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# **XOXBOX**

**BASS LINE SYNTHESIZER**

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**USER MANUAL (IN PROGRESS)**

**APRIL 30, 2005**

**For more information about x0xb0x please visit:  
<http://www.ladyada.net/make/x0xb0x>**

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# INTRODUCTION

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At this point, you should have successfully built your x0xb0x and performed basic tests to verify its functionality. This manual is intended to teach you the various functions of the synthesizer.

The manual is divided up into 3 sections. The first section describes all of the buttons, switches and ports individually. You should at least skim this section first so you know what we mean when we refer to the 'bank knob.' The second section is divided up by function and describes each function in detail and also provides examples for how to perform common tasks. The third section describes how to use the optional control software.

Since the x0xb0x is a 'living project,' there may be new versions of this document describing new functions. Be sure to check that this manual corresponds to the hardware, firmware and software version you have. The hardware version is written on the mainboard PCB. The firmware and software version can be verified through the computer control software.

This manual is written for:  
x0xb0x 1.0 Hardware  
x0xb0x 1.0 Firmware  
x0xb0x 1.0 Software

No manual is perfect, but we can strive for completeness. If you feel like there's something amiss (whether it be poor spelling, obfuscated language, or confusing pictures) send your suggestions and corrections to: **x0xb0x@gmail.com**. Chances are, you're not the only one.

We hope you enjoy using your x0xb0x to make hardcore acid tracks.

# QUICK OVERVIEW

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## XOXBOX CAPABILITIES

### Sequencer capabilities:

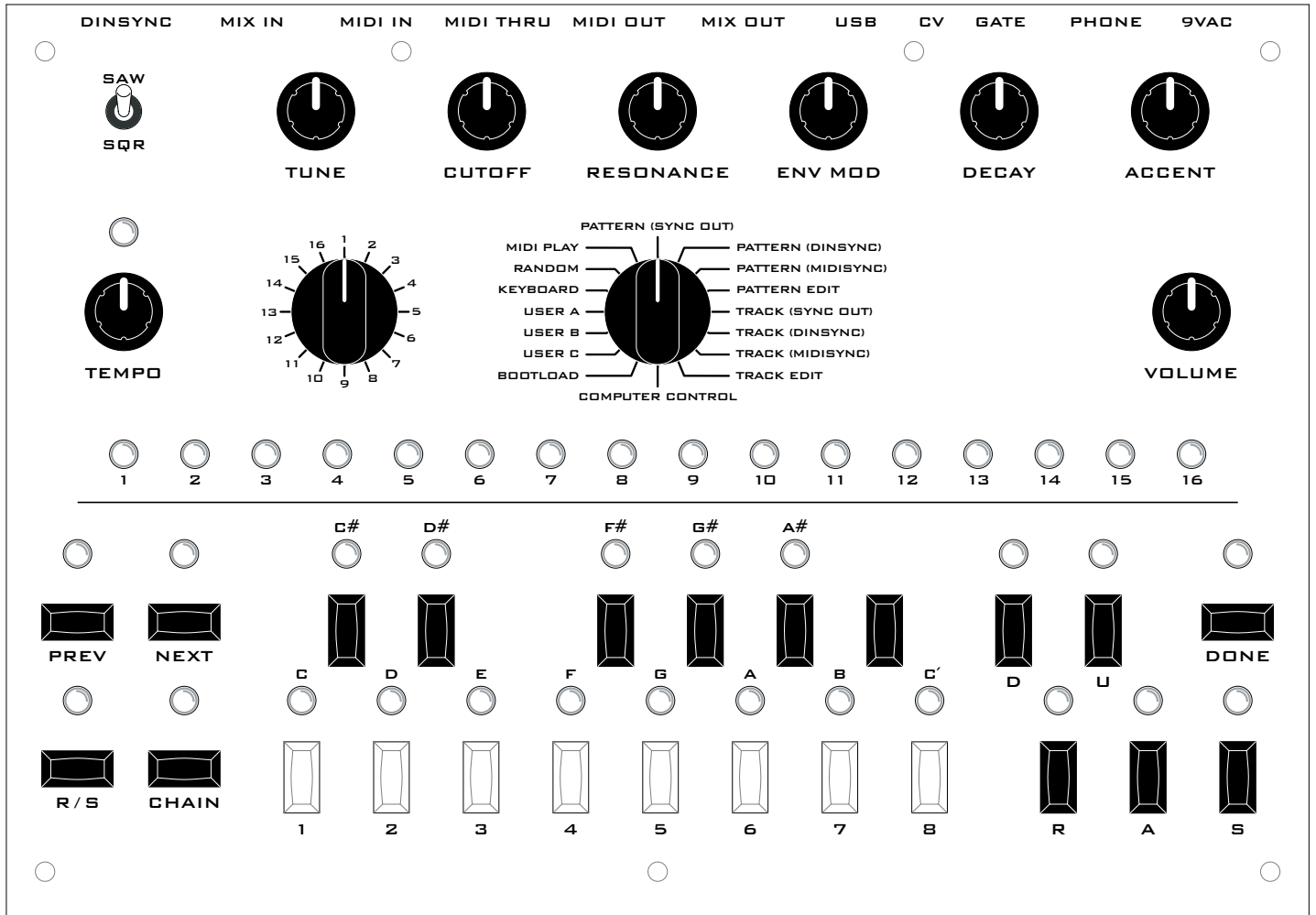
- Up to 128 patterns of up to 16 notes each
- Up to 64 tracks of up to 16 patterns each
- Input sync via DINSYNC or MIDI Clock sync
- Output sync via DINSYNC and MIDI Clock sync
- Can act as a MIDI-controlled synthesizer
- Can act as a MIDI-out keyboard
- Easy-to-use sequencer allows for quick pattern & track entry and editing
- Intuitive track and pattern play with 2 octaves of pitch shift, rest, accent and slide override, as well dynamic chaining of up to 16 patterns or tracks
- Built in "random pattern" generator
- Precision tempo (20BPM to 200BPM) can be set via computer or with tap-tempo

