LM 26: Digital Audio Loudspeaker 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**

  - ▸ Analog with Iso-Float™ ground isolation

  - ▸ Digital AES3 4-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 26 is a full-featured, 2-in / 6-out or 4-in / 4-out stand-alone digital audio loudspeaker processor. Based on the highly acclaimed Lake Processing technology, it provides seamless compatibility with Lab.gruppen's PLM™ Series Powered Loudspeaker Management™ systems as well as LM Series and the MY8-LAKE. The LM 26's easily programmable EQ and delay capabilities allow quick reconfiguration for use as processor and line driver for self-powered loudspeaker applications as well as for systems using separate power amplifiers.

In step with the flexible Lake Processing technology implemented in the PLM Series, the LM 26 accepts audio signals as analog, AES3 digital, or via Audinate's advanced Dante digital audio network at 48 kHz and 96 kHz sampling rates. Automatic input priority switching may be enabled, and the unit can function as both an input matrix mixer and Dante break-in and break-out box.

Exclusive Lake Processing features incorporated in the LM 26 include Raised Cosine Equalization; linear phase and classic crossovers; and LimiterMax peak and RMS limiters. The Super Module capability allows flexible grouping of processor channels across separate hardware frames, including prior Lake products and PLM Series units. All functions are controlled via wired or wireless networking by the Windows®-based Lake Controller software application. A universal power supply with detachable locking mains cable allows worldwide use.

The LM 26 can be controlled or monitored via a 9-pin General Purpose Input Output (GPIO) connection. External devices such as alarm systems can trigger mute, power control or preset recall functions; status and fault conditions can also be reported externally. GPIO configuration is available via the front panel or Lake Controller.

LM 26: 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, digital clock status and input level metering. A dedicated LED indicates various faults or warnings.

Powerful Matrix Router:

The LM 26 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, depending on Mesa or Contour mode being used. 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),

