

***PCM 80***  
*Pitch FX*  
*Algorithm Card*

V1.1  
User Guide

**lexicon**

**Unpacking and Inspection**

After unpacking the Pitch FX Algorithm Card, save all packing materials in case you ever need to ship the card. Thoroughly inspect the card and packing materials for signs of damage. Report any shipment damage to the carrier at once; report equipment malfunction to your dealer.

**Precautions**

This is a read only card.

Use only with the Lexicon PCM 80, software version 1.10 or higher.

To avoid damage to the card, do not expose to rain or moisture, extreme temperatures, direct sunlight, or extreme shock.

In the event the card is dropped, damaged, or exposed to liquids, do not insert it into the PCM 80.

Copyright ©1997  
All Rights Reserved.

Lexicon Part # 070-11674 Rev 1

Lexicon Inc.  
3 Oak Park  
Bedford MA 01730-1441  
Telephone 781-280-0300  
Fax 781-280-0490  
[www.lexicon.com](http://www.lexicon.com)

---

## Contents

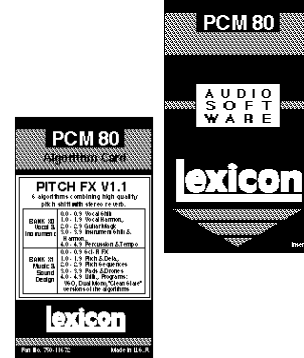
### Introduction

<b>1. Pitch FX Card Operation</b>	
Handling the Algorithm Card .....	1-1
Loading the Pitch FX Algorithms .....	1-3
Loading the Pitch FX Presets .....	1-4
<b>2. The Pitch FX Algorithms and Parameters</b>	
Overview .....	2-1
The Quad>Hall Algorithm .....	2-2
The Dual-Chmb Algorithm .....	2-4
The Dual-Plt Algorithm .....	2-6
The Dual-Inv Algorithm .....	2-8
The Stereo-Chmb Algorithm .....	2-10
The VSO-Chmb Algorithm .....	2-11
Parameter Descriptions .....	2-13
Tips for Setting Parameters .....	2-14
<b>3. Using the Submixer</b>	
Sends .....	3-2
Returns .....	3-2
Routing .....	3-3
Useful Configurations .....	3-3
Rvb and Pitch FX Block Controls .....	3-9
<b>4. The Presets</b>	
Program Bank X0 Vocal & Instrument .....	4-2
Program Bank X1 Music & Sound Design .....	4-6

Thank you for your purchase of the PCM 80 Pitch FX Algorithm Card. Six algorithms, each combined with uncompromised Lexicon reverb, provide a wide range of useful pitch shift effects, ranging from pitch correction to unique special effects.

A Quad>Hall algorithm provides a 4-voice pitch shifter, combined with the PCM 80 Concert Hall reverb. The other pitch shift algorithms use the PCM 80 Dual FX structure for unparalleled flexibility and ease of use. 100 new presets provide exciting examples of the effects that can be created from each algorithm.

## Introduction



The five Dual FX-type algorithms: Dual-Chmb, Dual-Plt, Dual-Inv, Stereo-Chmb and VSO-Chmb, each contain two independent effect blocks — one of three stereo reverbs and one of three different stereo pitch shift blocks. Each algorithm also has the full set of modulation and patch features introduced in the PCM 80.

## The Pitch FX Submixer

Configuration and routing control is provided by a dedicated Submixer incorporated into each algorithm. Any combination of reverb and effects blocks can be arranged in any configuration simply by changing the Submixer's controls. As the Submixer has continuously variable controls, you can alter the configurations on the fly — changing, for example, from reverb-into-effects to effects-into-reverb.

The Submixer appears as a new row on the PCM 80 parameter matrix. Three basic Submixer controls are provided: **Sends**, **Returns**, and **Routing**. Any configuration can be achieved by simply adjusting these three parameters.

**Sends** control the eight levels feeding into the reverb and effect blocks.

**Returns** control the eight levels feeding from the reverb and effect blocks.

**Routing** controls the configuration of all inputs and outputs to allow the two effects blocks to be placed in series, parallel, or reverse series.

The Submixer row also contains controls for each block: Input Level, Input Width, Output Width, Output Level, High Cut and Low Cut filters, and Wet/Dry Mix. All of the Submixer parameters are continuously variable and can be controlled in real-time by any PCM 80 patch source.

Five of the Pitch FX algorithms are made up of combinations of the following 2-voice Effect and Reverb blocks.

## Rvb and Pitch FX Blocks

Algorithm	Pitch FX	Reverb
Dual-Chmb	Dual Shift	Chamber
Dual-Plt	Dual Shift	Plate
Dual-Inv	Dual Shift	Inverse
Stereo-Chmb	Stereo Shift	Chamber
VSO-Chmb	VSO Shift	Chamber

Each of these five algorithms has a different combination of FX and Rvb types, but the basic functionality of each is the same. Controls for each algorithm are arranged in a PCM 80-type matrix. The audio parameters are identical to those in the PCM 80. New control parameters are found in the Control row and a new Submixer row.

### The Presets

The PCM 80 Pitch FX card contains a built-in library of 100 preset programs that provide not only a variety of effect configurations, but a whole new assortment of exciting and useful pitch shift sounds. As in the PCM 80, the presets are organized into banks of 50, and functionally grouped for a wide range of applications. Be sure to experiment with all 100 presets to get a feel for the full range of the Pitch FX capabilities. As in the PCM 80, each preset has one or more parameters patched to the front panel ADJUST knob, giving you instant control over the primary aspect of the effect — without going into Edit mode.

Pitch FX Card Banks	
<b>Bank X0 Vocal &amp; Instrument</b>	
0.0 - 0.9	Vocal Shift
1.0 - 1.9	Vocal Harmony
2.0 - 2.9	Guitar Magic
3.0 - 3.9	Instrument Shift & Harmony
4.0 - 4.9	Percussion & Tempo
<b>Bank X1 Music &amp; Sound Design</b>	
0.0 - 0.9	Sci-Fi FX
1.0 - 1.9	Pitch & Delay
2.0 - 2.9	Pitch Sequences
3.0 - 3.9	Pads & Drones
4.0 - 4.9	Utility Programs: VSO, Dual Mono, "Clean Slate" versions of the algorithms

Bank X0 contains pitch effects for voice and instruments. Row 0 contains “bread and butter” vocal effects for correcting intonation of recorded tracks or thickening up a voice (or voices) by adding from one to four additional doublings. These presets work well with single voice melodies or multi voice harmonies as input. The vocal harmony effects in Row 1 allow you to add from one to four voices of harmony and reverb to a single voice track. Presets 1.7-1.9 allow you to use a MIDI keyboard to control the tuning of voices in real time. The presets in Row 2 have been optimized for guitar. You’ll find the classic pitch effects for guitars (stereo detune, vibrato) and some new variations that take advantage of the combination of pitch shift with reverb. Row 3 contains a collection of useful shift and harmony effects for melodic and chordal instruments. Presets 3.8 and 3.9 are designed to be used with a foot pedal connected to the rear panel Foot Controller input. Row 4 is designed for drums and percussion. These presets let you retune the snare and toms, or even detune the drum reverb and slap delay. Presets 4.8 and 4.9 provide “scratch” effects on rhythm tracks. (Press **Tap** twice to lock in with the beat.)

Bank X1 provides special effects for music and sound design. The presets in Row 0 let you transform simple sound effects into cosmic events and change normal speaking voices into cartoon characters or demons from the dark side. Those in Row 1 use pitch, delay and reverb to create lush echoes in deep spaces with a variety of monophonic or polyphonic instruments as well as vocals. Row 2 contains musical special effects where a single input note produces pitch sequences based on a variety of chords and scales. Those in Row 3 are designed to spice up a synth pad or other sustaining source. Row 4 contains several useful tools: VSO presets set up for time correction of varispeed playback material, two dual mono in/stereo out variations that provide pitch shifting on the left input and reverb on the right and a set of “clean slate” versions of the algorithms to use when you want to create your own programs from scratch.

**Note:** All of the Pitch FX algorithms combine pitch shifting and stereo reverb. Be aware that in many of the presets the reverb mix or level is turned down or off. The amount of reverb for a given application is very dependent on what else is going on in the mix. In most of the presets where the reverb is turned down, we’ve already set the reverb parameters to values that will work well with the pitch effect — all you need to do is turn up the appropriate reverb parameter (**Rvb Mix** or **RvbOutLvl** in row 1 of any edit matrix).

We hope you will find the Pitch FX card easy to use, and a great extension of the power of your PCM 80. To get the most out of the card, we suggest that you invest the time to explore this manual. We think you’ll agree that the time spent investigating will reward you with enjoyment of the full capabilities of the card.

---

## Pitch FX Card Operation

The Pitch FX Algorithm Card is a standard PCMCIA card designed to be used with the Lexicon PCM 80 (version 1.10 or higher). Care and handling of the card, as well as some routine precautions are noted here. Please review these before using the card to avoid damage to the card, as well as abnormal behavior in the PCM 80. Refer to your PCM 80 User Guide for information on troubleshooting the PCM 80 itself.

### Handling the Algorithm Card

**The Pitch FX Algorithm Card is designed for use ONLY with the PCM 80 V1.10 or higher.**

### Care and Handling

The Pitch FX card is a Read Only Memory Card which cannot be overwritten. It will only load properly into PCM 80s running 1.10 or higher software.

#### Handle cards with care.

Do not bend the card, or subject it to moisture, extreme temperature, direct sunlight, or extreme shock.

#### Insert card completely before attempting card operations.

Incomplete card insertion can cause abnormal behavior.

### Card Insertion

#### Do not press EJECT while loading the card.

**If the card is inserted before the PCM 80 is powered on, wait for the completion of Power On Diagnostics and the loading of the first program before attempting to use or remove the card.**

### Operational Behavior

Card algorithms will be loaded automatically into the PCM 80 on power on. Removing the card before the completion of the normal PCM 80 power on cycle may cause abnormal behavior.

Once the algorithms have been loaded from the card, you can either remove the card, or leave it in the PCMCIA card slot.

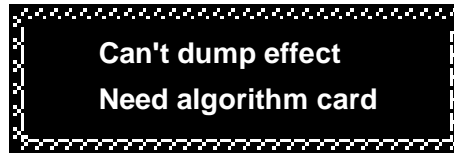
**While the PCM 80 is running an extension card algorithm, it will not load a second algorithm card.**

Recognition of a second algorithm card requires returning to the PCM 80's internal memory by loading a preset or register from one of the internal algorithms before loading the new algorithm card.

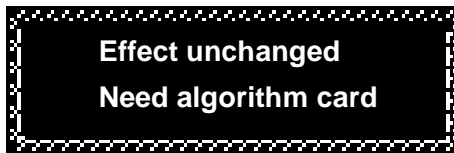
**MIDI SysEx register dumps require that the algorithm card used to create the effect(s) be loaded.**

Be aware that, if you create a bank of registers with effects created from more than one algorithm card, you will need to perform separate SysEx dumps for each card used.

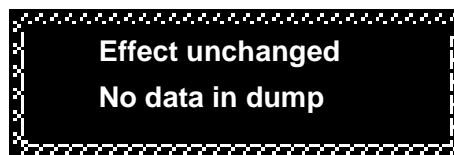
The algorithm used to create an effect must be loaded into the PCM 80 for a SysEx dump to occur. If you do not have the appropriate algorithm card loaded into the *transmitting* PCM 80, the data for the effect is not transmitted and the following message is displayed:



If you do not have the appropriate algorithm card loaded into the *receiving* PCM 80 when a valid SysEx for an effect created from a card algorithm is received, the following message is displayed:



A placeholder is transmitted for any register which cannot be dumped due to the absence of an algorithm card. This placeholder contains the program name and algorithm number, but no effect parameter data. This allows an editor to identify registers which were not sent, and the algorithm card which must be loaded to complete the dump. The PCM 80 will always ignore the placeholder, and will display the following message when a placeholder is received:



Note that registers made from algorithm cards *can* be freely copied between the PCM 80's internal register bank (R) and RAM card banks (C0, C1, etc.) without loading the algorithm card.

In order to run the Pitch FX algorithms, the software must be loaded into the PCM 80's "extension" memory. To do this:

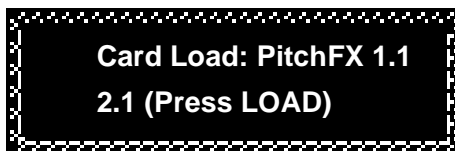
## Loading the Pitch FX Algorithms

*If the PCM 80 is turned off:*

1. Insert the Pitch FX algorithm card into the PCMCIA card slot.
2. Power up the PCM 80. The software will be loaded automatically.

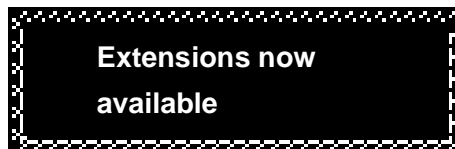
*If the PCM 80 is already running:*

1. Insert the Pitch FX algorithm card into the PCMCIA card slot.
2. Press **Control** and use SELECT and **Up** and **Down** to go to **Control 2.1**. The following message should appear:



**Card Load: PitchFX 1.1  
2.1 (Press LOAD)**

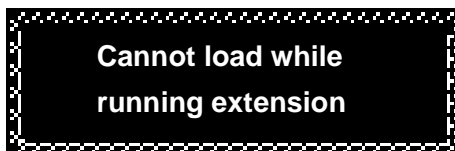
3. Press **Load/★**. The following message will appear briefly to indicate the load was completed:



**Extensions now  
available**

*If the PCM 80 is running an algorithm from a different extension card:*

Loading a different algorithm card requires returning to the PCM 80's internal memory by loading a preset or register from one of the internal banks. Otherwise, the following error message will be displayed when you press **Load/★**:



**Cannot load while  
running extension**

To load a different algorithm card :

1. Press **Program Banks** and select an internal preset bank (**P0 - P3**).
2. Turn SELECT to display any preset in any of these banks, then press **Load/★**.
3. The new algorithm card can now be loaded as described above.