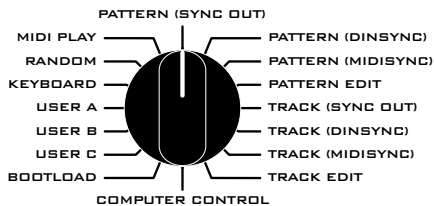
### Synthesizer capabilities:

- Monophonic, 4 octave VCO

# SECTION I

## SWITCHES, KNOBS, AND I/O





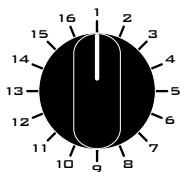
## FUNCTION KNOB

The **function knob** sets the mode of the synthesizer. It's functionality is the same in every mode: the x0xb0x is in the mode indicated by the knob. If the knob is changed, the current mode will be exited and all modifications (such as unsaved patterns or tracks, chains, pitch shifts, etc.) will be discarded. The only exception to this rule is *Bootload Mode* which is only active if the x0xb0x is powered on with the **function knob** in this position.

Each mode is described in detail in section II.

## BANK KNOB

The **bank knob** is has many uses. Its primary use is to select between banks of memory when writing or reading patterns and tracks. When addressing patterns, there are 16 banks and so all positions address a seperate bank. When addressing tracks, however, there are 8 banks. Therefore, bank position 9-16 are equivalent to positions 1-8 (respectively). Another use of the **bank knob** is to change the MIDI address of the device in *MIDI Play* or *Keyboard* mode.



## TEMPO KNOB & LED

The **tempo knob** is a rotary encoder, not a potentiometer. This means that tempo is adjusted by turning it left (down) or right (up) but that the particular location of the knob is irrelevant. (That is, turning the knob while the x0xb0x is powered off will not affect the tempo.)

The tempo is stored in internal memory on the microcontroller and can be precisely set using the x0xb0x control software.

The tempo is incremented or decremented one BPM per detent. The minimum tempo is 20BPM, the maximum is 300BPM. The current tempo is indicated by the **tempo LED** which sits above the **tempo knob**. The tempo knob is not functional when syncing with external signals such as DINSYNC or MIDI Sync. However, the **tempo LED** will always indicate the current tempo, even when sync'd to an external signal.

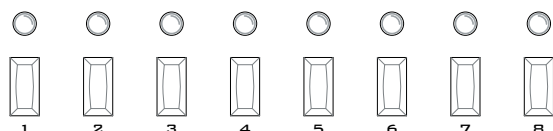




## BANK LEDs

The strip of 16 numbered LEDs is used as visual feedback in many of the different x0xb0x modes. In general, it is used to indicate the currently selected bank or the current position in a pattern or track.

In *MIDI Play* and *Keyboard* mode, it indicates the current MIDI address.



## NUMBERED KEYS AND LEDs

The 8 white keys as a group are sometimes referred to as the **numbered keys**. (These keys are also used and referred to as **note keys** when used as a one-octave keyboard.)

The numbered keys are used to address patterns and tracks in a bank while playing and editing.

The LEDs indicate the current pattern or track selected. In pattern play and track play modes, a blinking LED indicates the currently playing pattern or track and lit LEDs indicate patterns and tracks "waiting to be played."

## NOTE KEYS AND LEDs

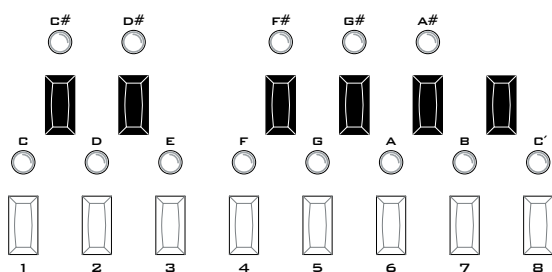
These 13 keys as a group are referred to as the **note keys**. They are also sometimes individually referred to by their label (i.e. "press the **C'** key"). The note keys are used to enter musical information.

