

The Forum-Vibe

Contributed by: Brad Burt
(aka: Redhouse)

What it is...

This layout is an effort to make a multi-use Univibe PCB which can support vintage or higher performance builds, allowing layout space for alternative component choices and supporting most of the common mods that have been contributed in the forums over the years.

The **R4-F** board layout I'm calling the **Forum-Vibe** is a 4th generation board which uses the 1970's *stand-up* component style where the resistors stand up on one leg to save space. supported modifications include JC Maillet's *bulb driver bias Offset-Adj* mod (the most useful mod IMHO) which allows nearly any small bulb in the 1.2v-14v, 20mA-100mA range to be used and enables the LFO circuit to be dialed-in finding the *sweet spot* for the LDR's. This pretty much negates the problem of finding the "*right*" LDR's or Lamps for the vibe.

If you are not familiar with JC's work you should go to his [website](#) and have a read, you will find lots of really great vibe (*and other*) stuff over there, and Moosapotamus's (CharlieB) univibe page is [here](#) where he has 'vibe and other really great stuff like the AD/A flanger clone there too, and I should also mention RG and his [geofex.com](#) website.

The Forum-Vibe supports *vintage* or *modern* builds in any combination. Support for the bulb driver mod, output mix mod, dual Darlingtons mod, dual MPS-A13 mod, universal Bourns type trim-pot pads, Greenies or WIMA's, Electrolytic, Tantalum or Panasonic ECQ-V stacked film caps, additional space for a Poly .22uF cap, and has an extra set of pads for the 1.2M resistors in the preamp section to ease the use of metal film resistors which don't normally come in 1.2M value (*can use a 1M and a 200K, in series, on-board*).

What it isn't...

It isn't a new design, unless you tend to call re-working a PCB layout "designing" (which I don't), and it's certainly not a *holy grail* of all things univibe, it's also not an *all-in-one* project as it uses an off-board power supply.

Kudos...

The root of my work is based on JC Maillet's work back in 1996 when he had developed a unique vibe board of single-sided construction with both the copper traces and the components on the same side. I liked the flow of his layout which loosely followed the original Uni-Vibe where the circuit wraps in a circle around the light shield. I contacted JC about using his layout as a starting point for further development of my own and he gave me a huge thumb's-up. He liked the idea of using his work as a spring-board even to the extent of offering assistance. So away I went and now I'm on Rev-6 now but the ForumVibe board described here is a dedicated version of my Rev-4 board **R4-F**.

-Brad

Classic
AMPLIFICATION

... the Disclaimer ...

This board is **not** an entry level project, it is meant for moderately skilled DIY effects builders who have already cut their teeth on other projects, if you haven't got the necessary skills to build this yourself (without assistance) you should look for other things to build until you do.

If you take-on this build you'll need to know your way around a schematic, a circuit board, components, a soldering iron, a power supply, and how to debug errors.

If you build this board and it doesn't work, you have simply made a mistake, or a bad component, or a bad solder joint, or a problem with your etch.

I have built a quite a number of these now, they work.

I asked a friend who knows nothing about electronics (except how to solder badly) to build an R4-F board as I watched him. Aside from the usual thing of trying to put the wrong component in the wrong location, and soldering badly, the unit fired up first time and worked.

While I don't have time to provide personal support as some DIY contributors, I do try to surf the forums www.freestompboxes.org and www.diystompboxes.com a couple times a week and can often respond to questions, but please note I'm a small shop and my time is most often taken. This board layout works very well with the parts specified, you are encouraged to build it and make modifications of your own. Please do let others know on the forums as your contribution will likely encourage someone else.

Caps Looking at replacing the 1uF Electrolytics seemed a good place to start and of course a re-work of the board was needed to make space. Those nice Panasonic ECO-V series stacked film capacitors have been a good replacement for electrolytic's in the past so I got busy moving around parts and traces because the stacked caps are about 11mm-Sq as compared to an electrolytic which is 5 or 6mm round. I also wanted to make space for alternate cap types for different builds on the same board like greenies, Ceramics, and the WIMA types, and some board space was definitely needed for a proper film-n-foil .22uF cap.

Resistors I wanted to use metal-film resistors and noticed that 1.2M isn't a standard value in metal-film (as it is in CC) and while this board is a *stand-up-component* type and one can easily just solder together a 1M/200K pair to get the value, I thought it might be better if there were pads on the board to support that, so I re-rerouted that area on the board to make some space to add the other two resistors.

Jumpers I'm not an *anti-jumper* guy as some folks really hate jumpers, I really don't mind throwing a jumper down if it makes for a better trace path, so I re-routed some of those long round-about traces in trade for some more board space.

Trimmers Making room for the horizontal mount trimmers was quite a time consuming challenge in moving parts/orientations without increasing the overall board size, but I'm there now so it was worth it. In my first few vibe builds I was using the vertical mount multi-turn trim pots and it got to be quite a hassle making adjustments (with a guitar in my lap, and micro screwdriver in hand) and it was also hard to get a visual idea of where you left an adjustment. I decided to make space for horizontal mount trimmers which are totally easier to deal with in this case.

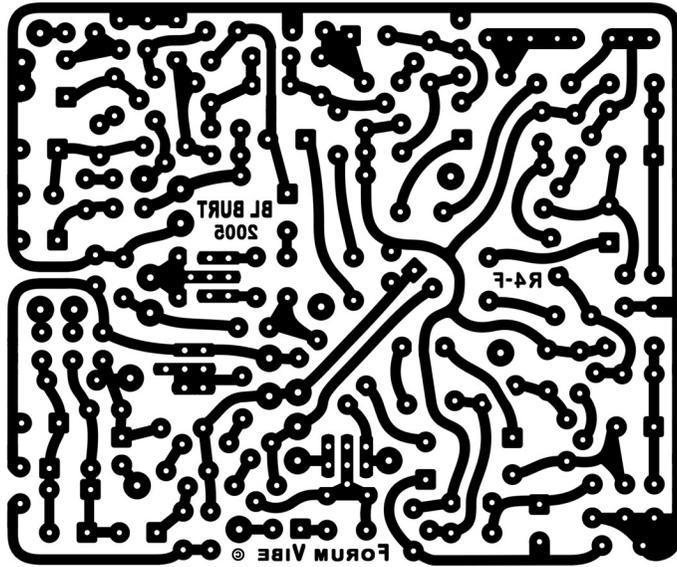
R4-F Board As my new layout boards were working well, rev's R1, R2, and R3 were firing-up every time, without issues, sounding great, easy to adjust, easy to mod, at some point I decided it might be cool to contribute a version of my new PCB layouts to the DIY community. I realized that most DIY folks don't prefer PIHER trim pots (*which I do*) so I re-rerouted my R4 board to make pad space for a universal *Bourns* style footprint.

Vintage vs Hi-Performance Avoid thinking one is "better" than the other, just as some think old vintage effects are better than new ones and others think otherwise, it's simply another option. I do both builds. If the Uni-vibe would have been built by a company like BOSS in the 90's instead of Shin-Ei in the 60's it most certainly would have used better parts.

