PCM 81
PCM 91

PCM 81 AND PCM 91 SPECIFICATIONS

Audio Input

Connectors: Combined 3-pole XLR and ¼ in. T/R/S phone jacks (2)

Impedance:
0dB/BAL switch position: 100kΩ, balanced
–20dB/UNBAL switch position: 50kΩm unbalanced

A/D Performance

THD: <0.003%, 10Hz to 20 kHz
Dynamic Range: >105 dB
Conversion: 24 bits, 128x oversampling

Levels:
0dB/BAL switch position: –2dBu min full scale, +20dBu max
–20dB/UNBAL switch position: –22dBu min full scale, 0dBu max

Audio Output

Connectors: ¼ in. T/R/S phone jacks (2); balanced XLR connectors (2)
Impedance: 125Ω, each side, balanced

D/A Performance

THD: <0.005%, 10Hz to 20 kHz
Dynamic Range: >98 dB
Conversion: 20 bits, 128x oversampling

Levels: +18dBm max, full scale

(+4dBu setting)
+4dBm max, full scale
(–10dBu setting)
Muting: Relays provided for output muting during power on/off

Analog Audio Interface

Frequency Response: 10Hz to 20kHz ±0.5dB
Crosstalk: –55dB max, 10Hz to 20kHz
S/N Ratio: 90dB min, 20kHz bandwidth
THD: <0.006% max, 10Hz to 20kHz
Dynamic Range: >96 dB
Sample Rates: 44.1kHz, 48kHz

Digital Audio Interface

Connectors: Coaxial, RCA Type (2); Balanced, XLR (2)
Format: S/PDIF (IEC-958) consumer and AES/EBU (AES3-1995) professional interface
Sample Rates: 44.1kHz, 48kHz
Conversion Data Path: 20 bits
DSP Data Path: 20/24 bits

Audio Memory Configuration

Base Memory: Two 256KB x 18 DRAMs (PCM 81)
Two 256KB x 20 DRAMs (PCM 91)

External Memory Card

Connector: Accepts PCMCIA Type 1 cards,
Standards: PCMCIA 2.0/JEIDA 4.0
Card Format: Supports up to 1MB SRAM

Control Interface

MIDI: 5-Pin DIN for MIDI IN, OUT, THRU
Footswitch: ¼ in. T/R/S phone jack for 2 independent momentary footswitches
Footpedal: ¼ in. T/R/S jack (Z=10kΩ – 100kΩ)

General

Dimensions: 19.0 in. W x 1.75 in. H x 12.0 in. D (483 x 45 x 305 mm), 19 in. rack mount standard, 1U high
Weight: Net 6.4 lbs (2.9 kg)

Power Requirements: 100–240vac, 50–60 Hz, 35 W, 3-pin IEC power connector
RFI/ESD: Conforms to FCC class B EN55022 Class B (CE), IEC 801-2, IEC 801-3

Environment:
Operating Temperature: 32° to 104°F (0° to 40°C)
Storage Temperature: –22° to 167°F (–30° to 70°C)
Humidity: Max 95% non-condensing

All specifications apply to both units unless otherwise indicated, and are subject to change without notice.

Studio Photo: Tom Gatlin; Courtesy of Masterfonics, Nashville, TN.

PCM 81 (top) and PCM 91 Rear Panel Connections

Lexicon
HEARD IN ALL THE RIGHT PLACES

A Harman International Company

3 Oak Park, Bedford, MA 01730-1441 Tel: 781/280-0300 Fax: 781/280-0490 Email: info@lexicon.com Web: www.lexicon.com

Printed in U.S.A.
PCM8191/0498/10M

©1998, Lexicon

Lexicon PCM SERIES

PCM 81
PCM 91

DIGITAL EFFECTS SYSTEM

PCM SERIES

The PCM 81 Digital Effects Processor & the PCM 91 Digital Reverberator

For over twenty-five years, Lexicon has been the leader in digital audio reverberation and effects. With more experience than any other digital manufacturer, it's no surprise that the PCM 81 Digital Effects Processor and the PCM 91 Digital Reverberator represent the most advanced and best sounding systems in their class.

