Evolver
Keyboard

Operation Manual

Dave Smith

I N S T R U M E N T S

Evolver Keyboard Operation Manual

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Dave Smith Instruments
1210 Cabrillo Hwy N
Half Moon Bay, CA 94019-1449
USA

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For Technical Support, email: support@davesmithinstruments.com

Contents

Welcome…

Thanks for purchasing the Evolver Keyboard! Listen to the sounds, twiddle some knobs, have some fun!

Register

If you purchased directly from us, there is no need to register – we already have your contact information. If you purchased it from a music dealer, please go to www.davesmithinstruments.com and register.

Quick Start

Here's how to quickly get started with your new keyboard:

First, plug in the power supply. The power supply will work anywhere in the world; change the AC adapter if necessary. Next, plug the stereo audio outputs into your mixer/sound system and switch on the power.

Start playing!

Try applying keyboard pressure (aftertouch) and the mod wheel. Many sounds are fairly simple at first, but come alive when you use the controllers. With other sounds, you may need to hold the notes a while to let the sound unfold. Playing in different ways has a big effect on the Programs.

Selecting and Editing Programs, Combos, and Global Settings

To change Programs, you can use the +/- switches to step through the Programs. Also, the PARAM 1 knob changes the Program number, and the PARAM 2 knob changes the Bank.

If you want to edit a Program, just turn any knob. The new value will be displayed in the LCD. Once a parameter has been selected, the PARAM 2 knob will also change the value, and the +/- switches will increment or decrement the value. Hit the + and - switches at the same time to set the parameter to zero.

That's the whole idea with this instrument – grabbing knobs and changing the sound! After turning knobs, just hit the Program switch so the LCD goes back to the Program / Bank screen, allowing you to change Programs again.

Your Evolver also has some very cool features for use as a stereo signal processor – be sure to check this out.

Press the GLOBAL switch to change higher level parameters, such as MIDI channel number, Transpose/Detune, and so on. These are remembered when the synth is turned off. Note that in Global Mode, the screen displays two parameters at a time. The top parameter is changed by the PARAM 1 knob and the lower parameter is edited by the PARAM 2 knob. The +/- switches select new pages.

Summary

You should be up and running now; for more operation information, read on. Or, just look up specific parameters for detailed notes. Pages 33 through 35 contain a handy reference for mod destinations and sources. At some point you should read through the manual to discover all the little features that you might not notice at first.

I should mention that this manual does not include explanations of basic synthesizer functions. It assumes you already know what an oscillator is, how a lowpass filter affects the sound, what an ADSR envelope looks like, and so on.

Fortunately, these days it is quite easy to find such resources on the Internet. If you want to learn the lingo and the basics, just try a search in Google (or the search engine of your choice), something like "analog synthesizer tutorial". You'll find plenty of good reading material.

Have fun!

Dave Smith

About the Programs

There are 512 Programs in your Evolver keyboard. The factory Programs are on our website if you ever need to refresh it. There are also additional banks of Programs on our website.

   Note: *Remember to occasionally save your sounds via program dumps!*

The programs are organized as follows:

Bank 1 and 2: These are classic Evolver sounds to be played from the keyboard.

Bank 3: These programs are all sequencer-based; they will not play from the keyboard; hit the Start switch to hear them.

Bank 4:
Programs 1 – 19: Droning sounds; they always play while selected. A couple have simple sequences that alter the playback to varying degrees.

Programs 20 – 29: Signal processing programs meant to be used with a guitar plugged into the Left Input jack. Or, any mono audio source can be used, but with liberal use of distortion, they lean heavily towards guitar use.

Programs 30-39: Signal processing programs meant to be used with external stereo audio sources plugged into the Left and Right Input jacks. Try playing a CD through Evolver with these programs.

Programs 40 – 127: Are a mix of miscellaneous keyboard-based sounds.

   Note: *Program 128 in every bank is a basic Program, meant to be a good starting point for making new programs from scratch*

The Programs were collected from previous Evolver and Poly Evolver patches, and a bunch of new ones were made up for the keyboard. Special thanks to Program contributors (past and present), including:

Tim Ande
Andrew Bode
Cameron Brand
David Bryce
Chris Curtis
Mike Estee
Don Gothard
Damon Menne
Eric Norlander
Mike Peake
Ravi Ivan Sharma
Doug Terrebonne
Goffe Torgerson
Stefan Trippler
Dave Wyatt

Frequently Asked Questions

The Evolver is a very flexible instrument. While this provides a wide range of operational possibilities, it also means that you can put it into a state where it doesn't seem to work. Here are some tips:

- **How do I save a Program?** Hit the WRITE switch. Then press the +/YES switch when prompted. All other switches are locked out, though you can hit the -/NO switch if you change your mind. You can change the Program and/or Bank and store in a different location using the knobs. You can also press COMPARE to check the sounds in the Program destinations.

- **When I change Programs, the Sequencer speed always stays the same.** Check the Global Prog Tempo parameter – if it is Off, then the speed is not updated when Programs change. Set it to On.

- **I can't get the filter to oscillate.** Check the 4/2/POLE switch – the filter only oscillates when in 4-pole mode. (The filter is in 4-pole mode when the 4/2/POLE switch is lit.)

- **I seem to be getting distortion in my output.** Assuming that Distortion and Output Hack are off, you are likely just overloading the signal somewhere. There are many signal sources, and many sources of gain. If too many are used at levels that are too high, you will likely get some distortion. For example, if you are using all four oscillators, lower the LEVEL setting of each oscillator to the 40 – 60 range. Likewise, if using all three delay taps, lower the AMOUNT setting of each.

- **I can't hear the External Audio input.** In addition to increasing External In LEVEL, the filter and VCA must be open to hear the signal. You can initially turn up the Lowpass Filter FREQUENCY and the initial VCA LEVEL to hear the signal. The Peak Hold or Envelope Follower can be used to control the VCA or Filter level, or the sequencer can trigger the envelopes. There are many different ways to use different modulation sources to control the VCA and Filter when using external inputs.

Chaining Multiple Evolvers Together

The Evolver Keyboard voice is identical to the 4 voices in a Poly Evolver (keyboard and rack), and the single voice in the original desktop Evolver. This compatibility enables you to chain multiple Evolvers together to increase polyphony, using your Keyboard as a controller for all chained Evolvers.

Note: *If the Poly Chain parameter is Off, the Poly Chain MIDI Output jack acts as a second MIDI Out jack.*

Poly Chain with a Poly Evolver Rack

You can poly chain your Evolver Keyboard with a Poly Evolver Rack for a very portable 5-voice synth. You should be aware, though, that you will not be able to control the Poly Evolver Rack's Combos from the Evolver Keyboard (the Evolver Keyboard is monophonic and doesn't *have* Combos) and that if you use the Rack's Mix Inputs, the 1 voice contributed by the Evolver Keyboard may be noticeably louder than the other 4 voices. The monophonic and polyphonic Evolvers' outputs are optimized for the best signal-to-noise ratio. The Poly Evolvers have more voices and thus require more headroom. In other words, the outputs on the Poly Evolvers are not as hot as on the Evolver Keyboard (or the desktop model). We suggest using a mixer to balance the levels. You will also need to load the same programs into both instruments.

To chain a single Poly Rack to your Evolver Keyboard:

1. Connect the Poly Chain MIDI output on the back of your Evolver Keyboard to the MIDI In of the Poly Rack.

2. On the Keyboard, in Global select the Poly Chain screen, and set it to the total number of voices. In this case, the total would be 5; 1 from the Evolver Keyboard, plus 4 from the Rack.

3. Next set the MIDI clock parameter to MIDI Out on the keyboard (or MIDI In/Out if using an external MIDI clock to drive the keyboard). On the Rack, select MIDI Clock In.

You should be all set to play! You can now virtually ignore the Rack, since the controls on the keyboard will control both units as if they were a single 5 voice. This includes saving a Program; if you save an edited program on the keyboard, it will also save the program on any Poly Chained instruments (updated with the latest revision software).

Note: *Remember that if you change a Main parameter on the Keyboard, the Rack will change also. For example, changing MIDI channels on the Keyboard will also change the MIDI channels on the Rack, which is likely what you would want. There are a couple exceptions: if you change Poly Chain or MIDI clock, it is not chained, since these parameters are usually different in each unit.*

Using Multiple Poly Racks

You can also chain more than a single Rack in the same manner. With two Racks, set the main parameter Poly Chain on the Keyboard to 9, and set Poly Chain on the first Rack to 8. The second Rack Poly Chain should be set to Off.

On the Keyboard MIDI clock is again set to Out, the first Rack set to In/out, and the second Rack to In.

Chaining Mono Evolvers

You can also use one or more mono desktop Evolvers for more voices. If using one, set the Keyboard to MIDI clock Out, and set Poly Chain to 2. Set the Evolver to MIDI Clock In.

A Note on Versions

The same basic voice structure is used on all Evolvers. Great care has been taken to maintain backwards compatibility, but there have been a few changes necessary in both the mono Evolver and the Poly Rack to make them work more seamlessly with the keyboard.

As a result, you may have to update your current synths to be compatible. Please check our website to get the latest information on these updates.

The Evolver Voice

This section provides a brief description of the architecture of a single Evolver voice. The signal flow diagram on the next page is a good starting point for understanding how the Evolver works.

The Analog Side

The analog electronics consist of two identical (Left/Right) synth sections, each with an analog waveshape oscillator, a 2/4 pole resonant lowpass filter, and a Voltage Controlled Amplifier (VCA). Control voltages are generated by the processors to control the analog components.

The Digital Side

Surrounding the analog electronics is a high-speed Digital Signal Processor (DSP) that both pre- and post-processes the audio signal. Since the DSP also computes the control voltages for the analog circuitry, it can handle a wide range of modulation with high precision.

The DSP provides audio functions such as the Digital Oscillators, Envelope Follower, the Peak/Hold detector (and associated external trigger generator), Highpass filter, Distortion (with noise gate), Pan, Delay, and Hack. It also handles the tuned feedback, as well as the additional Delay feedback paths and all the modulation calculations (envelopes, LFOs, routing, and so on).

Analog-to-Digital (A/D) and Digital-to-Analog (D/A) converters are used to connect the analog and digital sections. There are two sets of stereo converters running at a 48 kHz sampling rate with 24 bits of precision for minimum impact on the analog sound.

Audio Inputs and Outputs

There are several audio jacks on the rear panel. All are unbalanced stereo pairs (two mono jacks). First, there are the Audio Inputs for using the Evolver as a signal processor.

Next are the Stereo Outputs. If you only use the Left/Mono jack, you will get a mono mix of both channels – but you really should use both channels! Finally, there is a stereo headphone jack on the rear panel.

> **Note**: *Always turn down your mixer/amplifier volume when turning the instrument on or off to prevent pops!*

Evolver Signal Path
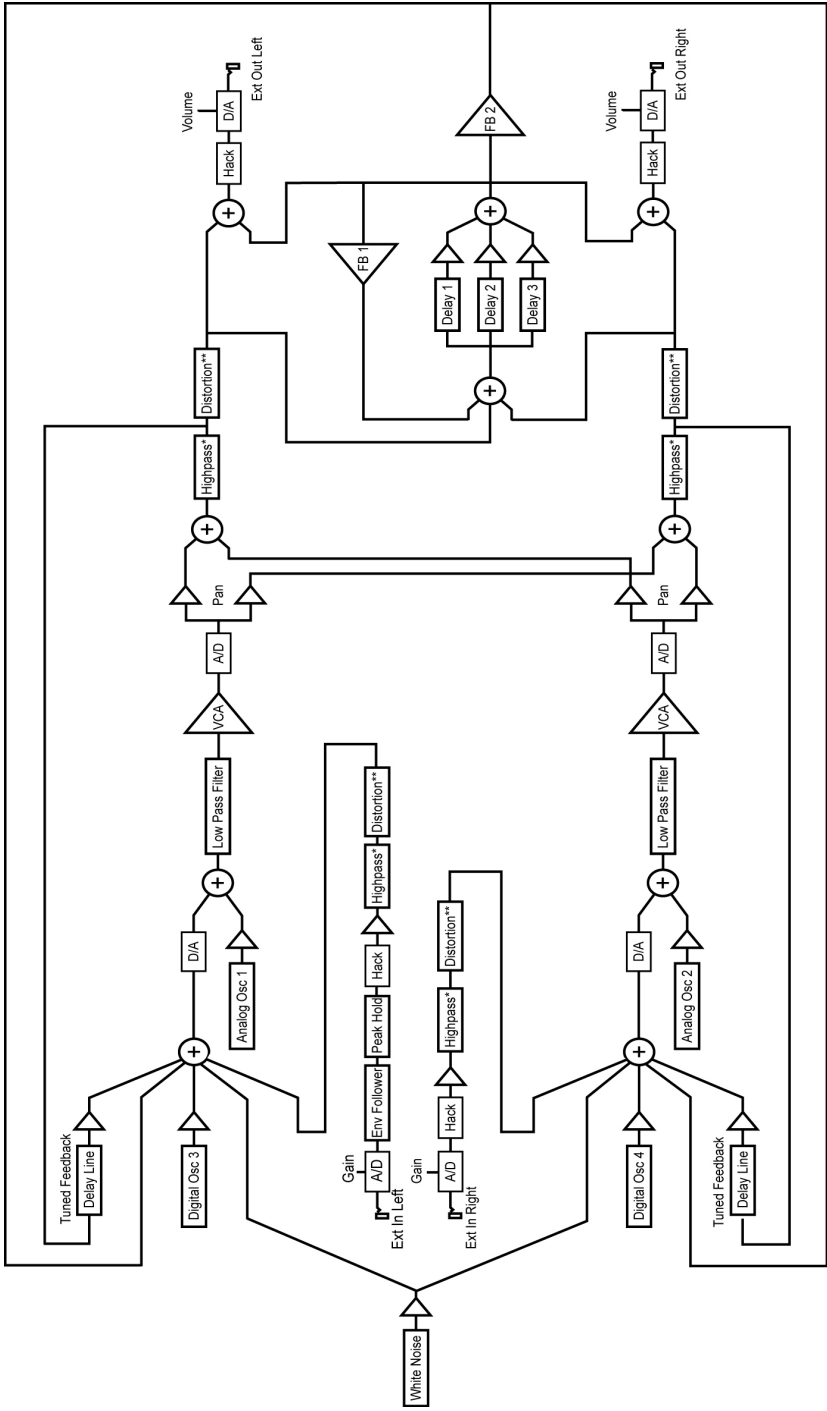
* Highpass can be placed either before or after analog filter

