

KINGMAKER

FX TYPE: Flanger

Based on the Pearl® FG-01™

Enclosure Size: 1590BB

"Softie" compatibility: none

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Overview

The Pearl FG-01 was a lesser known contemporary of some of the 1980's compact flanger pedals like the Boss BF-2 or DOD FX-75. Design-wise it is familiar and you will find similar circuit blocks used in the BF-2 and the MXR.

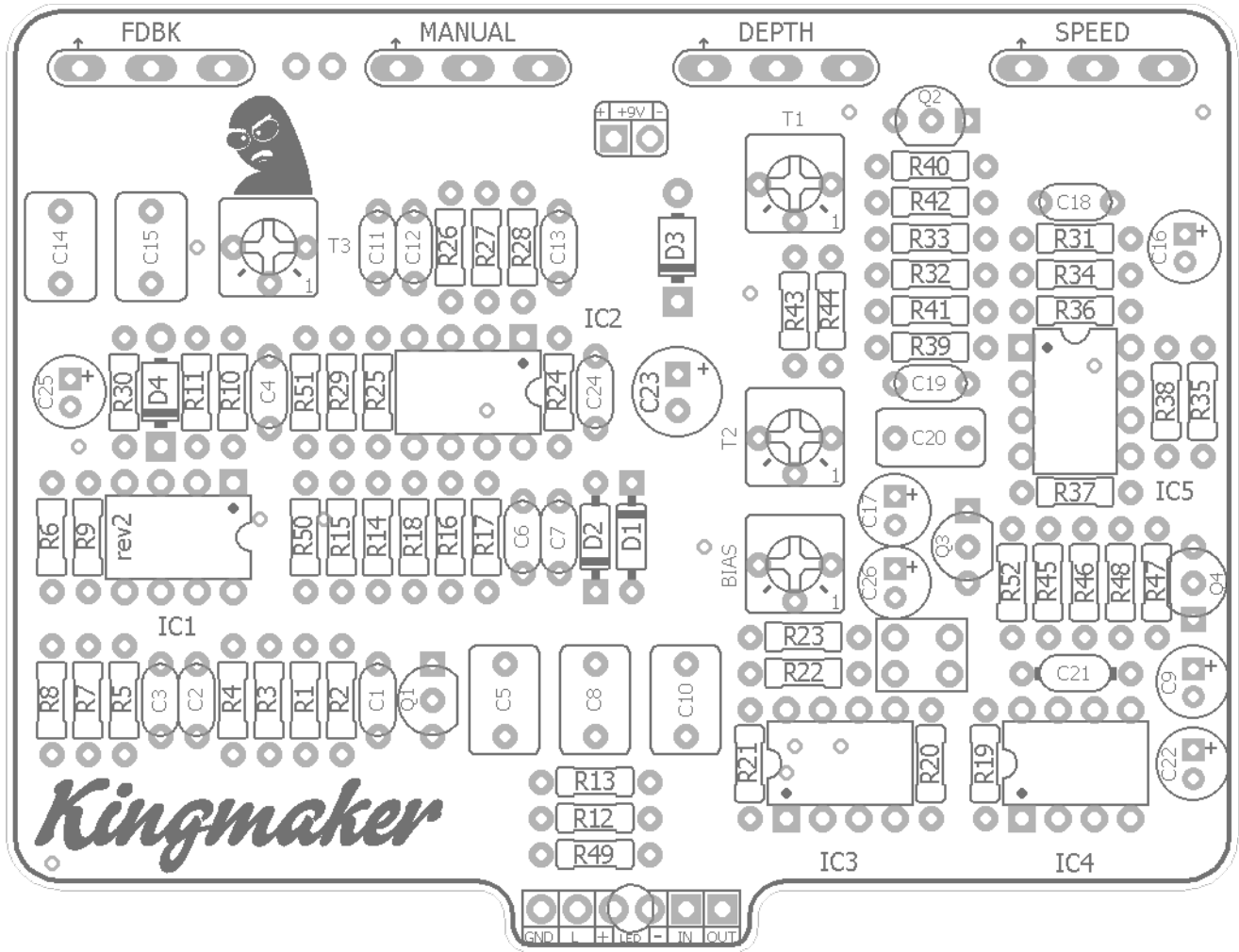
The FG-01 utilized the MN3207/MN3102 BBD/Clock pair. The **Kingmaker** project allows you to use the original chips or the MN3007/MN3101.

