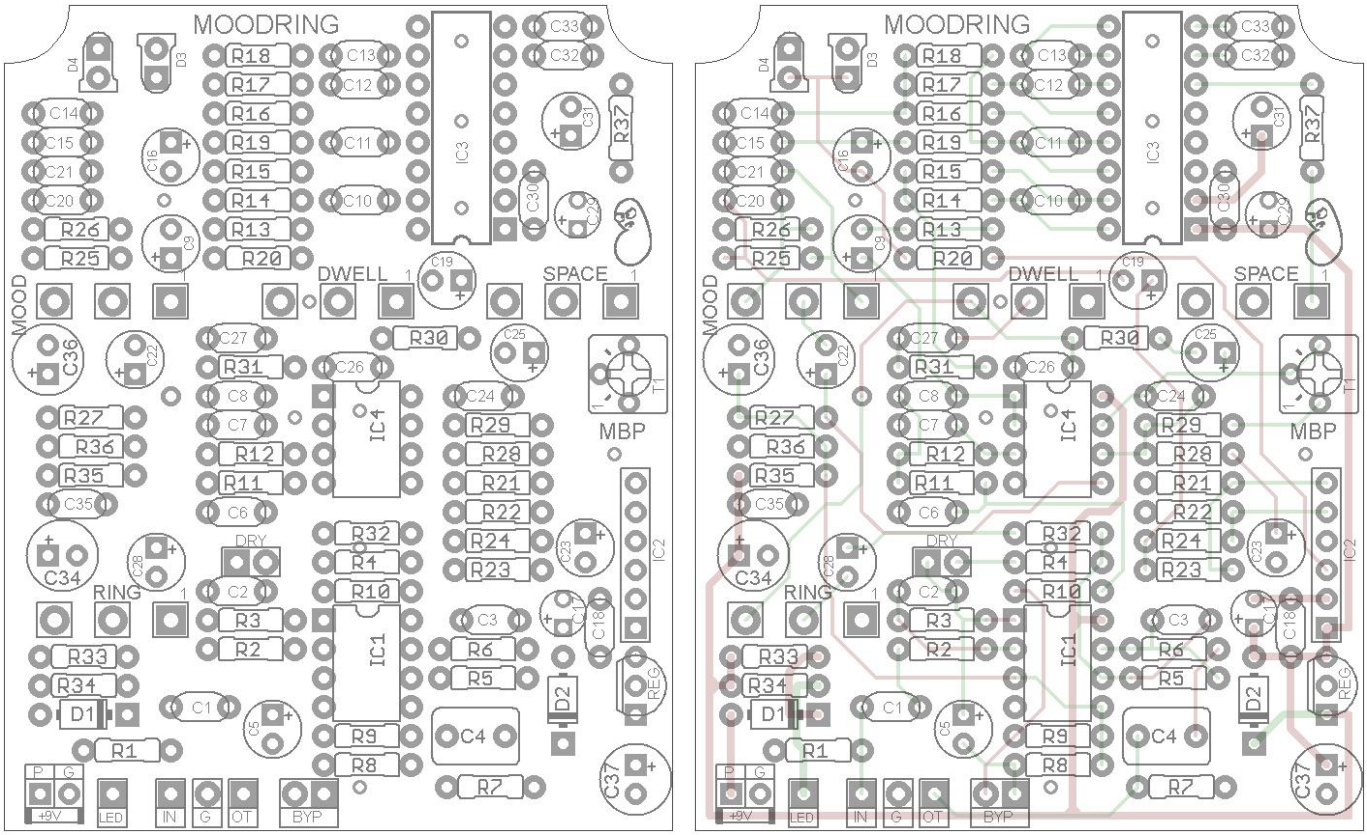
MOODRING

FX Type: Reverb