** Distortion can be placed either before or after analog filter

Basic Operation

When you first turn the power on, the keyboard will be in Program Mode with the PROGRAM LED lit and the following screen active:

```
Program: xxx B: x
xxxxxxxxxxxxxxxx
```

The top line shows the Program (1…128) and Bank (1…4) number of the currently selected Program, and the bottom line shows the 16-character name of the Program. The PARAM 1 knob changes the Program, and the PARAM 2 knob changes the Bank. The Program can also be incremented or decremented by pressing the +/YES or -/NO switch respectively.

To edit a Program, simply turn any knob. See the Program Parameters section for a detailed list of all parameters and their functionality. After editing parameters, hit the PROGRAM switch to enable program changes again.

Saving a Program
To save a Program, press the WRITE switch and the following screen appears:

```
Write? P: xxx B: x
Hit:  Yes or No
```

Press the +/YES switch to save the current Program, or -/NO (or the WRITE switch again) to cancel. To store in a different location, use PARAM 1 to select a new destination, and PARAM 2 for a different bank.

If there is a Poly Chained Evolver or Poly Evolver, and they have been updated to the latest software revisions, the program will also be saved in the chained units.

Compare Feature: While editing a Program, you can press the COMPARE switch to listen to the original version. If you press the switch again, the Evolver returns to the edited version.

Audition Destination Feature: While there is a write pending (see screen above), you can press the COMPARE switch to hear the target Program destination before saving. Just be sure to turn Compare off again before you actually hit the +/YES switch to save.

Transposing the Keyboard Range
Use the UP and DOWN Transpose switches to transpose the Keyboard up or down in octaves. The LED indicates the current keyboard transposition state. The transposition changes the MIDI note number of the keys, so MIDI notes sent will also be transposed.

Global Parameters

To edit the Global parameters, press the GLOBAL switch. The PARAM 1 knob changes the parameter on the upper LCD line, and the PARAM 2 knob changes the lower parameter. Use the +/YES and -/NO switches to change pages.

> **Note**: *If you hold the -/NO switch while you hit the +/YES switch, it will jump to the last page. Similarly, if you hold the +/YES switch when you hit the -/NO switch, it will jump to the first page.*

Page 1:

```
Transpose:    xx
Fine Tune:    xx
```

Transpose: *-36…+36* – Master Transpose control, 0 is centered. Steps in semitones.

Fine Tune: *-50…+50* – Master Fine Tune control; 0 centered. Steps in cents (50 cents = ½ semitone).

Page 2:

```
MIDI Channel: xx
Poly Chain:   xx
```

MIDI Channel: *ALL, 1…16* – Selects which MIDI channel to send and receive data, 1 to 16. All receives on any channel.

Poly Chain: *Off, 2…20* – Use this to link multiple Evolvers and/or Poly Evolvers into a system with more voices by intelligently processing the keys hit and passing MIDI data through to the Poly Chain MIDI out jack, where it can be routed to another Evolver or Poly Evolver. Note that MIDI clocks are handled separately per the MIDI Clock parameter. Check page 5 for more details.

If Poly Chain is set to Off, the Poly Chain MIDI out jack duplicates the MIDI out jack.

Page 3:

```
Clock:  xxxxxxx
Prog Tempo:   xx
```

Clock: *see table* – Selects the MIDI clock status, and enables External sequencer triggers, as follows:

Display	MIDI Clock Setting
Internal	MIDI clock is neither sent nor received
MIDI Out	MIDI clock is sent
MIDI In	MIDI clock is received
MidiIn/Out	MIDI clock is received and transmitted (use with Poly Chain)
MidInNoS/S	MIDI clock is received, but MIDI start/stop/continue messages are ignored.

Prog Tempo: *Off, On* – When set to Off, changing a Program will not change the tempo- this is useful for keeping a constant tempo but using different sounds. If set to On, a Program change will change the tempo to the BPM and Clock Divide values saved with the Program. When on, changing the main BPM will also change the Program BPM, and vice-versa. When off, changing one has no effect on the other.

Page 4:

```
Tempo (BPM): xxx
Clock Div:xxxxxx
```

Tempo: *30…250* – Sets the basic speed for the sequencer in BPM. Actual speed also depends on the Clock Divide setting. If using MIDI clock, it will display the BPM of the incoming MIDI clocks. If Prog Tempo is On, the Tempo and Clock Divide will both be updated on every Program change.

Clock Divide: *see table* – Used as a clock divider to provide a wider range of sequencer speeds. When set to Quartr (quarter notes), the BPM setting is exact, i.e. 120 BPM = 120 BPM. If set to Half (half note), the actual speed is half, so a setting of 120 BPM will actually play at 60 BPM.

Swing settings add a delay to every the odd steps (1, 3, 5, and so on), while shortening the even steps by the same amount, for a swing feel to the timing. Half swing is the same with less delay.

Here are all the possible settings, with the effect on the overall tempo:

Display	Tempo	Timing Division
Half	BPM/2	Half note
Quartr	BPM	Quarter note
Eighth	BPM x 2	Eighth note
8 half	BPM x 2	Eighth note, half swing timing
8swing	BPM x 2	Eighth note, full swing timing
8 trip	BPM x 3	Eighth note triplets
16th	BPM x 4	Sixteenth note
16half	BPM x 4	Sixteenth note, half swing timing
16swng	BPM x 4	Sixteenth note, full swing timing
16trip	BPM x 6	Sixteenth note triplets
32nd	BPM x 8	Thirty-second note
32trip	BPM x 12	Thirty-second note triplets
64trip	BPM x 24	Sixty-fourth note triplets

Page 5:

```
MIDI Program:xxx
MIDI Pressure:xx
```

MIDI Program: *Off, On* – When On, the synth will respond to MIDI program changes received, and will transmit Program changes to MIDI Out.

MIDI Pressure: *Off, On* – When On, the synth will respond to MIDI pressure (aftertouch) received, and will transmit Keyboard Pressure to MIDI Out.

Page 6:

```
MIDI Control: xxx
MIDI SysEx: xx
```

MIDI Control: *Off, On* – When On, the synth will respond to MIDI controllers, and will transmit controllers from the keyboard to the MIDI Out. Controllers include Pitch Wheel, Mod wheel, Pedal 1, and pedal 2.

MIDI SysEx: *Off, On* – When On, the synth will respond to MIDI SysEx messages, and will transmit them from the keyboard to the MIDI Out. Note that all knobs/parameters on the keyboard are sent as SysEx messages when enabled.

Page 7:

```
Input Gain: xxxxx
LCD Contrast: xx
```

Input Gain: *0db… 24d* **–** Provides extra gain on the Left and Right External Inputs. You can select no gain (0 dB), or a gain in steps of 3 dB up to 24 db.

> **Note:** *When this screen is selected, Sequence 1-8 LEDs become a VU meter for the left external input audio, and Sequence 9-16 for the right channel.*

LCD Contrast: *1…100* – This sets the contrast level for the LCD. Normally it will be around 25.

Page 8:

```
Pedal 1: xxxxxxxx
Pedal 2: xxxxxxxx
```

Pedal 1: *see table* – Sets the destination for the Pedal/CV1 input. Note that this input is heavily filtered for clean operation, so there is a limit to the speed it will respond to an external control voltage.

Pedal 2: *see table* – Same for Pedal/CV 2.

Display	Pedal Routing
FootCtrl	Routed to the Foot Control Modulation
Breath	Routed to the Breath Control Modulation
Expressn	Routed to the Expression Modulation
Volume	Controls Master Volume
LpFilter	Routed to the low pass filter
LpF Half	Routed to the low pass filter, but with half the range

Page 9:

```
Velocity Curve: x
Pressure Curve: x
```

Velocity Curve: *1…4* – Sets one of the four velocity curves for the keyboard; this gives you the ability to adjust the keyboard to your playing style.

Pressure Curve: *1…4* – Sets one of the four pressure curves for the keyboard; this gives you the ability to adjust the keyboard to your playing style.

Page 10:

```
LocalControl: xxx
DamperPolarity: x
```

Local Control: *Off, On* – Enables or disables the internal connection between the keyboard and panel controls and the synth electronics. This is useful with external sequencer operation.

DamperPolarity: *-, +* – For compatibility with different sustain (Damper) pedals connected to the Sustain jack on the rear panel. Use + for normally open switches, and use – for normally closed switches.

Page 11:

```
PotMode: xxxxxxx
```

PotMode: *Relative, Passthru, Jump* – The Evolver Keyboard PE (Pot Edition) has two types of rotary controls on its front panel, potentiometers (or "pots") and rotary encoders. Of the 58 controls, 43 of them are pots. Generally speaking, the more performance-oriented controls—like the filter's Frequency and Audio Mod controls—are pots. The most obvious difference between the pots and encoders is that the pots have about 330 degrees of travel with obvious minimum and maximum settings and the encoders are "endless"—they just keep turning. The three pot modes determine how the synth reacts when a pot-equipped parameter is edited.

When set to Relative, changes are relative to the stored setting. In Relative mode, the full value range is not available until either the minimum or maximum value and the respective lower or upper limit of the pot's travel is reached.

For example, the Resonance parameter has a value range of 0 to 127. Let's say the physical position of the Resonance pot is the equivalent of a value of 100. If you switch to a program that has a stored Resonance setting of 63 and turn the pot all the way up, it will only go to 90. To get to the maximum value of 127, you first have to turn down until the value is at the other extreme and the pot is at the limit of its travel (in this case, 0 and fully counter-clockwise, respectively).

In Passthru mode, turning the pot has no effect until after the edited value equals the preset value (that is, until the edited value "passes through" the stored value).

Jump mode uses an absolute value based upon the position of the pot when edited: turn a pot and the value jumps immediately from the stored value to the edited value.

Page 12:

```
Dump: (Hit S/S)
xxxxxxxxxxxxxxxx
```

MIDI Dumps: *see table* – Allows dumping of Programs over MIDI in a number of ways.

Display	MIDI Transmit Operation
Current Program	Send current program
Current Bank	Send all 128 programs in current bank
All Banks	Send all programs in all four banks

When this screen is active, the sequencer START/STOP LED will start blinking. When the START/STOP switch is hit, the transmission will start. It is handy for saving Programs on a computer or sending to another Evolver. The dumps include Program and Bank numbers, so when received the programs will be stored in the same location.

Program Parameters

All Program parameters can be edited using the front panel controls. To edit a program, simply turn the desired parameter knob. The selected parameter and value appears in the LCD display.

After a parameter is selected by turning its knob, you can also use the PARAM 2 knob to change the value of the selected parameter. The +/YES or -/NO switches incrementally adjust parameter values as well.

> **Note**: *Hit both +/YES or -/NO at the same time to set the parameter to zero.*

Following are descriptions of each Evolver Program parameter.

Oscillators

There are four oscillators in the Evolver voice. To select a particular oscillator for editing, press the appropriate oscillator switch, 1-4. Turning a knob will then adjust the parameters of the selected oscillator.

> **Note**: *Holding one of the four switches will solo that oscillator (the switch will blink) by setting the levels of the other three to zero. It does not affect any modulation that is routed to oscillator level, though, so at times it may not completely turn off all other levels.*

Oscillators 1 and 2
Oscillators 1 and 2 are analog oscillators. Oscillator 1 is hardwired to the Left channel; Oscillator 2 is hardwired to the Right channel.