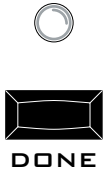
In *pattern edit* mode, they are used to edit notes in a pattern.

In *track edit* and *track/pattern play* mode, they are also used to enter in the desired pitch shift.

In *keyboard mode*, they are used as a one octave keyboard.

In some case the octave can be changed with the **Up** and **Down** keys.

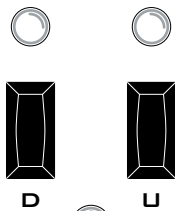




## DONE KEY & LED

The **done key** is essentially used to save tracks and patterns in *pattern edit* and *track edit* mode. It is also used as the *tap-tempo* button in *pattern play* and *track play* modes.

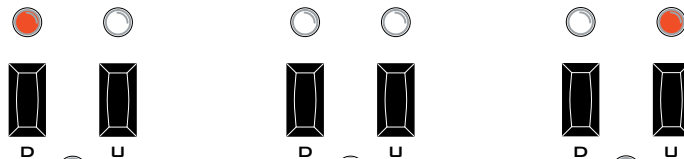
The **done LED** often indicates the end of a pattern or track (in *pattern edit* and *track edit* mode) or that a pattern or track is empty (in *pattern play* and *track play* modes)



## DOWN/UP KEYS & LEDs

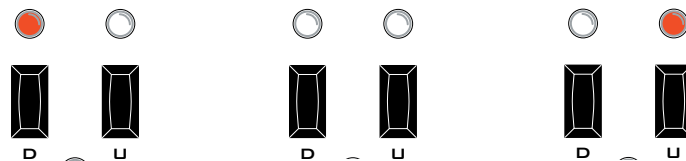
The **up key** and **down key** are used to extend the range of the single-octave keyboard. In *pattern edit* and *keyboard* mode, pressing the **down key** will lower the octave (no lower than the lowest octave) and pressing the **up key** will raise the octave (no higher than the 3rd octave). The LEDs will also indicate which octave is in use.

In *track edit* and *track play* mode, the **up/down keys**



*lowest octave*    *second octave*    *third octave*

are used to transpose patterns and tracks. Patterns can be transposed either up (one octave) or down (one octave). Pressing the relevant button will display the amount of transpose in that direction on the **note keys**. the LEDs will also indicate if the pattern/track is transposed and in which direction.



*transposed down*    *no transpose*    *transposed up*



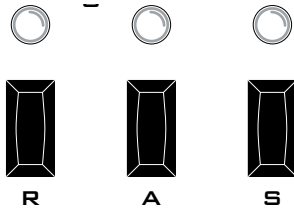
## REST/ACCENT/SLIDE KEYS & LEDS

The **rest key**, **accent key**, and **slide key** (and leds) are used to apply and indicate mute, accenting and portamento. Since they are often used as a group, they are sometimes referred to as the **RAS** keys and leds. While they have different effects in each mode, the overall meaning of their use is the same:

In *pattern edit* mode, they are used to create rest notes, accented notes and slides between notes. In *track edit* mode, they are used to mute patterns, accent entire patterns, and portamento entire patterns. In *pattern play* and *track play* mode, they provide 'instantaneous'/temporary over-riding mute, accent and slide.

In *keyboard mode*, only accent is used (sliding between notes occurs automatically when multiple keys are pressed).

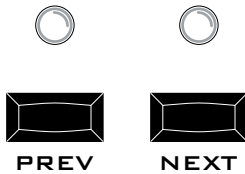
Lit **RAS LEDs** indicate that the effect is currently active.



## PREV/NEXT KEYS & LEDS

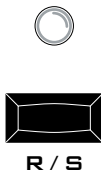
The **next key** and **prev key** are used in the *track edit* and *pattern edit* modes to index through patterns and tracks.

In addition, the next key is used to start step-write editing method in both *pattern edit* and *track edit* in which case the **next LED** will be lit



## RUN/STOP KEY & LED

The **run/stop key** is used to start and stop the sequencer. In *pattern edit* and *track edit* modes, pressing **run/stop** will start or stop either run or run-edit. In *pattern play* and *track play* with sync out, it will start or stop playing the selected patterns and tracks. The **R/S LED** indicates when the sequencer is running.



In *pattern play* and *track play* modes with external sync (such as MIDI clock or DINSYNC), the button doesn't do anything, but the **R/S LED** will still light up when the sequencer receives the proper external start command.



## CHAIN KEY & LED

The **chain key** is primarily used to create pattern and track chains in *pattern play* and *track play*: the button is held down while the desired chain is entered.

It is also used to create random patterns in *pattern edit* mode.