LUCIA®: Localized Utility Compact Intelligent Amplification

LAB.GRUPPEN

LUCIA is about bringing **great sound** to **everyday experiences.**

At the heart of LUCIA™ (Localized Utility Compact Intelligent Amplification) is its ingenious DSP and advanced limiter design - ensuring great sounding results, no matter what and providing a more dynamic listening experience, and more satisfying environment to be in. LUCIA is about simplicity. Removing the complications and compromises of traditional centralized audio systems, LUCIA brings truly exceptional sound quality, ease of use and flexibility to those everyday experiences where it matters most: restaurants and entertainment venues, retail spaces, corporate boardrooms and classrooms.

With LUCIA, Lab.gruppen brings enhanced audio performance and greater flexibility to a decentralized approach in AV systems design, putting power, processing, control and I/O exactly where it's needed. In a multitude of AV applications where high quality audio is required, LUCIA offers system designers a logical, cost-efficient and scalable alternative to complex and costly distributed systems with rack-mounted amplification, matrixing and processing.

Decentralize.

verb: (applied to power)

1.To **distribute power** and/or function over a dispersed area; **positioning power where it's needed locally,** the opposite of centralized power.

What is LUCIA?

Designed with speed of install and flexibility in mind, the 2-channel LUCIA is an extremely compact and versatile Energy Star qualified Class D amplifier platform. Combining innovative low-impedance electronics with cutting-edge processing from the world of high-end broadcast audio, LUCIA delivers consistently great sound at any listening level.

LUCIA sits at the heart of almost any room or zone where high quality audio, ease of use and flexibility are requirements – providing industry-renowned amplification, innovative auto-configuring DSP, flexible input and routing control (M-models only) in one quiet-running device. It does all the hard work, providing better sounding results 'out of the box', preventing audible clipping - even when subject to demanding operating conditions (eg. overdriven). **LUCIA always sounds great.**

Who is LUCIA for?

Wherever high quality audio is mandated with local source and simple control, close to hand, LUCIA provides the perfect solution – in conjunction with good quality ceiling and surface-mount loudspeaker products (such as CMS Series from Tannoy Professional).

Restaurant/Entertainment: Multi-function/zoned restaurants and entertainment venues where high quality background and foreground music varies throughout certain hours of the day in defined areas (eg. bar/lounge in evening), and local inputs and control are important.

Retail: High quality music is a vital aspect of modern fashion retail, with flexible audio control and local input for in-store promos (eg. DJ). LUCIA provides the perfect tool to provide impact for these types of retail/mall applications.

Corporate: Modern high-end boardrooms and other corporate presentation spaces such as dedicated training rooms, multimedia, video-conferencing and meeting suites.

Education: Multimedia equipped learning – classrooms, presentation rooms, and performance spaces. The audio node is integrated with interactive whiteboard teaching environment.

Front

Rear

# Great sounding results, quickly and easily

LUCIA has been designed and engineered with quick install and very easy setup in mind. Each unit comes supplied with a wall-mount bracket allowing for discreet on-wall location (such as behind video displays) but can also be located close to wherever it needs to be in the room – such as next to projector or integrated into a reception counter, podium & lectern or bar area. All connections are via Euroblock screw terminals (also RCA phono inputs shared with channel 1 and 2), and level setting is available on front-panel potentiometers. Advanced circuitry protects the amplifier and connected loudspeakers from potential damage caused by clipping, thermal overload, or extreme low line voltage.

The base models require no configuration whatsoever, with all DSP features fully automated (multi-band compressor, look-ahead limiter and load detection for optimized power output).

The versatile 4 x 4 Mix Matrix and comprehensive DSP features including Automatic Dynamic Loudness Contouring (ADLC™), featured on the LUCIA 240/2 M and 120/2 M eliminate the need for external mixers and processors in many applications, saving time and money. A software wizard facilitates fast setup, while the advanced editor allows offline configuration of common presets that can be quickly downloaded to multiple units via USB.

Green credentials

LUCIA amplifiers are Energy Star qualified, making them an ideal choice for installation in projects seeking energy efficient certifications. The amplifier automatically enters standby mode after 20 minutes of no signal input, consuming less than 1 watt. Automatic power-up requires less than two seconds of input signal presence.
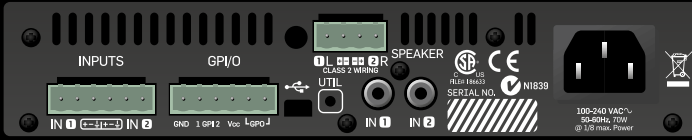
Base model
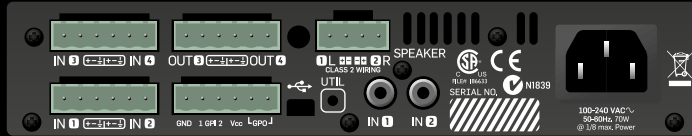
Matrix model

LUCIA SERIES AT A GLANCE

MAXIMUM RATED OUTPUT POWER/CHANNEL

Model	Chan	2-8 ohms	16 ohms	DSP	Mix Matrix	GPIO
LUCIA 120/2	2	60 W	60 W	Basic	No	Yes
LUCIA 240/2	2	120 W	30 W	Basic	No	Yes
LUCIA 120/2M	2	60 W	60 W	Adv.	Yes	Yes
LUCIA 240/2M	2	120 W	30 W	Adv.	Yes	Yes

Features

- Innovative DSP front-end on all models - Unique multi-band compressor and look-ahead limiter design to ensure no audible clipping for great sounding results, all the time

- Auto Load Sense (ALS™) - Proprietary auto-set Voltage Peak Limiter (VPL™) for optimum performance with any connected load, delivering maximum output power into 8, 4 or 2 ohms (2 x 60 W LUCIA 120/2 or 2 x 120 W on LUCIA 240/2)

- Advanced DSP** - Featuring Automatic Dynamic Loudness Contouring (ADLC) delivers "fuller" and more satisfying listening experience - especially at low perceived levels

- Energy Star qualified - Conforms to green building standards and latest Energy Star specifications

- Configuration Software** - Windows and Mac software wizard for initial setup, advanced editor for preset configuration (connection via USB)

- 4 x 4 Mix Matrix** - Route internally to amplifier or to line-level outputs

- Default preset mode - Works out of the box for common applications with no configuration

- GPIO** - Remote control (eg. wall panel) for channel switching and level control (Official accessories coming soon, will work with 3rd party controls).

