GOD CITY INSTRUMENTS – Gorilla Glasses V1.0 Build guide

The God City Instruments (GCI) Gorilla Glasses is a DIY friendly version of the GCI Ape Eye pedal which uses a common DIP-08 single op amp running at +/- 9VDC instead of Ape Eye's discrete op amp running at +/- 15VDC. The sound is full, dynamic, and expressive, holding its own against many beloved boutique overdrives. Experienced builders will recognize the topology as a Fetzer Valve style Jfet boost in front of a Distortion+ / DOD250 style distortion circuit. This PCB has been designed to be an easy build with minimum components, yet still offer the builder enough flexibility to tailor the tone to their own tastes.

Regarding the TC7660H, this is a charge pump which inverts +9VDC to -9VDC, allowing for +/-9V (18V total) operation. This can be substituted for TC7660SCPA, but some capacitor value changes are required. Check data sheets prior to making this substitution.

Regarding C9; If an older single op amp is used, it may require an external compensation cap. In that case, populate C9. This is not required for most current op amps.

If a clipping diode switch is desired, omit D1, D2 and D3 and run wires from the D3 position to a switch for off-board clipping diode options.

To bias the Jfet, set a DMM to detect DC voltage in the appropriate range, connect the black probe to ground (typically dropping it in one of the enclosures threaded holes is adequate) and the red probe to the VD pad. Apply power to the pedal. Adjust trim pot until DC voltage reads 4.5v. You can further adjust by ear while playing.

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.

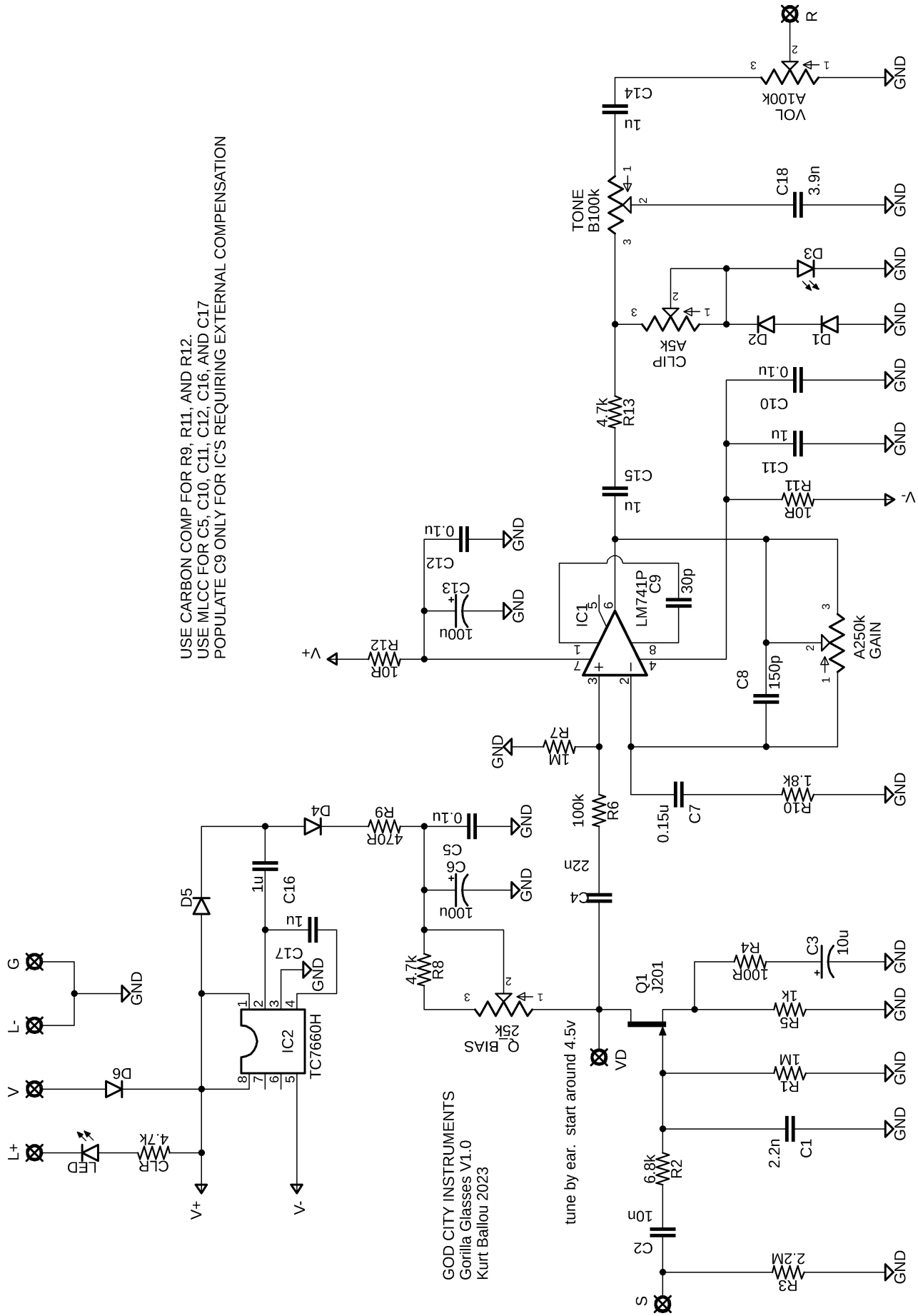
Don't forget to connect the ground pad of the PCB to the ground lug of the input, output, and DC power jacks!

