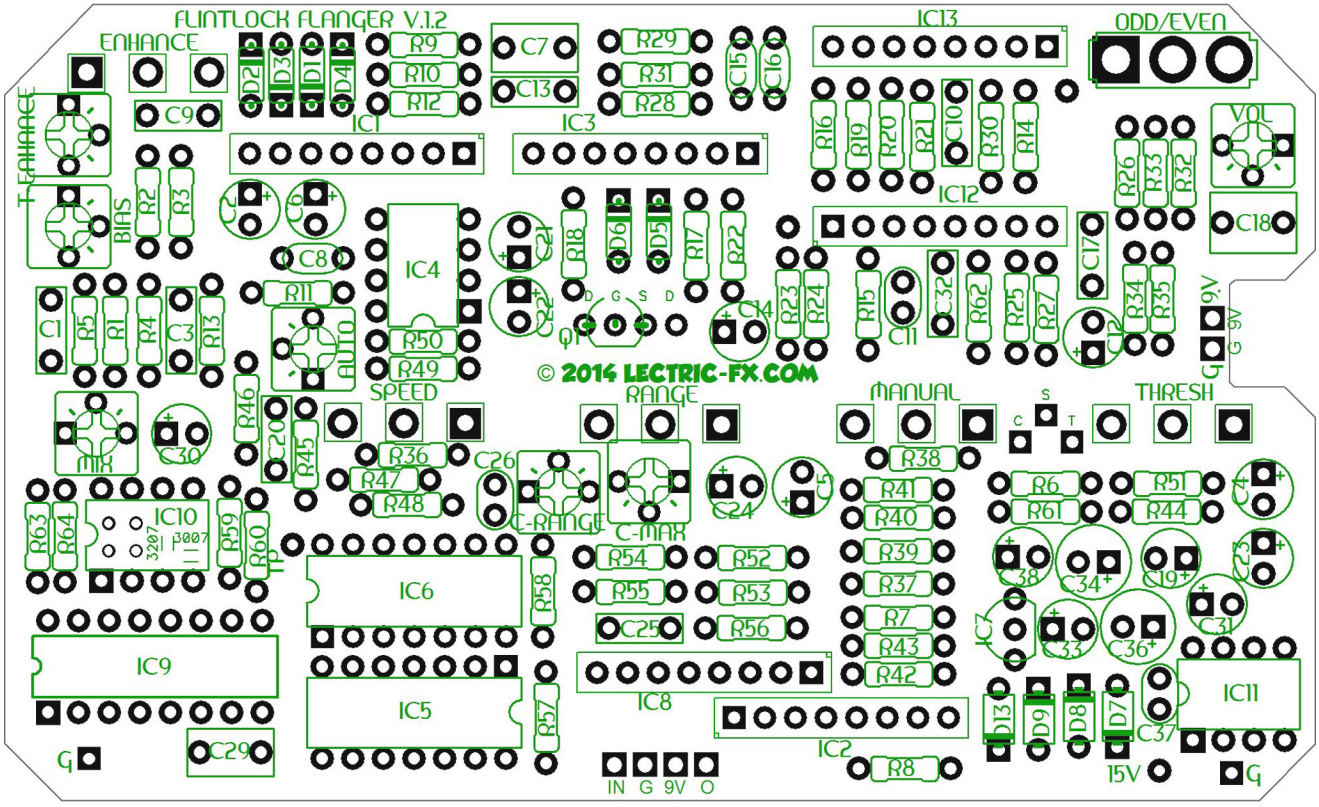
FLINTLOCK FLANGER V1.2



The Flintlock Flanger is a reproduction of the classic A/DA flanger circuit, adapted to use the more common MN3007 (Or MN/V/BL3207) BBD Chip, but still achieve the same sounds and wide sweep for which the original is famous. For the first time ever, this circuit can be built & housed in to a 1590BB enclosure if desired.

An on board charge pump & regulator is included to achieve the 15VDC voltage requirement for the circuit from a standard 9V supply, or to achieve a rock solid 9V for the 3207 version.

-CONTROLS:

-**ENHANCE**- Increases the signal fed back in to the BBD for a more intense flange sound.

-**SPEED**- Alters the rate of the sweep.

-**RANGE**- Determines if the delay time is a function of the manual control, speed control or a blend of both.

-**MANUAL**- Sets the delay time range, disabled when range is set fully clockwise.

-**THRESHOLD**- A noise eliminating gate that cuts off the wet signal when the input signal is low, can also be used for 'dynamic' flanging. Function is minimized when set fully CW.

-**ODD/EVEN**- Switch that sets the phase of the wet signal for Odd flanging (hollow pipe sound) or Even (full sound).

