

PROJECT NAME

CONSTELLATION

BASED ON

Shin-Ei Companion FY-2

EFFECT TYPE

Fuzz

BUILD DIFFICULTY

■■■■■ Easy

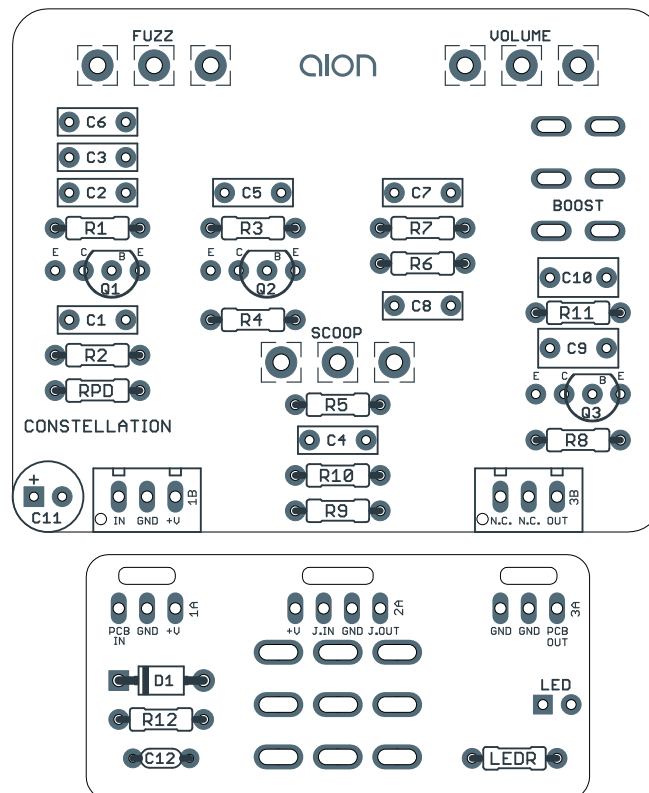
DOCUMENT VERSION

1.0.0 (2019-11-28)



PROJECT SUMMARY

An early silicon fuzz known for its scooped-midrange tone. This adaptation is updated with a switchable volume boost stage as well as a control to dial back the scoop.



Actual size is 2.3" x 1.86" (main board) and 1.78" x 0.86" (bypass board).

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INTRODUCTION

The Constellation Vintage Fuzz is an adaptation of the Shin-Ei Companion FY-2, an early 1970s silicon transistor fuzz that was also re-labeled under the brand names Avora, Jax, Kimbara, Thomas and Zenta.

The FY-2 is the slightly-less-famous and often-mistaken precursor to the FY-6, which was best known for being re-branded as the Univox Super Fuzz. The FY-2 does not have the octave effect of the Super Fuzz, but it does have the same scooped midrange character.

The fuzz control of the FY-2 is an odd setup that shifts the balance between the two transistor stages rather than directly controlling gain. Many people wonder whether it's working right because it doesn't seem to change the intensity of the effect as it's turned, just the harmonics and texture. This is how it's supposed to work. It's not tremendously useful, so most people just leave it up all the way.

The Constellation project is faithful to the original FY-2, with two additions: 1) a control to allow the characteristic mid-scoop to be dialed back into more of a flat EQ, and 2) an optional volume boost stage before the master volume control at the end. The original unit suffers from excessively low volume, so the make-up gain stage from the FY-6 has been adapted for this circuit. With the gain boost disabled and the Scoop control at maximum, the circuit is 100% identical to a vintage FY-2.

USAGE

The Constellation has the following controls:

- **Fuzz** controls the harmonics and texture of the fuzz tone.
- **Scoop** allows the mid-scoop to be lessened in intensity for more of a full-range fuzz. Note that the volume will decrease as this control is turned up, so the optional boost stage should be used at higher Scoop settings, but isn't as crucial if this control is dialed back.
- **Volume** is the master output volume control.
- **Boost** (toggle) enables or disables an optional gain stage at the end of the circuit.

