
- Rugged 9U frame
- Usable worldwide (100-240 V, 50/60 Hz)

IN A NUTSHELL



LA-RAK II AVB is a flyable touring rack offering twelve channels of high power amplification in a 9U frame. It is equipped with three LA12X amplified controllers, two LS10 AVB switches, two panels for mains power and signal distribution and a blank panel. All devices are internally prewired for audio, control and power to offer a plug-and-play solution with seamless networked audio redundancy based on the Milan protocol.

The rugged LA-RAK II AVB features a shock-absorbing inner frame, retractable front and rear doors, a detachable dolly and four handles to facilitate transport and manipulation. An optional flying frame supports up to four LA-RAK II AVB.

LA-RAK II AVB comes with three-phase 32 A IEC input and link connectors, allowing to link two LA-RAK II AVB. It also comes with a 30 A NEMA connector for 110 V operation. Additional power sockets are available for auxiliary equipment.

Usable worldwide, LA-RAK II AVB facilitates tour logistics and cross-rental between L-Acoustics rental network agents. LA-RAK II AVB is mechanically and electrically compatible with the LA-RAK II and LA-RAK legacy standard.



SYSTEM COMPONENTS



RK 9U: The 9U rack is a dual structure consisting of a rubber shock inner steel frame braced by an external aluminum frame and sided with highly resistant polyethylene panels. This ensures structural integrity while offering decoupling and maximum protection of the electronics inside the rack. Two retractable LEXAN® doors protect the internal components during transport. At the rear, two hinge-mounted panels cover and protect the analog, digital, and network connectors of the amplified controllers and create a neat and tangle-free cable environment. The RK 9U is equipped with a detachable dolly board and coupling bars for stacking up to 3 LA-RAK II AVB or flying up to 4 LA-RAK II AVB.



LA12X: The LA12X amplified controller operates all L-Acoustics loudspeaker systems. Based on a 4 x 4 architecture, LA12X delivers up to 3300 watts at 2.7 ohms per channel with record hold times. The universal SMPS (100 - 240 V) with Power Factor Correction offers a high tolerance to unstable mains. In a compact and lightweight 2U chassis, LA12X gathers a front panel interface with an LCD display and rotary encoder, two I/O Ethernet connection ports for AVB networked audio and control, a connection panel for analog and AES/EBU, and speaker outputs.



LS10: LS10 is a plug-and-play Avnu-certified AVB switch uniting audio and control distribution to provide a simple and reliable network solution. Two units are coupled side by side in the LA-RAK II AVB via the dedicated 1U rack shelf. LS10 is fitted with eight EtherCON™ connectors for maximum reliability. The rear EtherCON™ connectors of both LS10 are connected to each LA12X for seamless redundancy following the Milan protocol. The front EtherCON™ can be used to receive and send AVB audio and control to other LA-RAK II AVB. The SFP cages provides additional copper ports or optical links in case of long distance connections. For such configuration, the blank panel can be custom fitted with fiber optics connectors.



LA-PANEL II: LA-PANEL II is a 1U front patch panel for analog and digital audio signal distribution feeding the three LA12X with 6 discrete analog and 3 stereo AES/EBU signals with link-out capability to other racks. The analog connectors are compatible with the L-Acoustics 19 points PA-COM® standard. The digital audio signals use XLR connectors.

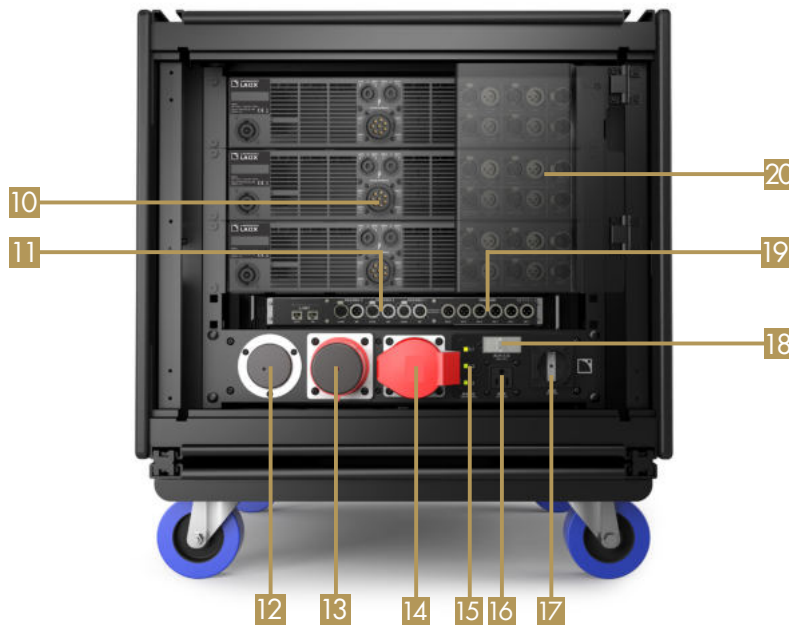


LA-POWER II: LA-POWER II is a 2U I/O power distribution panel. It automatically balances power with an equal number of LA12X per phase. It features a three-phase NEMA L21-30P input (US mode) and a CEE FORM 400V with a LINK OUT socket to power a second rack (EU mode). A mains switch allows to operate in US or EU mode. A NEMA 5-15 (US mode) and an F "Schuko" socket (EU mode) are also available to power auxiliary equipment. The auxiliary circuit features a 10 A breaker. Three LEDs help monitor the presence of each phase on the front end of the mains circuit regardless of the position of the mains switch.



LA-RAK BUMP: LA-RAK BUMP is engineered to fly up to 4 LA-RAK II for a drive capacity of up to 24 K1 enclosures. It can be flown from one or two pick-points and secured to an additional safety point. Its structure features a bolted assembly for better visual safety verification and is protected by a weather resistant coating.

USER INTERFACE



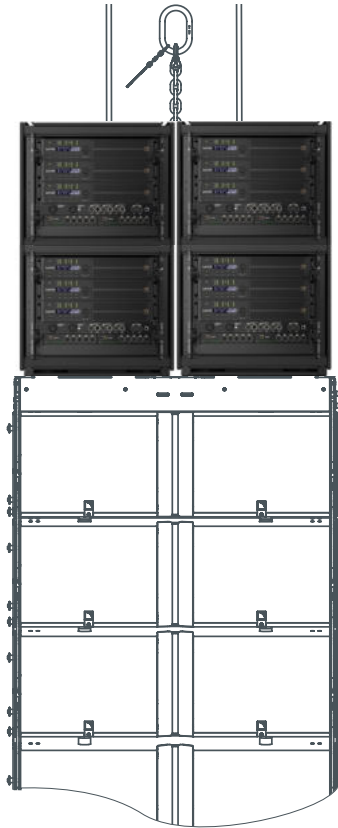
- | | | | |
|----|---|----|--|
| 1 | LA12X amplified controllers | 11 | AES/EBU internal input/link (6 XLR connectors) |
| 2 | Analog input/link (2 PA-COM® connectors) | 12 | 3P+N+E input (NEMA L21-30P, US mode) |
| 3 | LS10 AVB switch | 13 | 3P+N+E input (CEE FORM 400V, EU mode) |
| 4 | Removable dolly board | 14 | 3P+N+E link (CEE FORM 400V, EU mode) |
| 5 | Coupling bars | 15 | Phase presence LEDs (L1, L2, L3) |
| 6 | AES/EBU input/link (6 XLR connectors) | 16 | Auxiliary output (10 A NEMA 5-15 socket, US mode) |
| 7 | L-NET input/link (Unused) | 17 | Auxiliary output (10 A type F "Shuko" socket, EU mode) |
| 8 | Storage slots for front and rear doors | 18 | Circuit breaker (AUX L3) |
| 9 | Assembly rails (flying and stacking) | 19 | Analog internal inputs (6 XLR connectors) |
| 10 | LA12X speaker output panel (total: 3 PA-COM® + 6 SpeakON® connectors) | 20 | Hinge-mounted panels for connector protection |

