PROJECT NAME

STRAYLIGHT MINI

DIY GUITAR EFFECTS

BASED ON
Shin-ei/Univox Uni-Vibe®

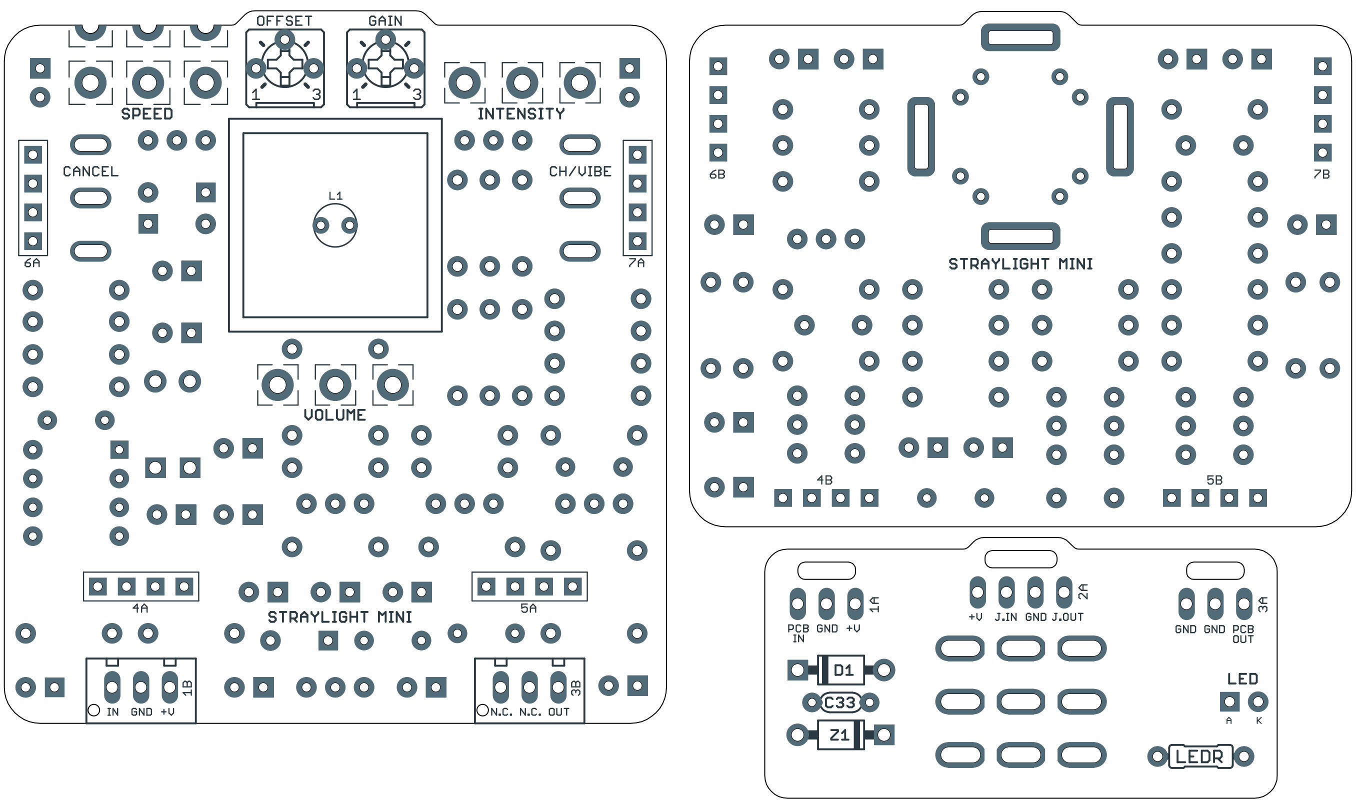
BUILD DIFFICULTY
Advanced

EFFECT TYPE
Chorus/phaser/vibrato

DOCUMENT VERSION
1.0.0 (2026-07-03)

PROJECT SUMMARY

Originally designed as a simulation of a Leslie spinning speaker cabinet, it uses an incandescent bulb and LDRs to produce an asymmetrical phase-shift effect. It was most famously used by Jimi Hendrix.



Actual size is 2.3" x 2.48" (bottom board), 2.3" x 1.81" (top board), and 1.78" x 0.87" (bypass board).

Since most of the components are mounted on the back, a reverse-side diagram can be found on page 16.

IMPORTANT NOTE

This project has a specialized method of assembly that is different from most DIY builds, and because of this there are a lot of ways to make mistakes that are hard to fix. Please familiarize yourself with the assembly instructions on pages **7-8** before installing any of the components.

Additionally, note that this is a more compact version of the Straylight project with a reduced set of features. The circuit is nearly identical, but the part numbering is different, so ensure that you are using the correct documentation for your version of the project.

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INTRODUCTION

The Straylight Chorus/Vibe is an adaptation of the Univox Uni-Vibe, one of the earliest modulation effects originally released in 1967. It was most famously used by Jimi Hendrix, but it's been used and adored by countless other professional musicians across its nearly sixty-year history.

The Uni-Vibe circuit is really a four-stage optical phaser as opposed to a true pitch-shifting vibrato, but aspects of the implementation (particularly the uneven capacitors in each stage) cause it to have a Doppler effect similar to a Leslie spinning speaker. The phase-shifted output can either be used on its own or mixed with the dry signal for a chorus effect.

The Straylight Mini is a direct clone of the original Uni-Vibe circuit, but with some added features and modern conveniences. We have added a charge pump voltage doubler so that it can run off of a standard 9VDC supply instead of wall power like the original. Like most clones, ours does not support a rocker pedal for the speed control. The original Straylight has a second footswitchable speed control, so if you want a ramping effect between two presets, the full-sized project may be a better choice.

In addition to fitting in a much more compact enclosure, the Straylight Mini differs from the original Straylight in some of its features. The second Speed knob and the rate LEDs have been removed. The Phase trimmer has also been removed since it rarely needs to be adjusted. All 1uF capacitors have been changed to electrolytics as in the original Uni-Vibe. And lastly, due to the stacked PCBs, there is a smaller light shield (available separately, not required).

USAGE

The Straylight Mini has the following controls:

- **Speed** controls the speed of the modulation effect.
- **Intensity** sets the depth of the modulation effect.
- **Volume** is the output volume at the end of the circuit.
- **Chorus/Vibe** (toggle) selects between vibrato mode (effect only) and chorus mode (effect + dry).
- **Cancel** (toggle) disables the lamp modulation, but still allows the signal to pass through all of the static phase stages. This is how the original unit was bypassed, and it provides a subtle coloration to the tone compared to standard true bypass.

DESIGN NOTES

Power supply

The Uni-Vibe ran on AC wall power with a transformer. The lamp driver circuit was supplied with around 22VDC, while the audio path was powered from an isolated and heavily filtered (but unregulated) 16V.

For our adaptation, we evaluated a few different ways of powering the circuit. In the end we determined that the best method available today is to use a charge pump doubler to get 18V from a standard 9V supply. The raw 18V is used for the LFO and lamp driver, and a regulated 15V is used for audio.

Since the lamp is driven by current rather than voltage, the actual difference in supply voltage is insignificant and there is no benefit to using the full 22V supply. The audio path is powered with a solid 15V, and the regulator has enough headroom that the supply does not fluctuate at all with the lamp's wide variance in current draw.

Light shield

The original Uni-Vibe enclosed the lamp and LDRs in a reflective sheet-metal box that served two purposes: 1) to isolate the LDRs from light other than the lamp, and 2) to reflect the light internally so that all four LDRs are evenly exposed.

The Uni-Vibe has been a staple of the DIY community for over 30 years, and this light shield has been implemented in many different ways during that time. But other than the original sheet-metal light shield, we've not seen a method that checks all the boxes. Most are cumbersome to install and many do not have a reflective interior.

