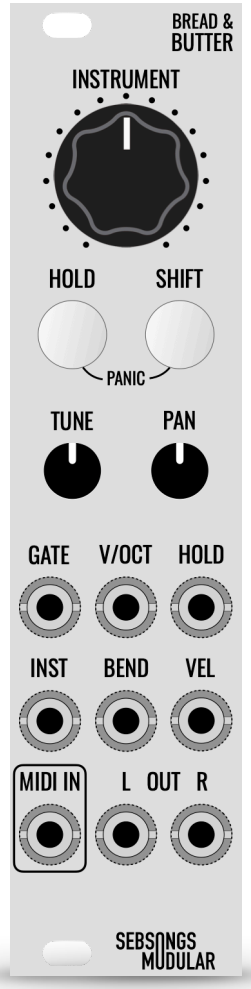
SEBSONGS MODULAR

BREAD & BUTTER | User Manual



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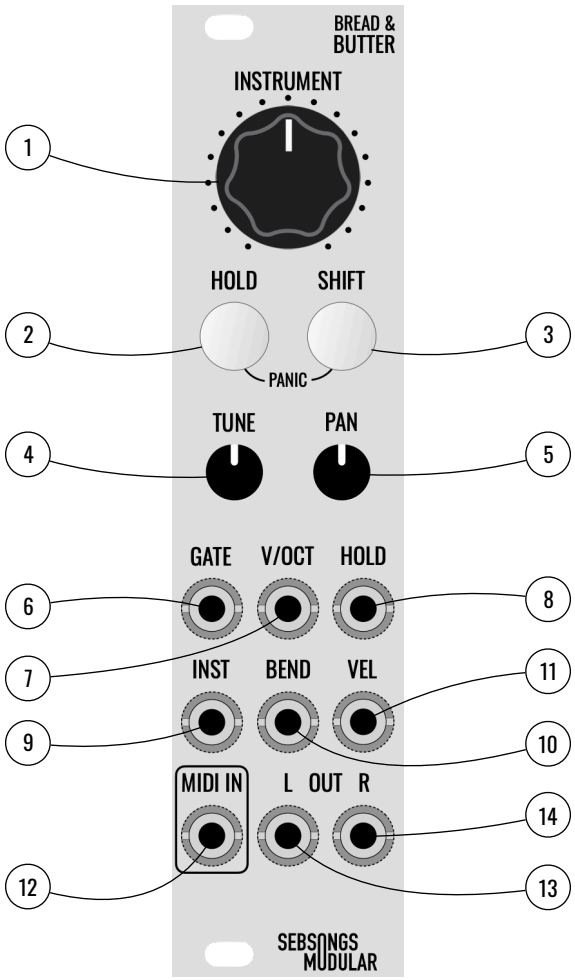
Overview



1. Instrument selection knob
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Description

Bread & Butter is a General MIDI based polyphonic synth voice with 128 selectable instruments plus a drums preset. The module is designed around the VLSI VS1053b chip. The sound banks have a synthetic and warm quality to them, and the variety of instruments makes this module a flexible and fun addition in any system.

Bread & Butter features the standard V/OCT and GATE inputs for triggering the synth voice. Thanks to a polyphony of up to 64, the voices will decay independently making it possible to ratchet chords that decay polyphonically. If the HOLD function is engaged, each note will also sustain.

In addition, the MIDI input can be used simultaneously with the V/OCT and GATE inputs. For example; trigger the drums on MIDI channel 10 while generating a bass line via the V/OCT/GATE inputs. The synth voices can also be played polyphonically via MIDI.

The module features stereo outputs and the PAN knob lets you spread the polyphonic voices out in the stereo sound field. Parameters such as pitch bend, velocity and instrument selection can be voltage controlled.

Features

Switches

HOLD: Momentary illuminated switch. Press this switch to turn on or off the hold function. If hold is active, each note that is triggered will sustain. If the instrument selected is a continuous instrument, for example and organ, the note will sustain indefinitely until the hold function is deactivated again. The green LED in the switch will light up when hold is active. Because the hold function can also be CV controlled, the LED will also light up if the HOLD CV input is active.

In addition, the green LED will flash quickly when turning the INSTRUMENT knob to indicate that a new preset has been chosen. This happens both when selecting instruments and banks. If HOLD is active and the green LED is constantly on, the instrument/bank indication will instead momentarily turn the green LED off and then on again (in other words, the LED behaviour is inverted).

SHIFT: Momentary illuminated switch. Press this switch to activate the shift functions of the three knobs, see descriptions of these functions in the ‘Potentiometers’ section. The built in yellow LED lights up when the switch is pressed. It will also indicate when a voice is triggered by the GATE input. If the switch is pressed, i.e. yellow LED is on, the GATE input will temporarily turn off the yellow LED to indicate that a voice is being triggered (in other words, the yellow LED behaviour is inverted).

