

EFX NOTATION

A Composer's Guide:
Suggestions for Standardizing
The Use of Live Effects

CHRIS MOTHERSOLE

1st Edition



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In the decades following the first integration of live effects into clarinet performance, clarinetists have seen numerous different notation styles in sheet music. To this day, notation for this aspect of instrumental performance largely lacks standardization.

It is my hope that the information in this handbook provides inspiration for composers of all experience levels looking for ways to visually communicate the use of live effects. Whether the performer chooses to use stompboxes (guitar effect pedals) or live audio processing software, the suggestions in these pages are based on my experience as both a performer and composer of electroacoustic music. My goal in compiling these was both clarity and simplicity, ensuring the composer's vision is communicated to the performer without visually distracting too much from the notes on the staff. For those with less experience in writing for live effects, repertoire suggestions will be provided to give examples of how each effect sounds when used in instrumental performance.

That being said, by no means am I suggesting that the following notation is perfect – As electroacoustic music gains popularity amongst today's performers and composers, I am certain that some of these suggestions will change. To the reader, it is simply my hope that this first edition is the start of an effort amongst composers to someday find consistency in how live effects are notated for performers in the 21st century.

Many thanks to my friends & colleagues for their advice & contributions to the world of electroacoustic performance, without you we would not have realized the true potential of woodwind & brass instruments in today's musical landscape. Let's keep exploring together!

A handwritten signature in black ink, appearing to read 'Chris Mothersole', with a stylized flourish at the end.

Christopher Mothersole
January 2023

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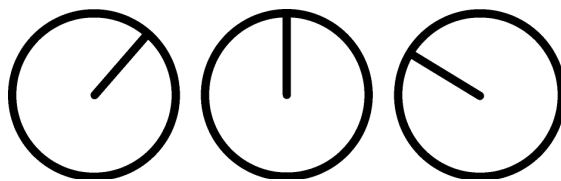
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INTRODUCTION

Let's begin with some definitions: **Electroacoustic Clarinet**, also known as **EFX Clarinet** or **Electric Clarinet**, combines clarinet performance with the use of live audio effects. With modern advancements in microphone technology and piezo-style pickups, clarinetists are able to augment their sound using the same range of effects available to today's electric guitarists: Distortion, pitch shifting, delay, reverb, and looping, to name a few. This opens up a new realm of sound possibilities for what is already considered a highly versatile instrument.

These effects can be achieved through a variety of means such as **stompboxes** (guitar effect pedals) or **live audio processing software** (ex. Ableton Live), combined with an amplifier to output the affected signal. The sound can be captured for this purpose in a number of ways as well, though personally I recommend the use of a piezo-style pickup (ex. the PiezoBarrel) for the player to easily obtain a clear and even sound signal throughout the entirety of their playing range, which comes in especially handy for heavier effects such as distortion. For the performer or composer that's curious to find out more, they can find demonstrations of this gear on my YouTube channel (www.YouTube.com/stompboxclarinetist).

Since there a number of options that today's performers have to achieve these effects, it's important for the composer to visually communicate the sound they want without being too specific to one particular method. To give an example, here is an earlier iteration of notation that was specific to one model of effect pedal:



In the above diagram, the circles refer to the position to which each parameter knob should be set in order to produce the intended delay effect (left to right: Delay Volume, Delay Time, Number of Repeats). While this works very well if the performer chooses to use this model, it isn't as widely accessible to other means of effect processing (especially if the originally

intended model is no longer in production). To solve this, we need to find a way of describing effects (and any necessary parameters within them) that is accessible to all performers, regardless of how they choose to produce their effects.*

The Format

The notation in this handbook follows the common format depicted below. Boxed text is used to indicate when effects are switched on and off, including an attached arrow directing where in the measure this switch is to take place:



For works that initiate an effect in the middle of a measure (ex. Marc Mellits's *Dark Matter* for Electric Bassoon), the arrow is particularly useful to the performer to provide visual clarity of where effect changes occur. In some cases, the addition of an ossia staff can be useful to show how the described effect will impact the musical line (this will be described in more detail later).

