

Evolver Operation Manual

Preliminary



This manual assumes a reasonable knowledge of synthesis; there is no attempt to explain basic functions. There are plenty of information sources for learning the basics. This is meant to explain the specific operation of Evolver. There is also a signal flow diagram, and an initial MIDI implementation spec included.

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Main Parameters

There are two rows of Main, or global, parameters. Hitting the MAIN switch repeatedly will toggle between the first row and the second.

If you hold the MAIN switch, it will start blinking – this indicates that it is ready to store a program. Hitting the MAIN switch a second time will store the program. Hitting any other switch will stop the blinking and abort the save. You can change the Bank and Program number while it's blinking to move programs between locations and banks.

Row 1

Program	Select Program 1-128 in the currently selected bank.
Bank Select	Select Bank 1, 2, or 3. Each bank has 128 Programs, for a total of 384 Programs.
Volume	Master Volume control, 0 to 100.
Transpose	Master Transpose control, -36 to + 36; 0 centered. Steps in semitones.
BPM	Basic speed for the sequencer, 30 to 250 BPM. Actual speed also depends on the Clock Divide setting.
Clock Div	Used as a clock divider to provide a wider range of sequencer speeds. When set to 4v (quarter notes), the BPM setting is exact, i.e. 120 BPM = 120 BPM. If set to 2v (half note), the actual speed is half, so a setting of 120 BPM will actually play at 60 BPM. Here are all the possible settings: 2v half note 4v quarter note 8v Eighth note 8H Eighth note, half swing timing 8σ Eighth note, full swing timing 8τ Eighth note triplets 16v Sixteenth note 16H Sixteenth note, half swing timing 16σ Sixteenth note, full swing timing 16τ Sixteenth note triplets 32v Thirty-second note 32v Thirty-second note triplets 64v Sixty Fourth note triplets
Use Pre Tempo	Use Preset Tempo – when set to OΦΦ, changing a Program will not change the tempo- this is useful for keeping a constant tempo but using different sounds. If set to Ov, a Program change will change the tempo to the BPM/Clock Divide values saved with the Program. Whenever you save a Program, the current tempo is saved also as part of the Program.
MIDI Clock	OΦΦ – MIDI clock is neither saved or received OYT – MIDI clock is sent IN – MIDI clock is received

Row 2

Lock Seq	When set to OΦΦ, sequencer operation is normal, and each Program plays its own sequence. If set to Ov, the sequence does not change when changing a Program. This provides an easy way to hear the same sequence with different sounds. Note that Lock Sequence can be used to copy a sequence from one Program to another.
Poly Chain	Poly Chain is used to link multiple Evolvers into a polyphonic system by selectively passing MIDI data through to the MIDI out jack where it can be routed to another Evolver. OΦΦ MIDI operation is normal. AAA All MIDI information is passed through to the MIDI out jack vοτ Only MIDI note data is passed through to the MIDI out jack.
Input Gain	Provides extra gain on the Left and Right External Inputs. You can select no gain (0δβ), or a gain in steps of 3 db up to 12db. Note that when the Input Gain knob is active, the row and column lights become a simple VU meter, with the rows showing the left channel, and the columns showing the right. The Clip light is always active.

	The Clip light has a dual purpose – it lights when either the left or right External Inputs clip, and it also lights when there is a clip on the internal A/D, which follows the analog circuitry. This helps set internal levels and prevent clipping and distortion (unless of course you want it to clip/distort!).
Fine Tune	Master Fine Tune control, -50 to + 50; 0 centered. Steps in cents (50 cents = ½ semitone).
MIDI Rec	MIDI Receive – determines what MIDI data to receive. ΟΦΦ – No MIDI data received ΑΛΛ – All MIDI data received πρo – Only MIDI program changes received (along with note/controller data) παρ – Only MIDI parameters received (along with note/controller data)
MIDI Xmit	MIDI transmit – determines what MIDI data to send ΟΦΦ – No MIDI data sent ΑΛΛ – All MIDI data sent πρo – Only MIDI program changes sent παρ – Only MIDI parameters received
MIDI Channel	Select which MIDI channel to send/receive data, 1 to 16. ΑΛΛ receives on any channel.
MIDI Dump	Allows transmission off either a single Program οvε or an entire bank αλλ. When this knob is active, the Sequencer START/STOP light will start blinking. If you hit the START/STOP switch, the transmission will start.