So for the Straylight project we took an entirely new approach, using interlocking PCBs to build a light shield that can be soldered in place. This light shield was then adapted into a smaller version for the Straylight Mini so that it can fit in between the sandwiched PCBs, with the top PCB acting as the lid. The inside is reflective, and the lamp and LDRs are easily accessible by separating the PCBs.

The light shield is not a requirement for the build. It will work fine with no light shield at all, but the slotted pads on the PCB can fit a variety of other solutions. If you're handy with sheet metal, you could cut a 0.44" x 3" strip and bend it into a square (0.74" to a side). If the metal is solderable, it can be soldered in place. Otherwise, you could cut tabs the size of the slots and bend them outward on the underside of the board to secure it in place. The slotted pads have no electrical connection to the rest of the circuit.

Cancel switch

The original Uni-Vibe's bypass switch was a simple connection to disconnect the lamp from the LFO, which puts the LDRs into their dark resistance range (in the mega-ohms) and passes full-frequency signal. However, there is a coloration that happens in bypass mode that some people like.

In this project, we opted to use true bypass, but we included a toggle switch for Cancel mode so that this coloration is still available, similar to Spectral mode in our Quadratron project (Lovetone Doppelganger).

PARTS LIST

This parts list is also available in a spreadsheet format which can be imported directly into Mouser for easy parts ordering. Mouser doesn't carry all the parts (most notably potentiometers) so the second tab lists all the non-Mouser parts as well as sources for each.

View parts list spreadsheet →

PART	VALUE	TYPE	NOTES
R1	22k	Metal film resistor, 1/4W	
R2	2M2	Metal film resistor, 1/4W	Use 47k for vintage circuit with lower output volume. See build notes.
R3	1M2	Metal film resistor, 1/4W	
R4	1M2	Metal film resistor, 1/4W	
R5	100k	Metal film resistor, 1/4W	
R6	47k	Metal film resistor, 1/4W	
R7	6k8	Metal film resistor, 1/4W	
R8	4k7	Metal film resistor, 1/4W	
R9	3k3	Metal film resistor, 1/4W	
R10	1k2	Metal film resistor, 1/4W	
R11	100k	Metal film resistor, 1/4W	
R12	100k	Metal film resistor, 1/4W	
R13	47k	Metal film resistor, 1/4W	
R14	220k	Metal film resistor, 1/4W	
R15	4k7	Metal film resistor, 1/4W	
R16	100k	Metal film resistor, 1/4W	
R17	100k	Metal film resistor, 1/4W	
R18	47k	Metal film resistor, 1/4W	
R19	4k7	Metal film resistor, 1/4W	
R20	4k7	Metal film resistor, 1/4W	
R21	4k7	Metal film resistor, 1/4W	
R22	100k	Metal film resistor, 1/4W	
R23	100k	Metal film resistor, 1/4W	
R24	47k	Metal film resistor, 1/4W	
R25	4k7	Metal film resistor, 1/4W	
R26	4k7	Metal film resistor, 1/4W	
R27	4k7	Metal film resistor, 1/4W	
R28	100k	Metal film resistor, 1/4W	
R29	100k	Metal film resistor, 1/4W	
R30	47k	Metal film resistor, 1/4W	
R31	4k7	Metal film resistor, 1/4W	
R32	4k7	Metal film resistor, 1/4W	

PARTS LIST, CONT.

PART	VALUE	TYPE	NOTES
R33	4k7	Metal film resistor, 1/4W	
R34	100k	Metal film resistor, 1/4W	
R35	68k	Metal film resistor, 1/4W	
R36	47k	Metal film resistor, 1/4W	
R37	22k	Metal film resistor, 1/4W	
R38	3k3	Metal film resistor, 1/4W	
R39	4k7	Metal film resistor, 1/4W	
R40	2M2	Metal film resistor, 1/4W	
R41	220k	Metal film resistor, 1/4W	
R42	2k2	Metal film resistor, 1/4W	Sets maximum speed. Most vintage units use 4k7.
R43	220k	Metal film resistor, 1/4W	
R44	2k2	Metal film resistor, 1/4W	Sets maximum speed. Most vintage units use 4k7.
R45	4k7	Metal film resistor, 1/4W	
R46	4k7	Metal film resistor, 1/4W	
R47	47k	Metal film resistor, 1/4W	
R48	47k	Metal film resistor, 1/4W	
R49	68R	Metal film resistor, 1/4W	
LEDR	10k	Metal film resistor, 1/4W	
C1	1uF	Electrolytic capacitor, 5mm	
C2	1uF	Electrolytic capacitor, 5mm	
C3	10uF	Electrolytic capacitor, 5mm	
C4	330pF	MLCC capacitor, NP0/C0G	
C5	1uF	Electrolytic capacitor, 5mm	
C6	1uF	Electrolytic capacitor, 5mm	
C7	15n	Film capacitor, 7.2 x 2.5mm	
C8	1uF	Electrolytic capacitor, 5mm	Max 7mm height. Minimum 25V.
C9	1uF	Electrolytic capacitor, 5mm	Max 7mm height. Minimum 25V.
C10	220n	Film capacitor, 7.2 x 3mm	
C11	1uF	Electrolytic capacitor, 5mm	Max 7mm height. Minimum 25V.
C12	1uF	Electrolytic capacitor, 5mm	Max 7mm height. Minimum 25V.
C13	470pF	MLCC capacitor, NP0/C0G	
C14	1uF	Electrolytic capacitor, 5mm	Max 7mm height. Minimum 25V.
C15	1uF	Electrolytic capacitor, 5mm	Max 7mm height. Minimum 25V.
C16	4n7	Film capacitor, 7.2 x 2.5mm	
C17	1uF	Electrolytic capacitor, 5mm	Max 7mm height. Minimum 25V.
C18	1uF	Electrolytic capacitor, 5mm	Max 7mm height. Minimum 25V.
C19	1uF	Electrolytic capacitor, 5mm	

PARTS LIST, CONT.

PART	VALUE	TYPE	NOTES
C20	1uF	Electrolytic capacitor, 5mm	
C21	1uF	Electrolytic capacitor, 5mm	
C22	10uF	Electrolytic capacitor, 5mm	
C23	10uF	Electrolytic capacitor, 5mm	
C24	22uF	Electrolytic capacitor, 5mm	Max 7mm height. Minimum 25V. Can be 10uF.
C25	47uF	Electrolytic capacitor, 5mm	Power supply filter capacitor.
C26	470n	MLCC capacitor, X7R	Power supply filter capacitor.
C27	47uF	Electrolytic capacitor, 5mm	Power supply filter capacitor.
C28	47uF	Electrolytic capacitor, 5mm	Power supply filter capacitor.
C29	470n	MLCC capacitor, X7R	Power supply filter capacitor.
C30	10uF	Electrolytic capacitor, 5mm	Charge pump capacitor.
C31	470n	MLCC capacitor, X7R	Power supply filter capacitor.
C32	100uF	Electrolytic capacitor, 6.3mm	Power supply filter capacitor.
C33	100n	MLCC capacitor, X7R	Power supply filter capacitor.
D1	1N5817	Schottky diode, DO-41	
D2	1N5817	Schottky diode, DO-41	
D3	1N5817	Schottky diode, DO-41	
D4	BAT48	Schottky diode, DO-35	
D5	1N914	Fast-switching diode, DO-35	
D6	1N914	Fast-switching diode, DO-35	
Z1	1N4741A	Zener diode, 11V, DO-41	
Q1	2N5089	BJT transistor, NPN, TO-92	
Q2	2N5088	BJT transistor, NPN, TO-92	
Q3	2N5088	BJT transistor, NPN, TO-92	
Q4	2N5088	BJT transistor, NPN, TO-92	
Q5	2N5088	BJT transistor, NPN, TO-92	
Q6	2N5088	BJT transistor, NPN, TO-92	
Q7	2N5088	BJT transistor, NPN, TO-92	
Q8	2N5088	BJT transistor, NPN, TO-92	
Q9	2N5088	BJT transistor, NPN, TO-92	
Q10	2N5088	BJT transistor, NPN, TO-92	
Q11	KSP13	Darlington BJT transistor, NPN	MPSA13 equivalent.
Q12	KSP13	Darlington BJT transistor, NPN	MPSA13 equivalent.
REG	78L15	Regulator, +15V, TO-92	
IC1	LT1054CP	Charge pump, DIP-8	
IC1-S	DIP-8 socket	IC socket, DIP-8	
L1	23 lamp	Incandescent lamp, 14V/40mA	JKL 23 (6.35mm height). Standard-height lamps will not fit.