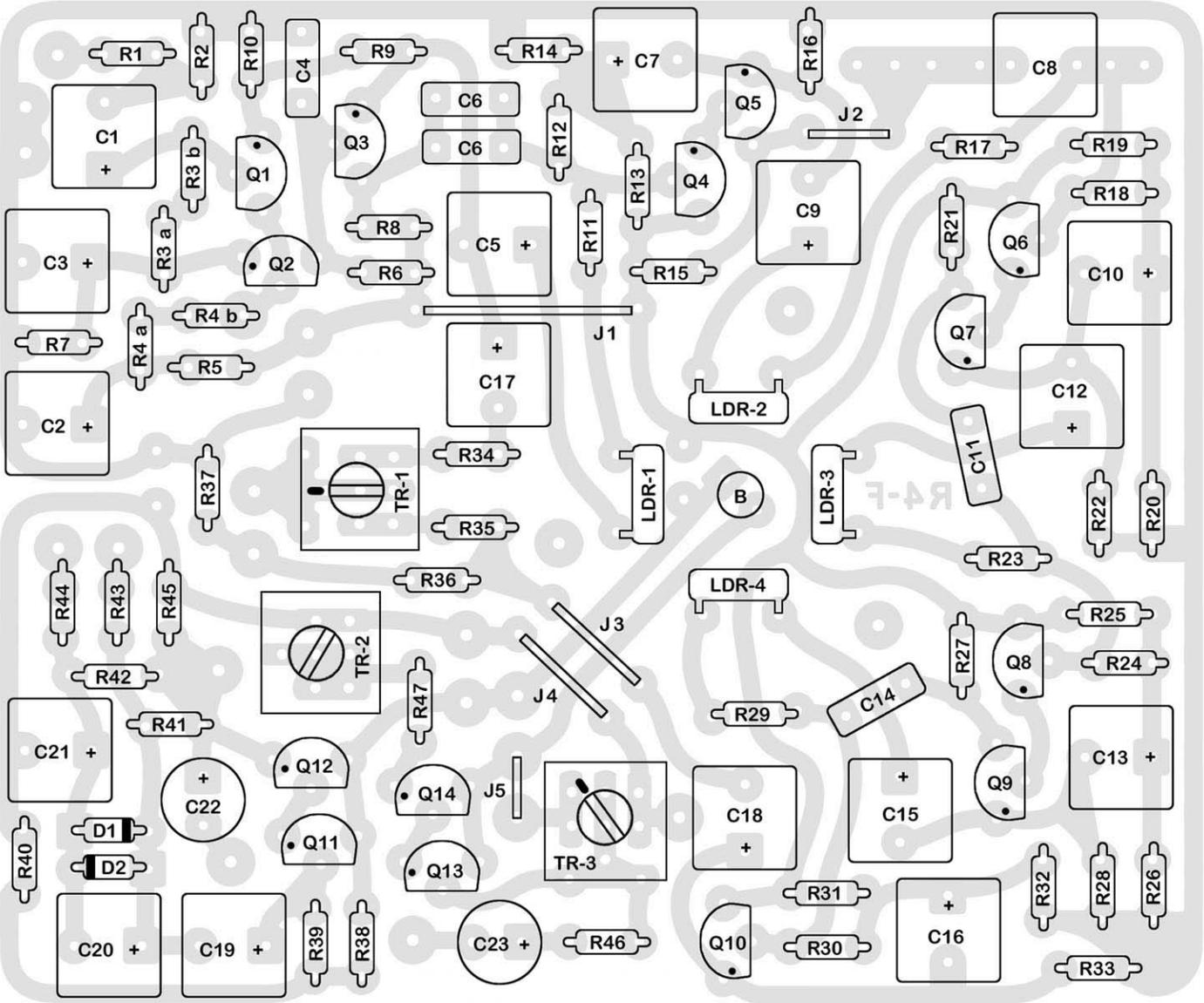
The following pages in this PDF file are presented in the spirit of sharing freely with people in the DIY community. If you have Uni-vibe questions: www.freestompboxes.org and www.diystompboxes.com are great places to find help and links to other 'vibe related resources. You are encouraged to build and mod this project and share on the forums your findings and contributions.

No permission/consent is given here for commercial use, I retain the copyrights to this layout.

Classic
AMPLIFICATION

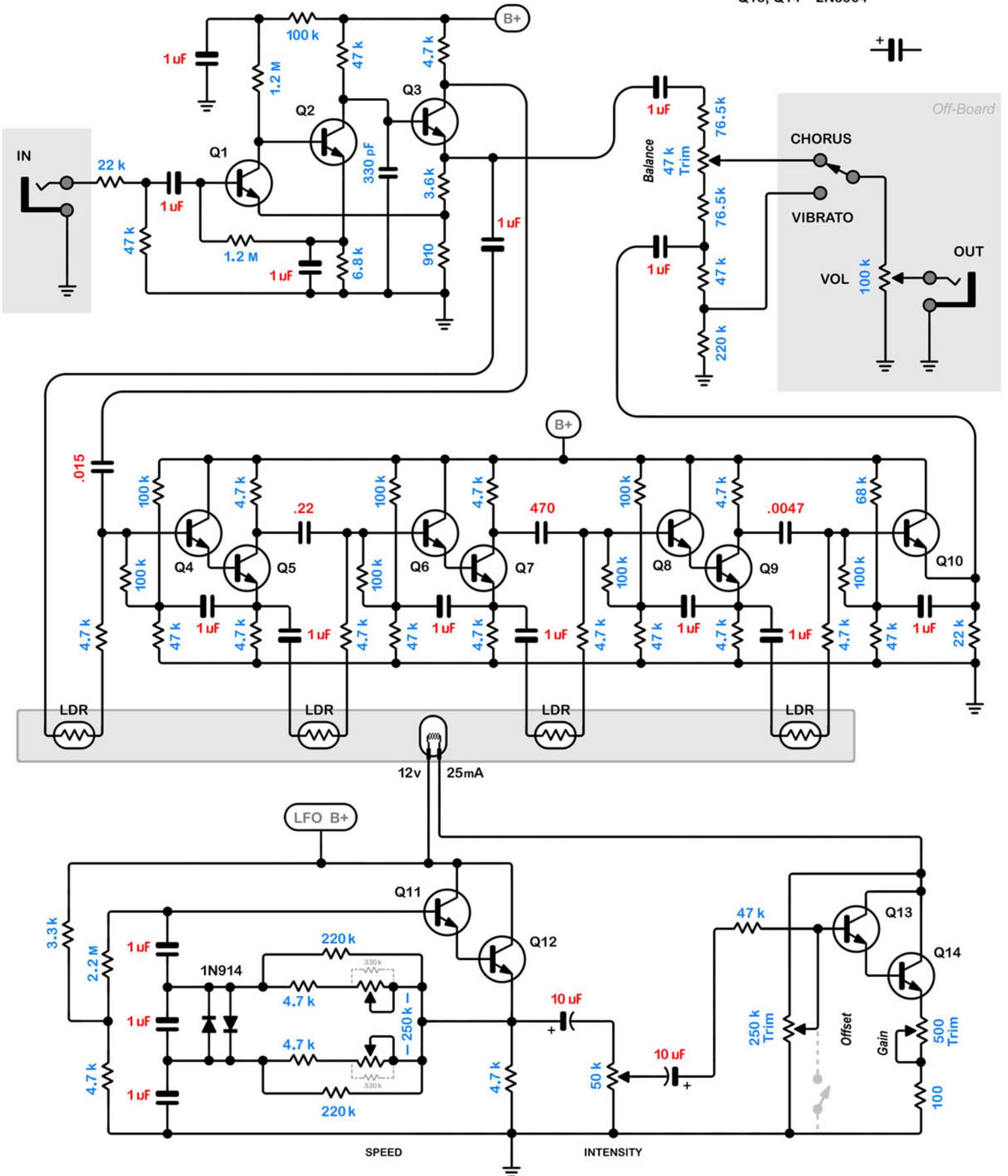


When communicating ideas or issues regarding the Forum-Mods board layout, use these designators in your posts.