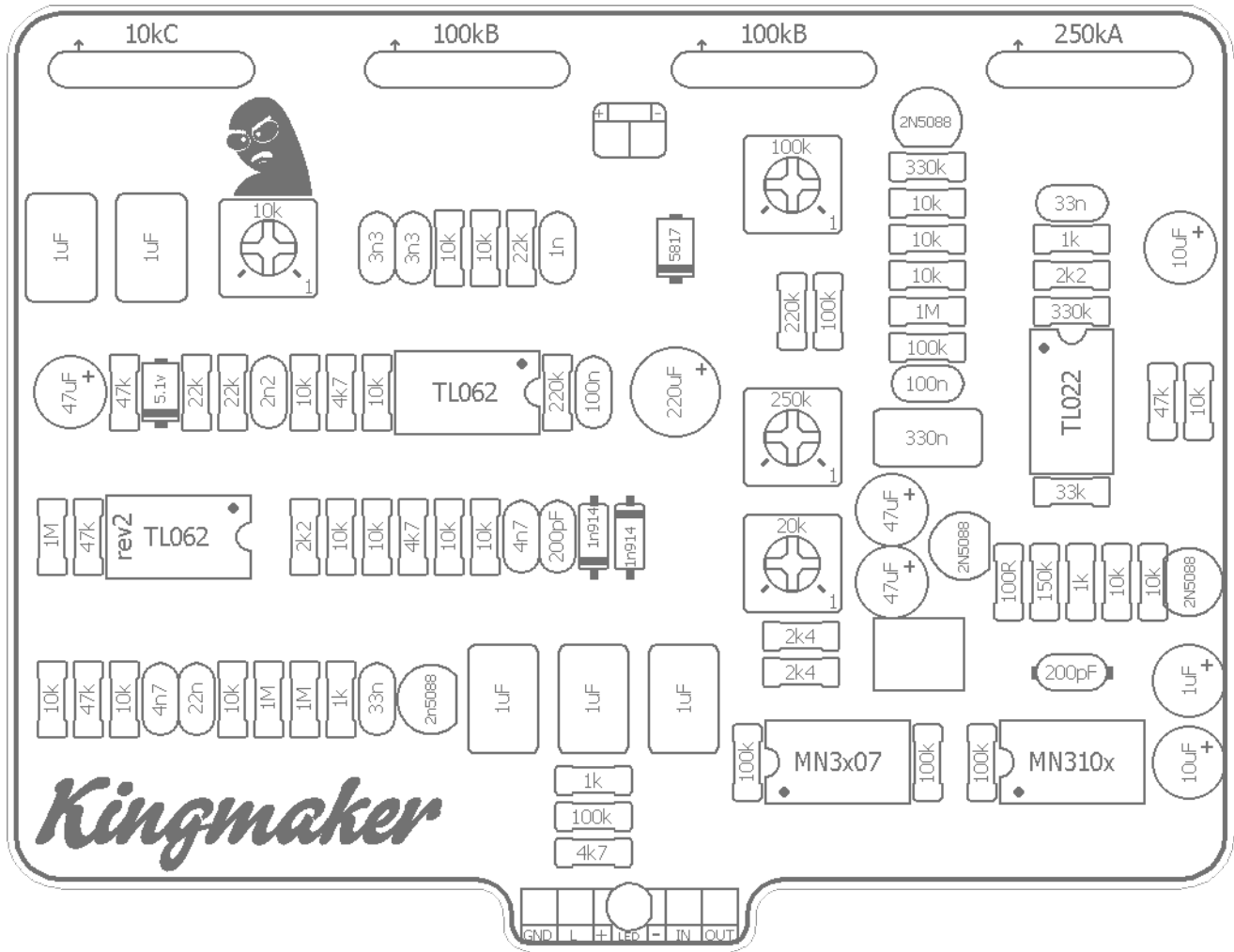
Controls

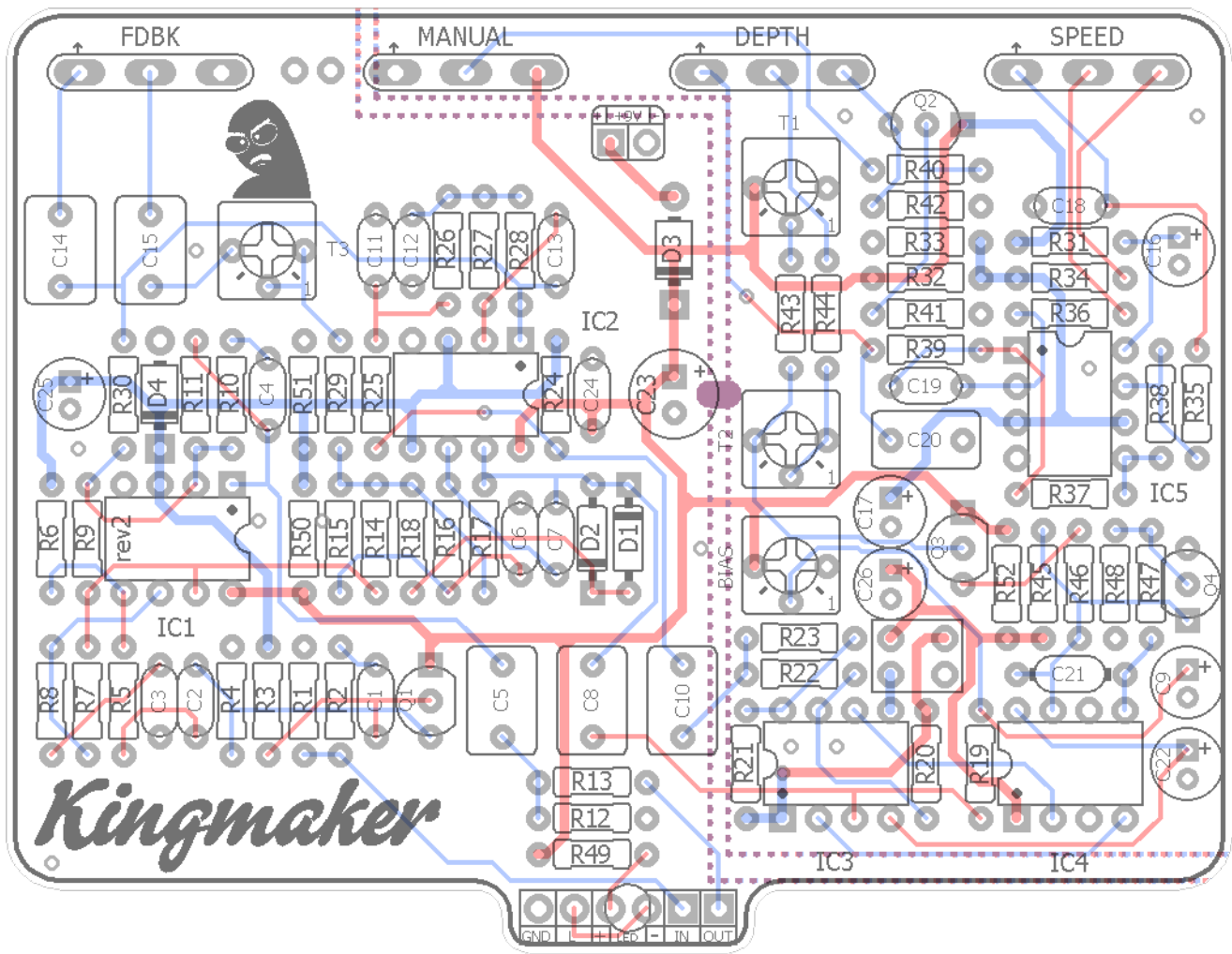
- **RATE** - Modulation speed.
- **MANUAL** - The MANUAL control has some effect on most DEPTH settings. With the DEPTH full CCW, the MANUAL control produces ringmod tones. As DEPTH is turned up the MANUAL control will change the center frequency of the flanger in its normal operation.
- **DEPTH** - Modulation intensity.
- **FDBK** - Modulation feedback amount.
- **BIAS** - This trimmer sets the voltage input bias of the BBD.
- **T1** - This trimmer sets the frequency range of the clock.
- **T2** - This trimmer sets the max DEPTH setting.
- **T3** - This trimmer sets the maximum amount of audio signal that is fed back through the circuit.