> **Note**: *There are additional modulation controls that affect Oscillators 1 and 2. These are covered in other sections of the Parameter definitions.*

Frequency: *C -2…C 8* – Selects the base oscillator frequency over a 10 octave range, from 8 Hz to 8kHz, stepping in semitones. C3 is middle C, the first octave is -2 (C-2, C#-2, and so on), the second octave is -1 (C-1, C#-1, and so on), the third is zero (C 0, C# 0…), and so on.

Fine: *-50…+50* – Fine Tune control; 0 centered. Steps in cents (50 cents = ½ semitone).

Shape/PW: *see table* – Selects the analog waveshape as follows:

Display	Waveshape
Sawtooth	Sawtooth
Triangle	Triangle
Saw-Tri	Sawtooth – Triangle mix
Pulse xx	Pulse Wave, with pulse width ranging from minimum (0) to maximum (99). The pulse width will turn off at the two extremes – this allows some interesting modulation possibilities. A square wave will be around Pulse 50.

Level: *0…100* – Sets the volume of the selected Oscillator.

Glide: *Normal 0…100; Finger 02…Finger 100; Keybd Off* – Sets the Oscillator Glide rate. Glide can be set independently for each oscillator. Low settings are faster. Normal Glide covers the range from 1 to 100 (0 is no glide). A "fingered" mode that only glides when more than one note is held down is selected by setting glide over 100, where it ranges from Finger 02 to Finger 100 (equivalent to glides of 2 to 100).

> **Note**: *If you set glide all the way to maximum, it goes to Keybd Off, which has the effect of disconnecting the selected oscillator from the keyboard.*

Sync 2-> 1 – When enabled (lit), turns oscillator hard sync on. With sync on, whenever oscillator 2 resets, it will also reset oscillator 1 for the classic hard sync sound.

Oscillators 3 and 4

Oscillators 3 and 4 are digital waveshape oscillators. Oscillator 3 is hardwired to the Left channel; Oscillator 4 is hardwired to the Right channel. Like the original Prophet VS, the digital oscillators in Evolvers get quite trashy at higher frequencies.

Frequency: *C -2…C 8* – Selects base frequency over a 10 octave range, from 8 Hz to 8kHz, stepping in semitones. C3 is middle C, the first octave is -2 (C-2, C#-2, and so on), the second octave is -1 (C-1, C#-1, and so on), the third is zero (C 0, C# 0…), and so on.

Fine: *-50…+50* – Fine Tune control; 0 centered. Steps in cents (50 cents = ½ semitone).

Shape/PW: *1…128* – Selects a digital waveshape. Waveshapes 1 - 95 correspond to ROM (preset) Waveshapes 32 - 126 in the Prophet-VS. Waveshapes 97 - 128 are user programmable via the software editor. In the VS, the user waves were 0 - 31, and wave 127 was noise, which is not included because the Evolver has a separate noise generator. Wave 96 has a Waveshape that is unique to Evolver in place of the VS noise. Wave 95 (126 on the VS) is a "blank" wave, which can give some options while sequencing waves. The Evolver ships with waves 97 - 128 the same as 1 - 32.

Level: *0…100* – Sets the volume of the selected Oscillator.

Glide: *Normal 0…100; Finger 02…Finger 100; Keybd Off* – Sets the oscillator Glide rate. Glide can be set independently for each oscillator. Low settings are faster. Normal Glide covers the range from 1 to 100 (0 is no glide). A "fingered" mode that only glides when more than one note is held down is selected by setting glide over 100, where it ranges from Finger 02 to Finger 100 (equivalent to glides of 2 to 100).

> **Note**: *If you set glide all the way to maximum, it goes to Keybd Off, which has the effect of disconnecting the selected oscillator from keyboard.*

FM: *0…100* – Sets the amount of Frequency Modulation. If Oscillator 3 is selected, FM is applied to Oscillator 3 from Oscillator 4. If Oscillator 4 is selected, FM is applied to Oscillator 4 from Oscillator 3. Note that each digital oscillator can FM the other at the same time for some wild results.

Ring Mod: *0…100* – Sets the amount of Ring (Amplitude) Modulation. If Oscillator 3 is selected, Ring Modulation is applied to Oscillator 3 from Oscillator 4. If Oscillator 4 is selected, Ring Modulation is applied to Oscillator 4 from Oscillator 3. Note that each digital oscillator can Ring modulate the other at the same time.

Note: *If the Ring Mod amount is turned up, you will get output from the Oscillator even if the Oscillator Level is set to zero.*

Shape Seq: *Off, Seq1...4 –* This parameter allows sequencing Waveshapes. Off if not in use, otherwise select one of the four sequences Seq 1, Seq 2, Seq3, or Seq 4 to change the waveshape on every sequence step. In other words, if sequence 1 is selected, with step 1 = 10 and step 2 = 5, then waveshape 10 will play in the first step, and waveshape 5 will play in the second.

Noise
Level: *0…100* – Controls the volume of white noise mixed into the filter. The same amount goes into both channels.

External In
Level: *0…100* – Controls the volume of external audio input connected to the Left and/or Right Audio Input jack on the rear of the Evolver Keyboard. There is a clip LED to the right of the control to indicate clipping on the input signal.

Note: *Use the Input Mode parameter in the Misc Params section to choose the input mode.*

Low-Pass Filter

The analog (*real* analog!) low-pass filter is actually two different filters; one for the Left channel and one for the Right channel. This allows true stereo processing of external audio signals run through Evolver. However, for simplicity and consistency the two filters are normally driven together in tandem, so they normally respond the same way.

Exceptions are when using the SPLIT parameter, and when using the separate filter cutoff and resonance modulation destinations, which allow the two filters to be modulated independently. Note that though they are normally controlled together, since they are analog there will always be some subtle differences between the two filters, which gives the Evolver a more natural sound.

4 Pole: – Selects either 2- or 4-pole operation for the filter. (The filter is in 4-pole mode when the 4 POLE switch is lit.)

Frequency: *0…164* – Sets the base filter cutoff frequency over more than 13 octaves. There is special smoothing on the operation of the filter knob to eliminate stepping as you turn the knob for clean manual filter sweeps.

Resonance: *0…100* – Sets the Resonance level of the filter. At high settings the filter will self-oscillate in 4-pole mode. If the filter does not oscillate, make sure the 4 pole switch is on.

Env Amount: *-99…+99* – Sets the amount of filter envelope to the cutoff frequency. This can be positive or negative, allowing inverted envelope control of the filter.

Velocity: *0…100* – Amount of key velocity controlling the level of the filter envelope.

Key Amount: *0…100* – Sets the amount of keyboard (MIDI note) to the filter cutoff. A setting of 72 will step the filter one semitone for each MIDI note, 36 would be half-semitones, and so on. Also, the MIDI note is derived using Oscillator 1 Glide, allowing Glide tracking.

Attack: *0…110* – Sets the Attack time of the filter ADSR envelope generator

Decay: *0…110* – Sets the Decay time.

Sustain: *0…100* – Sets the Sustain level.

Release: *0…110* – Sets the Release time.

Audio Mod: *0…100* – Sets the amount of audio modulation from the analog oscillator to the filter, separate in left and right channels (that is, Oscillator 1 modulates the left filter, and Oscillator 2 mods the right filter).

L/R Split: *0…100* – Split separates the cutoff of the left and right filters by raising the left and lowering the right. Normally the filters track in both channels, so this parameter provides a way to unlock them.

Amplifier

VCA Level: *0…100* – Sets a base level for the VCA (Voltage controlled Amplifier). This allows the VCA to be essentially bypassed, which may be necessary for processing external audio signals, or for Programs that drone.

> **Note:** *If VCA Level is on full, Envelope Amount has no effect.*

Env Amount: *0…100* – Sets the amount of VCA envelope to the VCA level.

Velocity: *0…100* – Sets the amount of keyboard velocity controlling the level of the VCA envelope.

Attack: *0…110* – Sets the Attack time of the VCA ADSR envelope generator.

Decay: *0…110* – Sets the Decay time.

Sustain: *0…100* – Sets the Sustain level.

Release: *0…110* – Sets the Release time.

Output Pan: *see table* – Sets output panning. This also affects the feedback; it allows signals from one channel to feedback into the other, for example.

Display	Output Pan Selection
LxxxxR	Stereo 1 – Left channel panned fully left, Right fully to the right
xLxxRx	Stereo 2 – Left channel panned mostly left, Right mostly to the right
xxLRxx	Stereo 3 – Left channel panned somewhat left, Right somewhat to the right
xMonox	Mono – Both channels mixed to the center – also useful when only using one output
xxRLxx	Reverse Stereo 1 – Right channel panned somewhat left, Left somewhat to the right
xRxxLx	Reverse Stereo 2 – Right channel panned mostly left, Left mostly to the right
RxxxxL	Reverse Stereo 3 – Right channel panned fully left, Left fully to the right

Note: *There is a clip indicator on the right side of the VCA box; this gives you an indication of signal levels between the analog and digital electronics. Occasional clip LED flashes are okay.*

High-Pass Filter

Frequency: *0…99* – Sets the cutoff frequency of the four-pole high-pass filter. When the HP Pre/Post parameter in the Misc Params section is set to Pre(After ExtIn) the high-pass filter is inserted before the analog low-pass filter, and only affects external audio input.

When the HP Pre/Post parameter is set to Post (After VCA), the high-pass filter is placed after the analog low-pass filter and VCA (but before the Delay) and filters the Evolver's audio accordingly. Refer to the Signal Flow diagram on page 8 for details on the signal path. There are two separate high-pass filters, one for each channel, and they are controlled in tandem.

Remember that any of the modulation sources can be routed to control the High-pass Filter. For example, Envelope 3 can be dedicated to the High-pass.

Note: *If the High-pass Amount is set to zero, modulating the High-pass filter will have no effect.*

Tuned Feedback

Feedback is implemented via two identical tuned delay lines, one for each channel. See the diagram on page 8 for details on the signal path. Since the delay is tuned, it can be played by modulating the feedback frequency, from the sequencer or other sources.

Note: *Feedback can also be used to implement plucked string physical models. Use Envelope 3 with Noise as a destination (all oscillators off). Play around with different Feedback Levels, and adjust the filter cutoff frequency.*

Frequency: *0…48* – Sets the base frequency of the main feedback loop. It steps in semitones from C0 to C4 (0 - 48) for a four octave range. The exact frequency is influenced by other factors, such as the filter frequency and number of poles, which can drive it slightly sharp or flat.

Level: *0…100* – Sets the level of feedback. As the level goes up, the feedback will eventually oscillate at the set Frequency. Medium levels of feedback add depth and movement to the sound.

Grunge: *OFF…On* – When on, it enables nasty feedback at higher levels. It has no effect at lower levels of feedback.

Distortion

Distortion: *0…99* – Sets the amount of distortion. There are two separate distortions, one for each channel. When the Dist Pre/Post parameter in the Misc Params section is set to Pre(After ExtIn), the distortion is introduced before the analog filter, and only affects external input. When the Dist Pre/Post parameter is set to Post (After VCA), the distortion is introduced after the analog filter, VCA, and High-pass, but before the Delay.

Note: *There is a built-in noise gate that is enabled when distortion is not zero. If you want to use the noise gate but without distortion, use a distortion setting of 1. The noise gate uses the Left channel signal level to gate both channels.*

Note: *If the Distortion Amount is = 0, modulating Distortion will have no effect.*

Delay

The delay takes a mix of both channels as input, and provides up to three independent taps, each of which can be individually time or level modulated. To select a delay tap for editing, press the appropriate Delay switch, 1-3. Turning a knob will then adjust the parameters of the selected Delay tap.

Note: *Holding one of the three switches will solo that delay (the switch will blink) by setting the levels of the other two to zero. It does not affect any modulation that is routed to delay level, though, so at times it may not completely turn off all other levels.*

The outputs of the three taps are mixed and summed with the Left and Right channels. The delay output also can be mixed back to the input of the delay for more ambience, repeating delays, or tuned feedback if the feedback level is set high.

A second feedback path takes the delay output and routes it back to the input of the analog filter. This path can be used for more extreme feedback effects.

Note: *If all three Delay taps are in use, the Levels of each should be set to lower amounts to prevent overload distortion*.

Time: *0…150, sync –* Sets the delay time of the selected delay tap. A setting of 0 - 150 will adjust the delay from zero to 1 second at 16 bits 48 kHz sampling, no compression. The middle range steps are in tuned semitones (noticeable with Feedback 1 turned up high). Since delay is a time measurement, higher delay numbers are lower frequencies. Step 22 corresponds to C7 (2,093 Hz), down to step 94 which is tuned to C1 (32.7 Hz).

Above 150, the sync delay times are as shown in the table below. The delay time can be set in multiples of a single sequencer step, or exact divisions of a step.