PARTS LIST, CONT.

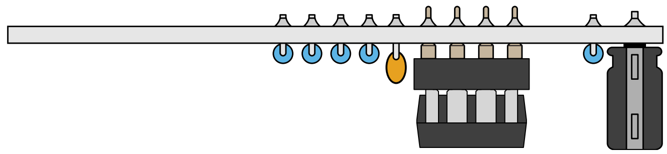
PART	VALUE	TYPE	NOTES
LDR1	PDV-P9203	LDR, 10-30k light, 5M dark	Can also use NSL-5542.
LDR2	PDV-P9203	LDR, 10-30k light, 5M dark	Can also use NSL-5542.
LDR3	PDV-P9203	LDR, 10-30k light, 5M dark	Can also use NSL-5542.
LDR4	PDV-P9203	LDR, 10-30k light, 5M dark	Can also use NSL-5542.
GAIN	500R trimmer	Trimmer, 10%, 1/4"	Bourns 3362P or similar.
OFFSET	250k trimmer	Trimmer, 10%, 1/4"	Bourns 3362P or similar.
SPEED	100kC dual	16mm dual pot, right angle	
INTENSITY	50kB	16mm right-angle PCB mount pot	
VOLUME	100kB	16mm right-angle PCB mount pot	
CH/VIBE	SPDT on-on	Toggle switch, SPDT on-on	
CANCEL	SPDT on-on	Toggle switch, SPDT on-on	
LED	5mm red	LED, 5mm, red diffused	
IN	1/4" mono	1/4" phone jack, closed frame	Switchcraft 111X or equivalent.
OUT	1/4" mono	1/4" phone jack, closed frame	Switchcraft 111X or equivalent.
DC	2.1mm	DC jack, 2.1mm panel mount	Mouser 163-4302-E or equivalent.
FSW	3PDT	Stomp switch, 3PDT	
ENC	125B	Enclosure, die-cast aluminum	Can also use a Hammond 1590N1.

ASSEMBLY INSTRUCTIONS

The Straylight Mini uses a stacked "sandwich" PCB design so that it can fit inside a 125B enclosure. It's not difficult to put together, but there's only one right way to do it and several wrong ways that may ruin your build if you're not careful. Make sure you have a good understanding of what the end result should look like before you begin installing any components.

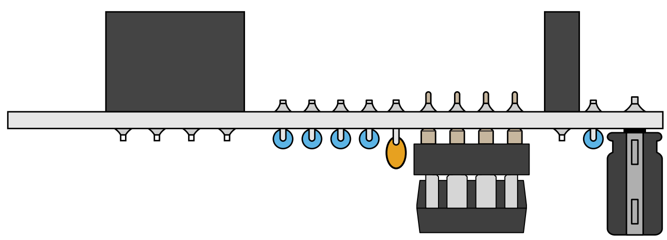
Step 1

Populate the PCBs according to the silkscreen. Unlike most other Aion FX projects, the components mount on the underside of both the main and secondary boards, the same side as the potentiometers. (The components on the bypass PCB mount on the top side as with other projects.)



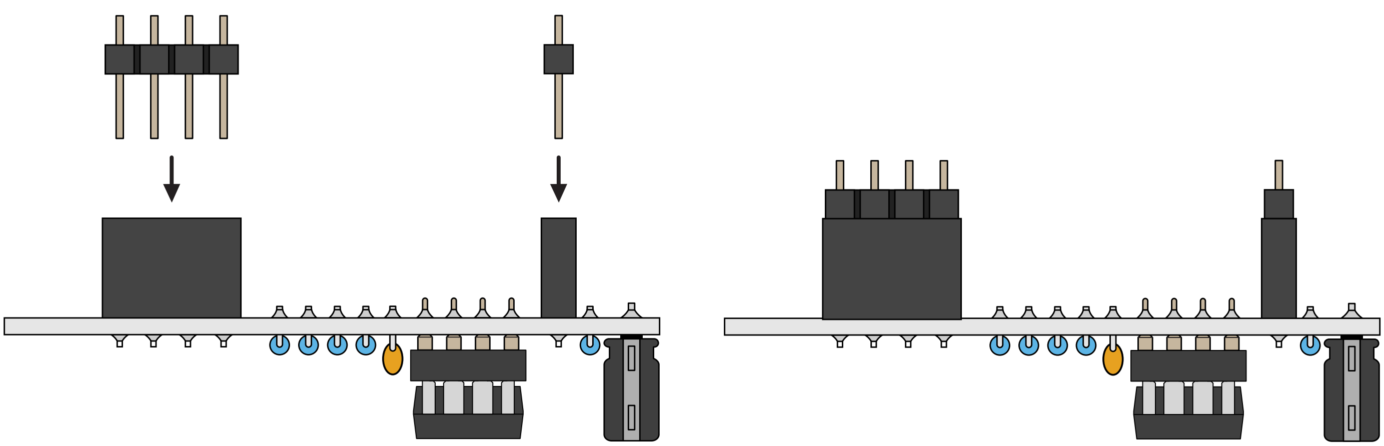
Step 2

Install the header sockets on the bottom PCB. It's recommended to turn the PCB upside down to hold all of them in place while soldering. Solder one leg of each header, then check them from the side to make sure they are straight and perpendicular with the PCB before soldering the remaining legs. If any of them are crooked, reflow the solder and adjust them as needed.



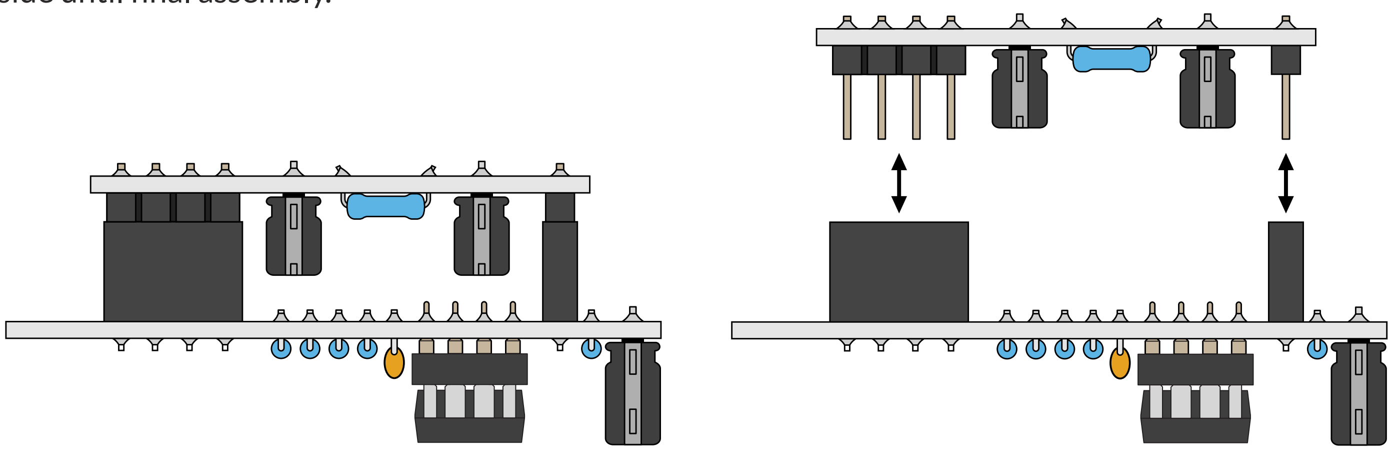
Step 3

With the header sockets installed to the bottom PCB, insert the male headers. The long side goes into the socket and the short side faces up.



