

Loop-ONE v. 0.8.7

by Carlo Laurenzi

WHAT IS LOOP-ONE

Loop-ONE is a virtual looper, an algorithm designed and built using Max-Msp, a software for music production by Cycling74 (www.Cycling74.com).

Max-Msp itself does not produce any music, nor does it have any preset or already done preset or patch. Everyone has to design and build audio/midi patches on his own. This aspect is the most important one in Max, in that it's an open platform upon which everyone can design and build virtually anything it comes to mind.

The idea of building a virtual looper came to my mind two years ago, when I was using some hardware loopers – some of them were foot pedal loopers – and I was unhappy about their tracks number limitations and poor sound manipulation possibilities.

Since I started attending a computer music school in 2004, and began experimenting with digital sound synthesis, I started thinking about making a virtual looper based upon the program I was learning at school: Max-Msp.

One year later, I met the Italian saxophonist Fabrizio Mandolini, who was interested in the project of developing a virtual looper, since he was, like me, unhappy about all the software loopers and foot pedal loopers, and was looking for something really powerful, flexible and full of sound manipulation possibilities, for his improvised performances.

He eventually gave me the reason to start this project, which I'm still currently working on, although since November 2005 Loop-ONE has become usable in live performances. Fabrizio Mandolini has been testing this program since December 2005. Since then, new features have been added and corrections made – some new features were suggested by Fabrizio himself. This, however, is still an open project, in that many other new features will be added in the future, according to a complex design I am developing day by day, also according to the increasing knowledge I am developing at school as a (computer music) student.

My main aim is to build a complex tool which may be used to make electronic improvised music (no matter what kind of music). As an electric guitarist I will use this tool for my improvised (solo or within a group) performances. What is important to me is to make the Loop-ONE a powerful, versatile and full-featured tool, but with a user-friendly graphic interface and an easy-to-use approach under every function it will offer.

However, as all other sound manipulation programs, Loop-ONE is itself an instrument and needs some practice with it before being able to produce satisfactory musical results.

HOW IT WORKS

Just connect a microphone or an instrument to your audio-card input, hit "Start Audio Input" and you'll hear audio coming from your speakers. This is the first step. Now some informations are necessary.

When starting Loop ONE for the first time it is recommended to click on "DSP Settings" button to check that correct audio driver, buffer size and input and output channels are set.

The concept behind Loop ONE is simple. There are 7 loopers, each one can record a loop whose duration is only limited by the capacity of your HD. By default, however, every loop has a starting dedicated memory of 36 seconds of mono audio signal.

Every looper has a Record button, a Speed variation control (called "Vari-Speed") that can go forward or backward, a Pan-pot slider, a Volume slider control, a Pitch shifter that can reach up to 10 octaves up, or ten octaves down. There are also 4 speed preset buttons for each looper, which

can be used to set different speeds: 1 forward normal speed, 0.5 forward half speed, -1 backward normal speed, -0.5 backward half speed.

All of the sliders (except the pan pot slider and the speed preset buttons, for now) can be controlled in real-time with a midi foot controller or midi mixer. Highly recommended for this use is the way good Foot Controller Yamaha MFC 10, which I used to implement all midi functions in the algorithm.

Every looper has also a spectrum monitor and a little V-meter to keep under control what's going on. Moreover, every looper has a button for loading in real-time pre-recorded audio files ("Load audio file" button), which can then be manipulated using Vari-Speed, Pitch Shifter, Pan and Volume.

Basically, Loop-ONE behaves like a stomp box looper: you hit record, play something, and when hit record again, the recording stops and what has been recorded starts playing back forward at normal speed. By default, when starting the program, the volume of every looper is set to a minimum of 20 (not 20 dB though, just 20 units, arbitrarily chosen), the pan is set to center, while vari-speed and pitch shifter are set to zero.

Every looper can be stopped at any moment using the dedicated "Stop loop" button, or one can suddenly stop all loopers using the "Stop all loopers" button (besides the global V-meter, at the right bottom part of the screen). However, just by touching the Vari-speed field of any looper and moving it a bit, or directly dialing a number in it, the audio content of the looper will start playing back again, at the speed you have dialed in. So every looper's content can be restarted at any time.

Closing the program, however, will cancel the content of every looper. Also, pressing Rec button within a looper who is already running will stop the looper and new audio material will overwrite what was playing back before. (so, be careful!)

The direct audio input, a microphone for voice performances or any other instrument through the input of an audio card, is active by default when switching on audio, and it's mixed with all the loopers signals, but can be muted at any time to prevent undesired audio content passing through the audio chain while not recording or performing interactively with the loopers (i. e. while doing manipulations with the mouse or keyboard and improvising using just the loopers).

A Compressor / Limiter and a Reverb are included in the program, and they are active by default when switching on "Start Audio Input", using presets "Normal" for compressor and "Hall" for reverb. These presets can be changed at any time while performing, using the other included presets buttons, or dialing directly in the parameters fields some desired numbers. There is a bypass button to exclude the Compressor, anyway, and if desired the Reverb also can be excluded, moving the slider of "Wet/Dry control" up a bit and then to zero.