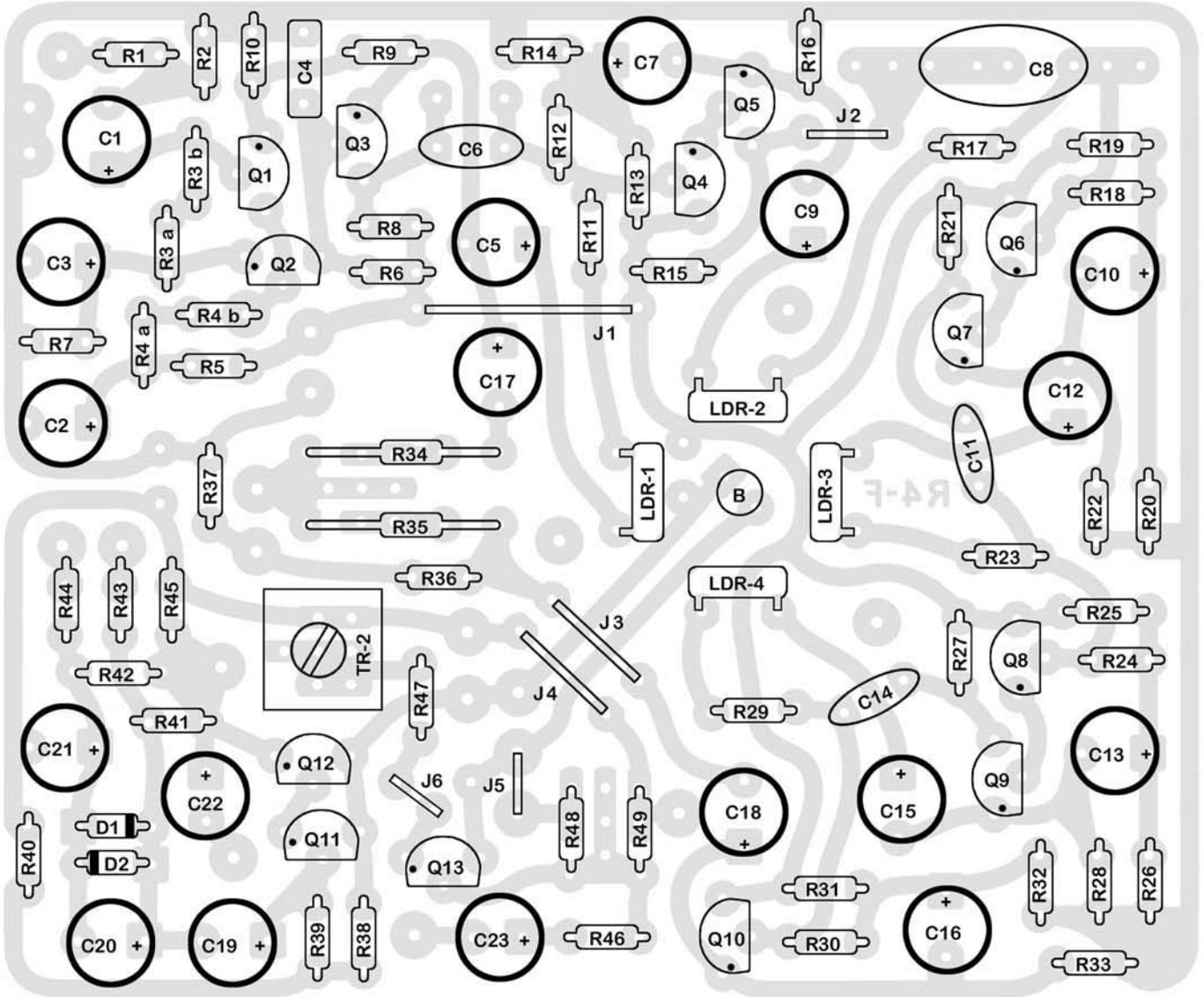


Forum Vibe

Q1 2SC539 / 2N5210 / 2N5089
 Q2 - Q12 2SC828 / 2N5088 / 2N5089
 Q13, Q14 2N3904

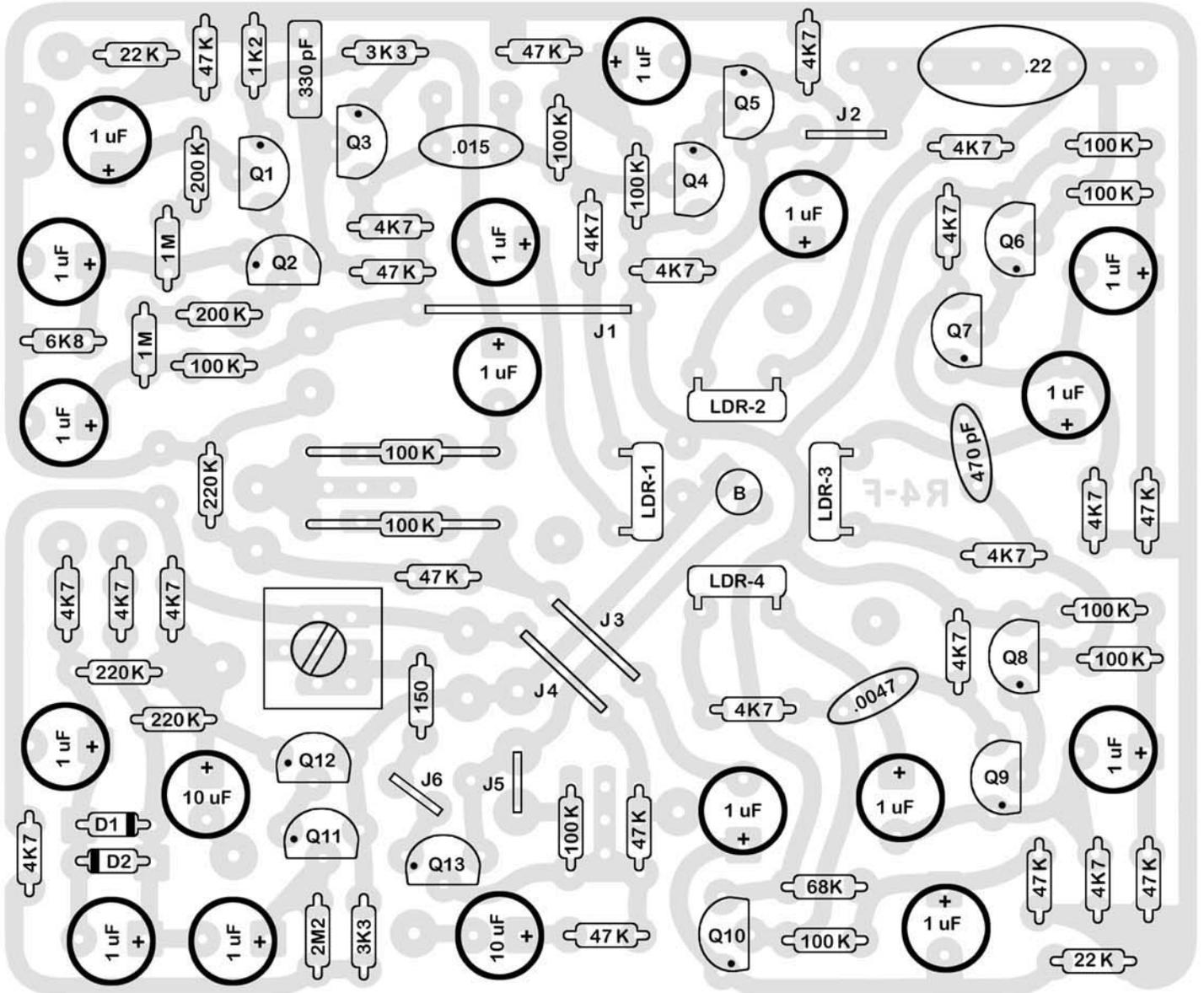


When communicating ideas or issues regarding the Vintage board layout, use these designators in your posts.