Step 4

With the male header sockets in place, put the top PCB in position, components facing down. (The headers and pins should always mount to the side with the rectangular outline on the PCB silkscreen.) Once everything is in place, solder the pins to the top PCB. The top PCB can then be removed and set aside until final assembly.



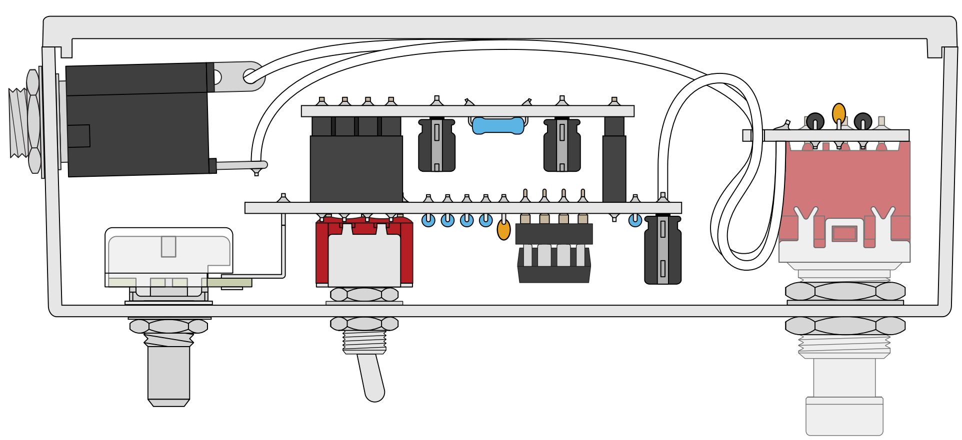
It’s done in this order so that that the pins are perfectly coupled with the headers. If they were soldered separately from each other, the slight misalignments between the pins and headers would create stress that could potentially cause cracked solder joints over time.

From here, you can proceed with the rest of the build as normal. It’s recommended to first attach the potentiometers to the drilled enclosure and then solder the lower PCB in place.

This way, the enclosure acts as a template that ensures the pots and switch are mounted at the correct height, and it will help compensate for any slight drilling inaccuracies in the enclosure.

Even if you decide to remove the PCB to test outside the enclosure before final boxing, this method will ensure there is no long-term stress on the joints of the PCB-mounted components once everything is reassembled.

Here is a diagram of the completed pedal once it’s installed and wired in the enclosure. (Shown without optional light shield.)



Headers and sockets

The Straylight Mini uses standard pin headers and sockets that are also used in many other types of DIY electronics such as Arduino shields. You'll need four 4-pin female sockets and one snap-apart male header that can be broken in to the matching sizes.

The best ones we've found are from Tayda Electronics. They're cheaper than the ones from Mouser and also make a much tighter connection with more tension. Here are the links:

- 4-Pin Female Header (4 needed)
- 40-Pin Snap-Apart Male Header (1 needed)

Electrolytic capacitor sizes

Due to the clearance between the PCBs, the electrolytic capacitors on the top PCB (C8-9, C11-12, C14-15, C17-18, and C24) have a maximum height of 7mm and a maximum diameter of 5mm. If you use the Mouser parts spreadsheet, the listed capacitors are all the correct size, so you can start there if you're having trouble finding them. All capacitors must be rated for a minimum 25V.

The filter capacitor, C24, is specified as 22uF, but you can also use 10uF if that's all you can find in the correct height. The majority of the power filtering for the audio path is handled by C25 on the main PCB, and C24 is only there to decouple the supply on the top board, so the exact value is less important.

Securing the top PCB

When the pedal is in playing position, gravity will be pulling against the top PCB, and it could potentially be knocked loose with enough shock. Once the pedal is fully biased and tested, you may want to attach some non-conductive adhesive foam to the inside of the lid that is thick enough to press down against the PCB when it's closed. Make sure the offboard wires are routed around the foam.

Alternately, you could also use some hot glue on the headers, or any other methods you may think of. Just ensure you've secured it somehow if you're planning on using the pedal in a live environment.

Lamp selection

The Straylight Mini is designed to use the JKL 23 (14V/40mA) lamp, which is significantly smaller than the types used in most Uni-Vibe clones but with nearly identical specs. It's available from Mouser.

According to R.G. Keen, the original Uni-Vibe used a 28V/40mA lamp. The rated voltage doesn't matter very much. 12-18V lamps are much more readily available and will perform the same.

Note that the rated voltage is not a hard maximum as with other components. It's more of an expected operating range for the datasheet specification. Higher voltages will reduce the maximum current somewhat, and vice versa with higher currents, but in this circuit the lamp is nowhere near the limits.

Incandescent lamps are not polarized, so it can be installed in any orientation. Just make sure to install it as close to the PCB as possible, both for stability and to allow enough clearance from the LDRs.

LDR selection

The original Uni-Vibe used a custom photocell with no cross reference to a standard manufacturer part number. The exact specs are not known, but in decades of DIY work on this circuit, many different types have been used successfully. As with most other Uni-Vibe adaptations, the Straylight includes a few different ways to tweak the operation of the lamp for best operation.

Above all, the important characteristic for the LDRs is a high dynamic range, around 10k to 100k under illumination, with a dark resistance of 5M to 20M. The **PDV-P9203** is the easiest type to find that meets these specifications and is readily available from Mouser and Digikey. The **NSL-5542** is another option with similar specs, but as of this writing is only available from RS (formerly Allied) and is more expensive.

The rise and fall time is also important, particularly if you plan to use it at fast settings, but don't be too concerned with this specification. Most LDRs fall in similar ranges, and the lamp's inability to turn on and off quickly will have much more of an impact on the speed characteristics of the filters.

Do the LDRs need to be matched?

One last discussion point: since it's a phaser, the question often comes up whether the LDRs need to be matched in any way, as with JFETs. According to R.G. Keen, there does not seem to be any clear benefit to matching in this circuit, and as long as the four LDRs have the same part number (e.g. the 9203 or 5542) then you can use the Gain trimmer to put in the optimal range for classic Uni-Vibe tones. The phase stages are already designed to be uneven due to the staggered capacitor values.

However, if you still want to try matching them, it's not terribly difficult as long as you have a batch of ten or twenty of them to choose from. Install them on their own rows on a breadboard, all legs electrically isolated, LDR pointing upward, exposed to the same light from the same angle. Then measure the resistance between the legs and choose the four whose resistance value is closest.

LDR placement

The LDRs are installed on the underside of the top PCB, while the lamp is on the top side of the bottom PCB. The LDRs should be installed flat against the board, or as close as possible, so that they have maximum exposure to the lamp.

