

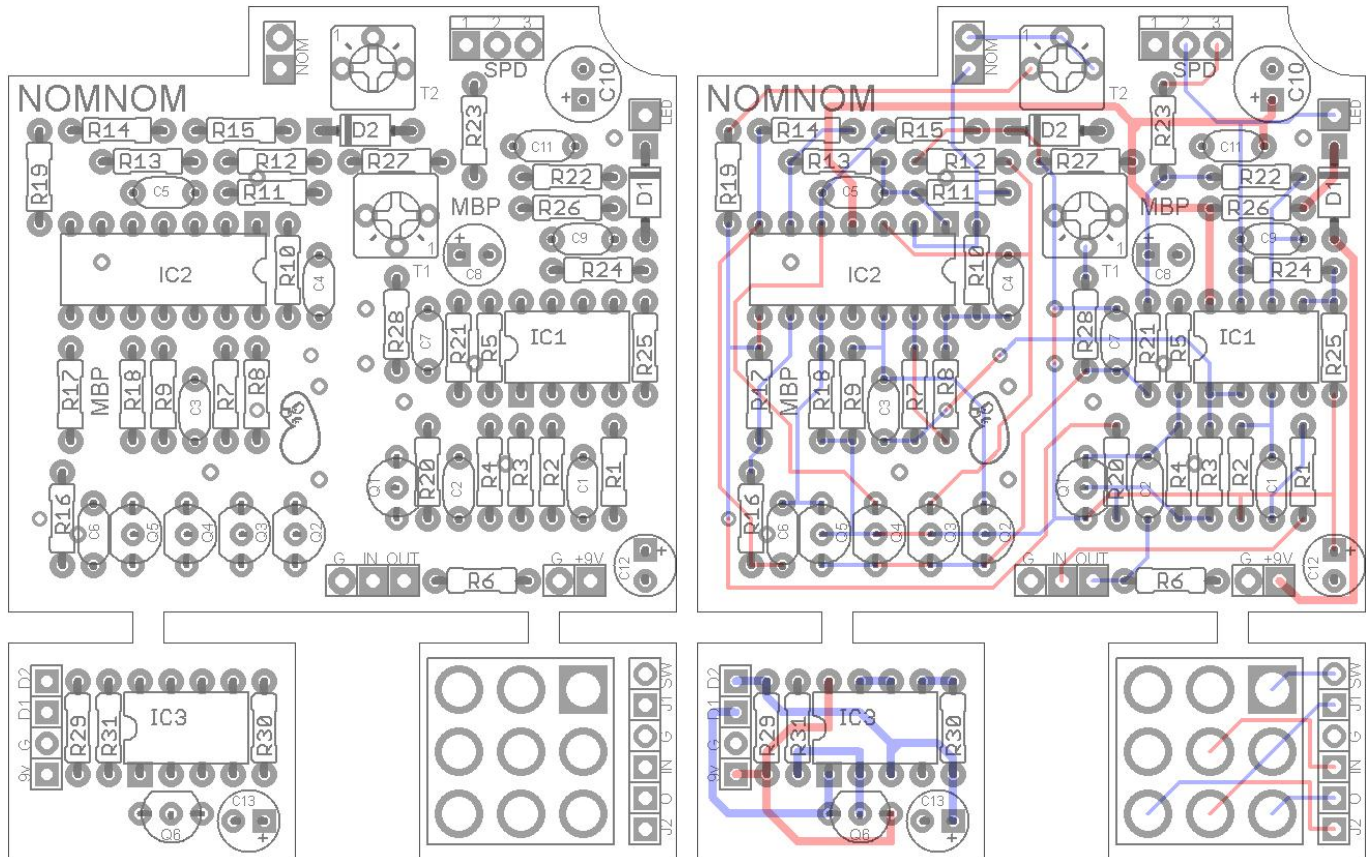
NOM NOM

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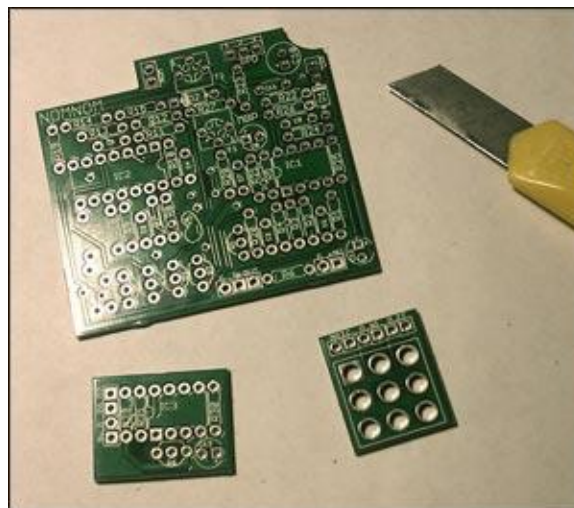
Based on the MXR Phase 90™