Note: *Depending on the current sequence speed, the longer sync delays may not be reachable. For example, at Tempo of 60 BPM and Clock Divide of Quartr (quarter note) each beat takes one second, so if you set it to 2 Steps (Delay is 2 steps in length), the delay should be two seconds. But, there is only enough memory for one second of delay, so it will not work. When too slow as in this case, simply clamping it at one second would not likely be a multiple of the step time. So, if the requested time is too long, the requested time is cut in half until it fits within the one second of available memory. So, don't be surprised if changing longer sync delay times does not make any difference to the sound*.

Display	Timing Sync
`32 Steps`	Delay is 32 steps in length
`16 Steps`	Delay is 16 steps in length
`8 Steps`	Delay is 8 steps in length
`4 Steps`	Delay is 4 steps in length

2 Steps	Delay is 2 steps in length
1 Step	Delay is 1 step in length
1/2 Step	Delay is one-half step in length
1/4 Step	Delay is one-quarter step in length
1/8 Step	Delay is one-eighth step in length
1/16Step	Delay is one-sixteenth step in length
6 Steps	Delay is 6 steps in length
3 Steps	Delay is 3 steps in length
1.5 Step	Delay is one and a half steps in length
2/3 Step	Delay is two-thirds of a step in length
1/3 Step	Delay is one-third step in length
1/6 Step	Delay is one-sixth step in length

Amount: *0…100* – Sets the delay amount of the selected delay tap. The left and right channels are mixed into a single delay.

Feedback 1: *0…100* – Sets the amount of feedback from the summed output of all the delay taps to the input of the delay.

Feedback 2: *0…100* – Sets the amount of feedback from the summed output of all the delay taps to the input of the filter for more extreme effects.

Output Hack

Amount: *0…14* – Trashes the output signal, quite rudely.

Envelope 3

Destination: *see table* – Sets the Envelope 3 destination. See the Modulation Destination table on page 33 for a list of possible destinations.

Amount: *-99…+99* **–** Sets the amount of Envelope 3.

Velocity: *0…100* – Sets the amount of key velocity controlling the level of envelope 3.

Delay: *0…100* – Sets the delay time of Envelope 3, prior to Attack.

Attack: *0…110* – Sets the Attack time of Envelope 3.

Decay: *0…110* – Sets the Decay time.

Sustain: *0…100* – Sets the Sustain level.

Release: *0…110* – Sets the Release time.

LFOs

The Evolver has four identical Low Frequency Oscillators (LFOs). To select a specific LFO for editing, press the appropriate switch, 1-4. Turning a knob will then adjust the parameters of the selected LFO.

> **Note**: *Holding one of the four switches will solo that LFO (the switch will blink) by setting the Amounts of the other three to zero. It does not affect any modulation that is routed to LFO Amounts, though, so at times it may not completely turn off all other Amounts.*

Frequency: *0…150, sync –* Sets the LFO frequency. Range 0-150 for un-synced LFO; speed ranges from slow (30 seconds) to very fast – at 90 (8 Hz, C-2) and above the speed steps in semitones, up to 150 (261 Hz, middle C).

> **Note**: *Some of the analog functions may not respond well to the fastest LFO speeds, due to speed limitations of the control voltages; but they will certainly generate some interesting sounds*.

Above 150, the sync speeds are as follows:

Display	Timing Sync
32 Steps	Sequence speed divided by 32; i.e. one LFO cycle takes 32 steps
16 Steps	Sequence speed divided by 16
8 Steps	Sequence speed divided by 8
4 Steps	Sequence speed divided by 4
2 Steps	Sequence speed divided by 2
1 Step	One cycle per step
1/2 Step	Two cycles per step
1/4 Step	Four cycles per step
1/8 Step	Eight cycles per step
1/16 Step	Sixteen cycles per step

Shape: *see table* – Selects the LFO waveshape:

Display	LFO Shape
Triangle	Triangle
Rev Saw	Reverse Sawtooth
Sawtooth	Sawtooth
Square	Square Wave
Random	Random – changes once per cycle for sample-and-hold effects

Amount: *0…100* – Sets the amount of LFO routed to the destination.

Key Sync: When this switch is enabled (lit) the Evolver re-starts the LFO each time a new note is played (Key Sync). Key Sync on each LFO can be set independently.

Destination: *see table* **–** see the Modulation Destination table on page 33 for a list of possible destinations.

Modulators

The Modulators section lets you configure the modulation routing and amount for the Evolver's four general-purpose modulation slots as well as for MIDI controllers such as the Mod Wheel, Key Pressure, Velocity, Breath Control, and more.

Since each Evolver mod source has a single destination, the four general purpose Mods provide a way to send a mod source (such as a sequence or LFO) to additional destinations, with a different amount. There are also additional mod sources available here, such as noise and the digital oscillators, allowing a wide variety of possibilities, such as audio-rate modulation. While some destinations may not be able to keep up with audio-rate modulation, you will certainly be able to generate interesting sonic results.

To configure a general-purpose modulation slot, press the appropriate switch, 1-4, and use the Source, Destination and Amount knobs to set the modulation as desired.

> **Note**: *Holding one of the four switches will solo that Mod (the switch will blink) by setting the Amounts of the other three to zero. It does not affect any modulation that is routed to Mod Amount, though, so at times it may not completely turn off all other Amounts.*

To configure modulation for a controller, press the MISC switch, select the desired controller with the Source knob, then use the Destination and Amount knobs to set its modulation.

The Breath and Foot Controller parameters can be controlled by the Pedal/CV 1 and 2 inputs on the rear panel. This gives you the ability to route them to different parameters on each Program for more flexible control. These are set in the Global section.

The In Peak fixed source takes the momentary peak of the left external audio input, and uses it as a modulation signal. The In Env Follower generates an envelope from the Left external audio input, and uses it as a modulation signal. These are both very useful when using the Evolver as a signal processor.

Source: *see table* – Selects a modulation source. See the list on page 35 for possible sources.

> **Note**: *General-purpose mod slot Sources are not filtered, so a MIDI controller going through this route will react quicker, but may produce stepping noise, depending on the controller. For filtered (smoothed) MIDI controller operation, use the direct Pressure, Mod Wheel, Breath Control, or Foot Control parameters in the Misc mods.*

Amount: -99…+99 – Sets the amount of modulation.

Destination: *see table* **–** Selects a modulation destination. See the Modulation Destination table on page 33 for a list of possible destinations.

Misc Parameters

The Misc Params section lets you configure a variety of parameters not found elsewhere. The parameter list is printed on the panel for easy reference. Use the Select knob to choose the desired parameter, and the Value knob, Param 2 knob, or the +/YES or -/NO switches to adjust the value.

Voice Volume: *0…100* – Sets the voice volume; usually used for matching volumes between Programs.

Name: The lower LCD line will display the name of the Program. The PARAM 1 knob selects which character is currently active, which is indicated by blinking the character. To change the character, use the PARAM 2 knob, the VALUE knob or the +/YES or -/NO switches

Trigger Select: *see table* – Selects the source of triggers/gates for the envelope generators. Some of the Trigger modes will automatically turn the Sequencer on. This allows gated-sequence Programs to be played without having to manually hit the START/STOP switch. The Trigger modes that do this are marked in the table as **AUTO**.

Display	Envelope Trigger Selections
Sequencer or Key	The envelopes will be triggered by either the sequencer or the keyboard. When triggered by the sequencer, the gates are on for half the step time. Simply adjust the envelope parameters (ADSR) for the desired effect.
Sequencer Only	The envelopes will be triggered by the sequencer only.
Keyboard Only	The envelopes will be triggered by the keyboard only.
Key, Resets Seq	The envelopes will be triggered by the keyboard, and the sequencer will be reset on every key (if it is running). The sequencer will not trigger the envelopes.
Key, Gates Seq	Gated mode – the envelopes will be triggered by the sequencer when a key is held; in other words the keyboard will gate the sequencer. **AUTO**
KeyGates Seq Rst	Gated mode, reset – same as Gated mode, except every time a key is hit, the sequencer is reset to step 1. **AUTO**
Ext Audio Input	The envelopes are gated by the Left external audio input signal level, in other words, when the signal gets above a fixed threshold, the envelopes start. The envelopes then go into the release phase when the signal level drops below a second fixed threshold.
Ext In, ResetsSeq	Same as external in, but also resets the sequencer to step 1 if it is running.
Ext In, Gates Seq	External In signal will gate the sequencer. **AUTO**
Ext In GateSeqRst	External In signal will gate the sequencer, and also resets the sequencer to step 1 on each new gate. **AUTO**

Key GatesSeqOnce	Plays a sequence once (according to the length of Sequence 1) when a key is hit. The sequence is not restarted on multiple keys until it finishes and stops. **AUTO**
Key GateSeqOnceR	Also plays a sequence once when a key is hit, but will re-start the sequence on each key hit. **AUTO**
Ext In Steps Seq	Plays one step of the sequencer on each External Input audio trigger. **AUTO**
Key Steps Seq	Plays one step of the sequencer on each key hit. **AUTO**

Key Mode: *Poly, Mono, Unison 1, Unison 2; see table* **–** Selects the key mode when playing on the keyboard. There are 4 groups of key modes: Poly, Mono, Unison 1, and Unison 2. Each mode has 6 basic key modes as seen in the table below.

> **Note**: *This may be somewhat confusing to have the four groups on a one-voice instrument. The four groups are necessary when using the Poly Chain feature to control additional voices. For this reason, the factory programs are all set to Poly, which is ignored when playing the Evolver Keyboard by itself, but allows polyphonic playing when another Evolver or Poly Evolver is Poly Chained.*

Display	Keyboard mode
Low Note	Low note priority
LowRetrig	Low note priority, re-trigger envelopes
HighNote	High note priority
HighRetrg	High note priority, re-trigger envelopes
LastNote	Last note hit priority
LastRetrg	Last note hit priority, re-trigger envelopes

As mentioned above, the four groups are basically ignored when playing the Evolver stand-alone. When Poly Chained for polyphonic playing, the Poly group is for normal polyphonic playing; in which case the six key modes will have no effect.. The Mono group will only play one voice. Unison will play all voices together for a very thick sound. Unison 2 has more detuning between the voices than Unison 1.

Key Off/Xpose: *Off, -36…+36* **–** Enables and transposes the keyboard. If set to Off, the keyboard note values are ignored. Otherwise, it transposes the keyboard from -36 to +36 semitones (+/- 3 octaves). It is usually set to -24 or -36 to be in the best range for both the keyboard and the sequencer.

> **Note**: *When set to Off, the Evolver will not respond to the keyboard.*

> **Another Note**: *This parameter is useful to help balance oscillator pitch ranges between the keyboard and the sequencer. For example, if you make a Program using the sequencer, you will likely set the Oscillator frequencies up to the desired pitch range. But, if you then try to play this Program from a keyboard, the pitches will likely be too high. Rather than lowering all the oscillator frequencies (which would mess up the sequence!) you can simply use the transpose here.*

Pitch Wheel Range: *0…12* – Sets the Pitch Bend Range of the Pitch Wheel, in semitones.

Osc Slop: *0…5* – The amount of random oscillator frequency slop. The analog and digital oscillators in Evolver are very accurate, and will not drift. This works great for accurate sounds, and allows precise de-tuning. The Oscillator Slop parameter allows subtle amounts of frequency drift. For larger amounts, use a random LFO or white noise mod.

Input Mode: *see table* – Selects the external audio signal input mode.

Display	External Audio Input Mode
Stereo	The left input in goes to the left channel, right to right.
Mono Left	The left input in goes to both channels (mono in).
Mono Right	The right input in goes to both channels (mono in).
LCon RAudio	A mono audio signal is routed to the Right Input; and a separate control audio signal (for envelope follower, peak hold, and clock source) into the Left Input. This allows one audio signal to control another for gating, filtering etc.

Env Shape: *Exponential, Linear* – Selects whether all three envelopes have a linear (straight line) shape, or exponential (curved). Exponential is the more natural of the two.

Input Hack: *0…14* – Trashes the external input signal, quite rudely. But, the analog filter tames it nicely. A good way to mess up a clean stereo signal.

HP Pre/Post: – This parameter selects where the High-pass Filter will sit in the signal chain. When set to **Pre(After ExtIn)** the high-pass filter is inserted before the analog low-pass filter, and only affects external audio input. When set to **Post (After VCA),** the high-pass filter is placed after the analog low-pass filter and VCA (but before the Delay) and filters the Evolver's audio accordingly. Refer to the Signal Flow diagram on page 8 for details on the signal path.

Dist Pre/Post: – This parameter selects where the Distortion will sit in the signal chain. When set to **Pre(After ExtIn)** the Distortion is inserted before the analog low-pass filter, and only affects external audio input. When set to **Post (After VCA),** the Distortion is placed after the analog low-pass filter and VCA (but before the Delay). Refer to the Signal Flow diagram on page 8 for details on the signal path.