Lamp lifespan

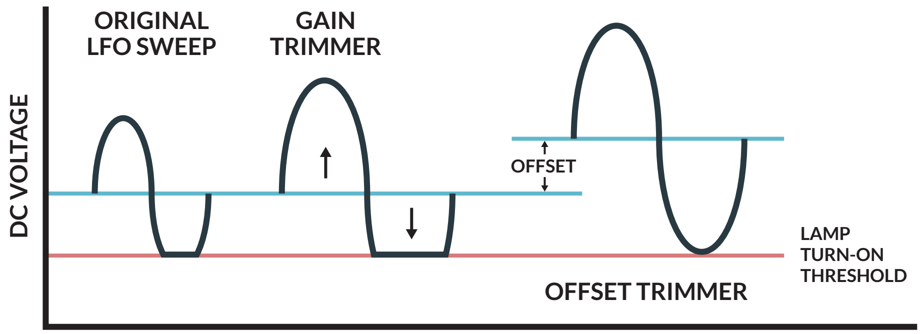
Current-production lamps have a rated lifespan of between 10,000 and 20,000 hours. The constant pulse of the LFO reduces this lifespan. It's strongly recommended to keep the pedal disconnected from power when not in use, which will lengthen the working lifespan by years if not decades. Alternately, you can engage the Cancel switch when not in use, which will have the same effect.

Either way, though, it's important to be aware that the lamp is the shortest-lifespan component in the circuit. It's not fragile by any means, but just keep it in the back of your mind that if the phasing stops working at any point, that's the first thing to check.

Biasing

There are two trimmers on the PCB that are used to calibrate the circuit. "Gain" and "Offset" directly control the lamp brightness and behavior and can be used to compensate for different lamps as well as different LDRs.

The behavior of these two trimmers is illustrated in the following diagram:



The **Gain** trimmer adjusts the overall amplitude range of the lamp's sweep, making it both brighter at the top end of the sweep and darker at the bottom.

The lamp has a fixed voltage threshold where it turns on, so the **Offset** trimmer is used to shift the range upward so that it only turns off at the very bottom of the sweep. If Gain is adjusted again, Offset will likely need to be as well.

The next two sections discuss the function of each bias trimmer in more detail.

Gain trimmer

This sets the gain of the lamp driver. As you turn it up, the lamp will increase in average brightness.

Start with this trimmer at 25% rotation, or around 10:00. Ensure the Offset trimmer is at 12:00. Turn Intensity all the way down, then adjust the trimmer until the lamp is dim but glowing. Then turn Intensity all the way back up and listen.

Note that even with the light shield installed, a small amount of light will still get in if you are testing in direct light with the enclosure lid removed, and this may affect the sound. It's recommended to replace the lid loosely when listening.

This trimmer is the primary way of compensating for different types of LDRs, so the lamp may need to be brighter or dimmer than this recommendation in order to get the LDR resistance into the correct range. Ultimately, just use your ears and leave it where it sounds best.

Some original Uni-Vibes used this trimmer, while others omitted it and just used a fixed resistor. If you want to leave it off, jumper pins 2 and 3 of the trimmer and use 150R for R49, but be aware that you may have a hard time getting it to sound right if your LDRs aren't identical in specs to the original.

Offset trimmer

This adjusts the DC bias point of the LFO going into the lamp driver. Lamps have a fixed turn-on threshold voltage, and this threshold may differ from lamp to lamp. This trimmer allows the LFO voltage range to be adjusted until the lamp cuts off at the very bottom.

With the Speed control set low, start with the trimmer at around noon and then adjust until the lamp goes dark at the bottom of the sweep. The goal is to have the biggest dynamic range between the top and bottom of the sweep—although be aware that due to the thermal time constant of the lamp, it may not be able to get fully dark on faster speeds. You may need to go back and forth a few times between Gain and Offset adjustments before you get it right.

Some other implemenations of this modification use a 100k trimmer with a 4k7 resistor for R48. This allows you to get the exact voltage divider ratio of the original (47k/100k) on the far end, but with a smaller range of adjustability.

Others dispensed with R47 and R48 and just used the 250k trimmer connected to ground and +V at either end. But with no minimum or maximum resistance values, this causes the LFO to malfunction at the extremes of the trimmer rotation. It seems that the 250k/47k/47k combination provides the best balance of adjustability, and so that is what we've specced for this project.

If you want to leave it off, use 100k for R48 and jumper pins 1, 2 and 3 of the trimmer.

Transistor selection

The original Uni-Vibe used 2SC828 transistors for all but Q1, which used 2SC539. The 2SC539 has slightly lower noise and higher h_{FE} (gain) than the 2SC828, and this is likely the reason it was specified.

These transistors are long obsolete and there are much better options available today. We recommend the 2N5089 for Q1 and 2N5088 for Q2-Q10. You can also use the BC549C for all of them, but note that the pinout is reversed so they will need to be rotated 180 degrees from the silkscreen on the PCB.

For Q11 (LFO) and Q12 (lamp driver), the MPSA13 Darlington is the best choice due to its much higher current handling. The Uni-Vibe did not take any special precautions for these two transistors, and as a result they tended to fail over time, particularly Q12, but with MPSA13 transistors it will be rock-solid. (The MPSA13 itself is obsolete, but the KSP13 is identical and still in production from ON Semi.)

Part variations

The Uni-Vibe circuit appeared under several brand names that all had minor variations, and even the official Uni-Vibe service manual's schematic differs from many of their own production units.

The Straylight Mini's parts list is based on the components that were most commonly used throughout production, and represents the generally-agreed-upon configuration from the DIY community.

We've attempted to compile all the official part variations we could find on the next page, but this is just a point of reference in case you're curious, or if you noticed a different value in a different DIY project. We strongly recommend using the default parts list.

BUILD NOTES, CONT.

Here are the specific part variations we have documented:

- **R3 and R4** are sometimes 1M (usually 1M2). Likely changed due to the characteristics of different transistors used throughout production for Q1-3, but may just be due to parts availability.
- **R9** is sometimes 3k (usually 3k3) and **R10** is sometimes 1k (usually 1k2). Likely changed due to the characteristics of different transistors used throughout production for Q1-3, but may just be due to parts availability.
- **R13** is sometimes 100k (usually 47k). This adjusts the level of vibe-only mode to match it with chorus mode.
- **R38** is sometimes 3k (usually 3k3). This adjusts the bias point of the LFO slightly, but may have just been due to parts availability.
- **C19** and **C21** are sometimes 0.68uF (usually 1uF). This adjusts the speed range of the LFO slightly.
- **R46** is incorrectly listed on the Univox factory schematic as 47k. It should be 4k7, which is the value used in every original unit and variant that we have seen.
- **R49** is usually 150R, either with a 500R trimmer or directly connected to ground. 68R allows for more of a gain range adjustment and you can still dial in the original resistance with the trimmer. You can also use 47R or 100R.
- **R42** and **R44** are often 4k7 and sometimes 1k8, 2k or 2k2. These resistors limit the maximum speed of the LFO, and so it's recommended to use a lower value. In our testing, 2k2 worked well.
- **Speed** (dual potentiometer) is sometimes 250kC. The increased value allows for a slightly slower modulation rate at the extreme. But due to the combination of the 220k parallel resistor and the reverse-log taper, the difference between 100k and 250k isn't much, and most DIY clones use 100k.

