

GOD CITY INSTRUMENTS – Baracus V1.6 Build guide

The God City Instruments (GCI) Baracus is a medium-gain silicon/germanium hybrid fuzz loosely based on an NPN interpretation of the Baldwin Burns Buzzaround circuit. The first two transistors have been replaced with common silicon bipolar junction transistors, however, Q3, the transistor most responsible for the characteristic Buzzaround tone remains a germanium.

Transistor selection and biasing has a huge influence on the tone of this pedal. Depending on transistor choice and bias, this circuit can produce anything from a loud clean boost, to squishy, zipper, gated fuzz, to heavy, thick saturation. Adjustments to resistor values may be required for proper bias of Q1 and Q2. While not necessary, a VC bias pad and extra ground pad are provided in case external bias points or a meter is desired.

Baracus V1.5 had an external bias control for Q3 which has been deemed unnecessary, hence the update to V1.6.

This pedal is an easy build, but this guide is intended for people who have some experience building pedals. Component sourcing, component identification, assembly techniques, wiring stomp switches, etc. is not covered. The GCI Brutalist Jr. assembly guide has helpful information for less experienced builders. That guide can be found here:

<http://www.kurtballou.com/brutalistjr/>

Available separately is the GCI 3PDT utility PCB for PCB pin 3PDT footswitches. This PCB makes footswitch wiring quick and easy. Not compatible with solder lug style switches.

Don't forget to connect the ground pad of the PCB to the ground lug of the input, output, and DC power jacks!

Due to the scope of this project, technical support is not available. However, consider joining the GCI DIY PCB Builders group on Facebook to get advice from and share your work with other builders. We require that all group members agree to the rules before being accepted into the group.

<https://www.facebook.com/groups/2454786551255317/>

Component values for the PCB as well as some alternate values are listed below. This is a BOM for the PCB only. Resistors and diodes are 6.3mm leg spacing, film and ceramic capacitors are 5.08mm leg spacing, and electrolytic capacitors are 2.54mm leg spacing. I/O jacks, DC jack, switch, enclosure, and knobs are not listed. The schematic and a drill template for a 125B (1590N1) sized enclosure are also attached.

Part	Value	Description	Substite	Substitution Notes
C1	47n	film cap	10n - 0.1u	Input cap
C2	470p	ceramic cap	100p-2.2n	Input LPF
C3	4.7u	electolytic cap	2.2u-47u	Bypass cap for Si transistor stage. Bigger for more gain
C4	1u	film cap		
C5	0.1u	1000pF - 0.47uF		
C6	1u	film cap		
C7	47u	electolytic cap	22u-220u	Power filter cap
D1	1n5817	Schottky diode	1n4001, BAT41, 1n5818, etc	Any suitable polarity protection diode for 9v
D2	1n34a	Germanium diode	1n270, 1n949	
LED	L1	3mm LED		
R1	1M	1/4 watt resistor	2.2M	Pull down resistor
R2	470k	1/4 watt resistor		
R3	100k	1/4 watt resistor		
R4	10k	1/4 watt resistor		
R5	3.3k	1/4 watt resistor		
R6	100R	1/4 watt resistor	0R-1k	Affects gain of Si transistor stage
R7	10k	1/4 watt resistor		
R8	10k	1/4 watt resistor		
R9	10k	1/4 watt resistor		
R10	10k	1/4 watt resistor		
CLR	4.7k	1/4 watt resistor	1k-10k	Current limiting resistor for LED
Q1	BC108	NPN Si Transistor	2n3904, 2n2222a, BC550, etc	Any medium to high gain BJT should sound good. Double check pinouts.
Q2	BC108	NPN Si Transistor	2n3904, 2n2222a, BC550, etc	Any medium to high gain BJT should sound good. Double check pinouts.
Q3	2n1306	NPN Ge Transistor	MP38A, AC176, 2n1289, etc	
VOL	A100K	16mm potentiometer		
FUZZ	A100K	16mm potentiometer		
S	PAD	Send to PCB		
L+	PAD	LED+		
L-	PAD	LED-		
R	PAD	Return from PCB		
V	PAD	9v in		
G	PAD	Ground		
VC	PAD	Q3 bias point	bias probe	Check bias voltage here. Wire to external probes or meters if you're interested.
G1	PAD	Ground	bias probe	Check bias voltage here. Wire to external probes or meters if you're interested.

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BARACUS V1.6
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Schematic diagram of the Baracus V1.6 circuit. The circuit includes a signal input S, a +9V power supply, and various components: resistors R1 (1M), R2 (470k), R3 (100k), R4 (10k), R5 (3.3k), R6 (100R), R7 (10k), R8 (10k), R9 (10k), R10 (10k); capacitors C1 (47n), C2 (470p), C3 (4.7u), C4 (1u), C5 (0.1u), C6 (1u), C7 (47u); transistors Q1 (BC108), Q2 (BC108), Q3 (2N1306); diodes D1 (5817), D2 (1N34a); an LED; and a variable resistor FUZZ (A100K). The circuit has several output points: G1, L-, G, V, L+, VC, and R. The signal path starts at S, goes through R1 and C2, then through a network of resistors and capacitors involving Q1, Q2, and Q3, and finally through a variable resistor FUZZ and C5 to the VC output. A +9V supply is connected to various parts of the circuit, including a network of resistors and capacitors leading to the LED and D1, and another network leading to the R output through Q3 and a variable resistor VOL.