Terms of Use: You are free to use purchased **Kingmaker** circuit boards for both DIY and small commercial operations. You may not offer **Kingmaker** PCBs for resale or as part of a "kit" in a commercial fashion. Peer to peer re-sale is fine, though.

Technical assistance for your build(s) is available via the [madbeanpedals forum](http://madbeanpedals.com). Please go there rather than emailing me for assistance on builds. This is because (1) I'm not always available to respond via email in a timely and continuous manner, and (2) posting technical problems and solutions in the forum creates a record from which other members may benefit.







Resistors		Resistors		Caps		Diodes	
R1	1M	R27	10k	C1	33n	D1	1n914
R2	1k	R28	22k	C2	22n	D2	1n914
R3	1M	R29	4k7	C3	4n7	D3	1n5817
R4	10k	R30	47k	C4	2n2	D4	5.1v Zener
R5	10k	R31	1k	C5	1uF	Transistors	
R6	1M	R32	10k	C6	4n7	Q1	2n5088
R7	47k	R33	10k	C7	200pF	Q2	2N5088
R8	10k	R34	2k2	C8	1uF	Q3	2N5088
R9	47k	R35	10k	C9	1uF	Q4	2N5088
R10	22k	R36	330k	C10	1uF	ICs	
R11	22k	R37	33k	C11	3n3	IC1	TL062
R12	100k	R38	47k	C12	3n3	IC2	TL062
R13	1k	R39	100k	C13	1n	IC3	MN3x07
R14	10k	R40	330k	C14	1uF	IC4	MN310x
R15	10k	R41	1M	C15	1uF	IC5	TL022
R16	10k	R42	10k	C16	10uF	Trimmers	
R17	10k	R43	220k	C17	47uF	BIAS	20k
R18	4k7	R44	100k	C18	33n	T1	100k
R19	100k	R45	150k	C19	100n	T2	250k
R20	100k	R46	1k	C20	330n	T3	10k
R21	100k	R47	10k	C21	200pF	Pots	
R22	2k4	R48	10k	C22	10uF	FDBK	10kC
R23	2k4	R49	4k7	C23	220uF	DEPTH	100kB
R24	220k	R50	2k2	C24	100n	MANUAL	100kB
R25	10k	R51	10k	C25	47uF	SPEED	250kA
R26	10k	R52	100R	C26	47uF		

Value	Qty	Type	Rating	Value	Qty	Type	Rating
100R	1	Carbon / Metal Film	1/4W	1uF	1	Electrolytic	16v min.
1k	4	Carbon / Metal Film	1/4W	10uF	2	Electrolytic	16v min.
2k2	2	Carbon / Metal Film	1/4W	47uF	3	Electrolytic	16v min.
2k4	2	Carbon / Metal Film	1/4W	220uF	1	Electrolytic	16v min.
4k7	3	Carbon / Metal Film	1/4W	1n914	2		
10k	17	Carbon / Metal Film	1/4W	1n5817	1		
22k	3	Carbon / Metal Film	1/4W	5.1v	1	Zener diode	1W
33k	1	Carbon / Metal Film	1/4W	2N5088	4		
47k	4	Carbon / Metal Film	1/4W	TL062	2		
100k	6	Carbon / Metal Film	1/4W	MN3x07	1	MN3207 or MN3007	
150k	1	Carbon / Metal Film	1/4W	MN310x	1	MN3102 or MN3101	
220k	2	Carbon / Metal Film	1/4W	TL022	1		
330k	2	Carbon / Metal Film	1/4W	10k	1	Bourns 3362p	
1M	4	Carbon / Metal Film	1/4W	20k	1	Bourns 3362p	
200pF	2	Ceramic / MLCC	16v min.	100k	1	Bourns 3362p	
1n	1	Film	16v min.	250k	1	Bourns 3362p	
2n2	1	Film	16v min.	10kC	1	PCB Right Angle	16mm
3n3	2	Film	16v min.	100kB	2	PCB Right Angle	16mm
4n7	2	Film	16v min.	250kA	1	PCB Right Angle	16mm
22n	1	Film	16v min.				
33n	2	Film	16v min.				
100n	2	Film	16v min.				
330n	1	Film	16v min.				
1uF	5	Film	16v min.				

