flight of harmony

Parasite Antifilter

WTF eurorack module v1
kit

Contents

(1) Front panel
(5) PCB - Control, Switch, Jack, Main, Rear
(3) Resistor card
(1) Semiconductor card
(1) Capacitor card
(1) Hardware bag
  (1) 2x5 box header
  (4) M3x0.5 eurorack mounting screw
  (4) M3 nylon washer
  (6) 3/8" locking PCB standoff
  (2) 1/2" locking PCB standoff
  (2) 1x3 0.1" pitch 0.235" height pin header (HDRSWFBM, HDRSWG1M)
  (1) 1x9 0.1" pitch 0.318" head x 0.235" tail pin header (HDRMJR)
  (1) 1x12 0.1" pitch 0.318" head x 0.235" tail pin header (HDRMJL)
  (1) 1x7 0.1" pitch 0.310" head x 0.318" tail pin header (HDRMPR)
  (1) 1x13 0.1" pitch 0.310" head x 0.318" tail pin header (HDRMPL)
  (1) 1x3 0.1" pitch 0.620" head x 0.110" tail pin header (HDRSWG2R)
  (3) 1x3 0.1" pitch machined socket header (HDRSWFB, HDRSWG1, HDRSWG2)
  (1) 1x5 0.1" pitch machined socket header (HDRPR)
  (1) 1x7 0.1" pitch machined socket header (HDRRPR)
  (2) 1x9 0.1" pitch machined socket header (HDRJR, HDRRJR)
  (2) 1x12 0.1" pitch machined socket header (HDRJL, HDRRJL)
  (2) 1x13 0.1" pitch machined socket header (HDRPL, HDRRPL)
(1) Power cable bag
  (1) 9" 10-conductor 0.050" pitch ribbon cable
  (1) 10-pin IDC socket connector
  (1) 16-pin IDC socket connector
(1) Potentiometer bag
  (1) Potentiometer, A100k
  (10) Potentiometer, B100k
  (11) M7 Washer
  (11) M7 Nut
  (11) M7 Knob
(1) Jack bag
  (13) M6 3.5mm TS jack
  (13) M6 Washer
  (13) M6 Nut
(1) Switch bag
  (3) SPDT (Single-Pole, Double-Throw) toggle switch with nut
  (3) 10-40 hex nut
  (3) #10 star internal-tooth lock washer
(1) Reference manual (this thing)
(1) Owner's manual (that other thing like this thing)

Kit Notes

Tools

- Soldering iron with fine tip
- Solder
- Fine-tip tweezers
- Nut drivers/sockets/wrenches:
  - 7mm (toggle switch)
  - 8mm (jack nuts)
  - 10mm (potentiometer nuts)

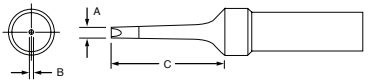
Skills

This kit assumes that you have a basic understanding of electronics, electronic components, and soldering and assembling electronics. Note that this kit is almost entirely Surface Mount Technology (SMT), so the assumption is that you understand how to work with Surface Mount Devices (SMD) and have some experience.

This doesn't mean that you're *completely* on your own, just that I'm not going to hold your hand[1]. Below are a few things to help get you started. Feel free to ignore them.

Assembly Tips

- RTFM[2]! All the way through!
- For the smaller SMD, use the smallest soldering iron tip that you have. My favorite is the Weller ETR: (Not an endorsement, nor do I get anything from it, it's just a good reference point.) Remember to switch back to a larger tip when soldering the through-hole components and the regulators.



Narrow Screwdriver

Cat.	A		B		C	
No.	in.	mm	in.	mm	in.	mm
ETR	0.062	1.60	0.044	1.12	0.625	15.90

- Good, fine-tip tweezers are a must. The Wiha 4b and 7a tweezers are great[3].
- One helpful trick for soldering SMD with wire solder is to pre-solder one pad for each component location. Next, hold the component in place and touch your soldering iron tip to the pre-soldered pad to reflow the solder. Then you can solder the other side normally.

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1) For many reasons, but two in particular: First, I'd have to leave my house, and I hate doing that. Second, it's really hard to solder with only one hand.
2) Read The F***ing Manual! This thing!
3) IMO, their 5abb were the best, but they discontinued them so FML. No, you can't have mine.

Kit Notes (cont.)

