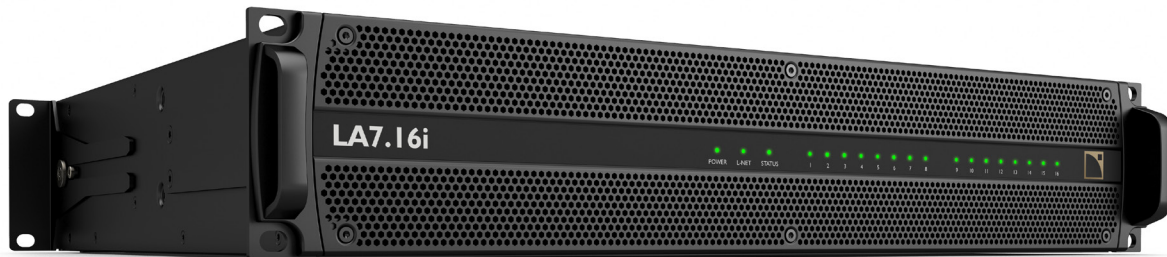


# LA7.16i AMPLIFIED CONTROLLER for install



- 16 x 16 architecture
- Compact (2U)
- Milan-AVB seamless redundancy
- L-SMART power management technology
- Optimized for multichannel applications
- High processing discretization



LA7.16i is a 16 x 16 architecture amplified controller dedicated to permanent installations which brings a unique solution to applications that can benefit from high discretization amplification and processing. Each of the 16 output channels can deliver up to 1300 W at 8 ohms or 1100 W at 4 ohms, making LA7.16i capable of driving most L-Acoustics loudspeakers in large quantities. This combination of high channel density and power capability makes LA7.16i the perfect partner for medium to large-sized permanent installations.

The flexible feature set offered by LA7.16i benefits all types of integration projects, involving any system that uses diverse combinations of loudspeaker elements, such as theaters and performing arts centers. Deployments requiring individual channel processing, such as L-ISA hyperreal and immersive hyperreal systems, can exploit the 16 discrete inputs and outputs. Additionally, line sources can benefit from single element discretization, leveraging Autofilter to deliver even more uniform coverage across the audience space.

Commonly an amplifier power supply unit (PSU) and its output channels are linearly proportioned to drive the most demanding and power-hungry loudspeakers, typically subwoofers. However, most systems are composed of a varied mix of loudspeaker types, passive and active, small and large, sub and full-range, and often with temporal offsets in the signals. This leads to unique power delivery needs, at specific times, for each amplifier channel, reducing the overall demand on the PSU. LA7.16i integrates L-SMART, a suite of advanced power management technologies, developed by L-Acoustics, which use predictive modeling algorithms to manage the PSU and the individual amplification channels. Hardware sensors feedback data which is analyzed by the DSP to match the real-time needs of the loudspeaker system being driven. The PSU can provide extremely high short-term peak power and 7000 W for longer hold times, and this energy is delivered dynamically and intelligently to the advanced Class-D output stages, assuring optimum system performance.

Packaged in a compact 2U chassis for efficient use of rack space and lower cost of integration, LA7.16i reduces the associated carbon footprint of any L-Acoustics sound system, supporting our constant effort for greater sustainability. It incorporates features tailored for installation applications, such as loudspeaker monitoring, protection, and management, GPIO's, terminal block connectors, and a backup 24V DC input enabling the DSP card to continue functioning if mains power is lost. Smart mains current limiting and circuit breaker emulation are also included. LA7.16i is Milan-certified and supports seamless network redundancy for both Milan-AVB and AES67 network modes, and is remotely controlled and monitored using LA Network Manager. An embedded web interface (Web UI) is also included to enable the configuration and monitoring of AES67 input streams.

