

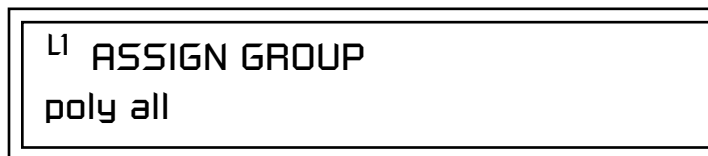
Assign Group

Synth (low): Same as Synth (last) but with low note priority. When you release the currently sounding solo key while holding other keys down, the lowest held solo key sounds in a Legato fashion (MiniMoog).

Synth (high): Same as Synth (last) but with high note priority. When you release the currently sounding solo key while holding other keys down, the highest held solo key sounds in a Legato fashion.

Fingered Glide: Same as Synth (last), except that Glide is disabled when playing Staccato, enabled when playing Legato.

Use the Assign Group parameter to assign a certain number of channels to each layer. By assigning all voices in the preset to assign groups, important parts are protected from being “stolen” by more recently played keys. Or you can assign a voice, such as an open high hat, to a mono channel so it is cancelled by a closed high hat on the same mono channel. Layers rotate within their assigned “bin” of channels, not interfering with other bins.



The modes are:

Poly All: Notes are played polyphonically with dynamic channel assignment using all 32 channels.

Poly 16 A-B: Two bins of 16 channels each. Notes are played polyphonically with dynamic channel assignment using no more than 16 channels.

Poly 8 A-D: Four bins of 8 channels each. Notes are played polyphonically with dynamic channel assignment using no more than 8 channels each.

Poly 4 A-D: Four bins of 4 channels each. Notes are played polyphonically with dynamic channel assignment using no more than 4 channels each.

Poly 2 A-D: Four bins of 2 channels each. Notes are played polyphonically with dynamic channel assignment using no more than 2 channels each.

Mono A-I: Nine monophonic channels, Any layers assigned to the same letter interrupt each other without affecting other layers.

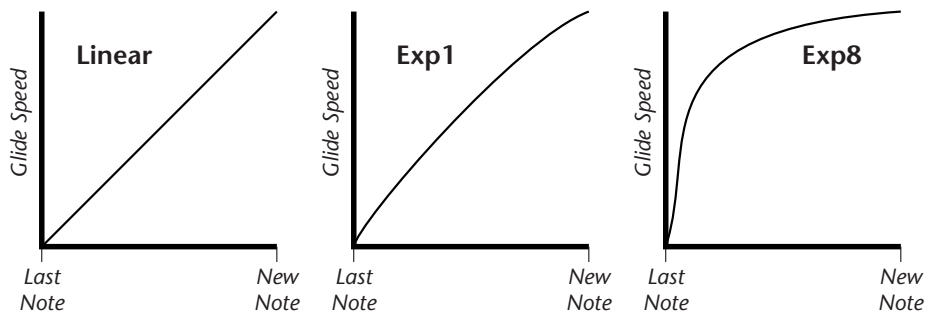
Glide

Glide creates a smooth transition from one note to the next instead of the normal instantaneous change in pitch when a new key is pressed. This effect is commonly heard on slide guitars, synthesizers and violins.

LI	GLIDE RATE	CURVE
	0.000 sec/oct	linear

The **Glide Rate** parameter defines the time it takes to glide to the new pitch (the larger the value, the slower the glide rate) The glide rate value range is from 0 through 32.738 seconds (zero means off).

The **Glide Curve** describes how the glide accelerates as it slides between notes. Because of the ear's non-linear response to pitch, a linear glide sounds slow at the beginning and speeds up toward the end. Exponential curves actually sound smoother and more linear. Eight exponential curves are provided. Choose one that suits your style.



Glide can be either polyphonic or monophonic depending of the state of *Solo Mode*.

Z-Plane Filters

A filter is a device which changes the output of a signal (sound) by removing certain elements of the signal based on the frequency and amplitude. The "Order" of a filter defines the number of filter elements it contains. The more elements, the more complex the filter.

Proteus 2000 contains 17 different types of E-mu's celebrated Z-plane filters. In addition to the standard Low pass, High pass and Band pass filters, Proteus 2000 contains Swept Octave Equalizers, Phasers, Flangers, Vocal Formant Filters, and digital models of classic synthesizer filters.

Filter Types

This screen allows you to choose the type of filter for the current layer.

L1 FILTER	Ord	Type
Phazer 2 E4	6	PHA

Filter Types

LPF	Low-pass filter
PHA	Phaser
HPF	High-pass filter
FLG	Flanger
BPF	Band-pass filter
VOW	Vowel/ formant
EQ+	EQ boost
EQ-	EQ cut
SFX	Special Effect

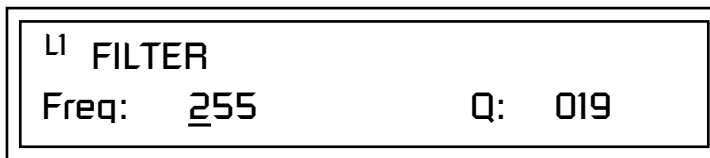
Filter Name	Order	Type	Description
Smooth	02	LPF	Typical OB type low-pass filter with a shallow 12 dB/octave slope.
Classic	04	LPF	4-pole low-pass filter, the standard filter on classic analog synths. 24 dB/octave rolloff.
Steeper	06	LPF	6-pole low-pass filter which has a steeper slope than a 4-pole low-pass filter. 36 dB/octave rolloff!
Shallow	02	HPF	2-pole high-pass filter. 12 dB/octave slope.
Deeper	04	HPF	Classic 4-pole high-pass filter. Cutoff sweep progressively cuts 4th Order High-pass.
Band-pass1	02	BPF	Band-pass filter with 6 dB/octave rolloff on either side of the passband and Q control.
Band-pass2	04	BPF	Band-pass filter with 12 dB/octave rolloff on either side of the passband and Q control.
ContraBand	06	BPF	A novel band-pass filter where the frequency peaks and dips cross each other midway in the frequency range.
Swept1>1oct	06	EQ+	Parametric filter with 24 dB of boost or cut and a one octave bandwidth.
Swept2>1oct	06	EQ+	Parametric filter with 24 dB of boost or cut. The bandwidth of the filter is two octaves wide at the low end of the audio spectrum, gradually changing to one octave wide at the upper end of the spectrum.
Swept3>1oct	06	EQ+	Parametric filter with 24 dB of boost or cut. The bandwidth of the filter is three octaves wide at the low end of the audio spectrum, gradually changing to one octave wide at the upper end of the spectrum.
AahAyEeh	06	VOW	Vowel formant filter which sweeps from "Ah" sound, through "Ay" sound to "Ee" sound at maximum frequency setting. Q varies the apparent size of the mouth cavity.
Ooh-To-Aah	06	VOW	Vowel formant filter which sweeps from "Oo" sound, through "Oh" sound to "Ah" sound at maximum frequency setting. Q varies the apparent size of mouth cavity.