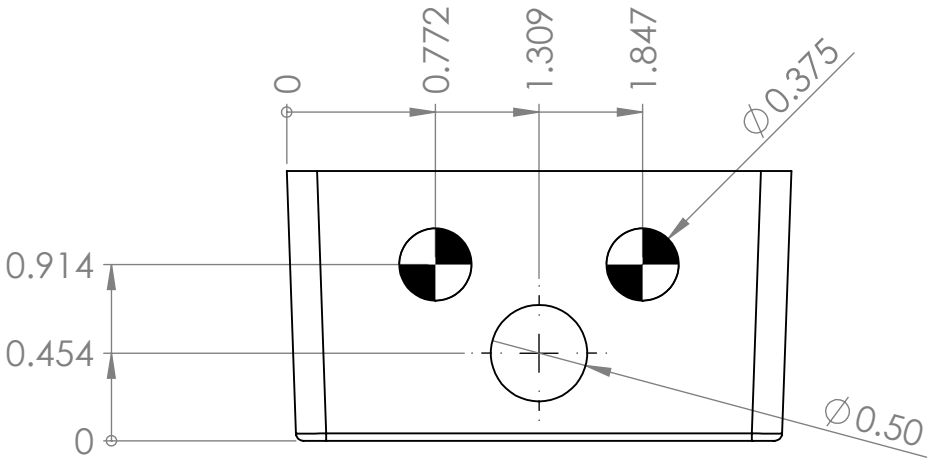
Due to the scope of this project, technical support is not available. However, consider joining the GCI DIY PCB Builders group on Facebook to get advice from and share your work with other builders. We require that all group members agree to the rules before being accepted into the group.
https://www.facebook.com/groups/2454786551255317/

