Delptronics LDB-1se

Little Drummer Boy

Analog Drum Machine

User Manual

The most up-to-date version of this manual can be found at:

https://delptronics.com/documents/LDB1seUserManual.pdf

Introduction

The LDB-1se is the second edition of Delptronics' modern classic LDB-1 "Little Drummer Boy" Analog Drum Machine. Our goal was to recreate the warm analog sounds of the legendary 80's machines, like the Roland TR-606 and TR-808. The brain of the LDB-1se is a microcontroller that is more powerful that anything available in the 80's, enabling us to provide all the features of a modern drum machine sequencer. All of this comes in an inexpensive, battery powered machine.

Features

- Eight Analog Drum Sounds
  - Kick Drum
  - Snare Drum
  - Low Tom
  - High Tom
  - Wood Block
  - Hand Clap
  - Closed Hi-hat
  - Open Hi-hat

- Eight Voice Polyphony
  - All instruments can be played simultaneously, Including the open and closed hi-hats
  - Closed hi-hat gates open hi-hat

- Play Modes
  - Individual instruments and rolls
  - Patterns, including songs up to 15 Patterns
  - Multiple modes of Fills and Overlaid patterns
  - Per-instrument Mute and Solo modes
  - Multi-level Swing and Randomness

- Programmability
  - 48 Pattern memory (4 banks of 16 patterns)
  - 4 Songs per bank of up to 15 patterns each
  - Step Edit and Pad Record programming modes
  - Configurable Options (MIDI channel, trigger modes, etc)
  - All data is retained without battery power

- Connectivity
  - Powered by built-in 9V battery, or standard pedal power supply
  - MIDI Input for playing individual instruments and/or MIDI clock/start/stop
  - DIN Sync Input for both clock and gate (start/stop)
  - Analog Clock Input
  - Analog Reset or Gate Input
  - Analog Trigger Output on selected steps and/or instruments

Quick Start

This manual gives you all the information you need to use every one of the many features of the LDB-1se Analog Drum Machine. But, before diving into the details, here is a quick start so you can begin playing rhythms right away.

Power Up

1. Insert a 9V battery, or plug in an AC adapter (AKA wall wart). The power jack on the LDB-1se is a center-negative, type-M power jack. You can use just about any standard 9 to 10 volt pedal power supply. Connecting a power supply with too high voltage will damage the LDB-1se.
2. Insert a mono 1/4" plug into the Audio output jack and plug the other end of the cable into your amplifier or mixer.
3. Press the red button on the back to turn on the LDB-1se.

Play Drums

4. The machine starts up in the “Pad Play” mode.
5. Press the buttons above the instrument names to play individual instrument sounds.

Play Patterns

6. Press and hold the Mode button, then press button #1 (which is labeled 1 / 9 / Kick Drum).
7. You are now in the “Pattern Play” mode.
8. Press the Play button to start the pattern playing.
9. Rotate the Tempo knob to change the speed of the pattern.
10. Press any of the number buttons along the bottom to play a different pattern.
11. Press and hold the Select button while pressing any of the number buttons to make a multiple pattern song. The patterns will play one after another, then repeat.

Read the Manual

12. Now that you have that out of your system, read the rest of the manual to get the most out of your LDB-1se Drum Machine!

Drum Machine Basics

The LDB-1se has a very simple interface for playing and editing rhythms. If you have used a drum machine before, then the LDB-1se will be very familiar to you. If this is your first drum machine, then the information below will help you get started.

First, let's define a couple of drum machine terms: Step, Pattern, and Song. A step is one beat, typically a sixteenth note. A pattern is a sequence of steps. A song is a sequence of patterns.

Drum Tabs

Take a look at the diagram below. It represents one of the most famous drum beats of all time, the Amen Break. The diagram is in a format called drum tablature or, more commonly, a drum tab. Drum notation can also be written in musical note form, but tabs are much easier to visualize.

```
   |1 + 2 + 3 + 4 + |1 + 2 + 3 + 4 + |1 + 2 + 3 + 4 + |1 + 2 + 3 + 4 + |
OH |----------------|----------------|----------------|----------x-----|
CH |x-x-x-x-x-x-x-x-|x-x-x-x-x-x-x-x-|x-x-x-x-x-x-x-x-|x-x-x-x-x---x-x-|
SD |----o--o-o--o--o|----o--o-o--o--o|----o--o-o----o-|-o--o--o-o----o-|
BD |o-o-------oo----|o-o-------oo----|o-o-------o-----|--oo------o-----|
```

Drum tabs are laid out in a grid with the drums (usually abbreviated) running vertically along the left side and the steps horizontally. The tab above is four measures of 16 beats each. In drum machine terminology, that is one song consisting of four patterns of 16 steps each. Each pattern can be at most 16 steps, however a pattern can have fewer steps. For example, patterns in ¾ time typically have 12 steps.

To play the above tab, a drummer would hit the bass drum (BD) and closed hi-hat (CH) simultaneously on the 1st and 3rd beats, the snare drum (SD) and closed hi-hat simultaneously on the 5th beat, the closed hi-hat alone on the 7th beat, the snare drum alone on the 8th beat, and so on.

There are many websites that give the drum tabs for popular songs. You will get millions of results if you search for "drum tabs".

