



USER GUIDE

A brief overview of the Monowave II (v1.20)

Paul Maddox
20.12.2003

(For technical information about the code and structure, read the technical guide to the Monowave II, coming Jan 2004.)

INDEX:

About Monowave II	3
The basic structure	4
The Oscillators	4
The LFOs	5
The Mixer	5
The Filter	5
The Envelopes	6
The Modulation Routing	7
The Delay Effect	8
Storing a Patch	8
Global Parameters	8
Other Functions	9
And Finally...	10
Monowave II parameter list	11/12

About Monowave II:

Monowave II is a fat and dirty monosynth for the Chameleon DSP platform. The initial starting point for the underlying code is the simple monosynth example code bundled free with the Chameleon Software Development Kit. It has been hacked, modified and adapted to create a grungy little monosynth for you to play with...

My background is in building hardware such as the Monowave I, pictured below. It is a digital/analogue hybrid. It has 2 DCOs with 256 waveforms (more than the original modular), two sub-oscillators, a Moog ladder filter and two Envelope Generators (EG's). The first module was very well received and I have had excellent feedback on its sound and originality, enough to persuade me to do a limited run of them. All 25 of the original hand-built Monowaves have now been sold.



However, my current project, the Monowave II for the Chameleon, is now totally DSP based. Now I don't have to solder endlessly and waste time and resources trying things out on dead end ideas! :)

It builds on the success of the hardware predecessor, offering increased functionality, improved modulation routing, patch memory and some exciting new features.

For those of you who are coders, you will be interested to know that it will become an open source project (as of Jan 2004). This is to encourage others to modify it to their own taste as I did to the basic Soundart Code, but I also want to show that you really don't have to be a DSP/Maths guru to write skins for the Chameleon.

The Basic Structure:

The voice structure is very typical of many monosynths and there are a few extras to give it a unique sound.

For the moment, consider it as a classic “analog” three-oscillator subtractive monosynth, with 2 LFOs, 3 ADSRs, a filter, VCA and stereo delay.

Though, as you will see from the complete list of the parameters at the end of this guide, its much more than that.

The Oscillators:

Firstly though, let's look at the Oscillators:

Press EDIT and you should start at the oscillator menu. Pressing GROUP selects which oscillator's parameters you are about to edit. Notice that oscillators 2 and 3 have an extra parameter which oscillator one does not. Here is what you find:

Oscillator 1 has the following:

- Wavebank – four banks of waveforms to choose from
- Wavnumber – each bank holds 64 waveforms (0 – 63)
- De-Res – A ‘unique’ function that lowers the quality of the sample to give extra old school and ‘grungy’ sounds
- Transpose – You can change the oscillators pitch, up or down in semitones
- Key Reset – Resets the oscillator each time a key is pressed

Oscillators 2 & 3 have the same controls as oscillator 1, but with an extra ‘detune’ parameter allowing the oscillators to be slightly detuned, giving a more ‘natural’ sound to your patch.

The LFOs

There are 2 LFOs. Each LFO has the following parameters; -

- Rate – A log scaled rate allowing a good range of LFO speeds
- Range – High or Low speed, so can get some weird FM effects.
- Waveform – 64 to choose from: along with the conventional sine/square/saw you have some other weird and wonderful waveform shapes to try!
- Reset on Key – Restarts the LFO when you hit a new note

LFO1 is routable to many sources, LFO2 is dedicated to Modwheel control of the oscillator pitch. LFO2 also has two extra parameters

- MW->Depth, selects how much the Mod Wheel affects the Depth of LFO2
- MW->Rate, controls how much the Mod Wheel affects the rate of LFO2

The Mixer

The mixer is straight forward, it has five elements to mix:

- Oscillator 1
- Oscillator 2
- Oscillator 3
- Noise
- External Input – this allows you to process external audio via the Chameleons inputs with the MonoWavell's filter.

The Filter

The filter has another unique function, it's called 'PoleSweep'. This allows you to smoothly change the response curve of the filter from 4-Pole ladder though Bandpass down to 1-Pole for those 'fizzy' sounds.

A further unique feature is the ability to route the filter envelope generator (EG) to the resonance,

Why? We all know and love the sound of big filter sweeps, yes? Well one thing you'll notice is that as you turn up the resonance amount, the signal gets quieter and loses some 'bottom'. So the trick to getting a really big juicy filter sweep is to modulate the resonance depth with the filter envelope, so as the filter sweeps the resonance changes. Give it a go, try the patch called 'Plucky Res' and see what I mean.

The following parameters are available for the filter:

- Cut-off – Filter cut-off setting
- Filter Envelope Depth – How much the filter ADSR sweeps the cut off
- Key Track – this increases the filter cut-off frequency as you play higher notes on the keyboard
- PoleSweep – That unique function outlined above: 0 = 1 Pole, 63 = Bandpass and 127 = 4 Pole
- Resonance – how much 'squelchyness' the filter has
- Filter Env to Resonance – the second unique feature of the MonoWavell filter, this sets how much the envelope generator (EG) adds to the resonance setting

The Envelopes

The Envelopes are standard ADSR types, there are three of them:

- one for the Filter
- one for the VCA
- one 'free' EG for routing to other parameters (see below)

All three have the same Attack, Decay, Sustain and Release parameters plus a 'retrigger' which will restart the EG when you press a new note. If you have a note held already and press another note, the old note is 'remembered' and the new note will also cause a retrigger.

The VCA

The 'VCA' section is fairly straight forward, just two parameters;-

- Envelope Depth – Changing this enables you to make your patch louder or quieter without using the volume knob
- Velocity Depth – How much the velocity affects the output level, this actually also controls Envelope Depth.

