



# THE NEW TOURING ICON

PLM+SERIES

## **PLM 20000Q foundation:**

an iconic amplifier design that is proven, tested,  
and trusted by professionals all over the world



# PLM+ is the brand new flagship touring platform from Lab.gruppen

PLM+ sets the benchmark for Powered Loudspeaker Management Systems. It combines four channels of amplification with unrivalled signal processing and audio management, allowing complete integration in the devices, and offering many unique functions not found in other amplifier and DSP “combined” platforms.

PLM+ has been designed with total integration at the core of the system, allowing complete control and monitoring of the whole platform ecosystem – including networking, audio I/O, signal processing, amplifiers, power supply and connected mains supply – delivering unique operational benefits and improved system control for the user via Lake Controller, CAFÉ and Third Party Protocol integration.

Building on the TEC Award winning PLM 20000Q and offering all of its unique performance characteristics, flexibility, and raw power, PLM+ delivers twice the processing power, twice the throughput, and a whole host of features designed to deliver real world benefits.

PLM+ makes any production life cycle easier to specify, smoother to run, and more efficient to control and monitor – at the system design stage, during the show, and right through to the final load out.

Proven at all levels of concert touring, Lab.gruppen's road-tested and environmentally conscious technologies are incorporated into the PLM+ series. Of the two models, the PLM 12K44 offers a touring technology first: Rational Power Management (RPM™), a brand new proprietary Lab.gruppen innovation that rationalizes power allocation between channels to optimise performance and potentially reduce amplifier inventory.

As with previous generations of PLM, the new PLM+ models benefit from the proven package of onboard Lake Processing and Dante™ digital audio networking, redundant audio inputs, and onboard load monitoring to fulfill the requirements of mission-critical live sound applications – where the show must go on, no matter what.





# Features + Benefits:

## + Rational Power Management (RPM)

- 4 x 3000 W output power, total 12000 W (12K44)
- 4 x 5000 W output power, total 20000 W (20K44)
- Any channel is capable of delivering up to 5900 Watts power output from total available power
- Flexible power output allocation across channels of the 12K44 model to match requirements, enabling more efficient use of amplifier inventory

## + Power Supply

- Unique universal Regulated Switch-Mode Power Supply (R.SMPS™) maintains stability despite wide fluctuations in mains supply voltage
- Best-in-class Power Factor Correction (PFC) helps maintain full output during extended power bursts
- Current Draw Modelling (CDM™) reduces mains peak draw
- Breaker Emulation Limiter (BEL™) tailors PLM+ Series to the available mains distribution
- Under-Voltage Limiting (UVL) enables continued operation with mains voltage sags as low as 65 V

## + Amplifier

- Amplifier Design: Class TD output stage
- Digitally controlled and recallable "amplifier gain" adjustable in 0.1 dB steps
- Digital output attenuation in 0.25 dB steps from -inf to 0 dB
- Digitally implemented, zero-overshoot Inter-Sample Voltage Peak Limiting (ISVPL) adjustable in 0.1 V steps from 17.8 to 194 V

## + Audio & Processing

- Dante low-latency digital network included as standard
- Full support for Dante Controller
- Lake's exclusive classic/linear-phase/FIR speaker processing platform with four throughputs
- Group control with Raised Cosine™ MESA EQ™ asymmetric filters
- LimiterMax™ peak and RMS limiters
- Comprehensive clocking management system with low latency sample rate conversion
- Multiple and redundant inputs with programmable failover
- Four "Lake Class" analog inputs with Iso-Float™ ground isolation
- Two AES3 on XLR digital inputs (4 audio channels)
- Eight dual-redundant Dante network audio inputs and outputs

## + Networking & Communications

- Compatible with Lake LM Series, and Lab.gruppen PLM and D Series
- Primary and secondary network connections
- High-Resolution daylight viewable LCD display
- Moisture resistant silicone touchpad for front-panel display mode selection and menu navigation

## + Physical Design

- Lightweight 2U chassis weighing only 16.5 kg / 36 lbs (12K44), 17 kg / 37 lbs (20K44)
- Copper-finned intercooler with transverse-mounted output devices
- Rugged, road tested construction









Open'er Festival



# The Solid Foundation: Lab.gruppen Core Technologies

Reliability, durability, sound quality and pure power remain the fundamentals for any touring amplifier, and in this regard PLM+ rigorously maintains Lab.gruppen's industry-leading reputation.