Proteus 2000 Filter Types

Filter Name	Order	Type	Description
PhazeShift1	06	PHA	Recreates a comb filter effect typical of phase shifters. Frequency moves position of notches. Q varies the depth of the notches.
PhazeShift2	06	PHA	Comb filter with slightly different notch frequency moving the frequency of notches. Q varies the depth of the notches.
FlangerLite	06	FLG	Contains three notches. Frequency moves frequency and spacing of notches. Q increases flanging depth.
BlissBatz	06	SFX	Bat phaser from the Emulator 4.

Filter Parameters

The Freq and Q parameters control various elements of the filter depending on the type of filter used. See the table in the *Filter Types* section for details about what the Freq and Q fields control in each filter.

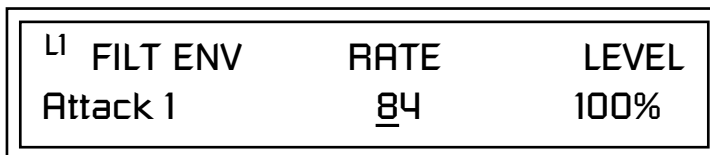


Filter Envelope

The Filter Envelope is normally used to control the filter frequency and has six stages. Unlike the Volume Envelope, the Filter Envelope must be patched to the Filter Frequency using a PatchCord. In this respect, it can be thought of as a general purpose envelope generator which is normally patched to control the filter. The Filter Envelope Levels can be negative as well as positive.

There are three mode options:

- **Time-based:** Defines the Filter Envelope rates from 0 to 127 (approximately 1 ms to 160 seconds). The Master clock has no affect on time-based rates.



- **Tempo-based:** The Filter Envelope times vary based on the master tempo setting and are displayed in values such as 1, 2, 3, etc. Note values are displayed instead of a number when the time corresponds to an exact note value. Tempo-based envelopes are useful when using arpeggiators and sequencers because the envelope rates compress and expand according to the Master Tempo setting, keeping the envelopes in sync with the music. See the illustration on page 97.

L1	FILT ENV	RATE	LEVEL
	Attack 1	1/4	100%

Envelope Repeat

The Envelope Generators can also be made to repeat. When the envelope repeat function is On, the Attack (1&2) and Decay (1&2) stages will continue to repeat as long as the key is held. As soon as the key is released, the envelope continues through its normal Release stages (1 & 2). For more information, see “Envelope Repeat” on page 60.

► To Turn on Envelope Repeat:


1. Move the cursor until it is underneath the Mode field as shown below.


L1	FILTER ENVELOPE
	<u>M</u> ode: time-based

2. Turn the data entry control clockwise. The lower line changes to:

L1	FILTER ENVELOPE
	Repeat: off

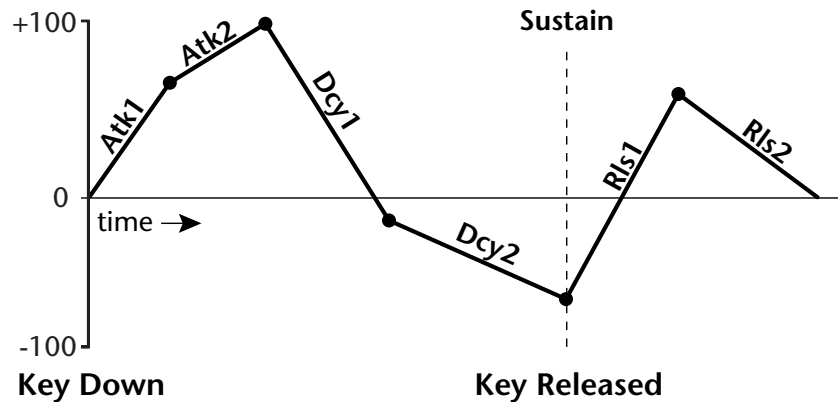
3. Move the cursor underneath the on/off field, then turn the data entry control clockwise so that Repeat is On.

 See the Programming Basics section of this manual for detailed information about how the Envelopes work.

 The default PatchCord settings connect the Filter Envelope to Filter Frequency but the envelope can be routed to any real-time control destination using a PatchCord.

Defining the Filter Envelope

The Filter Envelope controls the filter frequency of the layer over time. The Envelope has six stages to the contour: Attack 1, Attack 2, Decay 1, Decay 2, Release 1 and Release 2. When a key is pressed, the Envelope goes through the first four stages. If the key continues to be held, the envelope holds at the Decay 2 level. When the key is released, the envelope immediately jumps to the Release 1 stage, then the Release 2 stage finally ending at the Release 2 level.



Auxiliary Envelope

The Auxiliary Envelope is a supplementary general purpose envelope that can be routed to any real-time control destination in the PatchCords. It is identical to the filter envelope generator. See “Filter Envelope” on page 104 for full details.

Low Frequency Oscillators (LFOs)

A Low Frequency Oscillator or LFO, is simply a wave that repeats at a slow speed. Proteus 2000 has two LFOs per layer identified on the display as LFO1 and LFO2.

An LFO can be routed to any real-time control destination using a PatchCord. LFOs have a myriad of uses, some of which probably haven't been thought of yet. The following examples show a few common uses.

- Control the pitch of the sound (LFO -> Pitch). This effect is called “vibrato” and is an important performance tool. Many presets use this routing with the modulation wheel controlling “how much” modulation is applied.
- Create a “tremolo” effect by routing the LFO to control the volume (LFO -> AmpVolume).
- Add a bit of animation to the sound by routing the LFO to control the filter. Set the PatchCord amount low for a subtle effect.

The LFOs have five parameters: Shape, Sync, Rate, Delay and Variation.

Shape

LFO waveforms have different shapes. The shape of the waveform determines the effect of the LFO. LFOs have traditionally been used to add vibrato or repeating movement to a sound. These new shapes offer a lot of new programming possibilities.

If you modulate the pitch of an instrument, it's easy to visualize the shape of the waveform. For example, the sine wave has a smooth, rolling shape that changes the pitch smoothly. The square wave changes between two pitches abruptly. A sawtooth waveform increases the pitch smoothly, then abruptly changes back down. The available waveforms are shown below.