- Compact form factor - Half-rack, 1U chassis and supplied bracket for discreet on-wall mounting

- Efficient Class D amplifier - Patented design

- Fail-safe operation - Comprehensive short circuit, thermal, and under-voltage protection

- Balanced and unbalanced (RCA) inputs - Connects to any input source

- Universal power supply - Operates at 100 - 240 V AC (50 or 60 Hz)

- Intelligent fan control - Silent operation in idle and at lower output levels

- Sturdy metal chassis - Protection for long-term durability

- CE, CSA, CCC and PSE approvals - Conforms to building codes worldwide

**M 'Matrix' models only

LUCIA packs **big features** into a **small box**


Auto Load Sense (ALS)

LUCIA features innovative Auto Load Sense technology which detects the impedance load on each channel and self-configures for optimal performance, allowing it to deliver maximum power output on all loads from 2 – 8 ohms. This means a single LUCIA amplifier can be used to effectively drive up to 16 loudspeakers (if 16 ohm devices, 8 per channel) for unprecedented performance in a compact Lo-Z amplifier.

Great sound at any listening level

LUCIA delivers great sound under almost any conditions thanks to its powerful front-end DSP. All models feature advanced multi-band compression and look-ahead limiter design to ensure that there is never audible clipping. But the M (Matrix) models benefit from our proprietary Automatic Dynamic Loudness Contouring (ADLC) technology.

ADLC ensures a "fuller" and comfortable listening experience – especially at low perceived levels. Based on industry leading technology from TC Electronic, ADLC ensures that LUCIA makes the best of what comes into the system regardless of output gain (or "volume"). For normal SPL ranges, LUCIA applies adaptive ISO226 compensation. At the limits of a loudspeaker's SPL capability, LUCIA extends its useable range, keeping distortion at bay.

This dynamic processing automatically "eases off" at higher SPL so that the system maintains a consistent full-bandwidth sound with full impact at all listening levels.
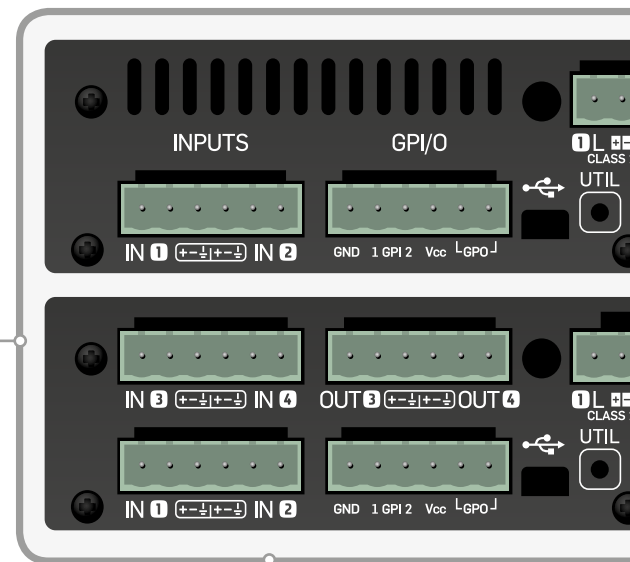
Remote control

All LUCIA models benefit from GPIO, allowing remote control/switching between inputs (if 2 mono sources on 'base' models), making it easy to integrate with 3rd party components such as wall panel controls, or as part of a larger system with paging control or emergency notification (such as in classroom or retail outlet in a larger mall). Official accessories are planned and should be available soon.

Easy configuration

Thanks to the integrated DSP featuring multi-band compression and look-ahead limiting, all LUCIA models come ready optimized out of the box, making it easy to get great sounding results.

For the LUCIA 'Matrix' models, a software configurator eases the process of commissioning each device in the system. All DSP parameters (including per-channel parametric EQ and high-pass filter) and routing can be controlled with ease using this powerful but easy-to-use application.

- Connection between laptop and LUCIA via USB
- Available for Windows and Mac
- Presets available for common loudspeakers including Tannoy's CMS, CVS, DVS and OCV Series'
- Program multiple LUCIA in a single system
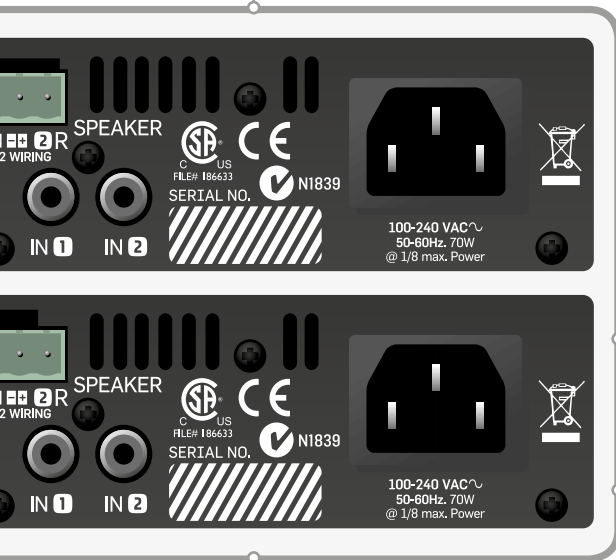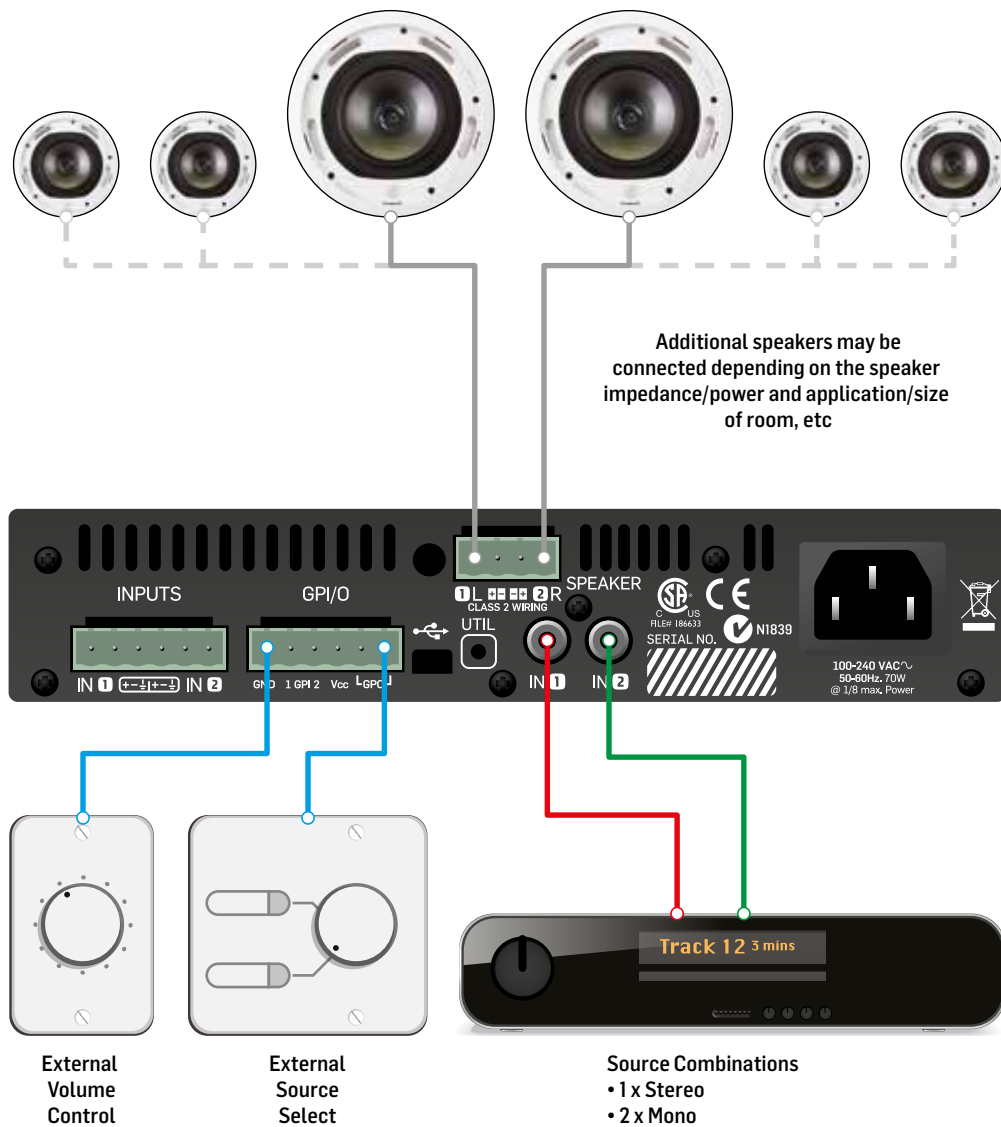

