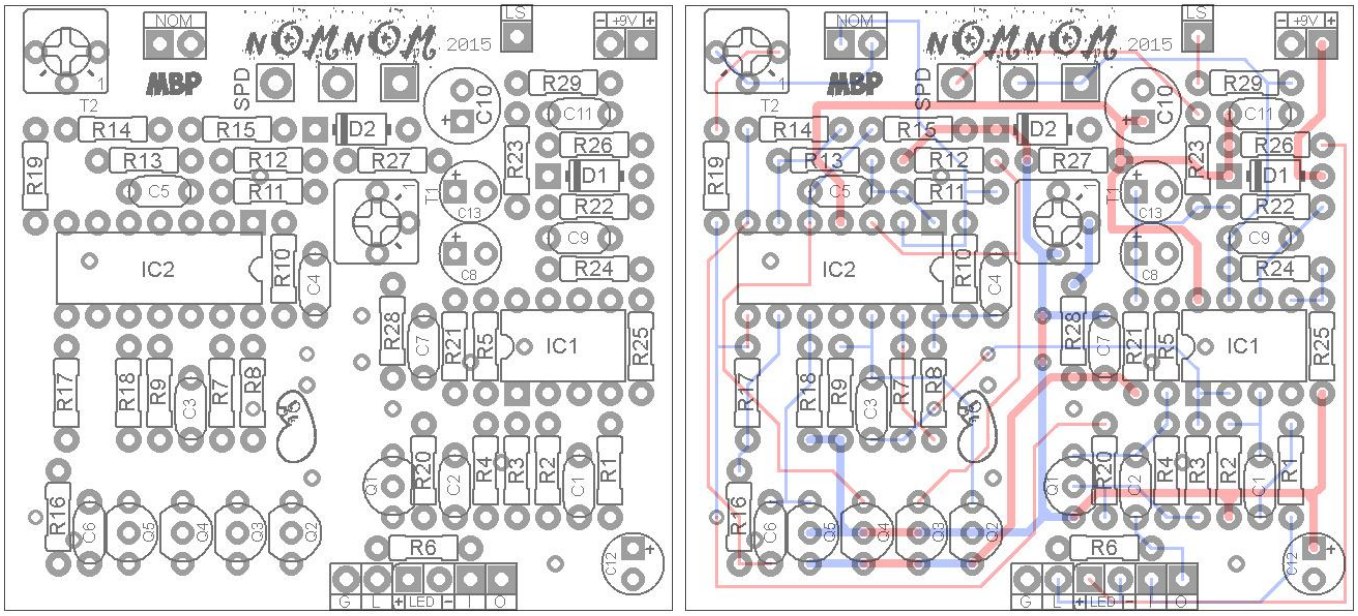
NOMNOM

FX Type: Filter

2015 edition

Based on the MXR Phase 90™

2.15” W x 1.95” H



Changes to the 2015 edition

- Added C13 and R29
- Changed SPD pot to PCB mount
- Removed 47R Power Supply resistor
- Removed JFET matcher and bypass board

B.O.M.					
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	2N5457
R6	150k	C6	50n	IC	
R7	10k	C7	50n	IC1	TL072
R8	10k	C8	15uF	IC2	TL074
R9	22k	C9	10n	Switch	
R10	10k	C10	100uF	NOM	SPDT
R11	10k	C11	100n	Trimpots	
R12	22k	C12	22uF	T1	250k
R13	10k	C13	**	T2	25k
R14	10k			Pot	
R15	22k			SPD	500kC
R16	10k				
R17	10k				
R18	22k				
R19	22k				
R20	150k				
R21	3M9				
R22	150k				
R23	4k7				
R24	470k				
R25	150k				
R26	4k7				
R27	10k				
R28	1M				
R29	***				