- *Flux is your friend.* Use flux. Water-soluble flux is best for a clean finish, but you have to make sure to get it all off when done, as it can corrode the joint and some fluxes may also be capacitive. NOTE: The potentiometers and switches are NOT sealed and cannot be submerged; so don't wash them. You can also use no-clean flux.
- *Smallest first.* Solder the components in increasing order of size. Per board, per side, not overall.
- *Minimize heat exposure.* Heat destroys components, and SMD are particularly sensitive because they have less mass to distribute the heat. Flux helps with this too.
- Use the face plate to line up the potentiometers, jacks, and LEDs, before soldering; this is much easier than resoldering them to line them up correctly afterward.

Assembly Order

The easiest build order is as follows:

1. All SMD, smallest first.
2. Install & solder all the headers on the Control, Jack, and Rear PCBs.
3. Install & solder the pin headers on the Main PCB - see instructions below.
4. Install & solder the potentiometers and jacks.
5. Attach the panel - see toggle switch jam nut instructions on p. 15.

Main PCB Pin Headers

The HDRMJL, HDRMJR, HDRMPL, and HDRMPR headers are used in an atypical fashion, so pay careful attention to these parts. They engage with socket headers on both sides so they extend through the Main PCB, and require special care when installing and soldering. To repeat: pay close attention! Incorrect soldering can cause the posts to not fit in the sockets, and putting them in incorrectly is extremely difficult to repair. To install:

1. Identify each header and where it goes. There are two different headers: the longer — HDRMPL & HDRMPR, with 0.310" head x 0.318" tail— mate with the Control PCB (fig. 1).

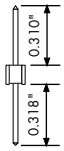


fig. 1: HDRMPL & HDRMPR header pin (to scale).

2. The shorter headers — HDRMJL & HDRMJR, with 0.318" head x 0.235" tail — mate with the jack PCB (fig. 2).

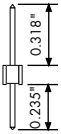


fig. 2: HDRMJL & HDRMJR header pin (to scale).

3. On both types of headers the *long end* goes through the PCB. This technically means HDRMJL & HDRMJR are installed upside down, but don't worry about it, it'll be fine[4] — see the Exploded View and Subassembly View diagrams for visual references. Install the headers and use the Control and Jack PCBs to hold them in place during soldering.

For soldering, it is important to try to keep the solder at the junction of the pin and the rear side of the PCB. Large soldering iron tips or too much heat will cause the solder to wick up the length of the pin, which can make the pin too thick to fit into its corresponding socket. A sharp, narrow soldering iron tip and thin wire solder helps prevent this. If you do end up with a blob of solder that impedes assembly, you can usually remove it with desoldering braid and a broad-tip soldering iron.

Film Capacitors

The plastic film box capacitors, C22 and C55, need to be laid over to one side to fit between the PCBs (see diagram on p. 14). Bend the legs 90° and install the capacitors so they rest on top of the adjacent chip resistors and capacitors. As shown in the Rear PCB Assembled View on p. 6, C22 should be oriented to the top of the PCB, and C55 should be oriented toward the bottom of its PCB for best clearance.

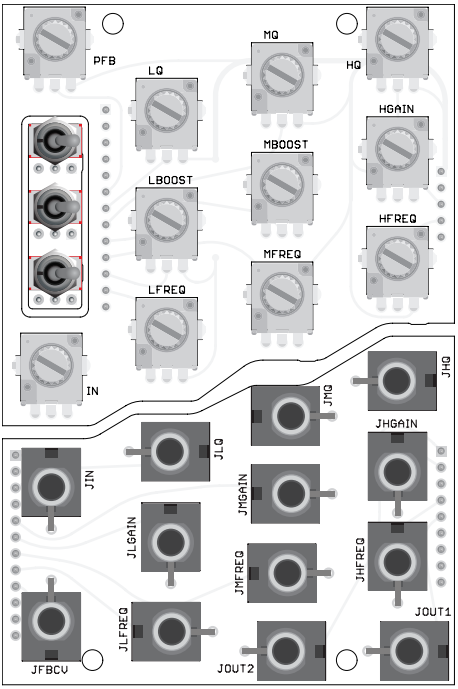
Help

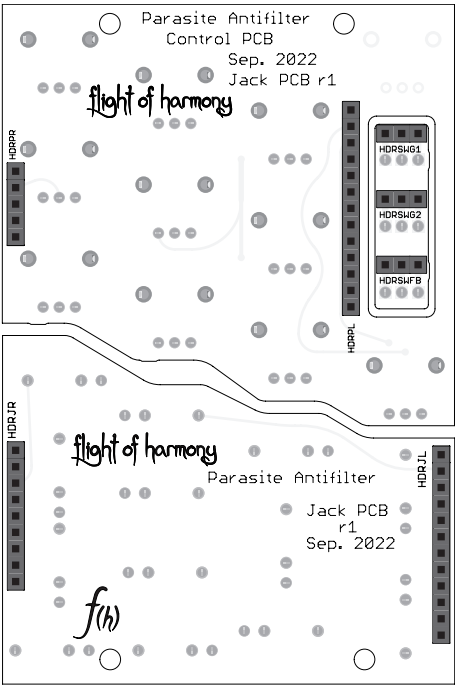
If you're still having problems, email me! I am always happy to help. When emailing, please include high-resolution pictures of your circuit boards.