Once extension card software is loaded, you can remove the card from the slot. The algorithms will remain in the PCM 80 until the unit is turned off, or a new algorithm card is loaded. This makes the PCMCIA card slot available for loading and storing registers on RAM cards.



## Loading the Pitch FX Presets

Once the software is loaded, the PCM 80 will have access to the additional program banks available on the algorithm card. These extension memory banks are labeled with an **X**.

1. Press **Program Banks** repeatedly until the **X** banks are displayed. These will follow all of the PCM 80's internal Program banks.
2. Use SELECT, **Up** and **Down** and **Load/★** to view and load the Pitch FX presets.

You can edit these presets and save the changed version into the PCM 80's internal registers, or you can save them into RAM card register banks. If the Pitch FX algorithms are loaded, recalling programs created with the algorithms is as simple as selecting and loading any PCM 80 program.

If the Pitch FX algorithms are not loaded when you attempt to load a program created with them, the display will indicate that the selected register requires extension memory (in this case, the Pitch FX card).



Complete descriptions of all of the Pitch FX presets are given in Chapter 3.

---

## The Algorithms and Parameters

### Overview

Digital pitch shifting requires temporal compression or expansion of audio data and the addition or removal of small audio segments to compensate.

Raising pitch is accomplished by compressing the audio data — making it run faster. As this shortens the audio segment, a copy of a section of the audio being processed is added to fill out the remaining time. To lower the pitch, the signal is expanded, requiring the removal of a section of the audio. These operations are performed repeatedly at high speed, at intervals which vary according to the type of audio signal being processed.

At each point where audio is added or removed, the audio signal must be rejoined, or spliced. If added or removed segments were perfectly correlated with the remaining audio, splicing would be seamless. In reality, these splice points are the source of audible artifacts which can be minimized, but not completely eliminated.

Much of the art of pitch shifting, therefore, is in determining the appropriate intervals for sampling and the optimal points for splicing. As the PCM 80 Pitch FX card gives you significant control over these operations, you may find it helpful to keep in mind some of the other factors which can affect pitch shift quality:

- **Amount of pitch shifting**  
Large shift intervals require more splicing. As each splice can be the source of an artifact, increasing their number increases the likelihood of audible artifacts.
- **Pitch-complexity of the input material**  
Pure tones have simple waveforms which can be correlated easily for smooth splicing. Pitch shifting of simple tones such as those generated by a solo voice or a monophonic instrument generally produces fewer artifacts than pitch shifting of wide bandwidth material such as piano chords, full orchestra, etc.
- **Low frequency content of the input material**  
Pitch shifting low frequency material requires the addition or removal of larger segments of audio than high frequency material. The increased size of these segments can introduce delays which are heard as artifacts.
- **Transient content of the input material**  
When large amounts of pitch shifting are applied to complex input material with dense percussive transients (drums, strummed mandolin, complex speech, etc.) some of the transients may lose definition or be shifted slightly in time.

The PCM 80 Pitch FX algorithms are designed to provide high quality pitch shifting and easy access to controls that can enhance the quality of the effects on any input material. The following descriptions provide the information you will need to select the most appropriate algorithm for your specific needs, as well as tips on adjusting the parameters.

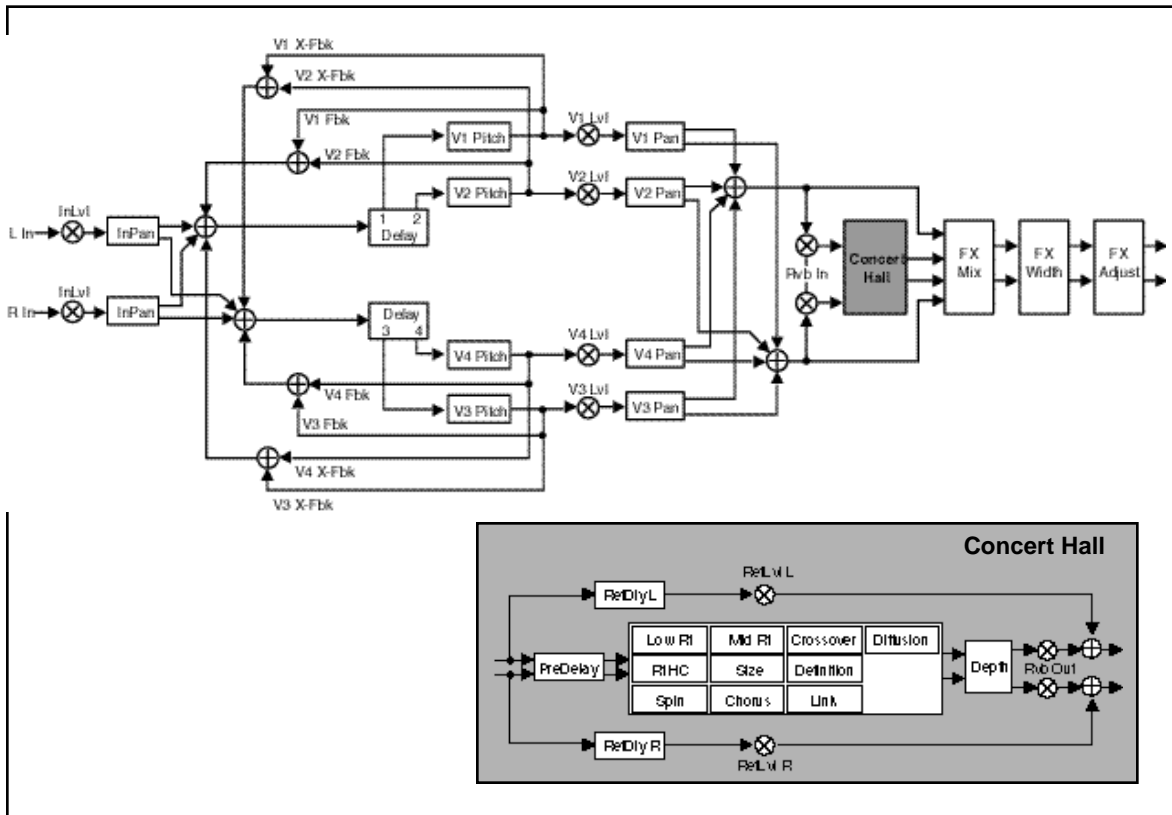
The PCM 80 Pitch FX Card contains 6 Pitch Shift algorithms: **Quad>Hall**, **Dual-Chmb**, **Dual-Plt**, **Dual-Inv**, **Stereo-Chmb** and **VSO-Chmb**. Each of these offers a unique type of pitch shifting, combined with an uncompromised Lexicon reverb.

The following pages contain diagrams for each algorithm, along with a complete parameter matrix. Descriptions of all of the pitch parameters follow the algorithm drawings. The control and submixer parameters which allow configuration and routing of the effect blocks are described in the next chapter. Refer to the PCM 80 User Guide for detailed descriptions of all other effect parameters.

**The Quad>Hall Algorithm**

The Quad>Hall algorithm, is a 4-voice pitch shifter in series with the PCM 80 Concert Hall reverb. As in the PCM 80 multi-voice algorithms, each voice has its own delay, level, feedback, cross-feedback and panning controls. The maximum delay time for each voice is 1.250 seconds.

In this algorithm, the reverb effect is fixed in position following the pitch shifters, with a final Mix control allowing control over the amount of reverb in the processed sound. Quad>Hall is designed for creating pitch effects, and is an obvious choice for creating sequences of notes or chords, melody fragments, or small amounts of pitch shift for doubling (or quintupling) effects.



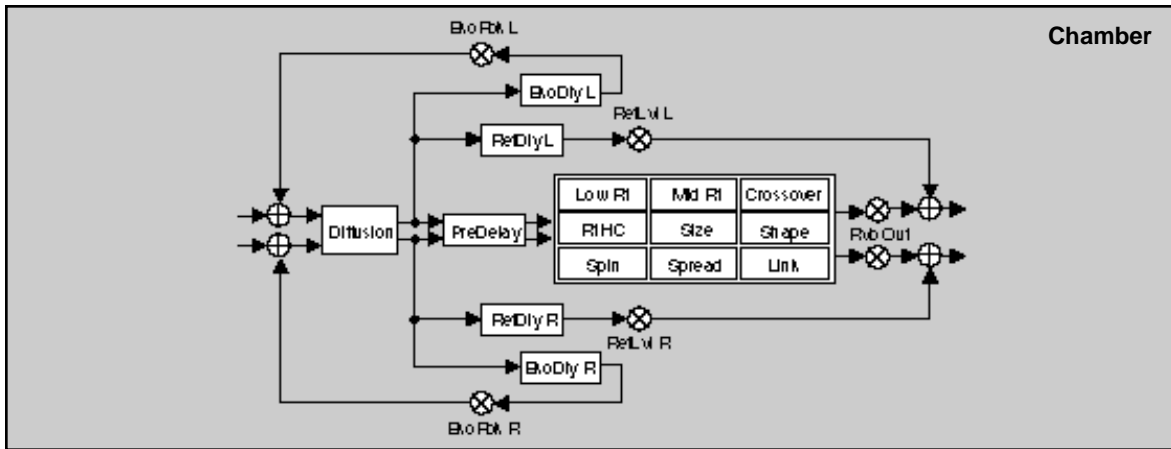
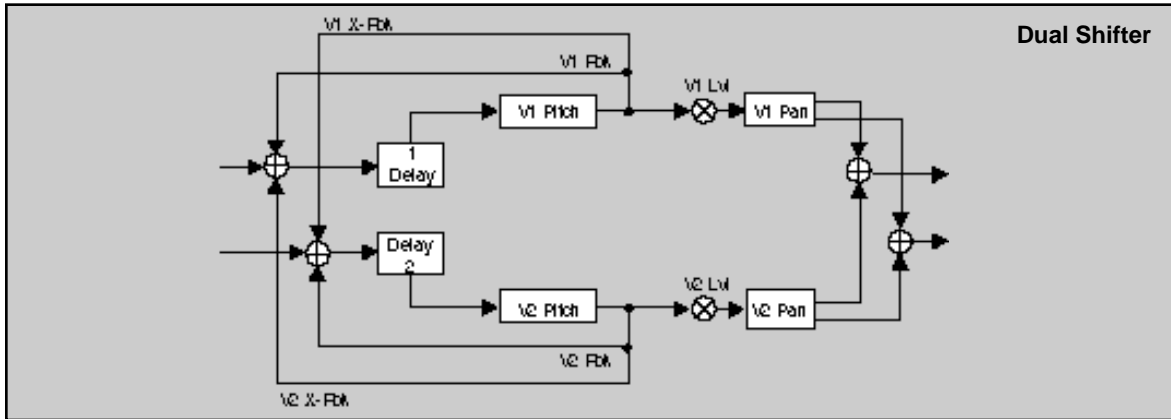
The PCM 80 Concert Hall provides very clean reverberation. It is designed to remain behind the direct sound — adding ambience, but leaving the source unchanged. This effect has a relatively low initial echo density which builds up gradually over time.

<b>0</b>	<b>Controls</b>	0.0 Mix	0.1 LvlAdjst	0.2 *InlyFPan	0.3 FXMix	0.4 FXWidth	0.5 *ADJUST				
<b>1</b>	<b>Reverb Time</b>	1.0 Low R	1.1 Mid R	1.2 Crosscor	1.3 Rt HC	1.4 Pre Delay	1.5 *Ref Lvl/Dly				
<b>2</b>	<b>Reverb Design</b>	2.0 Size	2.1 Diffusion	2.2 Def	2.3 Depth	2.4 Spin	2.5 Chorus	2.6 Link	2.7 *Reverb In/Out		
<b>3</b>	<b>Levels</b>	3.0 Master	3.1 Voice1	3.2 Voice2	3.3 Voice3	3.4 Voice4					
<b>4</b>	<b>Delay Time</b>	4.0 *Master	4.1 Voice1	4.2 Voice2	4.3 Voice3	4.4 Voice4					
<b>5</b>	<b>Pitch</b>	5.0 *Mtr/Certs	5.1 Voice1	5.2 Voice2	5.3 Voice3	5.4 Voice4					
<b>6</b>	<b>Feedback</b>	6.0 *Mtr Fbk	6.1 *V1 Fbk	6.2 *V2 Fbk	6.3 *V3 Fbk	6.4 *V4 Fbk					
<b>7</b>	<b>Panning</b>	7.0 MtrWidth	7.1 Voice1	7.2 Voice2	7.3 Voice3	7.4 Voice4					
<b>8</b>	<b>Modulation</b>	8.0 *Mod LFO	8.1 *Mod/AR Env	8.2 Mod Env L	8.3 Mod Env R	8.4 *Mod Latch	8.5 *Mod Str 1	8.6 *Mod Str 2			
	<b>Patches</b>	Patch 0	Patch 1	Patch 2	Patch 3	Patch 4	Patch 5	Patch 6	Patch 7	Patch 8	Patch 9

The remaining five Pitch FX algorithms: **Dual-Chmb**, **Dual-Pit**, **Dual-Inv**, **Stereo-Chmb** and **VSO-Chmb** are created from 3 Reverb blocks and 3 Pitch Shift Effect blocks. The individual reverb and effect blocks are described below, followed by the diagrams and matrixes and parameter descriptions for the algorithms. Descriptions of the Dual FX controls common to all of these algorithms is presented in Chapter 3.