Sequencer Operation

Evolver has a 4 x 16 “analog” style step sequencer. To program the sequencer, hit the SEQUENCER switch, and the program matrix is now active for editing the sequences. Row 1 has positions 1-8 of Sequence 1, and Row 2 has positions 9-16 of Sequence 1. Likewise the remaining rows cover Sequences 2 – 4.

You can easily switch the matrix back and forth between normal Program edit mode and Sequence mode by hitting the SEQUENCER switch. Assuming you have the Sequence destinations set, you can simply start a sequence (hit the START/STOP switch), and hear the result as you change the sequence step values, which range from 0 to 100. Note that when routing a sequencer to an oscillator, a sequence value of 24 corresponds to one octave, i.e. each step is one half a semitone.

Sequence 1 (Rows 1 and 2) also control rests and resets. If set to οφφ, there will not be a trigger to the envelopes on that step. If set to ρστ, the sequencer will reset to step zero when it reaches this step. For example, if you want a four step sequence, simply set step 5 to ρστ. Using rests, resets, and different Clock Divides (half swing, swing, etc.) you can achieve more complex sequences.

For easy programming of sequences, first connect a MIDI keyboard. Hold the SEQUENCER switch, and it will start blinking, indicating that the currently selected sequence will accept key information over MIDI. Each MIDI note-on will be saved in the current sequence location, and will automatically step to the next. It will loop around from step 16 to 1 if you keep playing notes. MIDI notes below C2 (48) act as rests. Note C2 will program a zero, C#2 a 2, etc.

Note that it does not remember the timing when programmed from a keyboard; it is simply a convenience feature.

Besides that, START/STOP obviously starts and stops the sequencer; the RESET switch will reset the sequence to step one if the sequencer is running or not running.

NOTE – the RESET switch also acts as a MIDI all-notes-off, and resets all MIDI controllers when hit while the sequencer is not running.

Program Parameters

There are eight rows of Program parameters. In addition, holding the SHIFT switch gives access to an additional 64 parameters. The Shift key must be held while modifying the parameter – it is not a toggle function. Note that sometimes the shifted parameter is related to the unshifted, but other times they are unrelated. The panel artwork shows the grouping to make it more obvious.

To select a row to edit, simply hit the desired Row switch, and you can any of the eight knobs to change a parameter in that row. NOTE! When you first grab a knob and turn it one click, it selects that column but does not change the programmed parameter value. Any further turning will then modify the value up or down. This makes it easy to check the value of a parameter without changing it.

The following parameter details are grouped by function, with row placement secondary. An (S) denotes the shift key is held down for this parameter.

