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FUNS part 2
tutorial for the Kurzweil K2-series of synths

by Brian Cowell.
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With the FUN part 1 tutorial behind us now. We can move onto some other FUNs and still be able to utilize some of the knowledge from the first part of the tutorial series. As you will find that as we move on, that all the FUNs are interactive and serve multiple purposes.

So before I put people into a state of confusion and get them thinking that this going to get to hard, lets ease into it by looking at our next FUN.

FUN |a+b|

    This FUN will make bipolar inputs change into unipolar inputs. In simpler terms, it makes inputs that can become negative and converts them to become positive. So things like ENV2,ENV3,LFO's,PITCH wheel etc. can be made unipolar. This also includes various tempo related functions like the GPHASE and CLOCK controllers.

    It has 2 inputs. Input a and Input b. It adds the 2 inputs together (whether they be positive or negative inputs) and outputs the result as a positive result. For the technical minded. Its (A+B) and if the result is negative it multiplies the result by -1.

    "Big deal ! " you say. Well, I'll add at this point that this FUN can be what a lot a people are looking for. It can change the output of its input waveforms to that of something else. (A unipolar one.) With your appetites wet for what I'm droning over here , lets look at "GPHASE1" as an example.

        GPHASE1 is a bipolar controller.
        GPHASE1 is a rising sawtooth waveform that is directly in step with the 'tempo'. (SONG page.)
        GPHASE1 has a range from -1 to +1.

So careful examination of GPHASE1 tells us that with each beat of the 'tempo' (MIDI clock) , that it goes from -1 to +1 in a single beat. This is very handy. As Kurzweil K2's theoretically don't have synchronized LFO's. (Remember I said 'theoretically' here !)

        GPHASE1 is a sawtooth waveform in sync with the tempo.

Well, moving back to our FUN of discussion.. FUN |a+b|. By putting GPHASE1 into 'input a' and we have nothing in 'input b' of the FUN |a+b| , we change the output waveform of just normal GPHASE1.

The FUN looks like this on your K2.

        FUN1   Gphas1 OFF |a+b|

So we've made the negative of the bipolar source GPHASE1 positive. "Big deal ! "..again someone says. Listen closely to what has happened here. I've just changed this rising sawtooth wave to a 'close' sine waveform in sync with the tempo. I said 'close' here as it is a rising/falling sawtooth actually. But close enough to be recognized as a 'sine' like type of waveform.

This is what's happening :

At the first half of the MIDI clock beat, GPHASE1 is usually going from -1 to 0. Which is half of the rising sawtooth waveform. But in the FUN |a+b|, its output would be going from +1 to 0. As this FUN only allows positive outputs.

So for the first half of the MIDI clock beat the waveform is "falling".

At the second half of the MIDI clock beat, GPHASE1 is going from 0 to +1. This doesn't change as they are positive outputs. So the output of this FUN using GPHASE1 would be a falling/rising output in sync with the tempo !

Example no.2

We will create a pad that moves with the tempo.

Ok. Firstly we need a KEYMAP: we will use 151 SAWTOOTH And we need an algorithm: we will use one from alg.1.

Using PROGRAM 199 'Default program' on your Kurzweil K2.

1. Press [EDIT]

2. Press [KEYMAP] and change it to read 151 Sawtooth.

3. Press ALG and change the algorithm from "None" to "4 POLE LOPASS W/SEP".

4. Press [F1 FREQ] Change "Src1" to "GPhas1".
   Change the "Depth" to 2400ct. I always use large values to hear the effect of what I'm doing. Now play the keyboard to hear what is going on. This effect becomes more pronounce when the "Depth" is set at 4800ct.

5. Press [FUN] and change the settings to as follows:

   FUN1 :   GPhas1 OFF |a+b|

6. Press [F1 FREQ]
   Change "Src1" to "FUN1".

Play the keyboard to hear the effect.

Now change the "Coarse" parameter to read "F#0 23 Hz". (This adjusts the cutoff frequency to let very low frequencies through the filter.) Adjust the "Depth" to 6400ct. I arrived at this setting because it let enough of the sound through that I liked ! You can use more or less if you like.