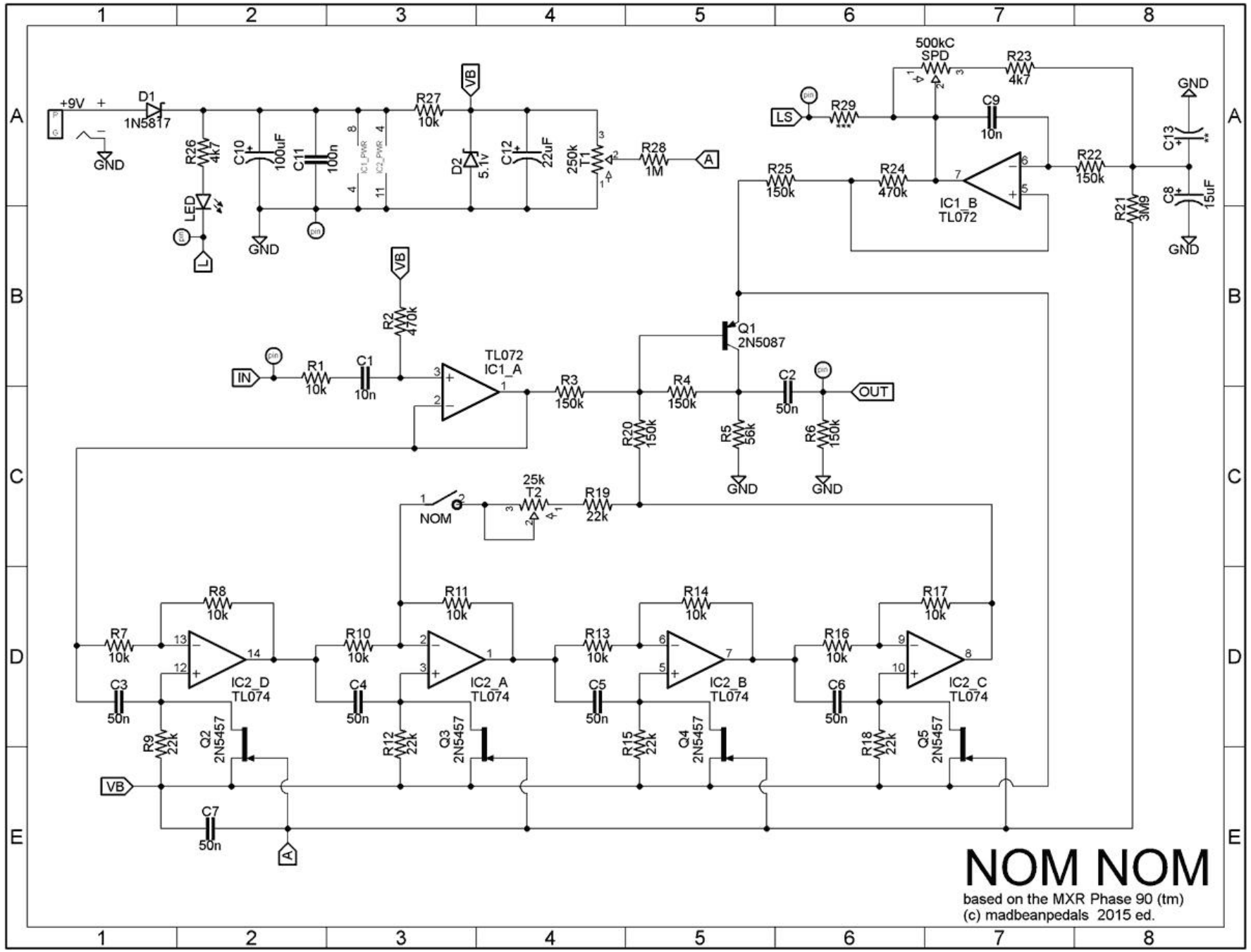
- 50n is a less common value in caps these days (at least in the U.S.). Use 47n instead.

- The **NomNom** 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.

- 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.