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 26 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 Lake Controller provides a real-time integration with Smaart 7 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 26 integrates into the Lake Controller software, alongside LM Series, PLM Series devices, and the Yamaha MY8-LAKE. New Lake Controller functionality provides LM Series-specific routing features, GPIO configuration and combined PLM and LM Series global power control and event log.
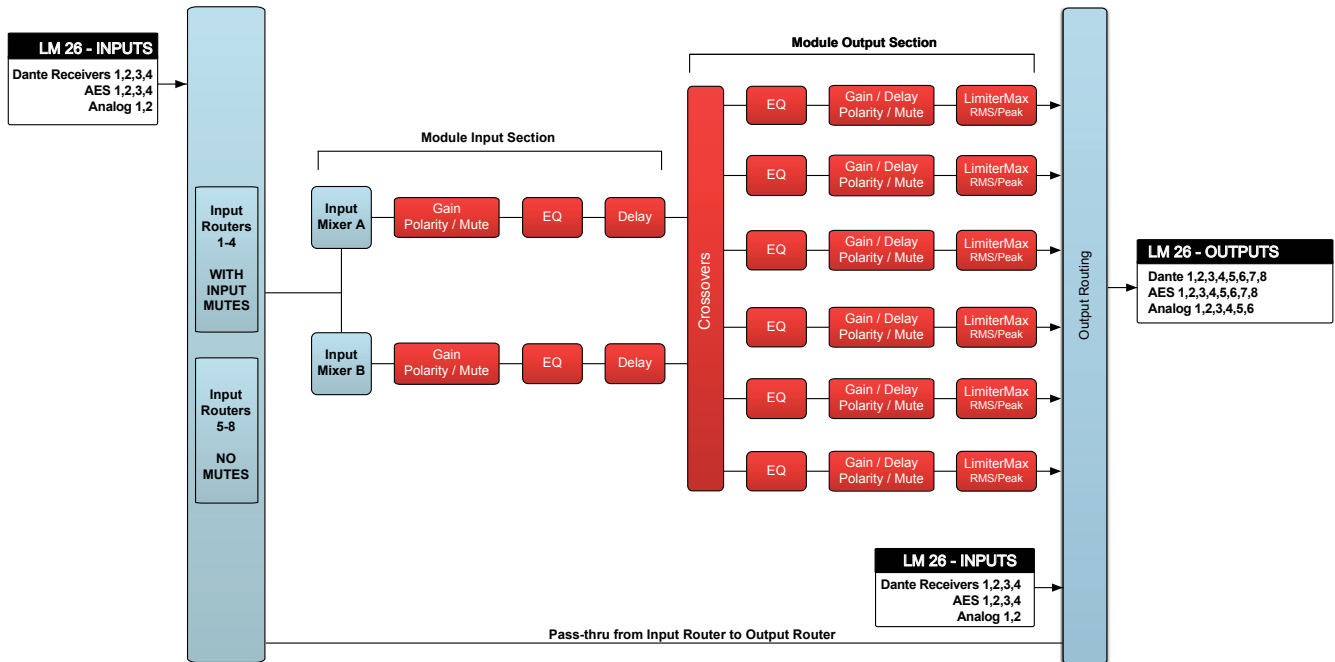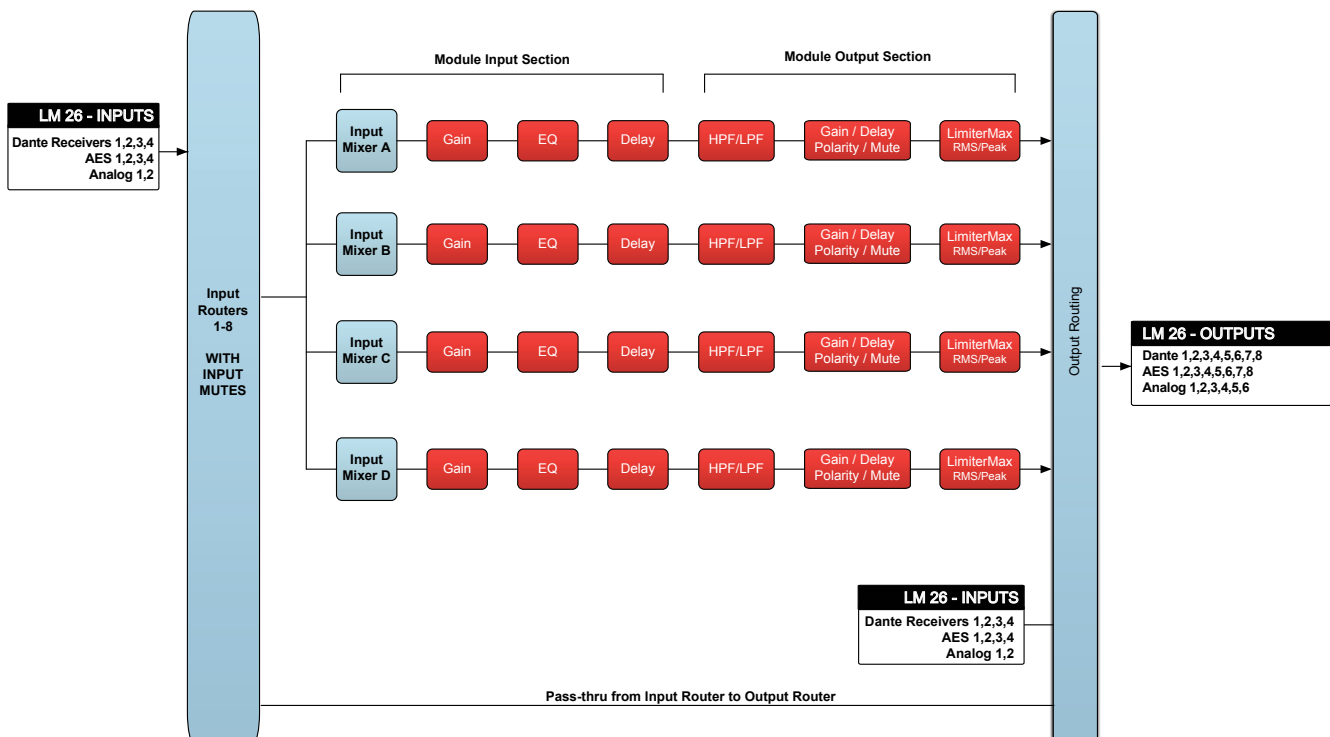
LM 26: Loudspeaker or system processor

The LM 26 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 fail-over functionality.

The processor can be configured to operate in Contour mode (loudspeaker crossovers) or in Mesa mode (4-channel system processor). A total of six input routers can be independently configured with up to four input fail-over priority settings and the output of any of these six 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 26 in Contour Mode:

Signal Flow for Lake LM 26 in Mesa Mode:

LM 26: Specifications

Lake features

Module configuration	2 Contour Modules 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	Raised Cosine Mesa and Ideal Graphic input equalizers
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,
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) 0.871 ms
	Analog (Analog in to Analog out via module) 1.039 ms
	Pass thru (Analog in to AES synchronous 96 kHz bypassing module) 0.158 ms
Maximum available user delay	2 seconds

Analog

Inputs and Outputs	2 inputs, 6 outputs
Frequency Response, analog-to-digital	+/-0.1 dB, 20 Hz to 20 kHz
Frequency Response, digital-to-analog	+/-0.03 dB, 20 Hz to 20 kHz
THD+Noise, Inputs	0.00024% at 1 kHz
THD+Noise, Outputs	0.00037% 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 or 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	4 inputs, 8 outputs
Supported sample rates	44.1, 48, 88.2, 96, 176.4, 192 kHz
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, 96 kHz
Support redundant paths	Yes
Device latency	0.25 ms, 0.5 ms, 1.0 ms, 2.0 ms, 5 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	2 + 6 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 alumimum 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