## I/O

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LA7.16i provides 16 inputs selected from up to 128 channels (16 streams of Milan-AVB (48 kHz or 96 kHz) or AES67 (48 kHz only) of up to 8 channels each) on etherCON™ connectors. With seamless network redundancy as standard, if there is a connection loss on the primary network audio will continue from the secondary network with no audible artifacts. If non-redundant network mode is selected the two network ports can be used to daisy-chain units, reducing the need for additional network switches.

Additionally, an AES/EBU and analog input are available on terminal block connectors. Assignable automatic fallback functions from the audio network to two channels of AES/EBU or a single channel of analog are available for increased audio path redundancy. These inputs can also be utilized as main inputs or for integration into a PAVA system, together with the GPIO and third-party monitoring and control options.

The 16 loudspeaker outputs are presented in pairs on eight terminal block connectors, making the LA7.16i fast to deploy and integrate. Terminal block connectors are also used to connect the configurable GPIO's and the backup 24V DC input.

Mains power is connected via a 32 A powerCON™ connector and the switch-mode power supply (SMPS) can be used worldwide without the need to change the voltage range.

## GREEN POWER

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Efficiency is a core design principle of LA7.16i. L-Acoustics System Modeling Adaptive Resource Technology, or L-SMART, intelligently matches the real-time needs of the loudspeaker enclosures being driven and the available power. Maximizing the output channel capacity for a given loudspeaker configuration and its power demands. In addition to the intelligent dimensioning of the power supply, computer modeling and a thorough airflow study of LA7.16i have resulted in a proficient thermal design, prolonging the long-term power delivery of the amplifier modules, by dramatically increasing their thermal performance.

Like all L-Acoustics amplified controllers, LA7.16i utilizes the latest SMPS technology and features power factor correction (PFC), which adds several benefits. Taking advantage of virtually 100% of the mains power cycle maximizes amplifier efficiency, increases tolerance to unstable mains, and enables significantly more economical use of the available electrical power. From a single 230 V / 16 A line, the LA7.16i delivers 16 channels of high-power amplification with 1300 W at 8 ohms and 1100 W at 4 ohms.

LA7.16i was also developed with sustainability in mind and brings direct economic benefits to integration costs and the long-term operational overheads of any system. The exceptional channel density leads to the minimization of network and rack infrastructure needs, with up to four times less requirements than an equivalent design using four-channel amplified controllers. Additionally, there are significant reductions in weight and idle mains power consumption, which delivers a positive impact on the running costs of the system.

The design choices mentioned above lower the stress on the components, offering the benefit of added long-term durability.

## SYSTEM MONITORING

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L-Acoustics amplified controllers integrate system supervision functions that monitor amplifier and loudspeaker 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 fault status. Any malfunction is reported in real-time within LA Network Manager control software or third-party control systems.

The Load Checker feature verifies the output cabling, validates that the preset loaded matches the expected load and number of enclosures in parallel.

LA7.16i monitors the output circuits using a combination of real-time load presence and periodic silent tests. And provides comprehensive integration with voice alarm systems via the control network and GPIO interfaces, including pilot tone, amplifier channel, and PSU status reporting. In addition to seamless network redundancy, options for automatic fallback and backup of input signals are available. These can be configured and enabled on a per-channel basis or globally as an input override if required.

# DSP

LA7:16i exploits our next-generation DSP processing, adding a summation matrix for the inputs, expanded audio network capabilities and new technologies. All L-Acoustics amplified controllers integrate powerful DSP resources gathering loudspeaker management, protection for transducers and electronics, and a comprehensive set of tools for system adjustments to create a natural, transparent, and realistic sound experience. The LA7:16i DSP engine is divided into four blocks.

