

FLUX BREAKOUT BOX

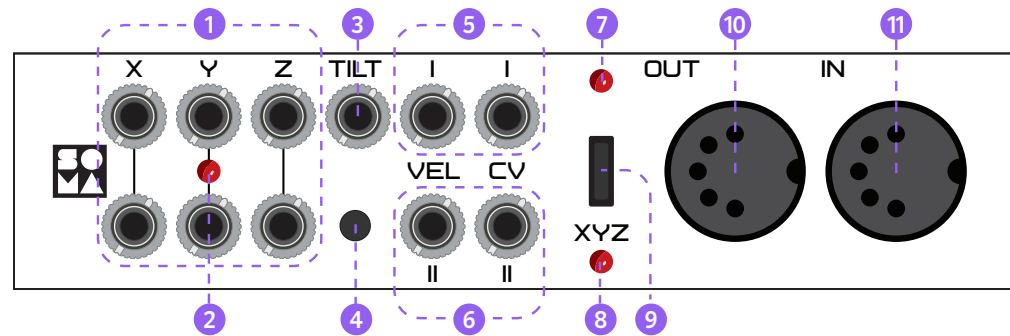
OPERATION
MANUAL

The Breakout Box is an accessory for FLUX which makes it possible to use FLUX as a controller for external gear through CV or MIDI MPE control.

As CV controller: All timbre sensors and tilt parameters have designated outputs which operate from -5 to +5 volts; CV range spans 8 octaves (0-8 volts), velocity range is 0-8 volts. Timbre sensor outputs can be configured as 6 poles with individual outputs for each sensor; or as a three-dimensional surface (akin to a KAOSS pad with added Z dimension) in XYZ mode where the upper 3 sockets have a range of 0-5 volts and the bottom X and Y sockets are -5 to 5 volts with 0 at the center of the timbral sensors area, while Z bottom socket indicates timbral bow flip enabling: 0 – normal bow, +5 volts – flipped bow.

As MIDI controller: MIDI output from FLUX is MPE with pitchbend of a channel reserved for pitch information and pressure for velocity, while timbre sensors are transmitted as CCs.

Additionally, the Breakout Box can operate as a USB MIDI interface and MIDI to CV converter when connected to a PC/Mac and the settings (used MIDI channels, sent CC numbers, etc.) can be programmed by SYSEX.



- ① Timbral sensors CV outputs
- ② Power LED
- ③ Tilt CV output
- ④ XYZ / CV learn button
- ⑤ Velocity and Pitch CV outputs for the 1st voice

- ⑥ Velocity and Pitch CV outputs for the 2nd voice
- ⑦ USB connection status LED
- ⑧ XYZ / CC learn LED
- ⑨ USB TYPE-C socket (device)
- ⑩ MIDI out ⑪ MIDI in

USING BOB WITH FLUX FOR TURNING FLUX INTO A MIDI/CV CONTROLLER

Connect the Breakout Box (BoB) to FLUX with a USB-C cable and turn FLUX on. The power on LED on the BoB should now blink and light up, after which the Status LED should light up indicating successful communication with FLUX. Use the CV outputs or a MIDI ca-

ble to connect FLUX to external gear. Pressing the button turns on XYZ mode, and the XYZ LED will light up.

For learning a FLUX timbre sensor as a CC controller in your DAW or synth, press and hold the button for at least 5 seconds. The XYZ LED will start blinking which means the unit has entered CC learn mode. When assigning a FLUX sensor via BoB to a (soft)synth in CC

Default configuration (XYZ mode functions marked in red)

- FLUX first voice channel 2
- FLUX second voice channel 3
- FLUX CC channel 1

FLUX output CC:

- 1st lower sensor – X (works only if the timbral bow is flipped, otherwise is 0) CC20
- 2nd lower sensor – Y (works only if the timbral bow is flipped, otherwise is 0) CC21
- 3d lower sensor – Z (works only if the timbral bow is flipped, otherwise is 0) CC22
- 1st upper sensor – X CC23
- 2nd upper sensor – Y CC24
- 3d upper sensor – Z CC25
- Tilt CC26

In the 6 pole (non XYZ) mode, a sensor without a bow sends CC 64, proximity of a normal bow generates 64–127 range, proximity of a flipped bow generates 64–0 values.



To work with BoB, your FLUX firmware must be updated to version 2.0 or higher.

learn mode, the BoB will only transmit values from the FLUX sensor which is held at maximum value. To achieve maximum value of a sensor, place your bow on the FLUX surface directly over the sensor you want to learn. Repeat this procedure for all sensors you need to learn without pressing the button again. For assigning Tilt, just tilt a bow over the Flux note keyboard in CC learn mode.

