



USER MANUAL

Updated Jan 17th 2022

Welcome to BlastBeats!

Please check the website for the latest firmware!

The feature set is also likely to evolve so its recommended to check the website for updates to this manual.

We always value feedback and ideas, so feel free to reach out.
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Features Overview

At the heart of this groove box is a YMF-262 Chip AKA OPL3 FM chip
-the same chip that was previously found in the Soundblaster16 /
SoundBlaster PRO2 sound cards found in 90s computers.

BlastBeats has two Stereo YAC512 DACs allowing 4 individual assignable
outputs to multi-track and route the instruments with flexibility.

BlastBeats features 10 voices consisting of:

- 6 drum voices: Kick/SD/Tom/closed hat/open hat and cymbal

- 4 synth voices. Each synth voice can be dual or quad operator
depending on the chosen algorithm.

Other features include:

- 8 waveforms per operator

- 56 faders with per step automation

- 32 illuminated buttons including: 3 mode buttons (top left), 3 transport
buttons (bottom left), a top row of 10 voice buttons referred to in this
manual as "top10" and a bottom row of 16 step buttons referred to as
"bottom16"

- DIN5 MIDI IN and OUT

- USB for firmware updates

- 4 Assignable MONO T/S 1/4" outputs

- 1 MONO T/S 1/4" MIX output (with all instruments mixed to one output)

- 2 DUAL MONO T/S 1/4" headphone output (same as mix on both sides)

- Analog Sync in and out via 1/8" mono TS jack

- MicroSD (included card and USB adaptor) for data storage

About Drum and Synth Voices

The YMF262 FM chip synthesises drum sounds using several FM operators. Some operators are shared between instruments. As a result some of BlastBeats faders affect several instruments at once.

There are 4 synth instruments. Synths 1 and 2 are monophonic (one voice) whereas synths 3 and 4 are duophonic (2 voices) and differ in the way the 2 voices are triggered:

- Synth 3 alternates between voice 1 and 2 on every triggered step. This allows voices 1 and 2 to overlap.
- Synth 4 triggers both voices at once, they can be detuned using the operator3 tune fader allowing fat bass lines or chord stabs.

You can choose between 5 algorithms for each synth instrument with the algo fader.



Depending on the chosen algorithm the instrument will offer two dual-operator voices (algo modes 3 and 5) or a single 4-operator (algo modes 1,2 and 4) .

In 2-op modes the second vibrato fader affects the pitch of operator 4. However in 4-op modes the second vibrato fader affects the multiplier of the operator 4 for a pseudo-arpeggiator effect.

Step Edit Mode

Press step to enter this mode, here we can edit steps of the pattern to create beats.

Selecting a page

If the pattern is more than 1 page long (above 16 steps) press step to flick through the pages. The top row of leds will briefly indicate the current page. A pattern can be up to 4 pages long aka 64 steps (see function mode to add pages to a pattern).

Selecting an instrument

There are 10 voices to choose from consisting of 6 drum voices and 4 synth voices.

Select the voice you wish to edit by pressing any of the top 10 voice buttons

Cloning a synth

You can clone the fader positions of the selected synth by holding one and pressing another of the last 4 top 10 buttons.

Note: this only applies to the synth voices.

X0X style step input

When REC is off, you can toggle steps on or off simply by pressing the bottom 16 buttons

Real time drum input

When REC is on and blast beats is running press top 10 buttons 1-6 to punch in a beat.

Note synth notes (top 10 7-10) are punched in differently

Real time synth input

When rec is on a blastBeats is running tap the bottom16 buttons to input a pattern melodically

changing the synth input octave

Hold rec and press the kit/patt, step or function buttons to choose low, mid or high octave respectively

changing the playback octave (synth or drum)

You can transpose the octave of any voice by holding its top10 button and pressing the following menu buttons:

- the Kit/patt button transposes the playback down an octave
- the step button plays back with octave unchanged
- the function button transposes the playback up an octave

Tip: Double-tapping any of the 3 above buttons transposes all voices at once!