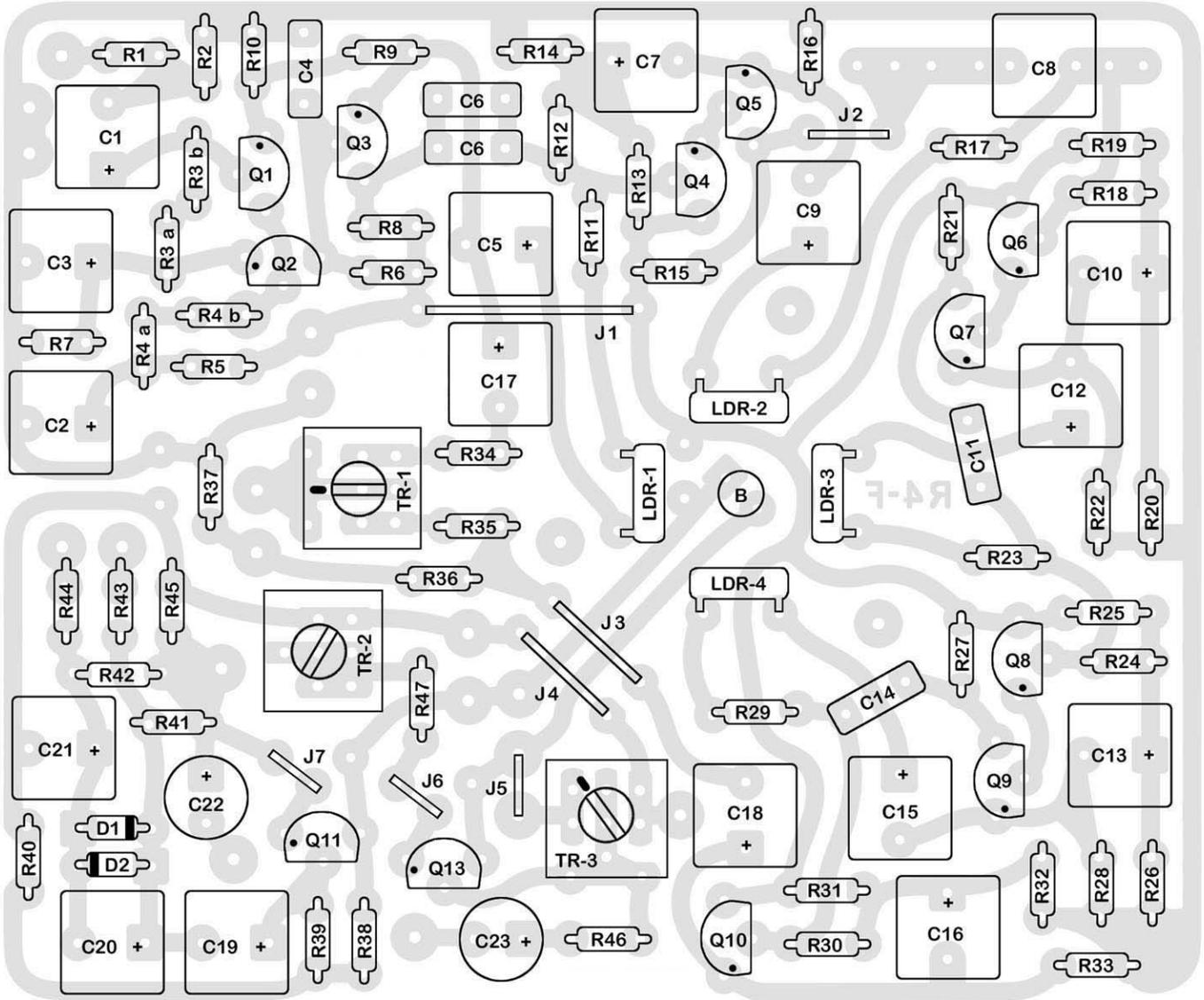


Part values are shown here to help when stuffing the board

(Vintage Build)



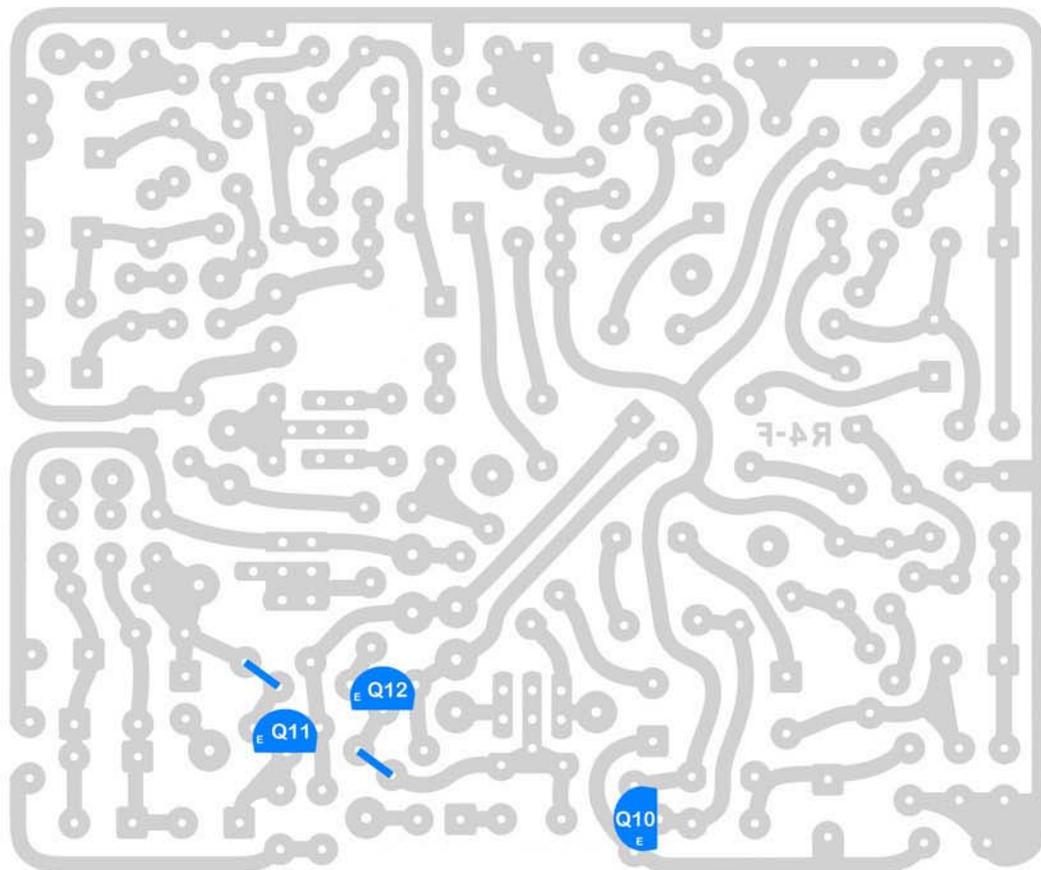
When communicating ideas or issues regarding the Redhouse-Mods board layout, use these designators in your posts.



I got an idea from working with JC Maillet's bulbdriver mod so here I replaced both darlington's in the LFO with MPS-A13's

Since switching to the MPS-A13's in the LFO I haven't had any problems with startup or continued oscillation in my vibe builds.