Key Lab.gruppen technologies incorporated in the PLM+ Series platform include:

**+ Regulated Switch-Mode Power Supply (R.SMPS)**

A fully regulated design that connects to any mains supply in the world and ensures stable output power independent of deviations in the mains voltage

**+ Under-Voltage Limiting (UVL)**

Allows continued operation despite severe voltage drops

**+ Best-in-class Power Factor Correction (PFC)**

Unique Current Draw Modelling (CDM™) reduces peak current draw from the mains supply; inherent rail regulation maintains stable rail voltages during extended bursts

**+ Patented Class TD® Output Stage**

Combines the efficiency of Class D with the sonic qualities of Class B topologies.

**+ Inter-Sample Voltage Peak Limiter (ISVPL™)**

Digitally controlled broadcast quality peak limiter with exceptional accuracy for maintaining sonic purity

**+ Intercooler® Cooling System**

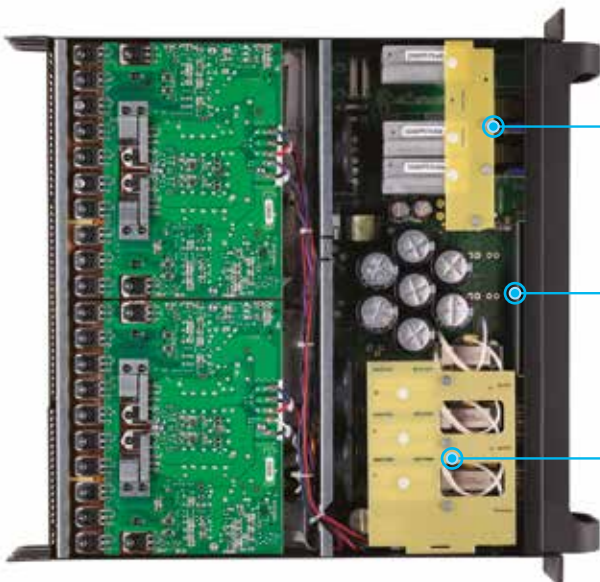
Equipped with the extraordinarily efficient copper-finned Intercooler system, PLM+ amplifiers expel heat more efficiently, eliminating 'end of tunnel' output device over-temperature problems

**+ Breaker Emulation Limiter (BEL)**

Prevents mains fuse tripping

**+ Full Suite of Protection Features**

Thermal 'show-must-go-on' Limiting, Very High Frequency Protection (VHF), Direct Current Protection (DC), Short Circuit Protection, Current Clip Limiter, Voltage Clip Limiter



Regulated Switch-Mode Power Supply (R.SMPS)

# Rational Power Management: Optimal performance and minimal equipment costs

## Rational Power Management provides true flexibility of power allocation

On top of the outstanding performance users have come to expect from a PLM, the 12K44 model also features Rational Power Management (RPM), a proprietary Lab. Gruppen technology that provides designers, systems techs, consultants and integrators with unprecedented freedom to allocate the available output power of each amplifier channel for optimum performance with specific load conditions.

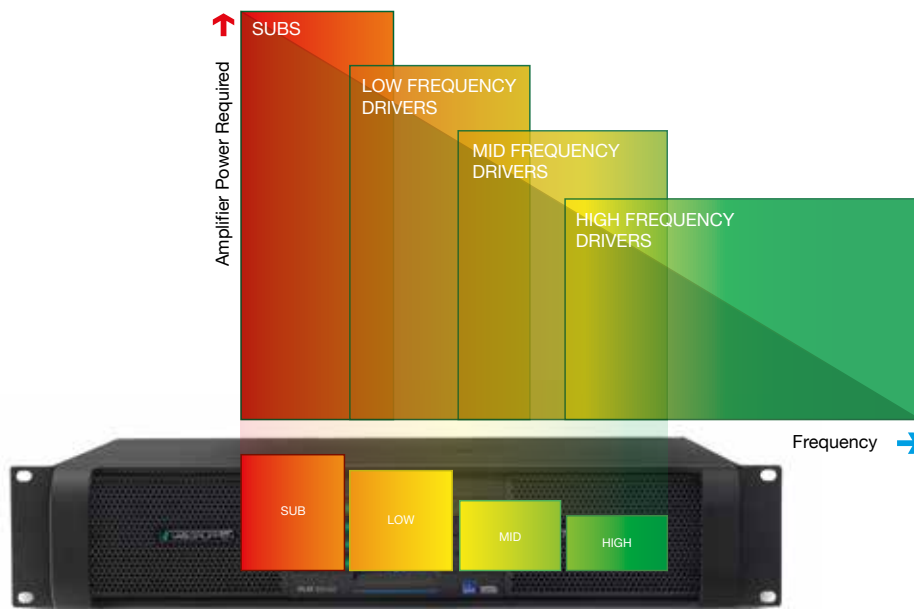
For the first time, RPM provides true flexibility in allocating available power across the four output channels. Each channel of the PLM 12K44 may be tailored to meet the requirements of the connected load, and any power not used for that channel may be allocated for use on other channels.