LDB-1se Instruments

Instrument	Drum Tab Abbreviation
Open hi-hat cymbal	OH, sometimes H or HH with an O
Closed hi-hat cymbal	CH, sometimes H or HH with an X
Hand Clap	CP
Wood Block	WB
High Tom-tom Drum	HT, T, T1, T2, or TT
Low Tom-tom Drum	LT, F or FT (floor tom)
Snare Drum	SD or S
Bass (or Kick) Drum	BD, B, B1, B2, or BA

Instrument Substitutions

If you have a drum tab that uses instruments not contained in the LDB-1se, you can substitute. For example, you can use wood block in place of claves (CL) or rim shot (RS), and the open hi-hat can stand in for other cymbals (C/CY), crash cymbal (CC), ride cymbal (RC) or splash cymbal (SC).

Drum Machine Basics (continued)

Accents

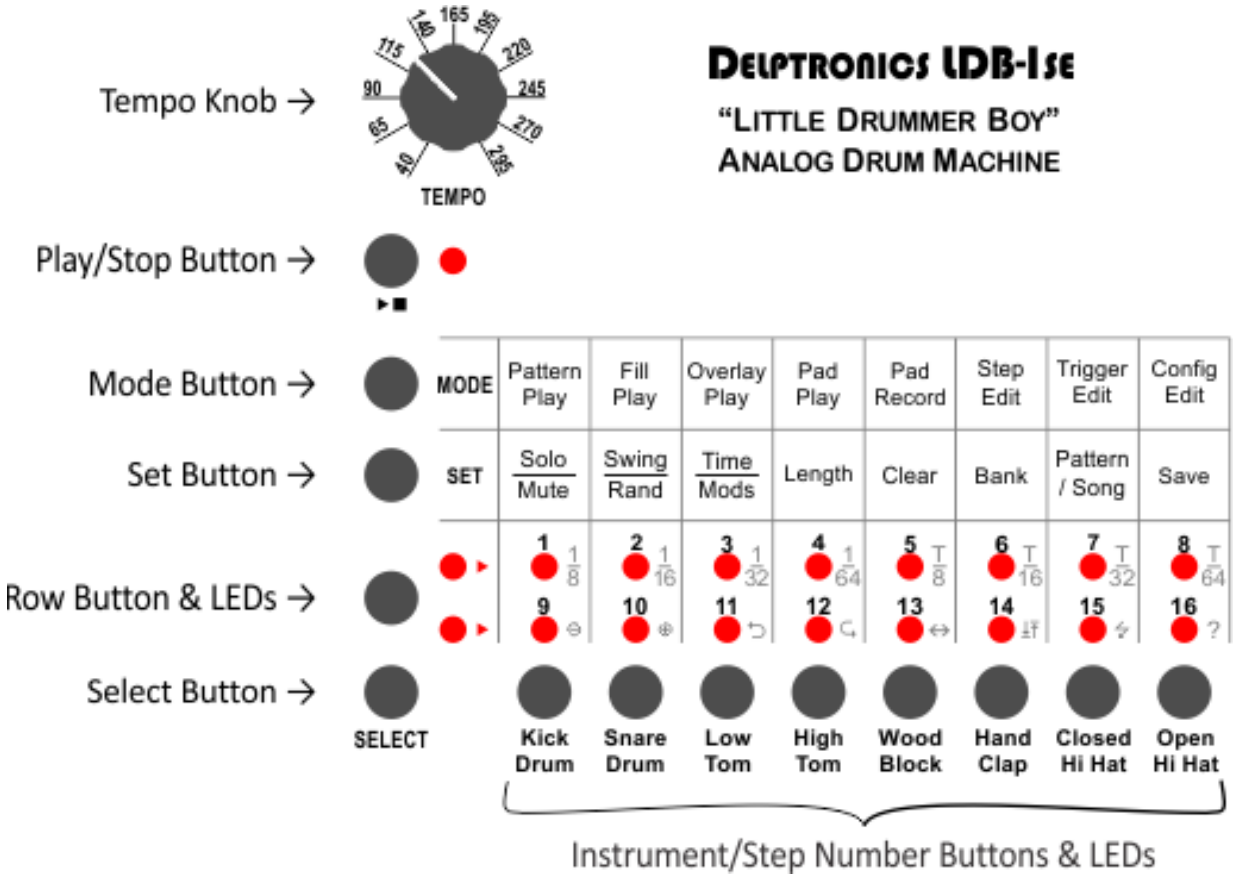
In drumming, an accent is when an instrument is hit a little harder and louder. In drum tabs, an accented instrument can be indicated with a capital *X* or *O* whereas the unaccented instrument will be indicated with a lowercase letter. Drum tabs written specifically for drum machines sometimes show the accent as a separate instrument. In that case, when there is an *X* or *O* in the accent row, it means that all instruments on that beat should be louder.

The LDB-1se does not have a separate accent feature; however, accents can be simulated quite effectively. For accented bass or snare drums, you can play the low tom on the same beat to get a louder, fuller sound. For an accented cymbal, you can play the open and closed hi-hat simultaneously which sounds very much like hitting the open hi-hat harder.

TR or x0x Style Programming

The particular style of drum pattern editing used in the LDB-1 is called TR or x0x. Both names come from the Roland series of drum machines, such as the TR-606, TR-808, or TR-909. This style of pattern programming interface shows you the steps that are turned on for one instrument at a time. It is equivalent to seeing a single row of a drum tab. The LDB-1se uses this style of programming in its Step Edit mode. The LDB-1se also has a Pad Record mode, wherein a pad is pressed to record a drum hit on a step in real-time.

Controls



Function Grid

The grid on the control panel shows the possible modes and set functions.

Tempo Knob

The Tempo knob sets the tempo of the currently playing pattern or song. The numbers around the Tempo knob on the control panel show the beats per minute (BPM). The position of the Tempo knob is ignored if you are using an external clock source.