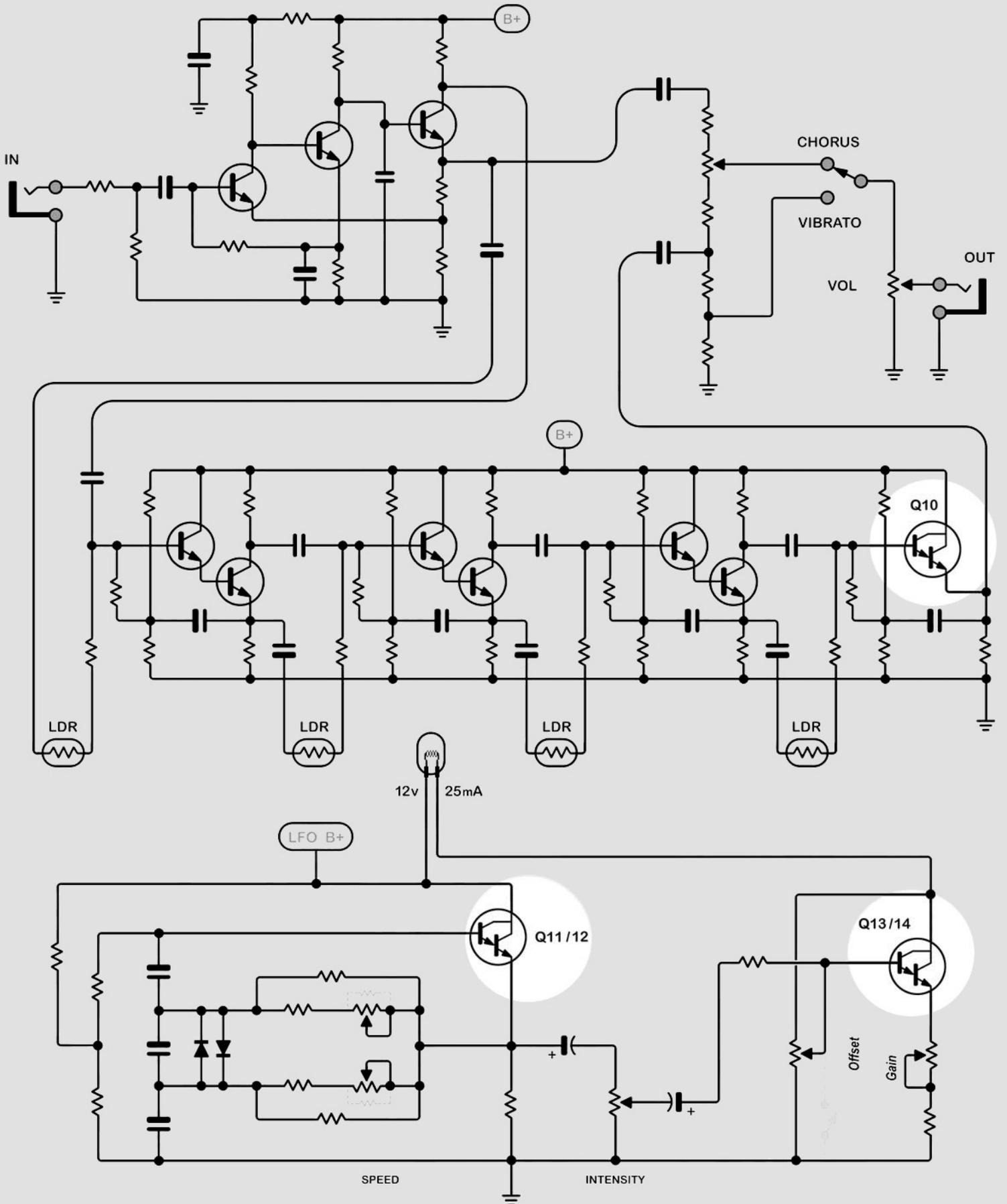
The MPS-A13 is spec'd at something like 900mA so driving the bulbs doesn't seem to be an issue.



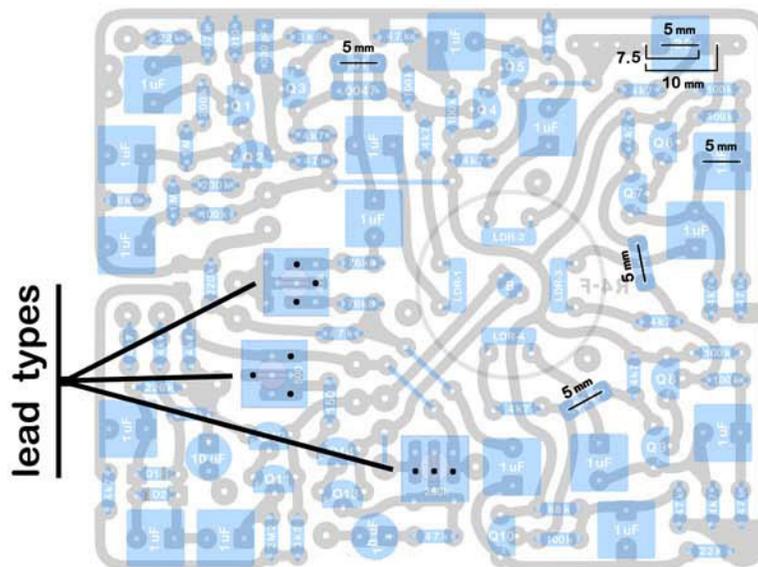
I also replaced the last phase stage transistor (Q10) with an MPS-A13.

Redhouse Mods

Q10, Q11 (11/12) and Q13 (13/14) = MPS-A13



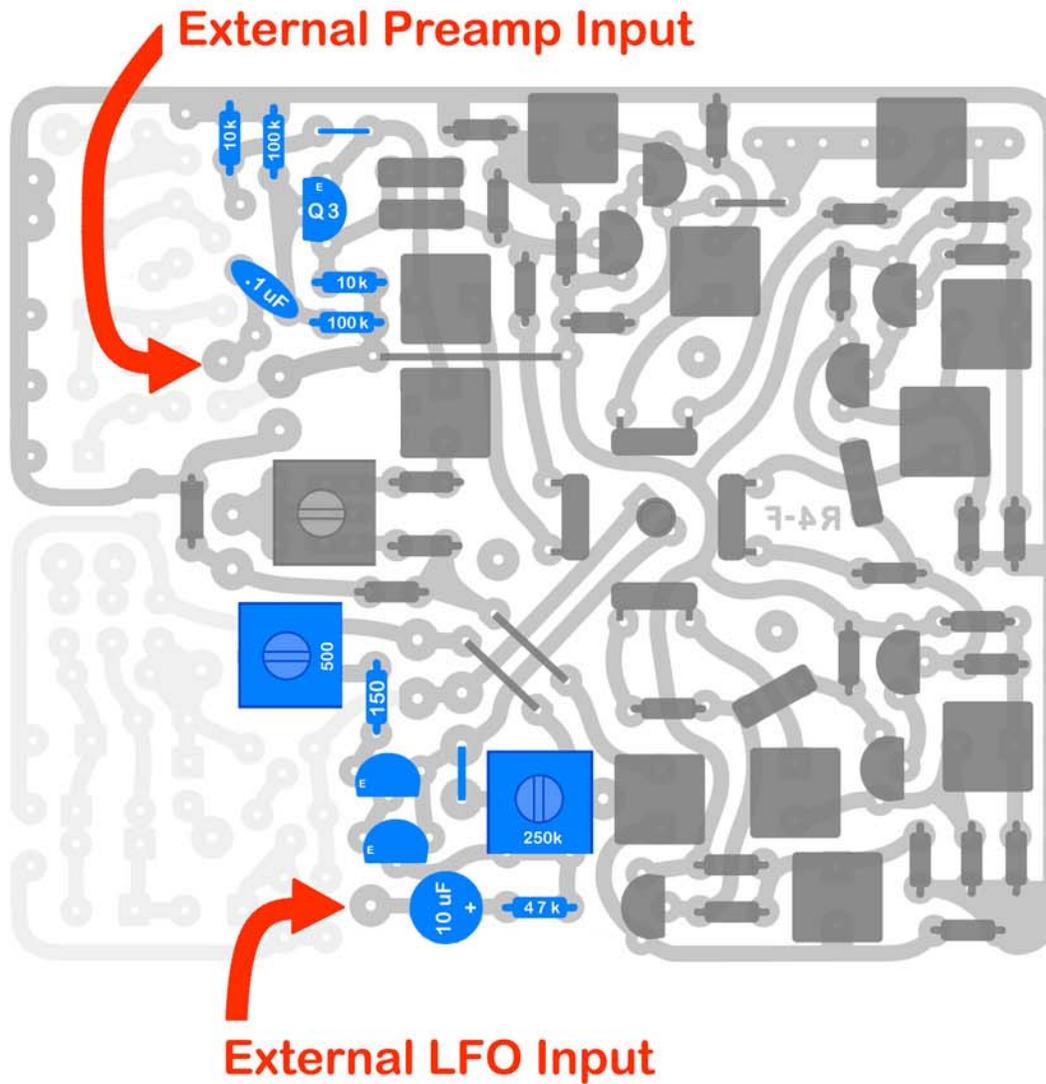
Capacitor pad spacing allows for the use of standard capacitors that use 5mm lead spacing such as WIMA and others. There are additional pads for the .22 cap because it can be hard to find a small sized cap apart from using ceramic types.



