

# **Flux**

**for either didgeridoo(s), bassoon(s), bass clarinet(s), voice(s), or...  
and 2176 sine tones**

**Michael Winter (2004)**

# **Flux**

**for either didgeridoo(s), bassoon(s), bass clarinet(s), voice(s), or...  
and 2176 sine tones**

**Michael Winter (2004)**

## **A Flux:**

A Flux, as in the context of this work, is a term used to describe an amplification of certain harmonics based on the coming into phase of several (16) sine tones clustered around 128 harmonic partials of a reference fundamental (see Sine Tone Configuration for details and rendering instructions).

## **Performance Instructions:**

Directly at the peak of the initial Flux, the performer is to enter on the same frequency of the fundamental used to create the sine tone configuration. This pitch will be held throughout the piece. They are to enter with a sharp attack that quickly recedes to a dynamic that is slightly stronger than the electronic accompaniment but not too overbearing. The performer should repeat this process instantly changing the timbre of the tone at every successive Flux while maintaining a steady tone, timbre, and dynamic in between the Fluxes. The balance should allow for both the sound of the instruments and the electronics to be heard clearly.

If performed by wind instrument(s), this change might be produced by alternate fingerings of the same tone. The performer(s) are free to use any combination of fingerings and resulting timbres throughout the piece in any order, repeating as infrequently as possible.

If performed with vocalist(s) or didgeridoo(s), the change in timbre will occur by changing vowel positions in the vocal tract. As with the wind instrument(s), the performer(s) can choose any combination of vowel positions and resulting timbres in any order repeating as infrequently as possible.

Though this piece may be performed with one performer, in which case circular breathing is preferred, any number of performers with any combination of the instruments described at the bottom of this page can be added to create a continuous drone. Only one player should be sounding at a time. The tone should be passed between performers right at the peak of the Fluxes with a slight elision. In such a scenario, the sharp attack of the tone produced by the incoming instrument should coincide with a sharp articulation at the very end of the tone produced by the exiting instrument.

At the end of the piece, the performer should stop playing at the peak of the final Flux.

To date, there have been two renderings of the electronics. One on A2 110 Hertz, which will work for bassoon, bass clarinet, and some vocalists, and a second on C#2 69.296 Hertz that will work for some didgeridoos. These are either included with the score or can be obtained. However, the piece can be performed with any type of clarinet, bassoon, voice, didgeridoo, or even any type of instruments that produces sound in a similar way to the aforementioned instruments; such as a saxophone, flute, or oboe. The electronics can be transposed and referenced from any fundamental that is suitable for the chosen instrument(s). Provided on the following page are instructions on how to render the electronics part.

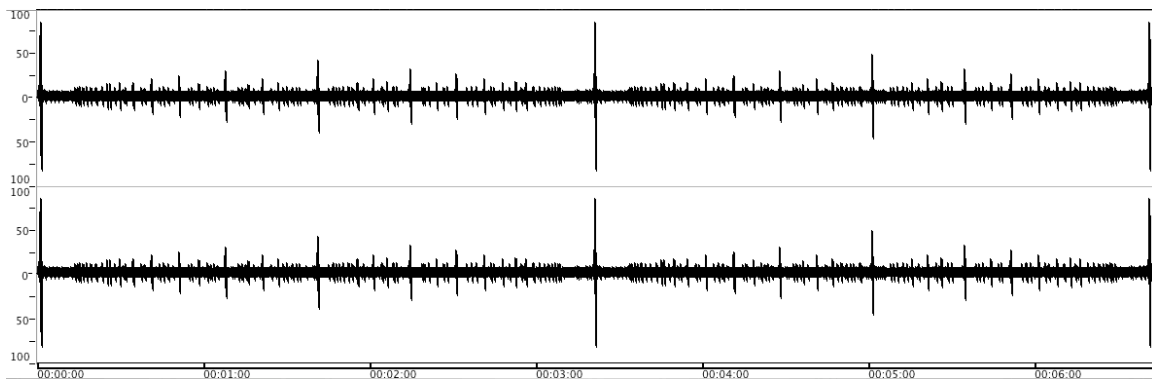
### **Sine Tone Configuration:**

The chosen fundamental should be a pitch that the instrumentalist(s) can sustain while changing timbres. Once this pitch is chosen, a preliminary set of 17 (8 on each side of the fundamental) sine tones can be configured by the following calculations for frequency:

f = fundamental (Hertz)

- |               |                |
|---------------|----------------|
| 1) $f + .04$  | 10) $f - .005$ |
| 2) $f + .035$ | 11) $f - .01$  |
| 3) $f + .03$  | 12) $f - .015$ |
| 4) $f + .025$ | 13) $f - .02$  |
| 5) $f + .02$  | 14) $f - .025$ |
| 6) $f + .015$ | 15) $f - .03$  |
| 7) $f + .01$  | 16) $f - .035$ |
| 8) $f + .005$ | 17) $f - .04$  |
| 9) f          |                |

All the other sine tones are determined by adding the next 127 harmonic partials of all the tones listed above (multiply the frequency of each tone by 1, then 2, 3, 4, ... 128). All 2176 tones should be rendered at the same amplitude. This will probably have to be rendered in parts because of the dsp load. If all sine tone generators are started together in phase, each cluster around a harmonic partial will come into phase every 17 beats and amplify since there are 17 tones to a cluster. Because of this particular configuration the occurrence of each harmonic Flux can be expressed as the 2<sup>nd</sup> harmonic partial's Flux occurring in a rhythm of 2:1 to the Flux of the fundamental, the 3<sup>rd</sup> occurring in a 3:1 rhythm to the fundamental Flux, the 4<sup>th</sup> 4:1, ...the 128<sup>th</sup> 128:1. Thus, harmonic partials will flux in coincidence with any other harmonic partial with a whole number multiple relationship. The fundamental should Flux three times and the entire sound file should be extracted from the zero crossing right before a Flux of the fundamental and right after two fundamental Fluxes later. The final sound file should look like the sound file below.



It may be helpful for the performers to play while watching the sound file being scrolled through so that they will visually be aware of Fluxes.