Play/Stop Button

The Play/Stop button starts or stops the currently pattern or song. The Tempo LED is illuminated when a pattern/song is playing and blinks with the tempo. When a pattern/song is not playing, pressing the Play button will start it at the beginning. When a pattern/song is playing, pressing the Play button will stop it immediately.

Holding hold down the Set button while pressing the Play button changes its behavior. When a pattern/song is playing, pressing Set + Play will stop play at the end of the current pattern, as opposed to immediately. When a pattern/song is not playing, pressing Set + Play will continue playing at the point at which it stopped, as opposed to at the beginning of the first pattern.

Controls (continued)

Mode Mode Button

The Mode button changes the basic mode of operation of the drum machine. You can press the Mode button at any time to see what the current mode is. When you hold down the Mode button, one of the number LEDs will be blinking, indicating the current mode. Release the Mode button to stay in the current mode, or hold down the Mode button then press one of the eight number buttons to switch to a different mode. The previous mode is shown on the second row of LEDs. This makes it easy to switch between two modes without having to read the control panel during performance.

The details of each mode are described in the following sections of this manual.

Set Set Button

The Set button performs various actions for editing patterns, changing the playback of patterns, and loading and saving patterns or songs. The second row of the function grid shows the settings that are associated with each of the number buttons. Not all set functions are available in all modes.

The details of each setting are described in the Set Functions section of this manual.

Row Row Button and Row LEDs

The Row button is an important concept in the operation of the LDB-1se. Pressing the Row button changes the state of the two Row LEDs. Only one of the Row LEDs is illuminated at a time. The illuminated Row LED indicates which row of numbered LEDs are affected when pressing a number button. That is all the Row button does, it has no additional meaning or function.

Num Number Buttons

The eight buttons and 16 LEDs across the bottom represent either the eight instrument sounds, the 16 steps in a pattern, or various settings, depending on the current mode. For simplicity, they are always referred to in this manual as the number buttons and number LEDs.

Select Select Button

The Select button is used to select various options depending on the current mode. It also has special meaning when changing certain settings. Refer to the table below. Additional detail is given in the applicable sections of this manual.

Mode	Select Button Function
Pattern Play	Add Pattern to Song
Fill Play	Repeat Fill
Overlay Play	Queue Overlays
Pad Play	Select Roll Timing
Pad Record	Select Roll Timing
Step Edit	Select Instrument
Trigger Edit	Edit Trigger Measures
Config Edit	Select Config Page

Set	Select Button Function
Solo/Mute	Turn On/Off
Rand	Randomize All Instruments
Mods	Modify All Instruments
Length	N/A
Clear	Clear All Instruments
Bank	N/A
Pattern	Add Pattern to Song*
Save	N/A

Pattern Play Mode

There are 48 patterns organized into four banks of sixteen patterns each.

Num **Patterns:** Pressing one of the number buttons selects the pattern to play within the current bank. The LED corresponding to the currently playing pattern is illuminated. If a pattern is playing when a different pattern is selected, the new pattern will not start playing until the current pattern finishes.

Row **Pattern Group:** Press the Row button to switch between patterns 1-8 or 9-16.

Play **Start / Stop:** The play button starts or stops playing the selected pattern/song. While playing, the selected pattern(s) will repeat continuously.

Select **Add Pattern to Song:** Hold the Select button while pressing any of the number buttons to create a multiple pattern song. The patterns will play one after another, then repeat.

Set **Available Functions:** Solo/Mute, Swing/Rand, Bank, Song, Save

Songs

A song is a series of patterns that play in a repeating sequence. To add a pattern to the song, hold the Select button while pressing a sequence of number buttons.

Holding Select while pressing a number button adds a pattern to the song, even if you have previously released Select, even if you have changed a setting, or switched modes.

To clear the song and play a single pattern, just press a number button without holding Select.

You can create a song while no patterns are playing. The song will begin playing when you press the Play button.

Patterns in the song do not need to be contiguous or sequential. For example: 2, 1, 5 is a valid song.

Patterns can repeat in the song. For example: 1, 1, 1, 2 or 1,2,1,3. Songs like those are very useful musically.

You can press the Row button while holding the Select button.

A song can be up to 15 patterns.

A song can be saved and recalled. See the Set: Save and Set: Song sections for details.

Fill Play Mode

A fill is a pattern that is played in the middle of a song. When a fill is queued, it will play after the currently playing pattern ends. When the fill ends, the normal pattern or song will continue.

Num **Play/Queue Fill:** Pressing one of the number buttons selects the fill pattern to be played. You can press a sequence of number buttons and the fills will be queued (up to 32). Each fill in the queue will be played in its entirety, then the currently playing pattern or song will continue. You can queue the same fill pattern more than once.

Select **Repeat Fill:** If you hold the Select button and hold a number button, the selected fill pattern will repeat until you release the Select and/or number button.

Set **Available Functions:** Solo/Mute, Swing/Rand, Bank, Pattern.

Notes

Fill patterns can be queued when the song is stopped. When the Play button is pressed, the fill patterns will be played one time, and then the song will begin. In this case, the fills are intro patterns.

Fills play at the time scale of the fill pattern. For example, if you have a pattern or song playing 16th notes, and you play a fill that is 32nd notes, the fill will play faster.

Overlay Play Mode

An overlay is a pattern that is played on top of the currently playing pattern. In essence, it merges the two patterns. An overlay pattern can be simple, like just a few claps, or it can be as complex as you wish.