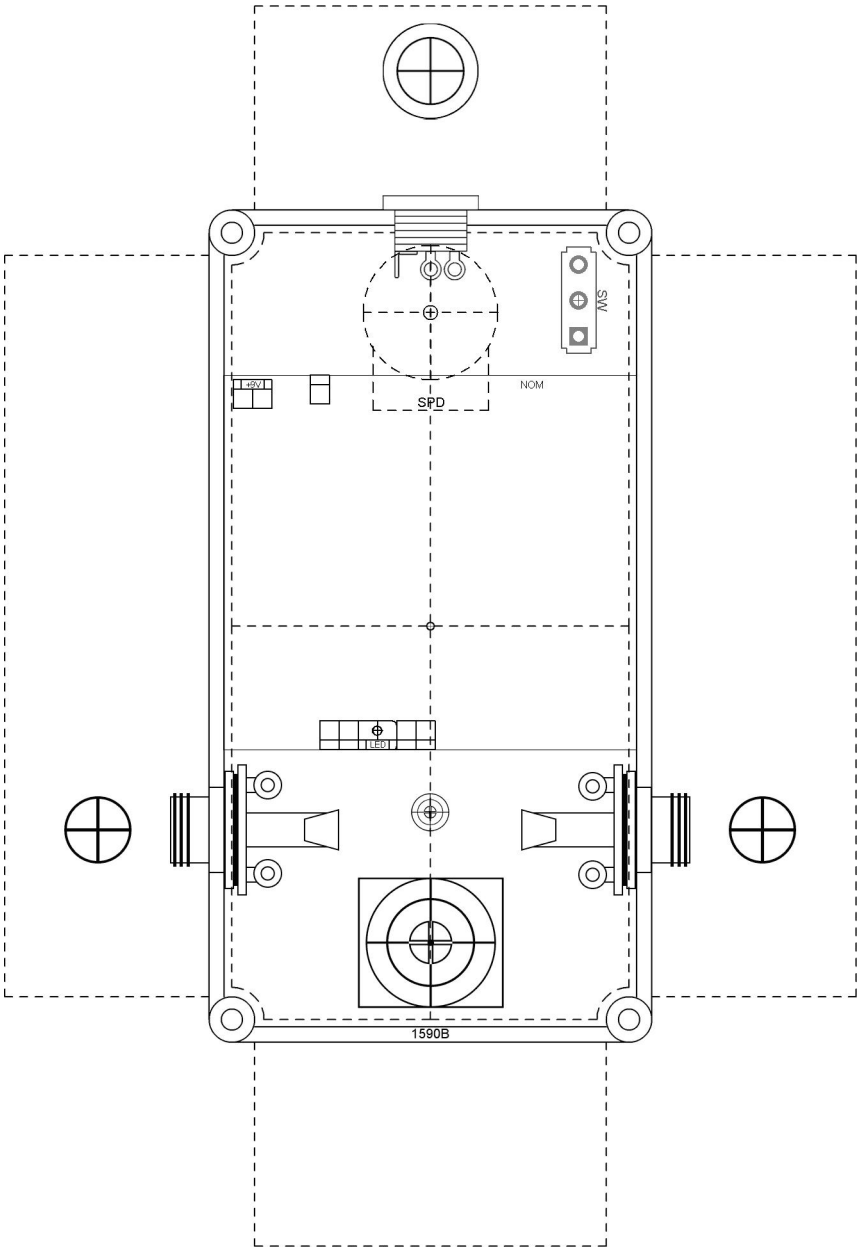
- If you do not have a 15uF cap for C8, use 10uF and add a 4u7 cap to C13 to approximate 15uF. Leave C13 empty if you are using 15uF for C8.

Shopping List			
Value	QTY	Type	Rating
4k7	2	Carbon / Metal Film	1/4W
10k	10	Carbon / Metal Film	1/4W
22k	5	Carbon / Metal Film	1/4W
56k	1	Carbon / Metal Film	1/4W
150k	6	Carbon / Metal Film	1/4W
470k	2	Carbon / Metal Film	1/4W
1M	1	Carbon / Metal Film	1/4W
3M9	1	Carbon / Metal Film	1/4W
10n	2	Film	16v or more
50n	6	Film	16v or more
100n	1	Film	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		1/2W or 1W
2N5087	1		
2N5457	4		
TL072	1		
TL074	1		
SPDT	1	On/On (or SPST)	
250k	1	Bourns 3362P	
25k	1	Bourns 3362P	
500kC	1	PCB Mount (short pin)	16mm


NOM NOM
based on the MXR Phase 90 (tm)
(c) madbeanpedals 2015 ed.
+9V
D1
1N5817
GND
R26
4k7
LED
C10
100uF
C11
100n
R27
10k
VB
D2
5.1v
C12
22uF
250k
T1
R28
1M
A
500kC
SPD
R23
4k7
LS
R29
C9
10n
R25
150k
R24
470k
IC1_B
TL072
R22
150k
R21
3M9
C13
C8
15uF
R2
470k
IN
R1
10k
C1
10n
TL072
IC1_A
Q1
2N5087
R3
150k
R4
150k
C2
50n
OUT
R20
150k
R5
56k
R6
150k
25k
T2
R19
22k
NOM
R8
10k
R7
10k
C3
50n
IC2_D
TL074
R9
22k
Q2
2N5457
R11
10k
R10
10k
C4
50n
IC2_A
TL074
R12
22k
Q3
2N5457
R14
10k
R13
10k
C5
50n
IC2_B
TL074
R15
22k
Q4
2N5457
R17
10k
R16
10k
C6
50n
IC2_C
TL074
R18
22k
Q5
2N5457
C7
50n