Bill of Materials

Part #	Value
R1	1k
R2	30k
R3	2k7
R4	30k
R5	1M
R6	47r
R7	68k
R8	68k
R9	20k
R10	27k
R11	47k
R12	68k
R13	10k
R14	1k
R15	43k
R16	100r
R17	1M3
R18	68k
R19	100k
R20	100k
R21	22k
R22	22k
R23	10k
R24	1M
R25	10k
R26	10k
R27	30k
R28	22k
R29	68k
R30	33k
R31	33k
R32	27k
R33	5k1
R34	100r
R35	100k
R36	2k7
R37	100k
R38	51k
R39	100r
R40	22k
R41	100k
R42	510k
R43	1M
R44	47r
R45	68k
R46	82k
R47	100k
R48	75k
R49	1k
R50	2k7
R51	47r
R52	20k
R53	20k
R54	150k
R55	51k
R56	10k
R57	47r
R58	2M2
R59	2k
R60	27k
R61	270r
R62	27k
R63	2k7
R64	2k7

Part #	Value
C1	10n
C2	4u7
C3	10n
C4	22u
C5	4u7
C6	2u2
C7	470n
C8	100p
C9	100n
C10	10n
C11	100p
C12	4u7
C13	100n
C14	2u2
C15	1n5
C16	510p
C17	10n
C18	1u
C19	22u
C20	10n
C21	33u
C22	33u
C23	22u
C24	4u7
C25	100n
C26	22p
C29	220n
C30	4u7
C31	22u
C32	100n
C33	10u
C34	100u
C36	220u
C37	*
C38	10u

Part #	Value
IC1	NJM4558L**
IC2	NJM4558L
IC3	NJM4558L
IC4	LM1458 ***
IC5	CD4007
IC6	CD4047BE
IC7	7815L
IC8	NJM4558L
IC9	CD4049
IC10	MN3007
IC11	LT1054
IC12	NJM4558L
IC13	NJM4558L

Part #	Value
D1	1n914
D2	1n914
D3	1n914
D4	1n914
D5	1n914
D6	1n914
D7	1n4002
D8	1n5817
D9	1n5817
D13	1n5817

Part #	Value
Q1	2N5457

Please note: The layout image shows the jfet position for a 2n3819. Pay attn to the pinout when using a different part such as the recommended 2n5457.

Part #	Value
RANGE	50KB
SPEED	500KC
THRESH	100KB
MANUAL	10KB
ENHANCE	10KB

Part #	Value
T-ENHANCE	20K
VOL	10K
AUTO	20K
BIAS	20K
MIX	100K
C-MAX	20K
C-RANGE	100K

Shopping List

Resistor Value	Quant
47r	4
100r	3
270r	1
1k	3
2k	1
2k7	5
5k1	1
10k	5
20k	3
22k	4
27k	4
30k	3
33k	2
43k	1
47k	1
51k	2
68k	6
75k	1
82k	1
100k	6
150k	1
510k	1
1M	3
1M3	1
2M2	1

IC Value	Quant
NJM4558L	6
LM1458	1
CD4047	1
CD4007	1
MN3007	1
LT1054	1
CD4049	1
78L15 TO-92	1

Cap Value	Quant
27p	1
100p	2
510p	1
1n5	1
10n	5
100n	4
220n	1
470n	1
1uF film	1
2u2	2
4u7	5
10u	2
22u	4
33u	2
100u	1
220u	1

