



D 200:4T/Ta | D 120:4T/Ta | D 80:4T/Ta



Lab.gruppen D Series: The Integration Superpower

The Lab.gruppen D Series provides exceptional performance and expanded flexibility in high-power audio amplification for challenging systems integration applications in stadia, arenas, convention centers and other large or particularly demanding installed sound installations. Based on the proven, road-tested and green amplifier technologies of Lab.gruppen's renowned PLM Series, the installation-dedicated D Series adds Rational Power Management (RPM™) – a new proprietary Lab.gruppen technology that rationalises power allocation and potentially reduces amplifier inventory. Equipment specification,

commissioning (including configuring RPM and other unique amplifier technologies) and on-going control and system monitoring are managed via the innovative CAFÉ™ software, running on Mac or PC. The dedicated D Series Tesira® variant models integrate seamlessly with Biamp® Systems' comprehensive Tesira® DSP platform via AVB. D Series features include redundant audio inputs as well as on board surveillance and load monitoring to fulfill the requirements of mission-critical voice evacuation compliance.

D Series Features and Benefits

- ▶ Four-channel amplifiers available in three power models
 - ▶ D 200:4 - 20000 W of total output power (4 x 5000 W nominal)
 - ▶ D 120:4 - 12000 W of total output power (4 x 3000 W nominal)
 - ▶ D 80:4 - 8000 W of total output power (4 x 2000 W nominal)
- ▶ Rational Power Management (RPM)
 - ▶ True flexibility in allocating power output across channels to match requirements, enabling more efficient use of amplifier inventory
 - ▶ Any channel is capable of delivering up to 5000 W power output, from total available power in each frame
- ▶ Dedicated on-board surveillance & load monitoring system
- ▶ Unique universal power supply
 - ▶ Regulated Switch-Mode Power Supply (R.SMPS™) maintains stability despite mains voltage fluctuations
 - ▶ Best-in-class Power Factor Correction (PFC)
 - ▶ Current Draw Modelling (CDM™) reduces mains peak draw
 - ▶ Breaker Emulation Limiter (BEL™) - Tailors D Series to the available mains distribution
 - ▶ Under-Voltage Limiting (UVL™) for continued operation despite severe voltage drops
- ▶ CAFÉ (Configuring Amplifiers For the Environment) Software incorporating ESP™ (Equipment Specification Predictor) for design, system and equipment planning, installation and commissioning.

Tesira® DSP and Networking Environment

- ▶ The Tesira® family of digital signal processors is developed and supported by Biamp Systems, a world leader in AV connectivity and control
- ▶ D Series Tesira® is fully integrated into the Tesira® environment as a high-power output expander device
 - ▶ Full amplifier and load surveillance from within Tesira® software
 - ▶ D Series Tesira® is fully managed by a Tesira® server supporting full configuration restore in case a hot-swap is required
- ▶ Channel processing with Mute, Level and Signal Invert
- ▶ Four channels of Ethernet-based Audio Video Bridging (AVB) networking input
- ▶ Optional four channels of Mic/Line input for local system input or analog failover
- ▶ Power state management with configurable Auto Power Down to ultra-low mains draw sleep state
- ▶ GPIO and serial port for further system integration
- ▶ Creation of customized control programs using Biamp Canvas software

D Series: Technology Overview

The D Series from Lab.gruppen offers an unprecedented combination of sustained high output, impeccable sonic performance, configuration flexibility, and real-world efficiencies for reduced installation and operating costs. D Series brings the world's most innovative, capable and proven amplifier technology to virtually any high specification installation project, regardless of preferred DSP platform or specific matrix components.

Proven Lab.gruppen Technologies

Reliability and durability remain the bedrock criteria for any installation amplifier, and in this regard the D Series rigorously maintains Lab.gruppen's industry-leading reputation. The amplifier output stages are the Lab.gruppen patented Class TD[®] which couples the efficiency of Class D topologies to the sonic purity of Class B designs.

Equipped with the Intercooler cooling system, D Series amplifiers dissipate heat more effectively and eliminate "end of tunnel" output device over-temperature problems. D Series also offers a full suite of protection features, including thermal "show-must-go-on" limiting, short circuit protection, excessive average current limiting, sustained VHF (very high frequencies) protection, DC protection and voltage- and current-clip limiting. None of the limiters introduce slow, long term gain changes that can risk altering the balance of a tuned system. A Breaker Emulation Limiter (BEL) prevents power interruption while Under-Voltage Limiting (UVL) allows continued operation despite severe voltage drops.