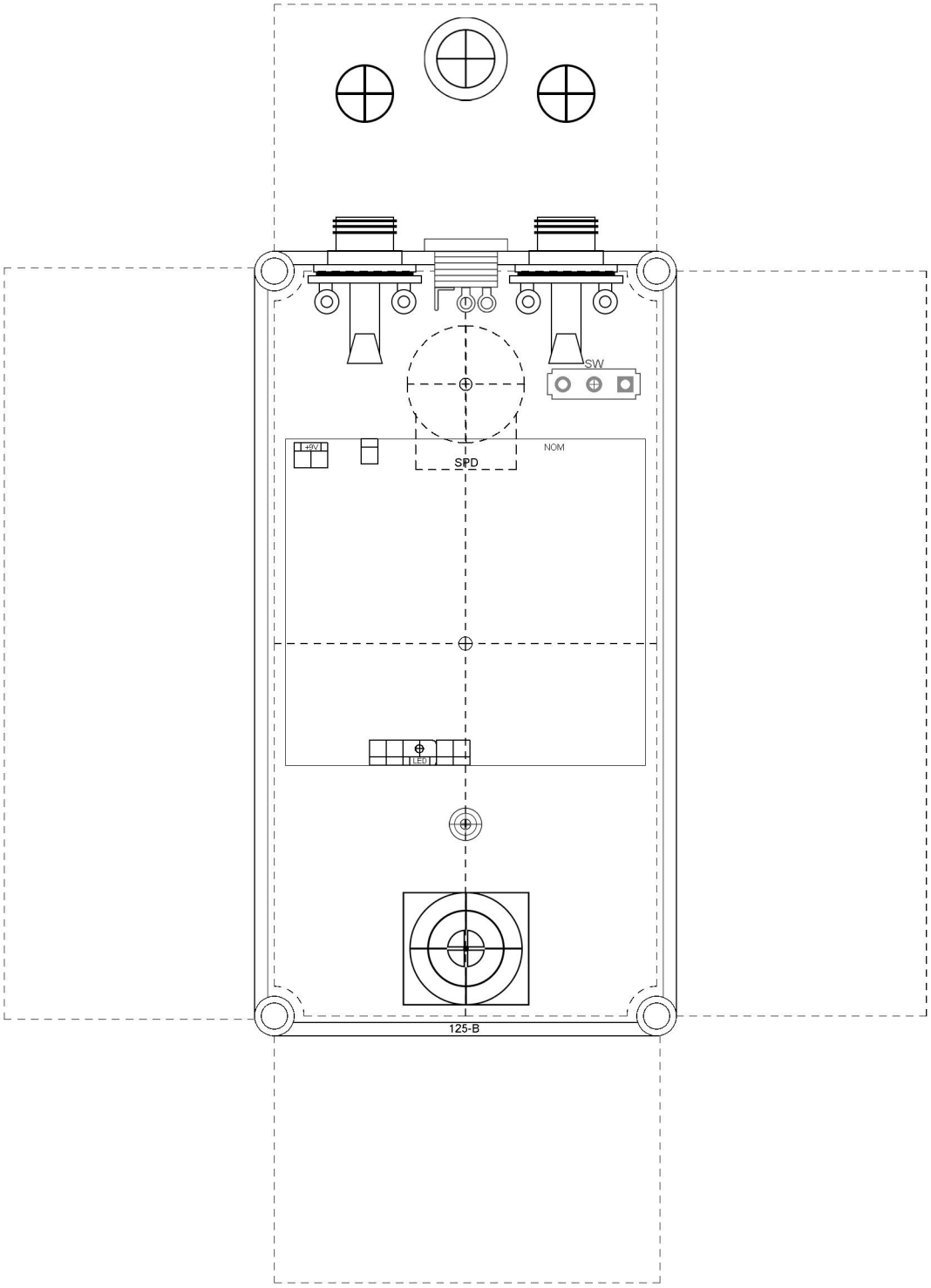
1590B Enclosure (Top-Down View)