Diode Value	Quant
1n914	6
1n4002	1
1n5718	3

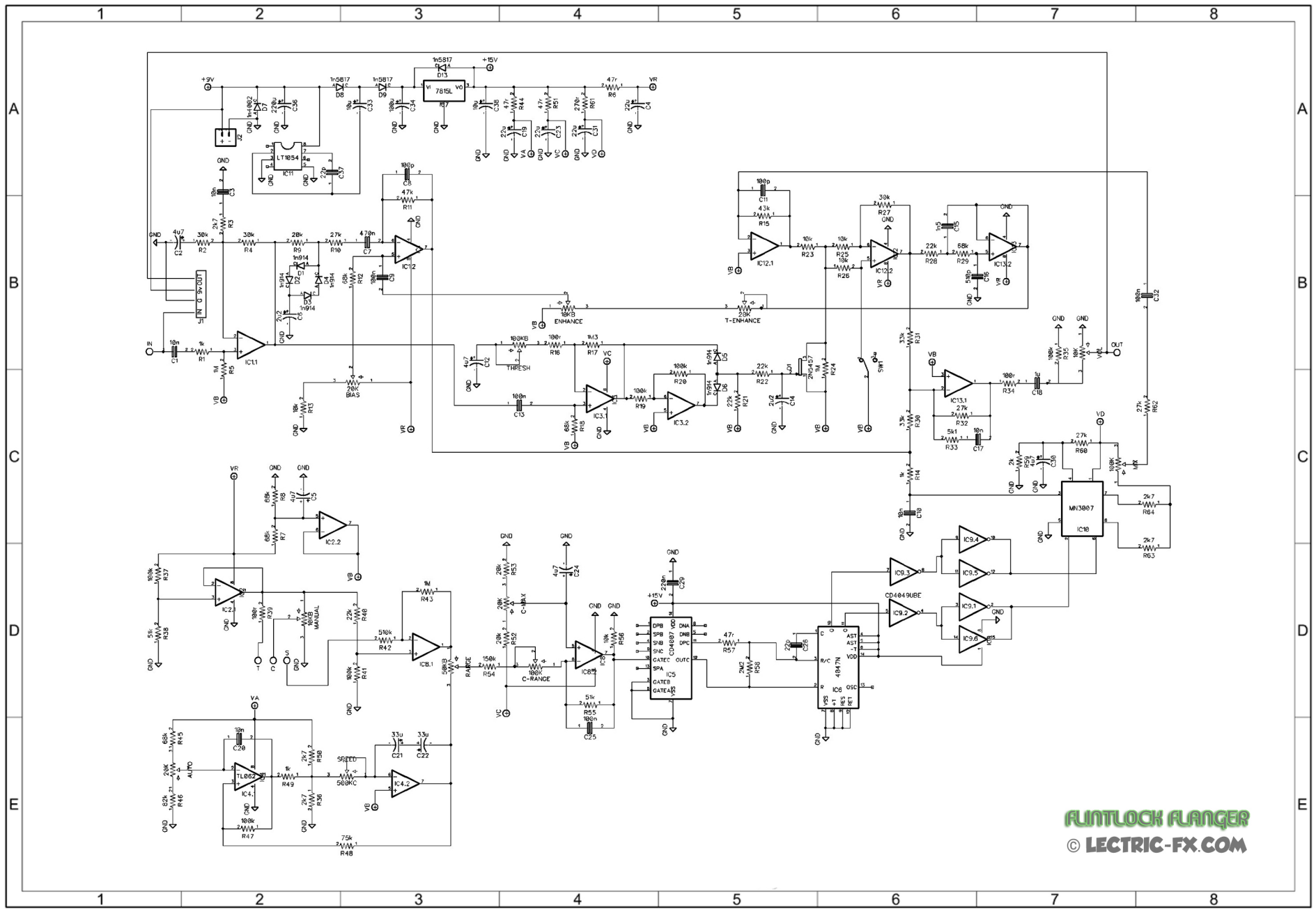
Trans Value	Quant
JFET	1

Pot Value	Quant
10KB	2
50KB	1
100KB	1
500KC	1

Trim Value	Quant	
10k	1	****
20k	4	
100k	2	

You will also need to get some small jacks to fit this in a 1590BB I think. I have successfully fit mouser PN 550-10284. Enclosed jacks may also fit. Standard size jacks are untested.

* OMIT unless there is undesirable noise between clock and charge pump. Try value 5p - 20p.
** You can most likely use any dual opamp in SIP-8 package for these 6. 4558L worked well for me.
*** Any low power dual opamp should work well. TLO62, LM1458, LM358, etc.
**** The pcb was designed to use 3362 cermet trimmers. Larger trimmer types might be a problem.


FLINTLOCK FLANGER
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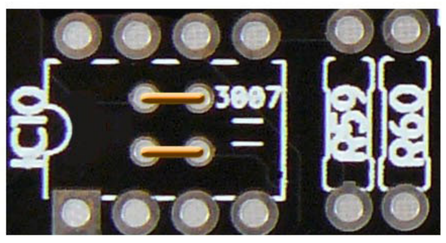
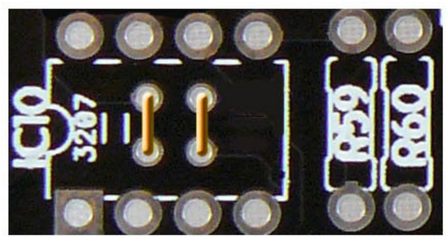
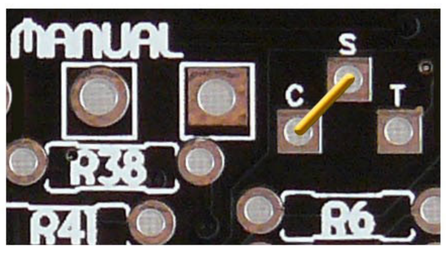
OK first off, install your jumpers. I recommend building this with an MN3007 (image on left), but it is possible to build with v3207. I would leave the 3207 version to the builder who is more adventurous since it may need some tweaking and experimentation to sound best. The jumpers under IC10 will be horizontal for MN3007, vertical for v3207.