RPM helps to avoid amplifier over-specification, or bridging of adjacent channels in order to meet minimum demands on one power-hungry load, which would otherwise result in a loss of channel count. RPM technology also enables the user to minimize equipment costs, reduce rack space and improve long-term energy efficiency – all achievable without compromising sonic performance.

Rational Power Management incorporates features that safeguard the defined power output of one or more specified channels. From within the CAFÉ software, it allows the desired power demand to be calculated for the different loads in several different ways. RPM then analyses the desired power in relation to the channel and device constraints and guides the system designer towards the most effective way of powering the PA.

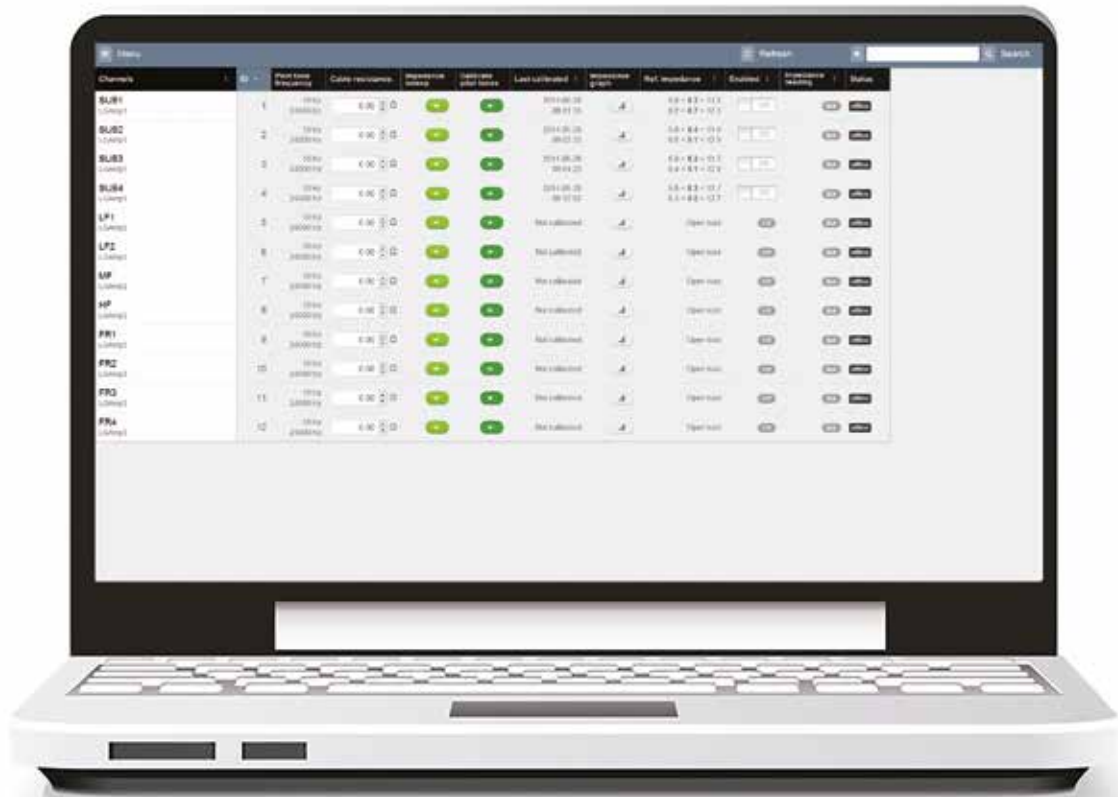
Rational Power Management results in real-world savings, both immediate and long-term. In many cases, fewer amplifiers – or lower cost models – may be specified while still fulfilling all power requirements.

It also allows better mains management, avoiding over-specification of mains distribution, cooling, and UPS (where required). Finally, the overall gains in efficiency in larger systems will minimize current consumption and reduce operation costs – a “green bonus” for the system owner.



PLM+ Series - Amp channels power adjusted to match the loudspeaker requirements





## CAFÉ with ESP: Integrated software for fast system configuration and surveillance

CAFÉ (Configuring Amplifiers For the Environment) is a dedicated software application for Windows and OSX that allows PLM+ amplifiers to be easily configured and monitored.

