

Nº390S

CD PROCESSOR

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MEMO

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MADRIGAL AUDIO LABORATORIES
Nº 390S CD PROCESSOR



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The N°390S is the successor to the N°39 CD Processor and delivers a remarkable improvement in sonic performance over the original design. The N°390S features a complete redesign of the N°39 Digital-to-Analog Converter (DAC) and Analog Output Module. Borrowing heavily from the design of N°40 Media Console and N°32 Reference Preamplifier, the N°390S incorporates our latest advances in DAC design, output buffer and volume control technologies, all implemented on a four-layer Arlon® circuit board.

Fully Balanced Design

The N°390S is fully balanced in both the analog and digital domains. Information from the disc and single-ended digital inputs are immediately converted to balanced signals and routed to balanced DACs by a Low Voltage Differential Signal receiving circuit. This design technique, borrowed from Mark Levinson digital processors, incorporates our Closed Loop Jitter Reduction™ technology to preserve the precise timing of the digital audio signal.

A four-layer Arlon® printed circuit board provides the foundation for the critical analog audio circuit. First used in the N°32 Reference Preamplifier, this material offers superb dielectric properties and helps the N°390S achieve remarkable performance with complex, low-level audio signals.

Design of the fully balanced DAC/analog output module follows the Mark Levinson tradition of rigorous component selection. An unusual hybrid design approach incorporating both advanced surface-mount and “through-hole” technologies, allows us to utilize the optimum part at each loca-

tion in the circuit, without the constraints on parts selection normally associated with traditional PCB assembly practices. Every active device has been painstakingly selected for top technical performance, with final device selections determined by numerous, controlled sonic evaluations.

Advanced Digital Filter Techniques

Just as with Mark Levinson Digital Audio Processors, the N°390S incorporates advanced digital filter techniques carefully chosen to optimize the sonic performance of its on-board digital processor. Whether playing a CD, or decoding a digital signal received through an auxiliary input, sample depth is increased to 24 bits and sample rate increased to 352.8kHz or 384kHz (input rate dependent) before conversion to an analog signal. This sophisticated processing of the digital signal before conversion (often referred to as “upconversion,” “upsampling,” or “oversampling”) is a fundamental contributor to the excellent sound achieved by all Mark Levinson digital processors. The N°390S confirms its internal conversion rate on its front panel display each time a disc is loaded, or an auxiliary input is chosen and locked.

The N°390S also incorporates High Definition Compatible Digital® (HDCD) decoding to take full advantage of the resolution available from HDCD-encoded 16-bit CDs. By encoding information more efficiently within the 16-bit space available on the disc, the HDCD format retains more of the resolution inherent in modern high-resolution recordings.

Digital-to-Analog Conversion

Digital-to-analog conversion within the N°390S features a Mark Levinson-developed, balanced implementation of a high-performance DAC. This multi-bit Sigma/Delta DAC device delivers superb technical performance. In addition to its unusual multi-bit architecture and unlike typical Sigma/Delta devices, this DAC has a differential current output stage, which allows us to optimize the crit-



ical current-to-voltage conversion stage with dedicated operational amplifiers possessing superlative rise time and bandwidth characteristics. Following this, an active analog filter circuit, implemented in a differential amplifier, sums both halves of the balanced signal and provides superb common mode noise rejection in addition to outstanding filtering.

This approach to the DAC circuit block yields extraordinarily low distortion and noise levels and contributes greatly to the natural sound of the N°390S.

Balanced Analog Volume Control

Rather than use the digital attenuator on board the DAC, the N°390S incorporates a fully balanced analog volume control similar to that found in Mark Levinson preamplifiers. When activated, the output of the N°390S can be attenuated in precise 0.1dB steps through most of the range. Significantly, the N°390S maintains the full performance of its remarkable DACs at all volume levels — something impossible with digital volume controls, regardless of what techniques may be employed to mask the sonic consequences of that design approach.