Lexicon's unique dual-DSP platform enables the *PCM 91* to offer the highest quality reverberation available, and allows the *PCM 81* to combine reverb with powerful, flexible effects. Professional digital (AES/EBU) and S/PDIF I/O on both units, along with the legendary Lexicon sound, make the *PCM 81* and *PCM 91* an essential combination for musicians and recording studios.

The PCM 81 – Stunning Effects with Uncompromised Reverb

The PCM 81 Digital Effects Processor has everything that made the PCM 80 the top choice among studio effects processors – and more. More effects, more algorithms, longer delay, and full AES/EBU I/O.

Two digital signal processors allow versatile effect combinations without compromising sonic clarity: Lexicon's proprietary *Lexichip*™ to run the reverbs and a second DSP engine to handle the other effects. With 24-bit internal processing, a true-stereo signal path, balanced analog I/O, full AES/EBU and S/PDIF digital I/O, the ability to combine analog and digital inputs, extensive modulation capabilities, and 300 installed presets, the *PCM 81* offers more effects – and more control over them than any processor in its class.

The Sounds

The *PCM 81* contains an enormous array of sounds to suit a multitude of applications. Each effect has an uncompromised stereo reverb with several voices of additional effects. A full complement of *Pitch Shifters* provides doubling, quadruple-tracking, chorus and pitch correction within a range of up to three octaves (up or down) – in one cent increments, as well as unique special effects.

300 presets give instant access to pitch, reverb, ambience, sophisticated modulators, 20-second stereo delays, and dynamic spatialization effects for 2-channel or surround applications. These presets have been carefully crafted for a wide range of applications – from musical uses (both performance and recording) – to effects designed specifically for pitch correction, video post-production and sound effects. We have also included updated versions of classic Lexicon effects such as *Tiled Room* and *Concert Hall*.

The Algorithms

The *PCM 81* features three types of specially-designed algorithms to create the effects: *4-Voice*, *6-Voice* and *Pitch*.

The 4-Voice algorithms, *Concert Hall*, *Plate*, *Chamber*, *Inverse* and *Infinite*, each combine a specific type of reverb with a 4-voice stereo "effect toolbox" called the *Reverb Shell*. This provides post-processing for the reverb. For example, it is possible to take an inverse reverb and assign a modulated delay to detune it – we call it *Ghost Flange*.

The 6-Voice algorithms, *Glide>Hall*, *Chorus+Reverb*, *Multiband+Reverb*, *Res 1>Plate* and *Res 2>Plate*, combine a specific type of reverb with a specialized 6-voice stereo effect. In these algorithms, you can combine the shimmer of a multi-voice chorus with a lush reverb tail (as in our *Wet Chorus*).

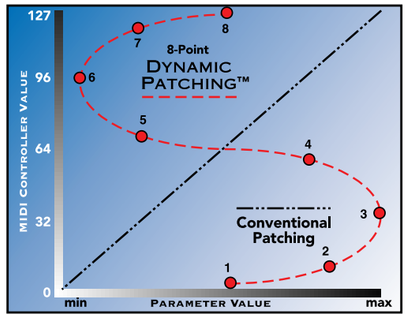
The on-board *Pitch* algorithms include all of the *Pitch* and *Vocal* correction algorithms and effects available to *PCM 80* users on plug-in cards. Seven algorithms include *Pitch Correct* for correction of monophonic sources, and *Stereo Chamber* for full-stereo pitch-shifting with *Chamber* reverb. A powerful submixer is built into the *Dual-Chamber*, *Dual-Plate* and *Dual Inverse* algorithms for complete flexibility in ordering and routing of two independent voices of pitch-shifting with reverb.

A 4-voice *Quad>Hall* algorithm provides four independent pitch-shift voices

with full stereo reverb, and a *VSO-Chamber* algorithm provides stereo time and pitch correction with *Chamber* reverb and variable speed pitch control in percent.

The PCM 91 – Reverb Realism

The *PCM 91* offers Lexicon's highest quality reverbs in a compact, affordable package with a powerful interface which allows both easy access and a wealth of programming capabilities for the sound designer. All of the features of the acclaimed *PCM 90* are included, plus full AES/EBU I/O, *Dual Reverb* algorithms, and presets with dynamic spatialization effects for 2-channel or surround applications (available for the *PCM 90* on a PC card).



