

LM 44 Digital Audio System Processor



Features

► Configurable Lake® Processor

- Mesa Mode (System EQ Processor 4-in/4-out)
- Contour Mode (Loudspeaker Processor 2-in/6-out)
- Raised Cosine Equalization™
- Linear phase and Classic crossovers
- LimiterMax™ peak and RMS limiters
- Maximum available delay of 2 seconds

► Audio Inputs and Outputs

- 4-in / 4-out Analog with Iso-Float™ ground isolation
- Digital AES3 8-in/8-out
- Gigabit dual redundant Dante™ by Audinate® audio networking

► Full control via Lake Controller software application

► Software configurable GPIO

► Front Panel

- Daylight-readable display
- Dedicated Module Input and Output LED Metering
- Dedicated Module Input and Output mute buttons with LED
- Dynamic buttons and rotary encoder for parameter adjustment

► Performance

- High quality A/D and D/A 24-bit conversion
- 96 kHz internal sampling frequency
- 32-bit floating point internal data path

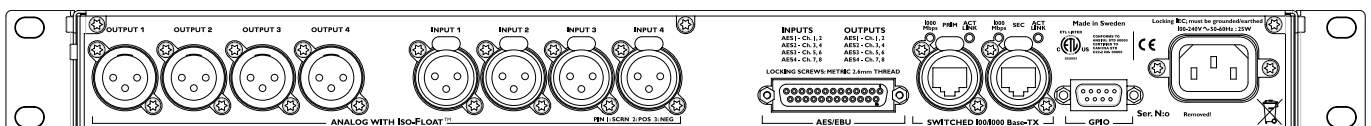
Technology Overview

The LM 44 is a powerful, full-featured digital audio processor based on the highly acclaimed Lake Processing technology. As its name suggests, LM 44 features 4-in / 4-out analog configuration, while also accommodating 8-in/8-out AES3 and 4-in/8-out Dante digital audio transport. The LM 44 benefits from the latest implementation of Lake's iconic 'Mesa EQ' configuration, utilising 4 Mesa modules, each with an independent input mixer and output signal processing chain.

With this configuration, the LM 44 is ideally suited for a wider range of applications, including as a mix-matrix and full system EQ when sitting between a mixer and virtually any high-end performance loudspeaker system. Other possible assignments include switching between consoles on large events, inserted EQ for monitor systems, FOH-to-stage digital transmission, line driver for self-powered systems, and as a Dante break-in/break-out box.

With its flexible 4 x 4 input configuration, one or more LM 44 units can replace the now-discontinued Dolby Lake Processor in most applications. It also offers a cost-effective, scalable alternative to other larger and more expensive processors in situations when only a 4 x 4 analog I/O configuration is required, or when multiple 4 x 4 configurations are needed.

Additionally, LM 44 can be operated in Contour mode configuration (two Contour modules) allowing for utilization as a loudspeaker crossover processor, much like the intended operation of LM 26. Inputs that are not routed to the processing modules (in each mode) may be passed through to the output router. As with the LM 26, all three signal types – Dante, AES and analog – are maintained simultaneously, with user-prioritised automatic failover and extra redundancy, eliminating single point of failure.



LM 44: Highlights



Display Meter View:

The default view of the daylight-readable display provides Module I/O gain and limiter gain reduction meters along with associated frame, module and channel labels; an alternate I/O Status View provides a summary of input configuration with easy access to input mutes, digital clock status and input level metering. A dedicated LED indicates various faults or warnings.



Powerful Matrix Router:

The LM 44 provides a powerful output routing matrix via the front panel. This matrix, similar to the Lake Controller, allows any input or module output to be routed to the analog or digital outputs. This allows easy configuration of I/O routing, without the need for a connected PC - convenient and practical.



Module I/O Levels and Dedicated Mute Buttons:

This section is dedicated to the Module input and output signals. The inputs and outputs are separated by a white marker. The meter segments for each channel indicate clipping (red); -2 dB (yellow); and -6, -12, -60 dB (green). The dedicated MUTE button is either RED (muted), WHITE (unmuted) or UNLIT (unused).



Intuitive Parameter Adjustment:

Parameters are adjustable using six dynamic function buttons and a rotary encoder. A user-editable parameter is identified with an illuminated button or encoder, providing intuitive navigation and control. Parameters can be adjusted in small increments and simultaneous multiple-parameter adjustment is also available.