<u>Oscillator 1</u>	Analog, left channel
Frequency	Selects base frequency over a 10 octave range. Steps in semitones. C3 is middle C, the first octave has no number (χ , $\delta\beta$, δ ...), the second octave is $-1(\chi \pm, \delta\beta \pm, \delta \pm\dots)$, the third is zero ($\chi 0$, $\delta\beta 0$, $\delta 0\dots$), etc.
Fine	Fine Tune control, -50 to + 50; 0 centered. Steps in cents (50 cents = $\frac{1}{2}$ semitone).
Shape/PW	Selects the analog waveshape as follows: $\Sigma\alpha\tau$ Sawtooth $\tau\rho 1$ Triangle $\sigma-\tau$ Sawtooth – triangle mix $\pi 0$ to $\pi 99$ Pulse Wave, with pulse width ranging to minimum (0) to maximum (99). The pulse width will turn off at the two extremes.
Level	Sets the volume of oscillator 1, 0 – 100.
Glide (S)	The Glide amount, from 0 – 100. Low numbers are faster.
Sync 2->1 (S)	Turns oscillator hard sync on or off. Whenever oscillator 2 resets, it will also reset oscillator 1 for the classic hard sync sound.
<u>Oscillator 2</u>	Analog, right channel
Frequency	Selects base frequency over a 10 octave range. Steps in semitones. C3 is middle C, the first octave has no number (χ , $\delta\beta$, δ ...), the second octave is $-1(\chi \pm, \delta\beta \pm, \delta \pm\dots)$, the third is zero ($\chi 0$, $\delta\beta 0$, $\delta 0\dots$), etc.
Fine	Fine Tune control, -50 to + 50; 0 centered. Steps in cents (50 cents = $\frac{1}{2}$ semitone).
Shape/PW	Selects the analog waveshape as follows: $\Sigma\alpha\tau$ Sawtooth $\tau\rho 1$ Triangle $\sigma-\tau$ Sawtooth – triangle mix $\pi 0$ to $\pi 99$ Pulse Wave, with pulse width ranging to minimum (0) to maximum (99). The pulse width will turn off at the two extremes.
Level	Sets the volume of oscillator 1, 0 – 100.
Glide (S)	The Glide amount, from 0 – 100. Low numbers are faster.
<u>Oscillator 3</u>	Digital, Left channel
Frequency	Selects base frequency over a 10 octave range. Steps in semitones. C3 is middle C, the first octave has no number (χ , $\delta\beta$, δ ...), the second octave is $-1(\chi \pm, \delta\beta \pm, \delta \pm\dots)$, the third is zero ($\chi 0$, $\delta\beta 0$, $\delta 0\dots$), etc.
Fine	Fine Tune control, -50 to + 50; 0 centered. Steps in cents (50 cents = $\frac{1}{2}$ semitone).
Shape	Selects a digital waveshape, 1-94. These correspond to the preset waveshapes in the Prophet-VS.
Level	Sets the volume of oscillator 1, 0 – 100.
Glide (S)	The Glide amount, from 0 – 100. Low numbers are faster.
FM 4->3 (S)	The amount of Frequency Modulation of Oscillator 3 from Oscillator 4, 0 – 100. Note that both digital oscillators can FM the other at the same time for some wild results.
Shape Seq (S)	This parameter allows sequencing waveshapes. Off if not in use, otherwise select one of the four sequences $\sigma\epsilon 1$, $\sigma\epsilon 2$, $\sigma\epsilon 3$, or $\sigma\epsilon 4$ 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.

Ring Mod 4->3 (S) The amount of Ring (Amplitude) Modulation of Oscillator 3 from Oscillator 4, 0 – 100. Note that both digital oscillators can modulate the other at the same time.

Oscillator 4 Digital, Right channel

Frequency Selects base frequency over a 10 octave range. Steps in semitones. C3 is middle C, the first octave has no number (χ , $\delta\beta$, δ ...), the second octave is $-1(\chi \pm, \delta\beta \pm, \delta \pm \dots)$, the third is zero ($\chi 0$, $\delta\beta 0$, $\delta 0 \dots$), etc.

Fine Fine Tune control, -50 to + 50; 0 centered. Steps in cents (50 cents = $\frac{1}{2}$ semitone).

Shape Selects a digital waveshape, 1-94. These correspond to the preset waveshapes in the Prophet-VS.

Level Sets the volume of oscillator 1, 0 – 100.

Glide (S) The Glide amount, from 0 – 100. Low numbers are faster.

FM 3->4 (S) The amount of Frequency Modulation of Oscillator 4 from Oscillator 3, 0 – 100. Note that both digital oscillators can FM the other at the same time for some wild results.

Shape Seq (S) This parameter allows sequencing waveshapes. Off if not in use, otherwise select one of the four sequences $\sigma\epsilon 1$, $\sigma\epsilon 2$, $\sigma\epsilon 3$, or $\sigma\epsilon 4$ 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.

Ring Mod 3->4 (S) The amount of Ring (Amplitude) Modulation of Oscillator 4 from Oscillator 3, 0 – 100. Note that both digital oscillators can modulate the other at the same time.

Filter

Frequency Selects base filter cutoff frequency over more than 13 octaves.

Env Amt Amount of filter envelope to the cutoff frequency.

