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LP2 Gen D mini looper

The LP2 mini looper offers 1-4 stereo tracks for looping. The LP2 is a less powerful version of the LP1 Gen B looper. Many of the features of the LP1 are accessible through MIDI commands. The audio interfaces is identical to the LP1 Gen B audio interface. Audio is sampled with a sample rate of 48 kHz and 24-bits per sample. Audio is stored internally in 128MB of RAM and at least 16GB of microSD. Like the LP1, currently recording and playing audio is stored in RAM. Tracks are saved to persistent (microSD) storage in the background while the audio continues to play.

Upgrading Firmware

The LP2 mini looper allows upgrading firmware to any LP2 firmware release. Firmware releases are on the Looperlative support page: https://www.looperlative.com/support. They are provided as MIDI

SysEx files. At a minimum, you will need a MIDI out on your computer connected to the MIDI in on the LP2. Any software capable of sending MIDI SysEx files can be used to send the upgrade to the LP2.

Looperlative also provides the utility lpmidimon.exe which can be used on Windows to send SysEx files to the LP2. If you attach the MIDI out on the LP2 to the MIDI in on the computer and the MIDI in on the LP2 to the MIDI out on the computer, then lpmidimon is able to display the LP2 status. This is not recommended when you you are using MIDI clock out because the status messages can interfere with the timing of the MIDI clock pulses.

Back Panel

FEEDBACK	The FEEDBACK input takes a ¼" TRS plug from an expression pedal. This controls the feedback setting of the current track. 100% means that the track will loop indefinitely. Anything less than 100% and the track will fade each time it plays.
CONFIG	The CONFIG button is used to select configuration or setup mode. A short press selects configuration mode. A long press selects setup mode.
SDCARD	The SDCARD slot is not used in the current generation LP2.
MIDI OUT	The MIDI OUT connector provides MIDI clock to other devices and provides Looperlative SYSEX messages for status of the device.
MIDI IN	The MIDI IN connector allows external clock and control to the LP2. Firmware upgrades can also be provided through this port as MIDI SYSEX files.
POWER	This is a 9V 1A negative-center power input.
IN	This is a ¼" TRS socket that accepts stereo audio input. You may connect a TS mono cable, but then only one of the two channels will be used.
OUT	This is a ¼" TRS socket that provides stereo audio output. You may connect a TS mono cable, but then only one of the two channels will be used.
MIX	This knob controls the amount of dry signal that is passed through the LP2 from input to output.

Level Controls

Inside the LP2 are 4 trim pots the control the input and output audio levels. Input and output levels are limited to 8Vp-p (11.2dBu) at the connectors. Internally, the CODEC is limited to 5Vp-p. An op amp is used on each input and on each output to provide appropriate filtering and gain of the signal. The trim pots on the input control the input level to the op amp. The trim pots on the output control the op amp gain. The red ellipse contains the input trim pots. The blue ellipse contains the output gain pots.

Top Face

The top of the LP2 has 4 buttons and 10 LEDs. The two LEDs next to the word "STATUS" are used to indicate basic status of tracks 1 and 2. The top LED is for track 1 and the bottom LED is for track 2. The 8 LEDs on the side are used to select different effects for the two effect buttons and are used for additional status. The 4 buttons are multipurpose depending on the mode. Their meaning in normal mode is printed under each button.

Operating Modes

There are several modes of operation that can be accessed using the various buttons on the unit. By default, the LP2 powers on in the normal mode.

Normal mode

This is the basic operating mode of the LP2. The status LEDs indicate individual track status as follows:

Blue Flash   The blue color is flashed at the start of the currently selected track. This helps indicate which track is currently selected and gives an indication of where the loop beginning is for that track.
Solid Blue   This happens when the currently selected track is empty.
Solid Red   This track has recorded audio but is stopped
Blinking Red   This track is currently recording.
Solid Green   This track is currently playing.
Blinking Green   This track is currently overdubbing or replacing

There is an alternate display for the status LEDs. If selected, the top LED displays current track number by the following colors: 1 is blue, 2 is cyan, 3 is purple, and 4 is yellow. The bottom LED displays the current track's status as specified in the table above. To select this new display setting, you need to send lp2displaynew.syx to the LP2 via MIDI.