ASSEMBLY PRINCIPLES

LA-RAK II stacking (max. 3 LA-RAK II)



Stacking onto K1-BUMP (max. 4 LA-RAK II + 24 K1)

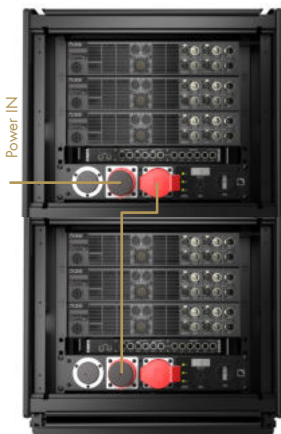


Flying under LA-RAK BUMP (max. 4 LA-RAK II)



CABLING SCHEMATICS

Power



External
Internal

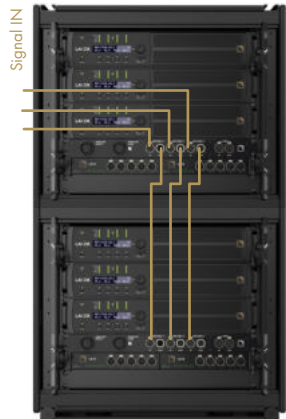


LA-POWER II rear view

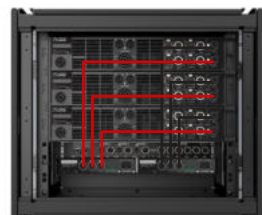
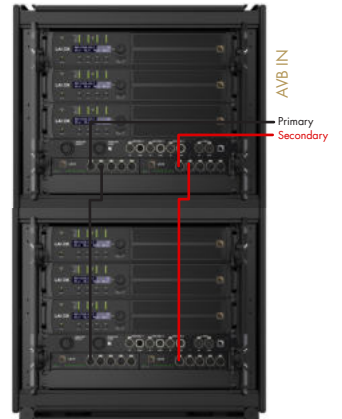
Analog audio