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 | 2M2 | Metal film resistor, 1/4W | |
| R2 | 22k | Metal film resistor, 1/4W | |
| R3 | 2M2 | Metal film resistor, 1/4W | |
| R4 | 47k | Metal film resistor, 1/4W | |
| R5 | 100k | Metal film resistor, 1/4W | |
| R6 | 10k | Metal film resistor, 1/4W | |
| R7 | 15k | Metal film resistor, 1/4W | |
| R8 | 100k | Metal film resistor, 1/4W | |
| R9 | 15k | Metal film resistor, 1/4W | |
| R10 | 1k | Metal film resistor, 1/4W | |
| R11 | 10k | Metal film resistor, 1/4W | |
| R12 | 100R | Metal film resistor, 1/4W | |
| RPD | 2M2 | Metal film resistor, 1/4W | Input pulldown resistor. |
| LEDR | 4k7 | Metal film resistor, 1/4W | LED current-limiting resistor. Adjust value to change LED brightness. |
| C1 | 47n | Film capacitor, 7.2 x 2.5mm | |
| C2 | 1n | Film capacitor, 7.2 x 2.5mm | |
| C3 | 47n | Film capacitor, 7.2 x 2.5mm | |
| C4 | 47n | Film capacitor, 7.2 x 2.5mm | |
| C5 | 3n3 | Film capacitor, 7.2 x 2.5mm | |
| C6 | 2n2 | Film capacitor, 7.2 x 2.5mm | |
| C7 | 1n | Film capacitor, 7.2 x 2.5mm | |
| C8 | 100n | Film capacitor, 7.2 x 2.5mm | |
| C9 | 1uF | Film capacitor, 7.2 x 3.5mm | |
| C10 | 1uF | Film capacitor, 7.2 x 3.5mm | |
| C11 | 100uF | Electrolytic capacitor, 6.3mm | Power supply filter capacitor. |
| C12 | 100n | MLCC capacitor, X7R | Power supply filter capacitor. |
| D1 | 1N5817 | Schottky diode, DO-41 | |
| Q1 | 2N3904 | BJT transistor, NPN, TO-92 | Substitute. Original uses 2SC536F (hFE 160-320) |
| Q2 | 2N3904 | BJT transistor, NPN, TO-92 | Substitute. Original uses 2SC536F (hFE 160-320) |
| Q3 | 2N3904 | BJT transistor, NPN, TO-92 | |

PARTS LIST, CONT.

| PART | VALUE | TYPE | NOTES |
|-------|--------------|--------------------------------|---|
| FUZZ | 50kB | 16mm right-angle PCB mount pot | |
| SCOOP | 50kB | 16mm right-angle PCB mount pot | |
| VOL. | 50kB | 16mm right-angle PCB mount pot | |
| BOOST | DPDT | Toggle switch, DPDT | |
| LED | 5mm | LED, 5mm, red diffused | |
| IN | 1/4" stereo | 1/4" phone jack, closed frame | Switchcraft 112BX 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. |
| BATT | Battery snap | 9V battery snap | Optional. Use the soft plastic type—the hard-shell type will not fit. |
| FSW | 3PDT | Stomp switch, 3PDT | |
| ENC | 125B | Enclosure, die-cast aluminum | Can also use a Hammond 1590N1. |

