BD-606 Bass Drum Module

Rev. 3 Drachma mfg.

Description

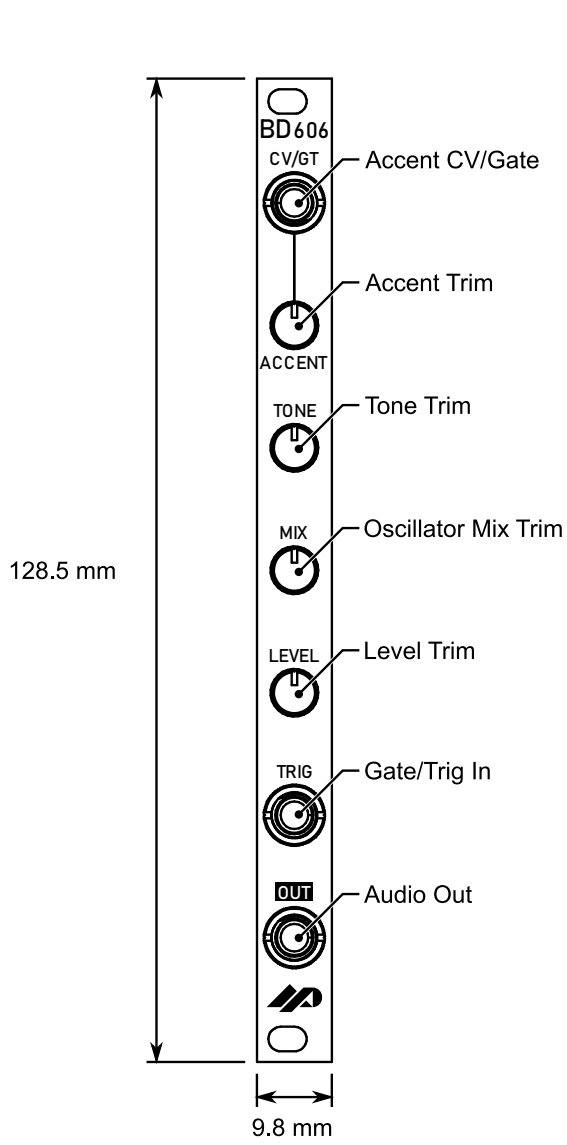
The BD-606 is a clone of the TR-606 bass drum, modified to fit the Eurorack size format and voltage requirements. It supports additional functionality not available in the original TR-606 drum machine, including features that make it more suited to the modular synthesizer format.

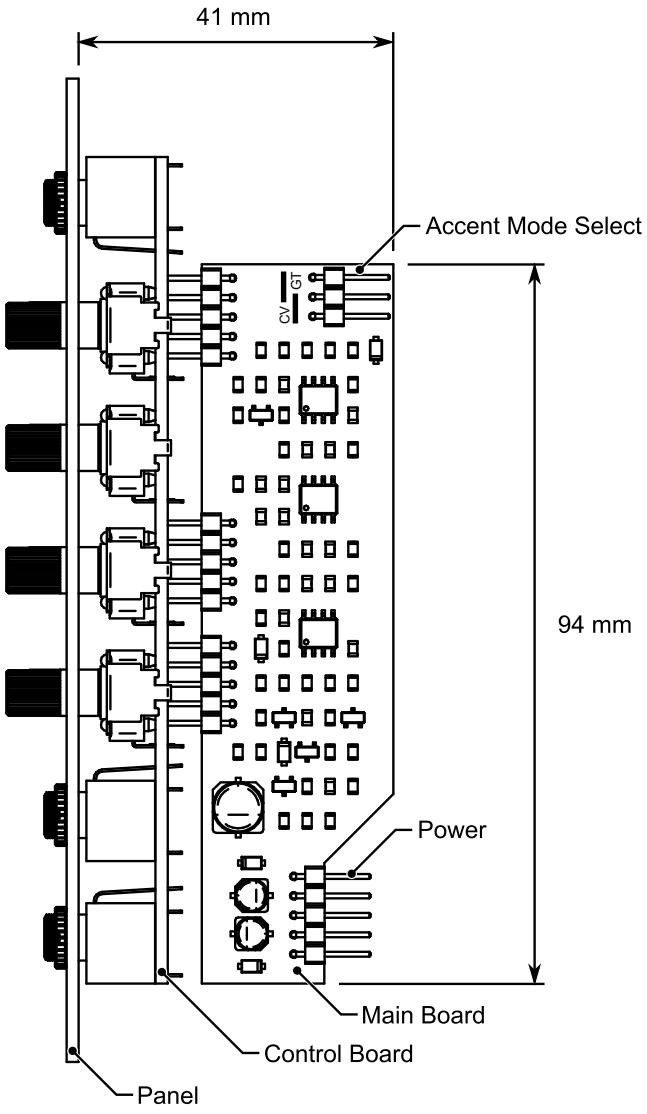
The BD-606 module fits in a compact 2hp form factor to minimize used rack space and has a max depth of 41 mm with recessed power header to fit almost any rack size. All inputs are robust with overvoltage and reverse-voltage protected.

Features

- Compact 2hp form factor
- Internal gate to timed trigger conversion
- Dual selectable Accent (AC) input modes
    - AC Control Voltage (CV) mode
    - AC Gate (GT) mode
- Accent trim
- Drum Tone trim
- Oscillator Mix trim
- Output Level trim
- Input overvoltage- and reverse-polarity protection
- Power input reverse-polarity protection

Module Layout





Functionality

Gate/Trig

The Gate/Trig input takes gate inputs longer than 1ms in duration and converts them into 1ms timed pulses. This avoids any need for an external gate to trigger converter and prevents double-triggering on the falling edge of longer gate inputs. Note that input pulses shorter than 1ms are not altered. Gate/Trig inputs can be any voltage between 5V and 12V.