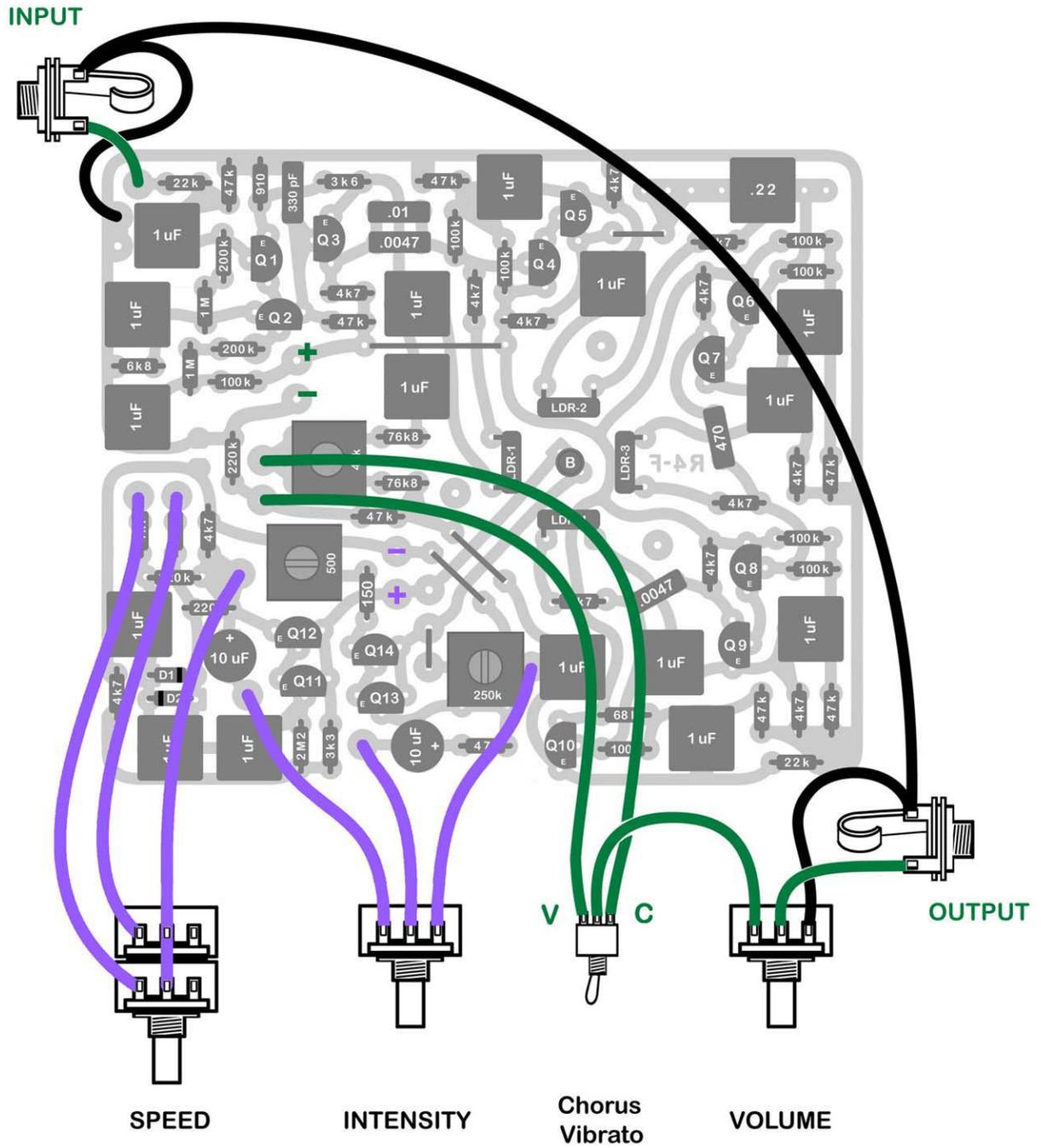
Universal pads for trimmers allow use of all three of the standard lead types.

Here are mods to use the board with external inputs, an external preamp can be used as input and an external LFO signal can be used to motivate the bulb driver circuit.

(Note that parts values are changed)