## System alignment:

The first block provides tools to create a coherent system by setting optimal summation of each element:

- Gain, polarity and up to 1 second of delay for each output channel
- The Autoalign tool, available as part of the M1 measurement suite, enables quick and easy alignment of an entire system

## System tonal balance:

The second block provides advanced tools to maintain a consistent sonic signature between arrays in the system and from one venue to another:

- The Autofilter tool is used to linearize the full frequency response of the entire array across the audience space on a per amplifier channel basis.
- The adjustable IIR & linear phase FIR filters are used to fine-tune the system to a specific venue or configuration
- The Array Morphing tool is a simple and yet efficient tool to adjust the sonic signature of line sources to meet the program material needs
- The Autoclimate and Air Compensation tool are used to adjust the system response in relation to atmospheric conditions while preserving driver resources

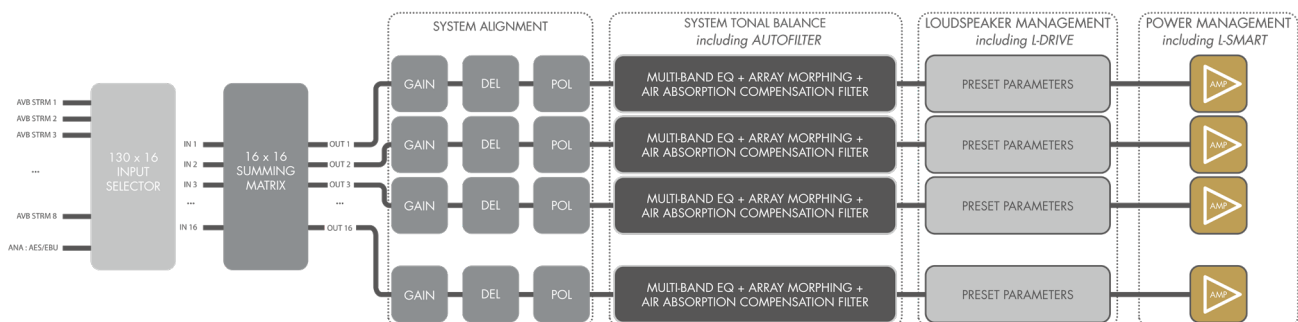
## Loudspeaker management:

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 system, providing over-excursion, over-voltage and thermal protection, to maximize output power and minimize nonlinearities. L-DRIVE optimum protection ensures durable performance and preserves sonic transparency in the linear and nonlinear domains.

## Power management:

In addition to the standard system tools, LA7:16i utilizes a suite of power management technologies. L-SMART intelligently manages PSU and amplifier efficiency by analyzing present needs and anticipating future demand thanks to a combination of DSP-controlled sensors, feedback loops, and predictive modeling techniques, which adapt to real-time conditions. Automatically applying momentary gain reduction to all outputs if excessive long-term power demands are experienced. Protecting the electronics and reducing the risk of long-term damage to the system.

Within L-SMART, the Power Budget enables loudspeaker systems to be deployed in several ways depending on users' needs, utilizing the multichannel architecture and capabilities of LA7:16i. The concepts of Nominal and Maximized Use allow the user to exploit the real-time temporal and level differences across the outputs and maximize loudspeaker system efficiency. There is no need for the user to fix or allocate channel resources, it is managed intelligently and automatically by L-SMART.