Step by step synth input

When rec is on but BlastBeats is stopped, you can input a melody step by step by tapping the bottom16 buttons.

If you reach the end of your sequence (16 steps if the song is only 1 page) it will overflow to step1 and overwrite endlessly

You can also input notes via MIDI using the channels 1-4 (or other depending on the midi routing)

If you wish to start over at any time toggle REC off then on again to reset the step recorder to the first step.

MIDI real time punching

When BlastBeats is running and rec is on, it will pick up midi notes sent to the corresponding MIDI channel depending on the settings (see midi channel routing for details).

Send the following notes on CH10 (by default) to input drum notes

MIDI note 36 =kick

MIDI note 38=snare

MIDI note 41=tom

MIDI note 42 =closed hat

MIDI note 46=open hat

MIDI note 49=cymbal

CH1-4: MIDI notes 36 to 100 synth1-4 respectively

Kit / Pattern Mode

In this mode you can change & chain patterns, and assign different kits to each pattern. Press kit/pat to enter this mode.

Changing Kit:

Press a top10 button at any time to change the kit assigned to the current pattern.

Each of the 16 patterns can have any of the 10 kits assigned to it.

Cloning Kit:

It's quick and simple to clone kits. Simply hold the kit you wish to clone (top10 button), and press any other top10 button to paste it

Changing pattern:

Press any bottom16 button to change pattern.

If the sequencer is stopped, BlastBeats will immediately change to the new pattern.

If the sequencer is running, BlastBeats will cue the next pattern and make the change when it reaches the last step of the current pattern. In this case the cued pattern will be indicated by a blinking bottom16 LED.

Cloning pattern:

Same process as cloning kits. hold the pattern you wish to clone (bottom16 button), and press any other bottom16 button to paste it.

Note: When changing pattern, the assigned kit will automatically be loaded

Chaining patterns

You can chain up to 256 patterns in a row to form a song.

Press rec to arm the sequencer (rec LED should blink)

When ready Press the first pattern of your song to start recording a chain.

BlastBeats will record up to 256 pattern changes in a row. You can loop the same pattern several times.

The current pattern will blink during the chain recording phase to indicate that it's armed.

when you have reached the end of the chain, Press rec again. The current pattern will no longer blink and BlastBeats will return to the first pattern in the chain and loop the chain endlessly.

Stopping the sequencer resets to the first pattern of the chain.

clear the chain

suppose we want to play only pattern 1

press rec to arm BlastBeats,

press bottom16 button1,

press rec again to un-arm BlastBeats (before pattern 1 reaches the end of its cycle if the sequencer is running).

Tip: if you have fast short patterns, it can be easier to clear chains with the sequencer stopped.

Song Mode

Song mode is where songs are loaded from the SD card.

Press kit/patt and function at the same time to enter song mode. Both kit/patt and function LEDs should now be lit at once.

From a single SD card BlastBeats can load up to 160 songs (10 folders X 16 songs).

There are 10 main folders labeled 1 to 0(10)

Each main folder contains 16 song folders labelled 1 to 16

Each song folder contains the following files:

AUTO.BB (automation)

CHAIN.BB (pattern chain)

10x DRUMX.BB (drum kits/presets where X= 1-10)

PAT-D.BB (drum patterns)

PAT-S.BB (synth/melodic patterns)

10x SYNTAX.BB (synth kits/presets where X=1-10)

You can safely mix and match these files between song folders

To load a new project tap a top10 button to select a folder, Then tap a bottom16 button to load a song.

1 song consists of:

16 patterns (up to 64 steps per pattern (arranged in 4 pages of 16 steps))

10 kits (aka presets) that hold all fader positions. Kits can be swapped on the fly and are linked to patterns.

A chain of up to 256 pattern changes can be recorded

Function Mode

Press function to enter this mode to edit the following functions:

Save

updates the SD card. You can save the current song to any folder/location.