**The Dual-Chmb Algorithm**

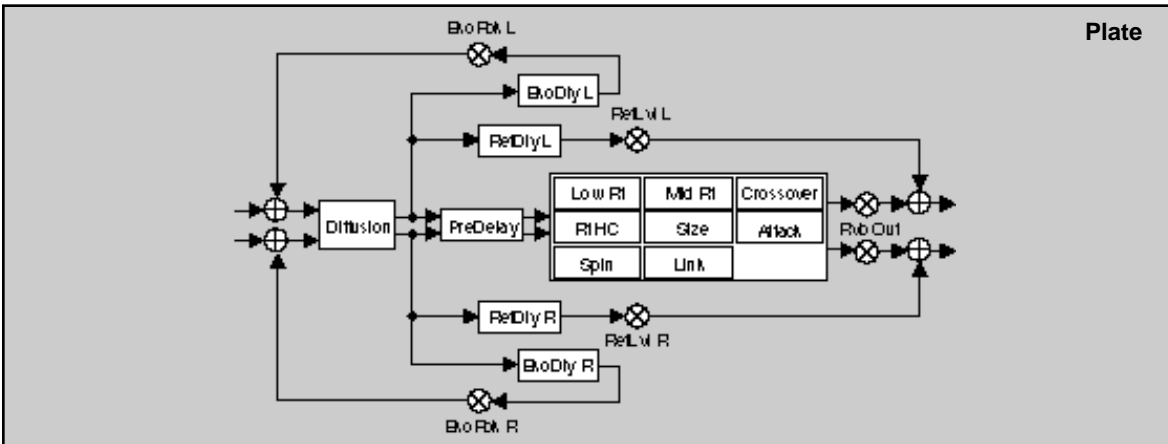
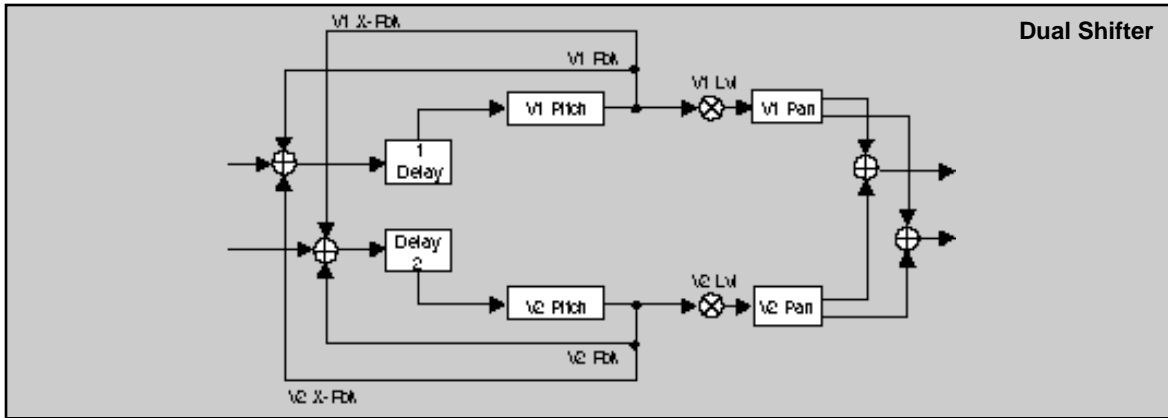
This algorithm includes a dual pitch shifter combined with the PCM 80 Chamber reverb using the Dual FX structure. The pitch shifter has two voices. Each voice has independent controls for pitch, level, delay, pan, feedback and cross-feedback. The pitch of each voice is adjustable up or down over a 3 octave range with a resolution of 1 cent. Maximum delay time for each voice is 1.250 seconds.



The Chamber reverb produces an even, relatively dimensionless reverberation, with little change in color as the sound decays. The initial diffusion is similar to the Concert Hall algorithm, but the sense of space and size is much less obvious. This characteristic, along with the low color in the decay tail, makes Chamber useful on a wide range of material. It is especially useful on spoken voice, giving a noticeable increase in loudness with very low coloration.

0	Controls	0.0	0.1	0.2	0.3	0.4					
		Mix	LvlAdjst	*InvlPan	FXWidh	*ADJUST					
1	Submixer	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9
		Sends	Returns	Routing	*Mix	*Invl	*InW	*HiCut	*LoCut	*OutLvl	*OutW
2	Reverb Time	2.0	2.1	2.2	2.3	2.4	2.5	2.6			
		Loa Rt	Mid Rt	Crosscaw	Rt HC	Pre Delay	*Rel LvlDly	*Els FlnDly			
3	Reverb Design	3.0	3.1	3.2	3.3	3.4	3.5	3.6			
		Slar	Diffusion	Shape	Spread	Spin	Link	Revb Out			
4	Levels	4.0	4.1	4.2							
		Master	Voice1	Voice2							
5	Delay Times	5.0	5.1	5.2							
		*Master	Voice1	Voice2							
6	Pitch	6.0	6.1	6.2							
		*MatrCerts	Voice1	Voice2							
7	Feedback	7.0	7.1	7.2							
		*Matr Fbk	*V1 Fbk	*V2 Fbk							
8	Panning	8.0	8.1	8.2							
		MatWidh	Voice1	Voice2							
9	Modulation	9.0	9.1	9.2	9.3	9.4	9.5	9.6			
		*ModLFO	*ModAR Env	ModEnv L	ModEnv R	*ModLatch	*ModStr 1	*ModStr 2			
Patches		Patch 0	Patch 1	Patch 2	Patch 3	Patch 4	Patch 5	Patch 6	Patch 7	Patch 8	Patch 9

**The Dual-Pit Algorithm** This algorithm includes a dual pitch shifter combined with the PCM 80 Plate reverb using the Dual FX structure. The pitch shifter has two voices. Each voice has independent controls for pitch, level, delay, pan, feedback and cross-feedback. The pitch of each voice is adjustable up or down over a 3 octave range with a resolution of 1 cent. Maximum delay time for each voice is 1.250 seconds.



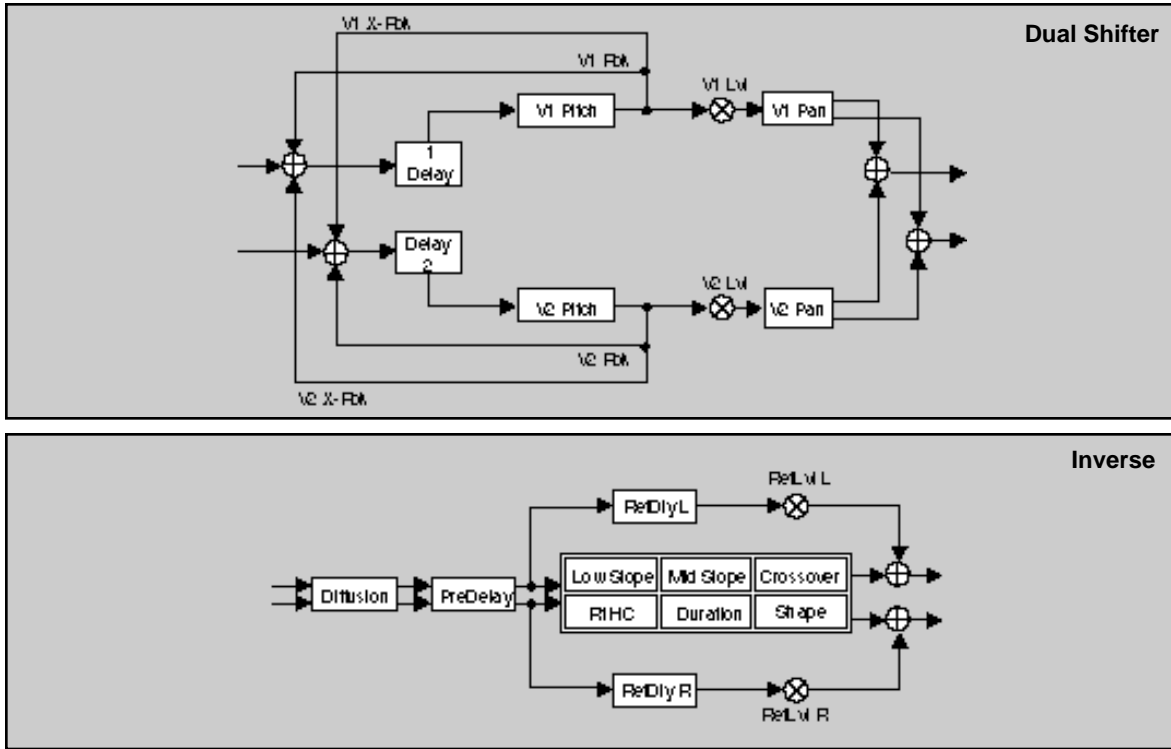
The Plate reverb mimics the sound of metal plates, with high initial diffusion and a relatively bright sound, making it a good choice for enhancing any type of percussion.

The Algorithms and Parameters

<b>0</b>	<b>Controls</b>	0.0 Mix	0.1 LvlAdjust	0.2 *InLvlPan	0.3 FXWidth	0.4 *ADJUST					
<b>1</b>	<b>Submixer</b>	1.0 Sends	1.1 Returns	1.2 Routing	1.3 *Mix	1.4 *InLvl	1.5 *InW	1.6 *HOut	1.7 *LoOut	1.8 *OutLvl	1.9 *OutW
<b>2</b>	<b>Reverb Time</b>	2.0 Lvl Rt	2.1 Mid Rt	2.2 Crosscove	2.3 Rt HC	2.4 Pre Delay	2.5 *Rt LvlDly	2.6 *Echo Fbk/Dly			
<b>3</b>	<b>Reverb Design</b>	3.0 Size	3.1 Diffusion	3.2 Attack	3.3 Spin	3.4 Link	3.5 Reverb Out				
<b>4</b>	<b>Levels</b>	4.0 Master	4.1 Voice1	4.2 Voice2							
<b>5</b>	<b>Delay Time</b>	5.0 *Master	5.1 Voice1	5.2 Voice2							
<b>6</b>	<b>Pitch</b>	6.0 *Mtr/Cents	6.1 Voice1	6.2 Voice2							
<b>7</b>	<b>Feedback</b>	7.0 *Mtr Fbk	7.1 *V1 Fbk	7.2 *V2 Fbk							
<b>8</b>	<b>Panning</b>	8.0 Mtr/Wth	8.1 Voice 1	8.2 Voice 2							
<b>9</b>	<b>Modulation</b>	9.0 *ModLFO	9.1 *ModAR Env	9.2 Mod Env L	9.3 Mod Env R	9.4 *Mod Latch	9.5 *Mod Sw 1	9.6 *Mod Sw 2			
	<b>Patches</b>	Patch 0	Patch 1	Patch 2	Patch 3	Patch 4	Patch 5	Patch 6	Patch 7	Patch 8	Patch 9



**The Dual-Inv Algorithm** This algorithm includes a dual pitch shifter combined with the PCM 80 Inverse reverb using the Dual FX structure. The pitch shifter has two voices. Each voice has independent controls for pitch, level, delay, pan, feedback and cross-feedback. The pitch of each voice is adjustable up or down over a 3 octave range with a resolution of 1 cent. Maximum delay time for each voice is 1.250 seconds.



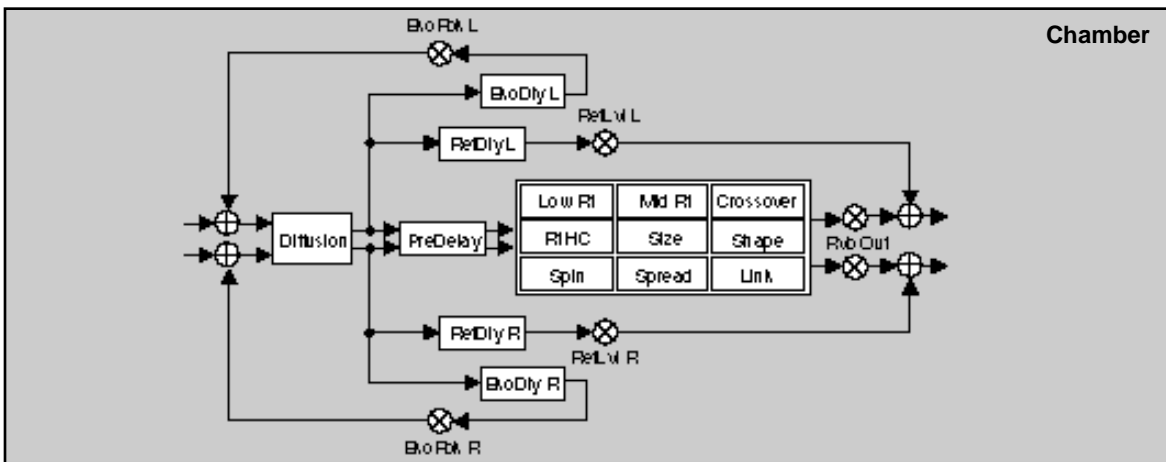
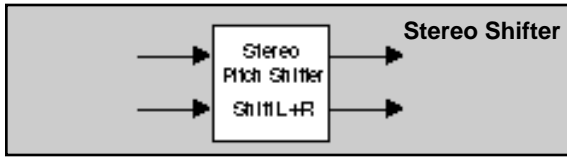
Inverse reverb allows you to vary the slope of the initial portion of the reverb envelope. The slope can decay, remain level, or rise over a variable time interval. When the time interval is up, the reverberation cuts off abruptly. The resulting effect is similar to a gate, but is not at all dependent on the level or complexity of the input signal. Slopes are adjustable over a negative, even, or positive slope. Positive slopes create inverse effects, while more even slopes create gated effects. Negative slope values have rather natural reverb tails.