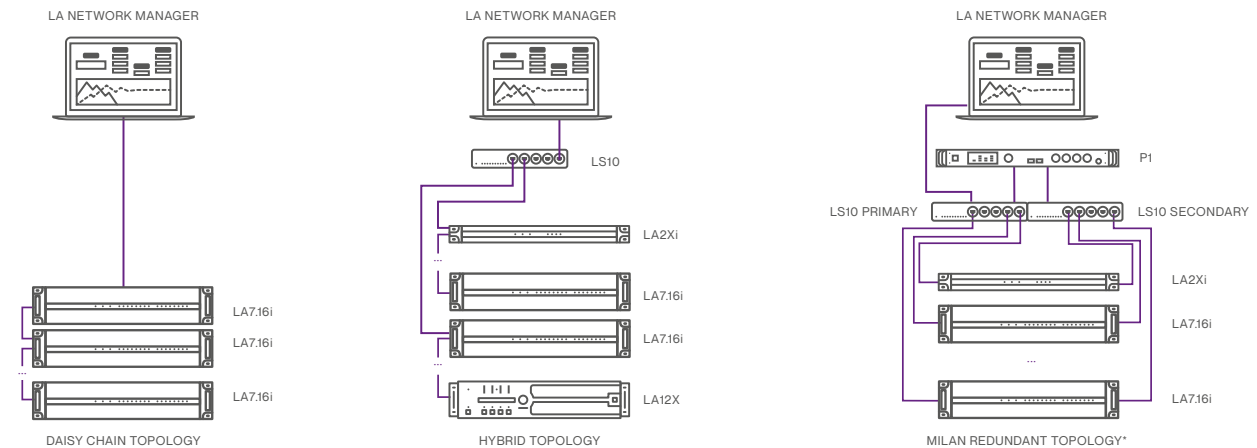


# SOFTWARE AND NETWORK



**NM** 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 on 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.

Our proprietary Ethernet based L-Net protocol is used to configure and monitor all L-Acoustics amplified controllers. Thanks to its high-speed data transfer capability of 1 Gbit/s, up to 253 units can be controlled and monitored in real-time by LA Network Manager, a proprietary software available for 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.

AVB is the only protocol that guarantees deterministic and synchronous network behavior, ensuring on-time delivery of time-sensitive data. Milan is the applications layer on top of AVB, independent from any private entity, that ensures seamless interoperability between any Milan-certified device. The Milan initiative developed agreed-upon standards for media stream format, media clocking, seamless redundancy, and more so that no IT expertise is required to set up a reliable and deterministic AVB network with Milan-certified devices.



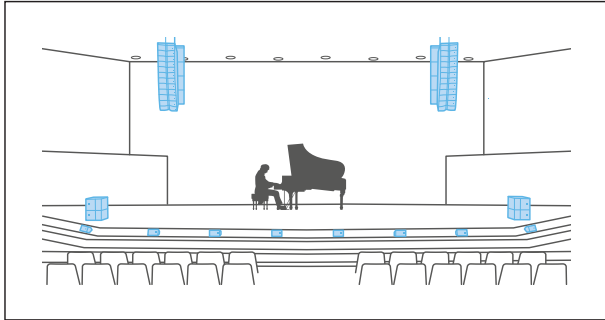
Milan-AVB is an evolving, long-term, viable and durable network developed by the industry for the industry.



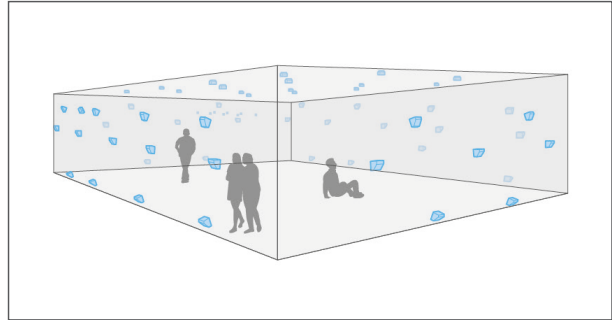
Several audio-over-IP (AoIP) systems have been developed to support high-performance media networking, but until AES67 there were no recommendations for connecting these systems in an interoperable manner. The AES67 standard provides comprehensive recommendations in the areas of synchronization, media clock identification, network transport, session description, connection management, encoding, and streaming. L-Acoustics supports this open standard as an additional network mode on several installation-focused products for increased compatibility and simplified connectivity in AoIP networks.

# APPLICATIONS

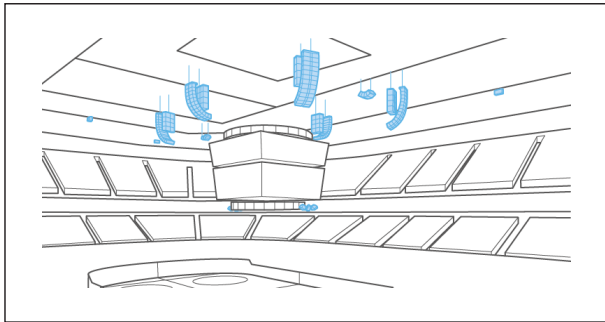
LA7.16i supports a wide variety of installed applications, powering most elements of a sound system from main PA, fills, delays, and monitors. The channel density and discretization available makes it ideal for distributed systems in medium to large sized concert venues, performing arts centers, and large line sources with the finest element granularity for enhanced performance. It is also ideal for applications that require large numbers of discreet signals such as L-ISA or surround systems in theaters, studios and operas.