PANIC: Pressing and holding the HOLD and SHIFT switch together for more than 1 second resets the VS1053 chip via a hardware pin, and then sends MIDI messages to configure the chip for use as if the module was power cycled. This can be useful for instance if there are stuck notes that wont go away just by cycling the HOLD switch.

Potentiometers

INSTRUMENT: Turn this knob to select between banks and instruments. Each bank contains 16 instruments and there are 8 banks plus a 9th bank for the drum set. To select an instrument, simply turn the knob. The points in the scale around the knob roughly indicate the position of the instruments. The green LED in the HOLD switch will flash when the next instrument has been selected.

To select a bank, press and hold the SHIFT knob and turn the knob. As there are only 9 banks, every other point on the scale around the knob roughly indicates the position of the banks. Again, the green LED in the HOLD switch will flash when the next bank has been selected.

For a complete list of the available instruments, see appendix A.

TUNE: This knob sets the global tuning of the whole module. When set at the 12 o'clock position the tuning is standard, i.e. 0 Volts is equivalent to a C note in the A=440 Hz standard. Turning the knob clock-wards increases the global tuning in semitone resolution up to +6 semitones. Turning the knob counter clock-wards decreases the global tuning in semitone resolution down to -6 semitones.

To change the global tuning in full octaves, press and hold the SHIFT switch while adjusting the TUNE knob. The range is 5 octaves with the default octave setting at at the 12 o'clock position. Turning the knob clock-wards increases the global tuning in octave resolution up to +2 octaves. Turning the knob counter clock-wards decreases the global tuning in octave resolution down to -2 octaves.

PAN: This knob sets the amount of pan spread in the stereo sound field for each voice that is being triggered. When set at the 12 o'clock position, there is no pan spread at all, i.e. all voices is equally loud in the left and right channel. Turning the knob clock-wards makes the voices spread randomly left and right, and the closer the knob is to fully clockwise, the wider the pan spread will be. Turning the knob counter clock-wards spreads each voice left and right every other time a voice is triggered. Again, the closer the knob is to fully counter clockwise, the wider the pan spread will be.

The pan spread function is achieved by incrementing the MIDI channel each time the module receives a GATE input, making it possible to set an individual pan setting for each new voice. If the module has been triggered via GATE/CV and then are to be triggered via MIDI, the panning could be randomly set on each channel. Therefore, pressing and holding the SHIFT switch while turning the PAN knob sets the panning manually for all MIDI channels at the same time. In this way, the panning can easily be reset for use with MIDI.

Note that the drums (MIDI channel 10) are not affected by pan spread. Also note that the pan spread function only works when the module is triggered via the GATE input and not via the MIDI input.

Inputs

GATE: Gate input for triggering the synth voice. The synth voices triggers on the rising edge. Any signal from +3.3V to +12V can be used. The input is protected from negative voltages.

V/OCT: Control voltage input for controlling the frequency of the notes being triggered. The input is quantised to semi tones in the one volt per octave standard, i.e. an increase of the voltage by 1/12 Volts will increase the note by one semitone. The input ranges from 0 to +5 Volts.

HOLD: Gate input for controlling the HOLD function of the module. When the signal is high, HOLD will be ON and vice versa. If HOLD is already engaged via the switch and the gate input signal becomes high, HOLD will stay ON, and then turn OFF if the gate signal goes low. Any signal from 0V to +12V can be used. The input is protected from negative voltages.

INST: Control voltage input for selecting instruments. This input is unipolar and the full 128 instruments plus drums are selectable with a voltage range of 0-5V. The input is protected from negative voltages.

BEND: Control voltage input for continuously and simultaneously modulating the pitch of all of the synth voices. This input is bipolar and has a voltage range of +/- 5V. The range of the pitch bend is +/- 2 semitones. The input is protected from negative voltages.

VEL: Control voltage input for continuously modulating the velocity of the voices being triggered. This input is unipolar and the full MIDI velocity range is mapped to a voltage range of 0-5V. The input jack is normalled to a voltage equivalent to a MIDI velocity value of around 100 (of the maximum 127). The velocity mainly affects the volume of the sound, but some voices also have other expressivity, for example some of the electric pianos sounds brighter with high velocity and duller with low velocity. The input is protected from negative voltages.

MIDI: TRS MIDI input normally configured as type A*. This MIDI input conforms to the MIDI standard and all normal MIDI commands can be used to play the GM synth voices as expected. The MIDI input can be used at the same time as the GATE and V/OCT inputs on the module, for instance triggering drums via MIDI channel 10 and sequencing a melody from a CV sequencer. For a complete list of the available MIDI commands, see appendix A.

* When assembling the module it is possible to flip the jack 180 degrees and achieve MIDI TRS type B.

Outputs

L: Audio output for the left channel. Maximum output is around +/- 5V.

R: Audio output for the right channel. Maximum output is around +/- 5V.