Enabling XYZ mode doesn't affect CC learn mode. Corresponding CCs for XYZ mode, are in the table above. For example, to learn flipped X, put the bow on the 1st lower timbre sensor, bottom left. To return to normal operation mode, just press the button on BoB again. The XYZ LED will stop blinking and the unit will return to normal operation mode.

The structure of settings packet is as follows:

0xF0 — SYSEX start	0xXX — PC/MAC 1st upper socket
0x7E 0x46 0x4C 0x55 — header	CC number (BoB MIDI input)
0x00 — settings command	0xXX — PC/MAC 2nd upper socket
0xXX — Flux 1st lower sensor	CC number (BoB MIDI input)
CC number (BoB MIDI output)	0xXX — PC/MAC 3d upper socket
0xXX — Flux 2nd lower sensor	CC number (BoB MIDI input)
CC number (BoB MIDI output)	0xXX — PC/MAC tilt CC number
0xXX — Flux 3d lower sensor	(BoB MIDI input)
CC number (BoB MIDI output)	0xXX — PC/MAC CC channel
0xXX — Flux 1st upper sensor	(BoB MIDI input)
CC number (BoB MIDI output)	0xXX — Flux voice 1 MPE channel
0xXX — Flux 2nd upper sensor	(BoB MIDI output)
CC number (BoB MIDI output)	0xXX — Flux voice 2 MPE channel
0xXX — Flux 3d upper sensor	(BoB MIDI output)
CC number (BoB MIDI output)	0xXX — PC/MAC voice 1 channel
0xXX — Flux tilt CC number	(BoB MIDI input)
(BoB MIDI output)	0xXX — PC/MAC voice 2 channel
0xXX — Flux CC channel	(BoB MIDI input)
(BoB MIDI output)	0xXX — Velocity curve (range 0–5,
0xXX — PC/MAC 1st lower socket	affects velocity CV outs)
CC number (BoB MIDI input)	0xXX — Reserved
0xXX — PC/MAC 2nd lower socket	0xXX — Reserved
CC number (BoB MIDI input)	0xXX — Reserved
0xXX — PC/MAC 3d lower socket	0xF7 — End of SYSEX
CC number (BoB MIDI input)	

Example of default settings:

0xF0 0x7E 0x46 0x4C 0x55 0x00 0x14 0x15 0x16 0x17 0x18 0x19 0x1A 0x00 0x14 0x15
0x16 0x17 0x18 0x19 0x1A 0x00 0x01 0x02 0x00 0x01 0x00 0x00 0x00 0x00 0x00 0xF7.

USING BOB WITH PC/MAC AS A MIDI/CV CONVERTER

Connect the Breakout Box to PC/MAC with a USB-C cable. The OS should recognize it as a class compliant audio MIDI device. Status LED will show any MIDI activity. There are 2 MIDI output and 1 MIDI input ports; the first output MIDI port is reserved for CV interface and configuration via SYSEX, while the second output and the input are routed to the two DIN-5 MIDI sockets on the BoB. The CV interface can operate either in standard last note priority mode on two channels with MIDI velocity mapped to velocity output and pitchbend range ± 2 semitones; or in MPE mode with channel pressure mapped to velocity output and pitchbend ± 48 semitones. MPE mode can be turned on by pressing the button, the XYZ LED will light up in MPE mode.

CV interface:

PC/MAC first voice channel	1
PC/MAC second voice channel	2
PC/MAC CC channel	0

PC/MAC output CC:

1st lower socket	CC20
2nd lower socket	CC21
3d lower socket	CC22
1st upper socket	CC23
2nd upper socket	CC24
3d upper socket	CC25
Tilt	CC26
CC range 0–127 maps to –5 to 5 volts with zero volts at 64.	

Settings:

Using SYSEX messages, you can change the CC numbers and channels from default settings for BoB operation for FLUX and PC/MAC modes. The changes you make are stored to the internal BoB memory and valid in the next power cycles.

To set the MIDI channels and CC numbers, a SYSEX packet should be sent to the first MIDI output port.

Designed and engineered:
Maxim Manakov

TECHNICAL SPECIFICATIONS

Power	5 V USB Type-C (from FLUX or PC)
USB Current consumption	150 ma
Digital connection	USB Type-C
MIDI IN/ OUT	DIN5/DIN5 MPE support
Number of voices	mohophonic/duophonic
CV Pitch	1 V/Octave CV, outputs range: 0-8 V
Velocity outputs range	0-8 V
Number of Timbral & Tilt outputs	7
Timbral & Tilt outputs range	-5 to 5 V
Firmware update	USB Type-C via PC
Formfactor	standalone/Eurorack
Dimensions (standalone/Eurorack)	140x45x34 mm/ 6 HP, 34 mm deep
Weight (standalone/Eurorack)0.3 kg/0.08 kg