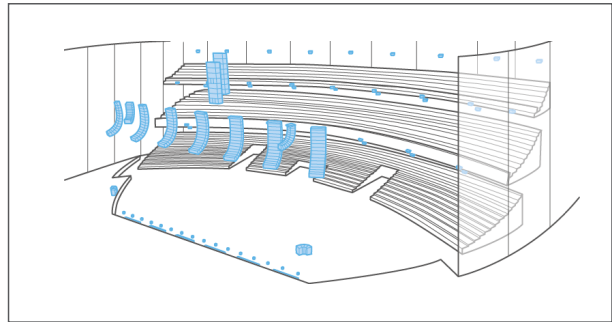
Multi-purpose Systems: cultural and performing arts centers



Multi-channel Systems: art and museum installations, theme parks



High Discretization Systems: sports arena's and stadia



Immersive Hyperreal Systems: theaters and large scale installations

# ENCLOSURE DRIVE CAPACITY

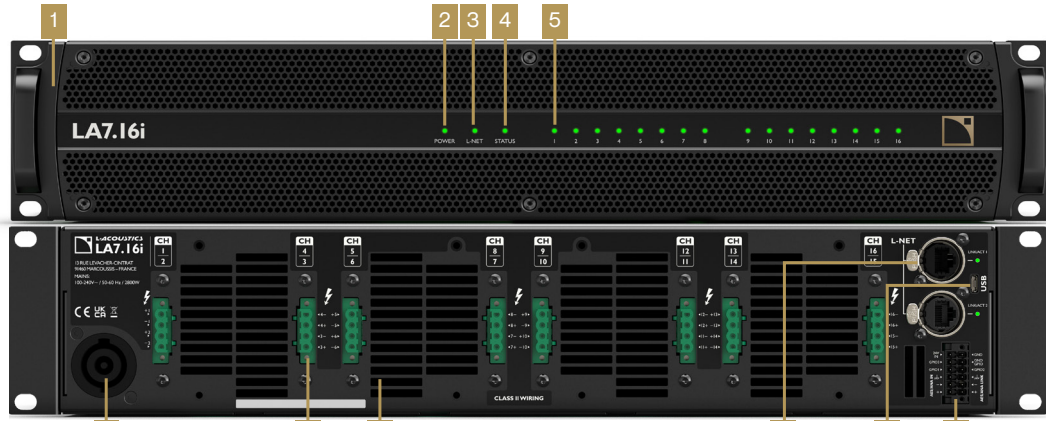
Categories - Series	Reference	Power Budget per enclosure*	Nominal Use	
			nb of enclosure per ouptut	nb of enclosure per LA7.16**
Short throw X Series	X4i	1.6%	4	64
	5XT	1.2%	3	48
	X6i	3.3%	1	16
	X8i	3.9%	1	16
	X8	3.6%	1	16
	X12	7.1%	1	14
Medium throw S Series	X15 HiQ	6.0%	1	8
	Soka	5.0%	1	16
	Syva	9.5%	1	10
	Syva Low	12.5%	1	8
Medium throw A Series	Syva Sub	6.0%	1	16
	A10(i) Wide/Focus	5.5%	1	16
Long throw K Series***	A15(i) Wide/Focus	9.7%	1	10
	KIVA II	3.1%	2	32
	KARA II(i)	5.5%	1	8
	K3(i)	12.5%	1	8
L Series	K2	11.5%	1	4
	L2 / L2D	47.0%	1	1
Subwoofers***	SB6i	1.1%	1	16
	SB10i	3.1%	2	32
	SB15m	11.0%	1	9
	SB18 (III)	16.7%	1	6
	KS21 (i)	12.2%	1	8