Tone

The Tone trim sets the pitch of the drum sound. This has a wide range of settings, from a deep bass sound to a higher pitched 'tom' sound.

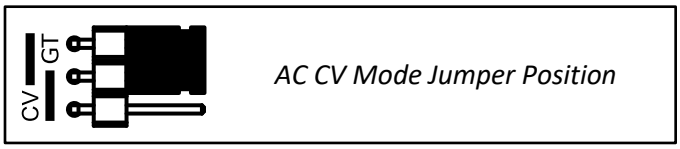
Oscillator Mix

The characteristic TR-606 bass drum sound is created by mixing two damped oscillators: the deeper 'bass' oscillator and the higher pitched 'click' oscillator. The Oscillator Mix trim allows the mixture of these oscillators to be altered. A lower setting will have more bass and less click, and vice-versa for a higher setting.

Accent

The Accent effect adds a dynamic feel to a drum sequence by modifying the strength of the drum hit (i.e. volume). The Accent effect can be set by the Accent trim alone (with no physical inputs to the AC CV/GT jack), or with external voltages. The BD-606 has two accent modes for external voltages, selectable with a jumper and 3-pin mode-select header: AC CV Mode and AC GT Mode.

AC CV Mode

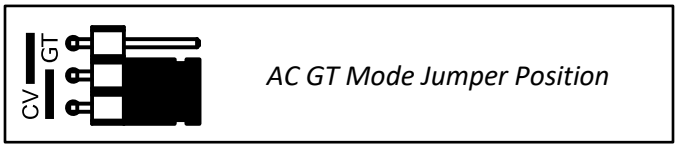


AC CV Mode Jumper Position

AC CV Mode allows the Accent setting to be modified by an external analog CV input. This input can range from 0V to 6V, with 0V being a 'light' drum hit and 6V being a 'hard' hit. CV input voltages larger than 6V will not damage the module, however they will also not further increase the accent setting.

In AC CV mode the Accent trim acts as an offset for the CV input. The Accent trim setting will always be active and applied to every beat, regardless of the presence of a CV voltage.

AC GT Mode



AC GT Mode Jumper Position

AC GT mode allows the Accent effect to be gated (On/Off) rather than continuously variable, similar to the functionality of the original TR-606. To gate the Accent effect (i.e., turn it On), any voltage input between 5V and 12V (High) can be used. A voltage input less than 2V (Low) will turn the Accent effect Off.

Though the AC GT input should be treated like any other digital gate input, note that it is internally pulled up to +5V. Floating input signals will be treated as a High input, allowing for the use of the Accent trim with no physical inputs to the AC CV/GT jack. In order to leave beats un-accented in AC GT Mode, the AC GT input must be pulled down to GND.

Bill of Materials

Value	Qty.	Name on Board	Description	Footprint
1kΩ	3	R25, R30, R37	1kΩ 1% 0.125W Resistor	0805
10kΩ	9	R6, R8, R9, R11, R18, R21, R23, R24, R31	10kΩ 1% 0.125W Resistor	0805
12kΩ	1	R33	12kΩ 1% 0.125W Resistor	0805
18kΩ	1	R34	18kΩ 1% 0.125W Resistor	0805
20kΩ	1	R3	20kΩ 1% 0.125W Resistor	0805
22kΩ	3	R22, R27, R35	22kΩ 1% 0.125W Resistor	0805
47kΩ	5	R5, R17, R19, R20, R26	47kΩ 1% 0.125W Resistor	0805
68kΩ	2	R1, R36	68kΩ 1% 0.125W Resistor	0805
100kΩ	9	R2, R4, R7, R10, R12, R13, R14, R15, R16	100kΩ 1% 0.125W Resistor	0805
560kΩ	1	R32	560kΩ 1% 0.125W Resistor	0805
680kΩ	1	R29	680kΩ 1% 0.125W Resistor	0805
150pF	1	C12	150pF 50V MLCC	0805
10nF	1	C9	10nF 50V MLCC	0805
15nF	2	C6, C7	15nF 50V MLCC	0805
56nF	2	C4, C5	56nF 50V MLCC	0805
100nF	6	C1, C15, C16, C17, C18, C19	100nF 50V MLCC	0805
470nF	1	C2	470nF 50V MLCC	0805
1uF	3	C8, C10, C11	1uF 50V MLCC	0805
10uF	2	C13, C14	10uF 25V Elec. Capacitor	4x5.7mm SMD
47uF	1	C3	47uF 25V Elec. Capacitor	6.3x5.8mm SMD
BC846 NPN	4	Q1, Q2, Q3, Q4	BC846 NPN Transistor	SOT-23-3
BC856 PNP	1	Q5	BC856 PNP Transistor	SOT-23-3
1N4148 Diode	2	D1, D3	1N4148 Gen. Purp. Diode	SOD-123
Schottky Diode	3	D2, D4, D5	Schottky Diode 40V	SOD-123
TL072	3	U1, U2, U3	TL072 Dual Op Amp	SOIC-8 150mil
B10k Pot Lin	3	RV1, RV2, RV3	10k Lin. Potentiometer	Alpha 9mm vertical
A50k Pot Log	1	RV4	50k Log. Potentiometer	Alpha 9mm vertical
3.5mm Jack	3	J1, J2, J3	3.5mm Mono Jack	PJ-3001F
5-Pin Header	4	J4, J6/9, J7/10, J8/11	2.54mm Header 5x1	2.54mm 5-pin right angle
3-Pin Header	1	J5	2.54mm Header 3x1	2.54mm 3-pin right angle
2-Position Jumper	1	N/A (For use on J5)	2.54mm 2-Pos. Jumper	N/A