AES/EBU audio

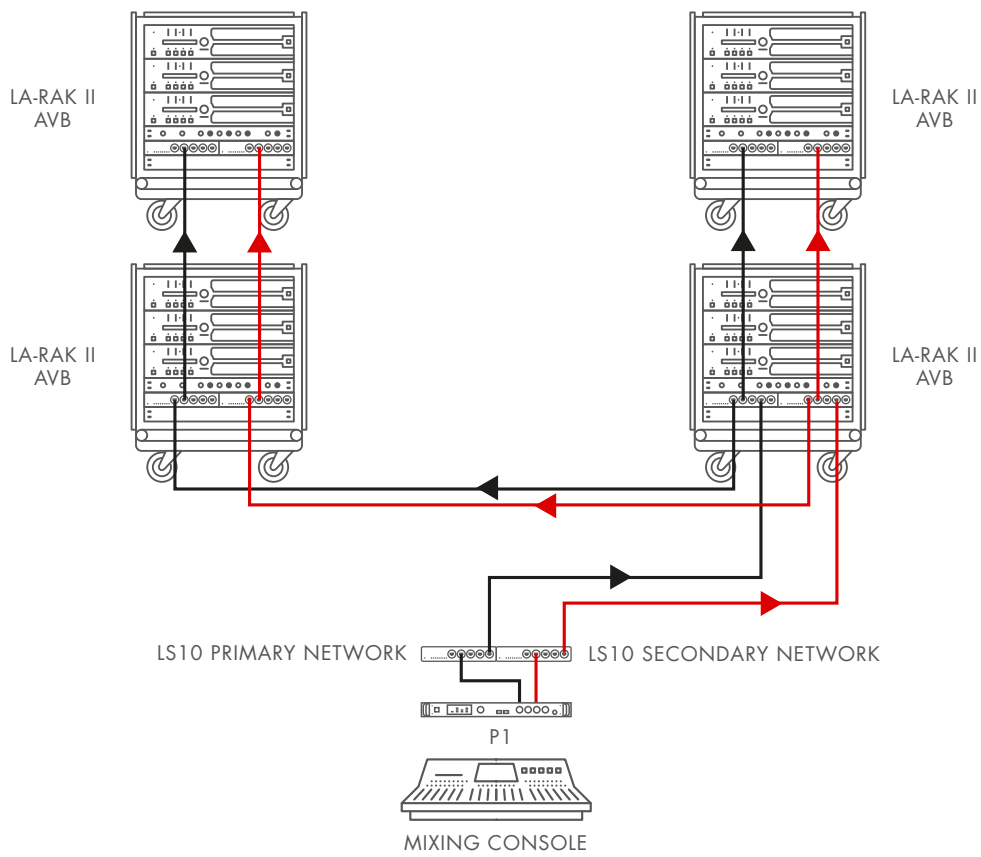


AVB audio and control

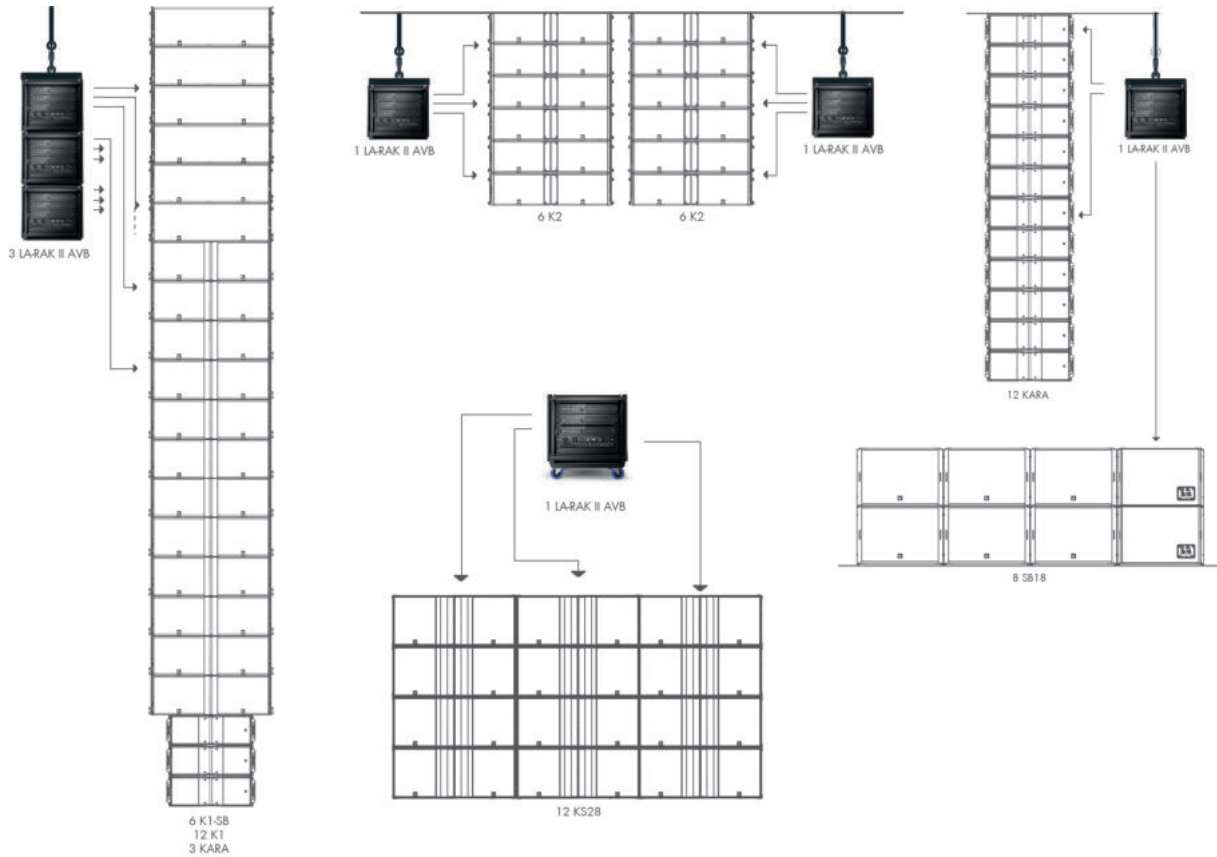


LA-POWER II invisible

AUDIO AND CONTROL CONNECTION EXAMPLE



LOUDSPEAKER CONNECTION EXAMPLES



LA-RAK II AVB TOURING RACK



LA-RAK II AVB is a flyable touring rack offering twelve channels of amplification in a 9 U frame. Three LA12X amplified controllers, two LS10 AVB switches and power and signal distribution panels are internally prewired to offer a plug-and-play, reliable solution that allows for seamless networked audio redundancy based on the Milan protocol.

The rugged LA-RAK II AVB features a shock-absorbing inner frame, protective and handling elements to ease transport and manipulation. With power connectors for any voltage standard, LA-RAK II AVB can be used worldwide to facilitate tour logistics and cross-rental between L-Acoustics rental network agents.

SPECIFICATIONS

LA-RAK II AVB

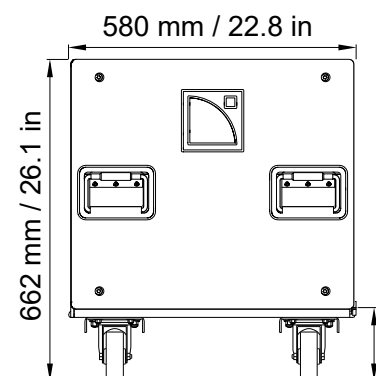
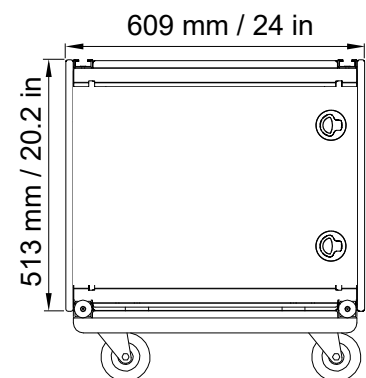
Content	3 x LA12X amplified controller 2 x LS10 AVB switch 1 x LA-PANEL II 1 x LA-POWER II 2 x doors, cables and 2 x coupling bars
Weight (net)	101.5 kg / 223.8 lb (with all the above)
Material	Polyethylene, aluminium and steel external structure, LEXAN® polycarbonate doors
Rigging and handling	2 x coupling bars, dolly board

LA-PANEL II

Front	
Analog input/link	2 x 19-point CA-COM
AES/EBU input/link	3 x female Neutrik® XLR3 (IN) / 3 x male Neutrik® XLR3 (LINK)
Network	2 x etherCON® (L-NET IN/OUT) - Unused
Rear	
Analog input	6 x male Neutrik® XLR3 (IN 1 to IN 6)
AES/EBU input/link	3 x female Neutrik® XLR3 (IN) / 3 x male Neutrik® XLR3 (LINK)
Network	2 x RJ45 (L-NET) - Unused

LA-POWER II

Front	
AC input (US)	30 A - NEMA L21-30P (3P+N+E) male outlet
AC input/link out (EU)	32 A - IEC 60309 (3P+N+E) male outlet 32 A - IEC 60309 (3P+N+E) female outlet DANGER: Do not use with a 120 - 208 V power supply.
AC presence	3 x dual LEDs: Left: US AC input / right: EU AC input
AC auxiliary output (US)	NEMA 5-15 female outlet (AUX US MODE)
AC auxiliary output (EU)	Type F «Schuko» female outlet (AUX EU MODE)
Protection	10 A type C circuit breaker (AUX L3)
Rear	
AC output for LA12X	3 x power cords fitted with 32 A Neutrik powerCON® connectors (AMP 1 L1, AMP 2 L2, AMP 3 L3)
AC input selector switch	Switch between EU MODE and US MODE Important: Do not switch mode when connected to power supply.
AC output for LS10	2 x IEC 60320-1 type C13 female outlets (AUX L3)



146 mm / 5.7 in

LA12X AMPLIFIED CONTROLLER



LA12X is a four-channel amplified controller designed to power the largest loudspeakers in the L-Acoustics catalog. LA12X features a proprietary switch mode power supply (SMPS) with DSP-controlled power factor correction (PFC) capable of delivering 12,000 watts of output power with record hold times.

The universal SMPS (100 - 240 V) allows worldwide operation of LA12X with identical performance while the PFC grants a high tolerance to unstable mains with low power consumption. The 4 x 4 architecture offers both flexibility to power a high density of passive loudspeakers and a powerful amplification for large format active enclosures.

Package in a 2U chassis, LA12X integrates powerful DSP resources with built-in loudspeaker optimization tools and the proprietary L-DRIVE system to protect the loudspeakers and the amplified controller. Beyond analogue and AES inputs, LA12X features AVB inputs and allows for seamless redundancy following the Milan protocol.

SPECIFICATIONS

Amplification and power supply	
Amplification class	Class D
Output power CEA-2006 / 490 A 1 % THD, 1 kHz, all channels loaded	4 x 1400 W (8 Ω) 4 x 2600 W (4 Ω) 4 x 3300 W (2.7 Ω)
Power supply model	Universal Switched Mode Power Supply (SMPS) with Power Factor Correction (PFC)
Mains rating	100 V - 240 V ~ ±10%, 50-60 Hz
Audio specifications	
Frequency response (20 Hz - 20 kHz, 8 Ω load, 60 W output power)	± 0.1 dB
Distortion THD+N (20 Hz - 10 kHz, 8 Ω load, 60 W output power)	< 0.1%
Output dynamic range (20 Hz - 20 kHz, 8 Ω, A-weighted)	> 114 dB
Noise level (20 Hz - 20 kHz, 8 Ω, A-weighted)	< -72 dBV
DSP	
Digital Signal Processor (DSP)	2x SHARC 32-bit, floating point, 96 kHz sampling rate
I/O routing	Flexible 4x4 routing matrix
Per output channel	Built-in EQ station with 8 IIR, 3 FIR EQ filters Array morphing (LF contour, zoom factor), Air absorption compensation filters Internal IIR and FIR EQ algorithms for speaker phase linearization and improved impulse responses L-DRIVE protection (excursion, temperature and over-voltage) Output delay from 0 to 1000 ms
Circuits protection	
Mains and power supply	Over and under voltage / over temperature / overcurrent / inrush current protection
Power outputs	Over current limiting / DC / short circuit / over temperature
Inputs / Outputs	
Analog input	4 balanced analog line inputs with passively connected link
AES / EBU Input	4 channels (2xAES3) with electronically buffered link and failsafe relay 44.1 - 192 kHz sampling rate
AVB input with support of Milan seamless redundant networking	4 channels from 1 stream of up to 8 channels at 48kHz or 96 kHz
Loudspeaker output	2 x 4-point speakON connector 1 x 8-point CA-COM connector
Remote control and monitoring	
Network connection	Dual-port Ethernet Gigabit interface
Third-party management solutions	QSC® / SNMP / Extron® / Crestron®
Physical data	
Height	2U
Weight	14.5 kg / 32 lb



PRELIMINARY

LS10 AVB SWITCH



LS10 is a plug-and-play Avnu-certified AVB switch that integrates seamlessly within the L-Acoustics ecosystem to further simplify connectivity, uniting audio and control distribution. LS10 runs out-of-the-box AVB, providing a reliable network solution that does not require IT expertise.