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2.15" W x 1.95" H (main PCB)



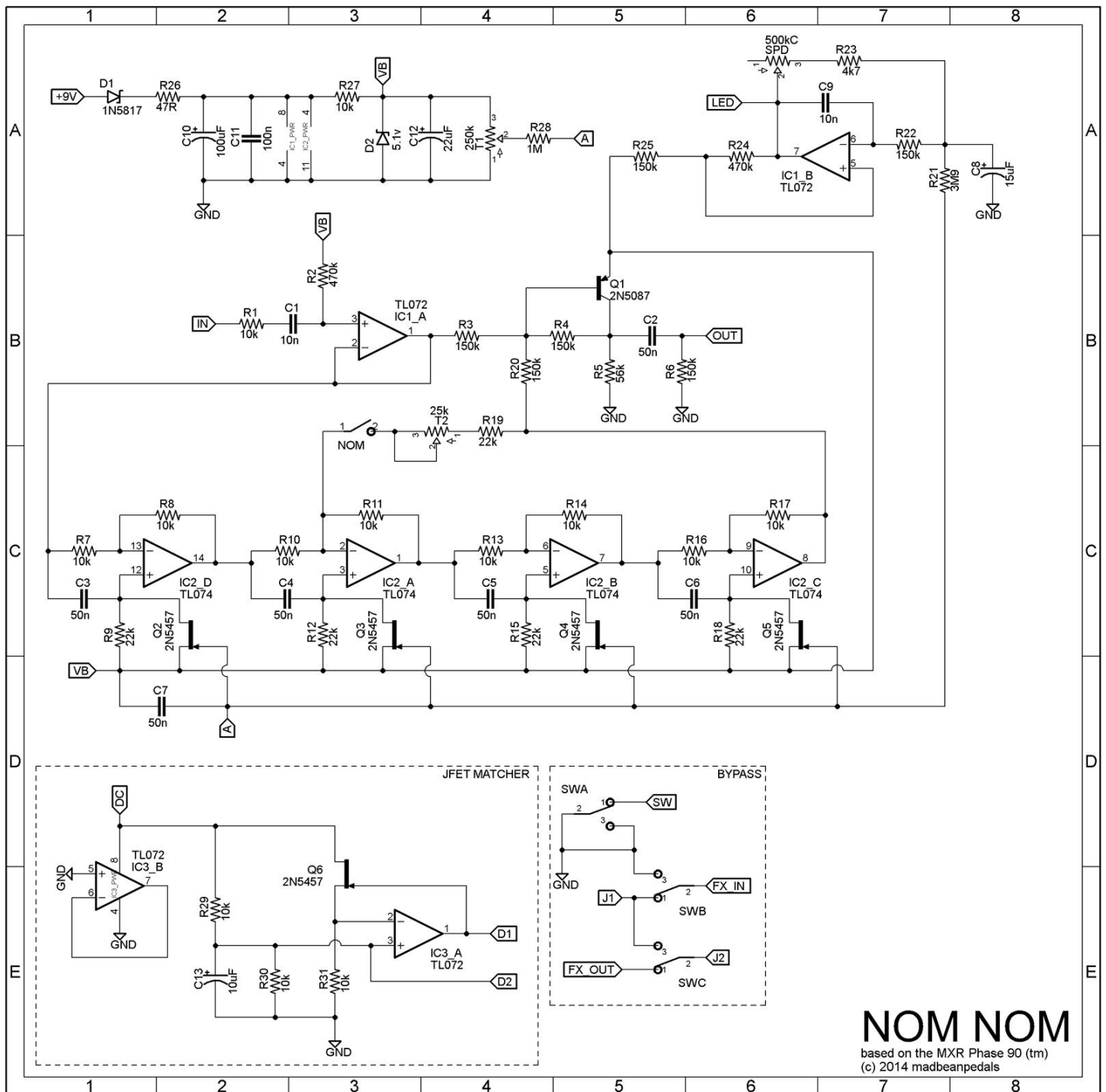
Before you begin, you need to separate the two daughter boards from the main board. Use a utility knife to score the bridges between the boards then snap them apart. Clean the edges with the knife so they are smooth. The bridges are not connected with copper so you will not damage the PCB by doing this but take care nonetheless.