While some effects might need specific parameters outlined (ex. the “time” and “repeats” settings for a delay effect, or specific intervals used in a pitch shifter), many of the effects in this handbook can be left to simple descriptors. For example, a reverb effect can simply be left to terms such as “Large Hall Reverb” or “Short Spring Reverb”.

At the end of this handbook you will find an example score showing this notation style in practice, an excerpt from my solo clarinet work *DEMO*. For questions about this notation style or inquiries regarding electroacoustic performance, composers & performers can reach out at MothersoleClarinet@gmail.com. Those looking for pedal recommendations to achieve these effects can view my current setup and find more information at www.MothersoleClarinet.com.

*This being said, an introductory note in the sheet music specifying the equipment that was originally used for a work's composition/premiere can be helpful if a performer isn't sure what equipment to seek out in order to perform it.

DELAY

Repertoire Examples:

Cacophony, for Clarinet & Delay Pedal by Jenni Brandon

Circleplay II, for Clarinet & Digital Delay by Shawn E. Okpebholo

Prelude to a Dream, for Clarinet & Vibraphone/Bells by Bryce Craig

A delay effect, simply put, is an echo – Whatever sound the device is receiving, it repeats the sound back after a specified time period. Additionally, the number of repeats can be controlled, ranging from a single repeat to endless echoes. Because of these parameters, this effect is highly versatile and can be a powerful compositional tool. It can offer a solo line more complexity and texture and, in some cases, it can provide precise rhythmic interaction that makes a solo piece feel like a duet as the player converses with material from its past self.

Given the number of ways that delay can be used, it's important to specify two main parameters: **Time** (space between the original sound and the first repeat) and **Feedback** (number of repeats). See below for an example:

Time (in seconds) Feedback

Delay: 2.0s / 2-3 Repeats

♩ = 60



The image shows a musical staff in 4/4 time with a treble clef. The staff contains a sequence of eighth notes. Above the staff, a box labeled 'Delay: 2.0s / 2-3 Repeats' has an arrow pointing to the first note. Above the box, 'Time (in seconds)' has an arrow pointing to the box, and 'Feedback' has an arrow pointing down to the box. To the left of the staff, '♩ = 60' indicates the tempo.

For composers looking for a specific rhythmic interaction, a variation of this notation can be utilized by simply listing the delay time not in seconds, but in a rhythm within the specified tempo:

Time (in a dotted quarter-note rhythm) Feedback


Delay:  / 1-2 Repeats

Andante



In the above example, the performer sets the delay effect to reflect the amount of time a dotted quarter note takes within the “Andante” tempo.

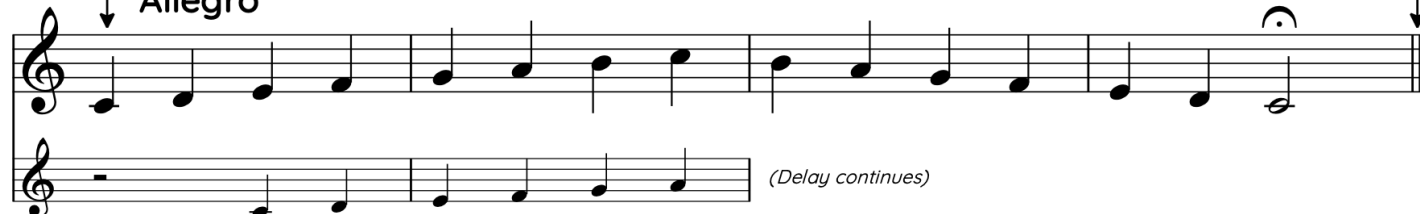
In addition to this, it often helps performers to visually see how this effect fits within the musical line as they’re playing. A short ossia staff can provide this visual, the music in which represents the delayed sound:

Delay:  / 1 Repeat

Allegro

Instructs the performer when to turn off the designated effect.

Delay: Off



(Delay continues)

In most cases, the ossia line only needs to be 1-3 measures long to visually establish how past and present lines interact with each other. After that, the above example states “Delay continues” to let the performer know that the effect will keep this interaction going, similar to the concept of a “simile”.