The 8 LEDs on the right side provide additional status information:

1 (top)   Is currently not used
2   Indicates that the current track is playing at quarter speed
3   Indicates that the current track is playing slower than normal speed
4   Indicates that the current track is playing in reverse
5   Indicates that the current track is track 1
6   Indicates that the current track is track 2
7   Indicates that MIDI clock is recognized on the input
8 (bottom)   Indicates that the latest changes to the track are not yet saved to the microSD card.

Record/Overdub button in normal mode

The Record/Overdub button is normally a 3-way toggle:

- On an empty or stopped track, the track starts recording.

- On a recording or playing track, the track switches to overdub mode.

- On an overdubbing track, the track switches to play mode.

A long press on the Record/Overdub button also depends on the situation:

- On a stopped track, a long press will erase all tracks.

- On a playing track, a long press will enter configuration mode. Configuration mode is also accessed through a short press of the config button on the back.

Play/Stop button in normal mode

The Play/Stop button is normally a 2-way toggle:

- On a stopped track, the track starts playing.

- On a playing track, the track stops.

- On a recording or overdubbing track, the track switches to playing.

Effect 1 or Effect 2 button in normal mode

The effect buttons in normal mode will perform whatever effect was selected for them in configuration mode.

Configuration mode

Configuration mode is used to select the function of the effect 1 and effect 2 buttons. Configuration mode is entered using a short-press on the config button the back of the unit. In this mode, all 8 LEDs will blink. The buttons will now do the following functions:

Config	Exit configuration mode and return to normal mode
Record/Overdub	Undo last change to the current track
Play/Stop	Enter song select mode
Effect 1	Enter effect 1 programming mode
Effect 2	Enter effect 2 programming mode

Effect 1 programming mode

In this mode, you press the effect 1 button until the LED is next to the function that you want assigned to the effect 1 button. These functions are:

Traditional set

RETRIGGER ONCE	This causes the loop to start or restart from the beginning and play exactly one time through to the end.
RETRIGGER RANDOM	This causes the loop to jump to a random point in the loop.
½ SPEED	This switches between normal speed and ½ speed.
REPLACE	While held, the track audio will be replaced.
REPLACE 1/8	Will replace the next quantized 1/8th of the loop
REPLACE 1/12	Will replace the next quantized 1/12th of the loop
REPLACE 1/7	Will replace the next quantized 1/7th of the loop
REPLACE 1/10	Will replace the next quantized 1/10th of the loop

Alternate set

RETRIGGER ONCE	Switch track. See section Track Switch below.

RETRIGGER RANDOM This causes the loop to jump to a random point in the loop.
½ SPEED This switches between normal speed and ½ speed.
REPLACE While held, the track audio will be replaced.
REPLACE 1/8 Will replace the next quantized 1/8th of the loop
REPLACE 1/12 Will replace the next quantized 1/12th of the loop
REPLACE 1/7 Will replace the next quantized 1/7th of the loop
REPLACE 1/10 Will replace the next quantized 1/10th of the loop

Bill Walker set

RETRIGGER ONCE Redo
RETRIGGER RANDOM Retrigger
½ SPEED ½ speed
REPLACE Fast scramble
REPLACE 1/8 Select track
REPLACE 1/12 Switch track
REPLACE 1/7 Double
REPLACE 1/10 1/13 quantized replace

Effect 2 programming mode

In this mode, you press the effect 2 button until the LED is next to the function that you want assigned to the effect 2 button. These functions are:

Traditional set

CONTINUE This causes the loop to start or restart from the beginning and play.
RETRIGGER CONTINUOUS This causes the loop to jump to a random point in the loop.
¼ SPEED This switches between normal speed and ¼ speed.
REVERSE Will cause the current track to go in the reverse direction.
REPLACE 1/16 Will replace the next quantized 1/16th of the loop
REPLACE 1/24 Will replace the next quantized 1/24th of the loop
REPLACE 1/9 Will replace the next quantized 1/9th of the loop
REPLACE 1/64 Will replace the next quantized 1/64th of the loop