Modulation routing

Next the modulation section, this comprises of two sources each with their own destinations, we'll tackle them one source at a time:

LFO1 Destinations –

- Osc1 pitch – controls the pitch of oscillator 1
- Osc2 pitch – controls the pitch of oscillator 2
- Osc3 pitch – controls the pitch of oscillator 3
- Filter Cutoff – again variable from -63 to +63
- PoleSweep – Variable from -63 to +63

EG3 (the free EG) Destinations –

- Filter resonance – For those nice big sweeps
- Filter slope – Allowing you to change the filter 'shape' in realtime
- LFO1 Rate – for all kinds of 'wierdness'
- Osc 1 Pitch – to 'bend' notes as you play
- Osc 2 Pitch
- Osc 3 Pitch

Velocity Destinations –

- Filter Cutoff
- Filter EG depth
- Filter Resonance
- Free EG Depth
- Osc1 Wave
- Osc2 Wave
- Osc3 Wave
- VCA EG Speed
- Filter EG Speed
- Free EG Speed

- Channel Pressure (After touch) Destinations –
- Filter Cutoff
 - Amplitude
 - LFO2 Depth
 - Resonance

As you can see this gives you plenty of options for control and generating some unique sounds, not possible on many synths.

The Delay effect:

The effects section has been kept deliberately simple, I've not added reverbs/chorus/flangers/phasers/etc as I believe that a good sounding synth should be able to 'hold its own'.

The minor concession in Monowave II is a delay. Most people when they start playing a monosynth instantly want a delay effect (for those OTT solos or TD impressions), so a simple stereo delay is included. There are the following parameters for both LEFT and RIGHT delays:

- Delay Level – how loud the effect is
- Delay time (in mS) – how long the delay is
- Delay Feedback – how many 'repeats' the delay gives.

Storing a Patch:

All the above parameters are stored 'per patch' this means that they change each time you recall a new patch.

Each time you exit EDIT mode MonowaveII will prompt you into naming and saving your creation. The options are the same as the Soundart Chameleon skins.

Here you have the option to scan through the patches before deciding where you wish to save your new patch.

Global parameters:

The following parameters are 'GLOBAL', meaning they remain the same regardless of which patch you have loaded.

- Input Thru
- Midi Channel – 1 to 16 (no surprise!)
- Midi Thru – Allows the Chameleons MIDI Out port to be a 'THRU' port instead
- MIDI Device ID – If you're lucky enough to have more than one MonoWavell and want to start sending SYSEX data then you'll need to set these differently for each one.

As you can see I have tried to keep things simple. Many of the features haven't changed from the original Soundart monosynth example that this is based upon (the Delay effect for example) but some features have been developed quite a bit (Oscillators/Filter).

Other Functions

Also, whilst you're editing a patch you can assign any of the 3 realtime controllers to change a parameter. Simply goto the parameter you want to assign to a controller, hold 'Shift' on the front panel and turn the controller you wish to assign it to.

If you forget which parameter you've assigned to each controller, you can show what it assigned to by doing the following, Make sure you're not in edit mode (just 'preset' mode, where you choose a patch) press either of the 'Parameter' buttons. A 'Sh' will appear in the top right of the LCD for 1 second, turn the controller during this time and it will show the parameter it is assigned to and also the current value, but it will not change it.

And Finally...

Monowave II is now finished, as of V1.20f. In January 2004 the source code will be put up so that people can make changes and 'personalize' it. I would like to hope that some extra features could be added to create a 'monster' Monosynth!

Most of all, enjoy the MonoWavell, it's a great sounding little synth and it has some truly great and unique features (even if I say so myself!) It's provided me with hours of fun to play with and countless weeks in coding. If you like it, then your contribution is most welcome. Even if you create any patches you'd like to share, feel free to e-mail me and I'll put them on the webpage.

Best wishes
Paul Maddox

paul.maddox@synth.net

for more info about the Chameleon visit ;-
Www.SoundArt-Hot.Com
For MonoWavell sounds visit ;-
Www.Modulus.Synth.Net

MonoWavell Parameters (V1.20)

GROUP	PAGE	Parameter
Oscillator	Osc1	WaveBank
		Waveform
		De-Res
	Osc2/3	Transpose
		Reset on Key
		WaveBank
LFO	LFO1	Waveform
		De-Res
		Transpose
	LFO2	Detune
		Reset on Key
		Rate
		Range
		Waveform
		Reset on Key
		Rate
		Range
		Waveform
Mixer		Reset on Key
		MW->Depth
		MW->Rate
		Osc1 Level
		Osc2 Level
		Osc3 Level
Filter		Noise
		External Input
		Cut off
		Filt Env Depth
		Note Follow
		PoleSweep
AMP		Resonance
		Filt Env to Resonance
		Amp Env Depth
	Velocity Depth	

GROUP	PAGE	Parameter
Modulation	LFO Dest	Osc1 pitch
		Osc2 pitch
		Osc3 pitch
		Filt Cutoff
		PoleSweep
	EG3 Dest	Resonance
		PoleSweep
		LFO Rate
		Osc1 pitch
		Osc2 pitch
		Osc3 pitch
		Velocity Dest
	Filter EG	
	Resonance	
	EG3 Depth	
	Osc1 Wave	
	Osc2 Wave	
	Osc3 Wave	
	Amp EG Rate	
	Filter EG Rate	
	Free EG Rate	
Chan Press	Filter Cutoff	
	Amplitude	
	LFO2 Depth	
	Resonance	
	Level	
EFX	Delay Left/Right	Time
		Feedback
Global		input Thru
		Midi Channel
		Midi Thru
		Midi Device ID