Low-impedance amplification

There are many advantages to Lo-Z audio systems compared to constant voltage 'distributed systems'. LUCIA harnesses all of these to give you the best sounding solution in the most cost-efficient package.

- Better sound
- Delivers full performance potential of amplifier and loudspeakers
- Improved LF/bass performance
- Greater flexibility
- Local zone control and I/O
- Easily scalable with additional infrastructure
- Cost-efficient
- No need for long cable runs and conduit/trunking (required for 70 V / 100 V)
- Save cost on loudspeakers without transformers

Input & routing

LUCIA offers simple but effective I/O across the range. More flexible input and routing is possible on the advanced 'Matrix' models, with routing software-configured (connection by USB to laptop) or switchable by 3rd party wall panel control (via GPIO). For typical examples of routing possibilities and real-world applications, see pages 8-21.

- 2 balanced inputs (Euroblock/Phoenix connector) directly to 2 amplifier channels ('base' models)

- 4 balanced inputs with 4x4 Mix Matrix to 2 amplifier channels and processed line-level outputs ('Matrix' models)

- RCA unbalanced inputs for channel 1 and 2 shared with the balanced input connector – for more typical user input options (iPod, laptop, etc)

Additional speakers may be
connected depending on the speaker
impedance/power and application/size
of room, etc

External Volume Control

External Source Select

Source Combinations
• 1 x Stereo
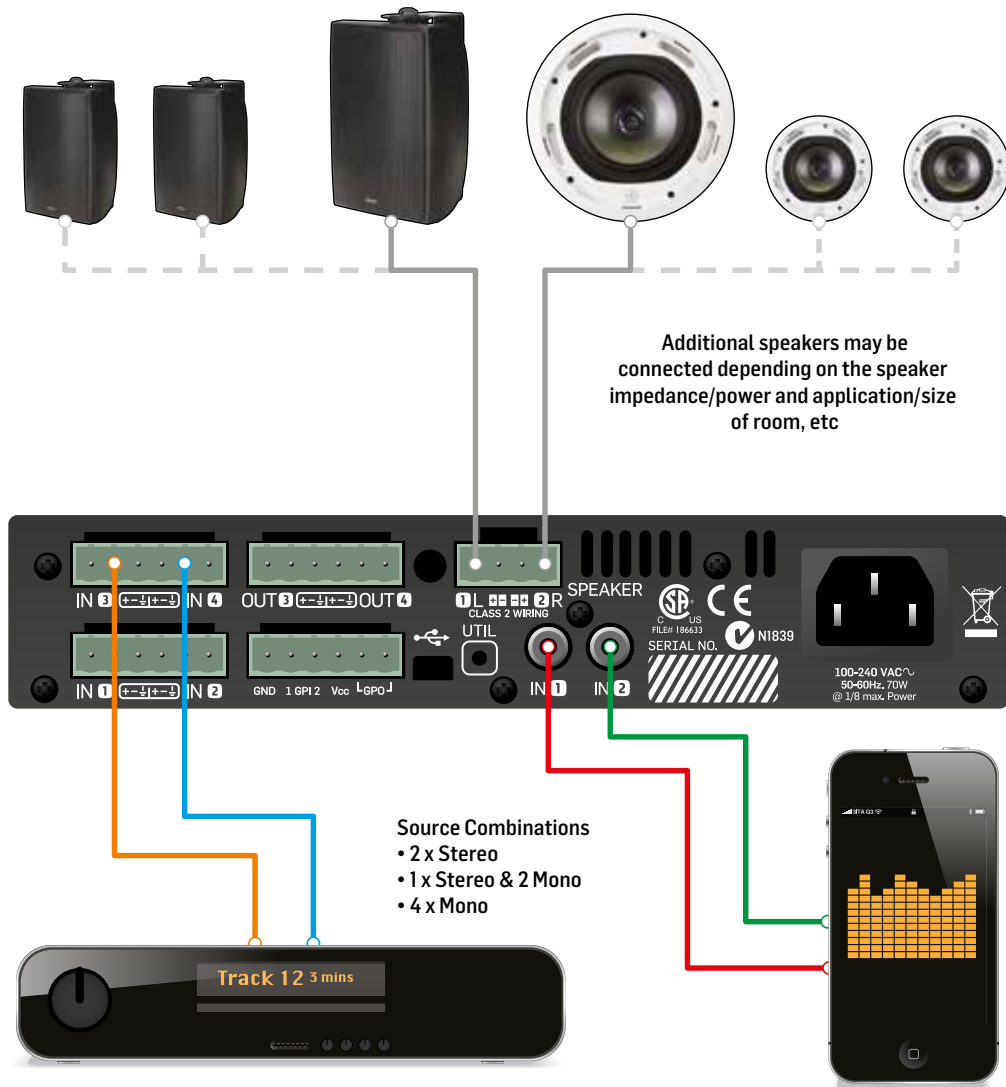• 2 x Mono

Typical Configuration

LUCIA offers remarkable flexibility, with inherent simplicity in setup. Illustrated above and right are typical configurations, for both the 2-input 'base' models and the 4-input 'Matrix' models.