4.43” W x 6.46” H

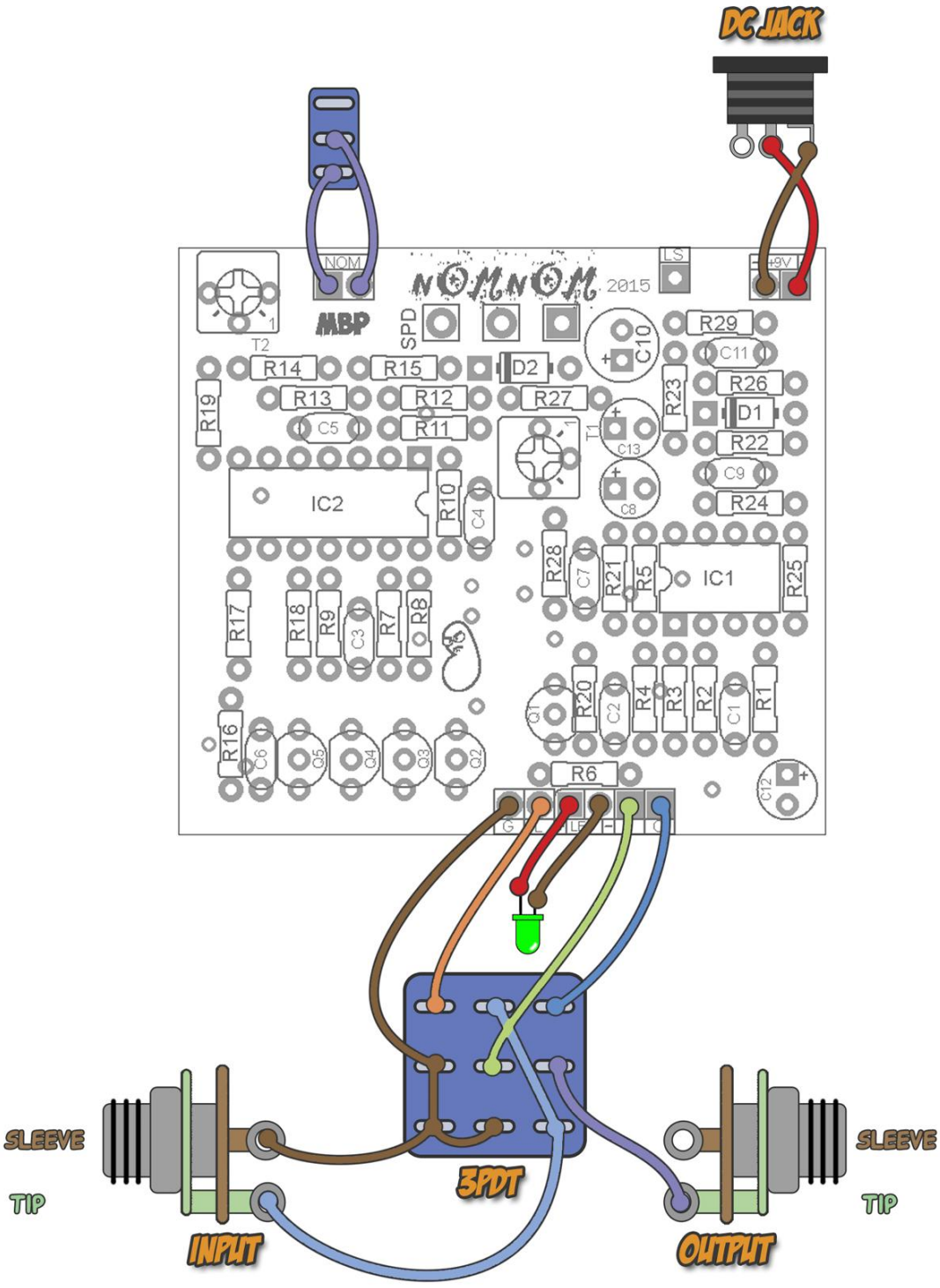


125B Enclosure (Top-Down View)

5.52” W x 7.65” H



Wiring Diagram



The **NomNom** is an MXR Phase 90™ (script logo) clone for the 1590B (or 125B). Building the NomNom requires the use of four matched JFETs to achieve proper phase.

- **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.

See pg.10 for more info on how to match transistors for the Nom Nom.

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.

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.