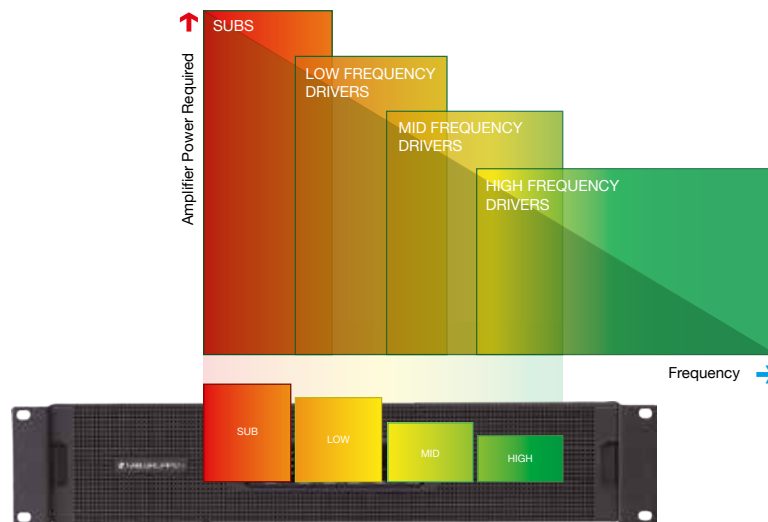
Rational Power Management (RPM)

At the core of the D Series platform is Rational Power Management (RPM), a proprietary Lab.gruppen technology that gives system designers and integrators unprecedented freedom to allocate the output power available on each channel for optimum performance with specific load conditions. RPM technology also enables the integrator to minimize initial equipment costs, reduce rack space requirement and improve long-term energy efficiency – all without compromising sonic performance.

With conventional installation amplifiers, it is often necessary to "over-specify" amplifiers to meet the maximum power demand on one channel, leaving excess power capacity wasted on the remaining channels. RPM reduces costly excess capacity by allowing re-allocation of output power capacity among the four channels. RPM can be configured so that any channel can supply up to 5000 W regardless of power model. With RPM in the D Series, the maximum output channel(s) can be used for power-hungry low-frequency

systems while the remaining output power can be allocated as needed for the mid-frequency and high-frequency drivers, or for less demanding zones within a typical large project – such as concessions, concourses, VIP suites and function rooms within a sports arena or stadium.

From within the CAFÉ software, RPM allows the desired power demand to be specified for the different loads in several different ways. RPM then analyses the desired power in relation to different channel and device constraints. If all desired power levels are within constraints, RPM safeguards the balance and assures that the specified output power will be maintained regardless of demand of other channels. If a particular zone's input is being driven beyond the specified power levels, RPM aids in limiting that zone to make sure the power is available for other zones. If the desired total power is in excess of what the power model can deliver, RPM can facilitate that the limitation is shared equally among the channels.



D Series - Amp channels power adjusted to match the loudspeaker requirements

CAFÉ and RPM for Green Credentials

D Series is configured and monitored using Lab.gruppen's CAFÉ (Configuring Amplifiers For the Environment) software suite. 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 D Series' innovative power supply technologies (true Power Factor