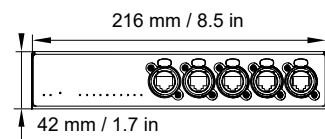
On its own or as an integral part of the LA-RAK II AVB, LS10 distributes audio and control via front and rear EtherCON™ connectors and SFP cages, enabling long-distance optical links. Two units mounted side-by-side on LS10-RAKSHELF, the dedicated 1U rack shelf, allow to create a seamless redundant network effortlessly. Upgrading LA-RAK II to LA-RAK II AVB is possible.

The rugged LS10 incorporates features designed to overcome the challenges of touring events but also installation applications. The quick, 5-second, startup time allows for rapid recovery in case of power loss. A configurable GPO port enables status monitoring and the auxiliary DC input offers ultimate reliability.

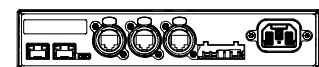
With LS10, lightning-quick setup of a stable distribution of your AVB signal is ensured without the need for extensive IT knowledge or experience.

SPECIFICATIONS

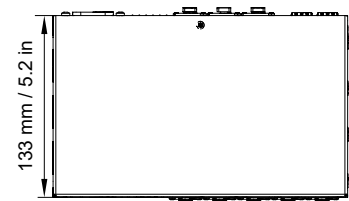
General	
Mains rating	100 V - 240 V AC (± 10%), 50 Hz - 60 Hz
Power consumption	10 W (normal operation) 20 W (redundancy operation)
Operating temperature	-5 °C / 23 °F to 50 °C / 122 °F
Connectors	
Network connectivity	8 Neutrik EtherCON™ (5 on Front, 3 on Rear) 2 SFP cages (Rear) compliant with SFP transceivers
Power connectivity	1 IEC inlet with lock compatible to Schurter V-Lock™ 1 redundant 24V DC power input 1 redundant 24V DC power output
User configurable GPO	1 potential free GPO on Phoenix connector
AVB	
AVB Ports	10 AVB ports at 1 Gb/s
AVB Bridge	IEEE 802.1BA-2011 standard Augmented by Avnu ProAV 1.1 requirements
Number of supported streams	150
Time to forward AVB streams after power up	5 seconds
Features	
Management	gPTP grandmaster capable RSTP
Port Sensing	Auto negotiation
Auto Crossover	MDI / MDIX (allows to use straight or cross cables)
Auto Sensing	Full or Half Duplex
Interface	Power status LED, fault status LED link up/activity status LEDs Reset to factory settings button micro USB
Physical data	
Height x Width	1.7" x 9,5" (1U x 1/2 U)
Weight	1.5 kg / 2.2 lb



Front



Rear



Top

THE HEART OF L-ISA IMMERSIVE HYPERREAL SOUND

The L-ISA Processor is a hardware solution that is exclusively dedicated to spatial audio processing, providing state of the art object-based mixing to the most demanding immersive audio productions.

Combining a powerful multi-core architecture with a compact form factor, the L-ISA Processor is the audio heart of each L-ISA system. It offers spatial processing and room simulation for up to 96 audio objects based on speaker positioning information and mixing parameters (pan, width, distance, elevation, aux send) and provides up to 64 audio outputs to L-Acoustics amplified controllers. The L-ISA Processor is remotely and uniquely controlled by the L-ISA Controller software.



SPATIAL PROCESSING

In an object-based mixing approach, the properties of each sound object are defined independently from the loudspeaker layout – so the entire mix can be faithfully scaled from the studio to a wide variety of venue and system configurations.

The L-ISA Processor provides five parameters to the mixing engineer for each sound object:



PAN

controls horizontal location



WIDTH

controls perceived size, from point source to panoramic



DISTANCE

controls perceived proximity (and applies the appropriate reverberation algorithm)



ELEVATION

controls vertical location



AUX SEND

provides a classic post-distance auxiliary bus send

PATENT-PENDING OBJECT-BASED ROOM ENGINE

The L-ISA room engine, accessible via the DISTANCE mixing parameter, allows users to naturally re-create different room acoustics within the same venue or show. Specifically designed for object-based audio and variable space configurations, the engine uses multi-channel 3D processing to diffuse energy across many loudspeakers, eliminating audible electronic processing.