Second, you will need to install a jumper between the C & S pads as shown below, unless you are going to wire up an expression jack (which also means you need a bigger enclosure than 1590bb). If you use an expression jack it needs to be a switching jack such as Mouser pn 568-NYS218 (credit to moosapotamus).



Next, I would start soldering in components according to height. Jumpers were first, next you could do your 1n914's, then resistors, then the larger diodes. Then your 3362 type trimmers, followed by sockets, then on to transistors, ceramic and box caps. Finally install your electrolytic caps and you should be just about finished. Install your ic's and wire everything up. Time to move on to calibration.

Basic set up procedure – 3007 version using a frequency counter (suggested);

Set all trimmers to 50% and all pots fully CW (The ODD/EVEN switch position during this procedure is not important).

First, power up and test for 15V at the test pad provided, then move on if it tests okay..

Start turning the bias trimmer until you hear a the modulated signal kick in to confirm you have signal through the pedal and that your clock and BBD are functioning and set the volume trimmer to an acceptable level to revisit later.

Now set the range & manual pots fully CCW and set your multimeter to the frequency setting (Hz) put the red probe to the test pad at pin 13 of the 4047 and the black lead to ground to start setting the clock frequencies.
(If you are not using a frequency counter see below)

Begin adjusting the 'C-Max' trimmer until you measure 69.6KHz, then turn the manual pot fully CW and adjust 'C-Range' until your meter reads 2.6Mhz and repeat, both trimmers interact and are very sensitive so you will likely find you have to repeat this process a few times until the manual pot sweeps between 69.6KHz & 2.6MHz.

Basic setup Procedure (Cont'd)

Once you have the clock frequencies set correctly, continue measuring at the test point and now set the range pot fully CW and speed pot fully CCW, the frequency should sweep between 69.6KHz & 2.6MHz, if not, adjust the 'Auto' trim until it does.

Good job, now take a break! Setting the clock frequency is probably the most important aspect of the sound and the most time-consuming part of setting up the A/DA (Flintlock).

Getting back after your break it is now time to set up the audio part of the flintlock;

Keep all the pots set fully CW but now set the speed to where you can hear the pedal sweeping clearly (do not worry if the flange sound is distorted or weak at this point).

Input some form of signal through the pedal (either constantly playing your guitar or other signal source) and set the volume trimmer so that the bypass level matches the effect and begin to carefully adjust the bias trimmer, set it for the 'cleanest' flanged sound you can.

Now adjust the 'Mix' Trim, this sets the Wet & Dry signal mix of the pedal, the aim is to set the wet (flanged) signal equal with the dry for a 50/50 mix, this will provide the 'best' flanger sound.

Finally you can set the 'Enhance' Trimmer, this is a matter of personal taste, you can adjust it so that the pedal will self oscillate with the Enhance pot set fully CW or to just before the point of self oscillation. Keep in mind that allowing the enhance pot to reach self oscillation can lead to some interesting experimental sounds when used in conjunction with the Threshold pot to gate off the signal.

*If you intend to try and set up the clock frequencies by ear and not use a frequency counter you will not get the best the flintlock can offer but can still achieve a very nice sound.

Follow the basic premise of the frequency counter set up above and set the low frequency (longer delay) to a point where no clock whine is heard and the high frequency to where you feel is best, once you have completed the set up procedure you may wish to revisit the clock trimmers to get the widest sweep you can with the range set full, remembering though that setting the bottom of the sweep lower will result in a wider sweep but the sound may become too 'bouncy', clock whine may enter the signal and you will no longer reach the high sweep point the A/DA is famous for but that setting it too high can lead to a weak flanger sound and a smaller sweep.

When set by ear the 'Auto' trim is probably best left near the center position, adjusting it too far can lead to a lopsided sounding sweep.

A word on enclosure choice for the Flintlock Flanger

It is possible to build this effect into a 1590bb. I have successfully done it with the kind of jacks you'd use in a baby build (1590a) pedal. I do not know if standard sized jacks will fit.
If you want to install an expression jack, or have your dc/in/out jacks top-mounted, you will need to jump up to a 125bb or similar (untested). Another great option would be 1590Q, which is the same size as a landscape 1590BB on all sides.

Drill Template

1590BB

Please measure very carefully. This is only a rough guideline based on what i think will work, based on what worked for me. You are ultimately esponsible for ensuring a good fit on your personal build.
The I/O jacks may be a tight squeeze, and it could be wise to use the kind of jacks you would find on a “baby build”.