Num **Overlay Patterns:** Pressing one of the number buttons selects pattern to be overlaid. You can press multiple number buttons and all of the selected patterns will be overlaid.

Select **Queue Overlays:** If you hold the Select button and press one or more number buttons, the selected patterns will be will be queued (up to 32). Each overlay will be played in its entirety on top of the currently playing pattern or song. When the overlays are finished, the currently playing pattern or song will continue as normal. You can queue the same overlay pattern more than once.

Set **Available Functions:** Solo/Mute, Swing/Rand, Bank, Pattern.

Notes

Both queued and constant overlays can be played at the same time.

Overlays play at the time scale of the underlying pattern. For example, if you have a pattern or song playing 16th notes, and you overlay a pattern that is 32nd notes, all the patterns will play 16th notes.

Pad Play Mode

In this mode, you can play instruments immediately by pressing the number buttons.

Num **Instruments:** Pressing the number buttons will play the corresponding instrument. If a pattern/song is playing, the instrument will sound in time with the tempo (AKA quantized).

Row **Individual / Rolled:** When the top Row LED is lit, pressing a number button will play the instrument once. When it the bottom Row LED is lit, holding a number button will roll (repeat) the instrument as long as the button is held down.

Select **Roll Timing:** Hold the Select button and press a number button to set the Roll Timing. Refer to the table below. A beat is a quarter note. A beat is every fourth step in 4/4 time. If the time scale is set to triplets, then a beat is every third step (and option 7 is the same as 4).

1	2	3	4	5	6	7
Every step	Every other odd step	Every other even step	Every beat starting on 1st step	Every beat starting on 2nd step	Every beat starting on 3rd step	Every beat starting on 4th step

Set **Available Functions:** Solo/Mute, Swing/Rand, Bank, Pattern.

Pad Record Mode

This is one of two modes in which you create and edit rhythm patterns. In the Step Edit mode you select an instrument and set the steps on which that instrument will play. In the Pad Record mode, instruments are added to the currently playing pattern when you press the number (instrument) button. If no pattern is playing, the number buttons act just like in pad play mode.

Num **Drums:** Pressing the number buttons will record the corresponding instrument into the playing pattern on the beat that is playing when you press the button.

Row **Individual / Rolled:** Works as in Pad Play Mode above, except that the instruments are recorded into the playing pattern.

Select **Roll Timing:** See the description of Roll Timing in Pad Play Mode above.

Set **All** Set Functions are available in the Pad Record Mode.

Step Edit Mode

This is one of two modes in which you create and edit rhythm patterns. In the Pad Record mode, instruments are added to the currently playing pattern when you press the number (instrument) buttons. In the Step Edit mode you select an instrument and then set the steps on which that instrument will play.

Num **Steps:** The number buttons and LEDs represent the steps in the pattern. Pressing a number button toggles the step on or off for the current instrument. The number LEDs are illuminated for the steps on which the current instrument will play.

Select **Select Instrument:** When you press and hold the Select button, the bottom row of number LEDs is illuminated indicating that they are valid selections. The LED corresponding to the currently selected instrument will blink. The top row of number LEDs indicates which instruments are in use in the pattern being edited.

To leave the instrument unchanged, release the Select button. To change the instrument, keep holding the Select button and press one of the eight number buttons. Press the Select button at any time to remind yourself which instrument you are editing.

For example, if you press the Select button while you are editing the snare, and the pattern you are editing has steps on for the kick, snare, and closed hi hat, the LEDs will look like this:

The bottom Row LED will be blinking fast to indicate that you should select something from the bottom row. The second LED will be blinking slowly to indicate that you are currently editing the snare. The top row has the first, second and seventh LEDs illuminated to indicate that those instrument that have steps on.

Set **All** Set Functions are available in the Step Edit Mode.

Notes

If a single pattern is playing, then you are always editing the playing pattern. If you set a different pattern to edit (see Set: Pattern), then the newly selected pattern plays.

If a song (multiple patterns) is playing, then it is possible to be editing a pattern that is not playing. Setting a different pattern to edit does not affect the song.

Even a song consisting of the same pattern twice counts as a song. In that case, although a single pattern is playing, and you can be editing a different pattern.

Trigger Edit Mode

The LDB-1se has a trigger output jack that can send trigger or gate signals to a synthesizer, sequencer, or other analog equipment. Triggers can be sent on any steps and/or instruments that you specify.

See the Config Edit section to assign triggers to specific instruments.

See the Connectivity section for the electrical characteristics of the Trigger Out jack.

Per-Pattern Triggers

Triggers can be either global, or per-pattern. By default, each pattern has its own set of triggers which are saved when the pattern is saved.

Global Triggers

Global means that there is one set of triggers that fire regardless of the playing pattern. Global triggers are particularly useful if you are using the Trigger Out as a clock signal to clock a separate sequencer. Global triggers are off by default, but can be turned on in the Config Edit mode.

Num **Steps:** The number buttons and LEDs represent the steps in the pattern. Pressing a number button toggles the trigger output on or off for that step. The number LEDs are illuminated for the steps on which a trigger will be sent. This works the same as editing an instrument in Step Edit mode.

Set **All** Set Functions are available when triggers are per-pattern. Only Clear and Save are available when triggers are global.

Select **Trigger Measures:** Press and hold the Select button to edit trigger measures.

Editing Trigger Measures

Triggers do not have to be active on every measure that the patterns are playing. For instance, you may want to output triggers only on every other measure, or every fourth measure, or the fifth and sixth measures, or whatever you like. Trigger measures gives you this capability. There is a sequence of up to 8 trigger measures, and triggers can be active or not on each measure of that sequence.