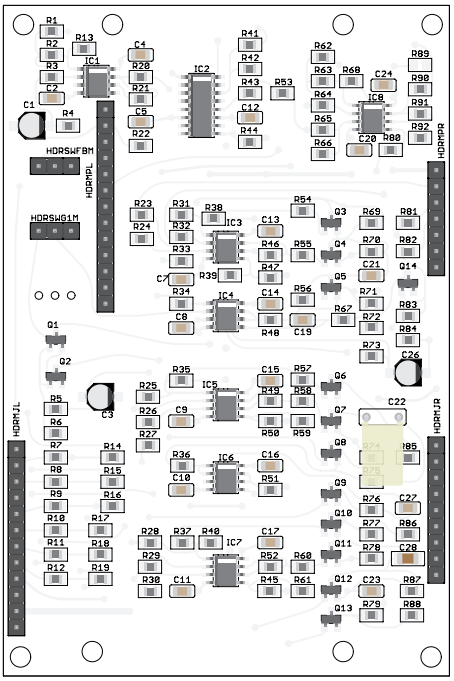
Most of the troubleshooting requests I have received were solved by zooming in and closely examining the pictures. Cold solder joints are sneaky and hard to spot if you haven't dealt with them before. A cold solder joint is where the solder doesn't adhere to both the pad and the component lead, and just flowed around one of them without making contact. They happen, and they suck, but they're easy fixes once you find them.

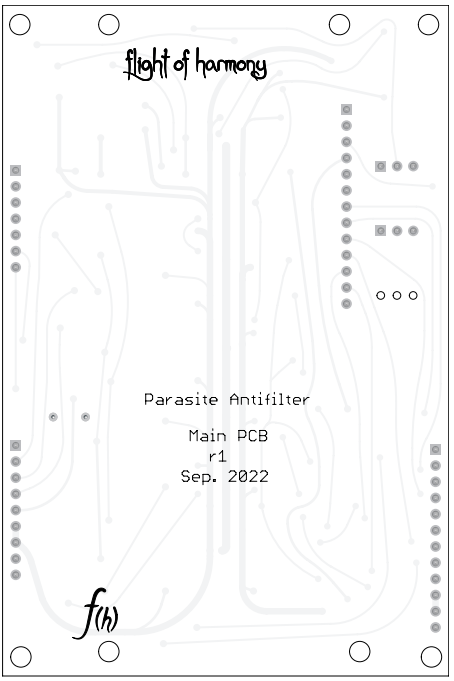
4) It actually will be fine. The small risers on the bottom side of most headers is to allow clearance for solvents, flux, and solder in automated assembly and cleaning processes, and have little-to-no impact on hand assembly. I mean sure, you could always prove me wrong, but that's not very nice.