BlastBeats will select the current folder and location by default, press any top button to select a destination folder, then press any bottom 16 to confirm location. BlastBeats only writes to SD when the synth is stopped. If it is running, it will wait for the next time you stop it (by pressing run) and save then.

Length

sets the length of the current pattern. Use top10 1-4 to select number of pages (x16 steps),

Then use bottom16 to select the last step.

Cloning the first page: If you hold the first top button and press another top button without releasing the first, the new added pages will contain the same pattern data as the first.

Clear

Has multiple functions:

- fader automation. Hold clear and move a fader to erase its automation

- pattern clear (per voice): press a top10 button to erase the enabled steps

- project initialize: hold clear and press kit/patt and function to replace the current project with template default.bb

Wiggle

This function adds randomness to any fader.

To assign the wiggler to a fader: hold wiggle and move a fader.

Set the depth of the wiggler: with the top10 buttons

To clear all faders assigned to the wiggler: hold wiggler and press clear.

Swing

Use the top10 buttons to set the amount of swing. Each pattern of a song has its own swing setting

Mute

In this mode use the top10 buttons to mute/unmute a channel

Solo

in this mode use the top10 buttons to solo a channel

Prob

In this mode set the trigger probability of a channel.

Select a channel: hold prob and use a top10 button

Set the level of probability (chances out of 10 of triggering) with the top10 buttons (without holding prob)

Stutter

This is a performance function, enabling you to retrigger the same instrument rapidly (like a Blast Beat). Hold the top 10 buttons to repeat the current step at various rates. The rates are divisions of the current tempo.

Tip: try holding wiggle during a stutter :)

Bend (spindown effect)

Hold bend to pitch bend downwards the global tuning of the FM chip.
Use the top10 buttons to set the bend strength.

Freeze

When freeze is held, the communication between brain and voice is suspended leading to sustained notes and glitches
(can be combined with bend and stutter)

Tremolo

Use the top10 buttons to set the tremolo rate (each pattern has its own tremolo rate)

This function will modulate the volume of the operator. A different Tremolo rate can be assigned to each pattern

Vibrato

Use the top10 buttons to set the vibrato speed (each pattern has its own vibrato rate)

This function will modulate the pitch of the operator. A different vibrato rate can be assigned to each pattern

Phones

Use the top10 buttons to set the phones level (recalled at startup)

Mix

Use the top10 buttons to set the mix level (recalled at startup)

Route

With this function you can assign the instruments to any of the 4 outputs. Note some instruments are locked together (snare+hats , tom+cymbal). This is a hardware limitation due to the way the voices are created by the YMF262.

hold route and press a top10 button select a target instrument.

Release route and now press the first 4 top10 buttons to attach/detach the target voice to outputs 1-4 (you can route a voice to multiple outputs to make it louder in the main mix)

Synching

Master Mode

BlastBeats will automatically start up in master clock mode.

Clock Out

BlastBeats will send a 5V pulse every 2 steps (2PPQ) at all times.

Analog Slave Mode

Plug a 1/8" mono TS cable into the sync input to activate Analog Slave mode. In this mode BlastBeats will advance 2 steps on every received pulse (2PPQ). MIDI clock is ignored in analog Slave mode.

BlastBeats will automatically reset to step 1 if no pulses have been received for several seconds. Pressing run in this mode will reset the sequencer to step 1.

MIDI Slave Mode

BlastBeats will automatically sync to incoming MIDI clock. MIDI slave mode is activated when BlastBeats receives a MIDI Start command.

Pressing run in this mode will reset the sequencer to step 1. BlastBeats will go back to Master mode after receiving a MIDI Stop command.

Setting The Tempo (Master Mode)

Tap tempo

Press a tempo button 3 times to tap the tempo. If BlastBeats isn't running it will start on the third tap.