In addition to providing comprehensive system surveillance and configuration of RPM and other amplifier features such as ISVPL and Breaker Emulation Limiter (BEL), CAFÉ also includes valuable help to save the environment. In combination with the RPM configuration CAFÉ can accurately predict, based on the true SPL and speaker requirements of the individual loads for the given project, estimations of average mains current draw and generated heat in BTU. With PLM+ Series' innovative power supply technologies (true Power Factor Correction utilizing Current Draw Modelling) the required mains draw is already best in class in relation to burst power output, but in combination with the BEL the mains draw can also be safeguarded to the predicted

level. The end result is precise mains management and thermal control, which allows more accurate (rather than over-specified) provision of mains distribution, cabling and cooling. This technology suite reduces lifetime running costs and minimizes environmental impact. It also reduces demands on UPS systems.

CAFÉ also features an innovative design aid: the Equipment Specification Predictor (ESP). ESP examines the system SPL and speaker requirements for a given project and aids in transforming that data into circuit and amplifier channel requirements. On a system level, CAFÉ supplies a recommendation for optimized placement of channels into amplifiers for the most cost effective solution. The recommendation includes model and quantities of PLM+ Series required with most rational use of amplifiers, minimizing wasted headroom.





# Lake: Power and flexibility for any networked solution

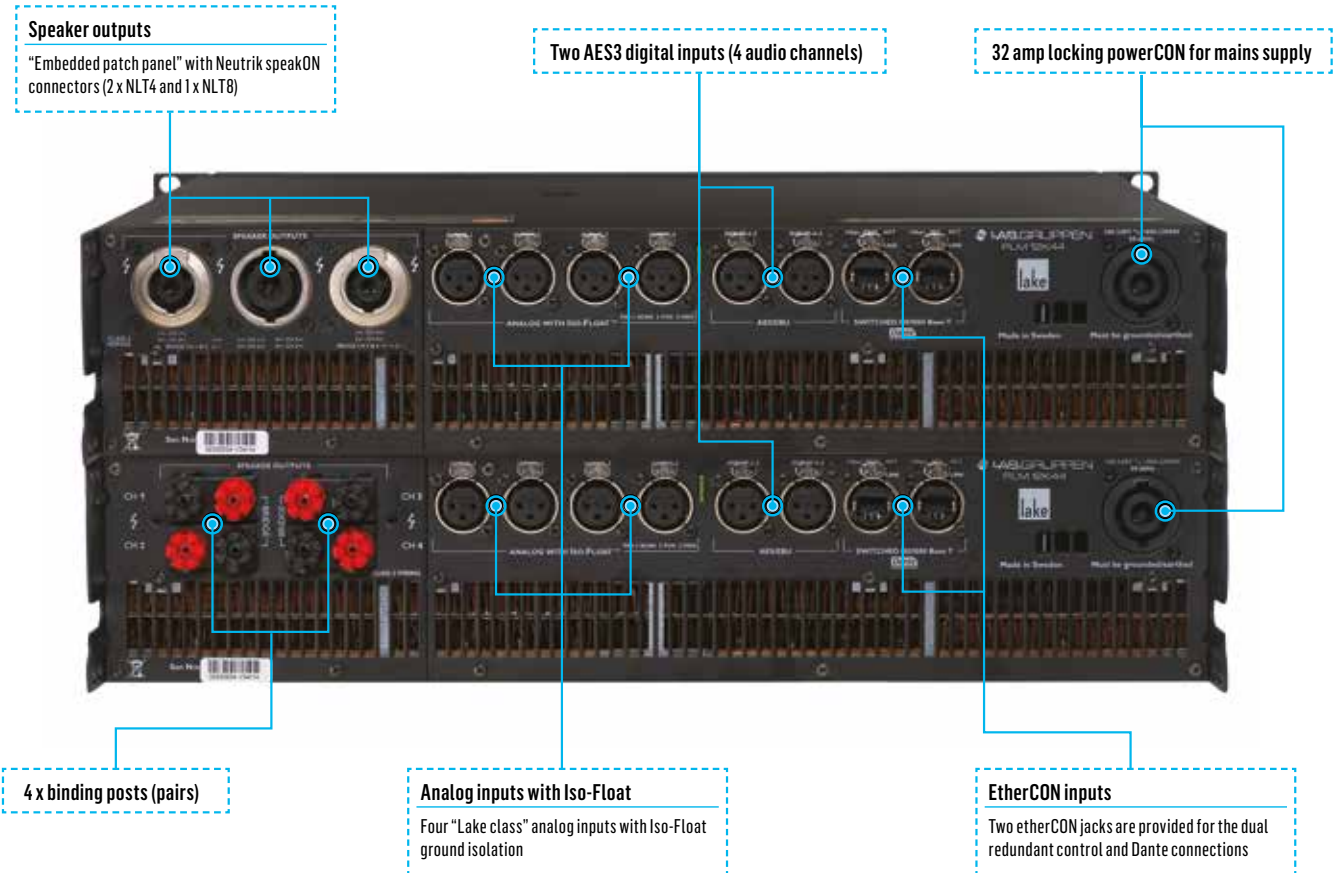
PLM+ devices provide extraordinary input flexibility, the legendary power of exclusive Lake processing algorithms, comprehensive control and load monitoring via Lake Controller, and seamless integration into Dante digital audio networks. All PLM+ models incorporate four full-featured Lake Processing modules, with four discrete channels of audio throughput input to output. Audio signals are selectable from four channels of analog (with Iso-Float ground isolation), four channels via AES3 digital inputs and eight dual redundant Dante networked digital inputs. Input signals are individually selectable for each channel, with programmable failover to a lower prioritized input.