Stereo setup

Above is shown a typical stereo application, with inputs via the RCA connectors, typically from a local user source such as mp3 player, laptop, CD player or DJ mixer. These inputs are shared on channel 1 and 2 with the Euroblock/Phoenix connector. Powered outputs are use the same connector type with each LUCIA capable of driving at maximum power down to 2 ohms. As shown, this

gives the LUCIA the potential of powering up to 8 loudspeakers on each channel if using 16 ohm devices – for a total of 16 loudspeakers on a single ultra-compact low-impedance amplifier! Typically, these would be high quality ceiling-mount or compact surface-mount speakers. Many such suitable products are available from Tannoy Professional.

GPIO provides potential for remote control, either integrating with wider system control framework (eg. Crestron or AMX) or simple wall-mounted user controls for volume and/or source selection (if 2 x mono sources).

Additional speakers may be
connected depending on the speaker
impedance/power and application/size
of room, etc

Source Combinations
• 2 x Stereo
• 1 x Stereo & 2 Mono
• 4 x Mono

Multiple source (switchable) setup

Here we show the additional flexibility available when deploying the LUCIA 'Matrix' models (120/2 M and 240/2 M) making use of the 4 inputs and routing capabilities. In this example, we have additional input channels 3 and 4, which could either be ster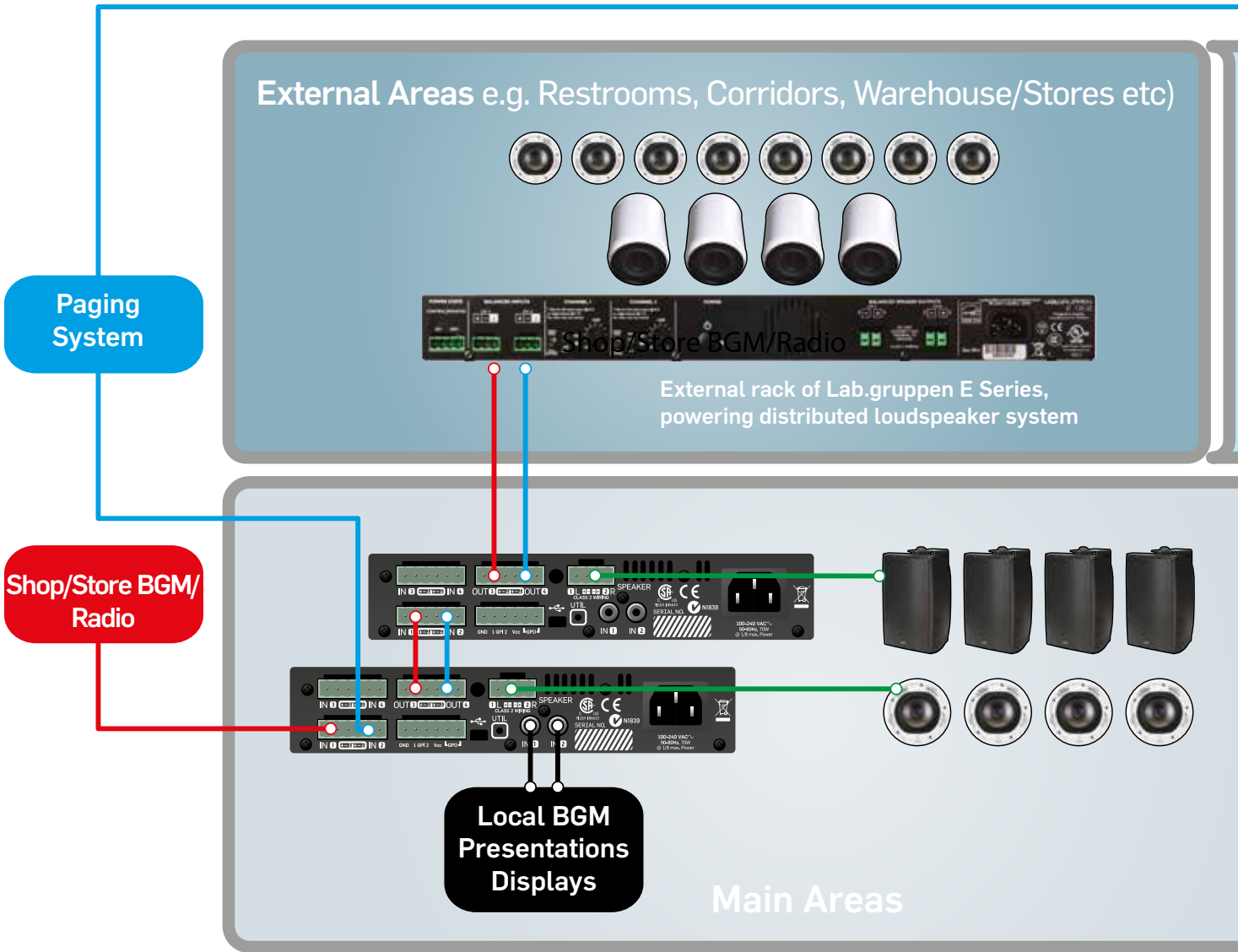eo or 2 mono in addition to the stereo input on channel 1 and 2. Alternatively it could facilitate a simple 4 mono input configuration, with routing to both the powered outputs and line level outs (3 and 4) configured by the LUCIA setup software initially and with user control via GPIO, similar to the 'base' model.

This type of simple setup could be used in a multitude of applications, such as in a retail outlet where the local stereo input on channel 1 and 2 can be remotely switched by GPI to external paging (such as in a shopping mall).

Perfect for
Restaurant / Entertainment

External Areas e.g. Restrooms, Corridors, Warehouse/Stores etc)