2.3” W x 2.85” H

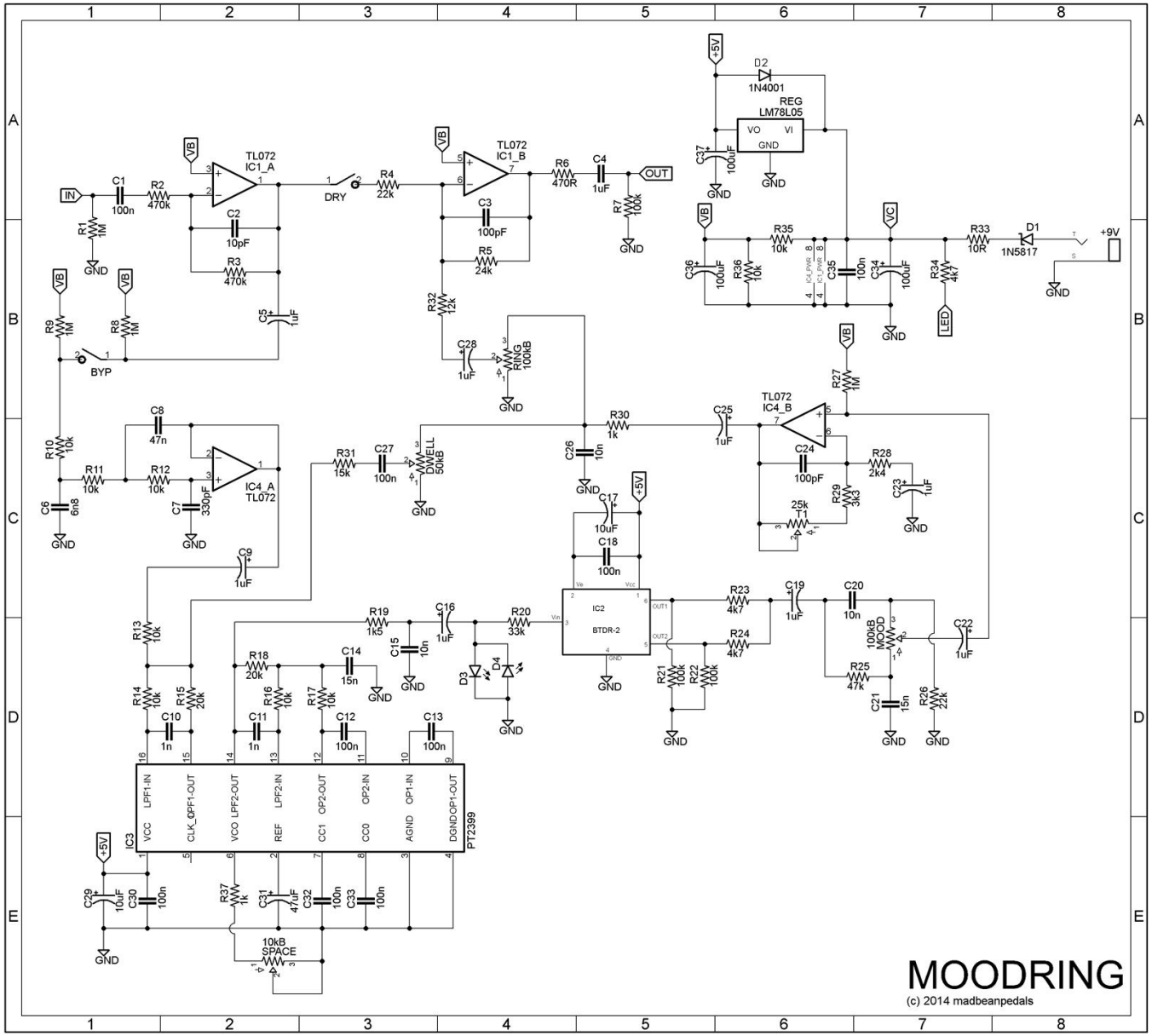


B.O.M.