Alternate set

CONTINUE Current track. See section Track Switch below.
RETRIGGER CONTINUOUS This causes the loop to jump to a random point in the loop.
¼ SPEED This switches between normal speed and ¼ speed.
REVERSE Will cause the current track to go in the reverse direction.
REPLACE 1/16 Will replace the next quantized 1/16th of the loop
REPLACE 1/24 Will replace the next quantized 1/24th of the loop
REPLACE 1/9 Will replace the next quantized 1/9th of the loop
REPLACE 1/64 Will replace the next quantized 1/64th of the loop

Bill Walker set

CONTINUE Undo
RETRIGGER CONTINUOUS Replace

¼ SPEED	1/11 quantized replace
REVERSE	Reverse
REPLACE 1/16	1/16 quantized replace
REPLACE 1/24	1/12 quantized replace
REPLACE 1/9	1/9 quantized replace
REPLACE 1/64	1/10 quantized replace

Song Select mode

The LP2 can choose between 8 different songs that you have recorded in the LP2. This mode is selected from Configuration mode as described above. In this mode, the two status LEDs will flash red together. One of the 8 LEDs on the right will indicate the song chosen. The Effect buttons will allow you to move the current selection up or down. The Play/Stop button will load the currently selected song.

Setup mode

To enter setup mode, you need to hold the config button for approximately 2 seconds until the track status button flashes alternately between red and green. In this mode, the 8 LEDs on the right will act as a level indicator for the input audio. From this mode, you may select either the traditional set of effect choices or you may select the alternate set. The traditional set matches the labels printed on the LP2 chassis. The alternate set replaces RETRIGGER ONCE and CONTINUE. RETRIGGER ONCE becomes SWITCH OTHER TRACK, and CONTINUE becomes SELECT OTHER TRACK.

A long press of one of the buttons in this mode chooses the effect set and then returns you to normal mode.

- Effect 1 chooses the alternate set

- Effect 2 chooses the traditional set

- Rec/Dub chooses the Bill Walker set

Track switch

If the alternate set of effects is selected and the effect 1 and effect 2 buttons are programmed to the top effect, then effect 1 will be programmed to be SWITCH OTHER TRACK and effect 2 will be programmed to be SELECT OTHER TRACK.

SWITCH OTHER TRACK

This is a multi-function button that makes it easier to record and play songs with 2 distinct sections. This button assumes that only one track will be played at a time. The action of this effect is dependent on the current state of the two tracks. This function thinks of the two tracks as a "from" track and a "to" track. The "from" track is whichever track is not empty and not stopped. If both tracks are either empty or stopped, then the "from" track is chosen to be the current track. "from" and "to" are always

opposite tracks. One of them is track 1 and the other is track 2. The function that occurs is then described in the following table:

"from" track state	"to" track state	action
Empty or stopped	Empty or stopped	Record into current track
Recording	Empty	Stop recording and start recording other track
Recording	Stopped	Stop recording, stop "from" track, start playing "to" track
Playing	Empty	Stop "from" track and start recording "to" track
Playing	Stopped	Stop "from" track and start playing "to" track
Overdubbing		End overdubbing and leave "from" track playing
Replacing		End replacing and leave "from" track playing

SELECT OTHER TRACK

This function simply selects the other track as the current track. If the current track is 1 then track 2 is selected. Otherwise, track 1 is selected as the current track.

Bounce

The LP2 has the ability to record the output of one track into a different track. The bounce functions are used for this purpose. When bounce is pressed, a new track starts recording using the current track plus the audio input as the source. This will continue until bounce is pressed a second time. By default, the LP2 choses the next available empty track to receive the recording. Instead there is a CC control that allows specifying the destination of the recording. If the CC is used, the destination track must be stopped or empty. The CC to use is 119. The value should be a track number from 1 to 4. This CC is only retained for the very next MIDI command. Thus the next MIDI command must be a bounce function.