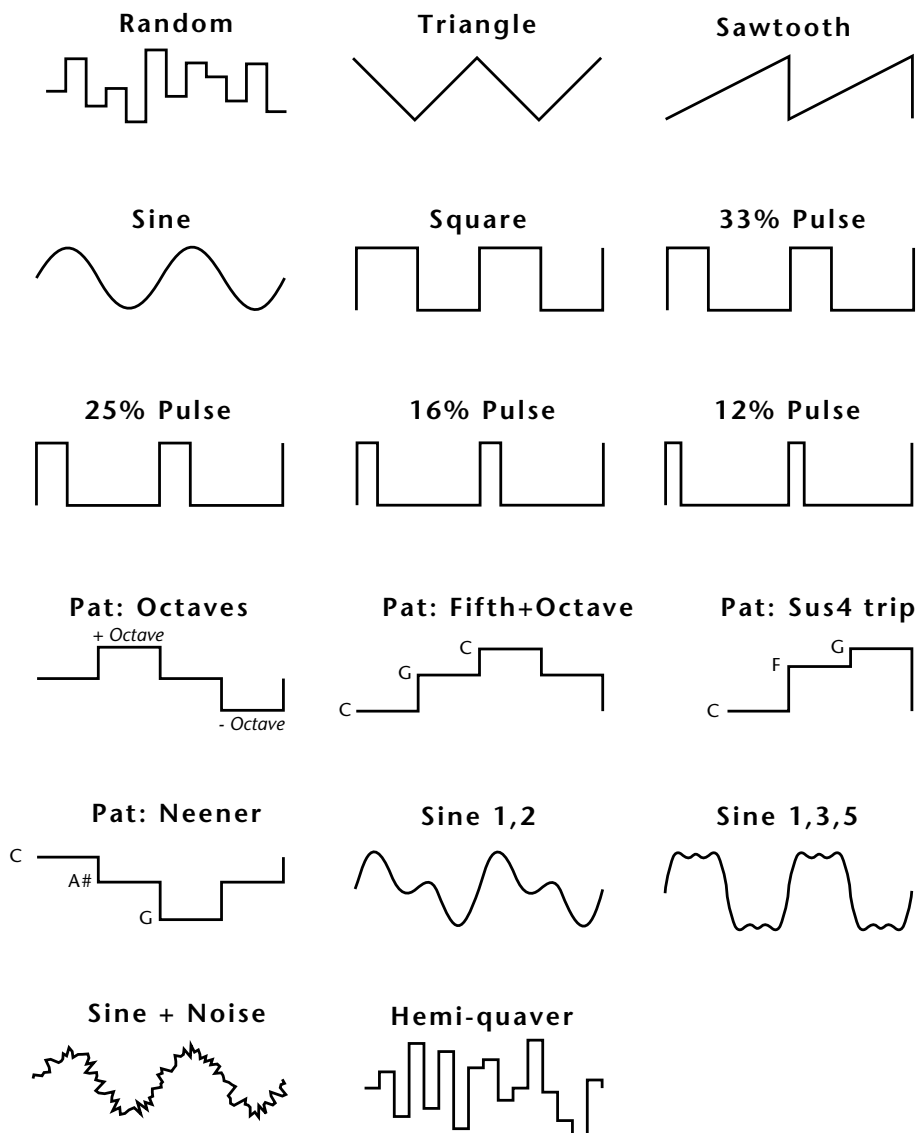
LFO Tricks & Tips:

- The Random LFO wave is truly random and is different for each voice and layer.
- The Pattern (Pat) waveforms will sound the same on different layers and voices.
- Sine + Noise is very useful for simulating trumpet and flute vibrato.

★ When routing Hemi-quaver to Pitch:

- +38 = major scale
- 38 = phrygian scale
- +76 = whole tone scale
- (+38) + (+76) = diminished (two cords)
- odd amount = S+H sound

Note: References to musical intervals in the pattern LFO shapes are with the LFO routed to pitch and a PatchCord amount of +38.



L1	LFO1	SHAPE	SYNC
		sawtooth	<u>key</u> sync

Sync

The Sync field specifies whether the LFO is synchronized to a key stroke or is Free Running. Key Sync starts the LFO wave at the beginning of its cycle each time you press a key on the controller. In Free Run mode, the LFO wave begins at a random point in its cycle each time you press a key on the controller.

Rate

The Rate field determines the LFO speed in absolute frequency rate values or tempo-based note values. All values equal to or greater than zero specify absolute frequency values from 0.08 Hz to 18.14 Hz.

Values less than zero specify tempo-based rates. If you modulate the rate of a tempo-based LFO, the rates will jump between the tempo-based note values with each PatchCord increment of "1". As an example: if the LFO rate was set to 8/1 and you patched the Mod Wheel to control rate with a PatchCord amount of +1, turning the Mod Wheel to maximum would change the LFO rate to 4/1d. Refer to the chart below.

L1	LFO1	RATE	DELAY	VAR
		<u>0</u> .08Hz	60	020

Tempo-based Rates (based on Master Tempo)	Display
octal whole note	8/1
dotted quad whole note	4/1d
octal whole note triplet	8/1t
quad whole note	4/1
dotted double whole note	2/1d
quad whole note triplet	4/1t
double whole note	2/1
dotted whole note	1/1d

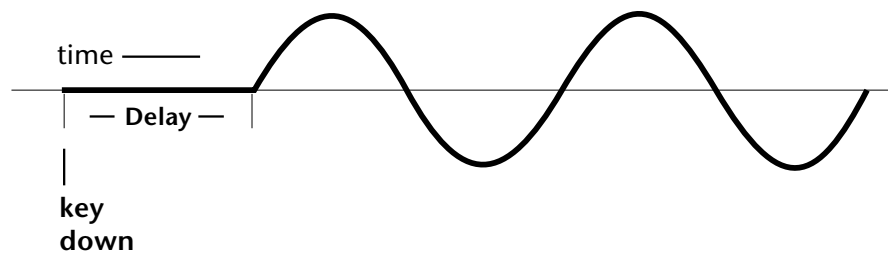


LFO Synced to 1/4 Note Clock

Tempo-based Rates (based on Master Tempo)	Display
double note triplet	2/1t
whole note	1/1
dotted half note	1/2d
whole note triplet	1/1t
half note	1/2
dotted quarter note	1/4d
half note triplet	1/2t
quarter note	1/4
dotted 8th note	1/8d
quarter note triplet	1/4t
8th note	1/8
dotted 16th note	1/16d
8th note triplet	1/8t
16th note	1/16
dotted 32nd note	1/32d
16th note triplet	1/16t
32nd Note	1/32

Delay

The Delay parameter defines the amount of time between hitting a key on the controller and the onset of the LFO modulation. Delay can be used to simulate an effect often used by acoustic instrument players where the vibrato is brought in only after the initial note pitch is established. The following illustration demonstrates how delay works.



All Delay values equal to or greater than zero specify absolute time rates from 0 to 127. Values less than zero specify Tempo-based mode. Refer to the previous table for times and tempo-based rates.