Trigger measures work whether the triggers are global or per-pattern. There is one set of trigger measures. They are not saved to non-volatile memory. When you power on your machine, they are reset to fire triggers on every measure.

Row **Length / State:** While editing trigger measures (holding the Select button), the Row button switches between editing the length of the trigger measure sequence (top row), and editing the state of the triggers for each measure (bottom row).

Config Edit Mode

This mode is where you edit seldom used configuration options. There are quite a few options, and there is no indication on the control panel as to what the options are. Therefore, you will have to refer to this section of the manual when editing the config.

If your LDB-1se is connected to a computer, you can also use the simple online configuration editor, which can be found at https://delptronics.com/ldb1se-config-editor.

Firmware Version

The term firmware refers to the software that is built into a piece of hardware. Occasionally, updates are made to the LDB-1se firmware to add a feature or fix a bug. When that happens, a new firmware version is released. It is important to know what firmware version is running on your machine, so you know if you need to update it or not.

When you first enter Config Edit mode, the number LEDs will indicate your firmware version number. For example: If you have V1.02, then LED 2 will flicker. If you have V1.18, then LEDs 2 and 16 will flicker.

The online firmware updater can be found at https://delptronics.com/ldb1se-firmware-update.

Editing Configuration Options

Select **Select Config Page:** The configuration options are organized into five pages. Hold down the Select button and press a number button to select the desired config page. After you have selected a page, you can hold Select any time to see what page you are on (one of the five number LEDs will be blinking).

Num **On / Off:** The number buttons and LEDs represent the state of the various options. Pressing a number button toggles the number LED on or off. The meaning of each LED is described below along with an easy to read quick reference grid. When you first enter Config Edit mode, you are not on any page, and the number buttons have no effect. This is intentional to prevent accidental modification of options.

Set **Save** is the only Set Function available in Config Edit mode. When selected, all config options are saved to non-volatile memory.

Pg	Option	1	2	3	4	5	6	7	8
1	**Startup Mode**	Pattern Play	Fill Play	Overlay Play	Pad Play	Pad Record	Step Edit	Trigger Edit	-
	Chaser LED On	Pattern Play	Fill Play	Overlay Play	Pad Play	Pad Record	Step Edit	Trigger Edit	-
2	**Clock Options**	Clock In Steps	Clock In 24 PPQN	Clock In 48 PPQN	-	Reset In =Gate In	-	MIDI Tr-ansport	MIDI Clock
	Trigger Options	Trigger 5ms	Trigger 1/2	Trigger 3/4	Trigger Full	-	Trigger Positive	Triggers Rando.	Triggers Global
3	**MIDI Mapping**	All Drums	Similar Drums	Specific (LDB-1)	Specific Alt.	All Notes	Sequen-tial	Seq. Naturals	Map None
	Seq Map 1st Note	-	Note Bit 6	Note Bit 5	Note Bit 4	Note Bit 3	Note Bit 2	Note Bit 1	Note Bit 0
4	**MIDI Channel**	1 9	2 10	3 11	4 12	5 13	6 14	7 15	8 16
5	**Drum Triggers**	Kick Drum	Snare Drum	Low Tom	High Tom	Wood Block	Hand Clap	Closed HiHat	Open HiHat

Config Edit Mode (continued)

1 Top – Startup Mode: This is the mode which the LDB-1se starts in when you power it on. Select one of the seven options. The default is Pad Play.

1 Bottom – Chaser LED On: You can decide in which modes the step chaser LED is on. In some modes, extra blinking might be distracting. Select any, all, or no modes. The default is just editing modes.

2 Top – Clock Options

Clock Timing: Select one of three timings for the external clock in jack. Steps means that the LDB-1se will advance one step per incoming clock tick, which is the equivalent of 4 PPQN (pulses per quarter note). 24 PPQN is the speed of the Roland DINsync standard. 48 PPQN is the speed of the Korg DINsync standard. The internal clock on the LDB-1se is also 48 PPQN.

Reset In = Gate In: Select this option to change the function of the reset in jack to a gate (on/off) signal like DINsync supplies, instead of reset, which is a common output of analog sequencers.

MIDI Transport: When this option is on, the LDB-1se will respond to incoming MIDI transport messages (start, stop, continue, song position). Turn it off to ignore transport messages.

MIDI Clock: When this option is on, the LDB-1se will respond to incoming MIDI clock messages. Turn it off to ignore clock messages. The MIDI Transport option must be on if MIDI Clock is on.

2 Bottom – Trigger Options

Trigger Length: This option sets the length of the trigger output. The ½ step and ¾ step lengths are useful if you are using the trigger output as a note on/off gate (rather than a true trigger). If the full step length is selected, and two triggers are on for adjacent steps, then there is no trigger off time between the steps. If using an external clock at one tick per step, the ¾ step length acts like a ½ step.

Trigger Positive: If this option is on, then an on trigger is a positive voltage and an off trigger is zero volts (v-trig). When this option is off, the trigger polarity is reversed (s-trig).

Triggers Randomizable: If this option is on, then triggers will be randomized the same way as instruments are, otherwise randomization does not affect triggers.

Triggers Global: When global triggers are turned on, there is one set of triggers that fire regardless of the playing pattern. If triggers are not global, then each pattern gets its own set of triggers.

3 Top – MIDI Mapping: This option defines how the LDB-1se instruments are mapped to MIDI notes.

All Drums: All MIDI percussion notes are mapped to the closest matching LDB-1se instrument.