DISTORTION

Repertoire Examples:

DEMO, for Solo EFX Clarinet by Chris Mothersole

Diptych, for EFX Clarinet Duo by Chris Mothersole

Dark Matter, for Electric Bass Clarinet/Bassoon by Marc Mellits

If you've listened to any hard rock, chances are you've heard plenty of distortion. This type of effect increases the gain of the sound signal and clips the sound wave, creating a heavier and grittier version of the sound it receives. This is commonly favorite amongst electric guitarists, and though it isn't used as often amongst clarinetists it's equally as enjoyable to play around with. Distortion can be described as a broader category with the following "flavors":

- **Overdrive** – Considered the mildest of distortion effects, the gain increase and waveform clipping of overdrive is more subtle. As a result, this effect is more dynamic sensitive, becoming more distorted as you put more volume into it.
- **Distortion** – A traditional distortion effect will be slightly more aggressive sounding than overdrive, resulting in a relatively more gritty and heavy sound.
- **Fuzz** – The most intense of the three flavors, fuzz involves more aggressive compression, higher gain, and the heaviest of waveform clipping. Historically the first of the three effects, fuzz was initially created to imitate the sound of an amp malfunctioning by overloading it with sound.

Distortion doesn't have many examples of usage in classical sheet music, but since there are no specific numeric parameters typically specified when used it can be notated by simply using descriptors of whatever "flavor" the composer is looking for in the sound.

Distortion: Light & Reedy

Distortion: Mild Overdrive

Distortion: Heavy Fuzz

Above are a few ways that distortion can be described in notation, providing a clear starting point that enables the performer to work with their desired gear to find the composer's intended sound. For those wanting hear examples of these effects, pedal demonstrations on resources such as YouTube are a great way to gain familiarity with how the distortion family of effects operates.

LOOPING

Repertoire Examples:

Looping Études for Treble/Bass Clef Instrument & Loop Pedal by Josh Oxford
DEMO, for Solo EFX Clarinet by Chris Mothersole

A looper is an extremely versatile effect for a solo performer – It allows them to layer recorded segments of music to play over, creating the effect of a full ensemble sound with just one instrument. Whether it's something as simple as a 4-bar bass line or a more complex multi-voice harmony, a looping effect can take a composer and performer a long way.

Looping can be a bit trickier to notate, but it helps to first understand the basic functionality of most loopers. I'll be describing this in terms of using a looper pedal, but other types of devices should also be able to follow this functionality as well:

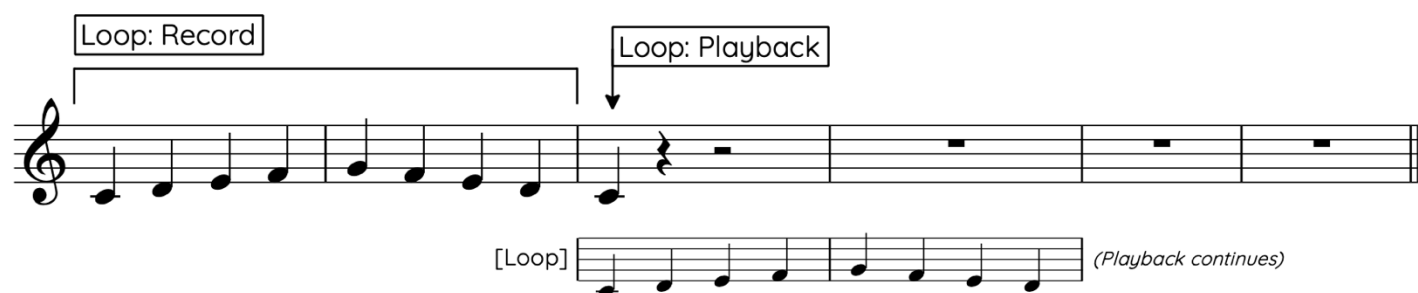
- **Record** – The record function sets up your first layer. To describe how this works with a guitar pedal: Hit the footswitch once to start recording, hit it again when you're done with the segment. The amount of time you can record depends on the device, but most loopers allow for anywhere from 60 seconds to several minutes of recording time.
- **Playback** – Once you've finished recording, the playback function takes that segment and loops it until you've directed it to stop. Many pedals will automatically switch to this mode once you're done recording.
- **Overdub** – While the looper is in playback mode, switching to overdub mode allows the player to continue adding layers onto their initial segment, each the same length of time as the first layer. For example, if you've recorded an 8-bar phrase, each layer on top of that will also be 8 bars long. Every time the loop plays back, a new layer is added until the performer directs the looper to stop, or to switch back to playback mode.