The Algorithms and Parameters

<b>0</b>	<b>Controls</b>	0.0 Mix	0.1 LvlAdjst	0.2 *InlvFFan	0.3 FXWidth	0.4 *ADJUST					
<b>1</b>	<b>Submixer</b>	1.0 Sends	1.1 Returns	1.2 Routing	1.3 *Mix	1.4 *Inlvf	1.5 *InW	1.6 *HiCut	1.7 *LoCut	1.8 *Outlvf	1.9 *OutW
<b>2</b>	<b>Reverb Time</b>	2.0 Lvl Slope	2.1 Mid Slope	2.2 Crossover	2.3 Rt HC	2.4 Pre Delay	2.5 *Rt LvlDly				
<b>3</b>	<b>Reverb Design</b>	3.0 Duration	3.1 Diffusion	3.2 Shape							
<b>4</b>	<b>Levels</b>	4.0 Master	4.1 Voice1	4.2 Voice2							
<b>5</b>	<b>Delay Time</b>	5.0 *Master	5.1 Voice1	5.2 Voice2							
<b>6</b>	<b>Pitch</b>	6.0 *Mtr/Cents	6.1 Voice1	6.2 Voice2							
<b>7</b>	<b>Feedback</b>	7.0 *Mtr Fbk	7.1 *V1 Fbk	7.2 *V2 Fbk							
<b>8</b>	<b>Panning</b>	8.0 MtrWidth	8.1 Voice1	8.2 Voice2							
<b>9</b>	<b>Modulation</b>	9.0 *ModLFO	9.1 *ModAR Env	9.2 Mod Env L	9.3 Mod Env R	9.4 *Mod Latch	9.5 *Mod Sw 1	9.6 *Mod Sw 2			
	<b>Patches</b>	Patch 0	Patch 1	Patch 2	Patch 3	Patch 4	Patch 5	Patch 6	Patch 7	Patch 8	Patch 9

**The Stereo-Chmb Algorithm**

The Stereo-Chmb algorithm is optimized for the best possible shifted audio quality while maintaining the stereo imagery of the source material. Pitch is adjustable up or down over a 3 octave range with a resolution of 1 cent. This effect is combined with the PCM 80 Chamber reverb using the Dual FX structure.



The Chamber reverb produces an even, relatively dimensionless reverberation, with little change in color as the sound decays. The initial diffusion is similar to the Concert Hall algorithm, but the sense of space and size is much less obvious. This characteristic, along with the low color in the decay tail, makes Chamber useful on a wide range of material. It is especially useful on spoken voice, giving a noticeable increase in loudness with very low coloration.

0	0.0	0.1	0.2	0.3	0.4						
Controls	Mix	LeAdjst	*InLvFPan	FXWidth	*ADJUST						
1	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	
Submixer	Sends	Returns	Routing	*Mix	*Invl	*InW	*HiCut	*LoCut	*Outvl	*OutW	
2	2.0	2.1	2.2	2.3	2.4	2.5	2.6				
Reb Time	Low Ri	Mid Ri	Crossover	Rt HC	Pre Delay	*ReLvlDly	*Eko Fbk'Dly				
3	3.0	3.1	3.2	3.3	3.4	3.5	3.6				
Reb Design	Size	Diffusion	Shape	Spread	Spin	Link	Reb Out				
4											
Pitch	*Low Pitch	Shft L+R									
5	5.0	5.1	5.2	5.3	5.4	5.5	5.6				
Modulation	*ModLFO	*ModAR Env	ModEnv L	ModEnv R	*ModLch	*ModSw 1	*ModSw 2				
Patches	Patch 0	Patch 1	Patch 2	Patch 3	Patch 4	Patch 5	Patch 6	Patch 7	Patch 8	Patch 9	

## **The VSO-Chmb Algorithm**

The VSO-Chmb algorithm provides the same high quality shifter as Stereo-Chmb, designed for on the fly pitch correction of varispeed playback sources. A varispeed parameter allows you to match the varispeed setting of the playback source. The algorithm can match speeds ranging from +55.00% through -35.48% with a resolution of .01%.

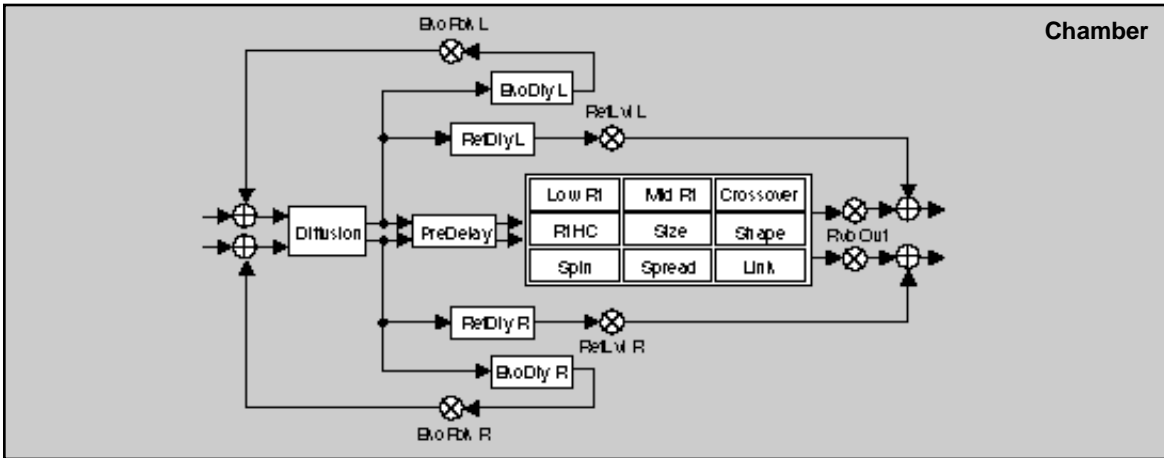
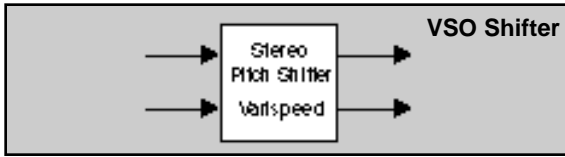
This algorithm is a utility program designed to provide pitch correction of varispeed material. This is a true stereo algorithm which maintains the stereo image of source material. It can be used in applications that require on the fly compression/expansion. Simply match the value of the Varispeed parameter to the varispeed setting of the playback source.

For example, to compress a 30 second spot to 24 seconds, the playback speed must be increased by 20%. The spot now has the correct run length, but increasing the speed created an upward pitch shift of 386 cents. Run the shifted audio through the VSO-Chmb algorithm. Set the Varispeed parameter to +20%. This shifts the pitch down 386 cents. The spot now has a run length of 24 seconds and is at its original pitch.

To expand a 28 second spot to 30 seconds, the playback speed must be decreased by 7.14%. Set both the playback source and the VSO Shifter to -7.14%. The spot will remain at its original pitch and have a run length of 30 seconds.

Like the Stereo-Chmb algorithm, VSO-Chmb is combined with a stereo chamber reverb within the Dual FX structure. This adds considerable flexibility. You can for example, add reverb to the material as it is being pitch corrected (great for voiceovers, etc.).

Note that there is no direct synchronization of the pitch shift with the playback source. The accuracy of the pitch correction is dependent upon the accuracy of the playback source's varispeed mechanism and display.



The Chamber reverb produces an even, relatively dimensionless reverberation, with little change in color as the sound decays. The initial diffusion is similar to the Concert Hall algorithm, but the sense of space and size is much less obvious. This characteristic, along with the low color in the decay tail, makes Chamber useful on a wide range of material. It is especially useful on spoken voice, giving a noticeable increase in loudness with very low coloration.

<b>0 Controls</b>	0.0 Mix	0.1 LvlAdjust	0.2 *InlvFFan	0.3 FXWidth	0.4 *ADJUST					
<b>1 Submixer</b>	1.0 Bands	1.1 Returns	1.2 Routing	1.3 *Mix	1.4 *Inlv1	1.5 *Inlv2	1.6 *HlOut	1.7 *LoOut	1.8 *Outlv1	1.9 *Outlv2
<b>2 Rvb Time</b>	2.0 Lvl Rt	2.1 Mid Rt	2.2 Crossover	2.3 Rf HC	2.4 Pre Delay	2.5 *Rf Lvl/Dly	2.6 *Eko Fbk/Dly			
<b>3 Rvb Design</b>	3.0 Size	3.1 Diffusion	3.2 Shape	3.3 Spread	3.4 Spin	3.5 Link	3.6 Rvb Out			
<b>4 Pitch</b>	4.0 *Low Pitch	4.1 Shift L-R								
<b>5 Modulation</b>	5.0 *Mod LFO	5.1 *Mod AR Env	5.2 Mod Env L	5.3 Mod Env R	5.4 *Mod Latch	5.5 *Mod Sw 1	5.6 *Mod Sw 2			
<b>Patches</b>	Patch 0	Patch 1	Patch 2	Patch 3	Patch 4	Patch 5	Patch 6	Patch 7	Patch 8	Patch 9

## Parameter Descriptions

### MstrCents

This is a master pitch offset control for all voices. The value dialed in here will be added to all voices. This control allows you to transpose pitch voices while keeping the relative interval(s) between them constant.

### MstrScale

This is a master pitch scaling control for all voices. The value of each pitch voice is multiplied by this percentage. This control allows you to shrink or enlarge the relative interval(s) between all voices.

### Low Pitch

This parameter allows you to optimize the pitch shifter for the low frequency content of the input material. Use low values when shifting single note material with low frequencies, polyphonic sources or full bandwidth material. Note that the lower this value, the longer the pitch shifted material is delayed. At the lowest setting, the amount of delay is about 42ms. At the highest setting it is about 12ms.

Use this parameter to minimize the amount of delay inherent in the pitch shift process. If the maximum delay of about 40ms is not a problem, you can simply set this value to its lowest setting. To minimize the delay for single note pitch shifting, set it to a value that matches the pitch of the lowest note in the input material. If you are pitch shifting polyphonic input material you may get better results by setting the value lower than the lowest note in the input material.

Lowest note of some typical sources:

Piano	A0
Bass guitar	E1
Guitar	E2
Trombone	F2
Tenor Sax	Bb2
Vocal: bass	Eb2
Vocal: baritone	Ab2
Vocal: tenor	Db3

### Splice

This parameter allows you to change the number of milliseconds used to crossfade the splices that are constantly occurring whenever pitch is shifted. For most material a value of 4ms is appropriate. Higher values will produce longer/smooth crossfades, but the intelligibility of transients and high frequency content may be affected. Lower values will reproduce transients more accurately and have more high frequency content, but the splices may be more audible.

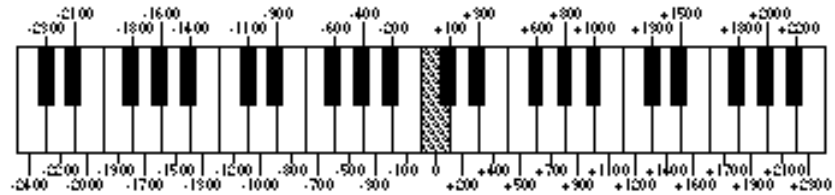
### GldResp

This parameter is similar to the GldResp parameter in the Master Delay parameter of the PCM 80 delay and reverb algorithms. It sets the pitch shifters responsiveness to modulation by internal controllers (LFO, AR, etc.) and MIDI controllers (AfterTouch, Velocity, etc.). It has no effect on the quality of the pitch shifted sound. At the highest setting (100) the pitch will track the modulation source very closely. At lower settings, the pitch will lag behind the modulation source. Use lower settings to smooth out modulation effects.

**Parameter Descriptions**  
cont'd.

**Voice 1-4 (or 1-2)**

These parameters determine the amount of pitch shift for the left and right input channels. In the Quad Shift algorithm, Voices 1 and 2 are left shifts and 3 and 4 are right shifts. In the 2-Voice algorithms, Voice 1 is left shift and Voice 2 is right shift. The value is given in cents (one cent is equal to 1/100th of a semitone — there are 1200 cents per octave, as shown below). The full range of pitch shift is up or down three octaves ( $\pm 3600$  cents). The range is adjustable in increments of a single cent. These values can be modulated smoothly with patch sources to create vibrato, Doppler, whammy bar and other pitch-related special effects.



**Shift L+R**

In the Stereo Shift algorithm, this parameter determines the amount of pitch shift for both the left and right channels. This is a true stereo pitch shifter. The left and right channels are sample synchronous to maintain stereo imaging.

**Tips for Setting Parameters**

All pitch shifting algorithms will produce some amount of glitches and all pitch shift algorithms have some amount of built in delay. Single note sources shift best. When shifting single notes, Low Pitch should be set at or below the lowest pitch in the input material.

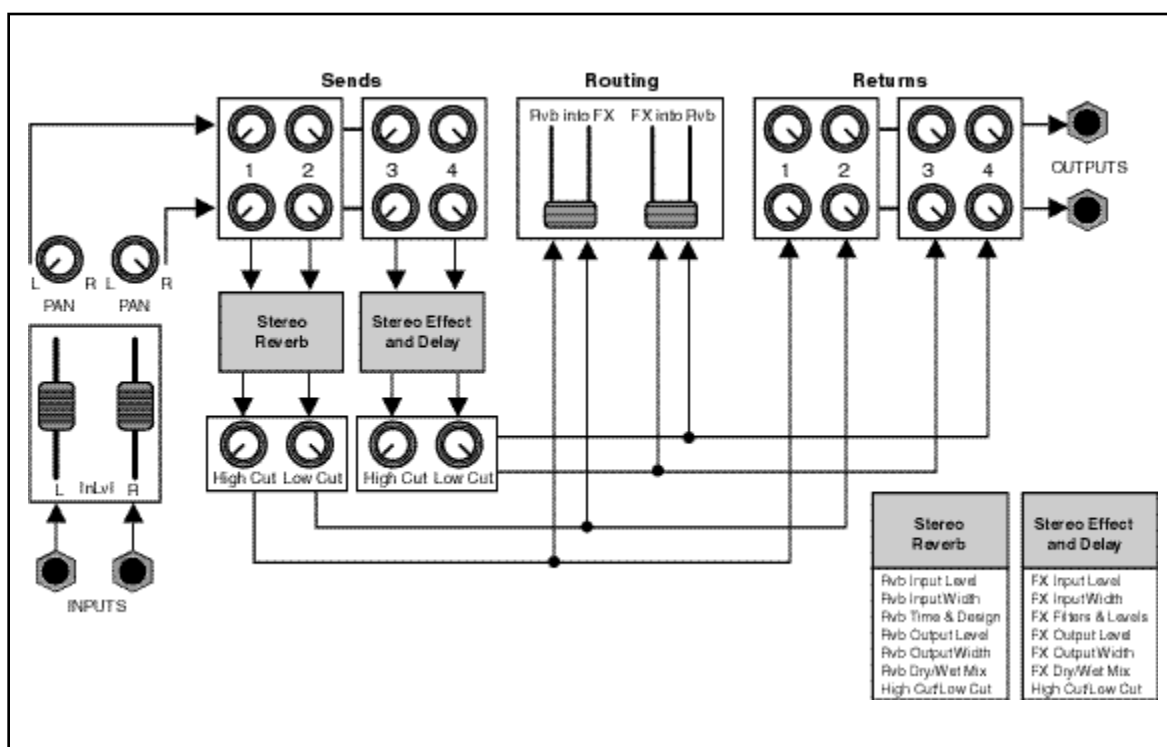
When shifting chords or full bandwidth material, first set the amount of shift. If you need to minimize the delay caused by the shifter, set Low Pitch to the lowest value and slowly increase it to the highest value that doesn't produce unacceptable glitches.