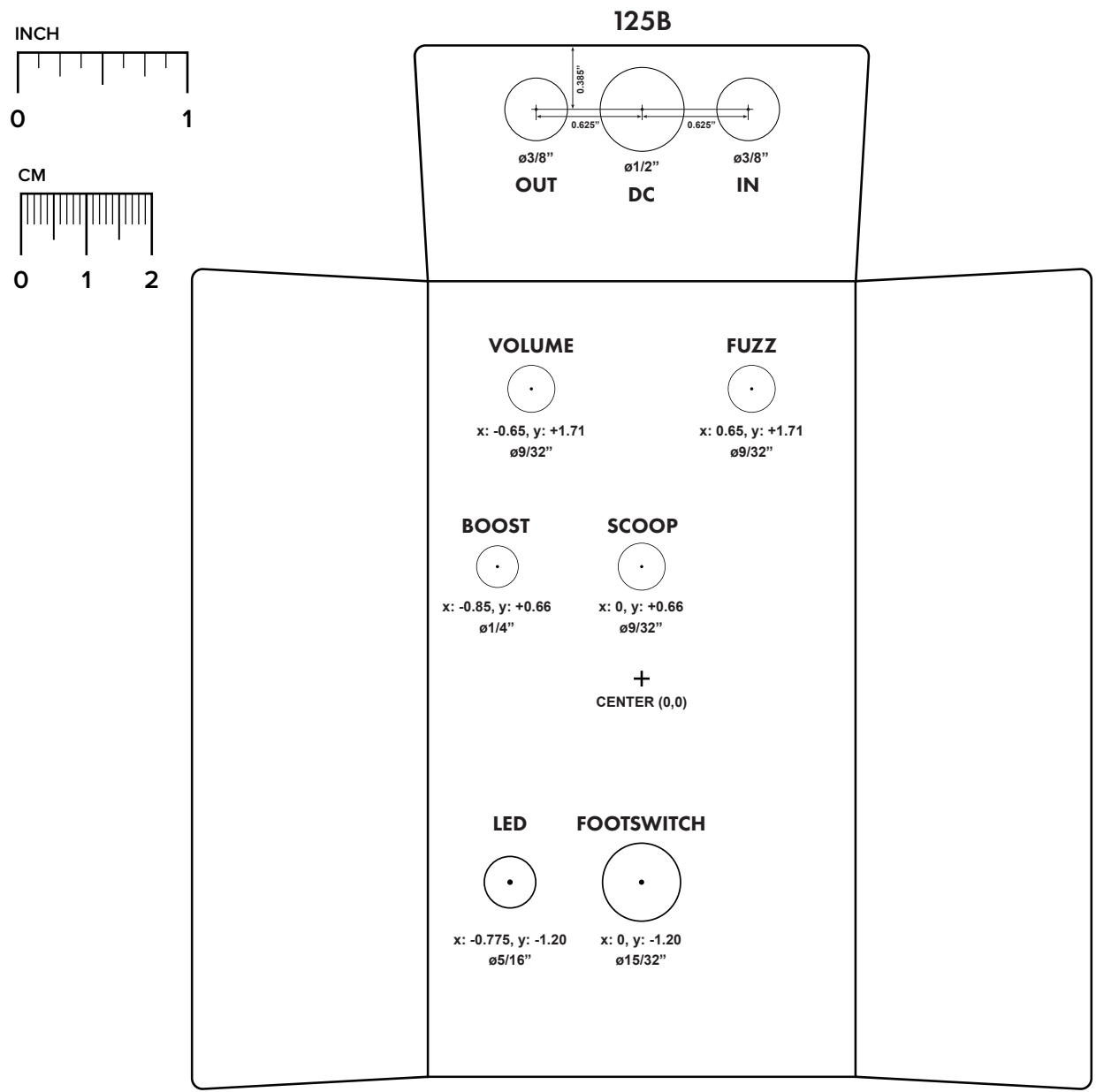
DRILL TEMPLATE

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.

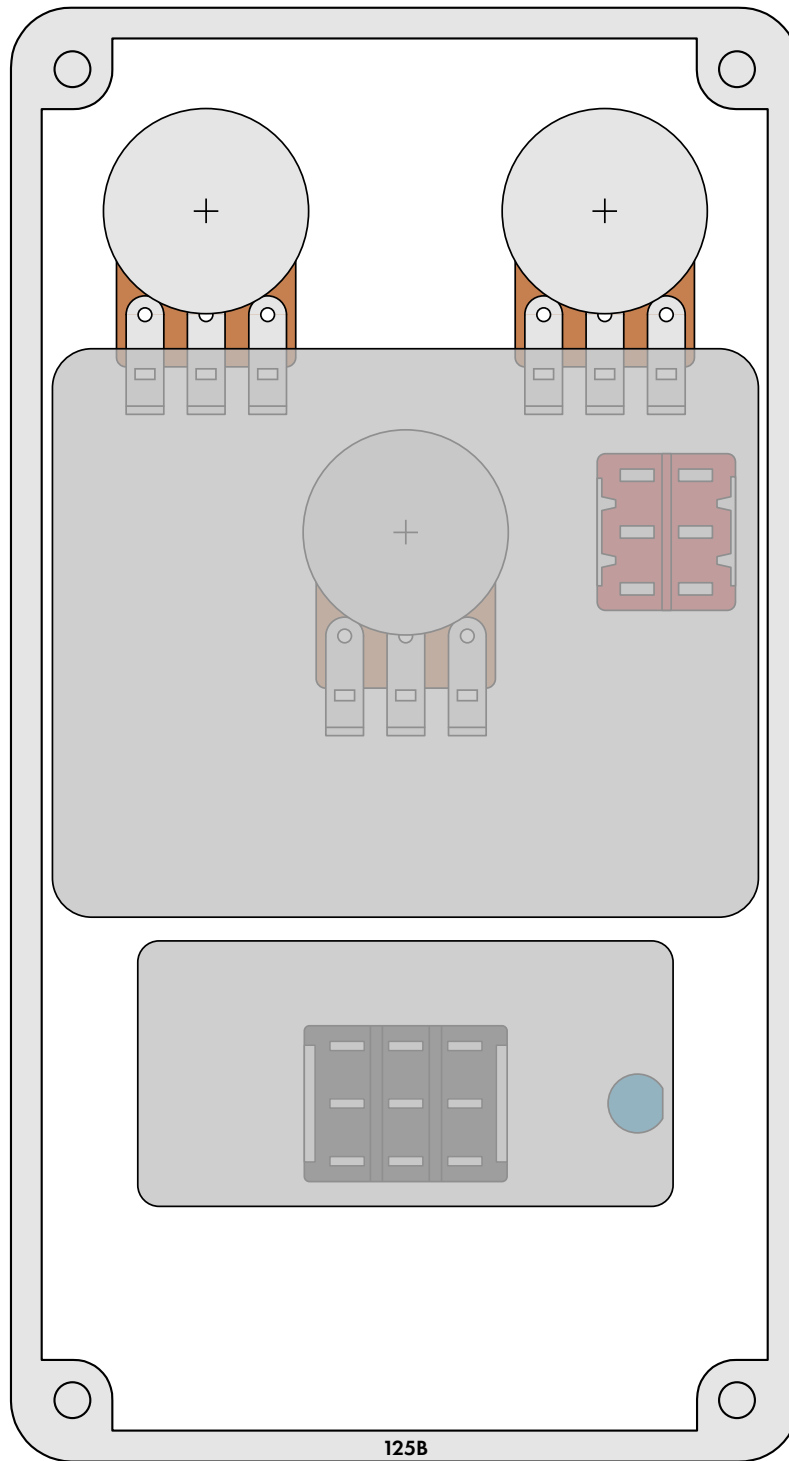
Top jack layout assumes the use of closed-frame jacks like the [Switchcraft 111X](#). If you'd rather use open-frame jacks, please refer to the Open-Frame Jack Drill Template for the top side.

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. See next page for jack layout and wiring.



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 (2019-11-28)

Initial release.