Voltages

	IC1
1	4.25
2	4.25
3	4.05
4	0
5	varies
6	varies
7	varies
8	8.67

	IC1
1	4.26
2	4.29
3	4.29
4	8.68
5	4.25
6	4.7
7	4.42
8	4.18
9	4.24
10	4.26
11	0
12	4.25
13	4.25
14	4.26

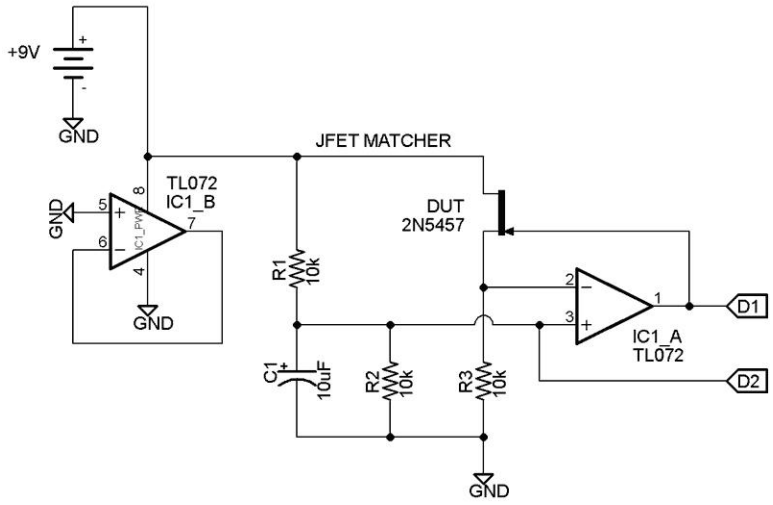
9.4 One Spot supply

These voltages were taken from the 2014 NomNom which included a 47R inline resistor on the power supply. Since this was removed from the 2015 edition your voltages will likely read a little higher. Keep in mind that some voltage readings will also depend on where you have T1 set. However, these readings should give you the ballpark estimate on what to expect.

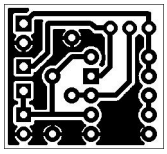
Matching Transistors

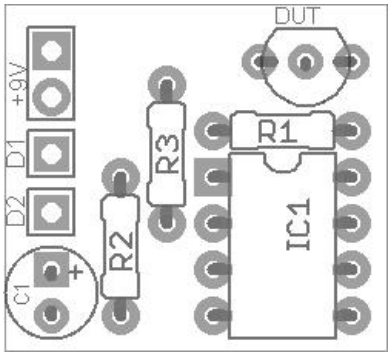
Read about how JFET matching is done here (courtesy of RG Keen):
http://www.geofex.com/Article_Folders/fetmatch/fetmatch.htm

You can use this schematic to breadboard the transistor matching circuit or etch your own PCB. DUT stands for “Device Under Test” (the transistor from which you take the Vgs reading).



0.83”W x 0.75”H





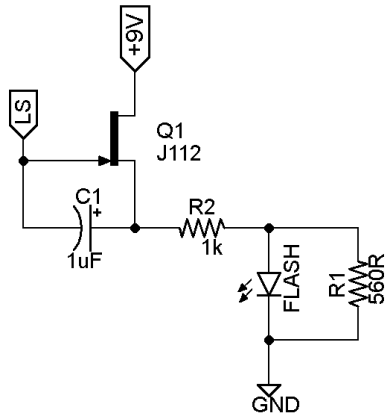
- Connect the RED lead of your DMM to D1 and the BLACK lead to D2. Set your DMM for a DC voltage reading (FYI it doesn’t matter which lead you connect to the D1/D2 pads as long as you do it consistently from device to device).
- Place the first transistor into the DUT socket. A 2N5457 goes in as is shown on the PCB. A 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, and 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.

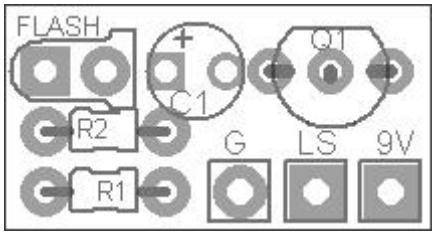
Using an LED

There are two ways you can use an LED indicator for the Speed control.

Method 1 – Make R29 a 1k resistor. Wire the “LS” pad to the anode of a 3 or 5mm diffused LED. Wire the cathode of that LED to ground. This method will show a square wave output so it will blink on and off.

Method 2 – Make R29 a 1M resistor. Wire the “LS” pad to the circuit shown below. This will give the LED some ramp up and down on its illumination so it is not quite so “square”.





0.71”W x 0.38” H