Currently you can find the MN3207, MN3102, v3207 and v3102 in stock at Cabintech:

<https://cabintechglobal.com/semi>

smallbear currently has the MN3007 (NOS and Xvive remakes) in stock:

<https://smallbear-electronics.mybigcommerce.com/ic-mn3007-bbd/>

<https://smallbear-electronics.mybigcommerce.com/mn3007-xvive-audio-bbd-ic-dip-8/>

smallbear also has a few MN3101:

<https://smallbear-electronics.mybigcommerce.com/ic-mn3101/>

TL022:

<https://stompboxparts.com/semiconductors/tl022cp-dual-op-amp-ic/>

<https://www.taydaelectronics.com/tl022cp-tl022-operational-amplifier-ic.html>

Bourns 3362p trimmers:

<https://www.taydaelectronics.com/potentiometer-variable-resistors/cermet-potentiometers/3362p.html>

16mm Right Angle Pots:

<https://smallbear-electronics.mybigcommerce.com/alpha-single-gang-16mm-right-angle-pc-mount/>

DC Jacks:

<https://smallbear-electronics.mybigcommerce.com/2-1-mm-all-plastic-round/>

<https://stompboxparts.com/power-connections/dc-power-jack-2-1mm-low-profile/>

<https://lovemyswitches.com/thinline-lumberg-dc-power-jack-2-1mm/>

1/4" jacks:

<https://smallbear-electronics.mybigcommerce.com/1-4-in-mono-nys229/>

<https://smallbear-electronics.mybigcommerce.com/1-4-in-mono-switchcraft-11/>

<https://lovemyswitches.com/1-4-mono-jack-lumberg-klbm-3/>

<https://lovemyswitches.com/1-4-mono-jack-neutrik-rean-nys229/>

My preferred 3PDT switch:

<https://lovemyswitches.com/pro-3pdt-latched-foot-switch-solder-lugs-feather-soft-click/>

The Kingmaker allows for two different versions of the BBD and clock.

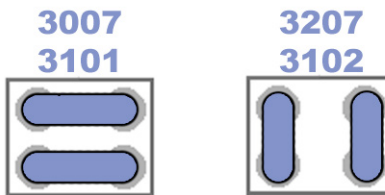
MN3007 BBD and MN3101 clock

You can use NOS chips for both or the NOS MN3101 and Xvive remake of the 3007 (there are no current production remakes of the MN3101 clock).

3207 BBD and 3102 clock

Any manufacturer of these can be used and even mixed with one another. You can use MN3207, MN3102, v3207, v3102, BL3207 or BL3102. I used the BL versions for my build. **The only caveat is you cannot use the 3102 clock with an MN3QA007 or a 3207 BBD with an MN3101 clock.**

The Kingmaker PCB has two jumpers you need to set according to which BBD and clock you are using. The jumper spots are located next to R22 and R23. You can solder the jumpers directly to the PCB or use sockets (in case you ever want to try the other combo later).



Quickstart Calibration

Potentiometers

SPEED and MANUAL @25%

DEPTH and FDBK @ 50%

Trimmers

T3 @ 0% (full CCW)