FULLY ADJUSTABLE



FRONTAL



SURROUND

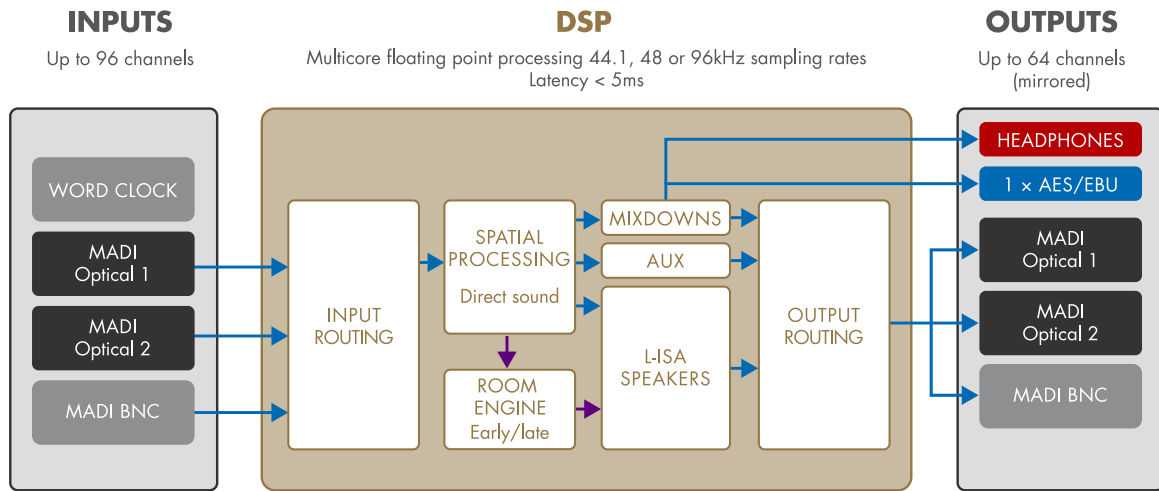


3D



PRECEDENCE SAFEGUARD

I/O & DSP ARCHITECTURE



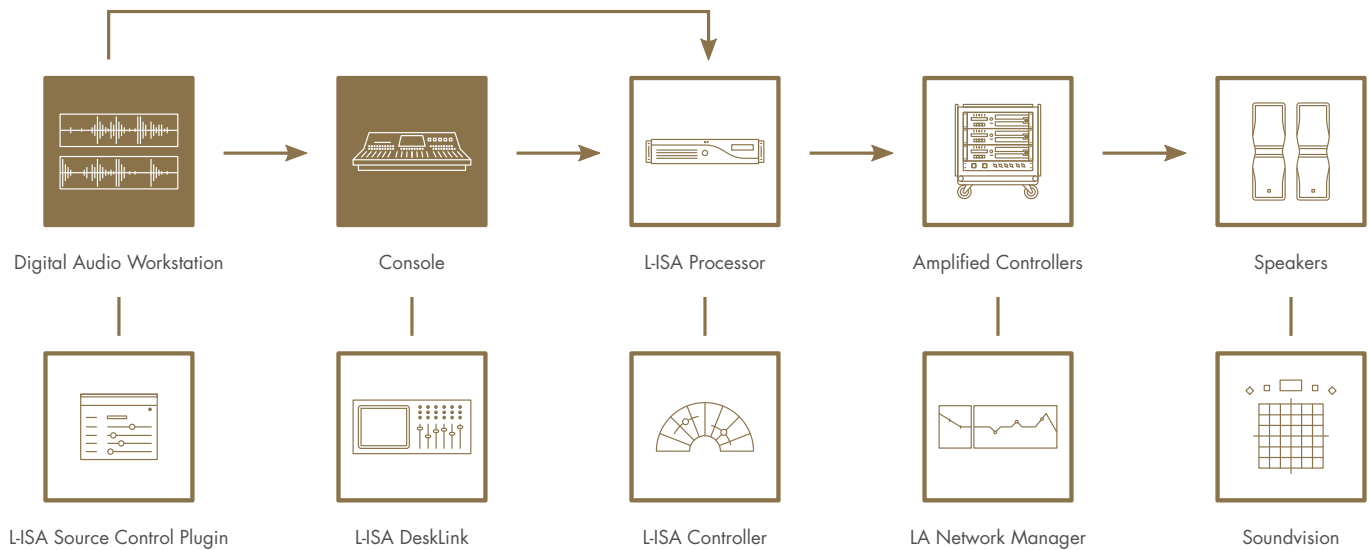
L-ISA CONTROLLER SOFTWARE



- Windows 10+ / macOS 10.12+
- Online or offline setup/programming
- Control up to 96 objects
- Speaker layout import from Soundvision
- Advanced Grouping features
- Advanced Snapshot features
- Remote control from DeskLink enabled mixing consoles
- Automation via VST/AAX L-ISA plugin
- External control via OSC
- Dynamic source positioning via certified tracking systems

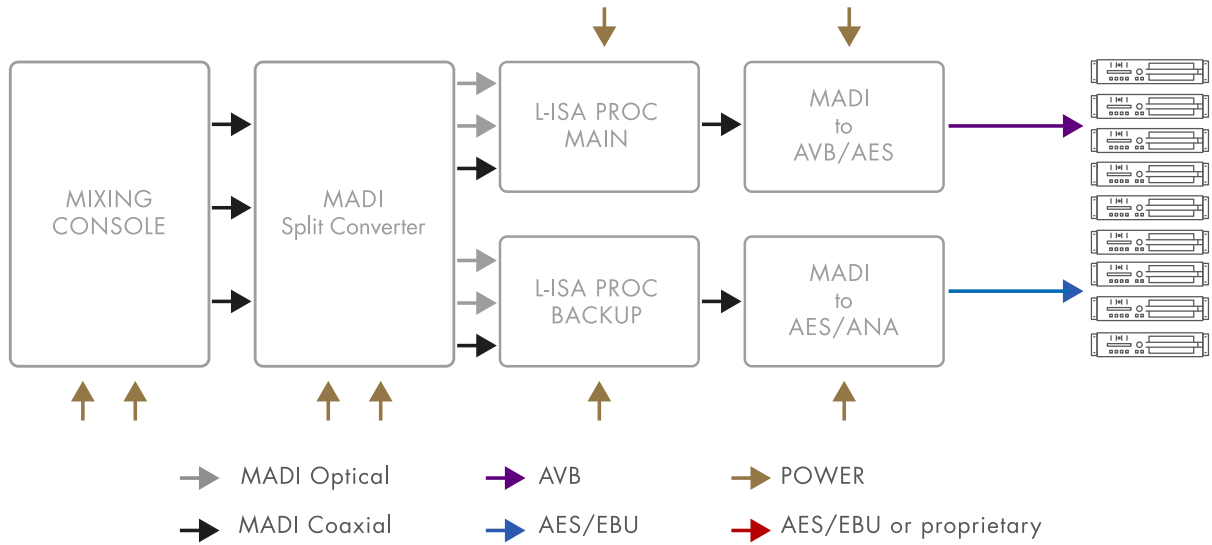
WORKFLOW

The L-ISA Processor can sit at the heart of a pre-production, post-production or live workflow, thanks to control integration into major Digital Audio Workstations or mixing consoles.