\* Approximate values per enclosure at full power, for accurate values refer to the latest version of LA Network Manager or Soundvision

\*\* The maximum number of enclosures per LA7.16i is given, for Nominal Use, assuming that all channels are driven at full power

\*\*\* K1, K1-SB, KS28 and SB28 are not supported by LA7.16i

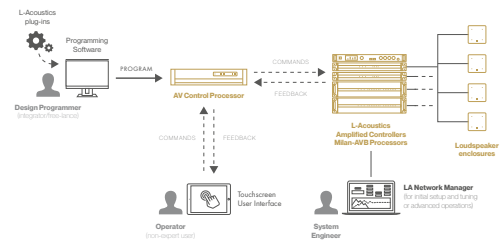
# USER INTERFACE



- 1 2U chassis
- 2 Power LED
- 3 L-NET control network LED
- 4 Status LED
- 5 Signal, limit, clip LEDs
- 6 powerCON™ power supply inlet
- 7 Loudspeaker outputs on 4-point terminal blocks (x8)
- 8 Fan grill
- 9 etherCON™ 1 Gb/s Ethernet connectors
- 10 USB port for IP address configuration
- 11 24 V DC External DSP backup voltage input

# THIRD-PARTY INTEROPERABILITY

L-Acoustics has developed several modules and plug-ins which facilitate integration with many popular media control systems, allowing interoperability between the L-Acoustics ecosystem and third-party platforms. Permitting centralized monitoring and management, via a customized interface, of L-Acoustics electronics products alongside other types of devices. This includes continuous monitoring where voice alarm integration is a requirement.



Supported AV control solutions: **HTTP**

# AMPLIFIED CONTROLLERS – THE RANGE

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	LA716(i)	LA2Xi	LA4X	LA12X
Touring / Install	Touring / (i) Install	Install	Touring / Install	Touring / Install
Multi / Four channel	Multi-channel	Four-channel	Four-channel	Four-channel
In x Out	16 x 16	4 x 4 / 4 x 3 / 4 x 2 / 4 x 1	4 x 4	4 x 4
Output power 12 dB Crest Factor, sine burst, 1 kHz, 2 ms	16 x 700 W (at 16 ohms) 16 x 1300 W (at 8 ohms) 16 x 1100 W (at 4 ohms)	4 x 190 W (at 16 ohms) 4 x 370 W (at 8 ohms) 4 x 710 W (at 4 ohms)	4 x 560 W (at 16 ohms) 4 x 1100 W (at 8 ohms) 4 x 1400 W (at 4 ohms)	4 x 1400 W (at 8 ohms) 4 x 2600W (at 4 ohms) 4 x 3300W (at 2.7 ohms)
All channels loaded CEA-2006/490A, Sine burst, 1 kHz, 20 ms, THD < 1%, all channels loaded	16 x 580 W (at 16 ohms) 16 x 920 W (at 8 ohms) 16 x 1000 W (at 4 ohms)	4 x 190 W (at 16 ohms) 4 x 360 W (at 8 ohms) 4 x 640 W (at 4 ohms)	4 x 1000 W (at 8 ohms) 4 x 1000 W (at 4 ohms)	4 x 1400 W (at 8 ohms) 4 x 2600 W (at 4 ohms) 4 x 3300 W (at 2.7 ohms)
Nominal current requirements for 200 - 240 V / 100 - 120 V	16 A / 30 A	10 A / 20 A	10 A / 20 A	16 A / 30 A
Input channels	16 x AVB (i: AES67)** 1 x Analog / 2 x AES/EBU	4 x AVB* 4 x Analog / 4 x AES/EBU	4 x AVB* 4 x Analog / 4 x AES/EBU	4 x AVB* 4 x Analog / 4 x AES/EBU
Noise level (20 Hz - 20 kHz, 8 Ω, A-weighted, digital input)	< -79 dBV	< -77 dBV	< -70 dBV	< -75 dBV
Front panel	TFT Colour Touch Screen (i: LED's only)	LED's only	LCD display with rotary encoder, power and mute keys	LCD display with rotary encoder, power and mute keys
Height	2U	1U	2U	2U
Weight	15.8 kg / 34.8 lb (i: 14.5 kg / 32 lb)	4.40 kg / 9.70 lb	11.3 kg / 24.9 lb	14.5 kg / 32 lb