Some loopers may have additional features, or in many cases you can switch the functions around to start with overdub mode first after recording, rather than initiating playback first. To gain full familiarity with loopers, once again I recommend watching demonstrations on YouTube – This is an extremely beneficial resource for anyone getting into live effects of any kind.

Below are some additional functions to know:

- **Stop/Pause** – Halts the playback of a loop until the performer directs it to resume. For single-switch looper pedals, this is done by double tapping the footswitch while in any of the three basic modes.
- **Clear/Erase** – Erases the recorded loop, allowing the performer to create a new loop later on.

With that being said, we can now use the above terms in our boxed text when notating looping. Below is more simply example demonstrating the record and playback functions. As mentioned previously with a delay effect, an ossia staff can show how the recorded loop fits within the musical line once it's done recording:



When we include overdubbing, we can now use the ossia staff to reflect how every layer combines together to form a composite. In the next example, a 2-measure loop is recorded. Afterwards, the looper switches directly to overdub mode – Since the recorded loop is 2 measures long, each new layer will also be 2 measures and as long as overdub mode remains active, the device will keep adding new layers. In this case, I've used double bar lines to indicate where each new layer starts. Once the device switches out to playback mode, it will then loop the 4 layers I've stacked until it's told to stop in the final measure:

The image displays four musical notation examples illustrating different looping functions on a staff:

- Loop: Record:** A bracket above the staff indicates a section of music to be recorded.
- Loop: Overdub:** An arrow points to a section of music, indicating it is to be overdubbed.
- [Loop]:** A bracket below the staff indicates a section of music to be looped.
- Loop: Playback:** An arrow points to a section of music, indicating it is to be played back.
- Loop: Stop, Erase:** An arrow points to a section of music, indicating it is to be stopped and erased.

For performers wanting to gain familiarity with the functionality of a looper, Josh Oxford's *Looping Études* (available on www.PotenzaMusic.com) is a great resource! The example score at the end of this handbook will also include examples of looping notation in practice.

MODULATION

Repertoire Examples:

Dark Matter, for Electric Bass Clarinet/Bassoon by Marc Mellits

DEMO, for Solo EFX Clarinet by Chris Mothersole

Modulation refers to a family of different effects that add time & pitch fluctuations to the sound to add texture & depth. To name and define just a few:

- **Chorus** – Imitates the thick, shimmering texture of multiple voices or instruments playing together. Takes the sound and mixes it with a second version with a time delay and/or slight pitch fluctuations. (Used throughout Mellits’s *Dark Matter*)
- **Flanger** – Similar to chorus in regards to mixing two different sound signals, but the speed of the second sound slows down and varies over time, creating a “swooshing” or jet engine-style effect. (Used subtly in my solo work *DEMO*)
- **Vibrato** – Creates oscillating pitch fluctuations.
- **Tremolo** – Creates oscillating volume fluctuations.

For a single-line instrument such as clarinet, these time & pitch fluctuations are immensely fun to experiment with, especially when combined with other effects such as distortion. You won’t find them often in classical music yet, but thankfully I find that there’s no need to get overly specific with notation. Below are a few examples of modulation notation, using short descriptors to indicate the intended sound, similar to what was discussed with distortion:

Modulation: Thick Chorus

Modulation: Slow Vibrato

Modulation: Fast Tremolo

PITCH SHIFTING

Repertoire Examples:

Circleplay III, for Clarinet & Digital Delay by Shawn E. Okpebholo

Dark Matter, for Electric Bass Clarinet/Bassoon by Marc Mellits

A pitch shifter moves the pitch a specified interval upwards or downwards, adding harmony to the original sound signal. In the realm of guitar pedals this usually takes the form of an octave down effect, though several devices exist that allow the performer to explore other intervals as well (or shift in two different directions simultaneously! This is done in Okpebholo's *Circleplay III*). This kind of effect is also especially useful for exploring notes that exist beyond the instrument's traditional range.