The Splice parameter generally works best for most material when set to 4ms. If the shifted audio sounds a bit harsh, you can smooth it out by raising this value. If there is a loss of intelligibility or rhythmic accuracy in the shifted audio, try setting Splice to a smaller value. As with most effect parameters, you should rely on your ears to find the best settings for a given situation.

# 3

## Using the Submixer

New configuration control is added to basic PCM 80 functionality with the Pitch FX Card. The most significant aspect of this expanded control is the addition of a Submixer which is incorporated into each algorithm. This Submixer lets you arrange any combination of reverb and effects blocks in any configuration simply by changing the three main Submixer controls: Sends, Returns and Routing. Additional controls are provided for each block: Input Level, Input Width, Output Level, Output Width, High Cut and Low Cut filters, and Wet/Dry Mix.



*The Pitch FX Card contains a complete dual-channel effects mixer.*



The Submixer appears as row 1 on the parameter matrix of each of the Pitch FX algorithms. The first three parameters in the row are the basic Submixer controls: Sends, Returns, and Routing. Any configuration can be achieved by simply adjusting these three parameters.



These parameters provide complete configuration and routing control of the effects.

The key to using the Sub Mixer parameters is understanding what the Sends and Returns parameters do, and how they interact with the Routing Parameters.

**Sends** The Sends parameter routes the PCM 80's two panned input signals to the four effect inputs (the *Rvb* and *FX* blocks). This parameter has a range of 0–300. The value of this parameter determines what mix of the left and right input signals is fed to the stereo inputs of the *Rvb* and *FX* blocks. The values 0, 100, 150, 200, 300 correspond to specific configurations and are labeled with text instead of numbers.

Sends Value	Rvb Sends	FX Sends
Stereo (0)	L to left Rvb In R to right Rvb In	L to left FX In R to right FX In
L=Rvb, R=FX (100)	L to left Rvb In L to right Rvb In	R to left FX In R to right FX In
Mono (150)	L+R to left Rvb In L+R to right Rvb In	L+R to left FX In L+R to right FX In
L=FX, R=Rvb (200)	R to left Rvb In R to right Rvb In	L to left FX In L to right FX In
Stereo (300)	L to left Rvb In R to right Rvb In	L to left FX In R to right FX In

**Returns** The Returns parameter routes the four effects outputs to the PCM 80's stereo outputs. This parameter has a range of 0–300. The value of this parameter determines what mix of the stereo *Rvb* and *FX* outputs is fed to the PCM 80's stereo outputs. The values 0, 100, 150, 200, 300 correspond to specific configurations and are labeled with text instead of numbers.

Returns Value	Rvb Returns	FX Returns
Stereo (0)	left Rvb Out to L right Rvb Out to R	left FX Out to L right FX Out to R
Rvb=L, FX=R (100)	left Rvb Out to L right Rvb Out to L	left FX Out to R right FX Out to R
Mono (150)	left + right Rvb Out to L left + right Rvb Out to R	left + right FX Out to L left + right FX Out to R
FX=L, Rvb=R (200)	left Rvb Out to R right Rvb Out to R	left FX Out to L right FX Out to L
Stereo (300)	left Rvb Out to L right Rvb Out to R	left FX Out to L right FX Out to R

## Routing

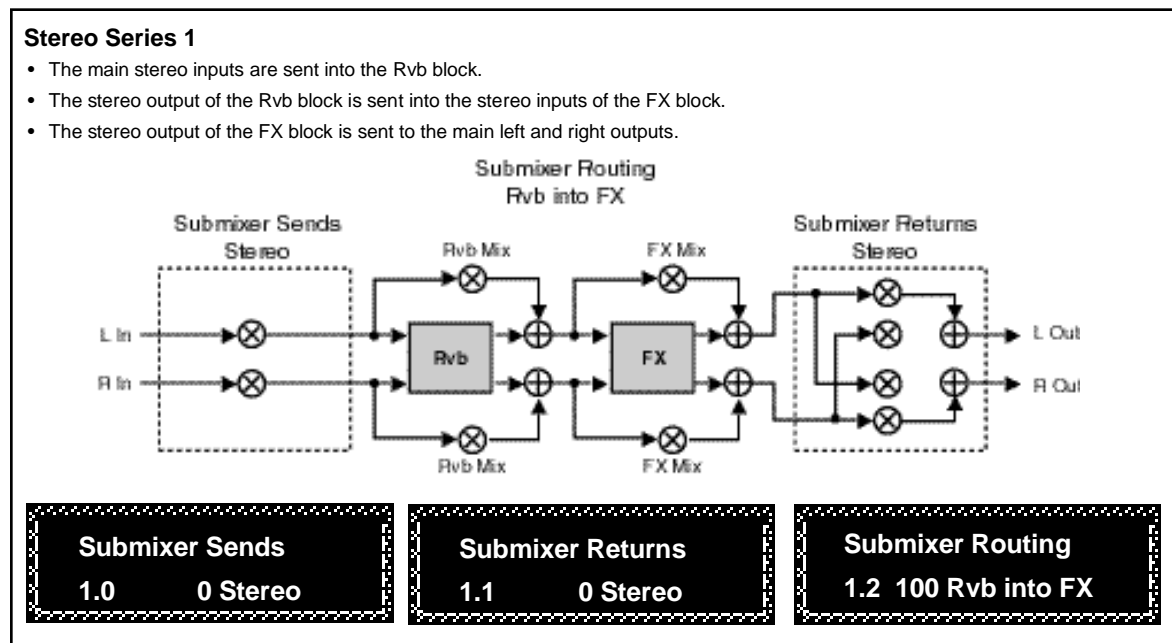
The Routing parameter provides continuously variable control of the FX and Rvb effect routing: Rvb and FX in parallel, Rvb into FX (series) and FX into Rvb (reverse series). This parameter has a range of 0–400. The value of this parameter determines the routing/ordering of the stereo Rvb and FX effects. The values 0, 100, 150, 200, 300, 400 correspond to specific configurations and are labeled with text instead of numbers.

Routing Value	Effects Routing
Parallel (0)	Rvb and FX are parallel
Rvb into FX (100)	Rvb outputs into FX inputs (series 1)
Parallel (200)	Rvb and FX are parallel
FX into Rvb (300)	FX outputs into Rvb inputs (series 2)
Parallel (400)	Rvb and FX are parallel

Note that the routing value takes precedence over the Sends and Returns values. For example, if Routing is set to Rvb into FX (100), no input signal is routed directly to the FX inputs — and the Rvb outputs aren't sent directly to the PCM 80's main outputs.

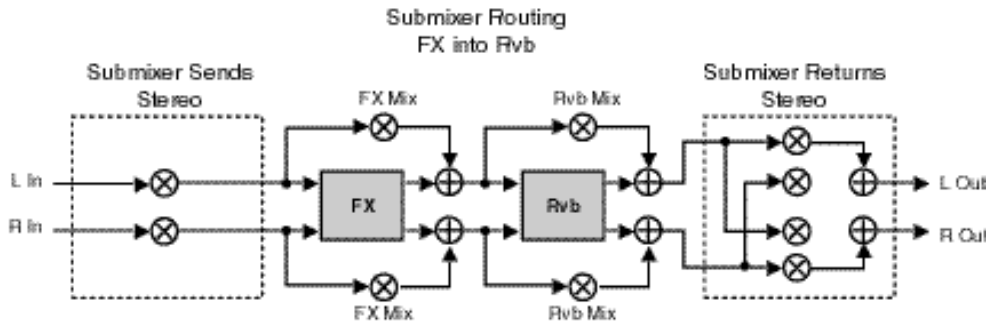
## Useful Configurations

It is possible to arrange the stereo Rvb and FX inputs and outputs into a variety of useful configurations by simply adjusting the Sends, Returns and Routing parameters. The following illustrations show several of these configurations. Each illustration contains a block diagram showing signal flow through the Submixer, as well as the displayed values for the Sends, Returns, and Routing parameters that will produce the configuration.



**Stereo Series 2**

- The main stereo inputs are sent into the FX block.
- The stereo output of the FX block is sent into the stereo inputs of the Rvb block.
- The stereo output of the Rvb block is sent to the main left and right outputs.



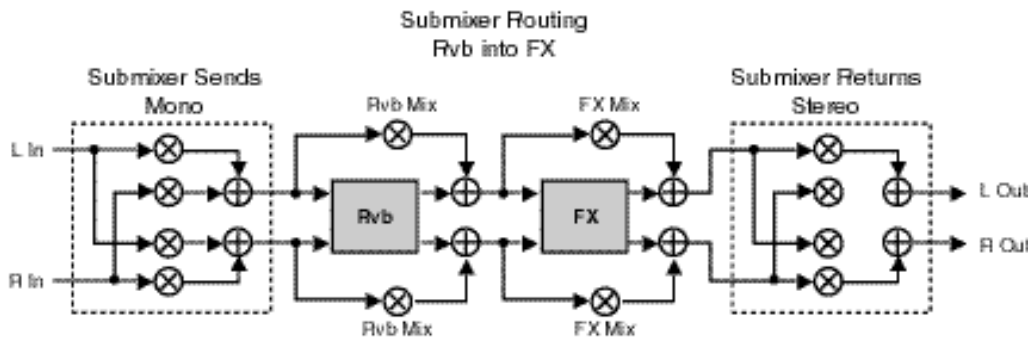
**Submixer Sends**  
1.0 0 Stereo

**Submixer Returns**  
1.1 0 Stereo

**Submixer Routing**  
1.2 300 FX into Rvb

**Mono In/Stereo Out Series 1**

- A mono mix of the left and right inputs is sent into the Rvb block.
- The stereo output of the Rvb block is sent into the stereo inputs of the FX block.
- The stereo output of the FX block is sent to the main left and right outputs.



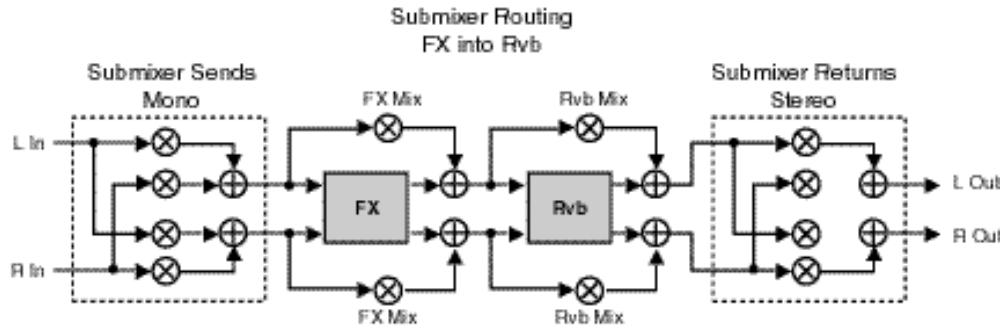
**Submixer Sends**  
1.0 150 Mono

**Submixer Returns**  
1.1 0 Stereo

**Submixer Routing**  
1.2 100 Rvb into FX

### Mono In/Stereo Out Series 2

- A mono mix of the left and right inputs is sent into the FX block.
- The stereo output of the FX block is sent into the stereo inputs of the Rvb block.
- The stereo output of the Rvb block is sent to the main left and right outputs.



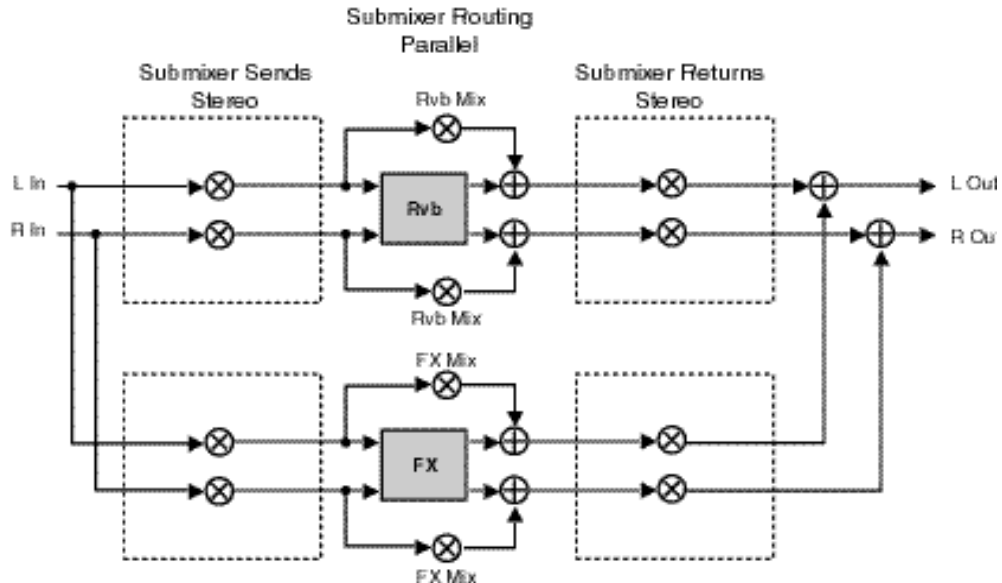
**Submixer Sends**  
1.0 150 Mono

**Submixer Returns**  
1.1 0 Stereo

**Submixer Routing**  
1.2 300 FX into Rvb

### Stereo Parallel

- The Rvb and FX blocks process the left and right inputs independently.
- The stereo outputs of both the Rvb and FX blocks are combined at the main outputs.