Now play the keyboard. Its all in sync with the tempo. Which is set in the SONG page in your Kurzweil K2.

But I haven't finished yet ! Its pretty lame and basic. I like to add flavour and color to sounds, so lets incorporate what we learned from the "PART 1" tutorial into this sound.

7. Press [FUN] and make the following settings.

   FUN2 :   0.22 GPhas1   Quantize B to A

If your not sure what is happening here, refer to the "PART 1" tutorial. Remember that GPHASE1 is bipolar.

8. Press [F3 SEP]
    Change "Src1" to FUN2.
    Change the "Depth" to 3100ct. (Again, another large value I liked.)

What we are doing here in the "Separation" page is controlling 'how wide' the filter will open. On the F1 FREQ page we are controlling 'how much we open/close the filter'.

For those finding this hard to understand. Its like water flowing through a tap. The F1 FREQ page is our tap handle. Opening and closing the water flow. The F3 SEP page is somebody grabbing the end of the hose making it wider spraying the water every where. Its not controlling the flow in the sense of the amount of pressure coming out. Its controlling how much area we are covering. (Boy ! That was hard for me to explain. :-) Play the keyboard and see what you think.

"What about some REZ Cowzar ?"........Ok ! I'm getting there.

9. Press [LFO] and change LFO1 to as follows.

       LFO1 :   0.55H   0.00H   OFF   SINE   0deg

    I've made the LFO slow enough to hear the results. If you feel really experimental , you can set the LFO as follows so the DATA slider can control the LFO speed.

       LFO1 :   0.55H   7.00H   Data   SINE   0deg

10. Press [F2 RES]
    Change the "Src1" to "LFO1".
    Change the "Depth" to "10.5dB".

11. Press [PITCH]
    Change the "Src1" to "FUN2".
    Change the "Depth" to 1200 ct.

Now play the keyboard. And we haven't added an EFFECT yet !

If we wanted to have some control over FUN1 we could use something like the MWHEEL to do it. As the FUN |a+b| actually adds the 2 inputs together, and we know that the MWHEEL is a unipolar device (0 to +1). We are able to control the FUN using it.

12. Press [FUN] and change the FUN1 settings to as follows.

       FUN1 :   GPhas1 MWheel |a+b|

But don't play the keyboard yet. It will introduce some high transient frequencies. So here is a little trick I'll teach you. (If you don't know it already.)

The filter when opened more will become louder. So we combat this problem by using the MWHEEL to also cut the sounds amplitude to keep the sounds volume in perspective. The rule is whenever you cut the frequencies, you boost the AMP. When ever you boost (open) the frequencies, you cut the AMP.

13. Press [AMP]
    Change "Adjust" to read "12dB".

I've done this at this stage to give the 'whole' sound a larger boost.

Change the "Src1" to read "MWheel".
And change the "Depth" to "-6dB".

So when we open the filter up via FUN1, we are also cutting the volume with the MWheel.

Now we are going to move into experimental land by doing some quick changes. This is where FUNs come into there own realm. No other synth can do this.

14. Press [FUN] and change FUN2 to read as follows.

FUN2 :   FUN1   GPhas1   Quantize B to A

Now play the keyboard and use the ModWheel. (MWheel).

A FUN now feeding a FUN. Who would have thought of that ? ;-)

Going back over what we've just down can seem very complicated to many. You would look over what we've just completed and thought, "How did I do that ?".

My answer to that is, "You broke things down to a form where you take 1 step at a time". And that is the key to synthesis programming.

Enjoy your Kurzweil. Its power packed with features yet untouched on.

Brian Cowell,

http://www.soundengine.com
(home of my products, Such as ASTRA, ENGINE ROOM for the Kurzweil K2's. And TITAN for the KORG TRINITY series.)

http://www.assessment.iupui.edu/cowzar/
(home of my up coming web site: 180 Megs of sounds to Download for your Kurzweil)

http://www.sweetwater.com/k2000/b-cowell/
(home of my current FREE PROGRAMs & SETUPs)

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