T2 @ 25%

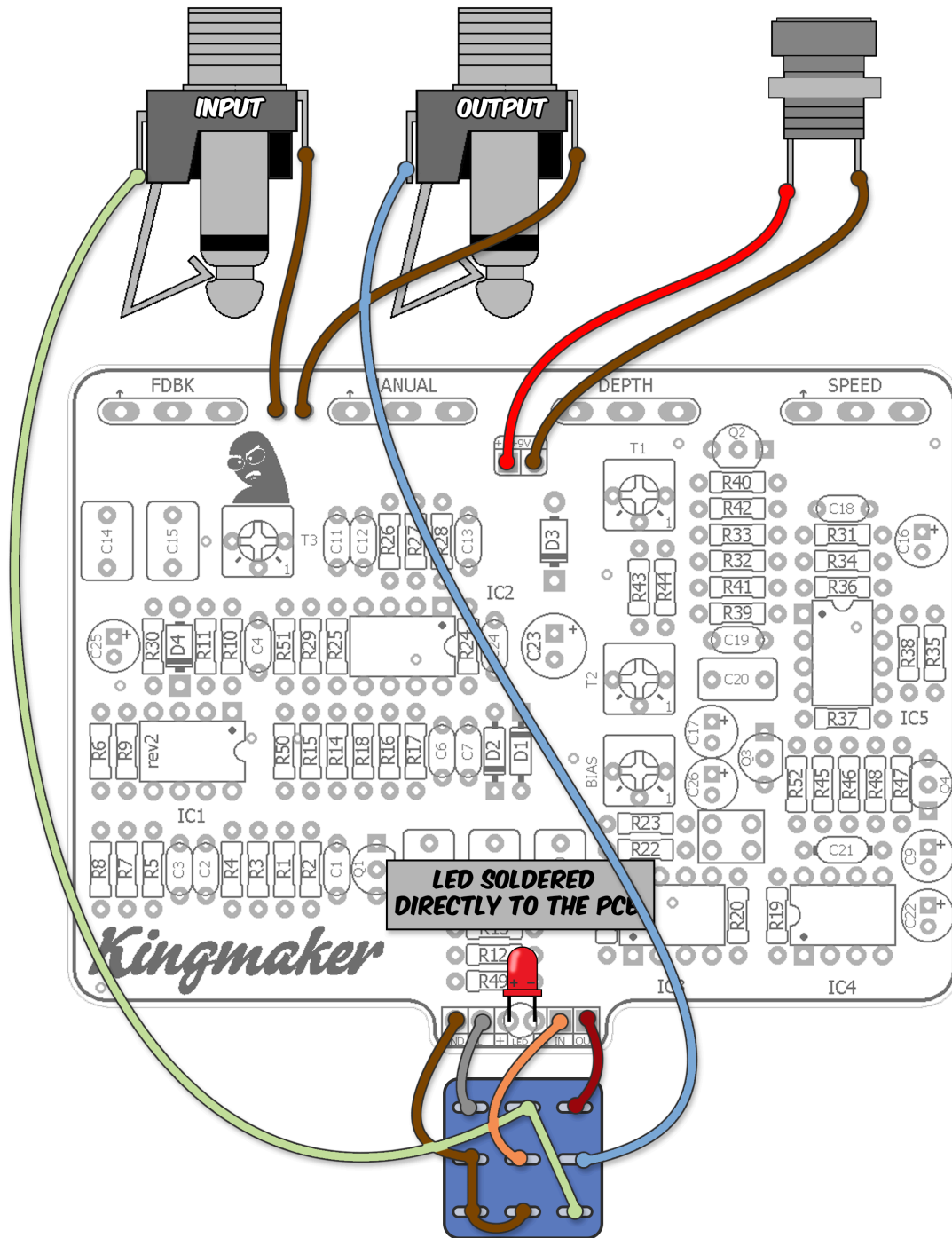
BIAS, T1 @ 50%

With the effect on and audio feed through the circuit you should hear some flanging with the settings above. Adjust the **BIAS** trimmer until you get the cleanest audio output possible. It should be right around the 50% mark but you may have to tweak the position slightly.