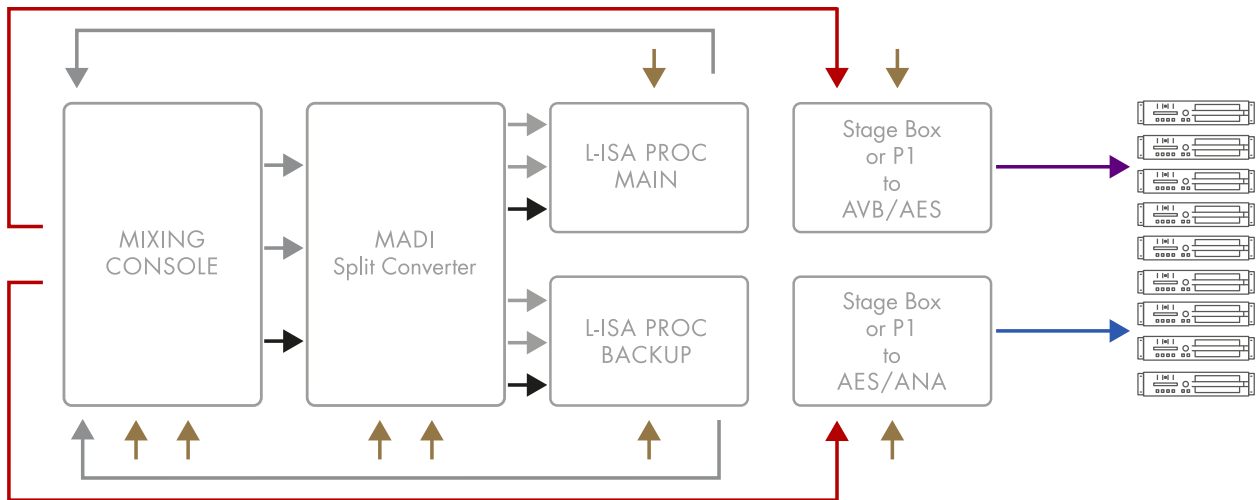


AUDIO SIGNAL DISTRIBUTION

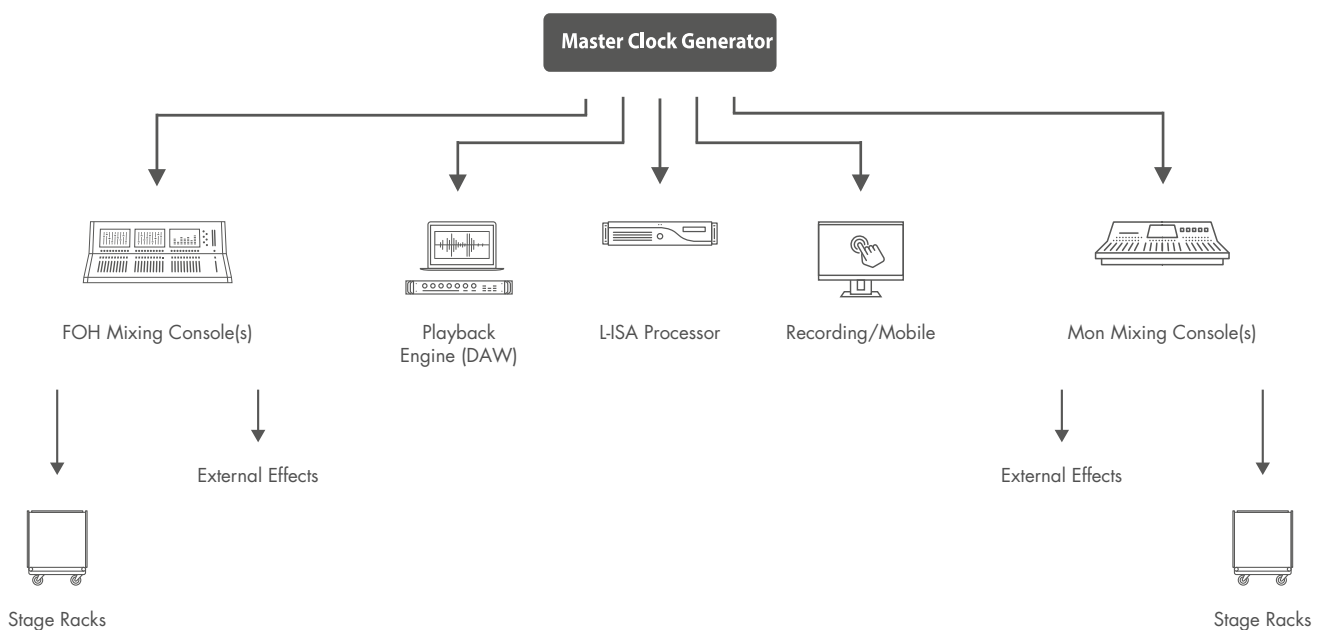
L-ISA Processor as "In-Line" device



L-ISA Processor as "Insert" device



AUDIO CLOCK DISTRIBUTION



CONNECTIONS

- **Audio inputs**

Sampling rate 44.1 kHz and 48 kHz:

MADI optical 1: inputs 1 to 64

MADI optical 2: inputs 65 to 96

Sampling rate 96 kHz:

MADI optical 1: inputs 1 to 32

MADI optical 2: inputs 33 to 64

MADI BNC 3: inputs 65 to 96

- **Audio outputs**

MADI optical 1 / MADI optical 2 / BNC: redundant outputs 1-64 (48 kHz) / 1-32 (96 kHz)

1 automatic stereo headphone downmix (analog, 6.3 mm TRS, 75 Ohms)

1 automatic stereo downmix (AES/EBU, XLR)

- **Audio Clock sources**

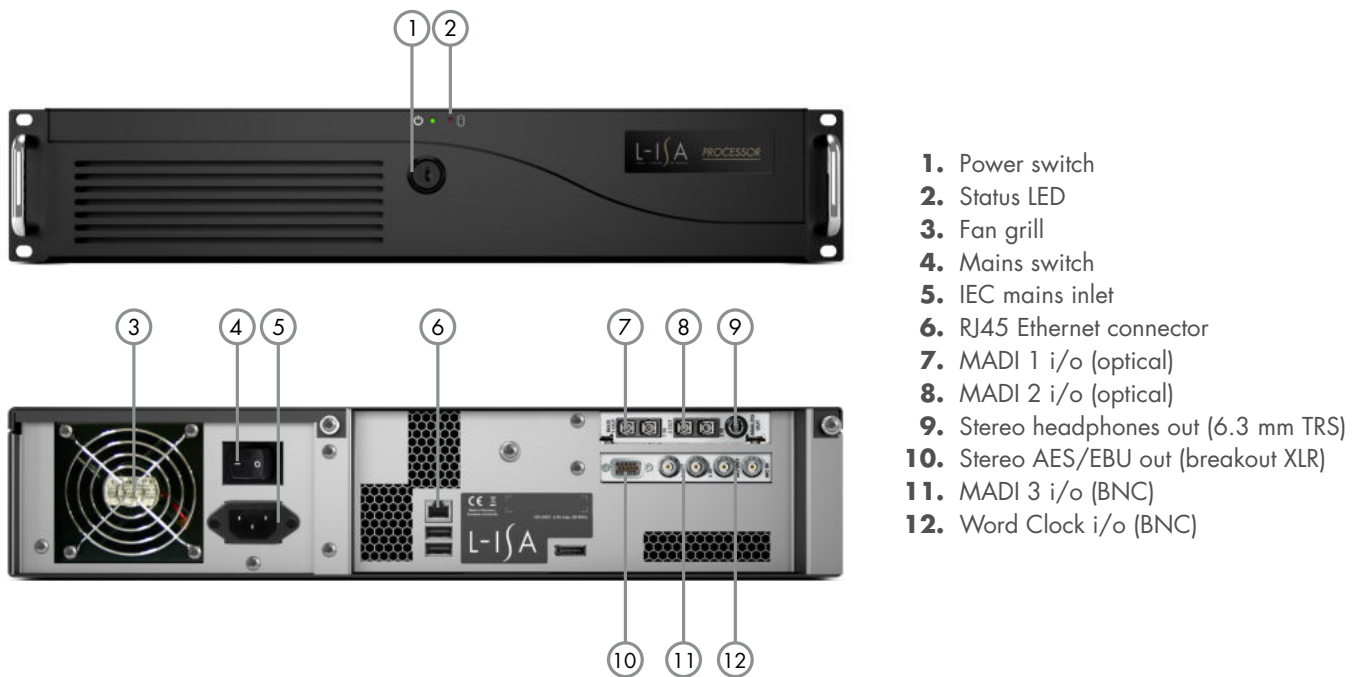
Word Clock In (BNC)

MADI optical in (1, 2) / BNC in (3)

- **Network**

1 Gb/s Ethernet port (RJ45) for remote control and monitoring from L-ISA Controller

FRONT AND REAR PANELS



PHYSICAL

H/W/D 88 mm (2U) × 482.6 mm × 350.8 mm
3.5" (2U) × 19" × 13.78"

Weight (net) 8.9 kg / 19.6 lb

Finish black

IP IP20

PRELIMINARY

LS10 AVB SWITCH



LS10 is a plug-and-play Avnu-certified AVB switch that integrates seamlessly within the L-Acoustics ecosystem to further simplify connectivity, uniting audio and control distribution. LS10 runs out-of-the-box AVB, providing a reliable network solution that does not require IT expertise.

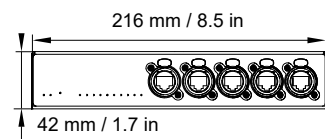
On its own or as an integral part of the LA-RAK II AVB, LS10 distributes audio and control via front and rear EtherCON™ connectors and SFP cages, enabling long-distance optical links. Two units mounted side-by-side on LS10-RAKSHELF, the dedicated 1U rack shelf, allow to create a seamless redundant network effortlessly. Upgrading LA-RAK II to LA-RAK II AVB is possible.

The rugged LS10 incorporates features designed to overcome the challenges of touring events but also installation applications. The quick, 5-second, startup time allows for rapid recovery in case of power loss. A configurable GPO port enables status monitoring and the auxiliary DC input offers ultimate reliability.

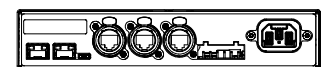
With LS10, lightning-quick setup of a stable distribution of your AVB signal is ensured without the need for extensive IT knowledge or experience.