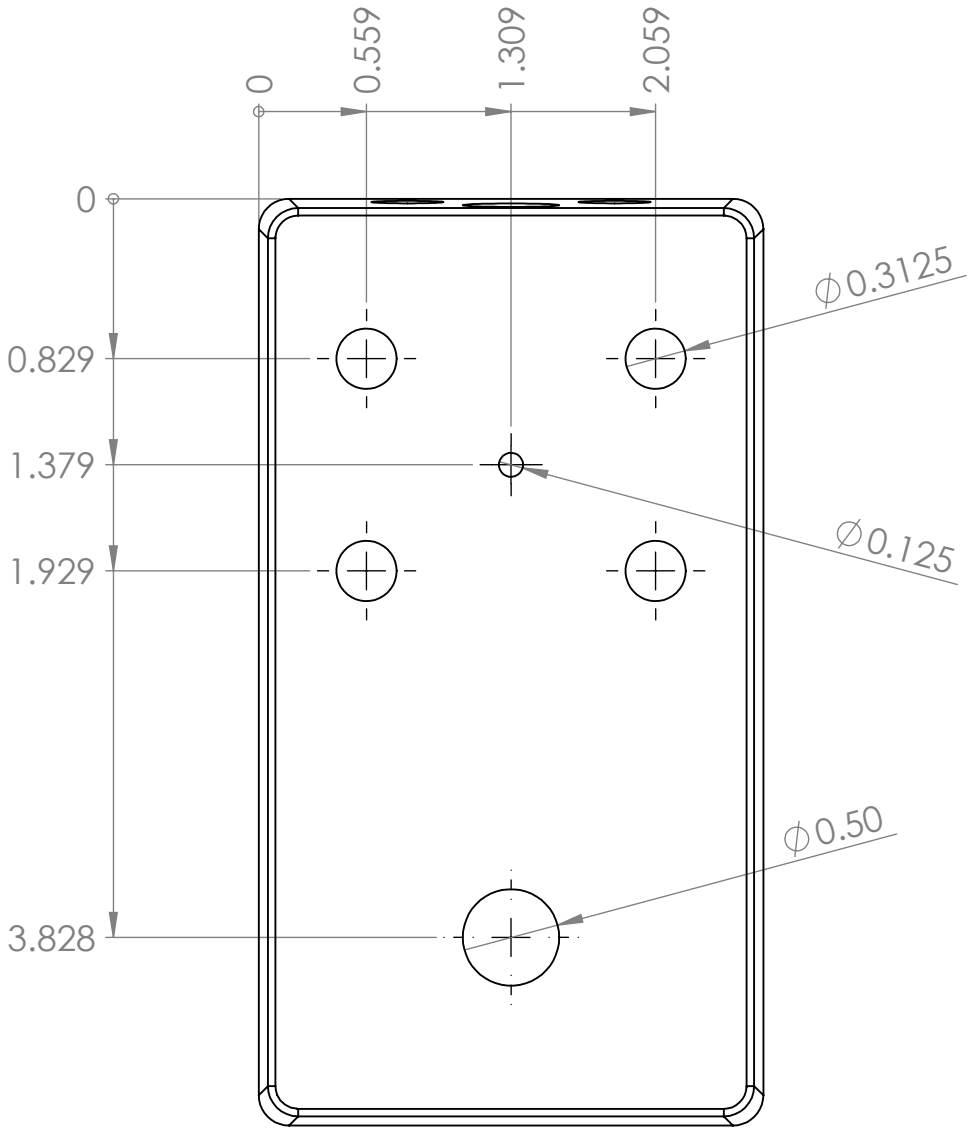
Component values for the PCB as well as some alternate values are listed below. This is a BOM for the PCB only. Resistors and diodes are 6.3mm leg spacing, film and ceramic capacitors are 5.08mm leg spacing, and electrolytic capacitors are 2.54mm leg spacing. I/O jacks, DC jack, switch, enclosure, and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