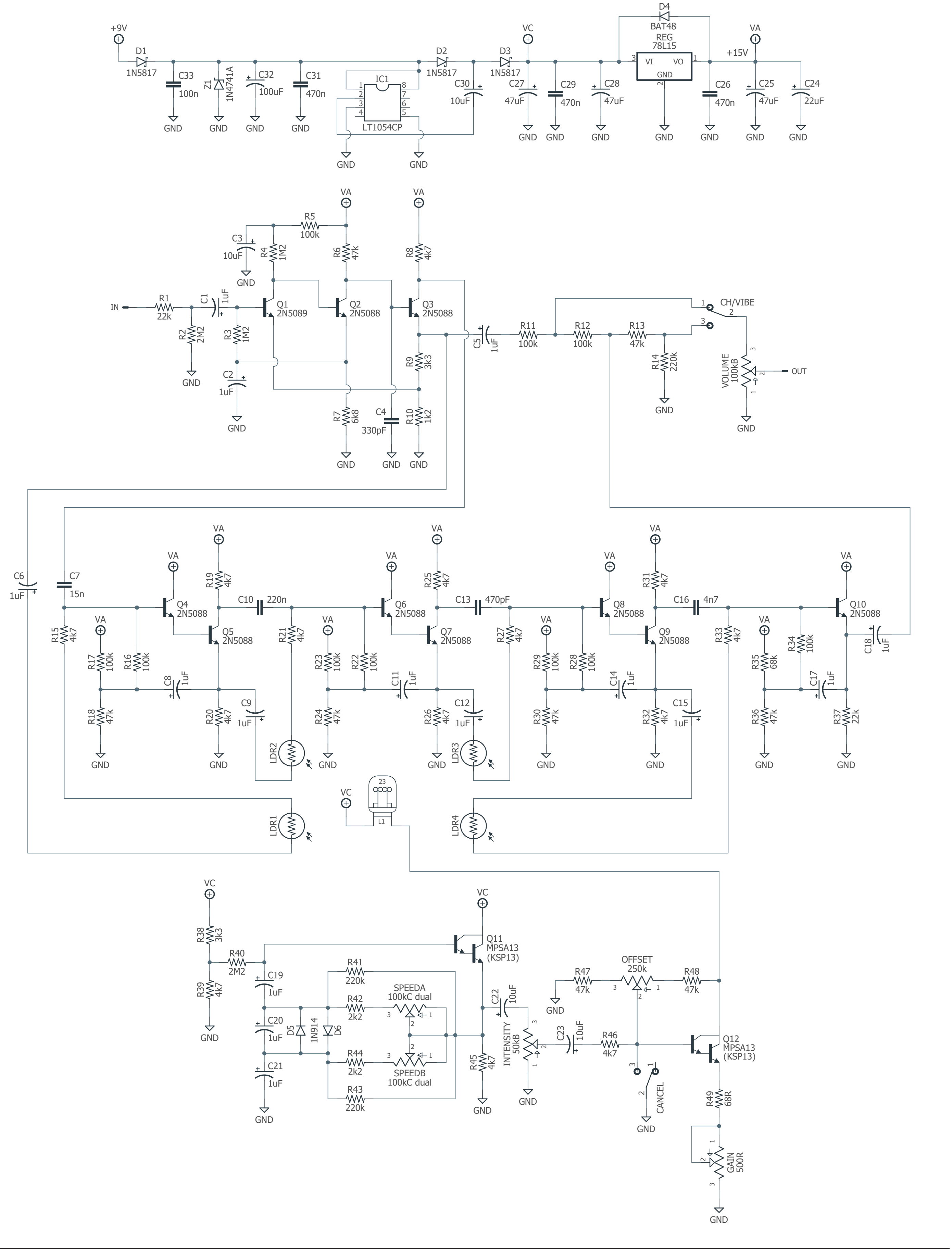
Input resistor

The original Uni-Vibe had a significant volume drop at the input, cutting the signal by 1/3, which was responsible for the weak output. Some clones add an input buffer or boost stage to help with this.

However, the issue is entirely caused by the R2 resistor at the input, which was 47k in the original. A much simpler solution is to just increase the value of this resistor to something much higher, such as 2.2M. We've included this higher value in the default parts list.

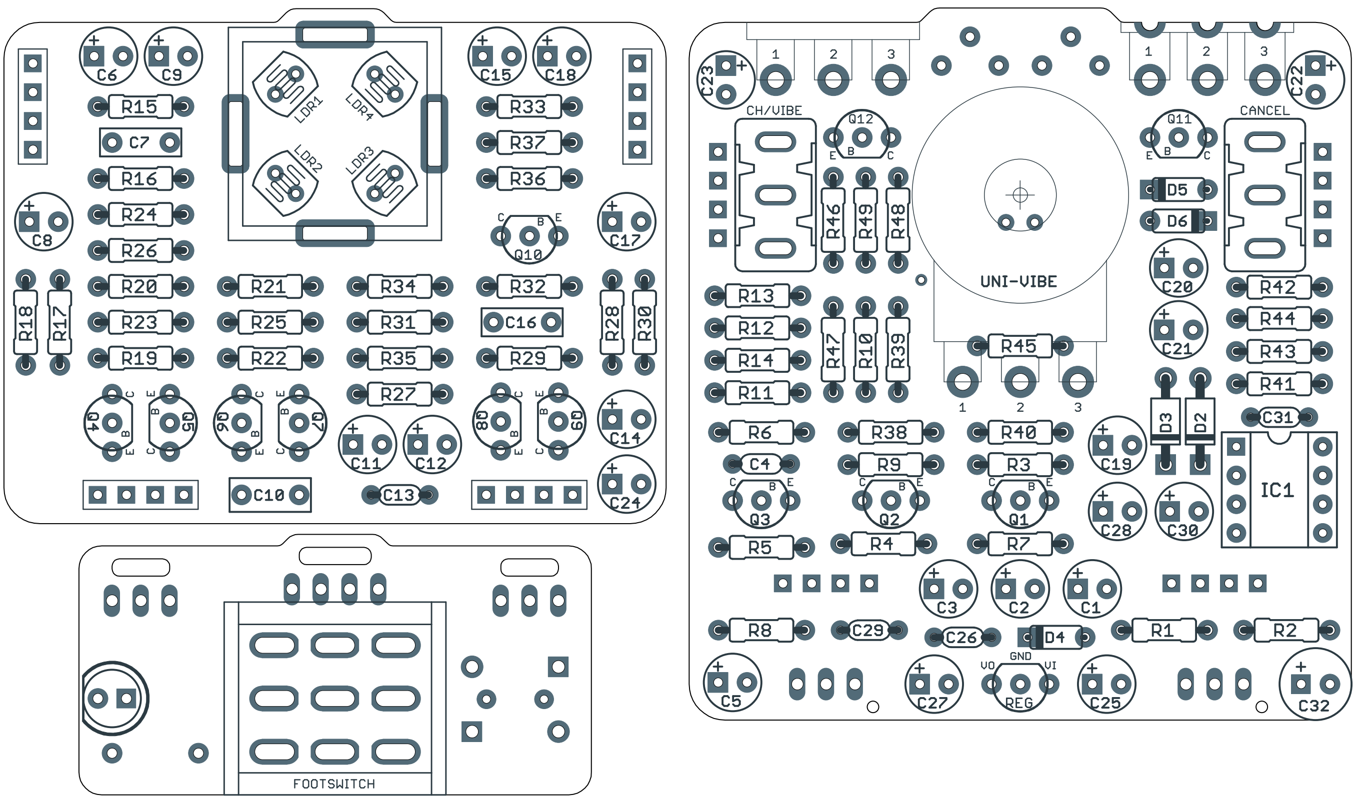
Some may feel that this low signal level is part of the classic sound, so use 47k for R2 if you want it to be identical to the vintage circuit. (The full-sized Straylight project uses an on-board slide switch to choose between both resistor values, but there wasn't space in the mini version.)