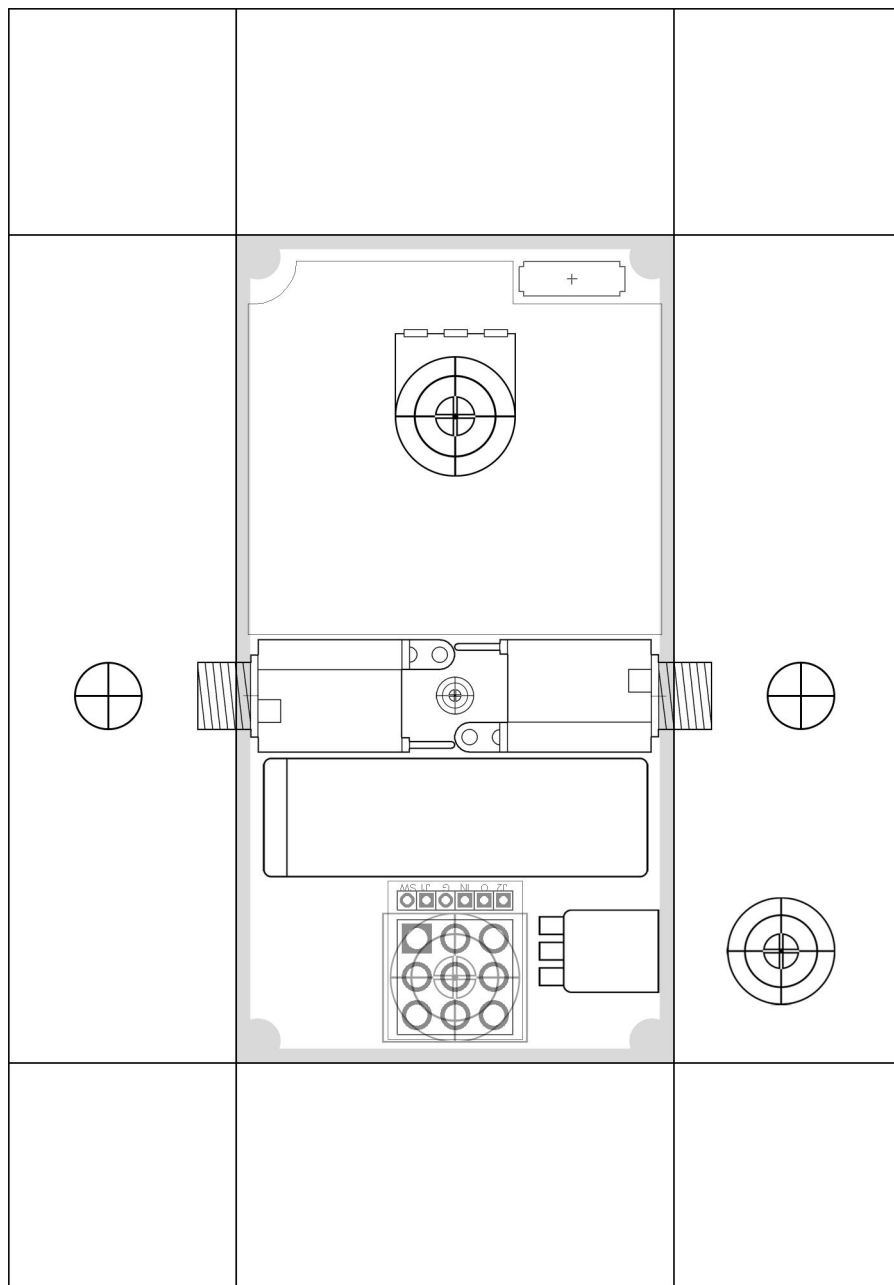
Resistors		Caps		Diodes	
R1	10k	C1	10n	D1	1N5817
R2	470k	C2	50n	D2	5.1v Zener
R3	150k	C3	50n	Transistors	
R4	150k	C4	50n	Q1	2N5087
R5	56k	C5	50n	Q2 - Q5	*see notes
R6	150k	C6	50n	IC	
R7	10k	C7	50n	IC1	TL072
R8	10k	C8	15uF	IC2	TL074
R9	22k	C9	10n	IC3	TL072
R10	10k	C10	100uF	Switches	
R11	10k	C11	100n	NOM	SPST
R12	22k	C12	22uF	Trimpots	
R13	10k	C13	10uF	T1	250k
R14	10k			T2	25k
R15	22k			Pot	
R16	10k			SPD	500kC
R17	10k				
R18	22k				
R19	22k				
R20	150k				
R21	3M9				
R22	150k				
R23	4k7				
R24	470k				
R25	150k				
R26	47R				
R27	10k				
R28	1M				
R29	10k				
R30	10k				
R31	10k				