As regards Midi Controls, it is needed a Midi controller (Foot controller or any other midi device) that has the "Toggle On/Off" function, to work with Loop ONE. That being said, one can activate recording Start/Stop for the loopers using toggle on/off messages on midi channels 1 to 7, while channel 8 bangs "Stop all Loopers" button. Channels 9 to 15 are reserved to midi foot pedals (up to five different pedals can be used) for controlling loopers's Volume, Vari-speed, or Pitch Shift. Sending a "toggle on" on channel 9 activates control of volume sliders, while sending toggle off on the same channel activates control of Vari-speeds (all pedals behaviour is affected by these switches). Sending a toggle on on channel 11 activates Vari-Speed controls while sending toggle off activates control of all Pitch shifters. Using Midi controls, however, limitations over control of these parameters by foot pedals must be taken into account: Volume can go from 0 to 344, while Vari-speed can go from - 5.00 to 7.00, and Pitch shifters can go from -36 semitones to +90. If using mouse to control these parameters, there is more extension available to any of these controls: Volume goes from 0 to 400, Vari-Speed has no limits, upward or backward, Pitch Shifters can go from - 90 to +120 semitones.

At the right bottom of the screen there's a V-Meter which measures the Amplitude of the Global Output signal. Under this Global V-meter there's a button for starting a recording of what is coming out from Loop-ONE. To activate recording, precise instructions must be followed: first switch on audio, then click on "Open" to locate a directory, a file format (Aiff or Wav) and a filename for the file into which the audio will be saved. Then hit "Recording Start/stop" (the button will light up in red). Under these buttons there's an indicator for the recording elapsed time, in minutes and seconds. Recording must be stopped before switching off the audio in Loop ONE, or before closing

the program, if you want the audio file to be written correctly and readable again by an editing software.

N. B.

When one is about to use Loop-ONE is strongly recommended to close all other applications and restart the computer, so to make Loop-ONE the first application to run after a restarting of the system.

FUTURE ADDITIONS

For now, Loop-One it's mainly a looping software, although includes some features that allow heavy sound manipulation, like the unlimited coarse sliders possibilities of the Vari-speed and the Pitch Shifters, that can completely alter the signal up to a point that it's not anymore comparable to the original timbre.

In the future, however, it's my intention to add a sound processing unit for the input signal, which will include an FM modulator, a ring modulator, a granulator, a Pitch shifter, a filter-based waveshaper, to be chosen alternatively.

Other processing units, similar to the one I described above, will be added also to the first 4 loopers. The reason for these limitation is to avoid the software becoming too heavy for the Cpu.

The Vari-speed will also have a switch to activate an LFO (Low Frequency Oscillator) to modulate the speed, especially useful when using extreme ratios.

HARDWARE AND SOFTWARE REQUIREMENTS

To run Loop-ONE there's no necessity to own or have a Max-Msp full installation. It runs using a limited version of Max-Msp called "Max-Msp Runtime", which can be freely downloaded from Max's web site (www.cycling74.com).

However, for PC users Loop-ONE is available as an .exe file which already has in itself Max-Msp runtime. Therefore, no software downloading from the internet is needed.

Loop-ONE runs under Windows XP SP2 (Service Pack 2) or Mac OSX.

Windows XP has to be tweaked a bit to achieve a better performance with audio, since most of the nice graphic tools and animations it has have a negative impact on audio calculations: the Screen saver has to be turned off, and also power management has to be disabled; no antiviruses (except little ones like Antivir) must be installed; all system sounds and windows or icons animations must be disabled. For a complete list of XP tweakings to get a good performance of your PC with audio see www.xp-audio.com.

A fast processor is necessary. Minimum requirements: 800 Mhz for MacIntosh, 2,8 Ghz for Pentium IV or Athlon 64 3000+ (1800 Mhz) for AMD Processors.

Several tests showed that Loop-ONE runs fine on Apple computers and AMD processors-based machines, while some strange behaviours and a global worse performance has been observed with Pentium-based computers.

A 7200 rpm Hard Drive (minimum 40 Gb) and a considerable amount of RAM is needed: at least 800Mb; recommended 1 Gb.

For both Windows and Mac users is strongly recommended not to use heavy custom wallpapers for their desktops, and is also recommended not to keep heavy files on the desktop, otherwise the computer will slow down it's performance a lot.

FAQs

1. Loop-ONE doesn't seem to work well, producing glitches, or severe drop-outs
 - a) Try increasing the buffer size of your audio card.
 - b) Try closing the program and restart the system, then reopen it and see if it happens again

2. When pressing “stop loop” or “stop all loopers” the audio starts to come out crackling, Loop-ONE becomes unstable and there’s no control over it.
 - a) There’s an issue with some Pc’s with Pentium processors, by which pressing stop all loopers causes the program to crash in such a way. One possibility could be to increase the buffer size of the audio card and, above all, increase the amount of RAM, but I’m not sure it can solve the problem: I’m still working on it.
3. Loop-ONE seems not to produce audio at all.
 - a) Check out the settings of your audio card, be sure that the correct audio driver and buffer size are set. Asio drivers usually give a better performance when using an external audio card.
4. When pressing “DSP settings” nothing happens. How can I check or set the correct audio driver?
 - a) Download the full demo Max-Msp package from cycling74 website. Remove Max-Msp runtime, restart the system and install the full demo package. After 30 days the demo version of full max-msp will expire, but this is not important. What matters is that the full package installs some additional components (in respect to the runtime version) that allow you to access the DSP settings in Max-Msp, and they never expire.

Carlo Laurenzi, 04/03/2006