Similar Drums: Only very similar MIDI percussion notes are mapped to the LDB-1se instruments. Those notes being 35 – 50 and 75 – 77.

Specific Drums: The LDB-1se will respond only to MIDI notes that directly correspond to LDB-1se instruments. MIDI notes 36, 38, 39, 42, 43, 46, 50, and 76 are mapped to BD, SD, CP, CH, LT, OH, HT and WB, respectively. Those are the same notes used in the LDB-1 specific map mode.

Specific Alternate: The LDB-1se will respond only to the following MIDI notes: 35, 37, 40, 41, 44, 48, 49, and 77 are mapped to BD, CP, SD, LT, CH, HT, OH and WB, respectively. This map allows you to control both an LDB-1 and an LDB-1se and not have overlapping notes.

All Notes: Each note in every octave will trigger an instrument. Notes C, D, E, F, G, A, and B are mapped to BD, SD, LT, HT, WB, CP, and OH, respectively. All sharps/flats are mapped to CH. This mode is useful for split-able keyboards where one octave can be used to control the LDB-1se while the rest of the keyboard controls your synthesizer. It is also fun to use a pitch sequence and have it converted to drums.

Config Edit Mode (continued)

3 Top – MIDI Mapping (continued)

Sequential Notes: The instruments BD, SD, LT, HT, WB, CP, CH, and OH (in that order) are mapped to sequential MIDI note numbers, the first note of which is configurable. This mode is useful when controlling the LDB-1se with a pad controller.

Sequential Naturals: Similar to the All notes mode, but only for one octave, and starting at a configurable first note.

3 Bottom – Sequential Map First Note: This sets the MIDI note number of the first note to use when using the sequential notes MIDI mapping modes. It is represented as a seven-bit binary number. To set this automatically, connect your MIDI controller to your LDB-1se and press the first pad while editing this config page. The default first note number is 32.

4 Both – MIDI Channel: Set the LED corresponding to the MIDI channel that you will use to send notes (drums) to the LDB-1se. The default is 10, the standard percussion channel. To make the LDB-1se listen on all channels, press the first and last number buttons at the same time. All LEDs will illuminate to indicate all-channels.

5 Top – Drum Triggers: To fire a trigger every time an instrument plays, turn on the LED corresponding to that instrument. The LDB-1se will still make a sound when the instrument plays unless you mute it (see Set: Mute). Select any, all, or none of the instruments. The default is no instrument triggers.

Note: The standard percussion note numbers can be found on the General MIDI Wikipedia page.

Set Functions

To use any of the Set Functions, follow these steps:

1. Hold down the Set button. Do not release it until the setting process is finished. The top Row LED is blinking fast. This tells you that you are expected to make a selection. The top row of number LEDs will be illuminated to indicate which settings are available in the current mode.
2. Press and release the number button associated with the desired setting/function.
3. Press the appropriate number buttons to adjust the setting.
4. Release the Set button.

To reiterate, you have to hold down the Set button the whole time.

Set Functions Available by Mode

Not every Set function is available in every mode. Refer to the table below. In general, pattern editing functions are only available in pattern editing modes, not in play modes.

	Solo Mute	Swing Rand	Time Mods	Length	Clear	Bank	Pattern / Song	Save
Pattern Play	✓	✓				✓	✓	✓
Fill Play	✓	✓				✓	✓	
Overlay Play	✓	✓				✓	✓	
Pad Play	✓	✓				✓	✓	
Pad Record	✓	✓	✓	✓	✓	✓	✓	✓
Step Edit	✓	✓	✓	✓	✓	✓	✓	✓
Trigger Edit	✓	✓	✓	✓	✓	✓	✓	✓
Config Edit								✓

Set: Solo / Mute

Solo and mute change which instruments are played without changing the patterns. The top LEDs indicate which instruments are soloed, and the bottom LEDs indicate which instruments are muted.

Row Switch between setting which instruments are soloed (top row) or muted (bottom row).

Num Add or remove an instrument from the solo group or mute group.

Select Turn solo/mute on or off. This is important. Changing the instruments in the solo/mute groups does not immediately affect what is playing. You have to turn either solo or mute on for it to have an effect. Press Select while the top Row LED is lit to turn solo on or off. Press Select while the bottom Row LED is lit to turn mute on or off. Solo and mute cannot both be on at the same time. The top or bottom Row LED blinks to indicate that solo or mute is on. If neither LED is blinking, then all instruments play normally.

Set: Swing / Rand

Row Switch between setting Swing level (top row) or Randomization level (bottom row).

Num Press a number button to set the desired level.

Swing

Swing adds a shuffle or groove to a rhythm. This is accomplished by slightly delaying every other step in the pattern. A swing level of 50% is no swing. It means that the swung note is halfway between the previous note and the next note. The swing percentages are slightly different depending on the time scale of the pattern. Refer to the chart below.

The swing setting has no effect when clocking the LDB-1 with a per-step analog clock signal, but it works correctly with a 24 or 48ppqn analog clock.

The MIDI clock is half the resolution of the internal clock, so the even numbered settings are the same as the next lower setting.