Attack Attack time of the filter ADSR envelope generator

Decay Decay time

Sustain Sustain Level

Release Release time

Resonance Sets the Resonance level of the filter from 0-100; at high settings the filter will self-oscillate in 4-pole mode.

Key Amt Amount of keyboard (MIDI note) to the filter cutoff.

2/4 Pole (S) Selects either 2 or 4 pole operation for the filter.

Velocity (S) Amount of MIDI velocity controlling the level of the filter envelope.

Audio Mod (S) Amount of audio modulation from the analog oscillator to the filter, separate in left and right channels.

Split (S) 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; this allows a way to unlock them.

VCA

VCA Level Sets a base level for the VCA (Voltage controlled Amplifier).

Env Amt Amount of VCA envelope to the VCA level.

Attack Attack time of the VCA ADSR envelope generator

Decay Decay time

Sustain Sustain Level

Release Release time

Velocity (S) Amount of MIDI velocity controlling the level of the VCA envelope.

Output Pan Selects from 7 different pan settings as below. This affects the feedback; it allows signal from one channel to feedback into the other, for example.

$\Sigma\tau 1$ Stereo 1 – Left channel panned fully left, Right fully to the right

$\Sigma\tau 2$ Stereo 2 – Left channel panned mostly left, Right mostly to the right

$\Sigma\tau 3$ Stereo 3 – Left channel panned somewhat left, Right somewhat to the right

mON Mono – Both channels mixed to the center – also useful when only using one output

$\rho\sigma 1$ Reverse Stereo 1 – Right channel panned somewhat left, Left somewhat to the right

$\rho\sigma 2$ Reverse Stereo 2 – Right channel panned mostly left, Left mostly to the right

$\rho\sigma 3$ Reverse Stereo 3 – Right channel panned fully left, Left fully to the right

Volume Sets the voice volume; usually used for matching volumes between Programs.

Feedback

Frequency Sets the base frequency of the main feedback loop. It steps roughly in semitones from 0 – 43 for about a 3 ½ octave range. Actual frequency is dependent on other factors, such as the filter frequency and number of poles.

Level Level of feedback. As the level goes up the feedback will eventually oscillate at the set Frequency.

Grunge When on, it enables nastier feedback at higher levels – it will not have any effect at lower levels.

Delay

Time 1 Sets the delay time of the first delay tap.

Level 1 Sets the delay amount of the first delay tap.

Feedback 1 Amount of feedback from the summed output of all the delay taps to the input of the delay.

Feedback 2 Amount of feedback from the summed output of all the delay taps to the input of the filter for more extreme effects.

Time 2 (S) Sets the delay time of the second delay tap.

Level 2 (S) Sets the delay amount of the second delay tap.

Time 3 (S) Sets the delay time of the third delay tap.

Level 4 (S) Sets the delay amount of the third delay tap.

LFO 1

Frequency Selects the frequency of LFO 1 (Low Frequency Oscillator). Range 0 – 150 for unsynced LFO; speed ranges from slow (20 seconds) to very fast – at 90 and above the speed steps in semitones, up to 150 which is middle C. Note that some of the voltage controlled functions can't respond very well to the fastest LFO speeds, but it will certainly generate some interesting sounds. Above 150 are the sync speeds as follows:

- σ32 Sequence speed divided by 32; i.e. one cycle takes 32 steps
- σ16 Sequence speed divided by 16
- σ 8 Sequence speed divided by 8
- σ 4 Sequence speed divided by 4
- σ 2 Sequence speed divided by 2
- σ 1 One cycle per step
- στ2 Two cycles per step
- στ4 Four cycles per step
- στ8 Eight cycles per step
- σ16 Sixteen cycles per step

Shape

Selects the LFO waveshape:

- τρ1 Triangle
- ρσσ Reverse Sawtooth
- Σατ Sawtooth
- πυλ Pulse (square wave)
- ρνδ Random – changes once per cycle for sample-and-hold effects

Amount

Sets the amount of LFO 1, 0 – 100.

Destination

LFO 1 destination - see the last page for a list of possible destinations.

LFOs 2, 3, 4

Same as LFO 1; LFOs 3 and 4 require the Shift key.