Sequencer

For many musicians, the term sequencer has become synonymous with MIDI sequencer; that is, a computer-based application or dedicated hardware device for recording and playing back notes and performance gestures via MIDI. But sequencers were around long before MIDI. Evolver's sequencer is much more like the original analog sequencers typically associated with modular synthesizer systems. The sequencer comprises four 16-step sequences that play in parallel. Each sequence can be routed to a chosen destination, and each step in a sequence can be set to a different value used to modulate that destination.

v = step value
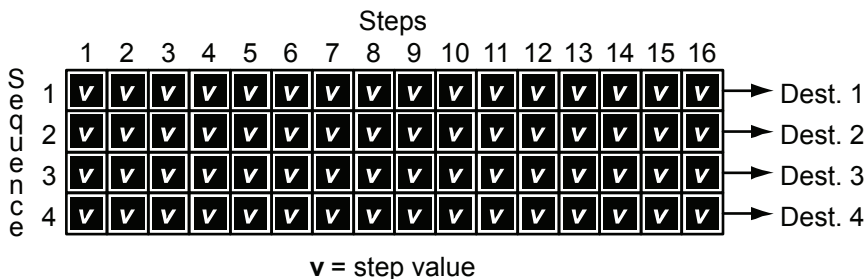
Strictly speaking, Evolver's sequencer does not play notes. (Not internally, anyway. There *are* sequence-only destinations that can control external MIDI devices.) If none of the sequence destinations are routed to oscillator frequency, the sequencer may not even affect the pitch. In Evolver terms, a sequence is just a series of events at timed intervals that changes the value of one of the synth's parameters in discrete steps. Because the four sequences play in parallel, up to four parameters can be affected by each step, one per sequence. For the most part, the sequence destinations are the same as the modulation destinations, which is appropriate: a sequence is just another modulation source.

For each sequence step, the envelopes are gated on for half the step's duration. The duration varies according to the BPM and Clock Divide settings (or the MIDI clock, if synced to an external source). The envelope settings of the current program ultimately determine how long each step plays, though, and longer (more legato) or shorter (more staccato) effects can be achieved by editing the envelope rates.

Reset and Rest

Sequences have a maximum of 16 steps, but they can have fewer—from 1 to 15—using Reset. (Sequences of 16 steps reset automatically.) Reset appears immediately after the highest value setting for a step. Setting a step to Reset causes the sequence to jump back to the first step and continue playing.

Reset is set separately for each of the four sequences, so it must be set at the same step in all four sequences to shorten all the sequences equally.

v = step value; R = Reset
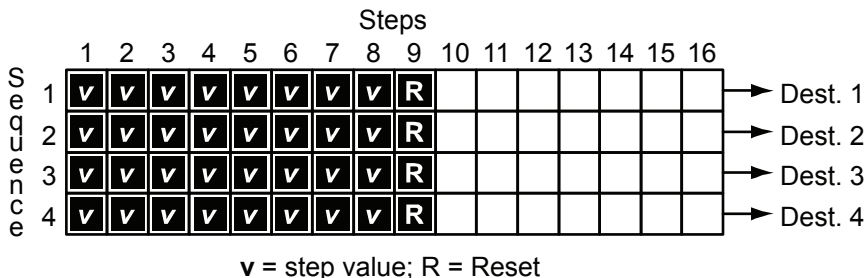
Tip: Using Reset while programming a sequence can be helpful. For example, when programming a specific melodic line, start by shortening the sequence to four or eight steps until those steps are set, and then gradually move the reset point to lengthen the loop until the desired number of steps is playing.

Sequences do not have to be the same length, however, which makes for some very interesting, less repetitive patterns, particularly when sequences are set to odd and even numbers of steps.
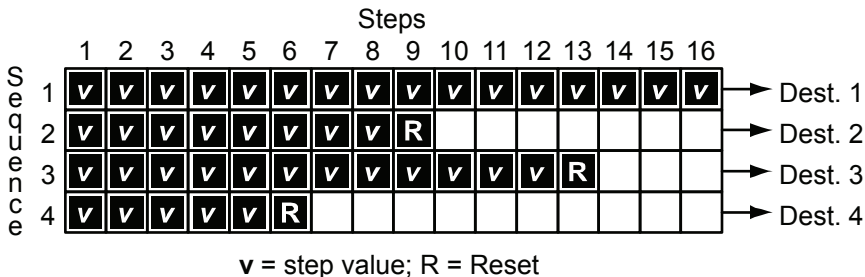
v = step value; R = Reset

Sequence one has an additional value, Rest, that appears in the list after Reset. Rest prevents the envelopes from being gated by the corresponding step, so a rest in sequence one affects all four sequences. If the sequences are the same length, rests will occur in the same place in all four sequences as they loop. If the sequences are different lengths, the rests in sequence one apply to whatever the current step happens to be in sequences two through four, resulting in a more random-sounding pattern (which can be really cool). In the following example, sequence one is 16 steps long and rests occur at steps 2, 6, 9, and 12. However, sequence two is only eight steps long, so rests occur at steps 2 and 6 the first time it plays through and then at steps 1 and 4—corresponding to steps 9 and 12 in sequence one—the first time it repeats. As sequence two loops, the rests will continue in the same alternating pattern.

v = step value; r = rest; R = Reset
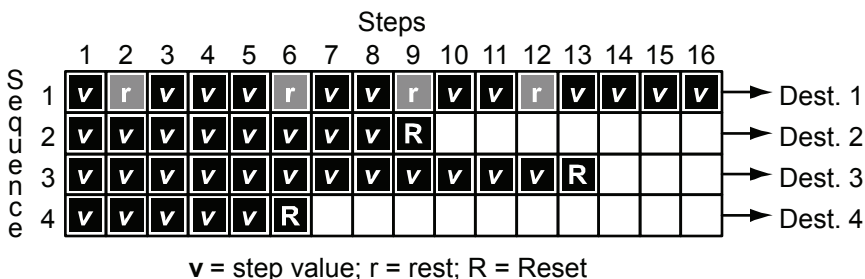
Sequencer Parameters

The Sequencer has a set of dedicated switches under the LCD, and 19 knobs that are shared with the filter and VCA knobs. Pressing SEQ EDIT changes the functions of those dual-purpose knobs from their normal program parameters (white text) to sequencer parameters (orange text). The sequencer can be triggered in a variety of ways, including from the internal clock, the keyboard, or with an external audio signal.

BPM: *30…250* – Sets the programmed basic speed for the sequencer in BPM. When Prog Tempo is set to On in the Global Parameters menu, changing this parameter also changes the master BPM, and vice-versa. When Off, changing this parameter has no effect.

Clock Divide: *see table* – Provides a wider range of sequencer speeds. When "Prog Tempo" is set to On in the Global Parameters menu, changing this parameter also changes the master Clock Divide, and vice-versa. When Off, changing this parameter has no effect.

Display	Tempo	Timing Division
Half	BPM/2	Half note
Quartr	BPM	Quarter note
Eighth	BPM x 2	Eighth note
8 half	BPM x 2	Eighth note, half swing timing
8swing	BPM x 2	Eighth note, full swing timing
8 trip	BPM x 3	Eighth note triplets
16th	BPM x 4	Sixteenth note
16half	BPM x 4	Sixteenth note, half swing timing
16swng	BPM x 4	Sixteenth note, full swing timing
16trip	BPM x 6	Sixteenth note triplets
32nd	BPM x 8	Thirty-second note
32trip	BPM x 12	Thirty-second note triplets
64trip	BPM x 24	Sixty-fourth note triplets

Destination: *see table* – Selects a modulation destination for the currently selected Sequence. See the Modulation Destination table on page 33 for a list of possible destinations.

> ***Note:** See "Trigger Select" in Misc Parameters for additional sequencer-specific settings.*

Programming a Sequence

Each of the 16 steps in the sequence has its own knob in Seq Edit mode, which can be set to a value from 0-100. Turning a Step knob past 100 sets the step to "Reset." Reset is useful for creating a sequence of fewer than 16 steps. For example, if you want to create a four step sequence, set step 5 to Reset.

In addition, in Sequence 1 you can program rests by setting a step value to "Rest", just past Reset. On that step, no trigger is sent to the envelopes. Since Sequence 1 controls rests for Sequences 2-4 as well, the rests will end up in different places on other sequences if they are a different length.

If you want all sequences to be the same length, make sure that the reset step is the same for all four sequences. If however, each sequence is a different length, the rests and clock swing settings will follow sequence 1. In other words, the envelopes are always triggered from one sequence and can't be separately handled by each of the 4 sequences.

Using rests, resets, and different Clock Divides (half swing, swing, and so on) you can generate very complex sequences.

To program a sequence:

1. Press SEQ EDIT.

2. Select the sequence you want to program by pressing the appropriate switch, 1-4.

3. Select the destination for that sequence using the Destination knob. For example, to generate a sequence of notes, select OscAllFreq.

Note: *When a sequence is routed to oscillator frequency, each knob increment equals half of a semitone. The LCD display will show the relative note value, with a "+" after it to show when at a half-semitone step.*

4. Press the Reset switch to reset the sequence to Step 1.

5. Turn the Step 1 knob to the desired value. If the sequencer is stopped, each time you turn a Step knob, the envelopes are triggered, allowing you to hear the notes (or other modulation) generated by the step value.

6. Repeat for each subsequent step in the sequence.

7. Press the START/STOP switch to start the sequence.

8. Press the START/STOP switch again to stop the sequence.

Note: *Pressing the RESET switch resets the sequencer to step 1 whether or not it is running. The RESET switch also acts as an all-notes-off, and resets all controllers if pressed while the sequencer is not running.*

An alternate way to program a sequence is to use the keyboard. Hit the WRITE switch, then hit START/STOP – you are now in sequence record mode. Simply hit the keys you want to record and the sequencer will automatically increment to the next step. It will keep looping from 16 to 1 if you keep hitting notes. You can hit any of the other sequence switches while recording to program all of the sequences in one write session. Hit START/STOP or WRITE when you are done recording.

You can use the TRANSPOSE switches to extend the range up or down one octave – going up or down two octaves will be outside the limits of the sequencer range.

When transposed up one octave, the high D is the highest note available in the sequencer range. Any keys hit above the high D will insert a Rest if Sequence 1 is being recorded, and the high C key will insert a Reset.

When recording from the keyboard, you cannot reach the half semitone step values. Note that you can program values into sequences using the keyboard even if a sequence is going to a destination other than oscillator pitch; this makes for quick programming.

Some Trigger modes will automatically start the sequencer for gated sequence operation.

Note: You can chain sequences together. While a sequence is playing, hold SEQ EDIT and change programs with the PARAM 1 knob. The program change will not take effect until the current sequence ends.

Suggested Destinations

You can really have some fun with other destinations. For example, route a sequence to Delay amount to have the delay level change; or to feedback amount to drastically change the sound every step. FM and Ring Mod Levels are fun to sequence, too— you get the idea. With four sequences, you can program a very dynamic sequence.

Another very useful way to modulate a sequence is using LFOs with sync; LFO frequency runs 0-150, after which you can select the sync settings. A setting of 16 Steps for LFO Frequency with a Triangle wave selected and routed to the filter will provide a clean filter sweep over a 16 step sequence, perfectly in sync! This is much easier (and smoother) than programming a filter sweep using sequence steps.

The sequencer can also be routed to MIDI output destinations, including Note Number, Velocity, Mod Wheel, Pressure, Breath, and Foot Controller. Velocity is a special case – it only works if selected as the destination for Sequence 2 when Sequence 1's destination routed to Note Number. The same for Sequence 3 and 4 (Sequence 4 can be velocity for Sequence 3). If velocity is not used as a destination, the velocity output is 120. So, it is possible to have up to 4 note sequences sent out over MIDI.

The actual MIDI note transmitted is the sequence step value plus one (since MIDI note on of zero = note off). Note that this is different than the half-semitone when driving the internal oscillators—this was done to provide a wider range of notes. Also, the main Transpose is added to/subtracted from the MIDI note output. Velocity and the other controllers are converted from 0 - 100 range to 0 - 127 range for MIDI.

Another possible sequencer destination is Clock Mod. It works via a multiplier based on a step value of 40. If a sequencer step is set to 40, the clock speed stays as set. If set to 20, (half of 40), the clock will be twice as fast for that step. Likewise, a step value of 80 will be twice as slow as normal, and 10 would be 4 times faster.

Note that overall limits of 30 to 250 BPM still apply; for example, if you have a BPM of 120, and a sequencer step of 10, it will try to go four times faster than 120, which is 480. Since it is greater than 250, it will clamp at 250. With clever choices of BPM (using Clock Divide as necessary) you can develop a pretty wide range of timing possibilities. Also, with sequences of different lengths, it can really get quite wild.

Arpeggiator

As a last-minute addition, a simple arpeggiator was included as a hidden function. As a hidden function, the operation is a little less than obvious, but the assumption is that it's nice to have anyway.

> **Note**: *The Arpeggiator settings are not saved as part of the Program.*

Basic operation is simple: while holding the RESET switch, simply hit the Sequencer 1 switch for an **Up** direction arpeggio, Sequencer 2 for **Down**, 3 for **Up/Down**, and 4 for **Assign**, which remembers the order the keys are held. The sequencer switch LED will blink indicating which mode is currently selected.

