

GOD CITY INSTRUMENTS – Bass Brutalist V1.2 Build guide

The God City Instruments (GCI) Bass Brutalist is an overdrive pedal derived from the Brutalist Jr. circuit but with component values and circuit topology tailored specifically for bass instruments. The circuit consists of two op amp gain stages and a tilt EQ inspired by the DOD FX10.

The first gain stage is non inverting and resembles a fixed-gain Rat in that there are two RC pairs shunted to ground in the negative feedback path. Each of these RC pairs form high pass filters which also influence gain. Larger caps allow more bass into the circuit. Larger resistors also allow more bass into the circuit, but reduce gain. A popular mod here is to reduce the resistor value, creating a thinner, but tighter sound with more distortion. Try replacing these resistors with pots. While the op amp in this stage is not crucial, it's a dual op amp who's other side is used for the EQ control. For adequate EQ headroom, it's advised to use hifi, rail-to-rail op amp. A TL072 will work in a pinch, but an OPA2134 will likely sound better.

The second gain stage is inverting with asymmetrical soft clipping provided by a pair of mismatched LED's. Try different clipping diodes for different sounds. The op amp chosen is an OP07 for its association with the Pro Co Rat. It's slow-ish slew rate seems well suited for producing focused mids in a bass guitar. Try a TL071 if a more hifi sound is desired.

The EQ stage a highly balanced active tone stack which can provide a large bass or treble boost. Making changes here can quickly knock the stack out of balance. To brighten the pedal, build using the stock FX10 values; R8 = 10k, R12 = 22k, R13 = 3.3k, C6 = 120p, C9 = 0.1u, C14 = 10u. For a more extreme bass boost, build using these values; R8 = 68k, R12 = 100k, R13 = 1k, C6 = 4.7n, C9 22n, C14 = 47u. Thanks to John Snyder of Electrical Audio Experiments for help simulating these frequency responses.

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	Substitute	Substitution Notes
C1	3.3n	Film cap	1n - 4.7n	Input LPF
C2	47n	Film cap	10n-100n	Input cap
C3	100u	Electrolytic cap	47u-220u	Power filtering
C4	22n	Film cap	10n-47n	First gain stage HPF 1
C5	0.1u	Film cap	47n-220n	First gain stage HPF 2
C6	220p	MLCC	100p-470p	First gain stage LPF
C7	1uF	Film cap		
C8	100p	MLCC	see build guide	LPF EQ stage. 2.2n makes for 1kHz peak
C9	68n	Film cap		
C10	330p	MLCC	100p-680p	Second gain stage LPF
C11	0.1u	Film cap		
C12	0.1u	MLCC		
C13	100u	Electrolytic cap	47u-220u	Power filtering
C14	22u	Electrolytic cap	see build guide	Tone cap - dark
C15	22n	Film cap		Tone cap - bright
IC1	OPA2134	Dual op amp	NE5532, TLE2072, AD712	Pin compatible dual op amp
IC2	OP07	Single op amp	LM308, LM741, TL071	Pin compatible single op amp
D1	3mm LED	Red LED	Yellow, green, MOSFET, diode	Clipping diode
D2	3mm LED	Yellow LED	Red, green, MOSFET, diode	Clipping diode
D3	1n5818	Schottky diode	1n4001, bat41	Any protection diode suitable for 9v
LED	3mm LED	LEDs, all sizes		
CLR	4.7k	1/4 watt resistor		
R1	2.2M	1/4 watt resistor		
R2	10k	1/4 watt resistor		
R3	2.2M	1/4 watt resistor		
R4	10k	1/4 watt resistor	1k-22k	Affects first stage HPF 2 and gain
R5	33k	1/4 watt resistor	22k-68k	Affects first stage HPF 1 and gain
R6	120k	1/4 watt resistor	82k-220k	Affects first gain stage. More is more
R7	2.7k	1/4 watt resistor	1.5k-4.7k	Affects gain of second stage. Less is more
R8	47k	1/4 watt resistor	see build guide	Affects gain of output stage
R9	120k	1/4 watt resistor		Affects gain of output stage
R10	10k	1/4 watt resistor		
R11	10k	1/4 watt resistor		
R12	68k	1/4 watt resistor		
R13	2.2k	1/4 watt resistor	see build guide	
R14	3.3k	1/4 watt resistor		
R15	2.7k	1/4 watt resistor	1k-10k	Sets minimum for gain pot
R16	1K	1/4 watt resistor		
DIST	A100K	16mm potentiometer	A50k, A250k	Affects gain of second stage
TONE	B100k	16mm potentiometer		
LEVEL	A100K	16mm potentiometer	A50k	Output volume
S	PAD	Send to PCB		
L+	PAD	LED+		
L-	PAD	LED-		
R	PAD	Return from PCB		
V	PAD	9v input		
G	PAD	Ground		