Hook-up for Pots and Jacks



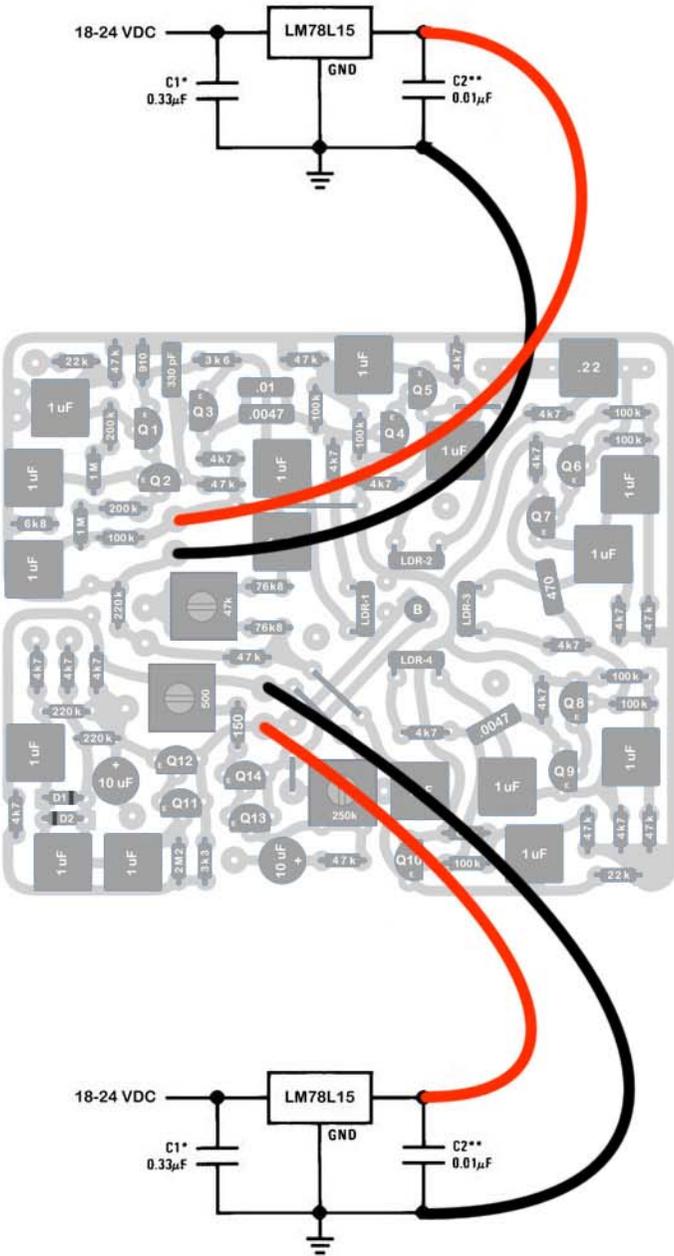
SPEED

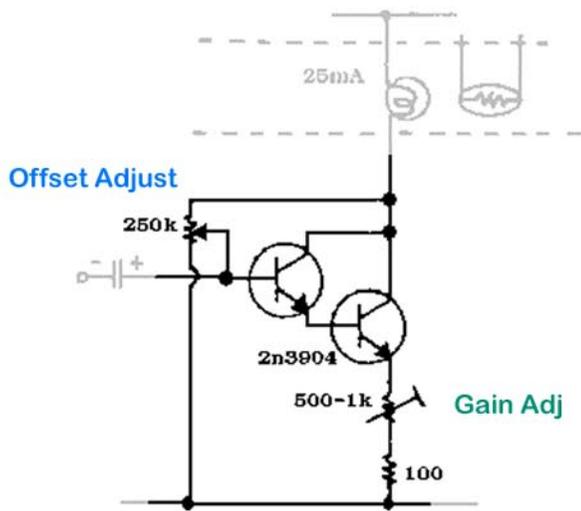
INTENSITY

Chorus
Vibrato

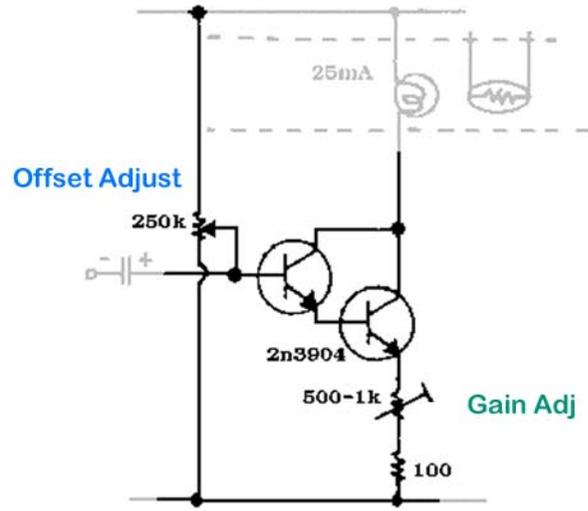
VOLUME

I use separate power regulators for the audio and LFO sections of the circuit but it isn't really necessary and both can be powered by the same regulator if you wish.

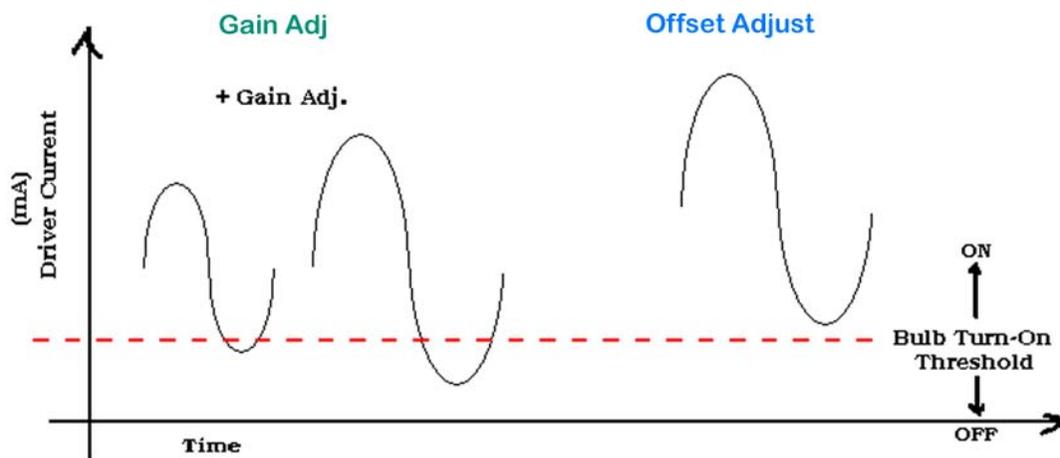




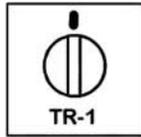
JC's original mod



alternate way

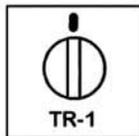


JC Maillet's offset adjustment for the Univibe LFO circuit



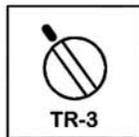
Mark TR-1 & TR-3

Because the Forum-vibe circuit is so adjustable with the trim-pot mods, it will at some point become necessary to know how to get back to where the a stock unit would be set if you need to. So before installing TR-1 and TR-3, do these two little things and life will be easier later on...



Find the EXACT resistance center of TR-1 by measuring it with your DMM (Ohm meter) when the exact center is found, mark that location with a mark of some kind that won't come off. (ie; exacto knife cut)

This allows you to return TR-1 to a 50/50 output mix anytime.



The original univibe bulb bias was a 100K/47K resistor string, which gives a bias point of 2/3 - 1/3 bias. (see schematic)

Find the spot on this 250K trimmer where you can read 83K from pin-1 (CCW) to pin-2 (wiper) and mark that location.

This allows you to return to the original bias setting anytime.

After both trim-pots have been measured and marked, install them on the board.

The Light Shield

3/4" Copper Pipe Cap

Since we rarely use those old black plastic film canisters in this digital age, and it's been getting much harder to find them, I thought I'd break from tradition and think of something else that would work and still be inexpensive too.

As I looked around at things I decided one of those copper pipe caps suits the need quite nicely, and they are very cheap too at about 40¢ to 90¢ at the local Hardware Depot store. They can be painted black or white on the inside (I prefer flat white) or clear will do, coat it with some kind of paint though copper will tarnish and turn green eventually. You can solder little leads onto it as I did (see the picture below), or just use some black silicone or even hot-glue it onto the circuit board if you wish.

It's just a cover and really serves no other purpose except keeping stray light out.

I prefer painting a black circular area on the circuit board to keep stray light from entering via the back of the circuit board, it helps while tweaking the mods when the board is out-of-the-box!

(I trimmed about a 1/4' off this one to fit inside the chosen box)



Post Build Setup

The vibe should be dialed in a little bit before closing the box up and playing.

- Before applying any power make sure the 500ohm trim-pot TR-2 is set to full-on resistance (CW) so the bulb won't blow right when you first turn it on.
- Switch the Chorus/Vibrato switch to "Vibrato" mode
- Make sure you have the Bias Offset trimmer at it's 30% mark you made when you measured it before installation
- Then apply power, then adjust TR-2 CCW slowly, while listening (with a guitar chord strummed) and adjust until you get the best "warble" or strongest pitch shift.

At this point you are in the zone, next you can make further adjustments to dial in according to your LDR's/Lamp and personal taste, adjusting TR-3 to get you desired effect. You may have to re-adjust TR-2 after tweaking TR-3 as they are interrelated and effect each other when adjusted.

- The following is from JC Maillet's post-build instructions -

Calibrating and Playing:

The vibe needs to be adjusted before you can play it.

Previous to plugging in power make sure the 500ohm trimmer is set to full resistance so that current through the bulb driver won't blow the bulb when you first turn it on- I did that a couple of times and it's a drag (you may want to buy a few extra bulbs just in case). Plug the power in and set the intensity" control to off" and adjust both trimmers a little at a time until a faint glow appears in the bulb.

The 250k trimmer acts as an offset control and can be used to control the proportional amount of time the bulb stays shut-off during the vibe's cycling process. The actions of both trimmers is interactive and it may take a while to find the exact setting you like- in general the bulb should not glow too bright.