\* 4 channels from one AVB stream of up to 8 channels \*\* 16 channels from up to 16 AVB streams of up to 8 channels



# LA7.16i AMPLIFIED CONTROLLER



LA7.16i is a 16-channel amplified controller dedicated to permanent installations. It integrates L-SMART power management technology to dynamically match the real-time needs of the loudspeaker system being driven. LA7.16i is efficiently dimensioned for multichannel applications, distributed systems, or line sources for the finest discretization.

Its streamlined and elegant 2U chassis hides a powerful DSP engine with features for loudspeaker management, system protection, and monitoring as well as a comprehensive set of tools for system adjustment and calibration. The Milan-certified LA7.16i supports AVB or AES67 input modes with seamless network redundancy, in addition to AES/EBU and analog connections. Three GPIO and a 24 V DC backup power for the DSP card offer external control and increased reliability.

## SPECIFICATIONS

Amplification and power supply			
Output power, all channels loaded	16 channels at 4 Ω	16 channels at 8 Ω	16 channels at 16 Ω
Peak output power 12 dB Crest Factor, sine burst, 1 kHz, 2 ms	1100 W	1300 W	700 W
Output power, CEA-2006 / 490A, sine burst, 1 kHz, 20 ms, < 1 % THD	1000 W	920 W	580 W
Amplification class	High efficiency class D		
Power supply model	Universal Switched Mode Power Supply (SMPS) with Power Factor Correction (PFC)		
External DSP backup voltage input	24 V DC (+/- 15%) 0.8 A		
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)	± 0.05 dB		
Distortion THD+N (20 Hz - 20 kHz, 8 Ω load, 60 W output power)	< 0.1%		
Output dynamic range (20 Hz - 20 kHz, 8 Ω, A-weighted, Digital input)	> 119 dB		
Noise level (20 Hz - 20 kHz, 8 Ω, A-weighted, Digital input)	< -79 dBV		
DSP			
Digital Signal Processor (DSP)	Gen.5 Dual SHARC 32-bit, floating point, 96 kHz sampling rate		
I/O routing	16 x 16 routing and summation matrix		
Per output channel	Built-in EQ station with 8 IIR, 4 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 Output delay from 0 to 1000 ms		
Technologies			
Loudspeaker Management	L-DRIVE advanced system protection (excursion, temperature and over-voltage)		
Power Management	L-SMART adaptive power management		
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			
AVB input with support of Milan seamless dual networking	16 channels 48 kHz / 96 kHz from 16 streams of up to 8 channels		
Alternative network protocol	AES67: 16 channels 48 kHz from 16 streams of up to 8 channels (configured using Web UI)		
AES/EBU input (shared connectors with Analog)	2 channels (1 x AES/EBU, 44.1 - 192 kHz sampling rate) With active link and bypass relay		
Analog input (shared connectors with AES/EBU)	1 channel, link output		
Loudspeaker output	8 female 4-point terminal blocks		
Control and monitoring			
Network connection	Dual-port Ethernet Gigabit interface etherCON™ I/O		
General Purpose Inputs / Outputs (GPIO)	3 GPIO, isolated optocoupler inputs, isolated relays contacts		
Third-party control solutions	Q-SYS® / Crestron®/ HTTP API		
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 88 [2U] x 411 mm / 19 x 3.5 [2U] x 16.2 in		
Weight	14.5 kg / 32 lb		