> **Note**: *You can change modes at any time while playing, or while the keys are latched.*

The Sequencer clock determines the speed, which means it also takes into account the Clock Divide value. This gives a very wide range of speed, and also enables swing timing on the arpeggio. And, it can sync to MIDI.

To latch an arpeggio, simple hit the WRITE switch, and the notes will be held when you remove your fingers from the keyboard. If you then hit another key, it will also be latched. Hit the WRITE switch again to un-latch.

> **Note**: *You can hit the WRITE switch with no keys held, and then just start hitting the keys you want in the arpeggio, and they will be latched.*

Hit the RESET switch to clear the latched notes.

> **Note**: *You can only have any specific key played one time in the arpeggio; ie if you are latching keys, and hit the same note twice, it will only latch the most recent hit.*

To stop the Arpeggiator, simply hit the START/STOP switch.

Modulation Destinations

Display	Destination
Off	No destination selected
Osc 1 Freq	Oscillator 1 Frequency
Osc 2 Freq	Oscillator 2 Frequency
Osc 3 Freq	Oscillator 3 Frequency
Osc 4 Freq	Oscillator 4 Frequency
OscAllFreq	Oscillator All Frequency – goes to all four
Osc1 Level	Oscillator 1 Level
Osc2 Level	Oscillator 2 Level
Osc3 Level	Oscillator 3 Level
Osc4 Level	Oscillator 4 Level
OscAll Lev	Oscillator All Level
NoiseLevel	Noise Level
ExtInLevel	External In Level
Osc1 PulsW	Oscillator 1 Pulse width
Osc2 PulsW	Oscillator 2 Pulse width
Osc All PW	Oscillator All Pulse width
FM Osc4>3	Frequency Mod (FM) Amount; Osc 4 -> 3
FM Osc3>4	Frequency Mod (FM) Amount; Osc 3 -> 4
RM Osc4>3	Ring Mod (Amplitude) Amount; Osc 4 -> 3
RM Osc3>4	Ring Mod (Amplitude) Amount; Osc 3 -> 4
Low Pass	Lowpass filter frequency
LP Split	Filter Split –separation between left / right
Resonance	Resonance
High Pass	Highpass filter- will not work if Highpass is set to 0
VCA Level	VCA amount
Output Pan	Pan
Fback Freq	Feedback frequency
Fback Amt	Filter Amount
Delay1Time	Delay 1 Time
Delay2Time	Delay 2 Time
Delay3Time	Delay 3 Time
DlyAllTime	Delay All Time
Delay1 Amt	Delay 1 Amount
Delay2 Amt	Delay 2 Amount
Delay3 Amt	Delay 3 Amount
DlyAll Amt	Delay All Amount
Delay FB1	Delay Feedback 1
Delay FB2	Delay Feedback 2

LFO 1 Freq	LFO 1 Frequency
LFO 2 Freq	LFO 2 Frequency
LFO 3 Freq	LFO 3 Frequency
LFO 4 Freq	LFO 4 Frequency
LFOAllFreq	LFO All Frequency
LFO 1 Amt	LFO 1 Amount
LFO 2 Amt	LFO 2 Amount
LFO 3 Amt	LFO 3 Amount
LFO 4 Amt	LFO 4 Amount
LFOAll Amt	LFO A Amount
Env 1 Amt	Envelope 1 Amount (Level)
Env 2 Amt	Envelope 2 Amount (Level)
Env 3 Amt	Envelope 3 Amount (Level)
EnvAll Amt	Envelope All Amount (Level)
Env1Attack	Envelope 1 Attack Rate
Env2Attack	Envelope 2 Attack Rate
Env3Attack	Envelope 3 Attack Rate
EnvAll Att	Envelope All Attack Rate
Env1 Decay	Envelope 1 Decay Rate
Env2 Decay	Envelope 2 Decay Rate
Env3 Decay	Envelope 3 Decay Rate
EnvAll Dec	Envelope All Decay Rate
Env1Releas	Envelope 1 Release Rate
Env2Releas	Envelope 2 Release Rate
Env3Releas	Envelope 3 Release Rate
EnvAll Rel	Envelope All Release Rate
LeftLP Frq	Filter 1 (Left) lowpass filter cutoff frequency
RightLPFrq	Filter 2 (Right) lowpass filter cutoff frequency
LeftLP Res	Filter 1 (Left) lowpass filter resonance
RightLPRes	Filter 2 (Right) lowpass filter resonance
Distortion	Distortion – will not work if distortion is set to 0 (off) or 1 (noise gate select)

Additional Sequencer-Only Modulation Destinations

Seq Clock	Sequencer clock (BPM) multiplier
Midi Note	MIDI note number
M Note Vel	MIDI Velocity
Midi ModWh	MIDI Mod Wheel
Midi press	MIDI Pressure
Midibreath	MIDI Breath Controller
Midi Foot	MIDI Foot Controller

Modulation Sources

Display	Source
Off	No Source selected
Sequence1	Sequence 1
Sequence2	Sequence 2
Sequence3	Sequence 3
Sequence4	Sequence 4
LFO 1	LFO 1
LFO 2	LFO 2
LFO 3	LFO 3
LFO 4	LFO 4
FilterEnv	Filter Envelope
VCA Env	Amp (VCA) Envelope
Envelope3	Envelope 3
ExtInPeak	External Audio Input Peak
EinEnvFol	External Audio Envelope Follower
PitchBend	Pitch Bend
Mod Wheel	Mod Wheel
Pressure	Pressure (Aftertouch)
MidBreath	Midi – Breath Controller
Midi Foot	Midi – Foot Controller
Velocity	Keyboard Note Velocity
KeyNumber	Keyboard Note Number
Midi Exp	Midi – Expression
Noise	Noise
Osc 3	Oscillator 3
Osc 4	Oscillator 4

MIDI Implementation

The Evolver receives MIDI data according to the mode controls in the Global Section. In addition, there is interaction between some of the Program parameters that determine the overall response of Evolver to MIDI data. Following are the Global parameters that affect response to MIDI.

Global Parameters

MIDI Channel: *ALL, 1…16* – Selects the MIDI channel to send and receive data, 1 to 16. All receives on any channel.

Poly Chain: *Off, 2…20*– Use this to link multiple Evolvers and Poly Evolvers into a system with more voices by intelligently processing the keys hit and passing MIDI data through to the Poly Chain MIDI out jack where it can be routed to another Evolver or Poly Evolver. Note that MIDI clocks are handled separately per the MIDI Clock parameter.

Local Control: *Off, On* – Enables or disables the internal connection between the keyboard and panel controls and the synth electronics. This is useful with some sequencers.

Clock: *see table* – Selects the MIDI clock status, and enables External sequencer triggers, as follows:

Display	MIDI Clock Setting
Internal	MIDI clock is neither sent nor received
MIDI Out	MIDI clock is sent
MIDI In	MIDI clock is received
M In Out	MIDI clock is received and transmitted (use with Poly Chain)
In no ss	MIDI clock is received, but MIDI start/stop/continue messages are ignored.

MIDI Messages

Status	Second	Third	Description
1000 nnnn	0kkkkkkk	0vvvvvvv	Note Off. Velocity is ignored
1001 nnnn	0kkkkkkk	0vvvvvvv	Note On. Note off if vvvvvvv = 0
1010 nnnn	0kkkkkkk	0vvvvvvv	Polyphonic Key Pressure
1011 nnnn	0vvvvvvv	0vvvvvvv	Control Change; see "Received Controller Messages" table following
1100 nnnn	0ppppppp		Program change, 0 – 127 for Programs 1 – 128 within current Bank
1101 nnnn	0vvvvvvv		Channel Pressure
1110 nnnn	0vvvvvvv	0vvvvvvv	Pitch Bend LS Byte then MS Byte

Notes:
0kkkkkkk — Note number 0 – 127
nnnn — Channel number 0 to 15 (MIDI channel 1-16). Ignored if MIDI channel set to ALL
0vvvvvvv — Value

Received Controller Messages

Status	Second	Third	Description
1011 nnnn	1	0vvvvvvv	Mod Wheel – directly assignable controller
1011 nnnn	2	0vvvvvvv	Breath Controller – directly assignable controller
1011 nnnn	4	0vvvvvvv	Foot Controller – directly assignable controller
1011 nnnn	7	0vvvvvvv	Volume – Combined with Master Volume and Program Volume
1011 nnnn	74	0vvvvvvv	Brightness – Added to lowpass filter cutoff frequency
1011 nnnn	11	0vvvvvvv	Expression Controller – directly assignable controller
1011 nnnn	32	0vvvvvvv	Bank Select – 0 to 3 selects banks 1 to 4; others ignored
1011 nnnn	64	0vvvvvvv	Damper pedal – holds envelopes in Sustain if 0100 0000 or higher
1011 nnnn	123	0vvvvvvv	All Notes Off – clear all MIDI notes
1011 nnnn	121	0vvvvvvv	Reset All Controllers – clears all MIDI controllers to 0, MIDI volume to maximum

Additional received CCs:

20	Oscillator 1 Frequency
21	Oscillator 2 Frequency
22	Oscillator 3 Frequency
23	Oscillator 4 Frequency
24	Oscillator 1 Level
25	Oscillator 2 Level
26	Oscillator 3 Level

27	Oscillator 4 Level
28	Oscillator 1 Shape
29	Oscillator 2 Shape
30	Oscillator 3 Shape
31	Oscillator 4 Shape
40	FM 4->3
41	FM 3->4
42	RM 4->3
43	RM 3->4
59	Noise Level
52	Low Pass Filter Frequency
53	Filter Resonance
54	Filter Envelope Amount
55	Filter Attack
56	Filter Decay
57	Filter Sustain
58	Filter Release
59	Filter Audio Mod
60	Filter Split
61	Filter Key Amount
75	Amp Attack
76	Amp Decay
77	Amp Sustain
78	Amp Release
13	Highpass Filter Cutoff
85	Feedback Frequency
86	Feedback Level
12	Distortion
102	Delay 1 Time
103	Delay 2 Time
104	Delay 3 Time
105	Delay 1 Amount
106	Delay 2 Amount
107	Delay 3 Amount
108	Delay Feedback 1
109	Delay Feedback 2

Status	Second	Third	Description
1111 0010	0vvvvvvv	0vvvvvvv	Song Position Pointer – LS Byte then MS Byte. Positions depends on Clock Divide. For example, if Clock Divide is set to 4ņ (quarter note), then the sequence is 4 measures of 4/4 in length. The Song Position will calculate correctly within the four bars.

System Real-time Messages

Status	Description
1111 1000	Timing Clock
1111 1010	Start – starts the sequencer from step 1
1111 1011	Continue – re-starts the sequencer from the current step
1111 1100	Stop – Stops the sequencer

Universal System Exclusive Message (Device Inquiry)

Status	Description
1111 0000	System Exclusive (SysEx)
0111 1110	Non-realtime message
0vvv vvvv	If MIDI channel is set to 1-16, 0vvvvvvv must match (unless MIDI Channel = ALL); always responds if 0vvvvvvv = 0111 1111.
0000 0110	Inquiry Message
0000 0001	Inquiry Request
1111 0111	End of Exclusive (EOX)

Evolver responds with:

Status	Description
1111 0000	System Exclusive (SysEx)
0111 1110	Non-realtime message
0vvv vvvv	If MIDI Channel = ALL, 0vvvvvvv = 0111 1111. Otherwise 0vvvvvvv = Channel Number 0-15.
0000 0110	Inquiry Message
0000 0010	Inquiry Reply
0000 0001	DSI ID
0010 0010	Evolver Keyboard ID (Family LS)
0000 0000	Family MS
0000 0000	Family Member LS
0000 0000	Family Member MS
0jjj nnnn	Main dsPIC Software version: jjj – Major rev; nnnn – Minor Rev
0vvv vvvv	DSP Software version LS
0vvv vvvv	DSP MS
1111 0111	End of Exclusive (EOX)

Transmitted Channel Messages

Status	Second	Third	Description
1000 nnnn	0kkkkkkk	0000000	Note Off.
1001 nnnn	0kkkkkkk	0vvvvvvv	Note On.
1011 nnnn	0vvvvvvv	0vvvvvvv	Control Change; see "Received Controller Messages" table following
1100 nnnn	0ppppppp		Program change, 0 – 127 for Programs 1 – 128 within current Bank
1101 nnnn	0vvvvvvv		Channel Pressure
1110 nnnn	0vvvvvvv	0vvvvvvv	Pitch Bend LS Byte then MS Byte

Notes:
0kkkkkkk	Note number 0 – 127
nnnn	Channel number 0 to 15 (MIDI channel 1-16). Ignored if MIDI channel set to ALL
0vvvvvvv	Value