Envelope 3

Amount Amount of envelope 3

Destination Envelope 3 destination - see the last page for a list of possible destinations.

Attack Attack time of ADSR envelope generator 3

Decay Decay time

Sustain Sustain Level

Release Release time

Delay (S) Delay time of Envelope 3, prior to Attack

Velocity (S) Amount of MIDI velocity controlling the level envelope 3.

Miscellaneous Parameters

Output Hack Trashes the output signal, quite rudely, 0 – 14.

Trigger Sel Selects the source of triggers/gates for the envelope generators.

all? The envelopes will be triggered by either the sequencer *or* MIDI notes. When triggered by the sequencer, the gates are on for half the step time. Simply adjust the envelope parameters (ADSR) for the desired effect.

seq? The envelopes will be triggered by the sequencer only.

mid? The envelopes will be triggered by MIDI notes only.

mdr? The envelopes will be triggered by MIDI, and the sequencer will be reset on every note. The sequencer will not trigger the envelopes.

ins? Combo mode – the envelopes will only be triggered with both a MIDI note and the sequencer is running; in other words the MIDI notes will gate the sequencer

msr? Combo mode 2 – same as Combo, except every time a MIDI note is hit, the sequencer is reset to step 1.

Key Off/Xpose Enables and transposes MIDI notes. If OFF, MIDI notes are ignored. Otherwise, it transposes midi notes from -36 to +36 semitones (+/- 3 octaves).

Seq 1 Dest Sequence 1 Destination - see the last page for a list of possible destinations.

Seq 2 Dest Sequence 2 Destination

Seq 3 Dest Sequence 3 Destination

Seq 4 Dest Sequence 4 Destination

Noise Vol The volume of white noise mixed into the filter. The same amount goes into both channels.

Ext In Vol The volume of external input connected to Left In and Right In.

Ext In Mode Selects the external input mode

st? Stereo – the left channel in goes to the left filter, right to right.

l? Left – the left channel in goes to both filters (mono in).

r? Right – the right channel in goes to both filters (mono in).

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

Osc Slop (S) The amount of random oscillator frequency slop, 0 to 5. 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. This parameter allows subtle amounts of frequency drift. For larger amounts, use a random LFO or white noise mod.

P Bend Range (S) Pitch bend range, from 0 to 12 semitones.

Key Mode (S) Selects the key mode when playing from MIDI:

L0? Low note priority

L0r? Low note priority, retrigger envelopes

h1? High note priority

h1r? High note priority, retrigger envelopes

LA? Last note hit priority

LAr? Last note hit priority, retrigger envelopes

Mod 1 Source(S) General purpose modulation source select – see list on last page for possible sources. Since all mod sources in Evolver have a single destination, the four general purpose mods allow a method to send a mod source (like a sequence or LFO) to another destination, with a different amount. Also, there are some additional mod sources such as noise and the digital oscillators available, allowing audio-rate modulation. As mentioned above, there are some destinations that are not able to keep up with audio mod, but it's fun anyway.

Mod 1 Amt (S) Amount of Mod 1 modulation.

M1 Destination (S) Mod 1 Destination - see the last page for a list of possible destinations.

Mods 2 – 4 (S) Same as Mod 1

Exp/Lin Env (S) Selects whether all three envelopes have a linear (straight line) shape, or exponential. Exponential is the more natural of the two.

Distortion (S) Amount of distortion. If set to 0 – 99, the distortion is before the analog filter, and only affects external input, the digital oscillators, and noise. If set to P00 to P99, the distortion is after the analog filter and VCA, before the Delay.

In Peak Amt (S) Amount of Peak modulation. Takes the momentary peaks of the external audio inputs, and uses them as a modulation signal.

Destination (S) Peak Mod Destination - see the last page for a list of possible destinations.

Env Fol Amt (S) Amount of Envelope Follower modulation. Generates an envelope from the external audio inputs, and uses it as a modulation signal.

Destination (S) Envelope Follower Destination - see the last page for a list of possible destinations.

Velocity Amt (S) Amount of MIDI Velocity modulation.