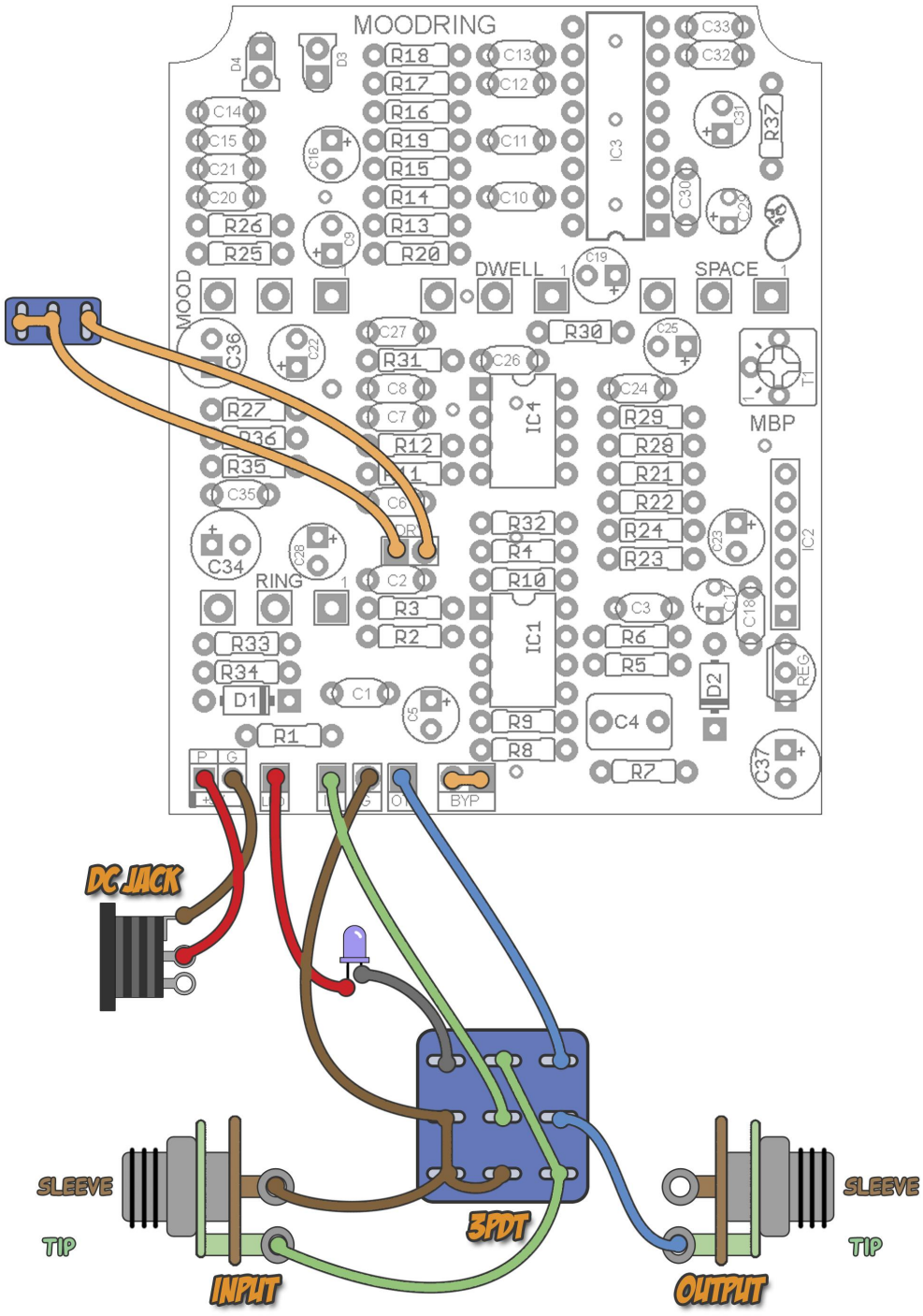
Resistors		Caps		Diodes	
R1	1M	C1	100n	D1	1N5817
R2	470k	C2	10pF	D2	1N4001
R3	470k	C3	100pF	D3, D4	RED 3MM
R4	22k	C4	1uF	**ICS**	
R5	24k	C5	1uF	IC1	TL072
R6	470R	C6	6n8	IC2	BTDR-2
R7	100k	C7	330pF	IC3	PT2399
R8	1M	C8	47n	IC4	TL072
R9	1M	C9	1uF	**Regulator**	
R10	10k	C10	1n	REG	LM78L05
R11	10k	C11	1n	**Switch**	
R12	10k	C12	100n	DRY	SPST
R13	10k	C13	100n	**Trimpot**	
R14	10k	C14	15n	T1	25k
R15	20k	C15	10n	**Pots**	
R16	10k	C16	1uF	RING	100kB
R17	10k	C17	10uF	SPACE	10kB
R18	20k	C18	100n	DWELL	50kB
R19	1k5	C19	1uF	MOOD	100kB
R20	33k	C20	10n		
R21	100k	C21	15n		
R22	100k	C22	1uF		
R23	4k7	C23	1uF		
R24	4k7	C24	100pF		
R25	47k	C25	1uF		
R26	22k	C26	10n		
R27	1M	C27	100n		
R28	2k4	C28	1uF		
R29	3k3	C29	10uF		
R30	1k	C30	100n		
R31	15k	C31	47uF		
R32	12k	C32	100n		
R33	10R	C33	100n		
R34	4k7	C34	100uF		
R35	10k	C35	100n		
R36	10k	C36	100uF		
R37	1k	C37	100uF		