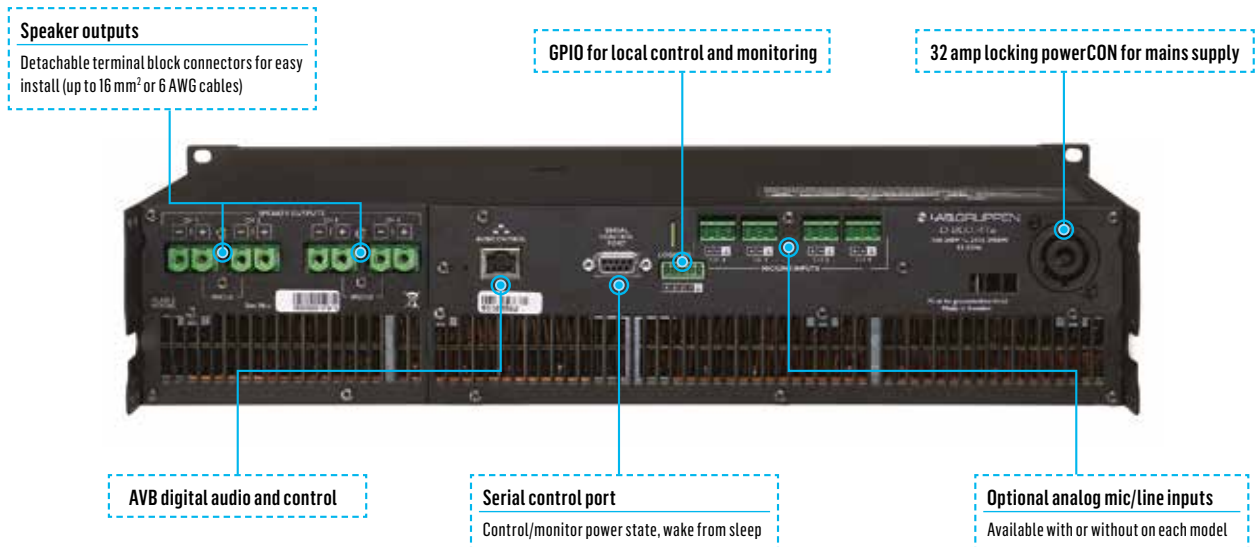
Correction utilizing Current Draw Modelling) the required mains draw is already best in class in relation to burst power output, but in combination with the BEL the mains draw can also be safeguarded to the predicted level. The end result is precise mains management and thermal control, which allows more accurate (rather than over-specified) provision of mains distribution, cabling and cooling. This technology suite not only saves on installation costs, it also reduces lifetime running costs and minimizes environmental impact. It also reduces demands on UPS systems in "mission critical" voice evacuation systems in arenas and stadia.



CAFÉ and Equipment Specification Predictor (ESP)

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, ESP supplies a recommendation for optimized placement of channels into amplifiers for the most cost effective solution. The recommendation includes model and quantities of D Series required with most rational use of amplifiers, minimizing wasted headroom.

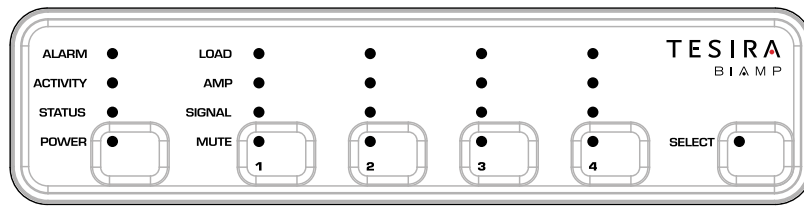




Full Integration with Tesira®

All three power models in the D Series platform are available as Tesira® variants for full integration into Biamp Systems' comprehensive networked environment based on AVB protocols. The D Series units function as a discrete high-power output device in the Tesira®

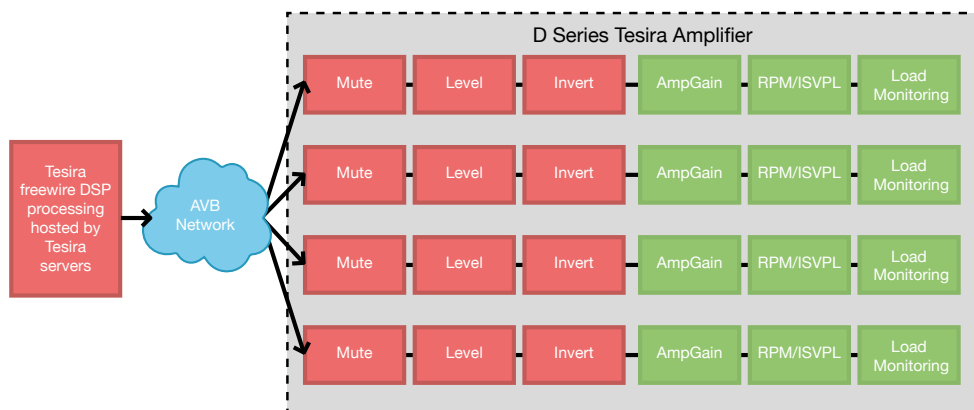
environment, with multi-channel audio inputs, control and monitoring all carried over a single Gigabit Ethernet port. An analog input option is available for local system input or analog failover redundancy, which may be required in critical PA/VA applications.