	1	2	3	4	5	6	7	8
8th Notes	50.0%	54.2%	58.3%	62.5%	66.7%	70.8%	75.0%	79.2%
16th Notes	50.0%	54.2%	58.3%	62.5%	66.7%	70.8%	75.0%	79.2%
32nd Notes	50.0%	58.3%	58.3%	58.3%	66.7%	66.7%	75.0%	75.0%
64th Notes	50.0%	50.0%	50.0%	50.0%	66.7%	66.7%	66.7%	66.7%
8th Triplets	50.0%	53.1%	56.3%	59.4%	62.5%	68.8%	75.0%	81.3%
16th Triplets	50.0%	53.1%	56.3%	59.4%	62.5%	68.8%	75.0%	81.3%
32nd Triplets	50.0%	56.3%	56.3%	50.0%	62.5%	62.5%	68.8%	75.0%
64th Triplets	50.0%	50.0%	50.0%	62.5%	62.5%	68.8%	62.5%	62.5%

Rand

Randomization alters the running patterns by randomly turning steps on or off. The randomization level determines the probability that a change will happen. It goes from off, to subtle, to crazy.

Select Randomize all instruments. Normally, only those instruments used in the playing pattern will be randomized. To randomize all instruments, hold Select while setting the level. This is not a toggle. You must hold the Select button each time you wish to randomize all instruments.

When all instruments are randomized, there is lower probability of unused instruments being added to the pattern when compared to the probability of a used instrument being modified.

For example: if a pattern does not contain any claps, then normally no claps will be added regardless of the randomization level. But if all instruments are randomized, then claps might be added.

Set: Time / Mods

Row Switch between setting time scale (top row) or performing pattern modifications (bottom row).

Time Scale

Sets the time scale of the pattern. The default is 16th notes. The LED corresponding to the current time scale blinks.

Num Press a number button to set the desired time scale.

1	2	3	4	5	6	7	8
8th Notes	16th Notes	32nd Notes	64th Notes	8th Triplets	16th Triplets	32nd Triplets	64th Triplets

In Pad Record mode, the time scale of all patterns in a song are modified. If the song contains patterns with different time scales, all of the corresponding LEDs will blink.

In Trigger Edit mode, Set Time affects only the current pattern if triggers are per-pattern, and affects all patterns in the song if triggers are global.

Modifications

Modifies the pattern being edited.

Num Press a number button to pick the desired modification. While the Set button is held down, you can press more than one number button, or press a number button more than once.

9	10	11	12	13	14	15	16
-	+	⮌	⮎	↔	⇵	↯	?
Subtract	Add	Rotate L.	Rotate R.	Reverse	Swap	Shuffle	Random

- **Subtract:** Turns a random step off.
- **Add:** Turns a random step on.
- **Rotate Left:** Shifts all the steps to the left. Step one moves to the last step.
- **Rotate Right**: Shifts all the steps to the right. The last step moves to step one.
- **Reverse:** Reverses the order of all the steps.
- **Swap:** Swaps halves of the measure. Takes into account pattern lengths shorter than 16. For example: in a 16-step pattern, steps 1-8 become 9-16 and vice versa. In a 12-step pattern, steps 1-6 become 7-12 and vice versa.
- **Shuffle:** Shuffles the steps around, but does not change the number of steps which are on and off.
- **Randomize:** Randomly changes some steps from on to off or from off to on.

Set: Mods (continued)

Select Modify all instruments. Normally, only the instrument being edited is modified. To modify all instruments in the pattern, hold the Select button while pressing a number button. This is not a toggle. You must hold Select each time you wish to modify all instruments, otherwise only the current instrument is modified.

In Pad Record mode, there is no single instrument being edited. Therefore, mods always affect all instruments, and the Select button has no effect. Furthermore, if a multi-pattern song is playing, all patterns in the song are modified.

In Trigger Edit mode, mods affect only the triggers, and the Select button has no effect.

Set: Length

Change the number of steps in a pattern. The LED corresponding to the current time scale blinks.

Num Press a number button to set the length of the pattern being edited. If the pattern is playing, then you will hear the change immediately, but the change will not be permanent until you release the Set button. You can play with this behavior by shortening the pattern, but then setting it back to 16 before releasing Set.

In Pad Record mode, the length of all patterns in a song are modified. If the song contains patterns with different lengths, all of the corresponding LEDs will blink.

In Trigger Edit mode, Set Length affects only the current pattern if triggers are per-pattern, and affects all patterns in the song if triggers are global.

Set: Clear

Clears all steps from the pattern or individual instruments. The bottom row of number LEDs indicates those instruments which are used in the pattern being edited.

Num Press a number button to clear all steps for the associated instrument.

Select Clear all instruments.

In Pad Record mode, if a multi-pattern song is playing, all patterns in the song are cleared.

In Trigger Edit mode, the triggers are cleared immediately. Number buttons and Select are not used.

Set: Bank

There are four banks. Each bank contains 16 patterns and 4 songs. Changing the bank changes the selected pattern to pattern one of that bank. If a pattern or song was playing, it will change to the newly selected pattern.

Num Press a number button to change to the selected bank. Four LEDs will be illuminated indicating that you have four choices. The current bank will be blinking.

The selected bank number will be immediately saved in non-volatile memory. When the machine starts up, the bank number will be set to the last selected bank.

Set: Pattern or Song

Changes the current pattern or song. The behavior of this setting is slightly different in different modes.

Pattern Play Mode:

Num **Load Song**: Press a number button to load a previously saved song. There are four songs per bank. Four LEDs will be illuminated indicating that you have four choices.

Step Edit Mode:

Num **Set Pattern:** Press a number button to change the pattern being edited. All 16 LEDs will be illuminated indicating that you have 16 choices. The current pattern will be blinking. The selected pattern becomes the pattern you are editing. If a single pattern is playing, the newly selected pattern starts playing when the currently playing pattern ends. If you re-set the pattern to the current pattern, then that pattern is reloaded from non-volatile memory – an un-do of any changes made since the pattern was originally loaded.