Shop/Store BGM/Radio

External rack of Lab.gruppen E Series, powering distributed loudspeaker system

Paging System

Shop/Store BGM/ Radio

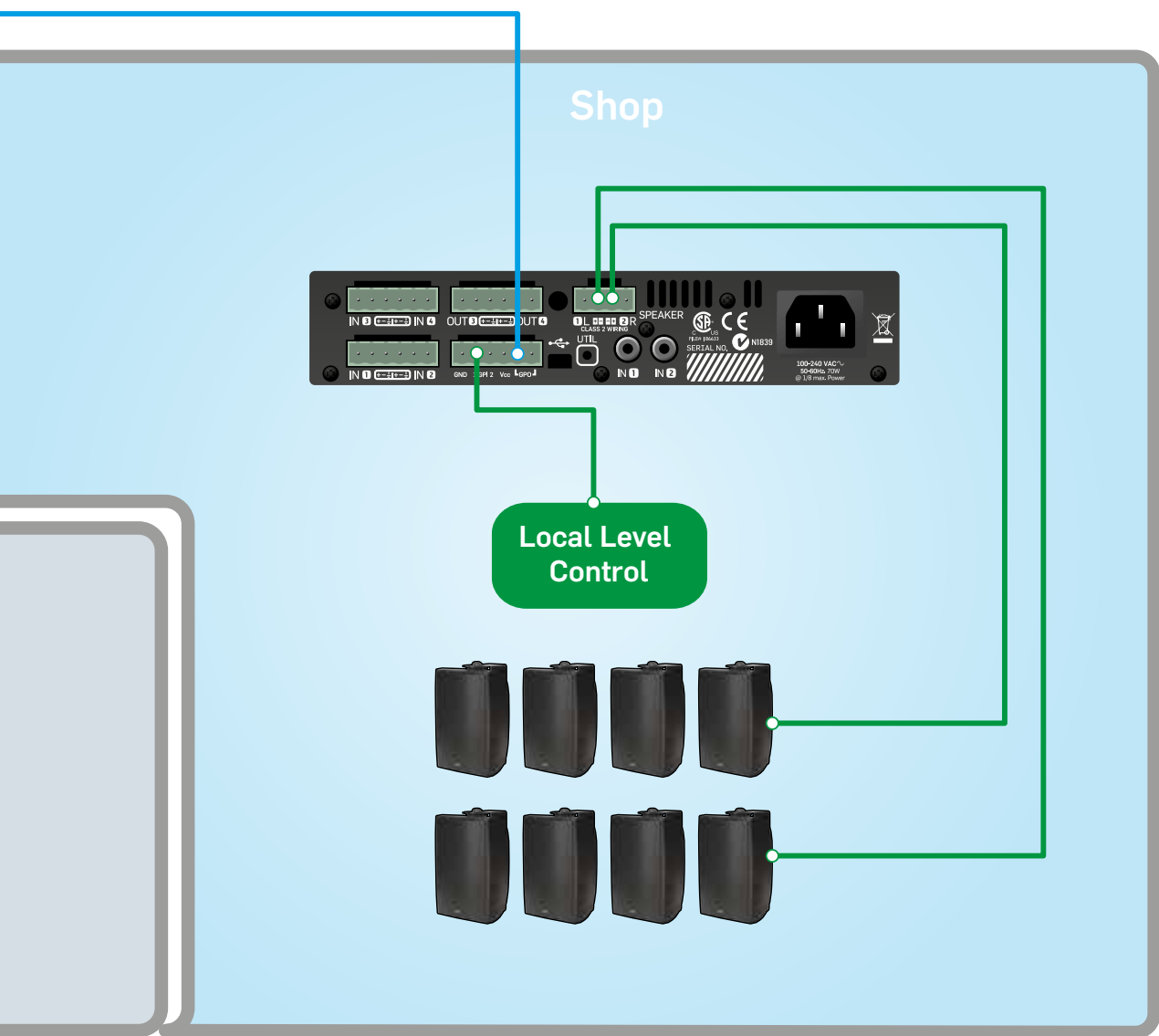**Local BGM Presentations Displays**

Main Areas

Retail / Commercial

Retail audio applications often demand high quality background music (BGM), with local user inputs, but without complexity and also with a degree of protection in event of 'over-energetic' use. Typically, particularly in fashion retail, this will involve high output dance and pop in-store music from a staff controlled source such as CD player, laptop or iPod. Often there's a need for secondary input from either video displays or perhaps in-store promo PA or DJ.

This typical application example also illustrates the possibility of using a 'Matrix' model as the front end in the primary area (eg. main counter of large fashion retail outlet), with both local input and external input (eg. mall paging). . The LUCIA amplifier powers loudspeaker systems in the immediate zone in addition to routing audio to external/ancillary areas such as changing rooms, stores and restrooms via a conventional 70 V / 100 V distributed system –

eg. powered by Lab.gruppen E Series. Additional zones can be created in the store (eg. menswear dept, etc) by adding further LUCIA units, each with input from the main paging system.
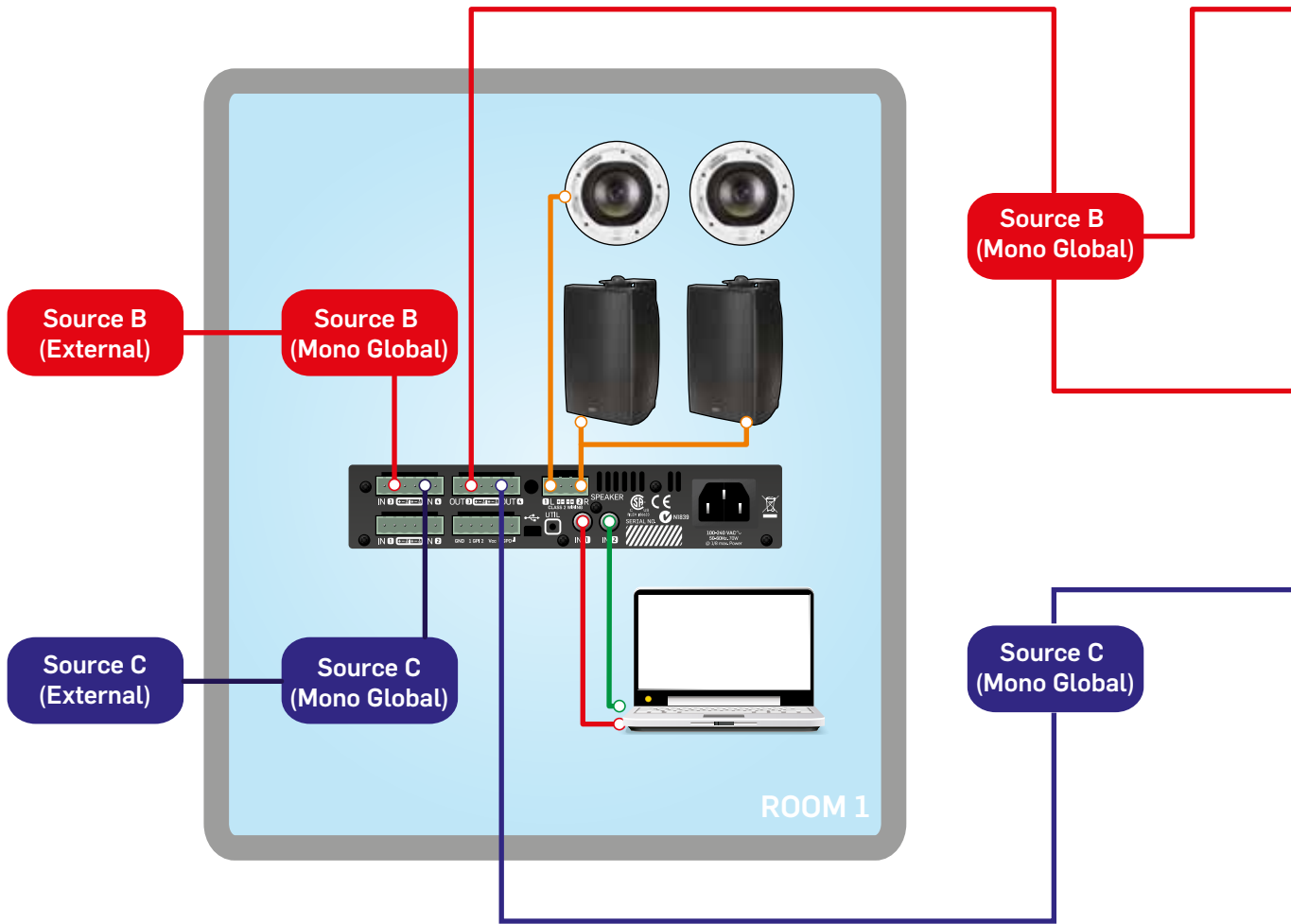
Shop