Front Panel: Tesira® Versions

The front panel provides controls for ON/SLEEP and for channel mute as well as bidirectional select between device and software. It also includes multi-color LED indicators which display important

status information for the D Series Tesira® platform unit as well as for each individual output channel.



System Block

The block diagram shows the signal flow and control points for D Series Tesira® versions. The portion shown in red is controlled

within the Tesira® software; the portion shown in green is accessible via CAFÉ software and monitored from the Tesira® software.

Specifications

| | D 200:4T/Ta | D 120:4T/Ta | D 80:4T/Ta |
|--|---|------------------------|------------------------|
| General | | | |
| Processing / Network | Tesira® by Biamp / AVB | Tesira® by Biamp / AVB | Tesira® by Biamp / AVB |
| Number of amplifier channels | 4 | 4 | 4 |
| Total burst power all channels (share among channels with RPM) | 20000 W | 12000 W | 8000 W |
| Max. Output Power (all ch.'s driven) ¹⁾ | | | |
| 2 ohms | 4400 W | 3000 W | 2000 W |
| 2.67 ohms | 5000 W | 3000 W | 2000 W |
| 4 ohms | 4400 W | 3000 W | 2000 W |
| 8 ohms | 2300 W | 1900 W | 1500 W |
| 16 ohms | 1150 W | 950 W | 750 W |
| Hi-Z 70 V | 3300 W | 3000 W | 2000 W |
| Hi-Z 100 V | 4700 W | 3000 W | 2000 W |
| Max output power single channel (all models) ¹⁾ | | | |
| 2 ohms | 4400 W | | |
| 2.67 ohms | 5900 W | | |
| 4 ohms | 4600 W | | |
| 8 ohms | 2300 W | | |
| 16 ohms | 1150 W | | |
| Hi-Z 70 V | 3300 W | | |
| Hi-Z 100 V | 4700 W | | |
| Amplifier output modules (all models, all channels) | | | |
| Peak output voltage | 194 V | | |
| Max output current | 67 A | | |
| Rational Power Management (RPM) | Regardless of model, any channel has potential to deliver the max single channel output power (1 channel on D 80:4, 2 channels on D 120:4) | | |
| Default voltage limitation (can be lifted with RPM configuration) | 194 V | 175 V | 155 V |
| Protection features | Current Average Limiter (CAL), Very High Frequency Protection (VHF), Direct Current Protection (DC), Short Circuit Protection, Current-Clip Limiter, Voltage Clip Limiter, Temperature protection | | |
| Amplifier platform | | | |
| Inter Sample Voltage Peak Limiter (ISVPL) | Configurable Peak voltage threshold and profile | | |
| Amplifier gain | Digital configurable amplifier gain 22 - 44 dB | | |
| Pilot tone generation and analysis | LoadPilot | | |
| Load impedance analysis | Yes | | |
| Temperature control | Regulated fans and show must go on limitation (ATL, PTL) | | |
| Audio Performance (Amplifier platform with digital input) | | | |
| THD + N 20 Hz - 20 kHz for 1 W | < 0.05 % | | |
| THD + N at 1 kHz and 1 dB below clipping | < 0.04 % | | |
| Dynamic range | > 114 dB | | |
| Channel separation (Crosstalk) at 1 kHz | > 70 dB | | |
| Frequency response (1 W into 8 ohm, 20 Hz - 20 kHz) | +/- 0.05 dB | | |
| Internal sample rate / Data path | 48 / 96 kHz / 32 bit floating point | | |
| Product propagation delay (straight path analog server input -> amp) | 3.857 ms / 185 samples @ 48 kHz | | |
| Tesira® | | | |
| D Series Tesira® system integration | Tesira® expander class device with full integration of amplifier configuration and amplifier surveillance | | |
| Device swap | Host name hot swap with full configuration transfer | | |
| Auto power down | Configurable auto power down to ultra low consumption SLEEP state | | |
| Channel processing | Mute, Level, Signal invert | | |
| AVB Audio Network | | | |
| AVB I/O | 4 x 4 | | |
| Sample rates / transport | 48 kHz / Unicast | | |
| Network latency | Configurable 1 or 2 milliseconds | | |
| Optional 4 channels analog inputs (included in the Ta versions) | | | |
| Usage | Configurable as Tesira® system inputs or analog failover | | |
| Balanced mic or line level input | + 48 V phantom power and digitally controlled input gain | | |
| Maximum input and digital reference | + 24 dBu | | |
| Sampling rate / resolution | 48 kHz / 24 bit | | |
| Input impedance | 8 kOhm | | |
| Frequency response (20 Hz - 20 kHz @ 4 dBu) | +/- 0.25 dB | | |
| THD + N (20 Hz - 20 kHz @ 0 dB gain + 4 dBu in) | 0.006 % | | |
| Dynamic range (20 Hz - 20 kHz, 0 dB) | > 108 dB | | |
| Cross talk (20 Hz - 20 kHz @ 0 dB gain + 4 dBu in) | > 85 dB | | |
| Back panel user interface | | | |
| Optional analog inputs | 4 x Terminal block connectors mic/line level analog input with +, - and ground | | |
| Output connectors | 4 x 2 pole Terminal block connectors rated at 1000 V / 76 A (exceeding amplifier capacity) Can take up to 16 mm ² (6 AWG) cables | | |
| Ethernet ports | 1 x RJ45 Tesira® Control, AVB networked Audio | | |
| Serial control port | DB - 9 RS232 for power state management | | |
| General purpose I/O | Local GPIO for power state management and amplifier surveillance | | |
| Detachable mains cord | Neutrik PowerCon rated at 250 V / 32 A | | |