SPECIFICATIONS

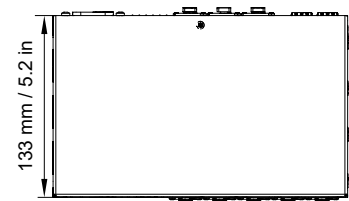
General	
Mains rating	100 V - 240 V AC (± 10%), 50 Hz - 60 Hz
Power consumption	10 W (normal operation) 20 W (redundancy operation)
Operating temperature	-5 °C / 23 °F to 50 °C / 122 °F
Connectors	
Network connectivity	8 Neutrik EtherCON™ (5 on Front, 3 on Rear) 2 SFP cages (Rear) compliant with SFP transceivers
Power connectivity	1 IEC inlet with lock compatible to Schurter V-Lock™ 1 redundant 24V DC power input 1 redundant 24V DC power output
User configurable GPO	1 potential free GPO on Phoenix connector
AVB	
AVB Ports	10 AVB ports at 1 Gb/s
AVB Bridge	IEEE 802.1BA-2011 standard Augmented by Avnu ProAV 1.1 requirements
Number of supported streams	150
Time to forward AVB streams after power up	5 seconds
Features	
Management	gPTP grandmaster capable RSTP
Port Sensing	Auto negotiation
Auto Crossover	MDI / MDIX (allows to use straight or cross cables)
Auto Sensing	Full or Half Duplex
Interface	Power status LED, fault status LED link up/activity status LEDs Reset to factory settings button micro USB
Physical data	
Height x Width	1.7" x 9,5" (1U x 1/2 U)
Weight	1.5 kg / 2.2 lb



Front



Rear



Top

P1 AVB PROCESSOR AND MEASUREMENT PLATFORM



- EQ, delay and dynamics processing
- Multi-mic acoustic measurement platform
- Bridging of AVB, AES/EBU and analog audio
- 8-bus matrix routing and mixing
- Fully integrated in LA Network Manager
- Silent tuning (delay-EQ)
- Time-aligned redundant signal distribution
- 20 in x 16 out architecture
- Milan-certified with seamless network redundancy



I/O & DSP ARCHITECTURE

20 Inputs

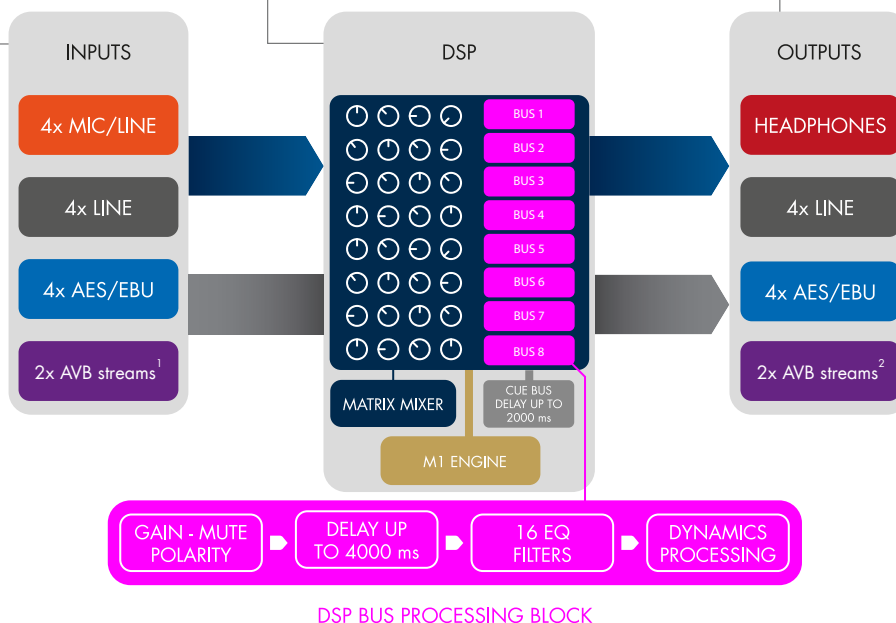
- Four mic/line inputs with switchable +48 V phantom power and high pass filter
- Four analog line inputs with premium A/D conversion
- Four AES/EBU inputs with high-quality Sample Rate Converter (SRC)
- One AVB Listener capable of retrieving eight audio channels from two streams

DSP

- Dual DSP core
- 32-bit floating point processing @ 96 kHz
- Matrix mixing of 20 inputs to eight independent DSP busses with EQ and dynamics signal processing
- Cue bus
- Direct routing to any of the 18 outputs
- Signal generator
- Media Player

16 + 2 Outputs

- Four analog line outputs with premium D/A conversion
- Four AES/EBU outputs
- One AVB Talker capable of sending eight audio channels in two streams
- 1 stereo headphone output



1- Two independent streams of up to 8 channels each in normal mode (ch 6. available when media Player is enabled).

Two parallel streams of up to 8 channels each in redundancy mode.

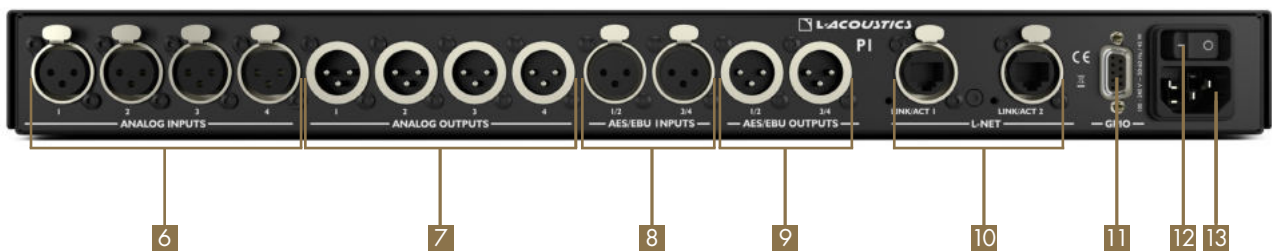
2- Two independent streams of up to 8 channels each in normal mode (restrictions apply in measurement mode).

Two parallel streams of up to 8 channels each in redundancy mode.

USER INTERFACE



- 1 TFT colour display touch screen (320 x 120 px)
- 2 Encoding wheel with push button
- 3 USB 2.0 host connectors
- 4 XLR3 analog mic input connectors (balanced mono, ESD protected)
- 5 1/4 inch stereo headphone jack

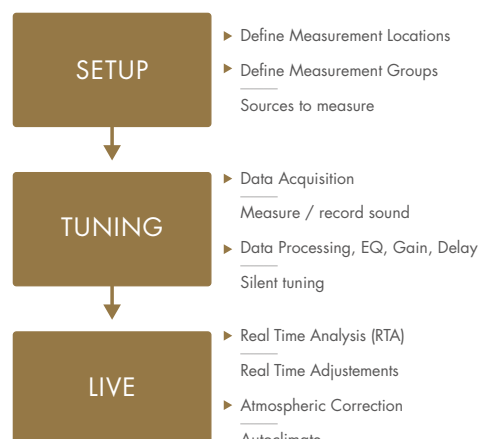


- 6 XLR3 analog line input connectors (balanced mono, ESD protected)
- 7 XLR3 analog line output connectors (balanced mono, ESD protected)
- 8 XLR3 AES/EBU input connectors (ESD protected)
- 9 XLR3 AES/EBU output connectors (ESD protected)
- 10 EtherCON™ I/O 1 Gb/s (L-NET and AVB)
- 11 General Purpose I/O (GPIO) DB9 female connector
- 12 On/Off switch
- 13 IEC C13 V-Lock power connector