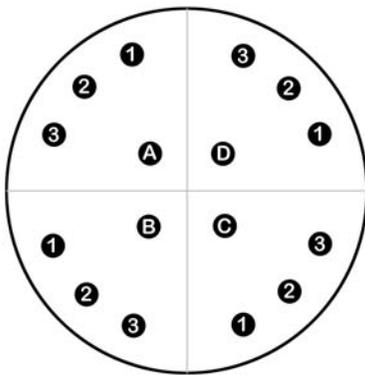
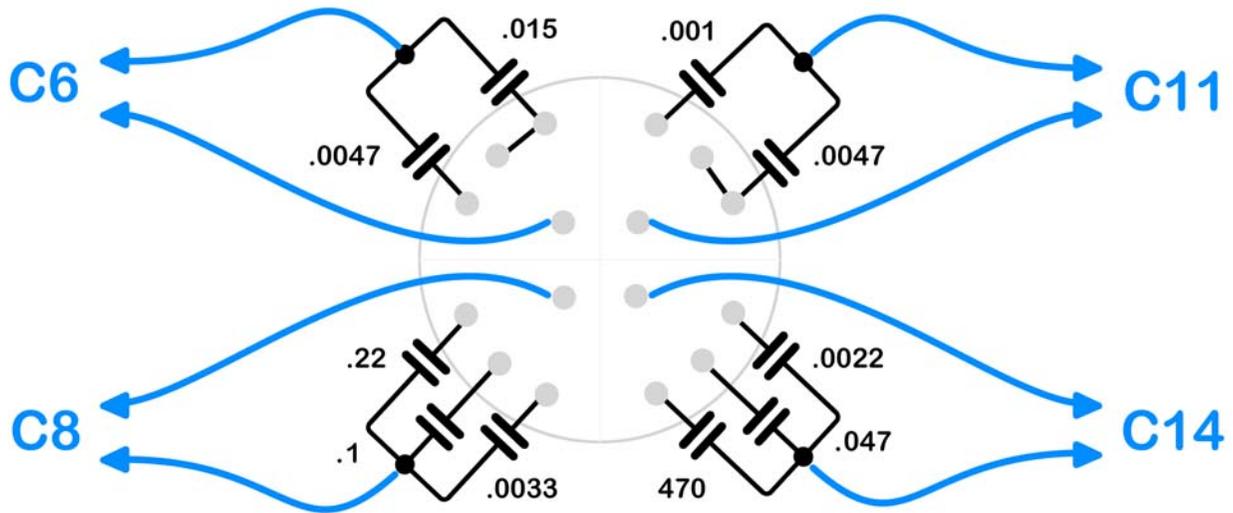
When the intensity control is full on and the oscillator is running at around 1Hz to 3Hz is when you'll catch the light glowing at its strongest. The balance adjustments should be made here.

Since the vibe seems to be used often with the intensity set at 1/2 or 2/3, where the oscillation doesn't appear so wobbly as it does when set at full- this is especially noticeable in chorus mode.

One Last Mod...

By using a rotary switch one can make the vibe more versatile, switching the phase shift caps (not while playing) you can get the Vibe to sound like other phase shifters, it works very well!

Shown here using a 4P3T switch to get: Pos1=Univibe, Pos2=VoodooVibe, Pos3=Resley Tone



Rear view of 4P3T rotary switch

Phase Shifter	C6	C8	C11	C14
Univibe	.015	.22	470pF	.0047
Resley Tone	.0047	.0033	.0022	.001
RM Voodoo Vibe	.015	.1	.047	.0047
Phase 90	.01	.01	.01	.01

Parts Matrix

Part or Value	F	V	R	Part Designation	Part Numbers
2N5089 (or 5088)	12	11	12	Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12	M# 512 - 2N5088TA
2N5210	-	1	-	Q1	M# 512 - 2N5210TA
2N3904	2	13	-	Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14	M# 512 - 2N3904TA
MPS-A13	-	-	3	Q10 Q11/12 Q13/14	M# 610 - MPSA13
1N4148 (or 914)	2	2	2	D1 D2	M# 512 - 1N4148TA
100	1	1	1	R47	
910	1	-	1	R10	
1K2	-	1	-	R10	
3K3	1	2	1	R9 R38	
3K6	1		1	R9	
4K7	15	15	15	R8 R11 R15 R16 R17 R21 R22 R23 R27 R28 R29 R40 R43 R44 R45	
6K6	1	1	1	R7	
22K	2	2	2	R1 R33	
47K	7	9	7	R2 R6 R14 R20 R26 R32 R36 R46 R49	
68K	1	1	1	R31	
76K5	2	-	2	R34 R35	
100K	8	9	8	R5 R12 R13 R18 R19 R24 R25 R30 R48	
200K	2		2	R3-b R4-b	
220K	3	3	3	R37 R41 R42	
1M	2	-	2	R3-a R3-b	
1M2	-	2	-	R3 R4	
2M2	1	1	1	R39	
330K	2	2	2	only needed if using a 250K Dual Linear speed pot	
10uF 25v Elect	2	2	2	C22 C23	
1uF 25v Elect	-	16	-	C1 C2 C3 C5 C7 C8 C10 C12 C13 C15 C16 C17 C18 C19 C20 C21 can also be BP or NP type	
1uF 60v Film	16	-	16	C1 C2 C3 C5 C7 C8 C10 C12 C13 C15 C16 C17 C18 C19 C20 C21 Panasonic ECQ-E(F)	DK# EF1105-ND
.22uF (220n) Film	1	1	1	C8	
.015uF (15n) Film	1	1	1	C6	
.0047uF (4n7) Film	1	1	1	C14	
470pF (.47n) Mica	1	-	1	C11 Silver-Mica, Polystyrene or Polypropylene	
470pF (.47n) Cer	-	1	-	C11 Ceramic Disc	
330pF (.33n) Cer	1	1	1	C4	
SPDT Switch	1	1	1		
1/4" (6.5mm) Jacks	2	2	2		
50K LIN Pot	1	1	1		
100K LIN Pot	1	1	1		
100K DUAL RevLOG	1	1	1	can use a 250K Dual-LIN pot by adding two 330K resistors	
500 Ohm Trimpot	1	-	1	TR-2 Bourns type 3386F	M# 652-3386F-1-501LF
50K Trimpot	1	1	1	TR-1 Bourns type 3386F	M# 652-3386F-1-503LF
250K Trimpot	1	-	1	TR-3 Bourns type 3386F	M# 652-3386F-1-254LF
LDR's	4	4	4	Smal Bear: 338-54C679, 54C79, NSL7530 Allied: Ceramic: NSL-4512, NSL5112, NSL5152, NSL6112 Hermetic sealed: NSL-4960, NSL4140, NSL6110 and many others that have reasonably fast response, in the range from 1K-20k in the light, and 1M-20M Dark (VTL5C3 and CLM6000 with some mods)	
Lamp	1	1	1	Any 1.2-14VDC lamp that draws less than 100mA will do <i>many use the Radio Shack lamp #272-1139</i>	

Transistor Voltage Chart

Audio path transistor voltages measured from two R4-F **Forum-Vibe** boards both were running at 15.4 VDC at the time.

Q1-Q9 = 2N5088
Q10 = MPS-A13

Transistor	Collector_v	Base_v	Emitter_v
Q1	2.03	1.33	.92
Q2	5.19	2.03	1.45
Q3	10.6	5.19	4.5
Q4	15.4	4.85	4.45
Q5	11.6	4.45	3.85
Q6	15.4	4.8	4.46
Q7	11.5	4.4	3.85
Q8	15.4	4.8	4.46
Q9	11.5	4.46	3.85
Q10	15.4	6.18	5.2

Note: voltages for the LFO transistors are not shown, they depend on the transistor type and trim-pot settings.