Specifications

| | D 200:4T/Ta | D 120:4T/Ta | D 80:4T/Ta |
|--|---|------------------|------------------|
| Front panel user interface | | | |
| System status indication | 3 x tri-color LED. ALARM, ACTIVITY, STATUS for Tesira® system status and Device STATUS indication | | |
| Channel status indication | 3 x tri-color LED per channel. Status indication separated for channel LOAD, AMP, SIGNAL status | | |
| Mute | Per channel touch button for MUTE control and bi-color LED for indication | | |
| Power | Touch button for ON/SLEEP control and tri-color LED for power state indication | | |
| Select | Touch button and LED for bi-directional device software select functionality | | |
| Mains Power | | | |
| Nominal voltage | 100 - 240 V AC 50 - 60 Hz | | |
| Operating voltage | 70 - 265 V AC 45 - 66 Hz | | |
| Mains wall plug | Selectable on order CEE 7/7 "Schuko" 230 V / 16 A, NEMA L5-30 "Twistlock" 125 V / 30 A, NEMA 5-15P 125 V / 15 A (D 80:4 only), NEMA 5-20P 125 V / 20 A (D120:4 only), NEMA 6-20P 250 V / 20 A, AS/NZS 3112 230 V / 15 A (Aus/Nz), BS 546 230 V / 16 A (India), C-30P 125V / 30A (Japan) | | |
| Power supply features | | | |
| Soft start / Inrush power | Yes / Max 8 A | | |
| Power factor correction | > 0.98 for mains power > 400 W | | |
| Regulated switch mode power supply (R.SMPS) | Yes | | |
| Breaker Emulation Limiter (BEL) | Configurable current threshold and breaker profile | | |
| BEL max current threshold | 32 A | 25 A | 15 A |
| Power Average Limiter (PAL) | Yes | | |
| Under Voltage Limiter (UVL) | Yes | | |
| Mains undervoltage and overvoltage protection and mains glitch tolerance | Yes | | |
| Dimensions | | | |
| Rack rail to rear panel | W: 483 mm (19"), H: 88 mm (2 U), D: 424 mm (16") | | |
| Overall all depth front-rear support | D: 463 mm | | |
| Weight | | | |
| | 16.5 kg (36 lbs) | 15.8 kg (35 lbs) | 14.5 kg (32 lbs) |
| Finish | | | |
| | Black painted steel chassis with grey painted steel front with detachable grille | | |
| Approvals | | | |
| | CE, ETL (ANSI/UL, CSA), PSE, RCM | | |

Note 1): Lab.gruppen burst power (1 kHz, 25 ms burst power @ 150 BPM, 12 dB Crest factor)

All specifications are subject to change without notice.