Shopping List

Value	QTY	Type	Rating
10R	1	Metal / Carbon Film	1/4W
470R	1	Metal / Carbon Film	1/4W
1k	2	Metal / Carbon Film	1/4W
1k5	1	Metal / Carbon Film	1/4W
2k4	1	Metal / Carbon Film	1/4W
3k3	1	Metal / Carbon Film	1/4W
4k7	3	Metal / Carbon Film	1/4W
10k	9	Metal / Carbon Film	1/4W
12k	1	Metal / Carbon Film	1/4W
15k	1	Metal / Carbon Film	1/4W
20k	2	Metal / Carbon Film	1/4W
22k	2	Metal / Carbon Film	1/4W
24k	1	Metal / Carbon Film	1/4W
33k	1	Metal / Carbon Film	1/4W
47k	1	Metal / Carbon Film	1/4W
100k	3	Metal / Carbon Film	1/4W
470k	2	Metal / Carbon Film	1/4W
1M	4	Metal / Carbon Film	1/4W
10pF	1	Ceramic	16v min.
100pF	2	Ceramic	16v min.
330pF	1	Ceramic	16v min.
1n	2	Film	16v min.
6n8	1	Film	16v min.
10n	3	Film	16v min.
15n	2	Film	16v min.
47n	1	Film	16v min.
100n	9	Film	16v min.
1uF	1	Film	16v min.
1uF	8	Electrolytic	16v or 25v
10uF	2	Electrolytic	16v or 25v
47uF	1	Electrolytic	16v or 25v
100uF	3	Electrolytic	16v or 25v
1N5817	1		
1N4001	1		
LED 3MM	2	red, diffused	
TL072	2		
BTDR-2	1		
PT2399	1		
LM78L05	1	T0-92 style	
SPST	1	or, SPDT	
25k	1	Bourns 3362P	
100kB	2	Alpha Right Angle PCB Mount	16mm
10kB	1	Alpha Right Angle PCB Mount	16mm
50kB	1	Alpha Right Angle PCB Mount	16mm