- 50n is a less common value in caps these days...at least in the US. Use 47n instead.
- The **Nom Nom** is laid out for 2N5457 transistors since they are still very common and work equally well in the phase circuit. If you want to use the original 2N5952, you will need to flip the transistors 180° on the PCB since the 2N5952 have the opposite pin-out of the 2N5457. The JFET matcher PCB is also fitted for the 2N5457 pin-out.
- 2N5087 is indicated for Q1 since it is also very common. You can use the original 2N4125 if you have it or even a 2N3906. All three have the same pin-out.

Shopping List			
Value	QTY	Type	Rating
47R	1	Metal / Carbon	1/4W
4k7	1	Metal / Carbon	1/4W
10k	13	Metal / Carbon	1/4W
22k	5	Metal / Carbon	1/4W
56k	1	Metal / Carbon	1/4W
150k	6	Metal / Carbon	1/4W
470k	2	Metal / Carbon	1/4W
1M	1	Metal / Carbon	1/4W
3M9	1	Metal / Carbon	1/4W
10n	2	Film	16v or more
50n	6	kewl	16v or more
100n	1	Film	16v or more
10uF	1	Electrolytic	16v or more
15uF	1	Electrolytic	16v or more
22uF	1	Electrolytic	16v or more
100uF	1	Electrolytic	16v or more
1N5817	1		
5.1v Zener	1		
2N5087	1	or, 2N4125 or 2N3906	
JFETs	4	2N5457 or 2N5952	
TL072	2	DIP	
TL074	1	Quad	
SPST	1	or SPDT	
250k	1	Bourns 2262P	
25k	1	Bourns 2262P	
500kC	1	Solder Lug (reverse audio)	16mm