SCHEMATIC


+9V
D1
1N5817
C33
100n
Z1
1N4741A
C32
100uF
C31
470n
IC1
LT1054CP
D2
1N5817
C30
10uF
D3
1N5817
VC
C27
47uF
C29
470n
C28
47uF
D4
BAT48
REG
78L15
VI
VO
GND
C26
470n
+15V
VA
C25
47uF
C24
22uF
GND
IN
R1
22k
R2
2M2
C1
1uF
R3
1M2
C2
1uF
C3
10uF
R4
1M2
R5
100k
R6
47k
R7
6k8
C4
330pF
R8
4k7
R9
3k3
R10
1k2
Q1
2N5089
Q2
2N5088
Q3
2N5088
C5
1uF
R11
100k
R12
100k
R13
47k
R14
220k
CH/VIBE
VOLUME
100kB
OUT
C6
1uF
C7
15n
Q4
2N5088
Q5
2N5088
R15
4k7
R16
100k
R17
100k
R18
47k
R19
4k7
R20
4k7
R21
4k7
C8
1uF
C9
1uF
C10
220n
LDR1
LDR2
Q6
2N5088
Q7
2N5088
R22
100k
R23
100k
R24
47k
R25
4k7
R26
4k7
R27
4k7
C11
1uF
C12
1uF
C13
470pF
LDR3
Q8
2N5088
Q9
2N5088
R28
100k
R29
100k
R30
47k
R31
4k7
R32
4k7
R33
4k7
C14
1uF
C15
1uF
C16
4n7
LDR4
Q10
2N5088
R34
100k
R35
68k
R36
47k
R37
22k
C17
1uF
C18
1uF
23
L1
R38
3k3
R39
4k7
R40
2M2
C19
1uF
C20
1uF
C21
1uF
D5
D6
1N914
R41
220k
R42
2k2
R43
220k
R44
2k2
SPEEDA
100kC dual
SPEEDB
100kC dual
Q11
MPSA13
(KSP13)
R45
4k7
C22
10uF
INTENSITY
50kB
C23
10uF
R46
4k7
R47
47k
OFFSET
250k
R48
47k
CANCEL
Q12
MPSA13
(KSP13)
R49
68R
GAIN
500R

PCB DIAGRAM (REVERSE SIDE)

The diagram on page 1 shows the front or top-facing side of the PCB, but since very few of the components are actually mounted on the front, we've included a reference for the bottom side of the PCB as well.



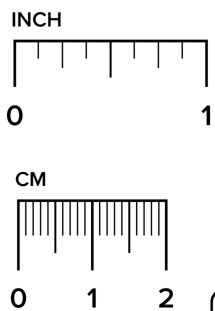
DRILL TEMPLATE

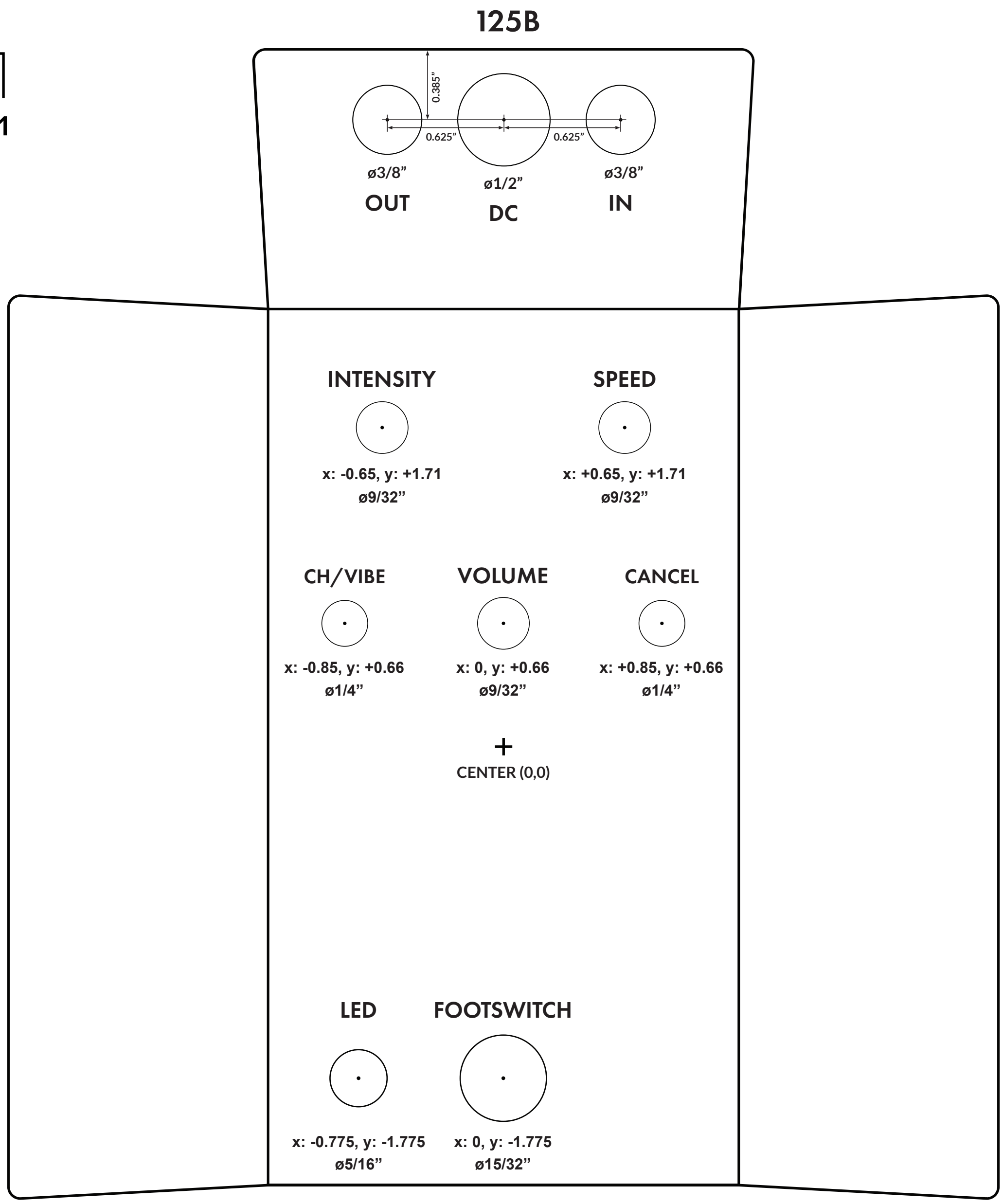
Cut out this drill template, fold the edges and tape it to the enclosure. Before drilling, it's recommended to first use a center punch for each of the holes to help guide the drill bit.

Ensure that this template is printed at 100% or "Actual Size". You can double-check this by measuring the scale on the printed page.

Top jack layout assumes the use of closed-frame jacks like the Switchcraft 111X. If you'd rather use open-frame jacks, please refer to the Open-Frame Jack Drill Template for the top side.