IN 3 IN 4   OUT 3 OUT 4   SPEAKER
IN 1 IN 2   GND GPI 2 Vcc GPO   UTIL
CLASS 2 WIRING   1 L   2 R
IN 1   IN 2
CSR   CE
ITEM 18663J   N1839
SERIAL NO.
100-240 VAC
50-60Hz. 70W
@ 1/8 max. Power

Local Level Control

Retail/
Commercial

Premium audio for
Corporate AV / Boardroom / Meeting rooms

Source B
(External)

Source B
(Mono Global)

Source C
(External)

Source C
(Mono Global)

Source B
(Mono Global)

Source C
(Mono Global)

ROOM 1

Corporate AV / Boardroom / Meeting rooms

LUCIA is well suited to corporate AV / boardroom applications where superior quality audio coupled with flexibility and ease-of-use are driving factors. This specific example illustrates how multiple LUCIA units can be deployed, with 'Matrix' model in the primary zone, and base model in the secondary zones and in the ancillary meeting room, each with local input, with and without local control.

Room 1 being a primary meeting/presentation room with both local inputs (eg. laptop or video screen) and external sources (shown here as 2 mono sources – may be centralized media server and paging), with high quality loudspeaker devices in room, both in-ceiling and surface mount. The external sources are routed on to other zones via processed line level output to the 'base' model LUCIA in Room 2. One of those sources (building-wide paging, for example)

is routed to the 3rd zone served by another 'base' model LUCIA.

Room 2 has local control for volume and source selection between both available mono sources via GPIO (wall panels). Sources could include the local input from Room 1 – allowing this space to be used as secondary presentation space, with same audio feed as primary.
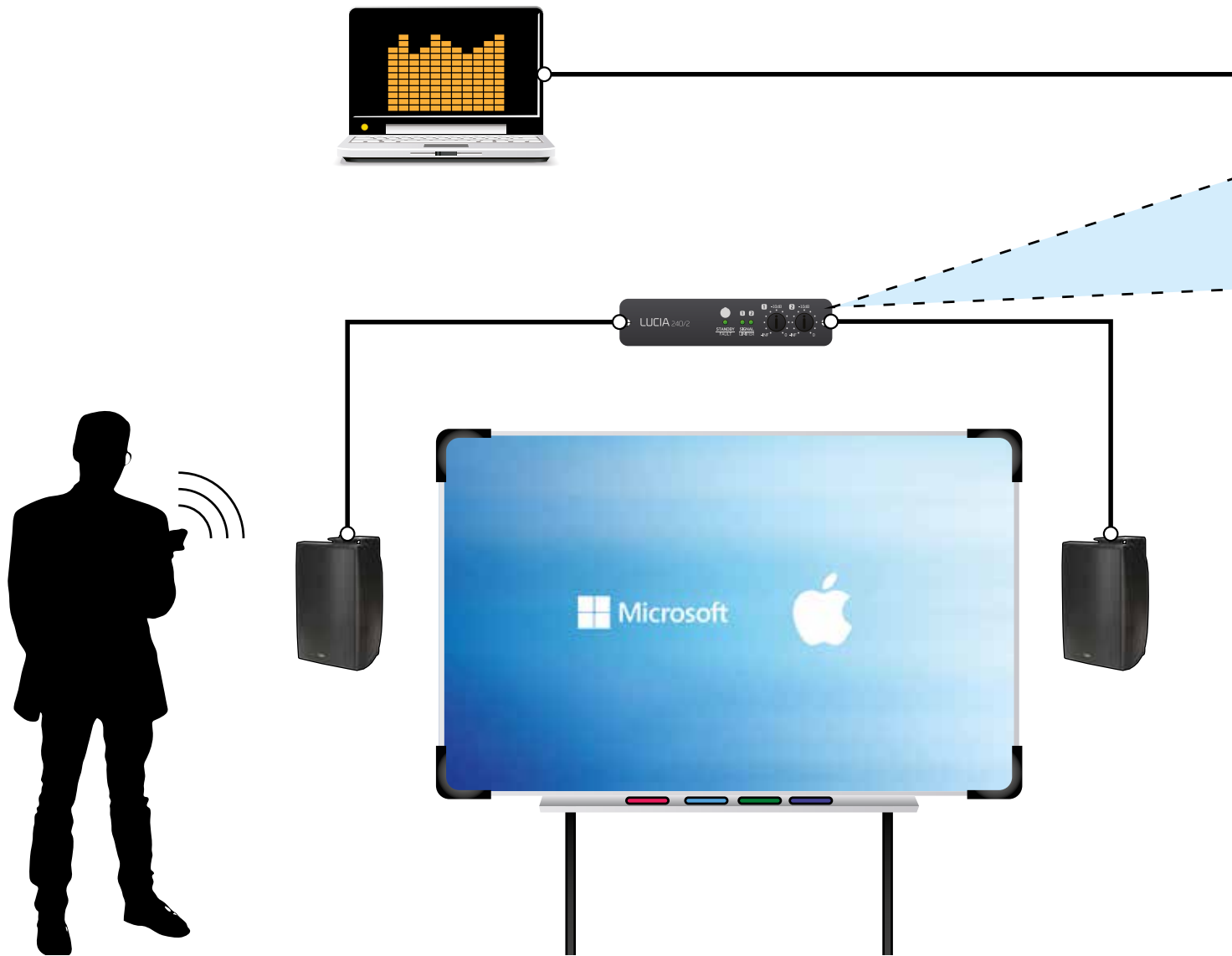
ROOM 2