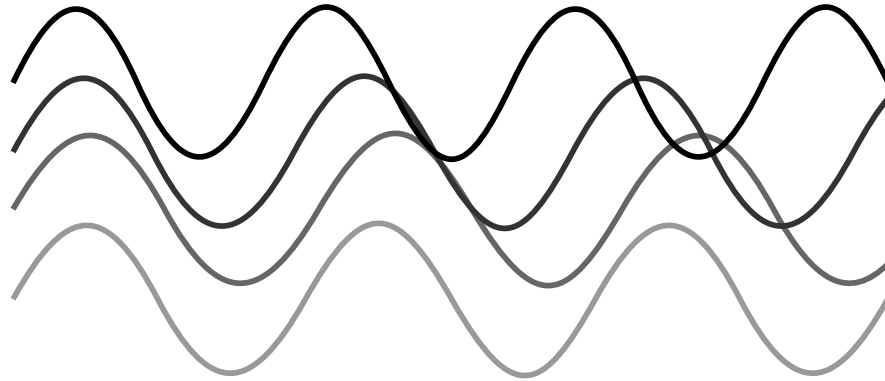
Variation

LFO Variation sets the amount of random variation of the LFO each time you press a key on the controller. This creates a chorus or ensemble effect since each note played has a slightly different modulation rate. The higher the value entered, the greater the note to note variation in the LFO.

The Variation value range is from 0 through 100.



Variation is disabled when a Tempo-Based LFO is selected.

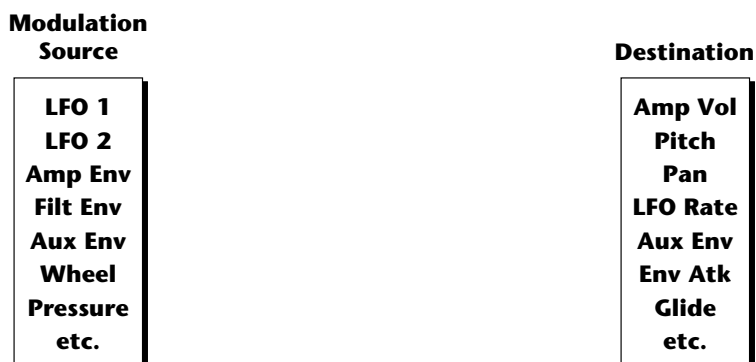
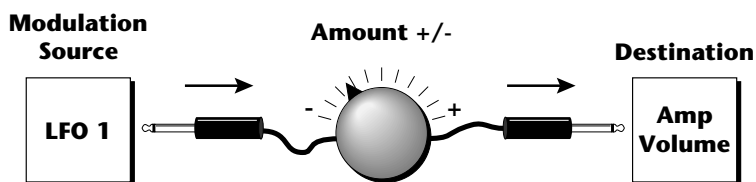


LFO variation changes the rate of each note to create an “ensemble” effect.

PatchCords

PatchCords tie everything together by connecting modulation sources to destinations. Each PatchCord has its own *Amount* control which can be positive or negative (negative amounts invert the signal). In addition, the PatchCord amounts themselves can be controlled by any modulation source. Proteus 2000 provides 24 patches for each layer.

There are three permanently connected control routings: volume envelope to amplifier, pitch wheel to pitch and key to pitch. All other connections must be made using the PatchCords.



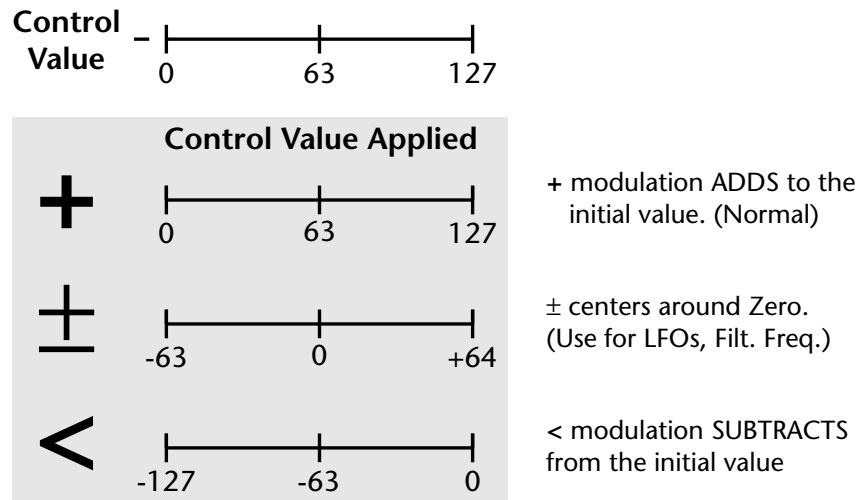
Each patch has an amount field which determines how much modulation is applied to the destination. The modulation amount can be positive or negative. Negative values invert the input. The amount value range is from -100 to +100.

L1	PATCHCORD	#01
<u>R</u> lsVel	-> AmpVol	+100

L1	PATCHCORD	#24
<u>K</u> ey+	-> FiltRes	-27

Modulator Polarity

You will notice that some of the modulation sources have symbols following their names. For example, there are three Velocity modulation sources, Vel +, Vel ±, and Vel <.



“+” Modulation: Uses only the positive half of the range, adding to the current value. For example, if the filter frequency were set to 100 and you patched Vel+ to the filter, the filter frequency would increase from 100 as velocity was applied.

“±” Modulation: Uses both sides (full) range and both adding and subtracting from the current value. For example, if the filter frequency were set to 100 and you patched Vel ± to the filter, the filter frequency would decrease from 100 with key velocities of 63 or less and increase from 100 with key velocities of 64 and above. Therefore with medium velocity, the Filter frequency is approximately where you set it at 100.

An LFO ± works the same way; on the positive half of the cycle it increases the initial amount and on the negative half of the cycle it decreases the initial amount. With a ± modulation source, a value of 64 equals 0.

“<” Modulation: Uses only the negative half of the range, subtracting from the current value. For example, if the Amplifier Volume were set to +3 dB and you patched Vel < to AmpVol, the volume would be at +3 dB only when maximum key velocity were applied. Lower key velocities would scale back the volume. In general, < modulation is the proper choice when modulating Volume.

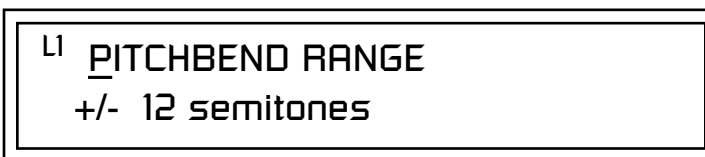
Refer to the following table for a list of modulation sources and destinations available in the Proteus 2000.