1590B Enclosure (Top-Down View)
4.64" W x 6.68" H

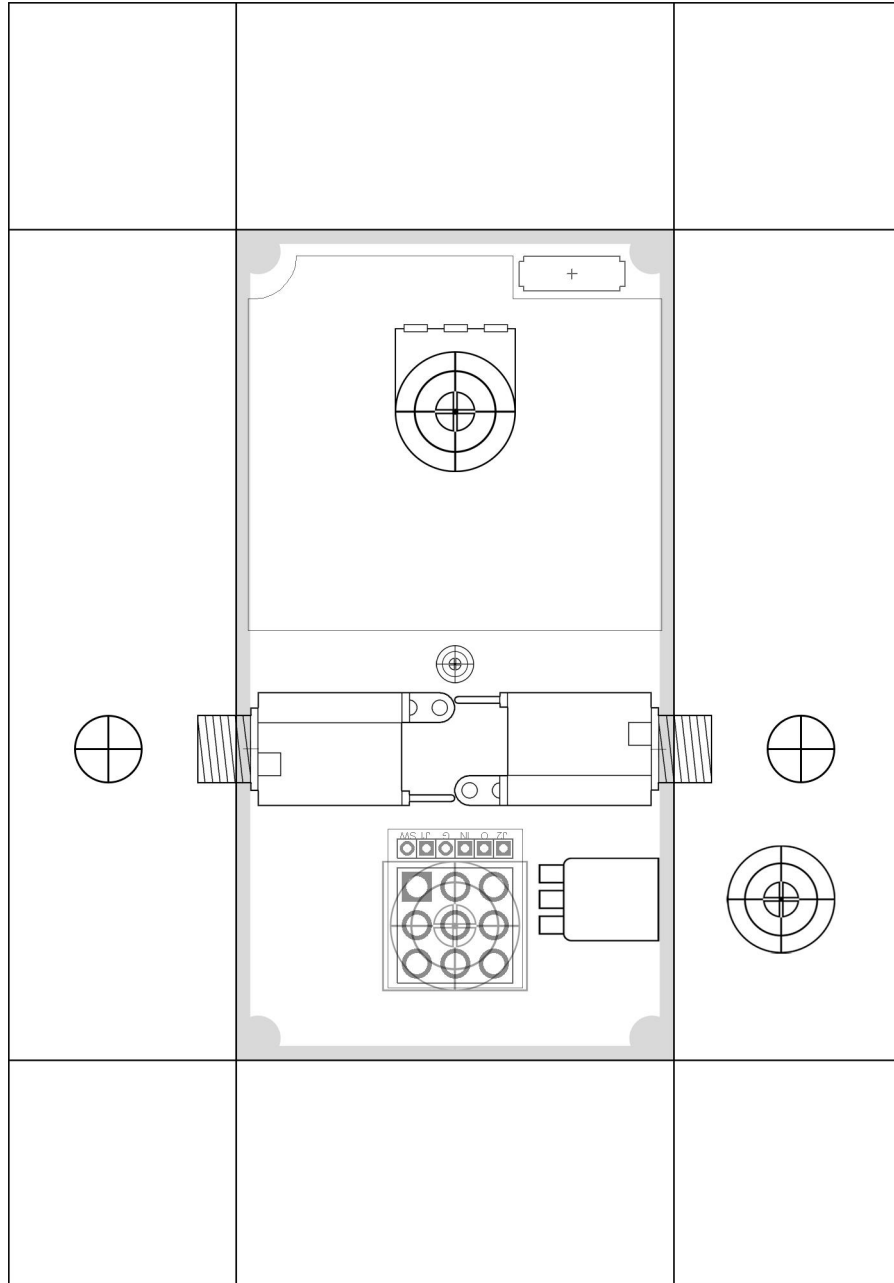


Download the Photoshop file used to create this template here:

http://www.madbeanpedals.com/projects/NomNom/NomNom_DRILL.zip

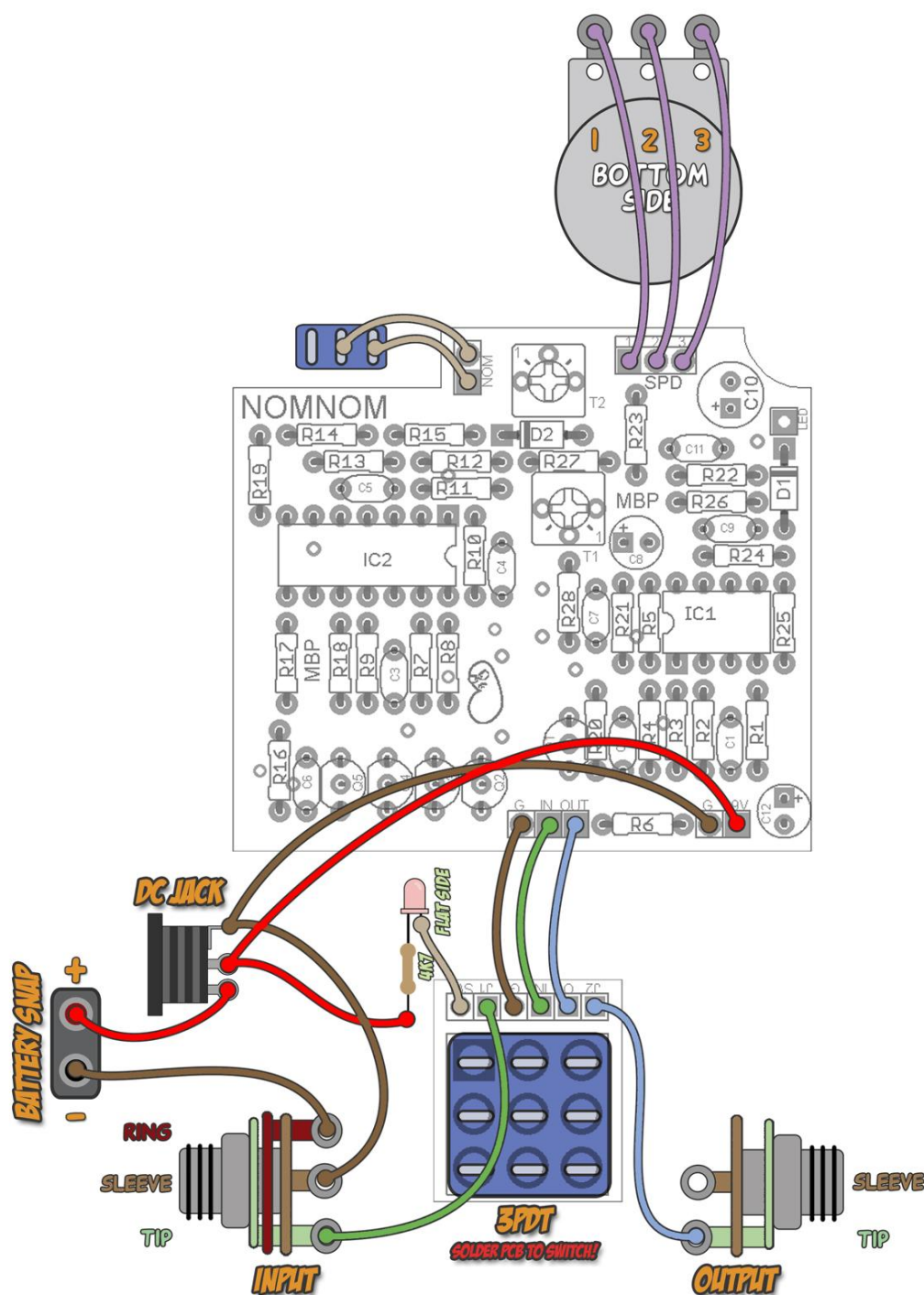
Note that if you are using the 3PDT breakout PCB it will be a pretty tight fit with a battery. You may want to forgo the 3PDT PCB in that case and move the input/output jacks further down away from the main PCB. I'd stick to the no-battery option if you can.