ROOM 3

Track 12 3 mins
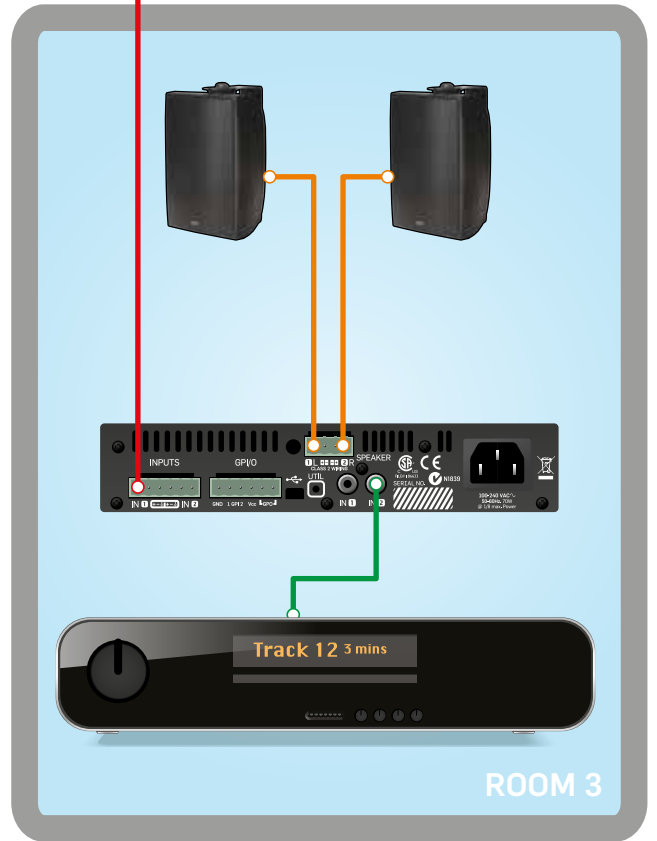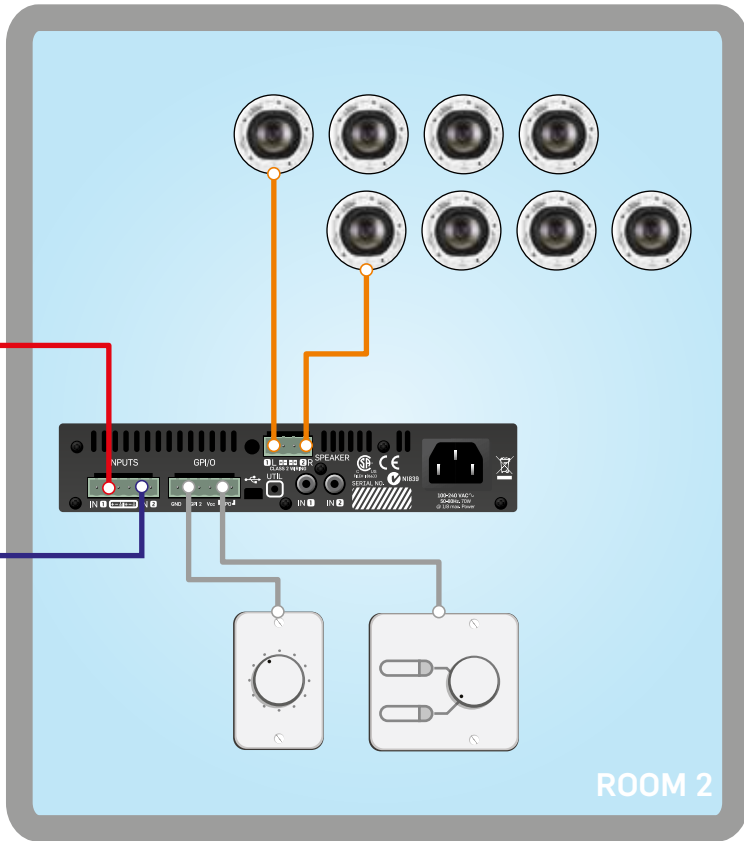
Corporate AV /
Boardroom /
Meeting rooms

Perfect for
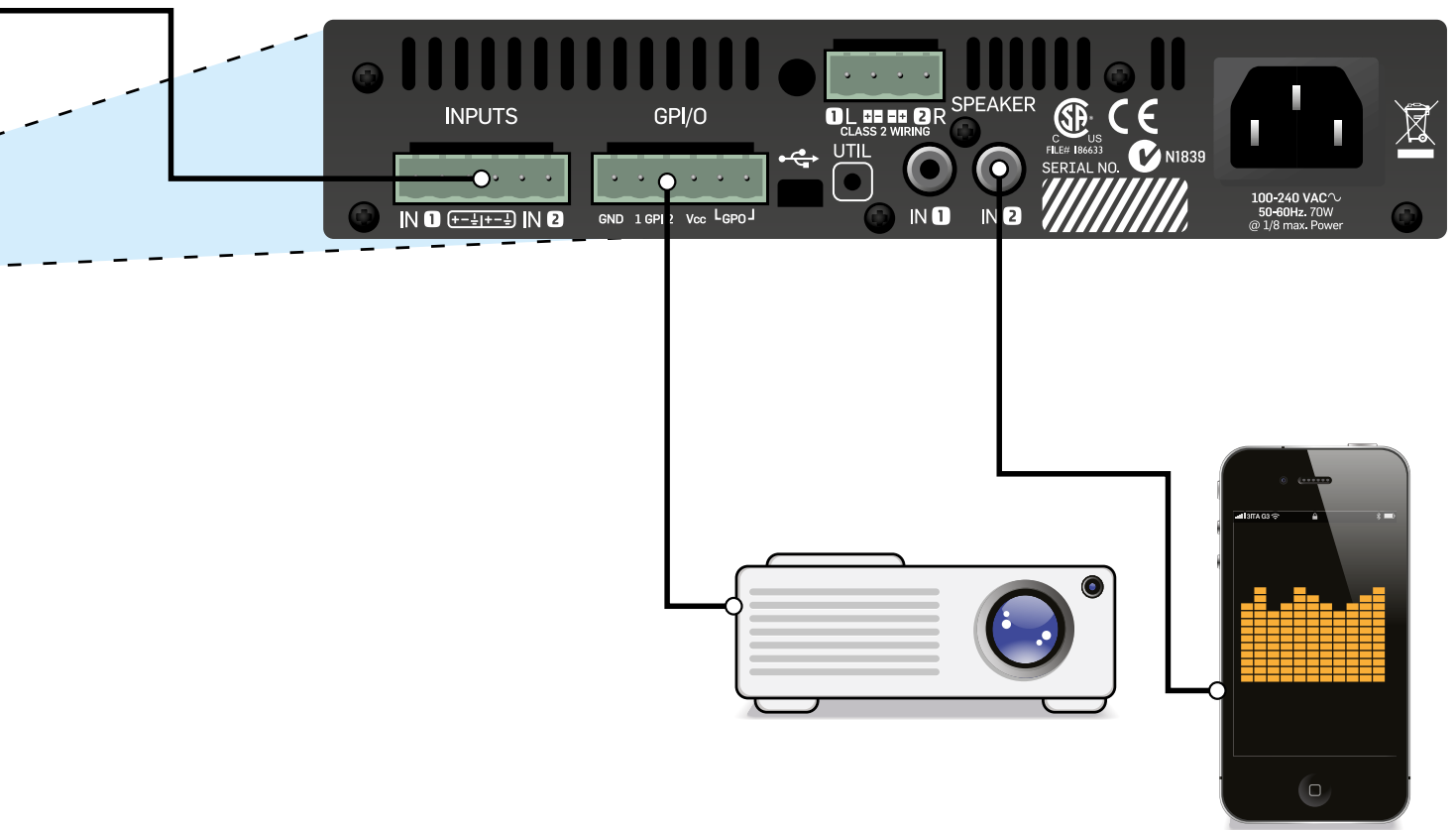# Classrooms & Lecture Theaters