Modulation Sources:	Modulation Destinations
Off	Off
Key (+, ±)	KeySust (Key Sustain)
Velocity (+, ±, <)	FinePtch (Fine Pitch)
RlsVel (Release Velocity)	Pitch
Gate	Glide
Pressure	ChrsAmt (Chorus Amount)
PitchWhl (Pitch Wheel)	'SStart (Sample Start) -note-on)
ModWhl (Modulation Wheel)	SLoop (Sample Loop)
Pedal	SRetrig (Sample Retrigger)
MIDI A-L	FiltFreq (Filter Frequency)
FootSw1 - 3 (Foot Switch 1-3)	'FiltRes (Filter Resonance -note-on)
FootnFF (Flip-Flop Foot Switch 1 -3)	AmpVol (Amplifier Volume)
MIDI Volume (Controller 7)	AmpPan (Amplifier Pan)
MIDI Pan (Controller 10)	RTXfade (Real-time Crossfade)
KeyGlide	VEnvRts (Volume Envelope Rates -all)
VolEnv +, ±, < (Volume Envelope)	VEnvAtk (Volume Envelope Attack)
FilEnv +, ±, < (Filter Envelope)	VEnvDcy (Volume Envelope Decay)
AuxEnv +, ±, < (Auxiliary Envelope)	VEnvRls (Volume Envelope Release)
LFO 1 & 2 (+, ±)	FEnvRts (Filter Envelope Rates -all)
White (White Noise)	FEnvAtk (Filter Envelope Attack)
Pink (Pink Noise)	FEnvDcy (Filter Envelope Decay)
XfdRand (Crossfade Random)	FEnvRls (Filter Envelope Release)
KeyRand 1 & 2 (Key Random)	FEnvTrig (Filter Envelope Trigger)
Lag 0 sum (summing amp out)	AEnvRts (Auxiliary Envelope Rates -all)
Lag 1 sum (summing amp out)	AEnvAtk (Auxiliary Envelope Attack)
Lag 0 & 1 (Lag Processor)	AEnvDcy (Auxiliary Envelope Decay)
Clk Divisors (Octal, Quad, Double Whole, Whole, Half, Qtr, 8th, 16th)	AEnvRls (Auxiliary Envelope Release)
DC (DC Offset)	AEnvTrig (Auxiliary Envelope Trigger)
Summing Amp	LFO 1 & 2 Rate
Sum	LFO 1 & 2 Trigger
Switch	Lag Processor In 0 & 1
Absolute Value	Sum (Summing Amp)
Diode	Switch
Flip-Flop	Abs (Absolute Value)
Quantizer	Diode
4x Gain	Quantize
	Flip-Flop
	Gain 4x
	Cord 1-24 Amount

Pitch Bend Range

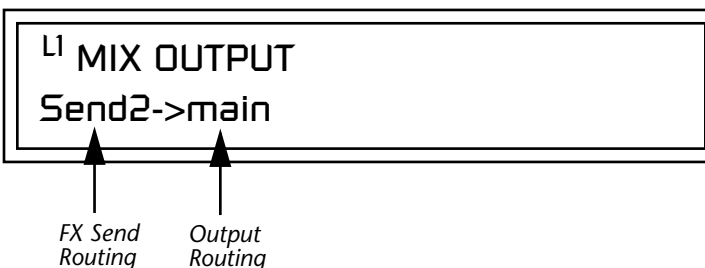
Specifies the Pitch Wheel range in semitones for the current layer. Pitch Wheel is a standard synthesizer control which is transmitted as a MIDI continuous controller message used (normally) to bend the pitch up and down.


The PitchBend range is from 0 to ± 12 semitones or "Master." A setting of "0" turns the pitch wheel Off for the current layer. The Master setting uses the Pitch Bend range defined in the *Master menu*.



Mix Output

This feature allows you to program the Effect Send as a part of the preset. Note that for this feature to work, the Mix Output setting in the Master menu MUST be set to "Preset" on the selected MIDI channel. If you want to define output routing by MIDI channel, set it up using the Mix Output page in the Master menu. See "Mix Output" on page 38 for more information.



 The entire Send is disconnected from the Effects Processors even if only one plug is inserted into the Submix jack.

The Sends function as effect processor inputs (effect sends). Send 2 and Send 3 are also used to route sounds to the Sub 2 and 3 outputs on the back panel. When a plug is inserted into the associated Submix jack on the back panel, the Send is routed directly to the output jack, bypassing the effects processor.

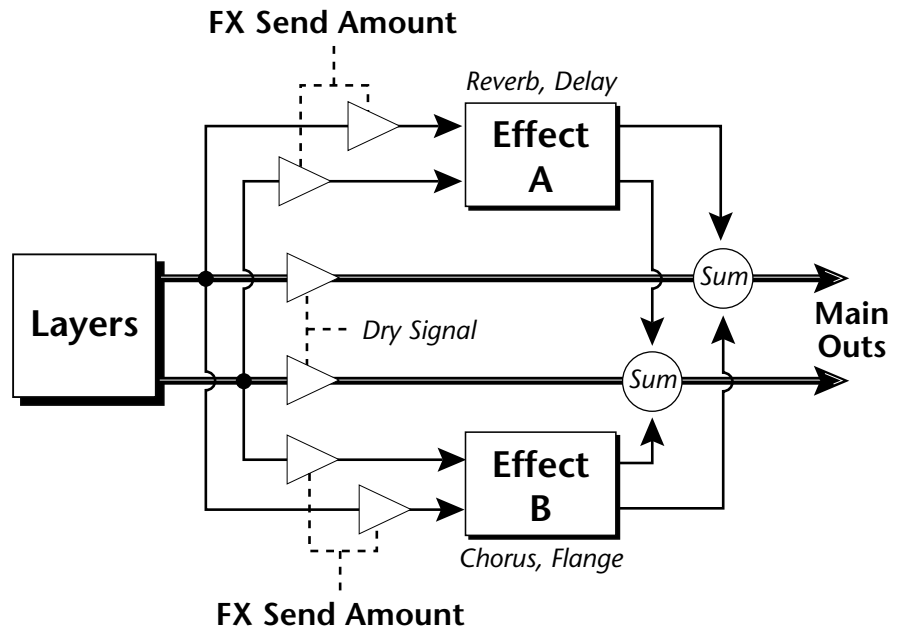
The Output Routing field shows the true routing of the Sends either to Main (through the effects processor) or directly to a Submix output. If a plug was inserted into a Sub 1 jack, the screen above would change to show, "Send2 -> sub1". This indicates that the preset is routed to the Sub 1 output jacks.