Dynamic Patching offers capabilities well beyond those of conventional signal processors…

450 All-New Presets

450 presets in the *PCM 91* provide sounds for real-world applications. We spent countless hours fine-tuning them – so you don't have to. Furthermore, to make it easy to make adjustments quickly, we have placed the most useful parameters for each sound within easy reach, in a user-definable *Soft Row*.

To make it even easier to find your sounds, we've clearly labeled each of the *Banks* and *Rows* so you'll always know where you are. For example, as you scroll through the first bank of programs, the label reads *Halls: Orchestral*. When you enter the next row within that bank, the display changes to *Halls:Vocal*.

Exclusive KeyWord Search

In the *PCM 91*, a unique *KeyWord Search* function allows you to find a group of programs designed for a given application. For example, if you choose the *Live PA KeyWord*, the *PCM 91* will automatically locate all the presets that have been optimized for live sound applications. There are 50 keywords in all, including four user-definable groups of effects.

PCM 91 Reverb Algorithms

Our research into the physics of classical acoustics is embodied in the *Random Hall* algorithm. Echograms of real halls have dispelled the myth of pre-delay and early reflections. In actual spaces, there is no empty interval between the direct sound's arrival and maximum reverb density to be filled in by early reflections. Instead, ambience builds gradually, with diffuse and complex reflections which do not color the timbre of the sound the way that fixed delay taps do.

Random Hall's unique *Size*, *Shape* and *Spread* parameters control the build-up and decay of the ambient envelope. *Size* determines how large the environment will be. *Shape* controls the contour of the ambient build: at its highest settings, it provides an inverse envelope for effects and gating. *Spread* controls the duration of *Shape*, setting the build-up and sustain.

Precision filters provide spectral control of reverberation time, and unique *Spin* and *Wander* parameters add random movement, ensuring silky smooth reverberant decay. Try the preset, *Deep Blue*, on piano to get a feel for this algorithm.

Lexicon's classic *Concert Hall* algorithm has been enhanced in the *PCM 91* with *Spatial EQ* and a *Compressor* to make it even more versatile and the *Rich Plate* algorithm provides simulated plate reverberation, as well as new variations on this classic effect. The *Ambience* algorithm provides effects tailored specifically for the post-production environment, permitting accurate matching of previously-recorded ambience. This allows new elements to be blended seamlessly, or sound effects, dialog or music to be placed realistically at different positions in the "space."

Each of the *PCM 91* algorithms includes selected tools for ambience, post-processing, compression/expansion, as well as modulation and patching parameters which are common to each.

10 *Dual Reverb* algorithms are built-in to the *PCM 91*. These algorithms contain two independent reverb blocks to create superb dual and cascade-configured stereo reverbs, each with all of the control features of the single effects.

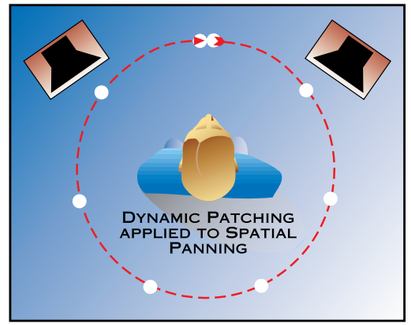
Unique Operating Features Give The PCM 81 & PCM 91 The Edge

The Interface

The *PCM 81* and *PCM 91* are as easy to operate as they are a joy to hear. You simply load a preset and a useful parameter is instantly available on the *Adjust* knob. For example, if you load the preset *Gothic Hall* (*PCM 91*), the *Adjust* knob controls the reverb decay time.

The next level was designed for professionals who want to further customize programs, but do not have the time to wade through the myriad of controls which we offer. In this mode, as many as ten of the most logical parameters in a given effect are easily accessible for customization.

For the sound designer, another mode allows access to the full editing matrix in the *PCM 81* and *PCM 91*. This mode features a user-assignable *Soft Row*, where you can store your own favorite parameters, as well as the full editing matrix. This mode lets you access the extensive modulation capabilities of the *PCM 81* and dynamic reverberation aspects of the *PCM 91*.