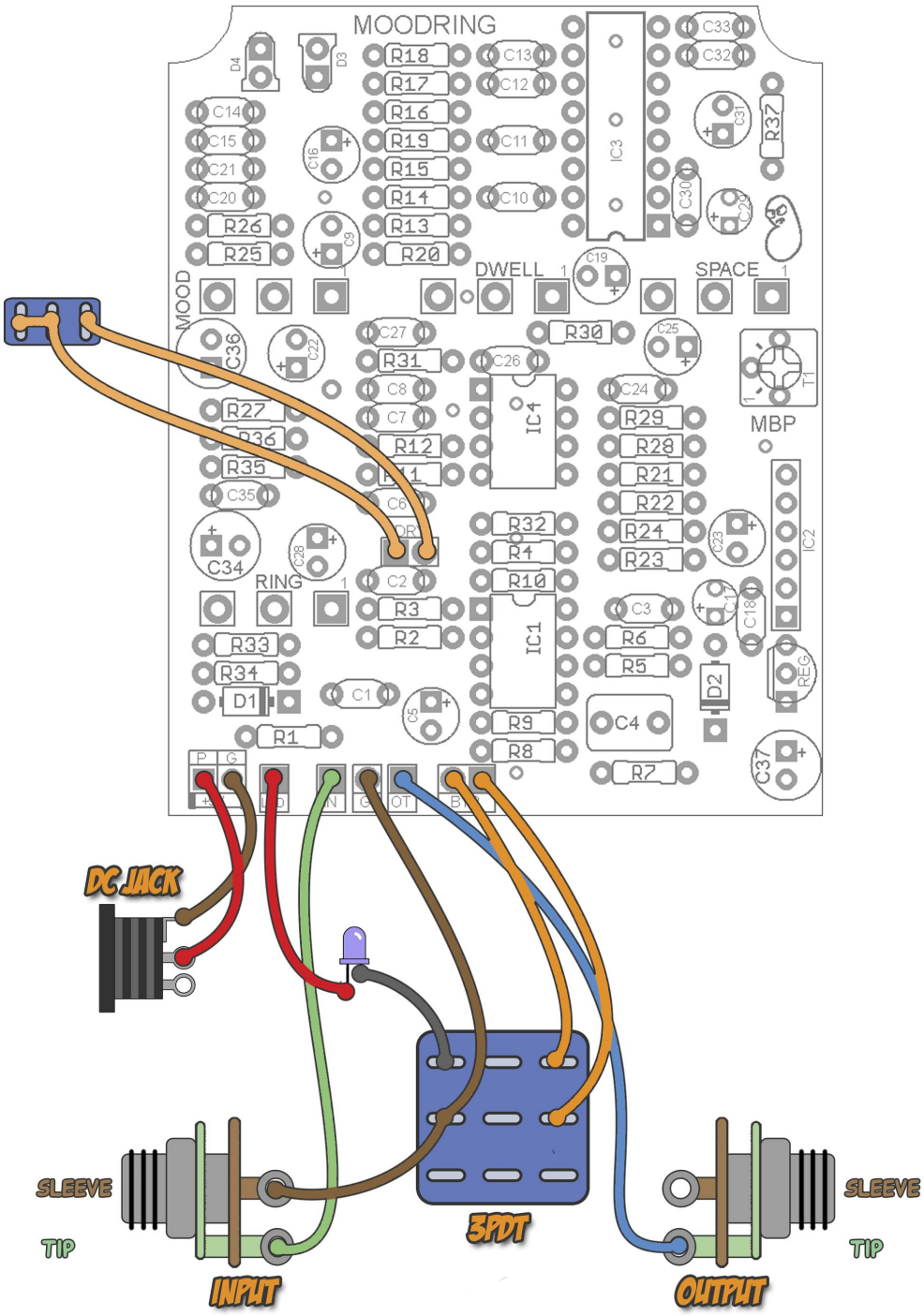

MOODRING
(c) 2014 madbeanpedals
IN
OUT
DRY
BYP
TL072
IC1_A
IC1_B
IC4_A
IC4_B
REG
LM78L05
1N4001
1N5817
+5V
+9V
VB
VC
GND
LED
IC2
BTDR-2
IC3
PT2399
LPF1-IN
LPF1-OUT
LPF2-OUT
LPF2-IN
OP2-OUT
OP2-IN
OP1-IN
OP1-OUT
VCC
CLK
VCO
REF
CC1
CCO
AGND
DGND
10kB
SPACE
RING
100kB
DWELL
50kB
MOOD
100kB

True Bypass Wiring



Be sure to jumper the two "BYP" pads as shown and omit R8.