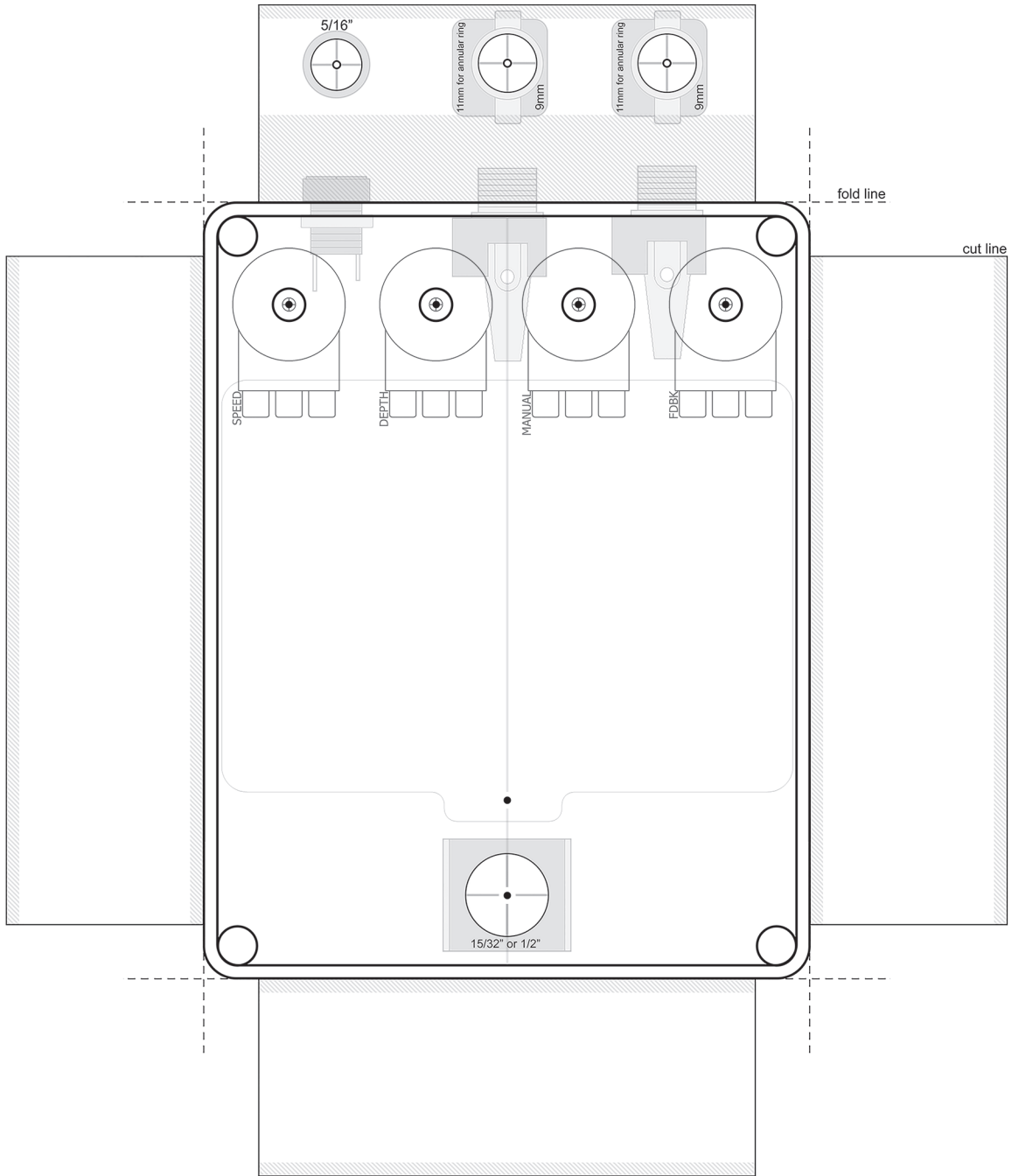
T1 adjusts the clock frequency range. As you turn CCW, the LFO will become stronger but more asymmetrical. When turned CW, the flanging effect will shallow out. I found the right setting to be just about 50%, luckily.

Turning **T2** CW will increase the range of the DEPTH control. However, I found it worked best at around 25% to keep in balance with the FDBK and MANUAL controls.

T3 acts as a limit on the FDBK control. With T3 CCW, turn FDBK all the way up. Leave DEPTH at full and SPEED about 1/3rd or so. Slowly adjust T3 clockwise until you get self-oscillation. Back T3 off just a bit to eliminate it. Now your FDBK control has the most range possible without oscillation.



Note: Drill Guides are approximate and may require tweaking depending on the types of jacks, switches and pots you use.