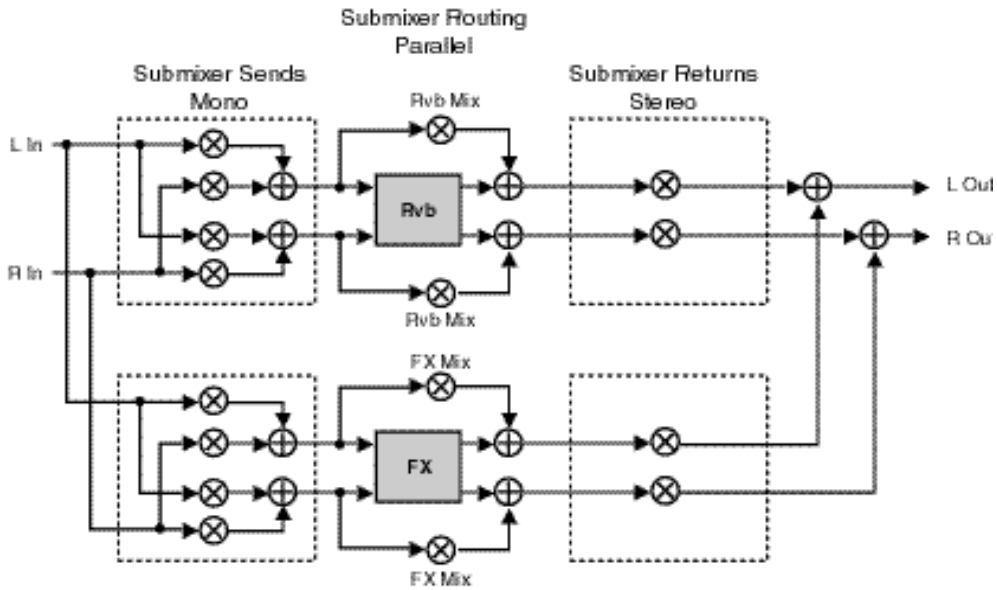
**Submixer Sends**  
1.0 0 Stereo

**Submixer Returns**  
1.1 0 Stereo

**Submixer Routing**  
1.2 0 Parallel

**Mono In/Stereo Out Parallel**

- The Rvb and FX blocks each independently process a mono mix of the left and right inputs.
- The stereo outputs of both the Rvb and FX blocks are combined at the main outputs.



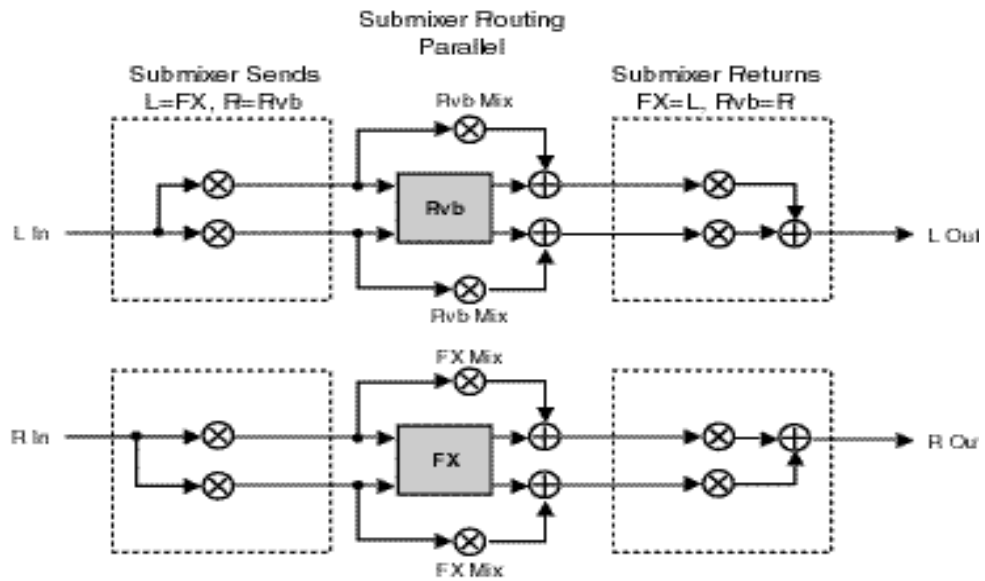
**Submixer Sends**  
1.0 150 Mono

**Submixer Returns**  
1.1 0 Stereo

**Submixer Routing**  
1.2 0 Parallel

### Dual Mono In/Stereo Out

- The Rvb block processes only the left input as a mono signal, and the FX block processes only the right input as a mono signal.
- The stereo outputs of both the Rvb and FX blocks are combined at the main outputs.



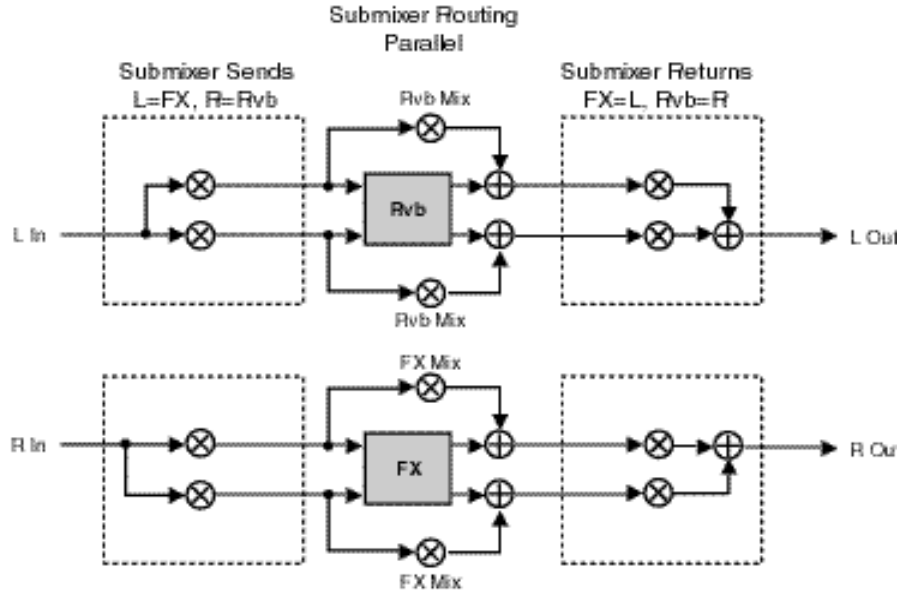
**Submixer Sends**  
1.0 100 L=Rvb, R=FX

**Submixer Returns**  
1.1 0 Stereo

**Submixer Routing**  
1.2 0 Parallel

**Dual Mono In/Mono Out**

- The Rvb block processes only the left input as a mono signal, and the FX block processes only the right input as a mono signal.
- A mono mix of the Rvb block output is sent to the left main output. A mono mix of the FX output is sent to the right main output.



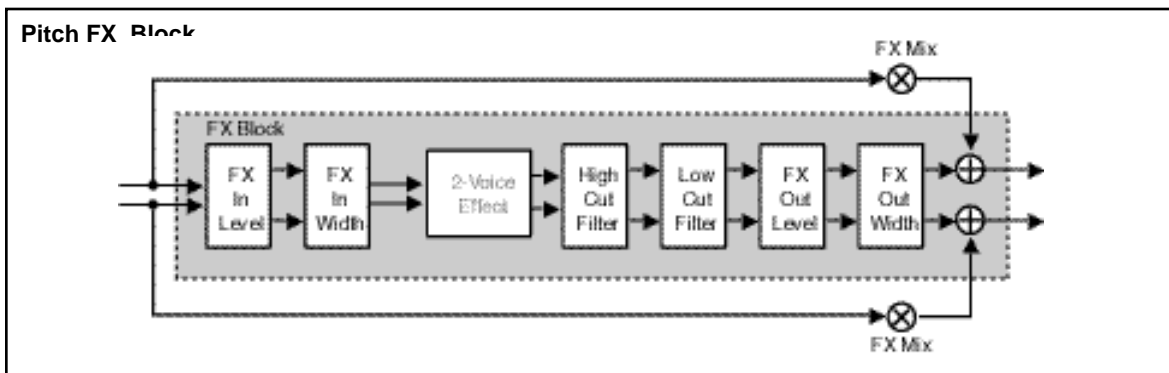
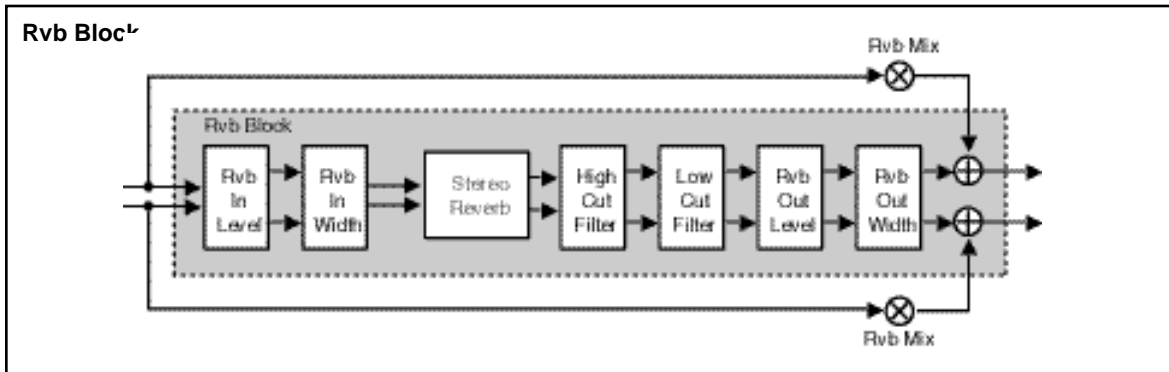
**Submixer Sends**  
1.0 100 L=Rvb, R=FX

**Submixer Returns**  
1.1 100 Rvb=L, FX=R

**Submixer Routing**  
1.2 0 Parallel

The Rvb and FX blocks shown in the previous configurations represent the Stereo Reverb and 2-Voice Pitch Shift effects. Each of these blocks has its own set of controls, shown in the diagrams below.

### Rvb and FX Block Controls



These effect block controls are also found in the Submixer row of each parameter matrix.

1	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9
Submixer	Sends	Ref Lvl	Routing	*Mix	*InLvl	*InW	*HiCut	*LoCut	*OutLvl	*OutW

These parameters provide independent control of input and output level and width, as well as high out and low out parameters for each FX and Rvb block.

Press **Load/\*** to toggle between Rvb and FX parameters.



These parameters are described below, in the order in which they appear in the Submixer row. (All other effect parameters are identical to those in the PCM 80, and are described in the PCM 80 User Guide.)

**RvbMix, FX Mix**

These are independent wet/dry mix controls for the Rvb and FX effect blocks.

**RvbInLvl, FX InLvl**

These are independent input level controls for the Rvb and FX blocks.

**Rvb In W, FX In W**

These are input width controls for the Rvb and FX blocks. These are essentially the same as the PCM 80 FX Width and Rvb Width parameters. The difference is that the width control in the Pitch FX algorithms is located at the input to the effect. This makes it possible to independently alter the stereo image of material feeding the two effect blocks.

**RvbHiCut, FX HiCut**

These parameters provide independent 6dB per octave, stereo high-cut filters on the outputs of the Rvb and FX blocks.

**RvbLoCut, FX LoCut**

These parameters provide independent 6dB per octave, stereo low-cut filters on the outputs of the Rvb and FX blocks.

**RvbOutLvl, FX OutLvl**

These are independent output level controls for the Rvb and FX blocks.

**Rvb Out W, FX Out W**

These parameters allow independent control of the stereo image of the output of each effect block.

## The Presets

The Pitch FX Algorithm Card has 100 factory-designed presets which are organized into two banks of 50 each (labeled **X0**, and **X1**). As with the internal PCM 80 banks, each bank is organized in a matrix of 5 rows of 10. Press the front panel **Program Banks** button to display the first bank. Press it again to switch to another bank. Simultaneously press **Program Banks** and either the **Up** or **Down** button to backstep through the banks. The display will show the bank label and the matrix location, the preset name, and the algorithm from which the effect is derived.

Turn **SELECT** to scroll through all of the presets in a bank in numerical order. Use **Up** or **Down** to jump forward or backward by 10. Press **Load/★** to load any displayed preset.

In the Program Banks mode (as in the Register Banks mode), **ADJUST** is a soft knob. Each preset has one or more parameters patched to this knob, providing a quick way to make useful changes to the effect. (A ■ symbol in the upper left corner of the display indicates that the currently running effect has an **ADJUST** knob patch.) When you turn **ADJUST**, the display will show the name assigned to **ADJUST**, as well as the patch value. Continue turning **ADJUST** to alter the patch value along its available range. For presets which can be synchronized to tempo, press the front panel **Tap** button twice in time with the beat. (Tempo can also be dialed in as a parameter value, or it can be determined by MIDI Clock.) Be sure to try these effects synchronized with MIDI sequence and drum patterns.

The Pitch FX program banks are organized as follows:

Bank	Matrix Location	Preset Type
<b>X0 Vocal &amp; Instrument</b>	0.0–0.9	Vocal Shift
	1.0-1.9	Vocal Harmony
	2.0-2.9	Guitar Magic
	3.0-3.9	Instrument Shift & Harmony
X1 Music & Sound Design	0.0–0.9	Sci-Fi FX
	1.0-1.9	Pitch & Delay
	2.0-2.9	Pitch Sequences
	3.0-3.9	Pads & Drones
	4.0-4.9	Utility Programs: VSO, Dual Mono, "Clean Slate" versions of the algorithms

Each preset is described in this section with a header which indicates the matrix location, the program name, the name assigned to the **ADJUST** knob, and the range of **ADJUST** knob control. This header is followed by a brief description of the effect.