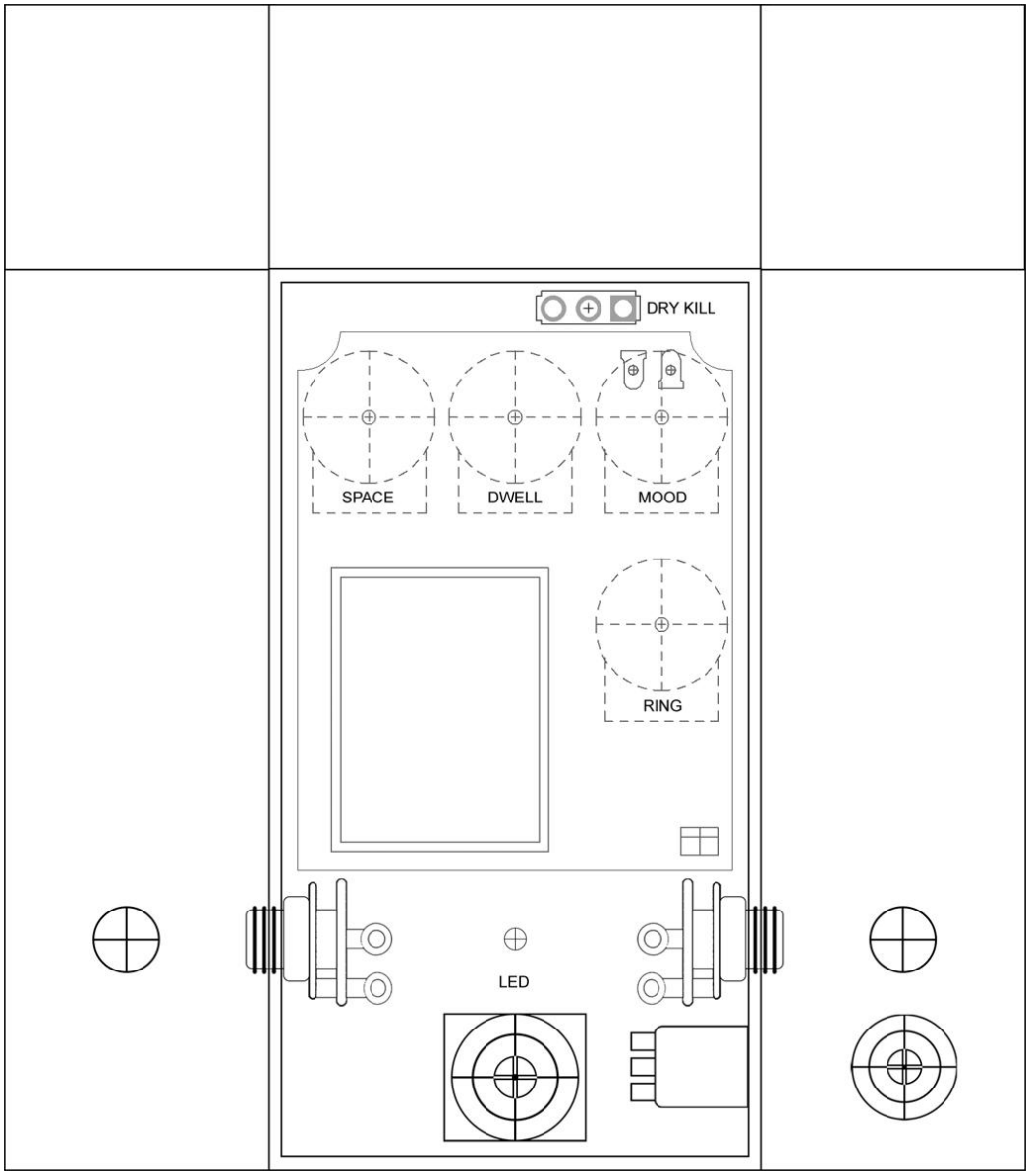
Buffered Wiring



Omit R1.