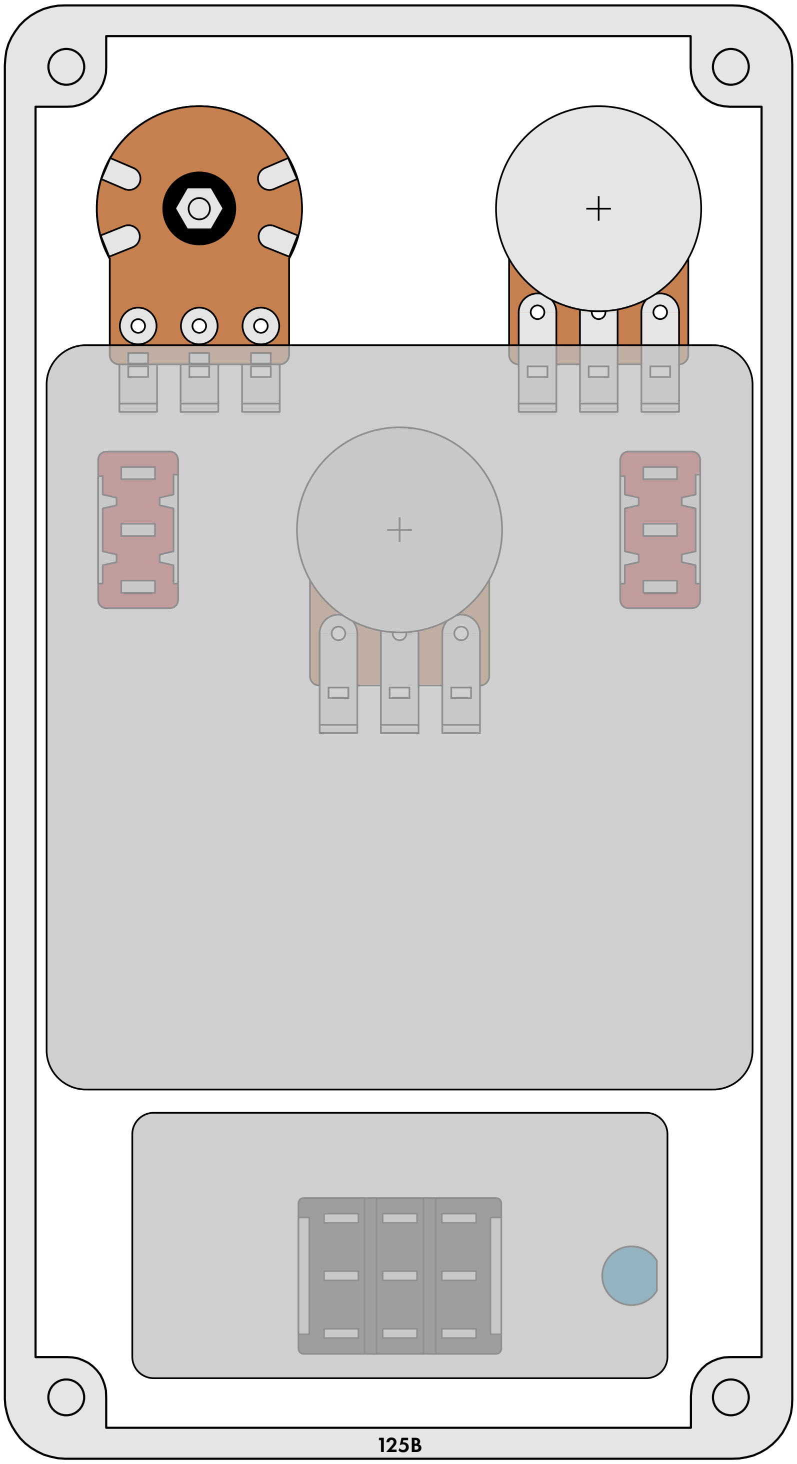
LED hole drill size assumes the use of a 5mm LED bezel, available from several parts suppliers. Adjust size accordingly if using something different, such as a 3mm bezel, a plastic bezel, or just a plain LED.





ENCLOSURE LAYOUT

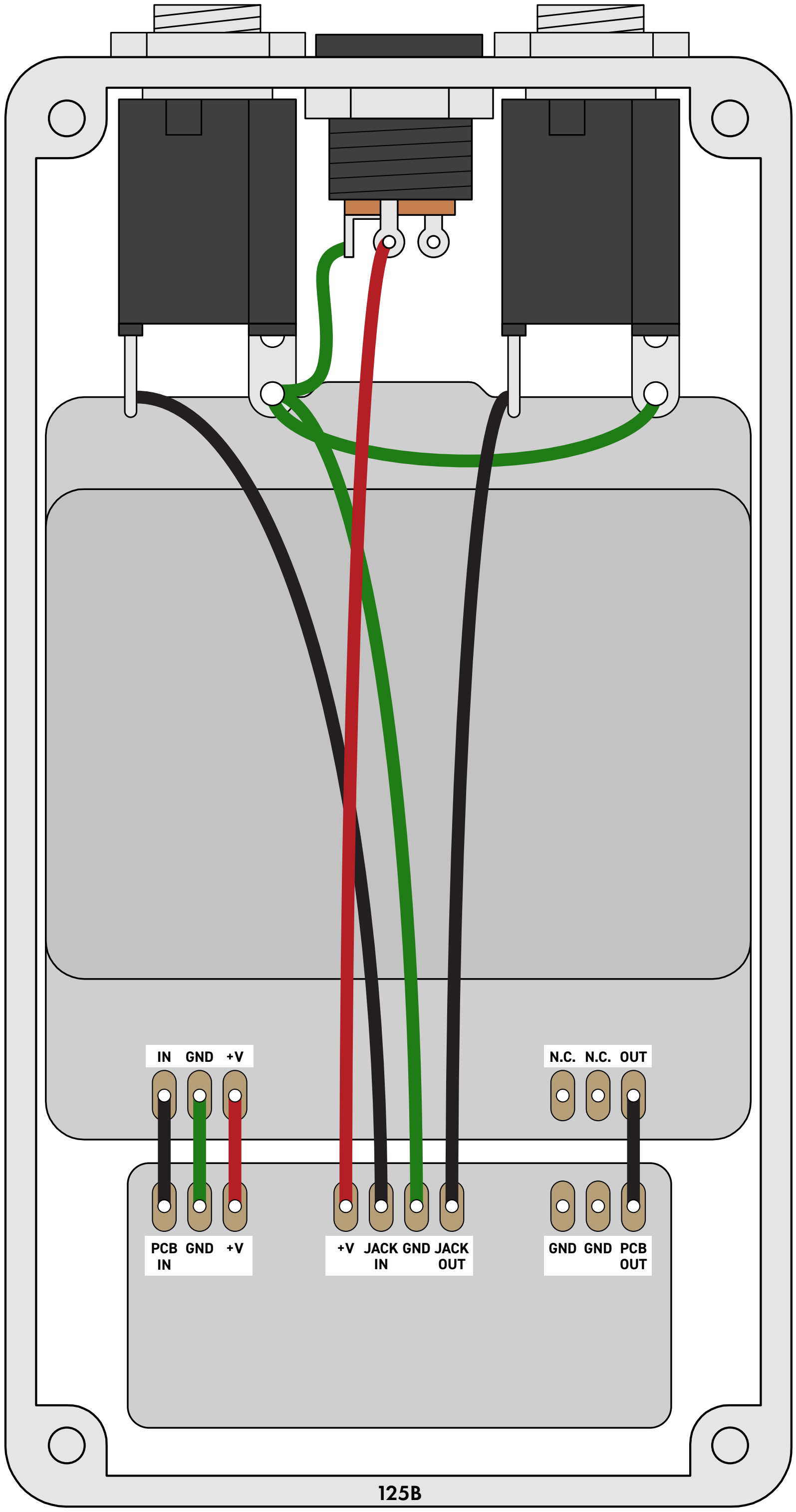
Enclosure is shown without jacks and top PCB. See next page for jack layout and wiring, and see page 9 for a full side-profile view of the assembled pedal.



Note: The upper pads for the dual-gang gain potentiometer appear to be cut in half. **This is intentional!** It's called a *plated half-hole* or *castellated hole*, and they're used so that the PCB can lay flat across the pots instead of angling upward for the dual pot.

Solder the pot like you would if they were normal pads, but bend the top pins forward slightly so they make contact with the edge of the pads.

WIRING DIAGRAM



LICENSE & USAGE

No direct support is offered for these projects beyond the provided documentation. It's assumed that you have at least some experience building pedals before starting one of these. Replacements and refunds cannot be offered unless it can be shown that the circuit or documentation are in error.

All of these circuits have been tested in good faith in their base configurations. However, not all the modifications or variations have necessarily been tested. These are offered only as suggestions based on the experience and opinions of others.

Projects may be used for commercial endeavors in any quantity unless specifically noted. No attribution is necessary, though a link back is always greatly appreciated. The only usage restrictions are that **(1) you cannot resell the PCB as part of a kit without prior arrangement**, and **(2) you cannot "goop" the circuit, scratch off the screenprint, or otherwise obfuscate the circuit to disguise its source**. (In other words: you don't have to go out of your way to advertise the fact that you use these PCBs, but please don't go out of your way to hide it. The guitar effects industry needs more transparency, not less!)

DOCUMENT REVISIONS

1.0.0 (2026-07-03)
Initial release.