Transmitted Controller Messages

Status	Second	Third	Description
1011 nnnn	0000 0001	0vvvvvvv	Mod Wheel
1011 nnnn	0000 0010	0vvvvvvv	Breath Controller – when assigned to Pedal/CV
1011 nnnn	0000 0100	0vvvvvvv	Foot Controller – when assigned to Pedal/CV
1011 nnnn	0000 0111	0vvvvvvv	Volume – when assigned to Pedal/CV
1011 nnnn	0100 1010	0vvvvvvv	Brightness – when assigned to Pedal/CV
1011 nnnn	0000 1101	0vvvvvvv	Expression – when assigned to Pedal/CV
1011 nnnn	0010 0000	0vvvvvvv	Bank Select – 0 to 3
1011 nnnn	0100 0000	0vvvvvvv	Damper pedal – sends 0 if off, 0100 0000 when on

System Exclusive Messages

Program Parameters

Status	Description
1111 0000	System Exclusive (SysEx)
0000 0001	DSI ID
0010 0000	Evolver ID
0000 0001	File Version
0000 0001	Program Parameter
0vvv vvvv	Parameter Number 0 – 127. The Parameter data starts on page 48.
0000 vvvv	Parameter value, LS Nibble
0000 vvvv	Parameter value, MS Nibble
1111 0111	End of Exclusive (EOX)

Sequencer Parameters

Status	Description
1111 0000	System Exclusive (SysEx)
0000 0001	DSI ID
0010 0000	Evolver ID
0000 0001	File Version
0000 1000	Sequence Parameter
00vv vvvv	Sequence step 0 – 63. 0 – 15 are sequence 1 steps, 16- 31 for sequence 2, etc.
0000 vvvv	Step value, LS Nibble
0000 vvvv	Step value, MS Nibble
1111 0111	End of Exclusive (EOX)

Global Parameters

Status	Description
1111 0000	System Exclusive (SysEx)
0000 0001	DSI ID
0010 0000	Evolver ID
0000 0001	File Version
0000 1001	Global Parameter
0000 vvvv	Global Parameter Number 0 – 17. Global Parameters are listed starting on page 46. Note that some parameter numbers are not used; this is to maintain compatibility with other Evolver models.
0000 vvvv	Parameter value, LS Nibble
0000 vvvv	Parameter value, MS Nibble
1111 0111	End of Exclusive (EOX)

Request Program Dump

Status	Description
1111 0000	System Exclusive (SysEx)
0000 0001	DSI ID
0010 0000	Evolver ID
0000 0001	File Version
0000 0101	Request Program Transmit
0000 00vv	Bank Number, 0 – 3
0vvv vvvv	Program Number, 0 – 127
1111 0111	End of Exclusive (EOX)

The Evolver will respond by sending out the Program Data in the format described in the Program Data Dump on page 43. It also sends a Program Name Dump message (also on page 43) after the Program dump. This makes it a complete Program dump while maintaining compatibility with other Evolver models.

Request Program Edit Buffer Dump

Status	Description
1111 0000	System Exclusive (SysEx)
0000 0001	DSI ID
0010 0000	Evolver ID
0000 0001	File Version
0000 0110	Request Program Edit Buffer Transmit
1111 0111	End of Exclusive (EOX)

Evolver will respond by sending out the current Program edit buffer in the format described in the Edit Buffer Dump on page 44

Request Waveshape Dump

Status	Description
1111 0000	System Exclusive (SysEx)
0000 0001	DSI ID
0010 0000	Evolver ID
0000 0001	File Version
0000 1011	Request Waveshape Transmit
0vvv vvvv	Waveshape number, 0 – 127
1111 0111	End of Exclusive (EOX)

Evolver will respond by sending out the requested Waveshape data, in the format described in the Waveshape Data Dump on page 44.

Request Global Parameter Dump

Status	Description
1111 0000	System Exclusive (SysEx)
0000 0001	DSI ID
0010 0000	Evolver ID
0000 0001	File Version
0000 1110	Request Global Parameter Transmit
1111 0111	End of Exclusive (EOX)

Evolver will respond by sending out the current edit buffer in the format described in the Global Parameter Dump on page 43

Program Data Dump

Status	Description
1111 0000	System Exclusive (SysEx)
0000 0001	DSI ID
0010 0000	Evolver ID
0000 0001	File Version
0000 0010	Program Data
0000 00vv	Bank Number, 0 – 3
0vvv vvvv	Program Number, 0 – 127
0vvv vvvv	220 bytes in "packed MS bit" format (see page **Error! Bookmark not defined.**). Includes 128 bytes of Program parameters and 64 bytes of Sequence data.
1111 0111	End of Exclusive (EOX)

Program Name Data Dump

Status	Description
1111 0000	System Exclusive (SysEx)
0000 0001	DSI ID
0010 0000	Evolver ID
0000 0001	File Version
0001 0001	Program Name Data
0000 00vv	Bank Number, 0 – 3
0vvv vvvv	Program Number, 0 – 127
0vvv vvvv	16 name data bytes. Note that the Evolver stores the basic 7 bit data. The assumption is that the data is ACSCII
1111 0111	End of Exclusive (EOX)

Program Edit Buffer Data Dump

Status	Description
1111 0000	System Exclusive (SysEx)
0000 0001	DSI ID
0010 0000	Evolver ID
0000 0001	File Version
0000 0011	Edit Buffer Data
0vvv vvvv	220 bytes in "packed MS bit" format (see page **Error! Bookmark not defined.**). Includes 128 bytes of Program parameters and 64 bytes of Sequence data.
1111 0111	End of Exclusive (EOX)

Global Parameters Data Dump

Status	Description
1111 0000	System Exclusive (SysEx)
0000 0001	DSI ID
0010 0000	Evolver ID
0000 0001	File Version
0000 1111	Main Parameter Data
0vvv vvvv	34 nibbles (LS then MS) for 17 Global parameters. Global Parameters are listed starting on page 46.
1111 0111	End of Exclusive (EOX)

Waveshape Data Dump

Status	Description
1111 0000	System Exclusive (SysEx)
0000 0001	DSI ID
0010 0000	Evolver ID
0000 0001	File Version
0000 1010	Waveshape Data
0vvv vvvv	Waveshape number, 0 – 127, corresponds to Waveshapes 1 – 128. Only Waveshapes 96 – 127 can be sent to Evolver and saved as user programmable; others will be ignored.
0vvv vvvv	293 bytes in "packed MS bit" format (see page **Error! Bookmark not defined.**). The 293 bytes = 256 data bytes, in the format of LS byte/MS byte, for the 128 16-bit words that make up a waveshape. The ROM Waveshapes are 12 bit two's complement (to match the VS), but the User Waveshapes (97 – 128) can be a full 16 bits.
1111 0111	End of Exclusive (EOX)

Packed Data Format

Data is packed in 8 byte "packets", with the MS bit stripped from 7 parameter bytes, and packed into an eighth byte, which is sent at the start of the 8 byte packet.

Example:

Input Data

```
1 A7 A6 A5 A4 A3 A2 A1 A0
2 B7 B6 B5 B4 B3 B2 B1 B0
3 C7 C6 C5 C4 C3 C2 C1 C0
4 D7 D6 D5 D4 D3 D2 D1 D0
5 E7 E6 E5 E4 E3 E2 E1 E0
6 F7 F6 F5 F4 F3 F2 F1 F0
7 G7 G6 G5 G4 G3 G2 G1 G0
```

Packed MIDI data

```
1   00 G7 F7 E7 D7 C7 B7 A7
2   00 A6 A5 A4 A3 A2 A1 A0
3   00 B6 B5 B4 B3 B2 B1 B0
4   00 C6 C5 C4 C3 C2 C1 C0
5   00 D6 D5 D4 D3 D2 D1 D0
6   00 E6 E5 E4 E3 E2 E1 E0
7   00 F6 F5 F4 F3 F2 F1 F0
8   00 G6 G5 G4 G3 G2 G1 G0
```

This is why it takes 220 MIDI bytes to transmit 192 Program/Sequence data bytes, and 293 bytes to send 256 Waveshape bytes.

Reset Switch

Status	Description
1111 0000	System Exclusive (SysEx)
0000 0001	DSI ID
0010 0000	Evolver ID
0000 0001	File Version
0000 0100	Reset Switch
1111 0111	End of Exclusive (EOX)

Only sent when Poly Chain is on and MIDI clock is set to Out

Select Program Mode

Status	Description
1111 0000	System Exclusive (SysEx)
0000 0001	DSI ID
0010 0000	Evolver ID
0000 0001	File Version
0011 0000	Select Program Mode
1111 0111	End of Exclusive (EOX)

Global Parameter Data

Parameter	Range	Description
0	0 – 127	Program Number 1 – 128
1	0 – 3	Bank Number 1 – 4
2	0 – 100	Master Volume 0 – 100
3	0 – 72	Master Transpose; 0 = -36 semitones (- 3 octaves), 36 = 0 (no transpose), and 72 = +36 semitones.
4	30 – 250	BPM
5	0 – 12	Clock Divide: 0 Half Note 1 Quarter Note 2 Eighth Note 3 Eighth Note half swing 4 Eighth Note full swing 5 Eighth Note triplets 6 Sixteenth Note 7 Sixteenth Note half swing 8 Sixteenth Note full swing 9 Sixteenth Note triplets 10 Thirty-second Notes 11 Thirty-second Notes triplets 12 Sixty-Fourth Notes triplets
6	0 – 1	Use Program tempo; 0 = Off, 1 = On
7	0 – 6	MIDI clock select 0 Use Internal clock, don't send MIDI clock 1 Use Internal clock, send MIDI clock 2 Use MIDI clock In 3 Use MIDI clock In, and retransmit MIDI clock out 4 No change 5 No change 6 Use MIDI clock In, but ignore MIDI Start/Stop
8	x	Not used (zero sent in Main Dump)
9	0 – 19	Poly Chain 0 No Chaining 1 2 voices total 2 3 voices total . 19 20 voices total
10	0 – 8	Input Gain 0 No gain 1 + 3 db 2 + 6 db 3 + 9 db 4 + 12 db 5 + 15 db 6 + 18 db 7 + 21 db 8 + 24 db
11	0 – 100	Master Fine Tune; 0 = -50 cents, 50 = 0 (centered), 100 = + 50 cents

12	x	Not used (zero sent in Main Dump)
13	x	Not used (zero sent in Main Dump)
14	0 – 16	MIDI Channel; if = 0, data received on all MIDI channels. Otherwise = channel number 1 – 16.
15	X	Not used (zero sent in Main Dump)
16	X	Not used (zero sent in Main Dump)
17	X	Not used (zero sent in Main Dump)
18	0 – 1	MIDI Program Change enable
19	0 – 1	MIDI Pressure enable
20	0 – 1	MIDI Controller enable
21	0 – 1	MIDI SysEx enable
22	0 – 5	Pedal/CV 1 destination
23	0 – 5	Pedal/CV 2 destination
24	0 – 3	Velocity Curve
25	0 – 3	Pressure Curve
26	0 – 1	Local Control Off/On
27	0 – 1	Damper Polarity; 0 = normally open, 1 = normally closed

Note: Some parameters are not used in order to maintain the closest match with other Evolver models.

Program Parameter Data

Parameter	Range	Description
0	0 – 120	Oscillator 1 Frequency, 0 – 120 in semitones (10 octave range)
1	0 – 100	Oscillator 1 Fine Tune; 0 = -50 cents, 50 = 0 (centered), 100 = + 50 cents
2	0 – 102	Oscillator 1 Shape 0 Sawtooth 1 Triangle 2 Sawtooth/triangle mix 3 – 102 Pulse Wave, Pulse width 0 – 99
3	0 – 100	Oscillator 1 Level
4	0 – 120	Oscillator 2 Frequency, 0 – 120 in semitones (10 octave range)
5	0 – 100	Oscillator 2 Fine Tune; 0 = -50 cents, 50 = 0 (centered), 100 = + 50 cents
6	0 – 102	Oscillator 2 Shape 0 Sawtooth 1 Triangle 2 Sawtooth/triangle mix 3 – 102 Pulse Wave, Pulse width 0 – 99
7	0 – 100	Oscillator 2 Level

Parameter	Range	Description
8	0 – 120	Oscillator 3 Frequency, 0 – 120 in semitones (10 octave range)
9	0 – 100	Oscillator 3 Fine Tune; 0 = -50 cents, 50 = 0 (centered), 100 = + 50 cents
10	0 – 127	Oscillator 3 Shape 1 – 128
11	0 – 100	Oscillator 3 Level
12	0 – 120	Oscillator 4 Frequency, 0 – 120 in semitones (10 octave range)
13	0 – 100	Oscillator 4 Fine Tune; 0 = -50 cents, 50 = 0 (centered), 100 = + 50 cents
14	0 – 127	Oscillator 4 Shape 1 – 128
15	0 – 100	Oscillator 4 Level