125B Drill Guide

5.41” W x 6.18” H



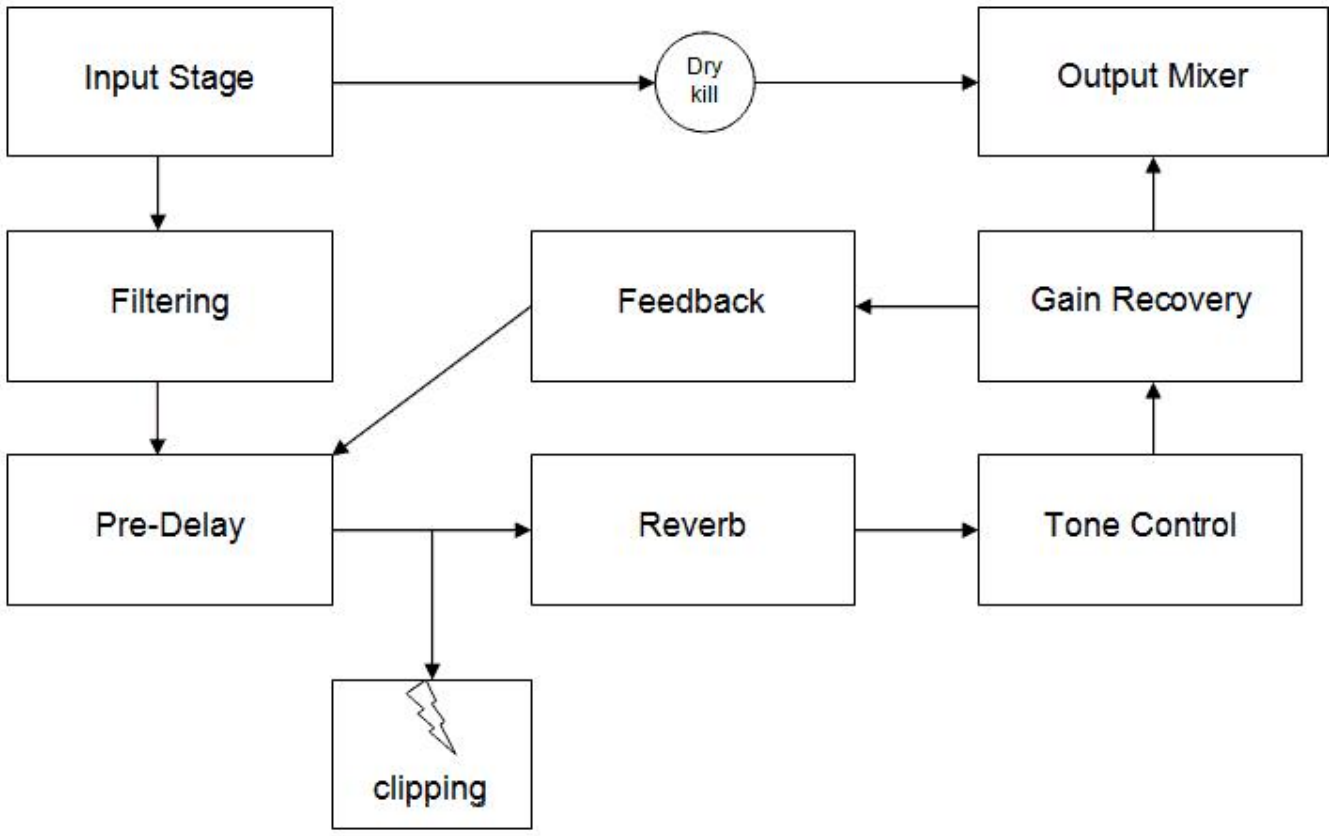
Download the Photoshop file used to make this guide here:
http://www.madbeanpedals.com/projects/Moodring/Moodring_Drill.zip

The **Moodring** has been in “development hell” for about two years. This reverb pedal has turned out to be the most revised and re-designed project since madbeanpedals began (some seven or eight different designs before release!) But, I’m happy to say that I think the Moodring is not only one of the best Belton Brick-based reverbs out there, but also one of the best sounding MBP projects. It has character, ambience and even a bit of weirdness if you dial the knobs right. While the part count is fairly high (more on par with an analog delay) it requires almost no tweaking or adjustment. Just plug it in and let your fat E chords rip!

Controls

RING: The amount of reverb mixed with the dry signal.
MOOD: A tone control for the reverb.
SPACE: The amount of pre-delay before the reverb. This goes from a few ms to about 300ms.
DWELL: The amount of reverb fed back into the pre-delay/reverb section.
DRY: This switch lets you kill the dry signal so that you only have reverb going to the output.
T1: This is an adjustable gain stage. Stock setting is about ¼ up. As you turn it up further, the reverb gets louder. This will let you fine tune just how much reverb gets fed into the RING and DWELL knobs.

Design Breakdown



Circuit (pseudo) Analysis

Input Stage/Output Mixer: Inverted method with high input impedance low output impedance. The implementation results in a fairly flat frequency response and minimal volume change to the inputted signal.

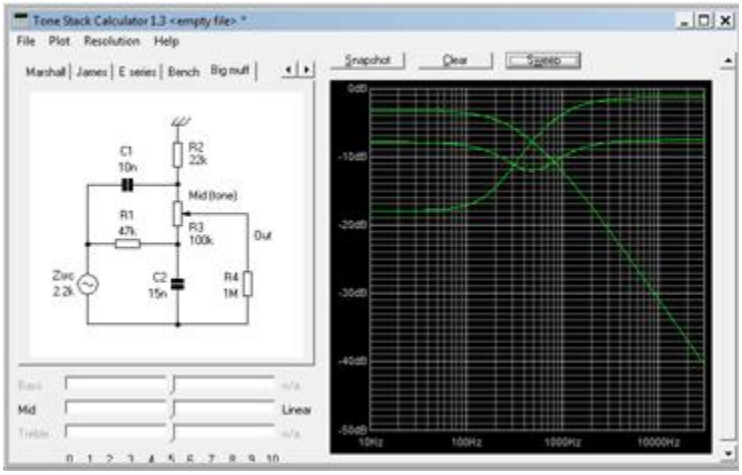
Filtering: Active filtering was chosen for the pre-emphasis portion of the reverb for convenience.