**NOTE:** Most presets are set to 100% wet. To hear the harmony/detune in many presets, dry signal should be added from the mixer. If the PCM 80 is connected in line, adjust the Pitch FX Mix parameter (**Control 0.0**) to add some dry signal.

## Program Bank X0 Vocal & Instrument

### Vocal Shift

- 0.0 FixYerVox** **ADJUST: Offset 0–100**  
Turns your marginal singer into a rock'n'roll star. Bounce your vocals to another track and fix the pitch on the fly. Stereo In/Stereo Out. ADJUST gives you  $\pm 100$  cents of offset to correct any other intonation.
- 0.1 FixYerVoxChm** **ADJUST: Offset 0–100**  
Similar to FixYerVox with an added vocal chamber for occasions when you run out of tracks and need to fix the pitch while you mix. Stereo In/Stereo Out.
- 0.2 ThickFixVox** **ADJUST: Thickness 0–50**  
Similar to FixYerVox with stereo detuning for occasions when you run out of tracks and need to fix the pitch while you mix. Stereo In/Stereo Out. ADJUST controls the amount of detuning, in cents.
- 0.3 Cocomo** **ADJUST: Thickness 0–100**  
The inputs are detuned. The left is delayed 31ms, the right is delayed 47ms. ADJUST controls the amount of + and – detuning in cents. Stereo In/Stereo Out.
- 0.4 QuadDTune** **ADJUST: Tune Knob 0–100**  
Fatten up vocals with four pitch shift voices panned across the stereo field. ADJUST sets the amount of detuning. (Two voices go sharp, two go flat.)
- 0.5 ADTStereoIn** **ADJUST: LFO Rate 0–100**  
The left input is pitch shifted up, the right input is shifted down. An LFO modulates the pitch from 2-12 cents. Stereo In/Stereo Out. ADJUST controls the LFO rate from 0-25Hz.
- 0.6 TripleTrack** **ADJUST: Separate 0–100**  
Adds two vocal tracks. ADJUST controls how closely the pitch shifted voices track the pitch and timing of the input track.
- 0.7 Quad Track** **ADJUST: Separate 0–100**  
Similar to TripleTrack, this preset adds a third doubling to the original track. ADJUST controls how tightly the three shifted voices track the original.
- 0.8 Quint Track** **ADJUST: Separate 0–100**  
Makes one voice sound like five by adding four double tracks to the original. Each one is slightly out of time and out of tune with the others. ADJUST controls how tightly the shifted voices track the original.
- 0.9 Add Voices** **ADJUST: How many? 1–4**  
A variation of QuintTrack with ADJUST adding more doublings to the original. 1=1 voice with slight detune, 2=2 voices, 3=3 voices, 4=4 voices.

### Vocal Harmony

- 1.0 Major Thirds** **ADJUST: Inversion 0–4**  
This preset allows you to treat the input note as the root or third in major third harmony. ADJUST lets you select the inversion. 0=slight detune, 1=sixth below, 2=third below, 3=third above, 4=sixth above.
- 1.1 Minor Thirds** **ADJUST: Inversion 0–4**  
This preset allows you to treat the input note as the root or third in minor third harmony. ADJUST lets you select the inversion. 0=slight detune, 1=sixth below, 2=third below, 3=third above, 4=sixth above.

- 1.2 Major Triads** **ADJUST: Inversion 0–6**  
 The input note can be harmonized as the root, third or fifth of a major chord. ADJUST selects the harmony and inversion. 0=slight detune, 1=input is root (1st inversion), 2=input is root (2nd inversion), 3=input is third (1st inversion), 4=input is third (2nd inversion), 5=input is fifth (1st inversion), 6=input is fifth (2nd inversion).
- 1.3 Minor Triads** **ADJUST: Inversion 0–6**  
 The input note can be harmonized as the root, third or fifth of a minor chord. ADJUST selects the harmony and inversion. 0=slight detune, 1=input is root (1st inversion), 2=input is root (2nd inversion), 3=input is third (1st inversion), 4=input is third (2nd inversion), 5=input is fifth (1st inversion), 6=input is fifth (2nd inversion).
- 1.4 Major & Dbls** **ADJUST: Inversion 0–4**  
 The input note is doubled and also harmonized as the root of a major triad. ADJUST selects the inversion of the chord.
- 1.5 Minor & Dbls** **ADJUST: Inversion 0–4**  
 The input note is doubled and also harmonized as the root of a minor triad. ADJUST selects the inversion of the chord.
- 1.6 4ths & Dbl** **ADJUST: Inversion 0–4**  
 The input note is doubled and also harmonized as the root of chord made of four perfect fourths. ADJUST selects the inversion of the chord.
- 1.7 MIDI Pitch** **ADJUST: Rvb Mix 0–100**  
 Use this preset to harmonize source material via single notes played on a MIDI keyboard. The amount of pitch shift is determined by the size of the interval played above or below middle C. ADJUST allows you to mix in some reverberation. Note that the audio source should not be the same source used to generate the MIDI notes.
- 1.8 MIDI Harmony** **ADJUST: Rvb Mix 0–100**  
 This is a useful variation of MIDI Pitch. Play two notes at once on a MIDI keyboard to add two voices to the input note to create three part harmony. The harmonies are relative to middle C. ADJUST allows you to mix in some reverb. Note that the audio source should not be the same source used to generate the MIDI notes.
- 1.9 MIDI Chord** **ADJUST: V2 Pitch 1–25**  
 A variation of MIDI Pitch that allows you to create four part harmonies. You can add two notes to the input note from a MIDI keyboard and dial-in an additional fixed harmony with ADJUST which provides 1 octave up or down in half steps. Note that the audio source should not be the same source used to generate the MIDI notes.

### Guitar Magic

- 2.0 SingleDetune** **ADJUST: 10=unison 0–20**  
 A high quality detuner. ADJUST shifts pitch up or down 10 cents. Detune is at unison when ADJUST=10.
- 2.1 DualDetune** **ADJUST: cents +/- 0–100**  
 A classic guitar effect. Two pitch shifters are used to spread out and thicken up the sound. ADJUST controls the amount of shift in cents. One side shifts up, the other shifts down.
- 2.2 Phat Detune** **ADJUST: TuneKnob 0–100**  
 A classic detune effect with two additional voices. The four voices are panned across stereo space to really widen up the sound. ADJUST controls the overall amount of detuning.

- 2.3 EGtrPitchRm** **ADJUST: Fbk Mix 0–50**  
 This preset produces a rich, room-like halo around every note. Sounds like reverb, but it's not. How can you tell? Choke off a note and you'll hear that there's no decay. The effect is created by using pitch shifted echoes with cross feedback. The input level controls the amount of cross feedback. When the input dies out, the X-feedback goes to 0. ADJUST lets you dial some back in.
- 2.4 VibroShift1** **ADJUST: Rate 0–100**  
 A simple unison vibrato with ADJUST controlling the rate. Mix with the original signal for chorusing or use 100% wet for straight vibrato.
- 2.5 VibroShift2** **ADJUST: Rate 0–100**  
 Similar to VibroShift1 with a touch of octave down vibrato. Nice on single notes or chords.
- 2.6 VibroTrem** **ADJUST: Rate 0–100**  
 Pitch shift vibrato and out-of-phase tremolo combined to create a new take on a retro sound. ADJUST controls the rate of the throb. For the fullest effect, don't mix any dry signal with the PCM 80 output.
- 2.7 VibroTremRvb** **ADJUST: Rate 0–100**  
 Another cool take on a vintage effect with reverb added between the vibrato and the tremolo. Play some chunky chords and listen to the verb pump. ADJUST controls the rate.
- 2.8 OctDown Verb** **ADJUST: Oct Mix 0–100**  
 Great with muted single note licks and runs, this preset also works well with chords. The reverb is fed by a unison vibrato and an additional vibrato shifted down one octave. ADJUST controls the mix of the unison and octave. 0=unison only, 50=unison and octave down, 100=octave down only.
- 2.9 PitchSlapRvb** **ADJUST: Rvb Tune 0–100**  
 This preset delivers a tight reverb slap after each note. The trick here is that you can tune the reverb sharp relative to the original note. ADJUST controls the reverb tuning — a little goes a long way.

### Instrument Shift & Harmony

- 3.0 24 String** **ADJUST: 8va Level 0–100**  
 Fatten up your 6-string with both detuning and an octave up. Stereo In/Stereo Out.
- 3.1 HonkyTonkPno** **ADJUST: Delay 0–100**  
 Go West, young man, to the frontier...and don't forget the pretzels and beer. Stereo In/Stereo Out.
- 3.2 PowerNotes** **ADJUST: 5ths Lvl 0–100**  
 This preset is tuned up to give you a power chord when you play a single note. Each note is doubled at the unison and at an octave down. ADJUST lets you tune in two fifths — one below and one above the input note.
- 3.3 4-NoteChords** **ADJUST: Inversion 0–6**  
 This preset treats the input note as the root or fifth of a major seventh, minor seventh or dominant seventh chord. ADJUST lets you select the chord and the inversion.
- 3.4 ModalChords1** **ADJUST: Mode 1–8**  
 This preset will produce four-note chords relative to the input note. ADJUST selects the chord. The chords are voiced in parallel, each chord in root position.
- 3.5 ModalChords2** **ADJUST: Mode 1–8**  
 A variation of ModalChords1 with the chords voice-led in close position to minimize the amount of pitch shifting required to produce each chord.

- 3.6 Chromatic Up** **ADJUST: HalfSteps** **0–12**  
Straightforward and simple, ADJUST lets you tune any chromatic interval up to an octave above the input note.
- 3.7 Chromatic Dn** **ADJUST: HalfSteps** **0–12**  
This variation lets you dial in any chromatic interval down to an octave below the input note.
- 3.8 FootPdl Oct** **ADJUST: Up / Down** **0–1**  
Designed to be used with a foot pedal. When connected, it produces a whammy bar slide up or down one octave. ADJUST sets the direction of the slide. 0=up, 1=down.
- 3.9 FootPdlChord** **ADJUST: UnisonMix** **0–100**  
Designed to be used with a foot pedal. In this case, the pedal slides two voices from unison to a major sixth (a fourth below and major third above the input note). ADJUST allows you to mix in the original note so you can pedal-slide major chords.

### Percussion & Tempo

- 4.0 SnareTools 1** **ADJUST: Crack** **0–100**  
Natural snare reverb with ADJUST providing “crack” control. Detune is added to the original input before both are sent to the reverb. FX Mix controls the blend of dry vs. pitched signal to achieve optimal “crack”. Stereo In/Stereo Out.
- 4.1 SnareTools 2** **ADJUST: Crack** **0–100**  
Trippy backwards effect. Reverb feeds the pitch shifter. Mono In/Stereo Out.
- 4.2 SnareTools 3** **ADJUST: Crack** **0–100**  
Inverse snare reverb with “crack” control via ADJUST. Detune is added to the original input before both are sent to the reverb. FX Mix controls the blend of dry vs. pitched signal to achieve optimal “crack”. Mono In/Stereo Out.
- 4.3 TomTomTools** **ADJUST: Boom!** **0–100**  
Turns oatmeal boxes into cannons. Stereo In/Stereo Out.
- 4.4 Slap Up BPM** **ADJUST: pitch** **0–100**  
A tuned percussion plate with a slap predelay. Great for unpitched percussion. Use ADJUST to tune the pitch of the reverb above the pitch of the percussion.
- 4.5 Slap Dn BPM** **ADJUST: pitch** **0–100**  
A variation with ADJUST tuning the reverb below the pitch of the percussion source.
- 4.6 Thick Slap** **ADJUST: detune** **0–100**  
This preset detunes the reverb above and below the original source. A great alternative for thickening drum sounds.
- 4.7 RepeatSlaps** **ADJUST: Fbk** **0–100**  
Pitched reverb echoes produce arpeggios. Try this with any short percussive track for an interesting effect. ADJUST controls the amount of feedback (decay of the arpeggio).
- 4.8 AutoScratch** **ADJUST: Rvb Mix** **0–100**  
Run a rhythm bed or drum machine into this preset and it will “scratch it” in tempo. ADJUST adds reverb. Press **Tap** twice to lock in the rhythm.
- 4.9 Stop n Go** **ADJUST: Rvb Mix** **0–100**  
A more radical version of AutoScratch.

## Program Bank X1 Music & Sound Design

### Sci-Fi FX

- 0.0 PullThePlug!** **ADJUST: Off/On** **0-1**  
Use this special effect to simulate the sound of a tape machine, juke box (etc.) running down when the power has been cut off in the middle of a tune. Turn ADJUST from 1 to 0 to cut the power, and from 0 to 1 to turn it back on.
- 0.1 Stargate** **ADJUST: Velocity** **0-100**  
A dramatic special effect that transforms a single percussive sound into a spatial wash of ascending and descending pitches. Try this with single drum hits or short sound effect samples. ADJUST controls the rate of the ascent/descent.
- 0.2 WhiteHole** **ADJUST: Big>Small** **0-100**  
A variation of Stargate that transforms a single sonic event into a randomized series of pitched echoes. ADJUST controls the pitch and delay deviation.
- 0.3 MotherShip** **ADJUST: Velocity** **0-100**  
Need some processing for lift-off or acceleration effects? This effect delivers. Drive it with a single impulse or short sound effect to produce a spatial glide that ascends to the limits of audibility. ADJUST controls the rate of ascent.
- 0.4 XplodeDown** **ADJUST: Velocity** **0-100**  
Use this preset to add more drama to special effects (or even single drum hits). This preset transforms the input source into an eerie downward glide with ADJUST controlling the rate of the glide.
- 0.5 Xplode Up** **ADJUST: Velocity** **0-100**  
A variation of XplodeDown with the input source transformed into an upward glide.
- 0.6 DialogCloner** **ADJUST: Tuning** **0-100**  
A special effect for speech, this preset creates the effect of several people speaking at once. Four additional voices are added above and below the pitch of the input source. ADJUST controls the tuning spread of the four clones.
- 0.7 Toon Voices** **ADJUST: Character** **0-7**  
Changes the character of vocals for special effect dialog tracks. ADJUST selects several different pitch shift amounts to create a range of characters from scary monsters, to chipmunks, to talking bees.
- 0.8 Evil Voice** **ADJUST: Pitch** **0-100**  
Downward pitch shift and a touch of reverb are used to turn a normal male speaking voice into something decidedly dark and nasty. ADJUST allows you to dial the appropriate touch of evil.
- 0.9 Evil Echoes** **ADJUST: Pitch** **1-100**  
This special effect has echoes that change pitch as they repeat. ADJUST controls the amount of shift per repeat. 1-49=descending pitch, 50=no pitch change, 51-100=ascending pitch.