1590B Enclosure (Top-Down View)
4.64" W x 6.68" H



- no battery version -

Wiring Diagram



TIP: If you are using open-frame jacks like the Switchcraft ones, you only need to ground the input jack. The enclosure will ground the output. If you are using a plastic enclosed jack like the Marshall variety, you should ground both the input and output jacks.

The **NomNom** is an MXR Phase 90™ (script logo) clone for the 1590B. In addition to the phase circuit board, two utility boards are also included: the JFET matcher and bypass PCB. Building the NomNom requires the use of four matched JFETs to achieve proper phase. The matcher PCB is a simple utility used with any DMM, pen and paper to find matching transistors. The bypass PCB will simplify the I/O connections and is soldered directly to the standard blue 3PDT footswitch.

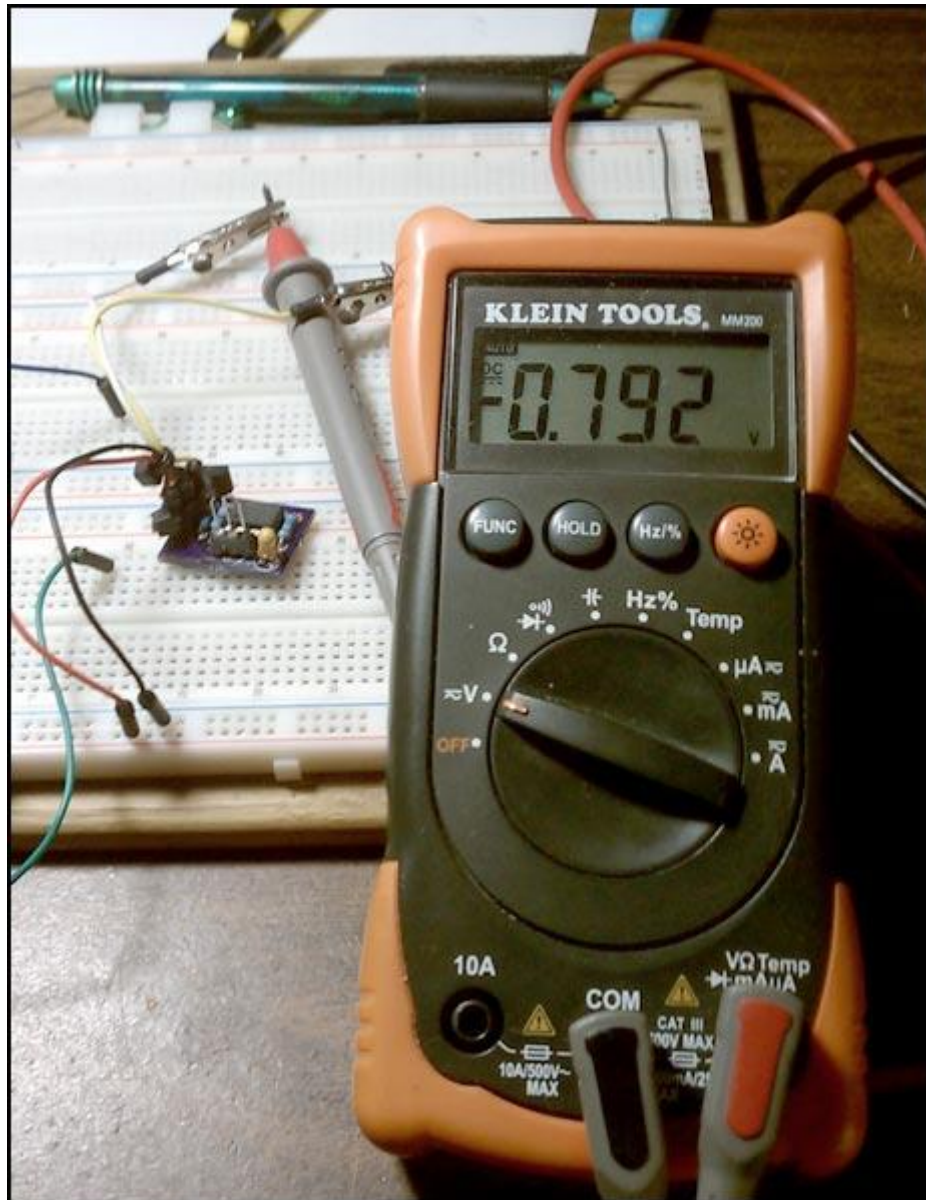
- SPD – Controls the rate of the LFO that sweeps the circuit through the phase stages from slow to fast.
- NOM – This switch enables feedback which intensifies the phase effect.
- T1 – This trimmer is used to calibrate the phase effect.
- T2 – This trimmer sets the maximum amount of feedback when the NOM switch is engaged.