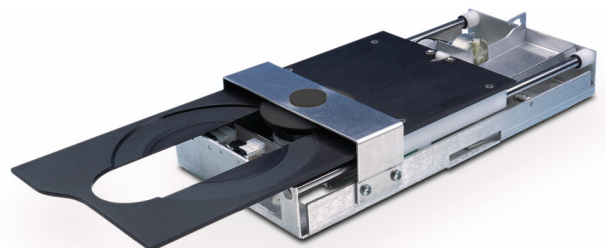
State-of-the-Art Output Buffer

The balanced discrete output buffer circuitry used in the N°390S employs the same topology used in the remarkable Mark Levinson N°32 Reference Preamplifier. A hallmark of Mark Levinson preamplifier and digital processor design, this circuit has proven to be both sonically transparent and exceptionally immune to adverse interactions with interconnecting cables and unusual input impedance characteristics of power amplifiers or preamplifiers. The N°390S features an ultra-compact implementation of the Mark Levinson output buffer circuit, pushing noise coupling and parasitic effects to vanishingly small levels. This exceptionally robust output stage allows the N°390S to make the most of any combination of preamplifier, power amplifier, and cables used.

Sound Quality

The N°390S successfully builds on the strengths of the popular N°39 CD Processor. The name change is intended to convey the level of sonic improvement that can be expected. It doesn't sound like an improved N°39 — it sounds like a completely new and significantly better product. The many design refinements in the N°390S have resulted in a significant reduction in the already very low noise levels present in the N°39. Low-level musical details that were previously masked are now revealed. High-frequency clarity and extension are improved. Low-frequency detail and drive is improved. Imaging and spatial information are substantially improved, with a greater sense of depth and width, providing an almost holographic quality to the presentation.

All of this musical information was always present on the CDs. Once again, significant sonic improvements were attained by better implementation of an existing technology. The N°390S achieves that goal.





N°390S CD Processor

Frequency Response:	10Hz - 20kHz, +0dB, -0.3dB
Total Harmonic Distortion: (THD)	0.002% @ 1kHz, 0dBFS (10Hz - 30kHz)
Dynamic Range:	96dB (10Hz - 30kHz)
Signal-to-Noise Ratio:	105dB (10Hz - 30kHz)
Channel Separation:	Better than 110dB
Intermodulation Distortion: (SMPTE IMD)	Less than 0.005%
Maximum Output: (0 dBFS signal)	4.45V balanced 2.225V single-ended
Volume Control: (attenuation) Range	61.2 to +12dB
Digital-to-Analog Conversion:	Dual differential 24-bit DACs
Conversion Rate:	352.8kHz or 384kHz (input signal dependent), 24-bit
Analog Filter:	Bessel-tuned, linear phase to 40kHz
Low-level Linearity:	Deviation less than 2dB to below -90dBFS less than 2dB to below -102dBFS w/20-bit input
Output Impedance (analog):	10Ω
Direct Digital Output, XLR:	AES/EBU 110Ω, 3.5V
Direct Digital Output, RCA:	S/PDIF 75Ω, 0.5V
Mains Voltage:	100V, 120V, 200V, 220V, 240V, factory set for destination country
Mains Frequency:	50 or 60Hz, factory set for destination country
Power Consumption:	36 watts maximum
Overall dimensions:	width: 15.75" (40cm) height: 3.84" (9.75cm) depth: 14.3" (36.3cm) 20.56" (52.21cm) with loader open
Input Complement:	(1) EIAJ digital input (1) S/PDIF (RCA) digital input
Output Complement:	(2) male XLR balanced audio outputs (2) RCA single-ended audio outputs (1) AES/EBU (XLR) digital output (1) S/PDIF (RCA) digital output
Other I/O:	(2) RJ-45 modular Communication Links (1) 3.5mm external IR input jack (1) IEC AC mains connector
Shipping Weight:	50lbs (23kg)

Specifications are subject to change without notice.

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mark
levinson®
MADRIGAL AUDIO LABORATORIES

3 Oak Park, Bedford, MA 01730-1413 USA
Tel: 781-280-0300 | Fax: 781-280-0490
www.marklevinson.com

HA Harman International Company