Control, Jack, & Main PCB Assembled Views

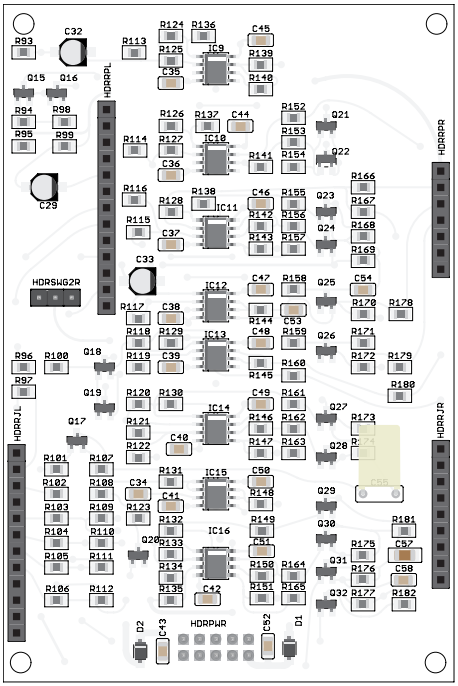


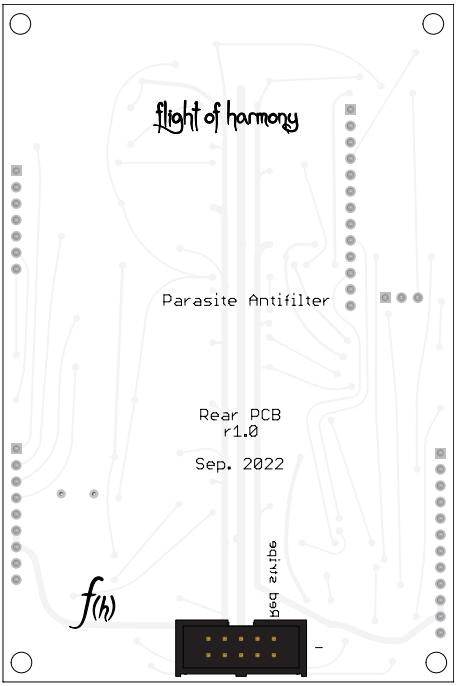