An important consideration: Do you want to match your JFETs or pay someone else to do it?

This is a good question to ask before you start. Finding four well matched JFETs for the NomNom (or any similar phaser) is going to require a healthy supply of transistors. You should have *at least* 25 transistors on hand before even considering doing it yourself and it would be much better to have 50 or more. The Vgs characteristic (the thing we are comparing) varies widely from device to device and it is entirely possible to go through a few handfuls to find the right ones. The good news is that if you have a sufficient amount of transistors, you will likely find several pairs or quads that will work for future phaser builds. However, if the NomNom is the *only* phaser you are ever going to build, it might be better to purchase pre-matched transistors and skip the matcher PCB altogether. If this is the route you chose, guitarpcb.com has a set of four matched 2N5952 transistors for \$9.95 at the time of this writing. By comparison, 50 2N5457 or 2N5952 transistors from smallbear will cost you \$25. Still, you might find cheaper lots of these on eBay so it is worth checking out.

F'IT, I'm gonna match my own!

- Read about how JFET matching is done with the utility PCB (thanks to RG Keen!): http://www.geofex.com/Article_Folders/fetmatch/fetmatch.htm
- Populate the JFET matcher PCB. Use a socket for Q6 (I also used a socket for the four I/O pads 9v, G, D1, D2 but this is not required—you can use soldered wires if you like).
- Connect the 9v and G wires to your breadboard and power it up with a 9v supply. Connect the RED lead of your DMM to the D1 wire and the BLACK lead to the D2 wire. Set the DMM for a DC voltage reading.
- Place the first transistor into the Q6 socket. Remember: 2N5457 goes in as is shown on the PCB and 2N5952 should be turned in the opposite direction.
- Measure the voltage reading and record it on a piece of paper. Take the transistor out and place it next to the written record.
- Repeat this process: load a transistor, make a recording, place the transistor next to the recording. Keep doing this until you start to see matches.
- You want to find the closest matching voltage readings on these transistors. At least within 5% of one another, although I generally shoot for 1% or less. So, if a device reads -0.75vDC, I would look for another one that measures -0.74 to -0.76v.
- You may find several matches over different groups of readings. If so, great! Gather them up in groups of two or four and save them for future builds. Set aside your four best matched transistors for the NomNom.
- You're done!



Here is an example of a transistor under test. The V_{gs} value reads -0.792 , so if I want to match this device I would look for another 2N5457 that reads between -0.78 and -0.8 .

Building the Main PCB

Socket Q2 – Q6. Even though you have matched your transistors, there is always the possibility that something might go wrong that requires you to switch one of them out. Socketing these components means a no-hassle swap, if needed.

Luckily, from this point on everything is easy...just a regular circuit board build.