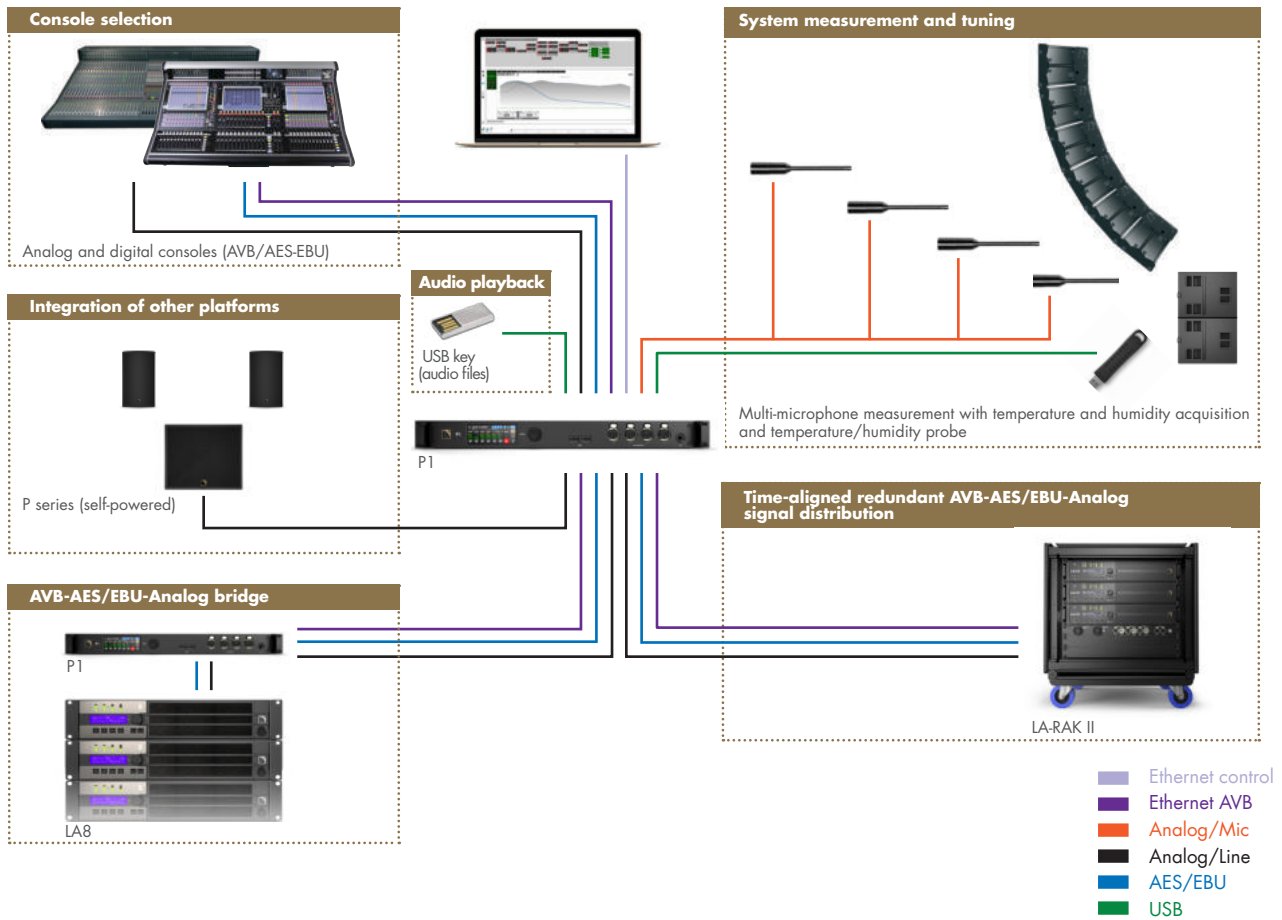
MEASUREMENT WORKFLOW IN LA NETWORK MANAGER*



* Requires LA Network Manager 3.X.



APPLICATIONS



SPECIFICATIONS

General	
Mains rating	100 V - 240 V (±10%), 50-60 Hz
Operating temperature	0 °C / 32 °F to 50 °C / 122 °F
Network audio I/O	
Standards	AVB, IEEE 1722, IEEE 1722.1
Number of input/output streams	2/2
Supported stream formats	IEC 61883-6 AM824, AAF PCM32
Supported sampling frequencies	48 or 96 kHz
Supported channel counts (input stream or output stream)	1 to 8
Channel selection	Up to 8 channels
Analog line inputs	
Number of line inputs	4
Input impedance	22 kΩ balanced
Max. input level	+22 dBu
Frequency response	±0.1 dB (10 Hz - 20 kHz)
A/D conversion	Operating at 32-bit/96 kHz
Input dynamic range	125 dB (-60 dBFS, A-weighted 20 kHz bandwidth)
Distortion THD+N ratio	0.0005%, 1 kHz, 12 dBu (10 dB below max), 20 kHz bandwidth
Channel separation	> 120 dB (at 1 kHz)
Analog line outputs	
Line output impedance	100 Ω balanced
Max. output level	+22 dBu
Frequency response	±0.1 dB (10 Hz - 20 kHz, load > 600 Ω)
Output dynamic range	125 dB (-60 dBFS, A-weighted, 20 kHz bandwidth)
Distortion THD+N ratio	0.0005%, 1 kHz, 0 dBFS, 20 kHz bandwidth
Channel separation	>120 dB (at 20Hz - 20kHz)

Analog mic/line inputs	
Number of mic inputs	4
Input impedance	2.4 k Ω balanced
Max. input level	+22 dBu at 0 dB gain
A/D conversion	Operating at 24-bit/96 kHz
Frequency response	± 0.15 dB (20 Hz - 20 kHz, at 0 dB gain)
Input dynamic range	118 dB (-60 dBFS, A-weighted, 20 KHz bandwidth, @ 0 dB preamp gain)
Gain range	0 dB to +60 dB by steps of 3 dB
Highpass filter	40 Hz, 12 dB octave (2nd order)
Phantom power	+48 V (10 mA max per channel)
Distortion THD+N ratio	0.0007%, 1 kHz, 12 dBu (10 dB below max), 20 kHz bandwidth, at 0 dB gain
Headphones	
Minimum load	32 Ω
Distortion THD+N ratio	0.004%, 1 kHz, -10 dBFS, 20 kHz A-weighted at 600 Ω load
AES/EBU inputs	
Number of inputs	2 (4 audio channels)
Standard	AES/EBU (AES3) or electrical S/PDIF (IEC 60958 Type II)
Supported sampling frequencies (Fs) and word length	44.1, 48, 88.2, 96, 176.4 or 192 kHz at 16, 18, 20 or 24 bits
AES/EBU inputs Sample Rate Converter (SRC)	
Sample rate conversion	Operating at 24-bit/96 kHz
Dynamic range	140 dB
Distortion THD+N	< -120 dBfs
Bandpass ripple	± 0.05 dB (20 Hz - 40 kHz, 96 kHz)
AES/EBU outputs	
Number of outputs	2 (4 audio channels)
Standard	AES/EBU (AES3) or electrical S/PDIF (IEC 60958 Type II)
Sampling frequency (Fs) and word length	96 kHz at 24 bits
Signal generator	
Signal types	Sine wave, sine bursts, 20 Hz - 20 kHz sweep, white noise and pink noise
Peak level	From -75 to 0 dBFS by 0.1 dB steps
Media player	
Supported file formats	.wav, .flac, .m4a, .caf, .aif, .aiff
Supported audio formats	PCM, FLAC, ALAC, from 44.1 kHz to 192 kHz, from 16 bits to 24 bits, mono or stereo
Stereo output	Operating at 24-bit/96 kHz, with automatic high quality SRC if Fs \neq 96 kHz
GPIO	
Input/Output	1 isolated, floating 1 referenced to chassis ground
Latency	
Input to output pass thru propagation delay	0.5 ms from analog or AES/EBU input to any analog or AES/EBU output
DSP propagation delay	0.37 ms
Time-aligned redundant audio distribution to LA4X/LA12X/P1	Always enabled for AES/EBU and analog chains, and time-aligned to AVB upon user selection
Remote control	
Network connection	Dual-port Ethernet Gigabit interface
L-Acoustics remote control software	LA Network Manager
Physical data	
Height	1U
Weight	3.7 kg / 8.2 lb
Protection rating	IP3x