The notation for this comes from Shawn Okpebholo's *Circleplay* series, which was originally intended for a larger rack mount effects unit by Digitech, the TSR-24. This device displayed pitch shifting as "Pitch: +/- X", with "X" referring to the number of semitones that the sound was shifting up or down. This was particularly effective in sheet music because it kept the direction short and simple (as opposed to something like "Shift: Minor 6th Down") so I've decided to use this in my own writing as well. Below is an example of this effect in notation with an additional delay effect. Notice how the ossia staff shows that the delayed signal is shifted down an octave from the original sound:

Pitch: -12 (8vb)
Delay: ♩ / 1 Repeat

The image shows a musical notation example with two staves. The top staff is a treble clef staff with a series of eighth notes. The bottom staff is also a treble clef staff, but it starts with a whole rest followed by a series of eighth notes that are an octave lower than the top staff. A box at the top left contains the text "Pitch: -12 (8vb)" and "Delay: ♩ / 1 Repeat". An arrow points from the box to the top staff. The text "(Delay continues)" is written at the end of the bottom staff.

REVERB

Repertoire Examples:

Cacophony, for Clarinet & Delay Pedal by Jenni Brandon

Reverb is a relatively easy effect to imagine that I find myself using often as a performer. Simply put, the effect produces different styles of artificial reverberation. From adding acoustic depth to a dry performance venue to creating an overall thicker sound in a solo piece, reverb is an incredibly handy effect for both composer and performer. As an example, Jenni Brandon's *Cacophony* uses an optional reverb effect to build a sense of space in the listener's mind – Written to evoke the imagery of birds calling out to each other at dawn, this effect helps create that atmosphere by allowing the sound to ring out longer, as if the listener was in the middle of a forest.

Below are a few examples of descriptors that can be used to notate reverb:

Reverb: Large Hall

Reverb: Mild

Reverb: Thick & Ambient

VOLUME

Repertoire Examples:

DEMO, for Solo EFX Clarinet by Chris Mothersole

Vus, for Contrabass Clarinet & Guitar Pedals by Aled Smith

It's rare to find an example of volume control in electroacoustic sheet music. In many cases, the effects used are either on or off, often without anything in between. For guitarists however, a volume pedal is incredibly useful – It not only acts as a master volume control for their instrument but it can also be a useful tool to fade in and out of certain effects, adding an extra dimension to their affected sound.

When a volume control is added to clarinet performance with effects, this allows us to create a separation between the volume of the acoustic side of the instrument and the volume of the electric side. Fading in and out of delay/reverb effects can help create lush, atmospheric textures, while fading into a pitch shifter can help harmony sneak in without entering abruptly.

The trouble with coming up for volume notation is that there isn't much that exists. I decided to come up with something new on my own – Something that closely resembled the notation for dynamics that we've known for centuries, yet visually was unique enough to have its own identity:

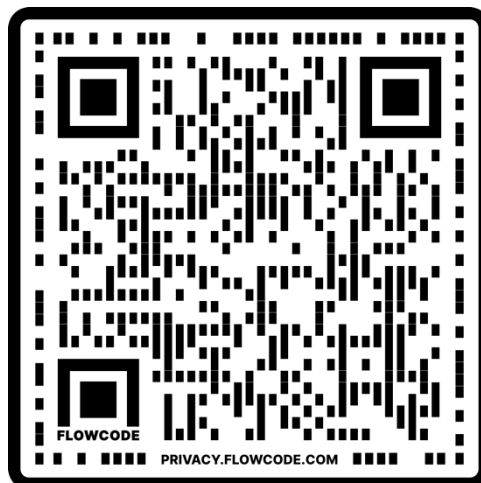


I've chosen to use dotted crescendos and decrescendos for this purpose, indicating when effects are fading in and out. The empty circles indicate that the effects are off, while the shaded circles indicate full effect volume. Again, this is separate from any traditional dynamics written on the page, since those would refer to the volume of the clarinet itself.

This means that composers can write forte espressivo moments without effects if desired, or piano sostenuto sections with constant sweeping up and down of the effects' volume. If you listen to a recording of my work *Diptych* for 2 clarinets, both players use volume pedals to ease in and out of distortion to create a smooth juxtaposition between classical and hard rock tones.