The full-featured, on-board Lake processor includes group control with Raised Cosine MESA EQ asymmetric filters to match the responses of any loudspeaker system. LimiterMax peak and RMS limiters set the industry standard for loudspeaker protection and sonic transparency.

The included Lake Controller software provides a unified interface for control of Lake functions and for comprehensive monitoring of both amplifier status and connected loudspeaker loads. Optimized for a wireless tablet PC, Lake Controller is easy and intuitive to operate, with the "feel" of real-time analog faders and controls.

Lake Controller also features seamless integration with third party, real-time sound system measurement, optimization, and control software packages. Users can measure spectrum and transfer function and adjust system EQ at the same time, using the same user interface.

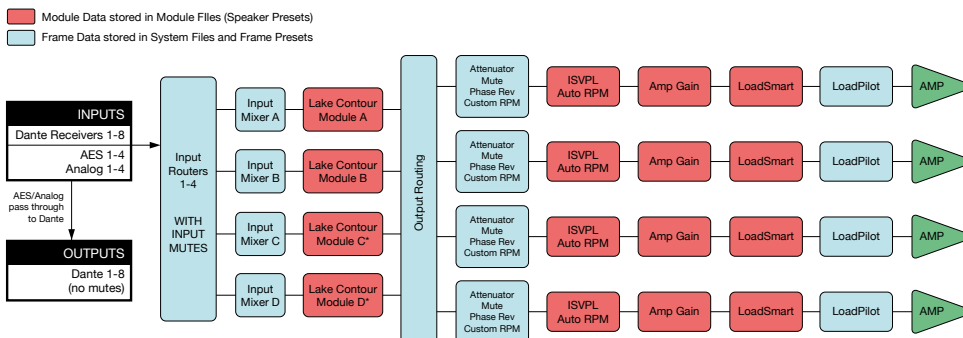
Lake Processing offers classical crossovers (selectable up to 48 dB per octave) as well as linear-phase crossovers capable of slopes exceeding 180 dB per octave for greater control to limit lobing and off-axis cancellation.





## PLM+ series amplifiers offer:

- + **Four complete Lake Processing modules –**
  - Classic, linear phase and FIR filters
  - Group control with Raised Cosine™ MESA EQ™
  - asymmetric filters
  - LimiterMax™ peak and RMS limiters
- + **Input flexibility and redundancy –**
  - Four analog inputs with Iso-Float ground isolation
  - Two AES3 digital inputs (four audio channels)
  - Eight dual redundant Dante network inputs
- + **Comprehensive loudspeaker preset database (LoadLibrary™)**
- + **Wireless tablet control with Lake Controller software for convenient remote system tuning and commissioning**



**Left:** The signal flow block diagram of PLM+ series Lake. The input section (inputs, input router and input mixer) allows for mixing capabilities as well as redundant and prioritized inputs with automatic switch-over in case of signal failure. Up to four Lake Processing modules provide user EQ and loudspeaker processing, including LimiterMax limiting. Each power output channel provides individual channel processing, including ISVPL limiter, RPM and load monitoring.



# LAB.GRUPPEN

Lab.gruppen adopts a policy of continuous improvement and product specification is subject to change.  
RPM, R.SMPS, PFC, CDM, BEL, UVL, CAFÉ, ESP, ISVPL, Iso-Float, Raised Cosine, MESA EQ,  
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