Manual aka BPM tempo

Press and hold the tempo button then press the top10 buttons to input the tempo in beats per minute. You can input either 2 or 3 digit BPM values.

Example 1: Set BlastBeats to 123 BPM

-Hold tempo and tap first, second then third top10 button

Example2: Set BlastBeats to 51 BPM

-Hold tempo and tap fifth then first top10button

-Release tempo button to set to 51.

Fader Automation

When in step mode you can record and automate the faders.

Recording a fader

To record a fader simply press the rec button in step mode (the rec LED will flash). Now the sequencer will record and repeat the fader movements. Press rec again to no longer record the faders.

Deleting automation for a single fader

To delete the automation of a single fader press function to enter function mode. Now hold **clear** and move the fader for which you wish to delete the automation.

Deleting all fader automation

To delete all the fader automation of the current pattern press function to enter function mode. Now hold **clear** and press **rec**

Trick Automation and step edit

In function mode you can record and play back the 3 available trick functions that are stutter, bend and freeze

Recording a trick

To record a trick simply press the rec button in function mode (the rec LED will flash). Now the bends, freezes and stutters that you activate will be recorded and played back.

Deleting trick automation

To delete trick automation press function to enter function mode. Now hold **clear** and press **stutter**, **freeze** or **bend** to delete the respective automation

Step Editing trick automation

You can edit the automation using the 16 step buttons just like you would edit the steps of a regular beat.

To access the trick step edit page hold **step** and press **stutter**, **bend** or **freeze** to access the respective editors. Now you can flick through the pages of the pattern by pressing **step** and the bottom 16 LEDs will light up when automation of the trick is present on a step.

To exit trick step editor press **function**, **kit/patt** or **step** + any top 10 button

Bend and Freeze step edit

Bend and freeze trick automation are edited the same way in that a single press of the bottom 16 buttons will turn the trick on or off for any step.

Stutter step edit

Stutter trick step edit allows you to activate and deactivate the stutter on any step but it also allows you to choose the stutter rate per step. Press a bottom 16 button to select a step. If no stutter automation is present on the step the LED will light and stutter will be added. Next press any of

the top 10 buttons to select the rate of the stutter for the selected step.
To clear a stutter on a step, press any LIT bottom 16 button twice

Special Startup Settings

Here are some special settings that can be activated by holding a button at startup:

Safe envelope ranges:

Hold length button at startup to toggle this on or off
the LED of the button will blink once or twice to indicate the setting.
Once=on twice=off. When Safe mode is on, the att and dec faders keep the envelope speeds within recommended ranges for drum machines. When safe is off, the faders reach the full range of the chip allowing very long attack and release times (drones).

Faster pitch fall (default=off)

Hold bend button at startup to toggle this on setting or off
the LED of the button will blink once or twice to indicate the setting.
Once=on twice=off.
When faster pitch fall is on the fall faders will pull the tune of the instrument up or down 4x faster
Useful for fast paced music.

Midi channel routing

Hold route at startup to enter Midi channel routing.
BlastBeats listens to 5 MIDI channels:

Drums (default CH10)
SYNTH 1 (default CH1)
SYNTH 2 (default CH2)
SYNTH 3 (default CH3)
SYNTH 4 (default CH4)

To change the channel select a target by pressing the following top buttons:

Top button 1-6 selects the drum voice

Top button 7-10 selects SYNTH1 to SYNTH4 respectively

Now press any bottom button (1-16) to choose the channel.

Power cycle blastBeats to resume normal operation.

Factory reset

Hold clear at startup to reset the settings to factory default. This can be useful if BlastBeats isn't behaving as expected after an accidental setting change.

These are the default settings:

Fall rate=normal

Current song=1

Current folder=1

Swing=off

Phones and Mix volume=6

All voices routed to all outputs

Safe envelope ranges = on

MIDI Channel routing:

Drums=CH10

Synth1=CH1

Synth2=CH2

Synth3=CH3

Synth4=CH4

Factory resetting won't affect the SD card data

Firmware Updates

To perform a firmware update connect BlastBeats to your computer with a standard USB type A to type B cable (the kind typically used by a printer).