Destination (S) Velocity Destination - see the last page for a list of possible destinations.

Mod Wheel Amt (S) Amount of MIDI Mod Wheel modulation.

Destination (S) Mod Wheel Destination - see the last page for a list of possible destinations.

Pressure Amt (S) Amount of MIDI Pressure modulation, either poly or channel pressure.

Destination (S) Pressure Destination - see the last page for a list of possible destinations.

Breath Amt (S) Amount of MIDI Breath controller modulation.

Destination (S) Breath controller Destination - see the last page for a list of possible destinations.

Foot Amt (S) Amount of MIDI Foot controller modulation.

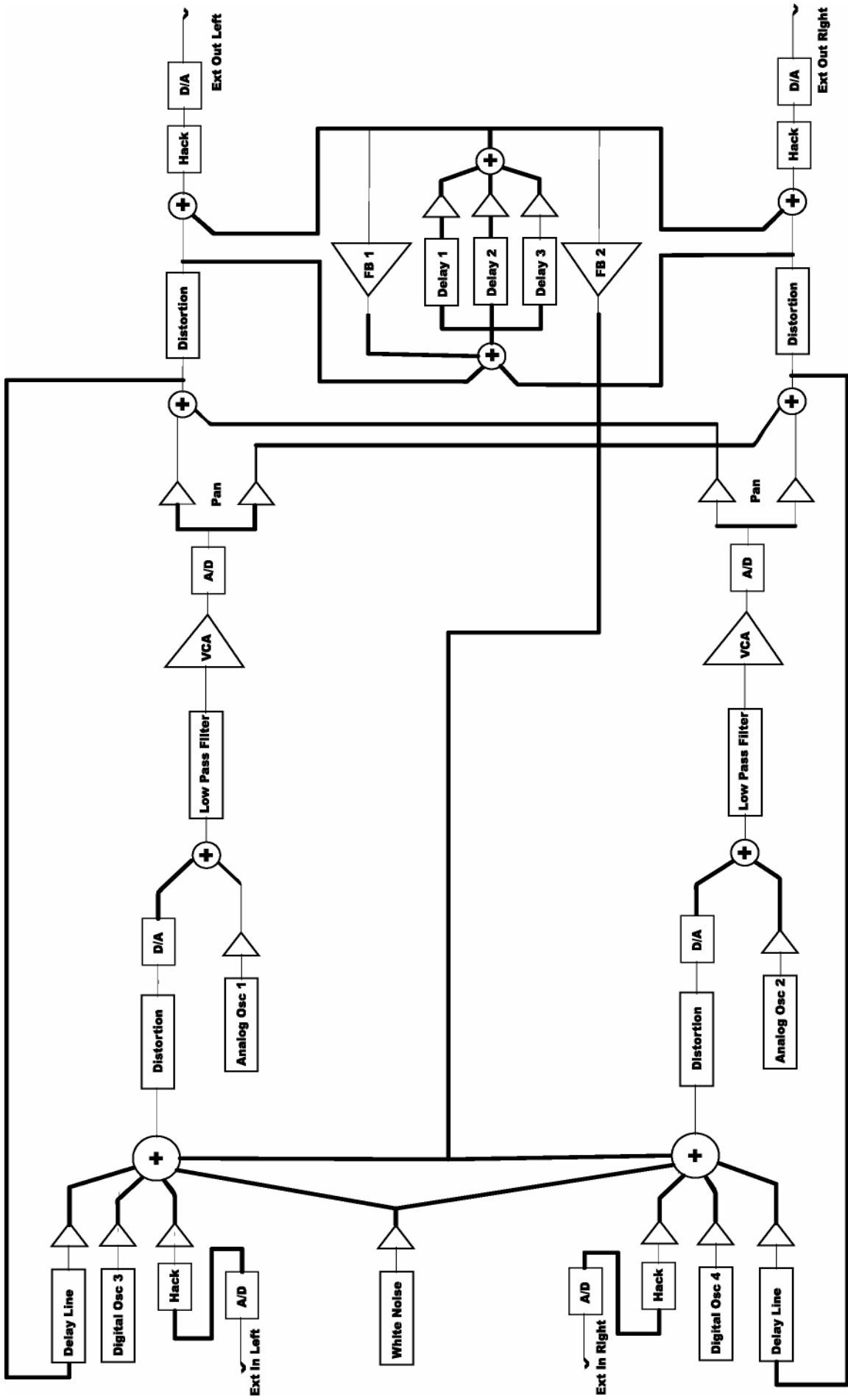
Destination (S) Foot controller Destination - see the last page for a list of possible destinations.