Specifications

- Size: 6 HP
- Depth: 40 mm
- Current draw: +51 mA / -12 mA
- CV input range: +/- 5V
- Gate input voltage: 3,3-10V
- Polyphony: Up to 64 voices (40 voices with sustain)

Appendix A

List of banks and instruments [1]

Bank 1
1 Acoustic Grand Piano
2 Bright Acoustic Piano
3 Electric Grand Piano
4 Honky-tonk Piano
5 Electric Piano 1
6 Electric Piano 2
7 Harpsichord
8 Clavi
9 Celesta
10 Glockenspiel
11 Music Box
12 Vibraphone
13 Marimba
14 Xylophone
15 Tubular Bells
16 Dulcimer

Bank 2
17 Drawbar Organ
18 Percussive Organ
19 Rock Organ
20 Church Organ
21 Reed Organ
22 Accordion
23 Harmonica
24 Tango Accordion
25 Acoustic Guitar (nylon)
26 Acoustic Guitar (steel)
27 Electric Guitar (jazz)
28 Electric Guitar (clean)
29 Electric Guitar (muted)
30 Overdriven Guitar
31 Distortion Guitar
32 Guitar Harmonics

Bank 3
33 Acoustic Bass
34 Electric Bass (finger)
35 Electric Bass (pick)
36 Fretless Bass
37 Slap Bass 1
38 Slap Bass 2
39 Synth Bass 1
40 Synth Bass 2
41 Violin
42 Viola
43 Cello
44 Contrabass
45 Tremolo Strings
46 Pizzicato Strings
47 Orchestral Harp
48 Timpani

Bank 4
49 String Ensembles 1
50 String Ensembles 2
51 Synth Strings 1
52 Synth Strings 2
53 Choir Aahs
54 Voice Oohs
55 Synth Voice
56 Orchestra Hit
57 Trumpet
58 Trombone
59 Tuba
60 Muted Trumpet
61 French Horn
62 Brass Section
63 Synth Brass 1
64 Synth Brass 2

Bank 5
65 Soprano Sax
66 Alto Sax
67 Tenor Sax
68 Baritone Sax
69 Oboe
70 English Horn
71 Bassoon
72 Clarinet
73 Piccolo
74 Flute
75 Recorder
76 Pan Flute
77 Blown Bottle
78 Shakuhachi
79 Whistle
80 Ocarina

Bank 6
81 Square Lead (Lead 1)
82 Saw Lead (Lead)
83 Calliope Lead (Lead 3)
84 Chiff Lead (Lead 4)
85 Charang Lead (Lead 5)
86 Voice Lead (Lead 6)
87 Fifths Lead (Lead 7)
88 Bass + Lead (Lead 8)
89 New Age (Pad 1)
90 Warm Pad (Pad 2)
91 Polysynth (Pad 3)
92 Choir (Pad 4)
93 Bowed (Pad 5)
94 Metallic (Pad 6)
95 Halo (Pad 7)
96 Sweep (Pad 8)

Bank 7
97 Rain (FX 1)
98 Sound Track (FX 2)
99 Crystal (FX 3)
100 Atmosphere (FX 4)
101 Brightness (FX 5)
102 Goblins (FX 6)
103 Echoes (FX 7)
104 Sci-fi (FX 8)
105 Sitar
106 Banjo
107 Shamisen
108 Koto
109 Kalimba
110 Bag Pipe
111 Fiddle
112 Shanai

Bank 8
113 Tinkle Bell
114 Agogo
115 Pitched Percussion
116 Woodblock
117 Taiko Drum
118 Melodic Tom
119 Synth Drum
120 Reverse Cymbal
121 Guitar Fret Noise
122 Breath Noise
123 Seashore
124 Bird Tweet
125 Telephone Ring
126 Helicopter
127 Applause
128 Gunshot

Bank 9
Drums

[1] Information about instruments and supported MIDI messages are cited from the following source: https://www.vlsi.fi/fileadmin/datasheets/vs1053.pdf

Supported MIDI messages [2]

- device control: 0x01 : master volume
- channel message: 0x80 note off, 0x90 note on, 0xc0 program, 0xe0 pitch wheel
- channel message 0xb0: parameter
- 0x00: bank select (0 is default, 0x78 and 0x7f is drums, 0x79 melodic)
- 0x06: RPN MSB: 0 = bend range, 2 = coarse tune
- 0x07: channel volume
- 0x0a: pan control
- 0x0b: expression (changes volume)
- 0x0c: effect control 1 (sets global reverb decay)
- 0x26: RPN LSB: 0 = bend range
- 0x40: hold1
- 0x42: sustenuto
- 0x5b effects level (channel reverb level)
- 0x62,0x63,0x64,0x65: NRPN and RPN selects
- 0x78: all sound off
- 0x79: reset all controllers
- 0x7b, 0x7c, 0x7d: all notes off

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