- Hold the run button and power on BlastBeats.
- Keep the run button held until your computer sees a hard drive labelled "UPLOAD_DISK"
- Now simply delete the file located on the disk and replace with the new firmware file.
- The disk will automatically eject from your computer and BlastBeats will reboot with the new firmware installed.

MIDI Implementation

BlastBeats responds to the following Note On messages. The drum voices will transmit MIDI notes out of the MIDI port when triggered by the internal sequencer allowing you to use Blast Beats as a MIDI drum sequencer!

Parameter MIDI Note number	
DRUMS (channel 10 by default)	
Bass drum	20
Snare	21
Closed Hat	22
Open Hat	23
Tom	24
Cymbal	25
SYNTHS (channels 1 to 4 by default)	

BlastBeats responds to the following MIDI Control Change (CC) messages. When moved all faders will send their respective MIDI CC out of the MIDI output port allowing you to use BlastBeats as a MIDI controller.

Parameter MIDI CC Range		
DRUMS (channel 10 by default)		
Bass drum carrier volume	20	0-127
Bass drum carrier waveform	21	0-127
Bass drum carrier feedback	22	0-127
Bass drum carrier multiplier	23	0-127
Bass drum carrier tune	24	0-127
Bass drum carrier tune fall	25	0-127
Bass drum carrier attack	26	0-127

Parameter MIDI CC Range		
Bass drum carrier decay	27	0-127
Bass drum modulator volume	28	0-127
Bass drum modulator waveform	29	0-127
Bass drum modulator multiplier	30	0-127
Bass drum modulator multiplier fall	31	0-127
Bass drum modulator attack	32	0-127
Bass drum modulator decay	33	0-127
Snare volume	34	0-127
Snare waveform	35	0-127
Snare multiplier	36	0-127
Snare tune	37	0-127
Snare tune fall	38	0-127
Snare attack	39	0-127
Snare decay	40	0-127
Hats Volume	43	0-127
Hats waveform	45	0-127
Hats multiplier	55	0-127
Hats tune	56	0-127
Hats tune fall	57	0-127
Hats attack	51	0-127
Hats decay	54	0-127
Tom Volume	42	0-127
Tom waveform	44	0-127
Tom multiplier	48	0-127
Tom/Cymbal tune	46	0-127
Tom/Cymbal tune fall	44	0-127
Tom attack	50	0-127
Tom decay	53	0-127
Cymbal Volume	41	0-127
Cymbal waveform	45	0-127
Cymbal multiplier	48	0-127

Parameter MIDI CC Range		
Cymbal attack	49	0-127
Cymbal decay	52	0-127
Synth (channels 1 to 4 by default)		
Operator 1 volume	20	0-127
Operator 1 waveform	21	0-127
Operator 1 feedback	22	0-127
Algorithm	23	0-127
Operator 1 multiplier	24	0-127
Operator 1 attack	25	0-127
Operator 1 decay	26	0-127
Operator 2 volume	27	0-127
Operator 2 waveform	28	0-127
Operator 2 multiplier	29	0-127
Operator 2 tremolo depth	30	0-127
Operator 2 vibrato depth	31	0-127
Operator 2 attack	32	0-127
Operator 2 decay	33	0-127
Operator 3 volume	34	0-127
Operator 3 waveform	35	0-127
Operator 3 feedback	36	0-127
Operator 3 tune	37	0-127
Operator 3 multiplier	38	0-127
Operator 3 attack	39	0-127
Operator 3 decay	40	0-127
Operator 4 volume	41	0-127
Operator 4 waveform	42	0-127
Operator 4 multiplier	43	0-127
Operator 4 tremolo depth	44	0-127
Operator 4 vibrato depth	45	0-127
Operator 4 attack	46	0-127
Operator 4 decay	47	0-127