Parameter	Range	Description
16	0 – 164	Filter Frequency, steps in semitones
17	0 – 198	Filter Envelope Amount; -99 to +99
18	0 – 110	Filter Envelope Attack
19	0 – 110	Filter Envelope Decay
20	0 – 100	Filter Envelope Sustain
21	0 – 110	Filter Envelope Release
22	0 – 100	Resonance
23	0 – 100	Filter Keyboard Amount
Parameter	Range	Description
24	0 – 100	VCA Level
25	0 – 100	VCA Envelope Amount
26	0 – 110	VCA Envelope Attack

27	0 – 110	VCA Envelope Decay
28	0 – 100	VCA Envelope Sustain
29	0 – 110	VCA Envelope Release
30	0 – 6	Output Pan 0 Left channel panned fully left, Right fully to the right 1 Left channel panned mostly left, Right mostly to the right 2 Left channel panned somewhat left, Right somewhat to the right 3 Mono 4 Right channel panned somewhat left, Left somewhat to the right 5 Right channel panned mostly left, Left mostly to the right 6 Right channel panned fully left, Left fully to the right
31	0 – 100	Program Volume

Parameter	Range	Description
32	0 – 48	Feedback Frequency – steps in semitones
33	0 – 100	Feedback Amount
34	0 – 1	Grunge; 0 = off, 1 = on
35	0 – 166	Delay 1 Time
36	0 – 100	Delay 1 Level
37	0 – 100	Delay sum feedback to Delay input
38	0 – 100	Delay sum feedback to filter input
39	0 – 14	Output hack amount

Parameter	Range	Description
40	0 – 160	LFO 1 Frequency; 0 – 150 unsynced frequency 151 Sequence speed divided by 32 152 Sequence speed divided by 16 153 Sequence speed divided by 8 154 Sequence speed divided by 4 155 Sequence speed divided by 2 156 One cycle per step 157 Two cycles per step 158 Four cycles per step 159 Eight cycles per step 160 Sixteen cycles per step
41	0 – 4	LFO 1 Shape 0 Triangle 1 Reverse Sawtooth 2 Sawtooth 3 Pulse (square) 4 Random
42	0 – 200	LFO 1 Amount (over 100 repeats with Key sync on)
43	0 – 68	LFO 1 Destination (see destination table on page 53)
44	0 – 160	LFO 2 Frequency (same as LFO 1)
45	0 – 4	LFO 2 Shape (same as LFO 1)
46	0 – 200	LFO 2 Amount (over 100 repeats with Key sync on)
47	0 – 68	LFO 2 Destination (see destination table on page 53)

Parameter	Range	Description
48	0 – 198	Envelope 3 Amount; -99 to +99
49	0 – 68	Envelope 3 Destination (see destination table on page 53)
50	0 – 110	Envelope 3 Envelope Attack
51	0 – 110	Envelope 3 Envelope Decay
52	0 – 100	Envelope 3 Envelope Sustain
53	0 – 110	Envelope 3 Envelope Release
54	0 – 13	Trigger Select 0　All – The envelopes will be triggered by either the sequencer or the keyboard 1　Seq – The envelopes will be triggered by the sequencer only. 2　The envelopes will be triggered by the keyboard only. 3　Same, with sequencer reset on Note On 4　Combo – Envelopes will only be triggered by both the keyboard and the sequencer is running 5　Combo Reset – same, with sequencer reset on Note On 6　External Input gates the envelopes 7　External Input gates the envelopes and resets the sequencer 8　External Input gates the sequencer 9　External Input gates the sequencer and resets the sequencer 10　Keyboard plays sequence once 11　Keyboard plays sequence once, resetting on multiple notes 12　External Trigger – the sequence plays once on an external signal 13　The sequence plays once when a key is hit
55	0 – 73	Key Off / Transpose – 0 = Key pitch ignored. 1 = -36 semitones keyboard transpose, 37 = no transposing, 73 = +36 semitones

Parameter	Range	Description
56	0 – 75	Sequencer 1 Destination (see destination table on page 53)
57	0 – 75	Sequencer 2 Destination (see destination table on page 53)
58	0 – 75	Sequencer 3 Destination (see destination table on page 53)
59	0 – 75	Sequencer 4 Destination (see destination table on page 53)
60	0 – 100	Noise Volume
61	0 – 100	External Input Volume
62	0 – 2	External Input Mode 0　Stereo 1　Left Input channel goes to both channels 2　Right Input channel goes to both channels 3　Left channel audio, Right channel control
63	0 – 14	Input Hack Amount

Parameter	Range	Description
64	0 – 200	Glide, Oscillator 1; 101 – 199 = Fingered; 200 = osc midi off
65	0 – 1	Sync; 0 = off, 1 = on
66	30 – 250	Program tempo

67	0 – 12	Program Clock Divide (see Master Clock Divide for selections)
68	0 – 200	Glide, Oscillator 2; 101 – 199 = Fingered; 200 = osc midi off
69	0 – 5	Oscillator Slop
70	0 – 12	Pitch Bend Range, in semitones
71	0 – 23	Key Mode 0 Low note priority 1 Low note priority with re-trigger 2 High note priority 3 High note priority with re-trigger 4 Last note hit priority 5 Last note hit priority with re-trigger Add 0 for Poly, 6 for Mono, 12 for Unison 1, and 18 for Unison 2 to the above

Parameter	Range	Description
72	0 – 200	Glide, Oscillator 3; 101 – 199 = Fingered; 200 = osc midi off
73	0 – 100	FM, Oscillator 4 to Oscillator 3
74	0 – 4	Shape Mod Oscillator 3; 0 = Off, 1 = Sequence 1, etc.
75	0 – 100	Ring Mod, Oscillator 4 to Oscillator 3
76	0 – 200	Glide, Oscillator 4; 101 – 199 = Fingered; 200 = osc midi off
77	0 – 100	FM, Oscillator 3 to Oscillator 4
78	0 – 4	Shape Mod Oscillator 4; 0 = Off, 1 = Sequence 1, etc
79	0 – 100	Ring Mod, Oscillator 3 to Oscillator 4

Parameter	Range	Description
80	0 – 1	2/4 Pole Select; 0 = 2 Pole, 1 = 4 Pole
81	0 – 100	Filter Envelope Velocity
82	0 – 100	Filter Audio Modulation
83	0 – 100	Filter Split
84	0 – 199	Highpass Filter cutoff. 0-99 for filter on output; 100 – 199 for levels 0-99 with filter on input
85	0 – 24	Modulation 1 Source (see Source Table on page 55)
86	0 – 198	Modulation 1 Amount; -99 to +99
87	0 – 68	Modulation 1 Destination (see destination table on page 53)
Parameter	Range	Description
88	0 – 1	Linear/Exponential envelopes 0 = Exponential, 1 = Linear
89	0 – 100	VCA Envelope Velocity
90	0 – 24	Modulation 2 Source (see Source Table on page 55)
91	0 – 198	Modulation 2 Amount; -99 to +99
92	0 – 68	Modulation 2 Destination (see destination table on page 53)
93	0 – 24	Modulation 3 Source (see Source Table on page 55)
94	0 – 198	Modulation 3 Amount; -99 to +99
95	0 – 68	Modulation 3 Destination (see destination table on page 53)

Parameter	Range	Description
96	0 – 24	Modulation 4 Source (see Source Table on page 55)
97	0 – 198	Modulation 4 Amount; -99 to +99
98	0 – 68	Modulation 4 Destination (see destination table on page 53)
99	0 – 166	Delay 2 Time
100	0 – 100	Delay 2 Level
101	0 – 166	Delay 3 Time
102	0 – 100	Delay 3 Level
103	0 – 199	Distortion; 0-99 for distortion on output; 100 – 199 for levels 0-99 with distortion on input

Parameter	Range	Description
104	0 – 160	LFO 3 Frequency (same as LFO 1)
105	0 – 4	LFO 3 Shape (same as LFO 1)
106	0 – 200	LFO 3 Amount (over 100 repeats with Key sync on)
107	0 – 68	LFO 3 Destination (see destination table on page 53)
108	0 – 160	LFO 4 Frequency (same as LFO 1)
109	0 – 4	LFO 4 Shape (same as LFO 1)
110	0 – 200	LFO 4 Amount (over 100 repeats with Key sync on)
111	0 – 68	LFO 4 Destination (see destination table on page 53)

Parameter	Range	Description
112	0 – 100	Envelope 3 Delay
113	0 – 100	Envelope 3 Velocity
114	0 – 198	External Input Peak Amount; -99 to +99
115	0 – 68	External Input Peak Destination (see destination table on page 53)
116	0 – 198	External Input Envelope Follower Amount; -99 to +99
117	0 – 68	External Input Envelope Follower Destination (see destination table on page 53)
118	0 – 198	Velocity Amount; -99 to +99
119	0 – 68	Velocity Destination (see destination table on page 53)

Parameter	Range	Description
120	0 – 198	Mod Wheel Amount; -99 to +99
121	0 – 68	Mod Wheel Destination (see destination table on page 53)
122	0 – 198	Pressure Amount; -99 to +99
123	0 – 68	Pressure Destination (see destination table on page 53)
124	0 – 198	Breath Controller Amount; -99 to +99
125	0 – 68	Breath Controller Destination (see destination table on page 53)
126	0 – 198	Foot Controller Amount; -99 to +99
127	0 – 68	Foot Controller Destination (see destination table on page 53)

Modulation Destinations

0	No destination selected
1	Oscillator 1 Frequency
2	Oscillator 2 Frequency
3	Oscillator 3 Frequency
4	Oscillator 4 Frequency
5	Oscillator All Frequency – goes to all four
6	Oscillator 1 Level
7	Oscillator 2 Level
8	Oscillator 3 Level
9	Oscillator 4 Level
10	Oscillator All Level
11	Noise Level
12	External In Level
13	Oscillator 1 Pulse width
14	Oscillator 2 Pulse width
15	Oscillator All Pulse width
16	Frequency Mod (FM) Amount; Osc 4 -> 3
17	Frequency Mod (FM) Amount; Osc 3 -> 4
18	Ring Mod (Amplitude) Amount; Osc 4 -> 3
19	Ring Mod (Amplitude) Amount; Osc 3 -> 4
20	Filter frequency
21	Filter Split –separation between left / right
22	Resonance
23	Highpass Frequency
24	VCA amount
25	Pan
26	Feedback frequency
27	Feedback Amount
28	Delay Time 1
29	Delay Time 2
30	Delay Time 3
31	Delay Time All
32	Delay Amount 1
33	Delay Amount 2
34	Delay Amount 3
35	Delay Amount All
36	Delay Feedback 1
37	Delay Feedback 2
38	LFO 1 Frequency
39	LFO 2 Frequency
40	LFO 3 Frequency
41	LFO 4 Frequency
42	LFO All Frequency
43	LFO 1 Amount
44	LFO 2 Amount

45	LFO 3 Amount
46	LFO 4 Amount
47	LFO A Amount
48	Envelope 1 Amount
49	Envelope 2 Amount
50	Envelope 3 Amount
51	Envelope A Amount
52	Envelope 1 Attack
53	Envelope 2 Attack
54	Envelope 3 Attack
55	Envelope A Attack
56	Envelope 1 Decay
57	Envelope 2 Decay
58	Envelope 3 Decay
59	Envelope A Decay
60	Envelope 1 Release
61	Envelope 2 Release
62	Envelope 3 Release
63	Envelope A Release
64	Filter 1 (left) Cutoff Frequency
65	Filter 2 (right) Cutoff Frequency
66	Filter 1 (left) Resonance
67	Filter 2 (right) Resonance
68	Distortion

Sequencer-only destinations

69	Tempo Clock multiplier
70	MIDI Note Out
71	MIDI Velocity Out
72	MIDI Mod Wheel Out
73	MIDI Pressure Out
74	MIDI Breath Controller Out
75	MIDI Foot Controller Out

Modulation Sources

0	No Source selected
1	Sequence 1
2	Sequence 2
3	Sequence 3
4	Sequence 4
5	LFO 1
6	LFO 2
7	LFO 3
8	LFO 4
9	Filter Envelope
10	Amp (VCA) Envelope
11	Envelope 3
12	External Audio Input Peak
13	External Audio Envelope Follower
14	Pitch Bend
15	Mod Wheel
16	Pressure
17	Midi – Breath Controller
18	Midi – Foot Controller
19	Key Velocity
20	Key Note Number
21	Midi – Expression
22	Noise
23	Oscillator 3
24	Oscillator 4

Hidden Functions

The following hidden functions are listed for information only; you should not normally have to use these. To select these, hold the RESET switch and hit:

OSCILLATOR 1 Switch: Display the software versions for the Main and DSP processors.

OSCILLATOR 2 Switch: Calibrate the low pass filters and analog oscillator waveshapes.

OSCILLATOR 3 Switch: Reset all Global parameters to factory settings

To calibrate the pitch and mod wheels:

1) Turn the mod wheel all the way off (down), and while also holding the pitch wheel off, hold the RESET switch and hit the LFO 1 switch.

2) Return the pitch wheel to center, and hold RESET and hit the LFO 2 switch.

3) Move the Mod wheel all the way on (up), and while also holding the pitch wheel all the way on, hold RESET and hit the LFO 3 switch.