Bounce sync can be used to create a track that is synchronized with the first track recorded. Bounce MIDI sync creates a destination track that is synchronized with the MIDI clock.

MIDI

Clock Out

The MIDI out connector on the back can provide clock to other devices. The LP2 assumes that track 1 is a single measure with 4/4 timing. It then produces MIDI clock pulses at the standard rate of 24 pulses per quarter note.

Clock In

If MIDI clock in is present on the MIDI input, then the Record button will function as a MIDI sync record button. In this mode, the track will assume 4/4 timing on the MIDI input clock and will guarantee that the loop length will be an integer multiple of the measure length. On playing of the loop, synchronization with the MIDI clock will be maintained.

MIDI start and stop

The MIDI start function causes the MIDI start command to be sent via MIDI out at the next loop start of the current track.

The MIDI stop function immediately sends the MIDI stop command via MIDI out.

Changing MIDI channel

The LP2 MIDI channel can be changed via a MIDI SysEx command. These SysEx command files are available from the Looperlative web site here: channel.zip.

The format of the SysEx message to control the MIDI channel is the following sequence of bytes represented in hexidecimal notation:

xf0 x00 x02 x33 x05 cc

"cc" is replaced by the desired channel minus one. For channel 1, "cc" should be 0.

MIDI map

The LP2 responds to certain MIDI note on messages and MIDI CC messages. The mappings below correspond to LP1 functions. For details on each function, please refer to the LP1 manual. Note that tracks 3 and 4 are accessible through these commands but those tracks do not show status on the top panel LEDs. You are welcome to use those tracks, but be aware that currently you cannot see their current status.

```
NOTE ON 0 (C-1)        Rec/Dub
NOTE ON 1 (C#-1)       Play/Stop
NOTE ON 2 (D-1)        All Tracks
NOTE ON 3 (D#-1)       Select Track 1
NOTE ON 4 (E-1)        Select Track 2
NOTE ON 5 (F-1)        Select Track 3
NOTE ON 6 (F#-1)       Select Track 4
NOTE ON 7 (G-1)        Retrigger Random
NOTE ON 8 (G#-1)       Retrigger Once
NOTE ON 9 (A0)         LP2 switch track
NOTE ON 11 (B0)        Track Erase
NOTE ON 13 (C#0)       Play Now
NOTE ON 14 (D0)        Stop Now
NOTE ON 15 (D#0)       Play
NOTE ON 16 (E0)        Stop
NOTE ON 17 (F0)        All Play Now
NOTE ON 18 (F#0)       All Stop Now
NOTE ON 19 (G0)        All Play
NOTE ON 20 (G#0)       All Stop
NOTE ON 21 (A1)        Set As Clock Src
NOTE ON 22 (A#1)       Next Track
NOTE ON 23 (B1)        Prev Track
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NOTE ON 24 (C1)        Double
NOTE ON 25 (C#1)       Triple
NOTE ON 26 (D1)        Quadruple
NOTE ON 27 (D#1)       MIDI Sync Rec
NOTE ON 28 (E1)        Reverse Track
NOTE ON 29 (F1)        Half Speed Tr
NOTE ON 30 (F#1)       Feedback 100%