Education / Classroom

LUCIA comes into its own in typical interactive whiteboard-based environments, where it easily forms the hub of a versatile, high quality audio system with local inputs and control – all discreetly mounted behind a display screen, by virtue of the included wall-mount brackets.

The example illustrates a 'base' model LUCIA powering a classroom loudspeaker system, with audio from either laptop or secondary device on shared input (eg. mp3 player or TV) for added flexibility and simple use. Integration with the interactive whiteboard is possible to the extent where IR remote control (to projector) can be used to control audio volume via GPIO to the LUCIA, with visual representation on screen (level metering).

INPUTS GPI/O

IN **1** $+ - \frac{1}{=} + - \frac{1}{=}$ IN **2**

GND 1 GPI 2 Vcc └GPO┘

1 L ■+ ■+ **2** R
CLASS 2 WIRING

UTIL

SPEAKER

IN **1** IN **2**

SERIAL NO.

CSR
c US
FILE# I86633

CE

✓ N1839

100-240 VAC~
50-60Hz. 70W
@ 1/8 max. Power

Education/
Classroom

Specifications

General	LUCIA 240/2M	LUCIA 120/2M	LUCIA 240/2	LUCIA 120/2
Number of powered channels	2	2	2	2
Total output all channels driven	240 W	120 W	240 W	120 W
Max output voltage per channel [1]	43.8 V peak	31.0 V peak	43.8 V peak	31.0 V peak
Max. output current per channel	7.8 Arms	5.5 Arms	7.8 Arms	5.5 Arms
Max. Output Power (all ch.'s driven)				
2 ohms	120 W	60 W	120 W	60 W
4 ohms	120 W	60 W	120 W	60 W
8 ohms	120 W	60 W	120 W	60 W
16 ohms	60 W	30 W	60 W	30 W
Performance				
THD 20 Hz - 20 kHz at 1 W into 8 ohms	<0.3%	<0.3%	<0.3%	<0.3%
THD at 1 kHz and 1 dB below clipping	<0.2%	<0.2%	<0.2%	<0.2%
Signal to noise ratio into 8 ohms	>101 dBA	>98 dBA	>101 dBA	>98 dBA
Channel separation (Crosstalk) at 1 kHz	>60 dB	>60 dB	>60 dB	>60 dB
Frequency response	5 Hz - 22 kHz	5 Hz - 22 kHz	5 Hz - 22 kHz	5 Hz - 22 kHz
Input impedance	10 kOhm	10 kOhm	10 kOhm	10 kOhm
Input common mode rejection, CMR	40 dB	40 dB	40 dB	40 dB
Gain, Sensitivity and Limiters				
VPL for 16 ohm mode	44 V	31 V	44 V	31 V
VPL for 8 ohm mode	44 V	31 V	44 V	31 V
VPL for 4 ohm mode	31 V	22 V	31 V	22 V
VPL for 2 ohm mode	22 V	15 V	22 V	15 V
Sensitivity, balanced input	4 dBu / 1.23 Vrms	4 dBu / 1.23 Vrms	4 dBu / 1.23 Vrms	4 dBu / 1.23 Vrms
Sensitivity, RCA input	-2 dBu / 0.62 Vrms	-2 dBu / 0.62 Vrms	-2 dBu / 0.62 Vrms	-2 dBu / 0.62 Vrms
Input headroom for clip, balanced [2]	12 dBu / 3.09 Vrms	12 dBu / 3.09 Vrms	12 dBu / 3.09 Vrms	12 dBu / 3.09 Vrms
Input headroom for clip, RCA [2]	6 dBu / 1.55 Vrms	6 dBu / 1.55 Vrms	6 dBu / 1.55 Vrms	6 dBu / 1.55 Vrms

Connectors and switches	
Input connectors (per ch.)	3-pin detachable screw terminals, electronically balanced
Input connectors (ch 1 & 2)	Unbalanced RCA type
Output connectors (per ch.)	2-pin detachable screw terminals
GPI (power control input) [3]	2 channels of voltage sense type. 4 pins in a detachable screw terminal. Default for gain.
GPO (power state output) [3]	Contact closure type, 2 pins in a detachable screw terminal. Default for external monitoring of fault/protection/power off
USB	For firmware update and configuration for the matrix models
Cooling	One fan, no filter required, front-to-rear airflow, temperature controlled speed. Can stay off if the sustained power average stays below 2 x 6 W and the surrounding temperature is below 25 degrees C
Auto mode	The power state is controlled automatically with the audio signal
Level adjustment (per channel) [3]	Front panel potentiometer, detented from -inf to 0 dB

Matrix model features	
Inputs processing block [4]	Default with 4 parametric EQ for each of the 4 input channels
Mix-matrix routing block [4]	4 in - 4 out mix-matrix controllable from GPI
Outputs processing block [4]	High pass filter Output EQ Output look ahead limiter ADLC (Adaptive ISO 226 compensation)
Two line level outputs [5]	Each capable of driving 6 LUCIA units in parallel
Latency from any input to any output	9.15 ms

Power	
Nominal voltage	100 - 240 VAC
Operating voltage	85 - 265 VAC
Standby consumption	<1 W
Mains connector	IEC inlet

Dimensions	
	W: 216 mm (8.5"), H: 44 mm (1.7"), D: 280 mm (11")
Weight	1.9 kg (4.2 lbs)
Finish	Black aluminum front and black steel chassis
Approvals	CE, CSA, CCC, PSE, FCC, ENERGY STAR

Note 1): Into 8 ohms and higher
Note 2): An analog soft limit will be engaged on the input above this level to reduce the clip distortion
Note 3): Can be configured for different functionality via USB
Note 4): DSP settings determined by settings downloaded from the Application Browser software; not configurable on the unit itself
Note 5): Noise levels typically allow daisy chaining of 3 LUCIA amplifiers without issues

All specifications are subject to change without notice.

Notes