…and Dynamic Patching can be applied to almost any effect parameter, such as spatialization settings.

PCM 91 Exclusive: Custom Controllers

Within the *PCM 91*, Lexicon provides even more control by adding up to four Custom Controllers. These controllers are placed on the *Soft Row* and are a combination of one or more parameters patched together, each with their own individual scaling values. It's like having four additional *Adjust Knob* controls on the *Soft Row*. As an example, the *PCM 91* preset *Dream Hall* has a Custom Controller labeled "Reverb Density" which simultaneously controls Mid-RT and Low-RT. As you turn the *Adjust* knob, the sound changes from thin and dark to dense and bright, altering the character of the effect completely.

Dynamic Patching™

The *PCM 81* and *PCM 91* take *Dynamic Patching* to a whole new level, giving you unprecedented control over your effects. From modulating sounds, to altering the attack and decay characteristics of the sound, to producing unusual and ethereal spaces, *Dynamic Patching* gives these processors a truly unique set of capabilities.

Dynamic Patching makes it possible to go far beyond simple modulation effects. For example, in the *PCM 81*, you can create modulation sweeps which move in time with the music or wildly changing effects that have a life of their own. You have the power to make your effects come alive as a vital part of your work.

The *Dynamic Patching* matrix maps data from any of 143 possible control sources to any effect parameter. These sources include 126 different MIDI controllers and external sources such as footswitches and footpedals. Internal controllers include *Tempo* (both internal *Tap* and external *MIDI clock*), *LFO*s (Sine, Cosine, Square, Triangle, Pulse, Sawtooth), *Time Switches*, *Latch*, *AR Generator*, and *Left & Right Envelope Followers*. Up to ten patches can be created per effect.

The *PCM 81* is particularly suited to make use of *Dynamic Patching*, thanks to the

way we allow you to control effects parameters. In a conventional patch scaling configuration, you have a maximum and minimum value which you can modulate between. In the *Dynamic Patching* matrix, you can set up to eight points, allowing very complex and mind-altering modulation paths.

Tempo Control

The *PCM 81* and *PCM 91* offer tap tempo control of delay lines as well as several rhythmic variations on the tap.

Tempo can also be 'dialed-in' in beats-per- minute, or you can generate MIDI clock from your tap, or receive MIDI tempo from an external sequencer or drum machine. Another exclusive feature of the *PCM 81* and *PCM 91* is the ability to have tempo control *LFO* speeds and *Time Switches*, allowing all of your modulations to be synchronized with your music.

Furthermore, you can set independent rhythmic values for each parameter within the same program. Tempos can be read as both *Rhythmic* value and *Absolute Time* value.

For long-delay aficionados, the *PCM 81*'s maximum delay time offers more than 20 seconds of stereo delay.

Dynamic Spatialization

Two independent spatial processors allow you to place effects virtually anywhere between your loudspeakers – or even beyond them. Most significantly, they allow you to locate effects dynamically, thus creating different spaces that change along with the music. For example, when playing sustained chords through *Steered Rear*, the *PCM 81* automatically steers the reverb around you (into full rear in surround-sound) when the input audio decays past the threshold.

Both the PCM 81 & PCM 91 allow RAM card storage of your presets and setups. In addition, the PCM 81 continues to accept plug-in cards designed for the PCM80: the Dual FX algorithm card, and the preset cards designed for Post and Music FX.

Professional Digital I/O

Both the *PCM 81* and the *PCM 91* are equipped with the professional AES/EBU digital audio I/O format, as well as S/PDIF digital audio I/O. And the output connectors of both the S/PDIF coaxial and the AES/EBU XLRs can be used simultaneously – doubling your digital audio output (see diagram, opposite page, top).

PC Card Slot

Both the *PCM 81* and the *PCM 91* are equipped with an industry-standard PC card slot, enabling you to use RAM cards for storing your own setups and programs.