NOTE ON 31 (G1)        Feedback +10%
NOTE ON 32 (G#1)       Feedback -10%
NOTE ON 33 (A2)        Feedback +5%
NOTE ON 34 (A#2)       Feedback -5%
NOTE ON 35 (B2)        Play Retrigger Continuous
NOTE ON 47 (B3)        Sync Rec/Dub
NOTE ON 48 (C3)        Replace
NOTE ON 49 (C#3)       Replace+Original
NOTE ON 51 (D#3)       MIDI Start
NOTE ON 52 (E3)        Fast Scramble
NOTE ON 53 (F3)        Medium Scramble
NOTE ON 54 (F#3)       Slow Scramble
NOTE ON 56 (G#3)       Replay/All Stop
NOTE ON 57 (A4)        Bounce
NOTE ON 58 (A#4)       Sync Bounce
NOTE ON 59 (B4)        MIDI Sync Bounce
NOTE ON 60 (C4)        Play/Stop Now
NOTE ON 74 (D5)        Pan Center
NOTE ON 75 (D#5)       Swell
NOTE ON 76 (E5)        Fade
NOTE ON 77 (F5)        Fade/Swell
NOTE ON 78 (F#5)       Q Replace
NOTE ON 79 (G5)        Q Replace+Orig
NOTE ON 81 (A6)        Undo
NOTE ON 82 (A#6)       MIDI Stop
NOTE ON 83 (B6)        Octave lower
NOTE ON 84 (C6)        Minor 2nd
NOTE ON 85 (C#6)       Major 2nd
NOTE ON 86 (D6)        Minor 3rd
NOTE ON 87 (D#6)       Major 3rd
NOTE ON 88 (E6)        4th
NOTE ON 89 (F6)        Diminished 5th
NOTE ON 90 (F#6)       5th
NOTE ON 91 (G6)        Minor 6th
NOTE ON 92 (G#6)       Major 6th
NOTE ON 93 (A7)        Minor 7th
NOTE ON 94 (A#7)       Major 7th
NOTE ON 95 (B7)        Original note
NOTE ON 96 (C-7)       Except Track
NOTE ON 97 (C#7)       Track Level 0
NOTE ON 98 (D7)        Track Level -5
NOTE ON 99 (D#7)       Track Level +5
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NOTE ON 100 (E7)	Switch-Record
NOTE ON 101 (F7)	SwitchPlay+CKSR
NOTE ON 102 (F#7)	Shrink to 50%%
NOTE ON 103 (G7)	Stretch to 200%%
NOTE ON 104 (G#7)	SwitchPlay
NOTE ON 105 (A8)	Random Restart
NOTE ON 106 (A#8)	Quant Value 1
NOTE ON 107 (B8)	Quant Value 2
NOTE ON 108 (C8)	Quant Value 3
NOTE ON 109 (C#8)	Quant Value 4
NOTE ON 110 (D8)	Quant Value 5
NOTE ON 111 (D#8)	Quant Value 6
NOTE ON 112 (E8)	Quant Value 7
NOTE ON 113 (F8)	Quant Value 8
NOTE ON 114 (F#8)	Quant Value 9
NOTE ON 115 (G8)	Quant Value 10
NOTE ON 116 (G#8)	Quant Value 11
NOTE ON 117 (A9)	Quant Value 12
NOTE ON 118 (A#9)	Quant Value 13
NOTE ON 119 (B9)	Quant Value 14
NOTE ON 120 (C9)	Quant Value 15
NOTE ON 121 (C#9)	Quant Value 16
NOTE ON 122 (D9)	Quant Value 32
NOTE ON 123 (D#9)	Quant Value 64
NOTE ON 124 (E9)	Q MIDI Sync Rec
NOTE ON 125 (F9)	Pitch Octave Up
NOTE ON 126 (F#9)	Redo
CONTROLLER 20	Track Volume
CONTROLLER 21	Feedback
CONTROLLER 22	Track 1 Volume
CONTROLLER 23	Track 2 Volume
CONTROLLER 24	Track 3 Volume
CONTROLLER 25	Track 4 Volume
CONTROLLER 52	Track 1 Feedback
CONTROLLER 53	Track 2 Feedback
CONTROLLER 54	Track 3 Feedback
CONTROLLER 55	Track 4 Feedback
CONTROLLER 60	Speed
CONTROLLER 61	Track Pan
CONTROLLER 102	Track 1 Pan
CONTROLLER 103	Track 2 Pan
CONTROLLER 104	Track 3 Pan
CONTROLLER 105	Track 4 Pan
CONTROLLER 119	Bounce Destination Track (1 - 4)
CONTROLLER 126	Quantization Number