Lake Controller Software:

The Lake Controller and associated applications, including Firmware Update and Preset Manager Utilities, form a powerful suite of software enabling detailed control and management of Lake Processor networks. The Lake Controller enables adjustment of all LM 44 parameters, including gain, delay, limiters, EQ, crossovers and all I/O configuration and routing.

Installed on a wireless touch-screen Tablet PC, the Lake Controller can be used to group processors together for simultaneous control from any location in the venue. The included Lake Analyzer Bridge provides a real-time interface with Smaart Live 5.4 and Live Capture Light/Pro, providing direct audio analysis and measurement feedback within the Lake Controller.



One Lake Controller for all Lake products:

The LM 44 integrates into the Lake Controller software, alongside LM 26, PLM Series devices, Dolby Lake Processors, and all other legacy Lake devices. New Lake Controller functionality provides LM Series-specific routing features, GPIO configuration and combined PLM and LM Series global power control and event log.

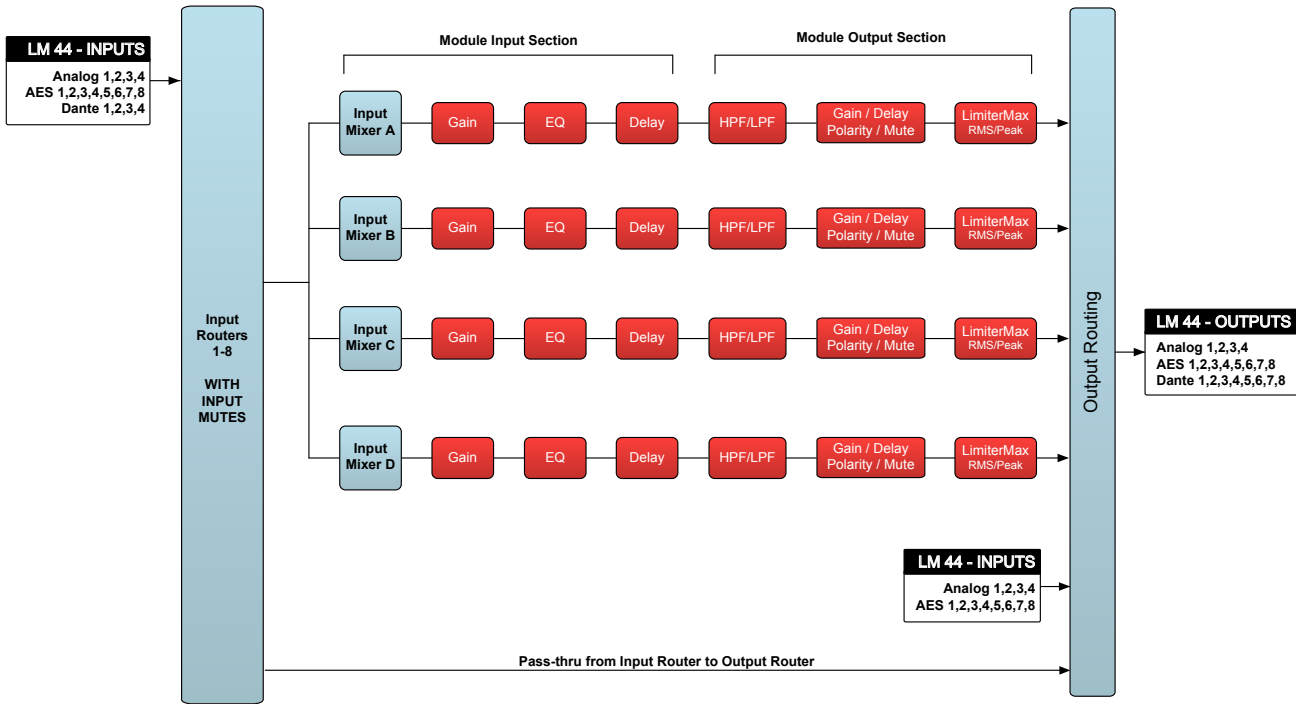


LM 44: System EQ or loudspeaker crossover processor

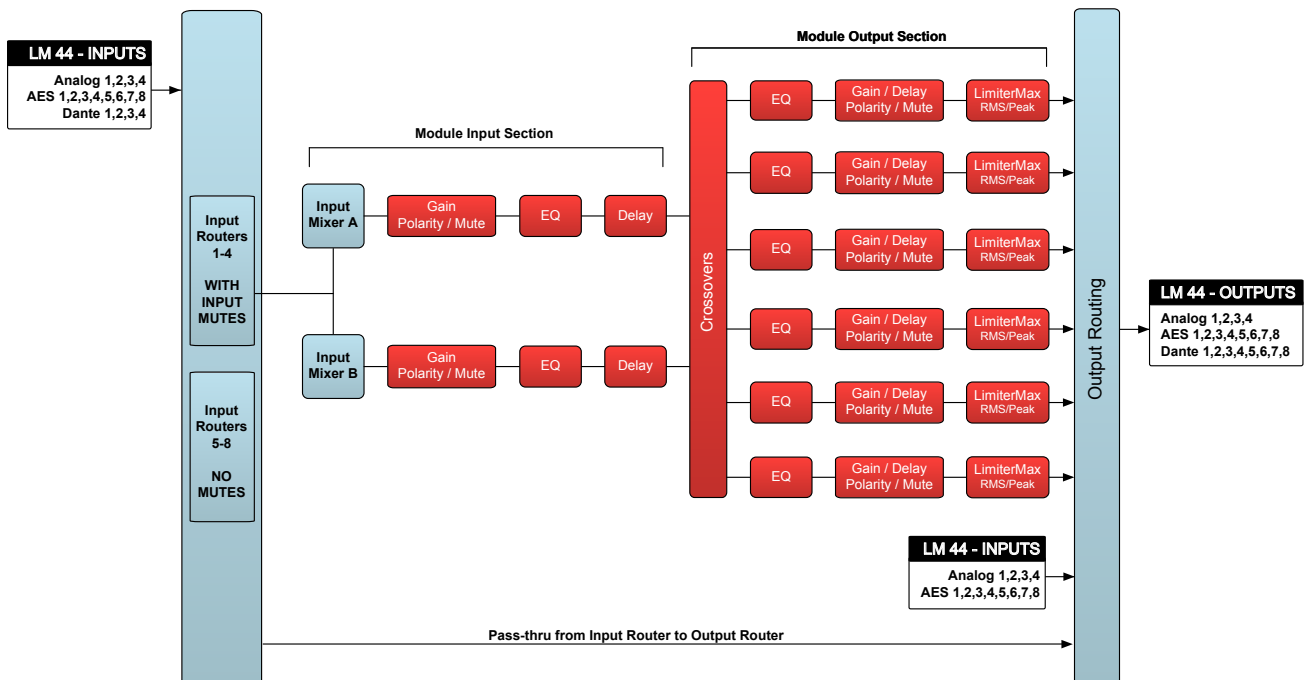
The LM 44 provides all the popular features found in legacy Lake Processors, including Mesa EQ filters, Linear Phase crossovers, AES3 connectivity, analog I/O with Iso-Float and Dante digital audio. In addition, this flagship Lake Processor range includes dual redundant Dante networking, GPIO connectivity, and new routing capabilities with dedicated pass-thru input routers to provide true Dante break-in and failover functionality.

The processor can be software-configured to operate in Mesa mode (4-channel System Processor) or Contour mode (Loudspeaker Crossover). A total of eight input routers can be independently configured with up to four input failover priority settings. Also the output of any of these eight input routers can also be patched directly to any analog, AES3 or Dante output without using any of the valuable Module processing channels.

Signal Flow for Lake LM 44 in Mesa Mode:



Signal Flow for Lake LM 44 in Contour Mode:



Specifications: LM 44

| | |
|---|--|
| Lake features | |
| Module configuration | 2 Contour or 4 Mesa modules |
| Processing channels | 6 in Contour mode, 4 in Mesa mode |
| Input routers | 8 input routers with 4 priorities in each, seamless failover to lower priorities |
| Module Input mixer | 4 ch. for Contour, 8 ch. for Mesa-modules. Mix any ratio between all input routers. |
| Input processing | Parametric EQ with Mesa and Ideal Graphic equalizers, both utilizing Raised Cosine algorithms |
| Output processing | Linear phase or Classic crossovers, Parametric EQ, shelving and all-pass filters |
| Features | Delay, Mute, Phase, Gain etc. |
| Limiters | LimiterMax with Peak and RMS limiter. Configurable MaxRMSLevel, MaxRMSCorner, MaxRMSAttack, MaxRMSRelease and MaxPeakLevel |
| SuperModule compatible | Yes |
| Audio Performance | |
| Conversion resolution | 24-bit |
| Internal sample rate | 96 kHz |
| Internal data path | 32-bit floating point |
| Product propagation delay | Best case (AES synchronous 96 kHz to AES synchronous 96 kHz via module) 0.872 ms Analog (Analog in to Analog out via module) 1.036 ms Pass thru (Analog in to AES synchronous 96 kHz bypassing DSP) 0.143 ms |
| Maximum available user delay | 2 seconds |
| Analog | |
| Inputs and Outputs | 4 inputs, 4 outputs |
| Frequency Response, analog-to-digital | +/-0.1 dB, 20 Hz to 20 kHz |
| Frequency Response, digital-to-analog | +/-0.1 dB, 20 Hz to 20 kHz |
| THD+Noise, Inputs | 0.00024% typical at 1 kHz |
| THD+Noise, Outputs | 0.00037% typical at 1 kHz |
| Dynamic Range, Inputs | 116 dB |
| Dynamic Range, Outputs | 115 dB |
| Input Impedance | 20 kOhm balanced, 10 kOhm unbalanced |
| Output Impedance | 50 ohm |
| Maximum Input level | +26 dBu |
| Input Sensitivity - settings for digital full-scale | +12 dBu, +26 dBu |
| Maximum Output level | +21 dBu |
| Crosstalk, Inputs | -98 dB, 20 Hz to 20 kHz |
| Crosstalk, Outputs | -98 dB, 20 Hz to 20 kHz |
| Common Mode Rejection Ratio (CMRR) | >70 dB, 20 Hz to 20 kHz |
| AES3/EBU (sample rate converters available as desired) | |
| Inputs and Outputs | 8 inputs, 8 outputs |
| Supported sample rates | 44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz, 176.4 kHz, 192 kHz (I/O individually selectable) |
| Supported resolutions | Up to 24-bit |
| THD+Noise | 0.00002 % at 96 kHz and 0.00006 % at 44.1 kHz sample rate |
| Dynamic Range | Base48 -140 dBFS, Base44 -125 dBFS |
| Clocking | |
| Clock selection | Manual or automatic according to priority scheme |
| Oscillator type / Synchronization | High quality VCXO clock can provide Dante master clock or slave. Automatic synchronization with Dante network. |
| Base48 | 2 (Primary and SRC) |
| Base44 | 1 (SRC) |
| Clock accuracy | < ± 7 ppm |
| Dante (Audio Network) | |
| Inputs and Outputs | 4 inputs, 8 outputs |
| Supported sample rates | 48 kHz, 96 kHz |
| Support redundant paths | Glitch-free Dual Redundant Dante using two Ethernet networks |
| Receiver latency | 0.5 ms, 0.8 ms, 1.3 ms, 4 ms |
| GPIO | |
| Inputs | 2 General Purpose Inputs (GPI) supporting external contact closure |
| Outputs | 2 General Purpose Outputs (GPO) with internal contact closure |
| Software configurable input control | Standby state, Mute state, Dual preset recall |
| Software configurable output indication | Standby state, Mute state, Faults, Ready |
| Device presets | |
| Frame presets | 100 |
| Power requirements | |
| Nominal Voltage | 100-240 VAC |
| Operating Voltage | 70-265 VAC |
| Power consumption | 30 W maximum |
| Front panel interface | |
| Display | Daylight readable monochrome (128 x 64) |
| Meters | LED for signal level and clip indicators per channel |
| Mute access | Dedicated Mute button and LED indication per processing channel |
| Menu | Intuitive and powerful user interface with soft keys |
| Status indication | LED Fault and Warning indication and detailed description on display |
| Parameter Adjustment | Single/multiple parameter edits with rotary encoder |
| Back Panel Interface | |
| Analog Inputs and Outputs | 4 + 4 XLR |
| AES Inputs and Outputs | DB-25, with selectable termination |
| Ethernet | Auto 100/1000, Auto uplink, 2 x Neutrik etherCON RJ45 connectors |
| GPIO | DB-9 |
| Power | Detachable locking 3-pin IEC |
| Control and monitoring interface | Via Ethernet for Lake Controller software, or DLM (the 3rd party protocol) |
| Dimensions (W/H/D) | |
| | 483 mm (19"), 44 mm (1 U), 290 mm (11.5") |
| Weight | 5 Kg (11 lbs.) |
| Finish | Black painted steel chassis with cast aluminum handles |
| Approvals | |
| | CE, ANSI/UL 60065 (ETL), CSA C22.2 NO. 60065, FCC |
| Warranty | 3 years, components and factory workmanship; see full warranty statement |

Specifications subject to change without notice



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Item no. TDS-LM44_V1.4