Pre-Delay: The PT2399 offers an adjustable pre-delay into the reverb section. Filtering here was kept to a minimum. The pre-delay circuit ranges from a few ms to about 300ms.

Clipping: LED clippers were used before the reverb circuit to limit excessive volume and noise from over-saturating its input. The higher forward voltage means they only begin to clip when the Dwell control is near maximum.

Reverb: The BTDR-2 was used here for availability, ease of use and size.

Tone: A Big Muff™ style tone control offered the best range of filter shaping on the reverb.



Gain Recovery: With the tone control, signal loss was a concern. Luckily, we have one-half of an op-amp left over to make a simple adjustable gain recovery stage.

Feedback: Feeding the output back into the reverb proved to offer some unique settings. It helps increase ambience and grit. It can even create drone-like settings. The Dwell and Tone control are somewhat interactive in this respect.

Dry Kill: a simple switch to remove the dry signal turns out to be a great option. Volume swells and light dynamics really shine.

Notes

The BTDR-2 is the only Belton Brick that will work with this design. The BTDR-1 and 3 are not compatible with the PCB.

There are three types of the BTDR-2: long, medium and short. The Moodring was tested with the medium type only. The other two will work, obviously. The only difference should be in the "room size" the modules put out. The medium seems to offer plenty of room, IMO. But, feel free to experiment.

The BTDR-2 has modulation built into its design, for better or worse. It cannot be "turned off". From what I can tell, it seems to be a triangle wave with a period of about a second…maybe a little more. The modulation did not seem to pose any problems in the Moodring.

Finally, the module itself should be soldered on the bottom side of the board with the pots. It must be soldered in the correct way to work. Pin1 is the square pin of IC2 (the BTDR-2).

IMPROTANT: the module is rather thick and runs the risk of being *almost* (but not quite) too tall for the PCB mounted pots. Keep your component leads trimmed close to the pads that are underneath the module and push the pins as far through the PCB pads as you can to avoid any problem with the module thickness.

Wiring

There are two methods of wiring the Moodring as shown on pgs.5,6.

True Bypass

- Advantages: No possible tone coloration when the effect is bypassed.
- Disadvantages: Mechanical noise from the 3PDT will propagate through the reverb when the effect is turned on. The reverb will cut off abruptly when the effect is turned off.

"Buffered" (this is not a true buffer…*it is non-true bypass*)

- Advantages: Switch popping will be minimal when the reverb is turned on. The reverb will "spill over" the dry signal when it is turned off and decay naturally.
- Disadvantages: There is a possibility that your normal guitar signal will be colored in some way since it always goes through the input/output mixer stages. IOW, part of the circuit is "always on".

Since you are an intelligent and thorough pedal builder, no doubt you follow the "box it before you rock it" mantra. As you will have the opportunity to test the effect out before committing it to an enclosure and wiring it up I say listen to the signal through portion versus your normal bypassed signal first. If you are happy that whatever changes result from the "always on" aspect are minimal (or at least not bad), then go with the non true-bypass wiring. You will probably like it much more that way! If, however, you find that it does change or color your bypass tone in some undesirable way then stick with the true bypass wiring. This is pretty unlikely to happen, but it is worth considering.

Voltages (DC) from a 9.3v supply

IC1

1 – 4.17
2 – 4.17
3 – 4.18
4 – 0.0
5 – 4.15
6 – 4.16
7 – 4.16
8 – 8.32

IC2

1 – 5.00
2 – 10mV
3 – varies
4 – 0.0
5 – 0.0
6 – 0.0

IC3

1 – 5.02
2 – 2.51
3 – 0.0
4 – 0.0
5 – 2.7
6 – 2.34
7 – 0.79
8 – 0.79
9 – 2.52
10 – 2.52
11 – 2.52
12 – 2.52
13 – 2.52
14 – 2.52
15 – 2.52
16 – 2.52

IC4

1 – 4.16
2 – 4.5
3 – 3.95
4 – 0.0
5 – 3.7
6 – 4.15
7 – 4.14
8 – 8.3