EXAMPLE SCORE

The following pages are an excerpt from my newest work, *DEMO* for Solo EFX Clarinet. In this you'll find each of these effects used in practice. You can find a recording of this work by scanning the QR code below:



VOLUME PEDAL NOTATION:

○ ●
Off Full

DEMO

FOR SOLO EFX CLARINET IN B \flat

Christopher Mothersole
(b. 1990)

DISTORTION: Heavy Fuzz
PITCH: -12 (8vb)
DELAY: 0.5 sec. / ∞ Repeats [Setting 1]

Freely

○ *mf* chant-like
(drone continues)

thick & reedy

f

rit.

ad lib.

mf cresc.

f

DELAY: ♩ / 2 Repeats [Setting 2]
(Distortion & Pitch Remain On)

Racing (♩ = 96-108)

mf

(delay continues)

sffz

cresc. poco a poco

mf

The musical score consists of the following sections and instructions:

- Section 1:** A melodic line in 6/8 time, featuring sixteenth-note runs and triplets. It includes a **LOOP: Record** and **LOOP: Playback** section.
- Section 2:** A melodic line in 3/4 time, starting with a **PITCH: Off** instruction and a **mf cresc.** dynamic. It includes a **[Loop]** section with the instruction **(playback continues)**.
- Section 3:** A melodic line in 3/4 time, featuring a **f vibrato** instruction and a **(growl while glissing downwards)** instruction.
- Section 4:** A melodic line in 3/4 time, featuring a **MODULATION: Mild Flanger** instruction and a **mf cantabile** dynamic.
- Section 5:** A melodic line in 3/4 time, featuring an **Improvisatory*** section with **Em** and **F#7** chords, and a **mf flashy** dynamic.
- Section 6:** A melodic line in 3/4 time, featuring **Em** and **Cmaj7** chords, and a **mf** dynamic.
- Section 7:** A melodic line in 3/4 time, featuring **D(add9)** and **Em** chords, and a **mf** dynamic.
- Section 8:** A melodic line in 3/4 time, featuring a **LOOP: Pause** and **LOOP: Resume Playback** section, and a **f** dynamic.

*Chord changes are provided if the player prefers to improvise instead of what is written.

mf cantabile
(playback continues)

fp *sharp* *sffz*

sffz *simile* *mp*

6 *6* *6* *6* *6*

mf *6* *6* *6* *6* *6* *3* *f* *6* *6* *6*

6 *6* *3* *subito p* *6* *3* *6* *3*

LOOP: Stop, Erase
DISTORTION: Off
DELAY: Setting 1
PITCH: On

6 *3* *ff*

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RECORDINGS & COMPOSER WEBSITES

Brandon, Jenni (www.jennibrandon.com)

Cacophony for Clarinet & Delay: <https://www.youtube.com/watch?v=jiDW8AIa-0c>

Craig, Bryce (www.bcraigmusic.com)

Prelude to a Dream for Clarinet & Vibraphone/Bells: <https://soundcloud.com/bryce-craig/prelude-to-a-dream>

Mellits, Marc (www.marc mellits.com)

Dark Matter for Electric Bass Clarinet/Bassoon: <https://www.youtube.com/watch?v=zwCB2WROfWA>

Mothersole, Chris (www.mothersoleclarinet.com)

DEMO for Solo EFX Clarinet: https://youtu.be/eR9aZi5_Zk0

Diptych for EFX Clarinet Duo: <https://youtu.be/oFBldL5KEbc>

Okpebholo, Shawn E. (www.shawnokpebholo.com)

Circleplay for Clarinet & Mixed Digital Effects: (I) https://youtu.be/2wadg_2ws5I
(II) <https://youtu.be/nRlq4zUXnOU>
(III) <https://youtu.be/qbUxA6hfB-s>

Oxford, Josh (www.joshoxford.com)

Looping Études for Treble/Bass Clef Instrument & Loop Pedal: <https://youtu.be/GtkJytsRB5A>

Smith, Aled (<https://junge-akademie.adk.de/en/people/aled-smith/>)

Vu for Contrabass Clarinet & Guitar Pedals: <https://youtu.be/doD9mcVAZiE>