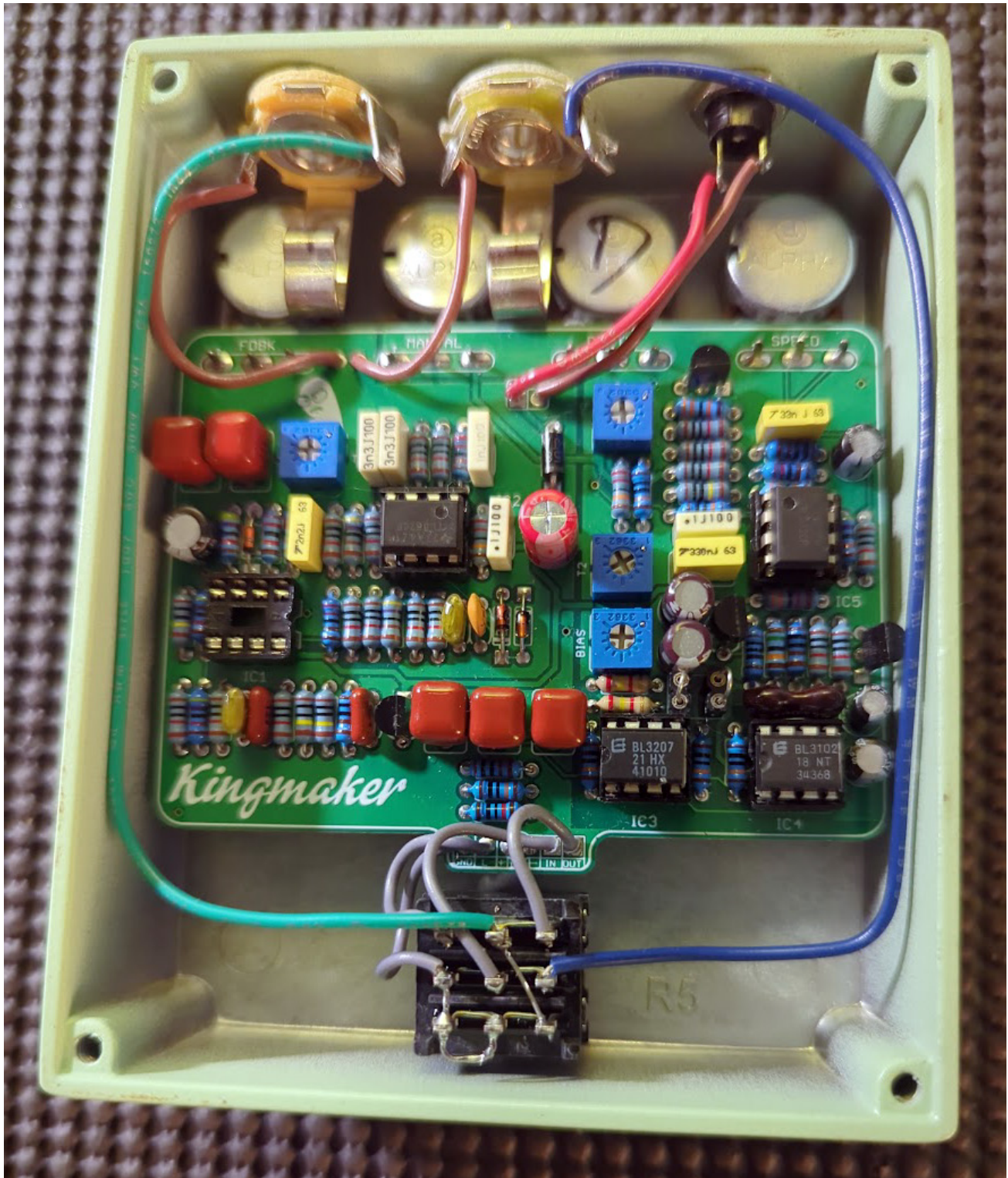
The input and output jacks are placed together to keep them as far away from the LFO/Speed knob as possible.

IC1	TL062	IC4	3102	Q1	2n5088
1	4.88	1	9.06	C	9.25
2	4.87	2	4.47	B	3.86
3	4.87	3	0	E	3.56
4	0	4	4.48	Q2	2n5088
5	4.45	5	92mV	C	9.24
6	4.85	6	8.89	B	3.05
7	4.85	7	3.5	E	2.53
8	9.24	8	8.47	Q3	2n5088
IC2	TL062	IC5	TL022	C	9.24
1	4.87	1	~4.63	B	3.84
2	4.87	2	4.62	E	3.59
3	4.87	3	4.61	Q4	2n5088
4	0	4	0	C	3.51
5	4.87	5	varies	B	64mV
6	4.87	6	4.61	E	0
7	4.89	7	~4.65		
8	9.24	8	9.08		
IC3	3207				
1	0				
2	4.48				
3	4.81				
4	8.47				
5	9.07				
6	4.47				
7	5.29				
8	5.29				

If you are using the 3007/3101 combo instead of the 3207/3102 some voltages for IC3 and IC4 will be different than those listed in the chart.

- 3007 pins 1 and 5 voltage readings will be swapped from the 3207 (b/c pin1 on the 3007 is power and pin5 is ground).
- pin4 of the 3007 and pin8 of the 3101 will read about 0.6v.
- pin7 and 8 of the 3007 may be different.

- 9.42vDC One Spot
- Current Draw: ~8mA
- All knobs set @ 50%



I took this pic before final calibration, so that's why IC1 is not inserted.