Common Preset Parameters

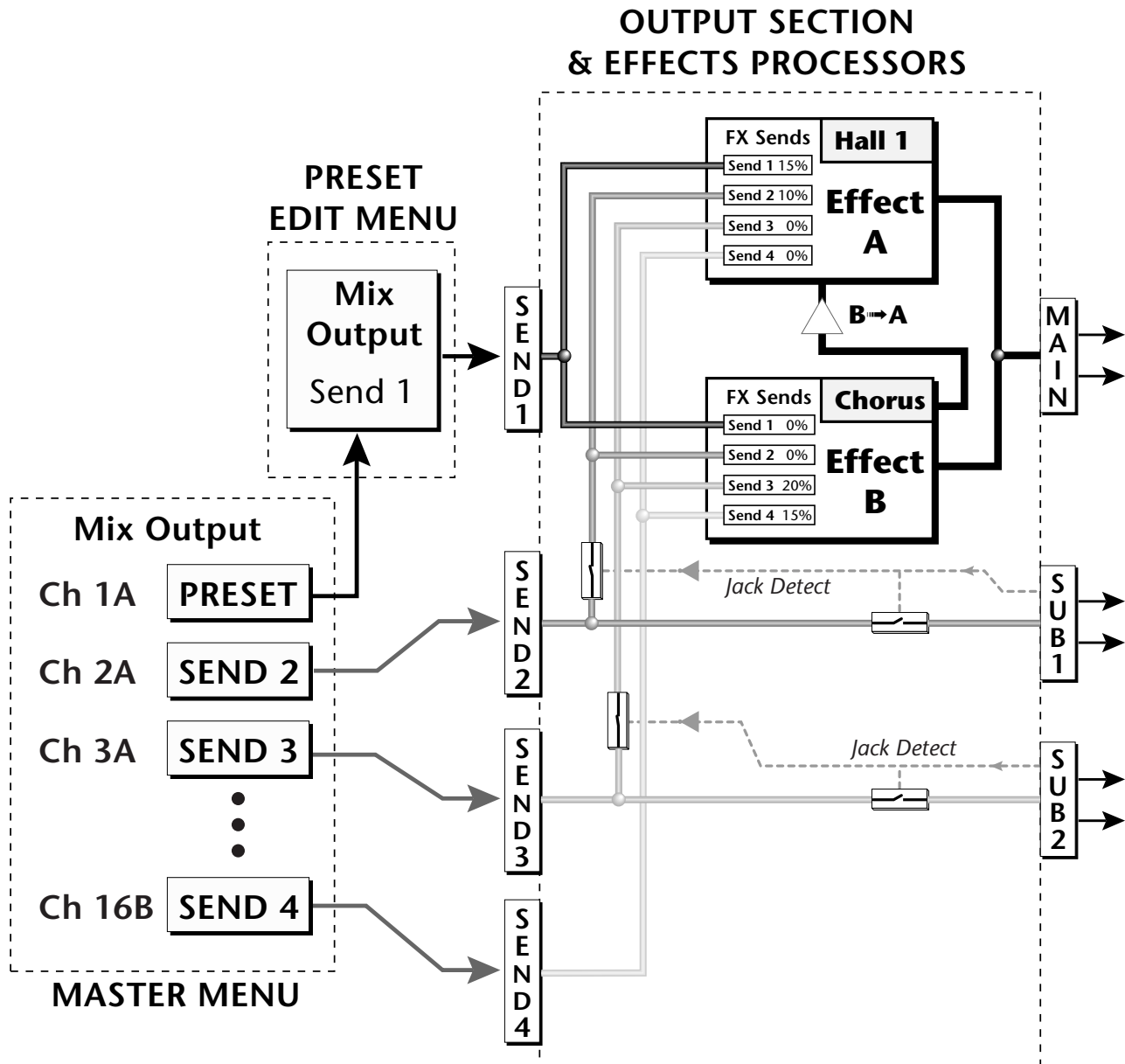
Presets Effects

This section of the Edit menu chapter describes parameters that affect all layers in the preset.

Proteus 2000 has two stereo effects processors. When playing presets one at a time, the two processors can be programmed as part of the preset. The diagram below shows how the effects are integrated into the signal path using a parallel effects send/return model, similar to a mixing console.



Refer to the Effects chapter for additional information and instructions for setting up both the Preset Effects and the Master Effects.



The Mix Output setting in the Master Menu determines if the Preset's Mix Output routing will be used. This allows the Sends to be programmed by either MIDI Channel or by Preset, whichever you prefer.

FXA Algorithm

This screen selects the effect type for Effect Processor A. The “A” effects consist of different reverb types and digital delays. Move the cursor to the lower line of the display and select the effect you want.



A Effect Types

1. Room 1
2. Room 2
3. Room 3
4. Hall 1
5. Hall 2
6. Plate
7. Delay
8. Panning Delay
9. Multitap 1
10. Multitap Pan
11. 3 Tap
12. 3 Tap Pan
13. Soft Room
14. Warm Room
15. Perfect Room
16. Tiled Room
17. Hard Plate
18. Warm Hall
19. Spacious Hall
20. Bright Hall
21. Bright Hall Pan
22. Bright Plate
23. BBall Court
24. Gymnasium
25. Cavern
26. Concert 9
27. Concert 10 Pan
28. Reverse Gate
29. Gate 2
30. Gate Pan
31. Concert 11
32. Medium Concert
33. Large Concert
34. Large Concert Pan
35. Canyon
36. DelayVerb 1
37. DelayVerb 2
38. DelayVerb 3
39. DelayVerb 4 Pan
40. DelayVerb 5 Pan
41. DelayVerb 6
42. DelayVerb 7
43. DelayVerb 8
44. DelayVerb 9

FXA Parameters

The FXA parameters are Decay, High Frequency Damping, and the FxB to FxA send. **Decay** sets the length of time it takes an effect to fade out. **HF Damping** causes the high frequency energy to fade away more quickly during the reverb decay. **FxB to FxA** controls the amount of the “B” effect sent through effect “A”. This allows you to place the two effects in series and create setups such as “distortion through reverb” among others. Please refer to the Effects chapter for more information about the effects.

FXA	DECAY	HFDAMP	FxB>FxA
	048	064	000

FXA Send Amounts

These parameters set the effects amounts for each of the four stereo effects busses.

FXA SEND AMOUNTS	1:100%
2: 50%	3: 10%
	4: 0%

FXB Algorithm

This screen selects the effect type for Effect Processor A. Move the cursor to the lower line of the display and select the effect you want.