Modulation Destinations

Off	No destination selected
01F	Oscillator 1 Frequency
02f	Oscillator 2 Frequency
03f	Oscillator 3 Frequency
04f	Oscillator 4 Frequency
0af	Oscillator All Frequency – goes to all four
01l	Oscillator 1 Level
02l	Oscillator 2 Level
03l	Oscillator 3 Level
04l	Oscillator 4 Level
0AL	Oscillator All Level
noL	Noise Level
E1l	External In Level
01P	Oscillator 1 Pulse width
02p	Oscillator 2 Pulse width
0ap	Oscillator All Pulse width
F43	Frequency Mod (FM) Amount; Osc 4 -> 3
F34	Frequency Mod (FM) Amount; Osc 3 -> 4
R43	Ring Mod (Amplitude) Amount; Osc 4 -> 3
R34	Ring Mod (Amplitude) Amount; Osc 3 -> 4
FuL	Filter frequency
FLS	Filter Split –separation between left / right
Res	Resonance
UCA	VCA amount
Fbf	Feedback frequency
Fba	Filter Amount
Dlt	Delay Time
Dla	Delay Amount
L1f	LFO 1 Frequency
L2f	LFO 2 Frequency
L3f	LFO 3 Frequency
L4f	LFO 4 Frequency
Laf	LFO All Frequency
L1A	LFO 1 Amount
L2a	LFO 2 Amount
L3a	LFO 3 Amount
L4a	LFO 4 Amount
Laa	LFO A Amount
E1a	Envelope 1 Amount
E2a	Envelope 2 Amount
E3a	Envelope 3 Amount
Eaa	Envelope A Amount
E1r	Envelope 1 Rate
E2r	Envelope 2 Rate
E3r	Envelope 3 Rate
Ear	Envelope A Rate

pan Pan Modulation Sources

Off	No Source selected
SE1	Sequence 1
Se2	Sequence 2
Se3	Sequence 3
Se4	Sequence 4
Lf1	LFO 1
Lf2	LFO 2
Lf3	LFO 3
Lf3	LFO 4
fen	Filter Envelope
aen	Amp (VCA) Envelope
en3	Envelope 3
etp	External Audio Input Peak
ete	External Audio Envelope Follower
mpb	Midi - Pitch Bend
mmu	Midi - Mod Wheel
mpR	Midi - Pressure
mbr	Midi - Breath Controller
mft	Midi - Foot Controller
rne	Midi – Note Velocity
rnno	Midi – Note Number
mep	Midi – Expression
not	Noise
Os3	Oscillator 3
Os4	Oscillator 4



MIDI Implementation

Evolver Receives MIDI data according to the mode controls in the Main Section. There is interaction between some of the controls to determine the overall response of Evolver to MIDI data.

MIDI Channel Select which MIDI channel to send/receive data, 1 to 16. ALL receives on any channel.

MIDI Rec MIDI Receive – determines what MIDI data to receive.
 OΦΦ – No MIDI data received
 ALL – All MIDI data received
 πρo – Only MIDI program changes received (along with note/controller data)
 παρ – Only MIDI parameters received (along with note/controller data)

MIDI Xmit MIDI transmit – determines what MIDI data to send
 OΦΦ – No MIDI data sent
 ALL – All MIDI data sent
 πρo – Only MIDI program changes sent
 παρ – Only MIDI parameters received

Poly Chain Poly Chain is used to link multiple Evolvers into a polyphonic system by selectively passing MIDI data through to the MIDI out jack where it can be routed to another Evolver.
 OΦΦ MIDI operation is normal.
 ALL All MIDI information is passed through to the MIDI out jack
 νοτ Only MIDI note data is passed through to the MIDI out jack.