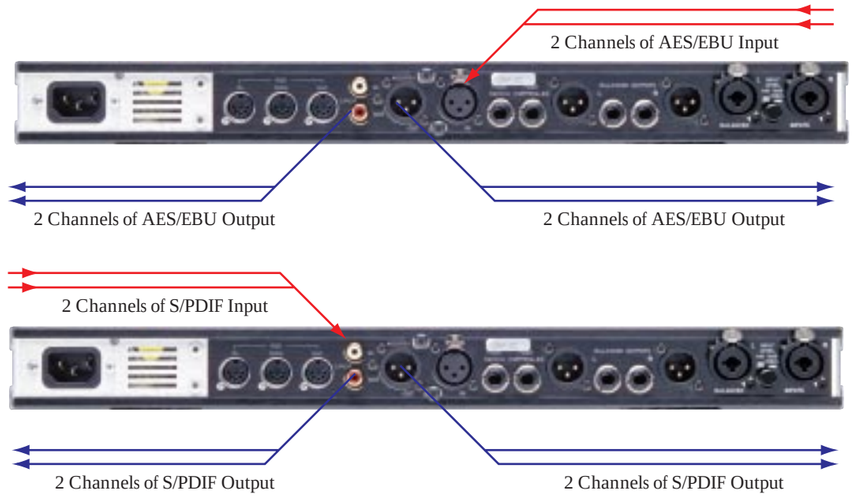
For the *PCM 81*, adding Lexicon's *Dual FX* algorithm and specially-designed preset cards for the *PCM 80* (all of which are compatible with the *PCM 81*) increases the number of algorithms to more than 40 – and the number of presets to nearly 800.

Professional Commitment

The *PCM 81* and *PCM 91* offer a host of features and effects that set the standard for professional digital effects and reverberation. They embody Lexicon' s commitment to the audio professional – with creative control and superlative sound, backed by uncompromising support.

The *PCM 81* gives you superb reverb and effects for a myriad of applications, while the *PCM 91* provides the ultimate in dedicated digital reverberation. Once you experience both of these astounding processors, you won't want to be without either of them.

PCM 81 and PCM 91 – Two in / Four out Digital I/O



You can use both XLR and RCA digital output connectors simultaneously to double your digital audio output channels.

PCM 81 & PCM 91 Features

PCM 81	PCM 91
Algorithms	
4-Voice:	Random Hall
Concert Hall	Ambience
Plate	Rich Plate
Chamber	Concert Hall
Inverse	Chamber/Room
Infinite	***Dual Rvb (Dual Mono):***
6-voice:	Room2-Room2
Glide>Hall	Inverse-Inverse
Chorus+Rvb	Chamber-Inverse
M-Band+Rvb	Inverse-Room2
Res Chord:	Chamber-Chamber
Res1>Plate	Matrix Chamber
Res2>Plate	***Dual Rvb (Cascade):***
Pitch:	Chamber>Room2
Quad>Hall	Inverse>Chamber
Dual-Chmb	Room2>Chamber
Dual-Plt	Inverse>Room2
Dual-Inv	
Stereo-Chmb	
VSO-Chmb	
Pitch Correct	

Program/Function	PCM 81	PCM 91
Control Capabilities		
Dynamic Patching	✔	✔
Adjust Knob	✔	✔
Custom Controllers		✔
Keyword Preset/Reg Search		✔

Program/Function	PCM 81	PCM 91
Spatial Width	✔	✔
Spatial EQ		✔
FX Ordering	✔	
Pitch Shift Capabilities	✔	
Tap Tempo Capability	✔	✔
Modulation Control	✔	
Number of Presets	300	450
Number of Registers	50	100
Dynamic MIDI	✔	✔
MIDI Clock	✔	✔
Footswitch Input	✔	✔
Footpedal Input	✔	✔
Built-in Help	✔	✔
Interface Capabilities		
Select, Load, Adjust	✔	✔
Multiple Level Interface	✔	✔
Digital S/PDIF I/O	✔	✔
Digital AES/EBU I/O	✔	✔
Analog / Digital Mixing	✔	✔
Specifications		
Universal Power Supply	✔	✔
105dB Dynamic Range	✔	✔
PC Card - Storage	✔	✔
PC Card - Algorithm	✔	
Processor Platform	*Lexichip/56002*	*Dual Lexichip*
Reverb Heritage	*224, PCM-60/70*	*300/480L*