FXB ALGORITHM
Panning Delay

B Effect Types

- | | | |
|--------------|--------------------|-----------------------|
| 1. Chorus 1 | 12. Flange 5 | 23. PanDelay Chorus 1 |
| 2. Chorus 2 | 13. Flange 6 | 24. PanDelay Chorus 2 |
| 3. Chorus 3 | 14. Flange 7 | 25. Dual Tap 1/3 |
| 4. Chorus 4 | 15. Big Chorus | 26. Dual Tap 1/4 |
| 5. Chorus 5 | 16. Symphonic | 27. Vibrato |
| 6. Doubling | 17. Ensemble | 28. Distortion 1 |
| 7. Slapback | 18. Delay | 29. Distortion 2 |
| 8. Flange 1 | 19. Delay Stereo | 30. Distorted Flange |
| 9. Flange 2 | 20. Delay Stereo 2 | 31. Distorted Chorus |
| 10. Flange 3 | 21. Panning Delay | 32. Distorted Double |
| 11. Flange 4 | 22. Delay Chorus | |

FXB Parameters

The FXB parameters are Feedback, LFO Rate and Delay. **Feedback** sends the output of the effect back into the input. This creates multiple echoes on a delay effect and intensifies a chorus or flange effect. **LFO Rate** allows you to change the speed of the modulation oscillator for flange and chorus effects. **Delay** sets the length of the delay line. This affects the time between echoes, or the tone of flange effects.

FXB	FEEDBK	LFORATE	DELAY
	032	003	200ms

FXB Send Amounts

These parameters set the effects amounts for the four stereo effects busses.

FXB SEND AMOUNTS	1: 100%
2: 50%	3: 10%
	4: 0%

Effects Patchcords

Effects PatchCords give you real-time control of the effects send amounts. You can dynamically adjust the effects mix during a sequence or live performance. The effect processors are a powerful synthesis tool and this feature lets you control and use them in exciting new ways. There are 12 effects PatchCords per preset with a source, a destination and an amount control. The amount can be set from -100 to +100. The effects PatchCord controls are **added** to the FX Send Amounts set in the Master or Edit menus.



The FX Cords allow you to crossfade between effects.

- 1) Set FXA Send 1 to 100%.
- 2) Set FXB Send 1 to 0%.
- 3) Set FX Cord #1 to FXA Send 1 at -100.
- 4) Set FX Cord #2 to FXB Send 1 at +100.

Increasing the controller amount will crossfade from FXA to FXB.

FX CORDS	#01
Pedal -> FXBSend2	+100

Modulation Sources:

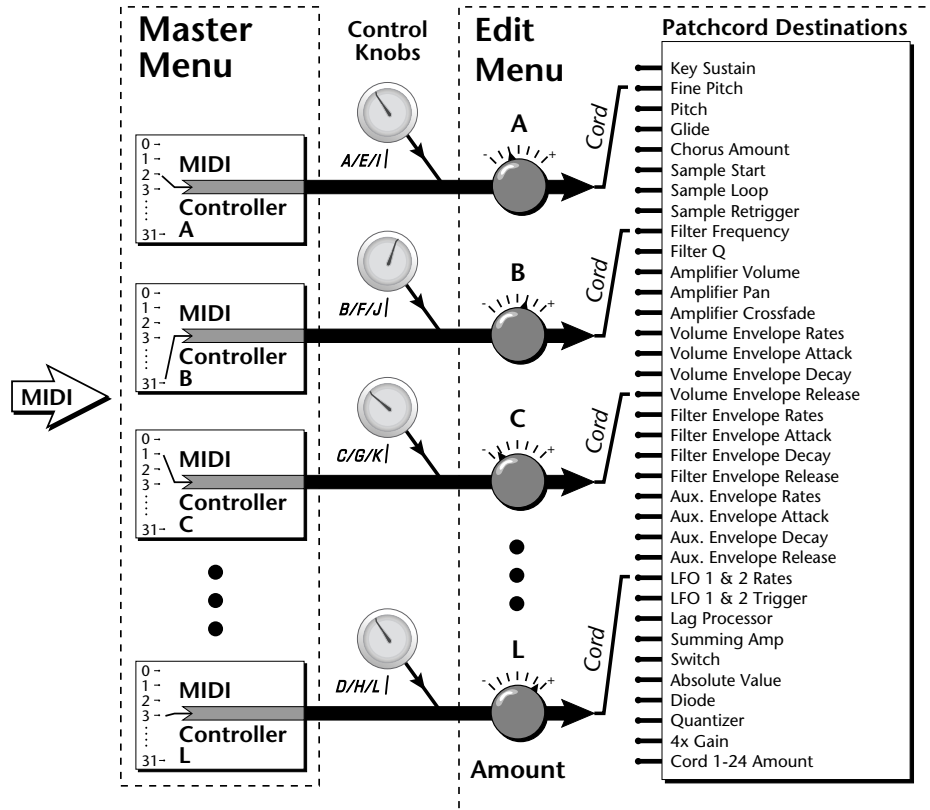
- Off
- PitchWhl (Pitch Wheel)
- ModWhl (Modulation Wheel)
- Pedal
- MIDI Volume (Controller 7)
- MIDI Pan (Controller 10)
- MIDI A-L

Modulation Destinations

- Off
- Effect A Send 1
- Effect A Send 2
- Effect A Send 3
- Effect A Send 4
- Effect B Send 1
- Effect B Send 2
- Effect B Send 3
- Effect B Send 4

Initial Controller Amount

This parameter sets the initial value of MIDI controllers A-L when the preset is first selected. The front panel Control Knobs can be thought of as front panel MIDI controllers because in the Proteus 2000, they are treated just as if they originated from an external MIDI device. Refer to the following diagram. There are three Initial Controller Amount screens (A-D, E-H, I-L).



External MIDI controller numbers are assigned to the Letters A-L in the Master menu. The Initial Controller Amount value is sent to the PatchCord destination when the Preset is first selected. If you move the Control Knob, then that value replaces the initial value. If MIDI controller data is received it will similarly replace the knob or initial setting.



The Initial controller amounts can be set from 000-127 or they can be turned Off. If set to Off, the current controller value is used when the preset is first selected. Setting the Initial Amount to "off" uses the values from the previously selected preset.

Keyboard Tuning

In addition to the standard equally divided octave tuning, Proteus 2000 contains twelve factory programmed tunings and 12 user-definable tunings. The Keyboard Tuning parameter selects which tuning is used by the current preset. The User Tuning tables are defined in the Master menu.

The factory Keyboard Tuning tables are described in the following table.