Calibrating

Once you have populated the main PCB, attached the SPD pot, NOM switch and connection wires it's time to load this thing up onto your testing rig for calibrating. You DO have a testing rig...right? Well, allow me to retort. You needs one. Unless this is the only pedal you are ever going to build, every rocker should have a prototyping rig to Rock It Before You Box It. Need help on making one? Here's the science: <http://www.madbeanpedals.com/forum/index.php?topic=1140.0>

Set the T1 and T2 trimmers about half-way up. Set the SPD pot half-way, too and leave the NOM switch OFF. Throw some fat chords out on your guitar and begin tweaking the T1 trimmer. What you are trying to achieve is a setting that results in the maximum amount of phase depth with minimum noise. What's happening here is that the trimmer is adjusting the bias voltage created by R27 and D2 via the current limiting resistor of R28. Put simply, you are dialing in the right voltage to allow the LFO to sweep the guitar signal through the four phase stages for the most pleasant sounding result. Try setting the SPD pot up and down further and continue tweaking. It is actually very simple and should only take a minute or two to find the right setting.

Once you have T1 dialed in turn the NOM switch on to enable feedback. Adjust T2 to taste. Counter-clockwise settings produce more feedback and vice versa. You may find the lowest setting on T2 produces some self-oscillation and this should be avoided. Personally, I prefer the feedback setting a bit higher so it is not too intense, so around the middle of the trimmer is just right for me.

If for some reason you are not getting any phasing at all, you need to start standard debug procedures. Check voltages on the ICs and transistors ensure that all transistors are oriented correctly; all joints are properly soldered, and so on. I have read that in some cases D2 might need to be replaced with a 4.7vZener if you are not getting the phasing effect, however in practice I have never experienced this. Still, it is something to keep in mind if all other possibilities are eliminated.

Final Steps

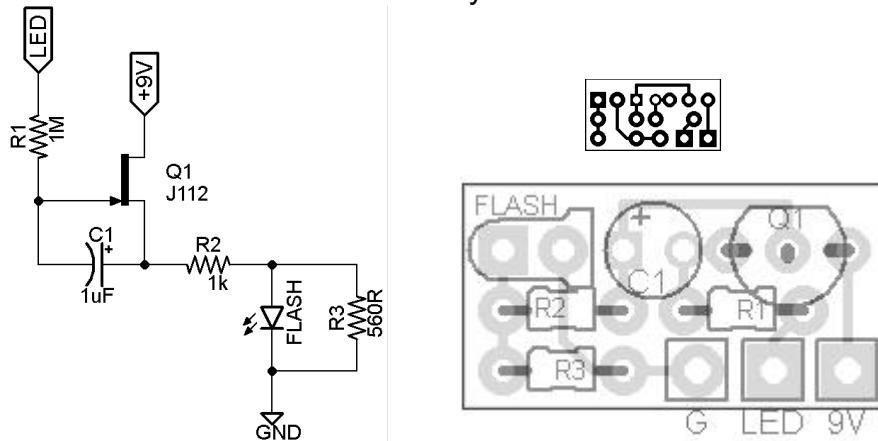
Solder the bypass PCB to your 3PDT switch. It is a tight fit, so don't be afraid to push the PCB into place. I find the easiest way to solder a PCB to a large switch is to temporarily mount it to the outside of a drilled enclosure. This locks the switch in place while soldering and ensures a good connection.

That's it! You have Rocked It. Now Box it!

Bonus #1

Hey! There's another pad on the top right of the PCB labeled LED...what gives? Why doesn't my bypass LED connect here? This is a pad to connect an LED if you want a rate indicator with the SPD pot. This can be a nice thing to have, or very annoying depending on your own preference. However, there is a problem here; connecting an LED straight from an LFO output can sometimes subtly alter the LFO waveform. Not always the case, but if you have ever scoped LFOs with LED indicators attached you may have seen it. We don't want to take any chances with our beautiful phase wave, so let's go the extra mile here.

Here's the handy little circuit:



You'll have to etch your own board, or build it on perf / vero. The PCB image is .37"H x .71"W. Connect the LED pad on the Flash board to the LED pad on the NomNom, and also connect the 9v and G pads to the DC jack.

Bonus #2

If you want a different flavor of phase, you can substitute the phase caps for the values used in the Univibe. It won't magically turn your NomNom into a Univibe, but it will get you in the ballpark. Obviously you will want to socket these caps so you can revert to the traditional values if you want.

Make the following changes: C3: 15n, C4: 220n, C5: 470pF, C6: 4n7

Double Extra Bonus #2: try the same values in a different order. Ex: 470pF, 4n7, 15n, 220n and so on.

And, just in case you are tempted....

DO NOT LET KITTEH BUILD THE NOM NOM~!



HE DON'T KNOW ABOUT TEH PEDULZ!