Part	Value	Description	Substitute	Notes
C1	2.2n	film capacitor		
C2	10n	electrolytic capacitor	4.7n-22n	Input high pass
C3	10u	film capacitor	4.7u-22u	Affects Jfet gain
C4	22n	film capacitor	10n-0.1u	Interstage HPF
C5	0.1u	MLCC		
C6	100u	electrolytic capacitor		
C7	0.15u	film capacitor	0.1u-0.22 u	Affects tightness of bottom end. Bigger is looser.
C8	150p	MLCC	100p-470p, Polystyrene	Drive circuit low pass filter. Bigger is warmer.
C9	30p	MLCC	33p, none	Required for externally compensated op amps
C10	0.1u	MLCC		
C11	1u	MLCC		
C12	0.1u	MLCC		
C13	100u	electrolytic capacitor	47u-220u	Power filtering
C14	1u	film capacitor	0.47u-4.7u	Coupling cap
C15	1u	film capacitor	0.47u-4.7u	Coupling cap
C16	1u	MLCC		
C17	1u	MLCC		
C18	3.9n	film capacitor	2.7n-4.7n	Affects range of tone control
CLR	4.7k	1/4 watt resistor	1k-10k	Affects LED brightness
R1	1M	1/4 watt resistor		
R2	6.8k	1/4 watt resistor		
R3	2.2M	1/4 watt resistor		
R4	100R	1/4 watt resistor		
R5	1k	1/4 watt resistor		
R6	100k	1/4 watt resistor		
R7	1M	1/4 watt resistor		
R8	4.7k	1/4 watt resistor		
R9	470R	1/4 watt carbon resistor	Metal	Carbon is more resilient to power supply issues
R10	1.8k	1/4 watt resistor	1k-2.7k	Smaller increases gain and tightness.
R11	10R	1/4 watt carbon resistor	Metal	Carbon is more resilient to power supply issues
R12	10R	1/4 watt carbon resistor	Metal	Carbon is more resilient to power supply issues
R13	4.7k	1/4 watt resistor		
D1	1n5818	Schottky Diode		
D2	1n5818	Schottky Diode		
D3	RED	3mm LED	Yellow, Green	Affects clipping symmetry
D4	1n5818	Schottky Diode		
D5	1n5818	Schottky Diode		
D6	1N5818	Schottky Diode		
LED	L1	3mm LED		
IC1	LM741	Op Amp	TL071, NE5534, LF356	Pin compatible single op amp capable of 18v supply

IC2	TC7660H	Charge Pump	TC7660SPCA	Adjust power supply caps accordingly
Q1	J201	Jfet	J113, MPF5102, 2n5857	Pin compatible Jfet
Q_BIAS	25k	Trim Pot	20k-100k	Affects bias range
VOL	A100k	16mm Pot	A50k	
GAIN	A250k	16mm Pot		
CLIP	A5k	16mm Pot		
TONE	B100k	16mm Pot	B25k, B50k	Affects range of tone control
S	PAD	Send to PCB		
L+	PAD	LED+		
L-	PAD	LED-		
R	PAD	Return from PCB		
V	PAD	9V input		
VD	PAD	Jfet bias test		
G	PAD	Ground		


USE CARBON COMP FOR R9, R11, AND R12.
USE MLCC FOR C5, C10, C11, C12, C16, AND C17
POPULATE C9 ONLY FOR IC'S REQUIRING EXTERNAL COMPENSATION
GOD CITY INSTRUMENTS
Gorilla Glasses V1.0
Kurt Ballou 2023
tune by ear. start around 4.5v
G
L-
V
L+
V+
V-
S
R
VD
GND
LED
CLR
4.7k
D6
D5
D4
D3
D2
D1
IC2
TC7660H
1u
C16
C17
R9
470R
0.1u
C5
C6
100u
R8
4.7k
Q_BIAS
25k
C4
22n
100k
R6
1M
R7
IC1
LM741P
C9
30p
C12
C13
R12
10R
C8
150p
A250k
GAIN
0.15u
C7
1.8k
R10
C14
1u
VOL
A100k
TONE
B100k
C18
3.9n
CLIP
A5k
4.7k
R13
C15
C10
C11
R11
Q1
J201
100R
R4
C3
10u
1k
R5
1M
R1
2.2n
C1
6.8k
R2
10n
C2
2.2M
R3


0
0.772
1.309
1.847
∅0.375
0.914
0.454
0
∅0.50


0
0.559
1.309
2.059
0
∅0.3125
0.829
1.379
∅0.125
1.929
∅0.50
3.828