### Pitch & Delay

- 1.0 Pitch Across** **ADJUST: Detune** **0-100**  
A single note produces a 4-voice panned delay. ADJUST controls the amount of pitch shift for the four voices. Small values produce detuning. The maximum value (100) produces a major arpeggio. The delay rhythm is tempo-controlled. Press **Tap** twice to lock in with the beat.

- 1.1 PitchEkoRvb** **ADJUST: Eko/Rvb 0–100**  
The dual pitch shifters produce a detune/echo effect with reverb. ADJUST lets you set the balance of the two effects. 0=detune echoes only, 50=detune echoes and reverb, 100=reverb only.
- 1.2 PitchPong** **ADJUST: DelayRate 0–100**  
The inputs are delayed, pitched down a little, then cross fed to the other side. Slap echoes bounce from left to right and fall slightly in pitch. The LFO adds chorusing to the pitch change. Stereo In/Stereo Out.
- 1.3 AR DlyVerb** **ADJUST: Detune 0–100**  
When the input level drops, delays fade away into reverb. Stereo In/Stereo Out.
- 1.4 In The Air** **ADJUST: Go 0–1**  
The inputs are detuned + and - 8 cents. When ADJUST is changed from 0 to 1, a quarter-note delay recirculates through the detuner. Stereo In/Stereo Out.
- 1.5 Thick>Ducked** **ADJUST: Detune 0–100**  
The inputs are detuned. When the input level drops below the threshold, quarter-note delays with regeneration recirculates into the detuners. Stereo In/Stereo Out.
- 1.6 FootPdlEkos** **ADJUST: Detune 0–100**  
Designed to be used with a foot pedal. A detune chorus is routed through stereo delays and reverb. The pedal controls the input level to the delays and reverb. Use the pedal to capture specific phrases in the delays/reverb. Great with guitar and other solo instruments.
- 1.7 DualDTuneDly** **ADJUST: cents +/- 0–100**  
This preset combines two detuned voices with delays. ADJUST controls the amount of detune. Controls for the delays (and reverb too) are in the Soft row.
- 1.8 QuaDTuneDly1** **ADJUST: TuneKnob 0–100**  
For thicker detune and delay effects, this preset uses four pitch shifters for detuning. ADJUST controls the pitch spread of the four shifters. Delay and reverb controls are in the Soft row.
- 1.9 QuaDTuneDly2** **ADJUST: TuneKnob 0–100**  
Similar to QuadTuneDly1 with the delays set to rhythmic values (eighths and triplets). Press **Tap** to synchronize the rhythms to the beat.

### Pitch Sequences

- 2.0 Major Across** **ADJUST: MasterDly 0–100**  
A major triad is arpeggiated across the stereo field. ADJUST controls the overall timing of the arpeggiation.
- 2.1 Minor Across** **ADJUST: MasterDly 0–100**  
A minor triad is arpeggiated across the stereo field. ADJUST controls the overall timing of the arpeggiation.
- 2.2 Dim hARP** **ADJUST: GlissRate 0–100**  
The inputs rise in a diminished arpeggiated scale. This preset turns one harp note into a glissando, or one quarter note into a harp chord. Individual voices are panned across the stereo field. Stereo In/Stereo Out.
- 2.3 Dim hARP Vrb** **ADJUST: GlissRate 0–100**  
Similar to Dim hARP with an added reverb.



- 2.4 DimScaleDown** **ADJUST: ScaleRate 0–100**  
The inputs descend into a diminished arpeggiated scale. This preset turns one note into a scale or glissando. Individual voices are panned across the stereo spectrum. A little reverb is added.
- 2.5 GlassCascade** **ADJUST: MasterDly 0–100**  
A glassy, chime-like tail makes this preset great for sustained single-note melodies. Spooky and pretty at the same time. Stereo In/Stereo Out.
- 2.6 Carnival** **ADJUST: MstrFdbk 0–100**  
Turns guitar or piano into steel drums, especially if you play diatonic thirds, as steel drummers have been known to do. Stereo In/Stereo Out.
- 2.7 Sequence 1** **ADJUST: MasterFbk 0–100**  
Play single note lines. Adds M6 and M9. Tap tempo-driven. Stereo In/Stereo Out.
- 2.8 Sequence 2** **ADJUST: MasterFbk 0–100**  
Similar to Sequence1 with a very different sound.
- 2.9 Pentatonics!** **ADJUST: MasterFbk 0–100**  
A sequence of notes from the minor pentatonic scale are played for each input note. The input note is treated as the root of the scale. ADJUST controls the amount of feedback.

### Pads & Drones

- 3.0 JurassicSolo** **ADJUST: Decay 0–100**  
A very long plate reverb is pitched down a minor third. Spooky. Good for single-note melody soundtracks. Stereo In/Stereo Out.
- 3.1 SwrlWhlnt** **ADJUST: MasterDly 0–100**  
Swirling Whole Note — An LFO controls FX Width. FX Mix is 100% reverb. Delay time is 0ms. Slightly detuned swirling voices produce a reverb that is especially wonderful on whole notes. Stereo In/Stereo Out.
- 3.2 Sweet Chorus** **ADJUST: Spd/Width 0–100**  
An LFO sine wave alternates detuning from positive to negative pitch values. The pitch of both outputs is positive, then negative. ADJUST changes both the speed and width of detuning (faster=wider). Stereo In/Stereo Out.
- 3.3 MirrorChorus** **ADJUST: Speed 0–100**  
An LFO square wave alternates detuning from positive to negative pitch values. The pitch shift of the left output is the opposite of the right. Stereo In/Stereo Out.
- 3.4 LFO Detune** **ADJUST: Detune 0–100**  
A slow, chorusy detuner. Stereo In/Stereo Out.
- 3.5 SpatialDuck** **ADJUST: cents +/- 0–100**  
This preset produces a wash of detuned echoes with long reverb decay. The reverb OutWidth is modulated to create spatial movement. The entire effect is ducked by input level. (The reverb and echo decays increase as the level fades.) ADJUST controls the amount of detuning.
- 3.6 Vibrato BPM** **ADJUST: Depth 0–100**  
The vibrato produced by this effect is tempo controlled so it can be synchronized to the beat. ADJUST sets the vibrato depth. Press **Tap** twice to lock-in the tempo.

- 3.7 VerbatO** **ADJUST: Depth 0–100**  
 In this preset, a small stereo chamber reverb is routed through the stereo pitch shifter. The pitch shifter is set to create vibrato. A nice way to thicken up a track without messing with the dry sound.
- 3.8 WetDtune Dly** **ADJUST: cents +/- 0–100**  
 A detune chorus feeding long delays and reverb. Just right when you need to add another brick to the wall. ADJUST sets the amount of detuning.
- 3.9 Acid Chorus** **ADJUST: speed 0–100**  
 An LFO sine wave alternates detuning of both outputs from positive to negative pitch values. This preset has an extra large amount of detuning. Stereo In/Stereo Out.

### Utility Programs (VSO, Dual Mono, Clean Slates)

- 4.0 Stereo VSO** **ADJUST: Rvb Mix 0–100**  
 Use this preset for pitch correcting stereo off-speed playback material. Set the Varispeed parameter (in the first position of the Soft row) to *match* the amount of varispeed used for playback. ADJUST controls the amount of reverb added to the corrected audio.
- 4.1 Mono VSO** **ADJUST: Rvb Mix 0–100**  
 Use this preset for pitch correcting mono off-speed playback material. Set the Varispeed parameter (in the first position of the Soft row) to *match* the amount of varispeed used for playback. ADJUST controls the amount of reverb added to the corrected audio.
- 4.2 Pitch + Rvb1** **ADJUST: cents +/- 0–100**  
 The left input feeds a mono in/stereo out dual detuner. The right input feeds a mono in/stereo out reverb. Use this preset to process two mono sources independently or to process one mono source with independent detune and reverb. ADJUST controls the amount of detuning.
- 4.3 Pitch + Rvb2** **ADJUST: HalfSteps 0–24**  
 The left input feeds a mono in/stereo out chromatic pitch shifter. The right input feeds a mono in/stereo out reverb. Use this preset to process two mono sources independently or to process one mono source with independent detune and reverb. ADJUST controls the amount of pitch shifting — up or down one octave in half steps; 0=down 1 octave, 12=unison, 24=up 1 octave.

Presets 4.4-4.9 are clean slate versions of the Pitch FX algorithms. No ADJUST, Soft row or patch assignments have been made. Use them when you want to create your own effects from scratch.

- |            |                        |                     |
|------------|------------------------|---------------------|
| <b>4.4</b> | <b>NewVSO-Chmb</b>     | <b>ADJUST: none</b> |
| <b>4.5</b> | <b>NewQuad&gt;Hall</b> | <b>ADJUST: none</b> |
| <b>4.6</b> | <b>NewDual-Chmb</b>    | <b>ADJUST: none</b> |
| <b>4.7</b> | <b>NewDual-Inv</b>     | <b>ADJUST: none</b> |
| <b>4.8</b> | <b>NewDual-Plt</b>     | <b>ADJUST: none</b> |
| <b>4.9</b> | <b>NewSter-Chmb</b>    | <b>ADJUST: none</b> |

Alphabetical Index of Presets			
24 String	X0 3.0	NewQuad>Hall	X1 4.5
4-NoteChords	X0 3.3	NewSter-Chmb	X1 4.9
4ths & Dbl	X0 1.6	NewVSO-Chmb	X1 4.4
Acid Chorus	X1 3.9	OctDown Verb	X0 2.8
Add Voices	X0 0.9	Pentatonics!	X1 2.9
ADTStereoIn	X0 0.5	Phat Detune	X0 2.2
AR DlyVerb	X1 1.4	Pitch + Rvb1	X1 4.2
AutoScratch	X0 4.8	Pitch + Rvb2	X1 4.3
Carnival	X1 2.6	Pitch Across	X1 1.0
Chromatic Dn	X0 3.7	PitchEkoRvb	X1 1.1
Chromatic Up	X0 3.6	PitchPong	X1 1.2
Cocomo	X0 0.3	PitchSlapRvb	X0 2.9
DialogCloner	X1 0.6	PowerNotes	X0 3.2
Dim hARP	X1 2.2	PullThePlug!	X1 0.0
Dim hARP Vrb	X1 2.3	Quad Track	X0 0.7
DimScaleDown	X1 2.4	QuadDTune	X0 0.4
DualDetune	X0 2.1	QuaDTuneDly1	X1 1.8
DualDTuneDly	X1 1.7	QuaDTuneDly2	X1 1.9
EGtrPitchRm	X0 2.3	Quint Track	X0 0.8
Evil Echoes	X1 0.9	RepeatSlaps	X0 4.7
Evil Voice	X1 0.8	Sequence 1	X1 2.7
FixYerVox	X0 0.0	Sequence 2	X1 2.8
FixYerVoxChm	X0 0.1	SingleDetune	X0 2.0
FootPdl Oct	X0 3.8	Slap Dn BPM	X0 4.5
FootPdlChord	X0 3.9	Slap Up BPM	X0 4.4
FootPdlEkos	X1 1.6	SnareTools 1	X0 4.0
GlassCascade	X1 2.5	SnareTools 2	X0 4.1
HonkyTonkPno	X0 3.1	SnareTools 3	X0 4.2
In The Air	X1 1.3	SpatialDuck	X1 3.5
JurassicSolo	X1 3.0	Stargate	X1 0.1
LFO Detune	X1 3.4	Stereo VSO	X1 4.0
Major & Dbls	X0 1.4	Stop n Go	X0 4.9
Major Across	X1 2.0	Sweet Chorus	X1 3.2
Major Thirds	X0 1.0	SwriWhoInt	X1 3.1
Major Triads	X0 1.2	Thick FixVox	X0 0.2
MIDI Chord	X0 1.9	Thick Slap	X0 4.6
MIDI Harmony	X0 1.8	Thick>Ducked	X1 1.5
MIDI Pitch	X0 1.7	TomTomTools	X0 4.3
Minor & Dbls	X0 1.5	Toon Voices	X1 0.7
Minor Across	X1 2.1	TripleTrack	X0 0.6
Minor Thirds	X0 1.1	Verbato	X1 3.7
Minor Triads	X0 1.3	Vibrato BPM	X1 3.6
MirrorChorus	X1 3.3	VibroShift1	X0 2.4
ModalChords1	X0 3.4	VibroShift2	X0 2.5
ModalChords2	X0 3.5	VibroTrem	X0 2.6
Mono VSO	X1 4.1	VibroTremRvb	X0 2.7
MotherShip	X1 0.3	WetDtune Dly	X1 3.8
NewDual-Chmb	X1 4.6	WhiteHole	X1 0.2
NewDual-Inv	X1 4.7	Xplode Up	X1 0.5
NewDual-Pit	X1 4.8	XplodeDown	X1 0.4

Lexicon Inc.  
3 Oak Park  
Bedford MA 01730-1441  
Telephone 781-280-0300  
Fax 781-280-0490  
[www.lexicon.com](http://www.lexicon.com)

Lexicon Part # 070-11674 Rev 1