Tuning Tables	Description
Equal Temperament	Standard Western tuning (12 equally spaced notes per octave)
Just C	Just intonation. (Based on small interval ratios. Sweet and pure, non-beating intervals.)
Vallotti	Valotti & Young non-equal temperament. (Similar to 12 tone equal temperament. Each key has a different character for a given scale.)
19-Tone	19 tone equal temperament. (19 notes per octave. Difficult to play, but works well with a sequencer.)
Gamelan	5 tone Slendro and 7 tone Pelog. (Javanese. Pelog are white keys, Slendro are black keys. Exotic tunings of Gamelan flavor.)
Just C2	Allows you to play the following chords in the key of C: C, E, F, G, A, B, C#m, D#m, Em, F#m, G#m, Am, Bm
Just C-minor	Allows you to play the following chords in the key of C: C, E, F, G, A, B, Em, Am, Bm, C#m, D#m, G#m
Just C3	Allows you to play the following chords in the key of C: C, D, F, Bb, C#m, Dm, Em, F#m, G#m, Am
Werkmeister III	A "well" temperament developed in the 17th century. Although you can play in all keys, each key sounds slightly different.
Kirnberger	Another well temperament developed by Johann Philipp Kirnberger where no pitch is more than 12 cents off from equal temperament.
Scarlatti	A variant of Meantone tuning which was used from the 15th to 18th centuries.
Repeating Octave	Middle C octave is repeated up and down the keyboard. Link with a preset in equal temperament to form unusual inversion up and down the keyboard.
User 1-12	Define your own tuning tables (<i>Master menu</i>).

Refer to "User Key Tuning" on page 53 in the Master Menu chapter for instructions on how to define your own Keyboard Tunings.



Proteus 2000 implements the MIDI Tuning Dump protocol which allows you to create tuning tables on your personal computer and download them via MIDI. There are several computer applications available on the internet which let you create and download tuning tables via MIDI.

The Just C Tuning Tables

Well Tempered and Just were standard keyboard tunings up until the 20th-century when the current “equal tempered” scale became prevalent. In an equal tempered scale, the octave is equally divided into 12 parts. In Just or Well Tempered scales, the 12 notes are separately tuned to produce pure chords. However, in Just tunings you are limited to playing certain chords and if you play the wrong chord it may sound very BAD!

Proteus 2000 allows you to modulate between keys by providing you 12 user tuning tables. Tuning tables can be changed as you play using a program change (create several presets with the same sound and different tuning tables), by MIDI SysEx command (using a programmable MIDI footswitch or other device), or using a continuous controller (link 2 presets and crossfade between them using a controller). The Just C2, Just C min, Just C3 Tuning Tables

These new tuning tables take the concept of just intonation a step beyond previous E-mu products. Fully explaining the mysteries of just intonation is beyond the scope of this manual, but the subject is covered exhaustively in Hermann Helmholtz's On the Sensations of Tone, available at most libraries and bookstores.

The new tables are called Just C2, Just C3, and Just C Minor. Try playing in the key of C/Cm using each table. You'll quickly discover both the wonders and the frustrations of just intonation! In Just C, for example, you'll find that the chords C, Em, F, G, and Am sound beautiful. If you hold one of these chords, you'll hear no “beating”. After playing for a few minutes, switch back to Equal Temperament for a rude awakening!

At this point you might wonder why anyone would use Equal Temperament to begin with. For the answer to that question, play a D, Dmi, or Bb chord!.The intervallic ratios that make the C & G chords sound so pure make the D chord sound horribly out of tune. That's why we had to include Just C3. In this tuning, D, Dmi and Bb sound in tune, but the G chord will sound wrong.

Each of the 4 tables allows you to play a different group of common chords in just intonation. Sadly, there is no single 12 note tuning that will allow all of the common chords to be in tune, and of course that's why they invented the equal temperament tuning system that we use today.

Just C

Play these chords: C, E, F, G, A, Cm, C#m, Em, F#m, Gm, Am

Just C2

Play these chords: C, E, F, G, A, B, C#m, D#m, Em, G#m, Am, Bm

Just C2 minor

Play these chords: C, D^b, D, E^b, G, A^b, Cm, Em, Fm, Gm

Just C3

Play these chords: C, D, F, B^b, C#m, Dm, Em, F#m, G#m, Am

Preset Links

You can link presets to other presets to create layering or keyboard splits. The current preset can be linked with up to two other presets (Links 1 & 2). Each linked preset can be assigned to a specific range in order to create keyboard splits or can be assigned a velocity range to switch links according to key velocity. In addition, you can specify Volume, Pan, Transpose and Delay settings for each Link. The modulation parameters specified in each preset remain in effect for each preset in the link.

LINK 1 Preset	CMP5R
000 ² Preset Name	

LINK 1	KEY	VEL
RANGE	C-2	G8
		000-127

LINK 1	VOLUME	PAN
	+0dB	00

LINK 1	TRANSPOSE	DELAY
	+00	0

Links provide an easy way to create new sounds by combining the existing presets. Or, you can create your own custom stacked presets with up to 12 layers! We're talking LARGE sounds here. Of course Links can also be used when you just want to stack up two sounds.

As an example, let's stack two presets to create a big sound. Start with a preset you like, then go into the Links screen and start scrolling through the preset list while you play to hear both presets together. When you find a winner, simply Save the preset and you're finished!

- You can "Split" the keyboard up to 12 ways by using combinations of the Layers and Links.
- By adjusting the Velocity for the link, you can bring in the link by playing hard.
- Transposing the Link can radically change the sound.
- The delay parameter lets you create surprise effects, echoes or cascades of sound as you continue to hold the keys.

Preset Tempo Offset

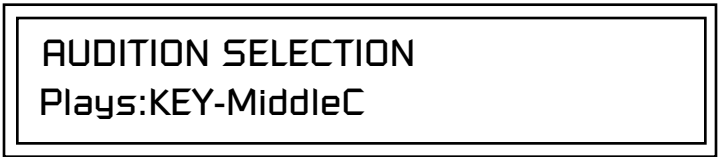
This function allows you to double or halve the Master Tempo as it applies to this preset. When playing or sequencing several presets in Multimode, the Master Tempo may be too fast or slow for one preset. Using this feature, you can adjust the tempo for the misbehaving preset. The Tempo Offset can use the **current tempo** or be set to **half** or **twice** the current tempo.



Audition Riff Selection

This function allows you to assign a Riff to a Preset to be played when the front panel Audition button is pressed. A Riff is a short pre-recorded musical phrase designed to demonstrate the presets. A Riff can also be a single note. The Riffs themselves cannot be modified.

Listening to the Riffs is a quick way to learn the sounds in Proteus 2000. Riffs allow the Sound Designers to demonstrate what they had in mind when they designed the preset. If a preset has hidden tricks or controllers, these will be shown off in the Riff.



Play Solo Layers

When constructing multilayer sounds it is often useful to turn off one or more of the layers so you can hear what you're doing! This feature allows you to temporarily solo individual layers or listen to them in any combination. This screen differs from the other Edit screens in that it is NOT saved with the preset. The values reset each time you exit the Edit menu.

Solo is activated by setting any layer to On (On = the layer is being Soloed). Any layers set to **On will play** and any layers set to **Off will be muted**. If all layers are set to Off, then Solo mode ends and all layers play normally. When you exit the Edit menu, all layers play normally.