MIDI Clock OΦΦ – MIDI clock is neither saved or received
 OYT – MIDI clock is sent
 IN – MIDI clock is received
 I-O – MIDI clock is received and retransmitted

NOTE – the RESET switch also acts as a MIDI all-notes-off, and resets all MIDI controllers when hit while the sequencer is not running.

Received Channel 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 following table
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 LSBByte then MSByte

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

Recognized Controller Messages

Status	Second	Third	Description
1011 nnnn	0000 0001	0vvvvvvv	Mod Wheel – directly assignable controller
1011 nnnn	0000 0010	0vvvvvvv	Breath Controller – directly assignable controller
1011 nnnn	0000 0100	0vvvvvvv	Foot Controller – directly assignable controller
1011 nnnn	0000 0111	0vvvvvvv	Volume – Combined with Master Volume and Program Volume
1011 nnnn	0000 1101	0vvvvvvv	Expression Controller – directly assignable controller
1011 nnnn	0010 0000	0vvvvvvv	Bank Select – selects banks 1, 2, or 3 – others ignored
1011 nnnn	0100 0000	0vvvvvvv	Damper pedal – holds envelopes in Sustain if > 0100 0000
1011 nnnn	0111 1101	0vvvvvvv	All Notes Off – clear all MIDI notes
1011 nnnn	0111 1011	0vvvvvvv	Reset All Controllers – clears all MIDI controllers to 0, MIDI volume to maximum

System Common Messages

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

System Realtime 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 0111	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 0111	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 0000	Evolver ID (Family LS)
0000 0000	Family MS
0000 0000	Family Member LS
0000 0000	Family Member MS
0vvv vvvv	PIC Software version
0000 0000	
0vvv vvvv	DSP Software version
0000 0000	
1111 0111	End of Exclusive (EOX)

System Exclusive Messages

Program Parameter

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. Parameters are in the order of the front panel, with the 64 shift parameters following the non-shift parameters
0000 vvvv	Parameter value, LS Nibble
0000 vvvv	Parameter value, MS Nibble
1111 0111	End of Exclusive (EOX)

Sequence Parameter

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)

Main Parameter

Status	Description
1111 0000	System Exclusive (SysEx)
0000 0001	DSI ID
0010 0000	Evolver ID
0000 0001	File Version
0000 1001	Main Parameter
0000 vvvv	Main Parameter Number 0 - 15
0000 vvvv	Parameter value, LS Nibble
0000 vvvv	Parameter value, MS Nibble
1111 0111	End of Exclusive (EOX)

Program Data

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 - 2
0vvv vvvv	Program Number, 0 - 128
0vvv vvvv	220 bytes in “packed MS bit” format (see below). Includes 128 bytes of Program parameters and 64 bytes of Sequence data.
1111 0111	End of Exclusive (EOX)

Edit Buffer Data

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 below). Includes 128 bytes of Program parameters and 64 bytes of Sequence data.
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:

<u>Input Data</u>	<u>Packed MIDI data</u>
1 AAAA AAAA	1 0GFE DCBA
2 BBBB BBBB	2 0AAA AAAA
3 CCCC CCCC	3 0BBB BBBB
4 DDDD DDDD	4 0CCC CCCC
5 EEEE EEEE	5 0DDD DDDD
6 FFFF FFFF	6 0EEE EEEE
7 GGGG GGGG	7 0FFF FFFF
	8 0GGG GGGG

This is why it takes 220 MIDI bytes to transmit 192 Program/Sequence data bytes.

Request Program Transmit

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 - 2
0vvv vvvv	Program Number, 0 - 128
1111 0111	End of Exclusive (EOX)

Evolver will respond by sending out the Program Data as described on the previous page.

Request Edit Buffer Transmit

Status	Description
1111 0000	System Exclusive (SysEx)
0000 0001	DSI ID
0010 0000	Evolver ID
0000 0001	File Version
0000 0101	Request Program Transmit
1111 0111	End of Exclusive (EOX)

Evolver will respond by sending out the current edit buffer as described on the previous page.