Fill Play, Overlay Play, Pad Play, or Pad Record Mode:

Num **Set Pattern:** Press a number button to change the current pattern. The LEDs corresponding to all of the patterns in the current song will be blinking.

Select **Add Pattern to Song:** Hold the Select button while pressing any of the number buttons to create a multiple pattern song. The patterns will play one after another, then repeat.

Trigger Edit Mode:

If triggers are per-pattern, then Set Pattern works as it does in the Step Edit mode. If triggers are configured as global, then Set Pattern works as in the Fill, Overlay or Pad modes.

Set: Save

Saves the current pattern or song to non-volatile memory. This feature works slightly differently in different modes, as described below.

Pattern Play Mode:

Num Press a number button to save the current song, even if that song is a single pattern. There are four songs per bank. Four LEDs will be illuminated indicating that you have four choices.

Step Edit Mode:

Num Press a number button to save the current pattern to the selected pattern slot in non-volatile memory. All 16 LEDs will be illuminated indicating that you have 16 choices. The current pattern will be blinking.

If you save the current pattern to a different slot, the new pattern number becomes the pattern you are editing. You can click more than one number button to save the same pattern to more than one slot. This is an especially useful feature when you want to make variations to a pattern.

Pad Record Mode:

Num Press a number button to save the pattern in that slot to non-volatile memory. LEDs will be illuminated indicating which patterns have been modified and not saved. The patterns that make up the current song will be blinking. Unsaved patterns in the current song blink slower. You can click on any or all of the unsaved patterns to save them.

This is handy if you have edited multiple patterns and do not remember which ones have changed.

Triggers Edit Mode: If triggers are configured as global, then the global triggers are saved in non-volatile memory as soon as you press the button. If triggers are per-pattern, then save works as in the Step Edit mode.

Connectivity

Power

The LDB-1se runs on 9 to 10 volts. You can connect a 9 volt battery, and/or an AC adapter (AKA wall wart). The power jack on the LDB-1se is a center-negative, type-M power jack. At Delptronics, we are partial to the Boss PSA-120S, however, just about any standard 9V pedal power supply will work.

The LDB-1se has reverse voltage protection, so if you plug in a center-positive power plug, it will not work, but will not cause any damage. Plugging in a supply that is over 12V will damage your drum machine.

Audio Out

The audio output is a mono 1/4" jack. If you insert a stereo plug, it will still work, but you will only get sound out of the left channel.

Analog Connectors

The **Trigger Out**, **Clock Input**, and **Reset/Gate Input** jacks are mono 3.5mm (1/8") jacks. They are used for connecting your LDB-1se to a modular synthesizer, or sequencer.

Trigger Out

The trigger output voltage is equal to the power supply voltage, nominally 9 volts. Keep in mind that both batteries and AC power adapters rated at 9 volts could be supplying slightly more or less than 9 volts. The LDB-1se will still work fine, but the trigger output will be slightly higher or lower. That should not affect most modular synthesizers.

Clock Input

The Clock Input jack accepts a 1 to 15-volt signal from a modular synthesizer or sequencer. So, you can control the tempo of the LDB-1se from another device, or use a master clock module to control multiple devices, including the LDB-1se.

Reset/Gate Input

The Reset/Gate Input jack accepts a 1 to 15-volt signal from a modular synthesizer or sequencer. When configured as reset, a positive going pulse resets the playing pattern/song to the beginning. When configured as a gate, a voltage makes the pattern(s) play, and zero volts makes them stop. Configure it as a gate to use DINsync.

DINsync Input

DINsync is a standard used by older drum machines, primarily from Roland. DINsync provides a clock signal and a gate (on/off) signal. The same jack is used for DINsync or MIDI, so you cannot use both functions at the same time.

The clock pin and the gate pin on the DIN jack are connected to the 3.5mm clock input and reset/gate input jacks, but they are switched. So, if you plug into the 3.5mm jack, the signal is disconnected from the corresponding pin on the DIN jack.

MIDI Implementation

Notes: See the MIDI Mapping config option for details on how MIDI notes are mapped to LDB-1se instruments. When no patterns are running, incoming MIDI notes are played immediately, otherwise they are played at the selected tempo (quantized). MIDI note off messages, and zero velocity note on messages are ignored.

Song Select Messages: The LDB-1se will respond to MIDI song select messages that have a song number of 1 to 16. The selected in the current bank pattern will play.

Real-Time Messages: The LDB-1se will respond to the below MIDI system real-time messages. The LDB-1se can be configured to ignore clock messages or all transport messages.

Clock: Overrides the internal clock.

Stop: Stops the currently playing song or pattern immediately.

Start: Starts playing the current song or pattern at the beginning.

Continue: Starts playing the current song or pattern at the point at which it stopped.

Song Position Zero: Sets the song position to the beginning of the song, so that a Continue message will start it playing from the beginning. This message is handled because some MIDI implementations only send one Start message and subsequent messages consist of a Song Position Zero message then a Continue message. Messages that attempt to set the song position to a point other than zero are ignored.

Memory

The LDB-1se contains non-volatile memory. That is, it remembers data even with no power.

The only thing that is automatically saved to non-volatile memory is the current bank number. All other data will only be saved when you explicitly save it. That includes patterns, songs, triggers, and configuration options.

Factory Reset

To reset all configuration values to the factory defaults, Hold the Start and Mode buttons while powering on the machine.

To reset all patterns to the factory defaults, Hold the Start and Set buttons while powering on the machine.

To reset both configuration values and all patterns to the factory defaults, Hold the Start, Mode, and Set buttons while powering on the machine.