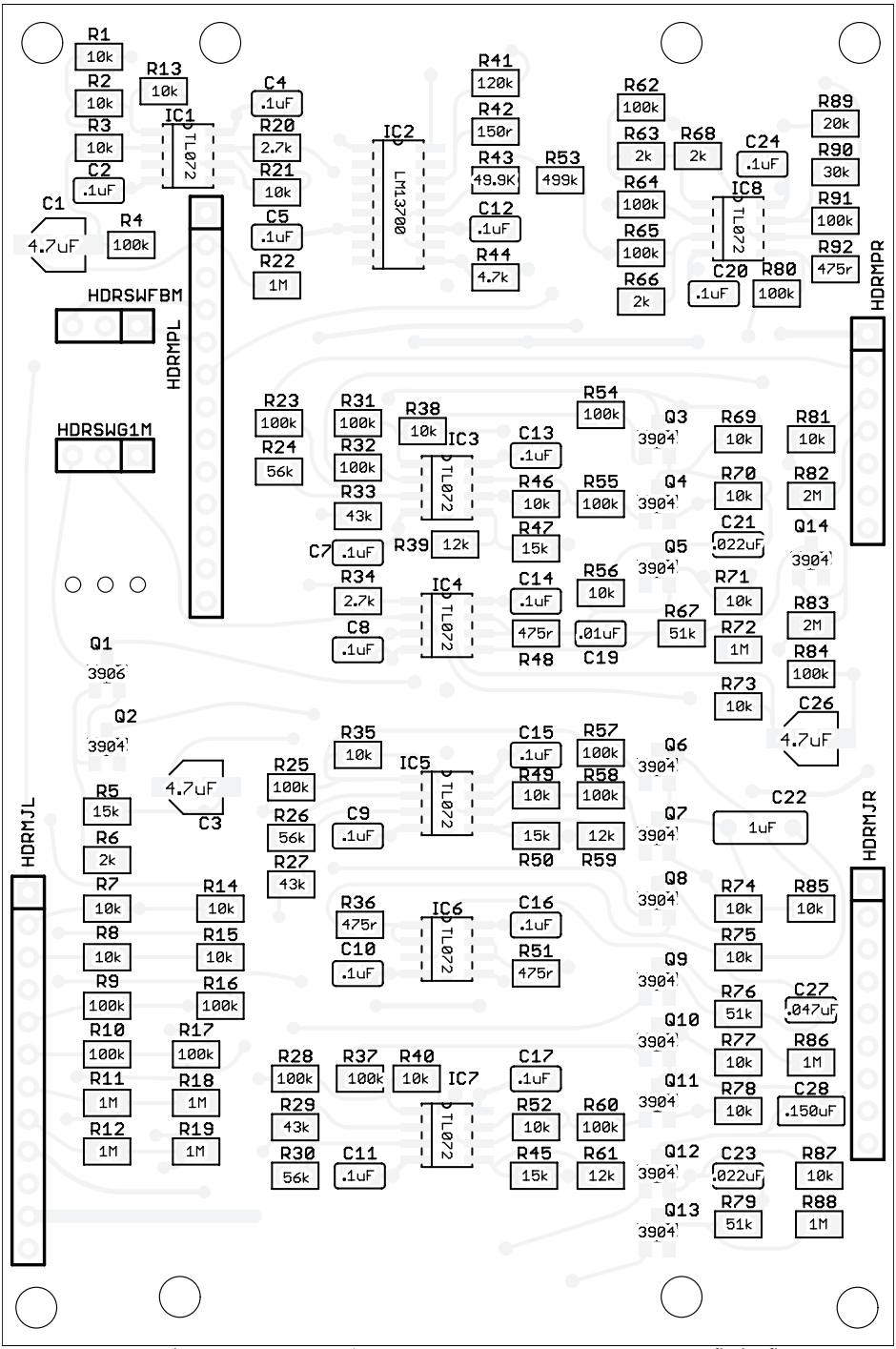


Rear PCB Assembled View

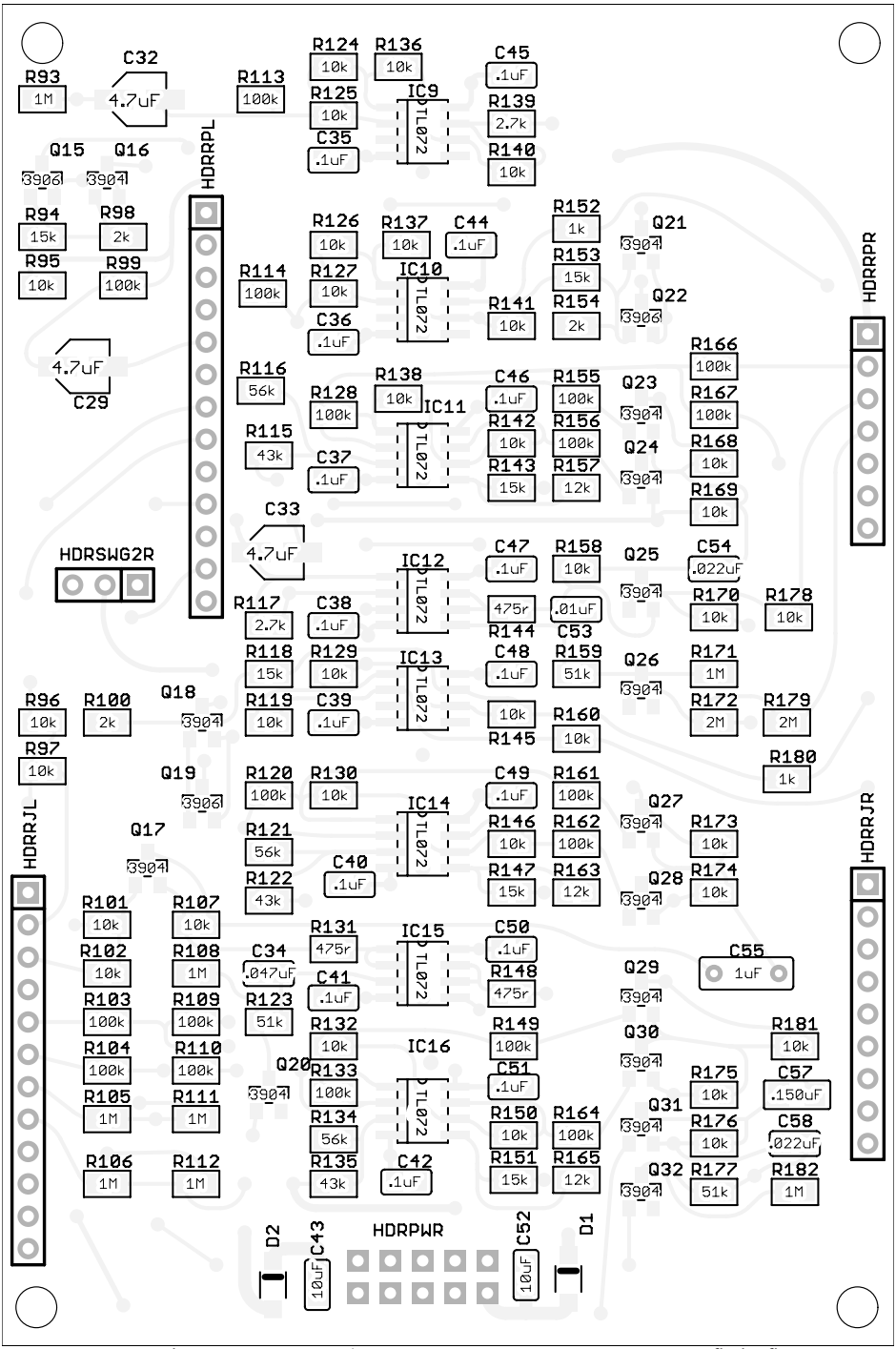




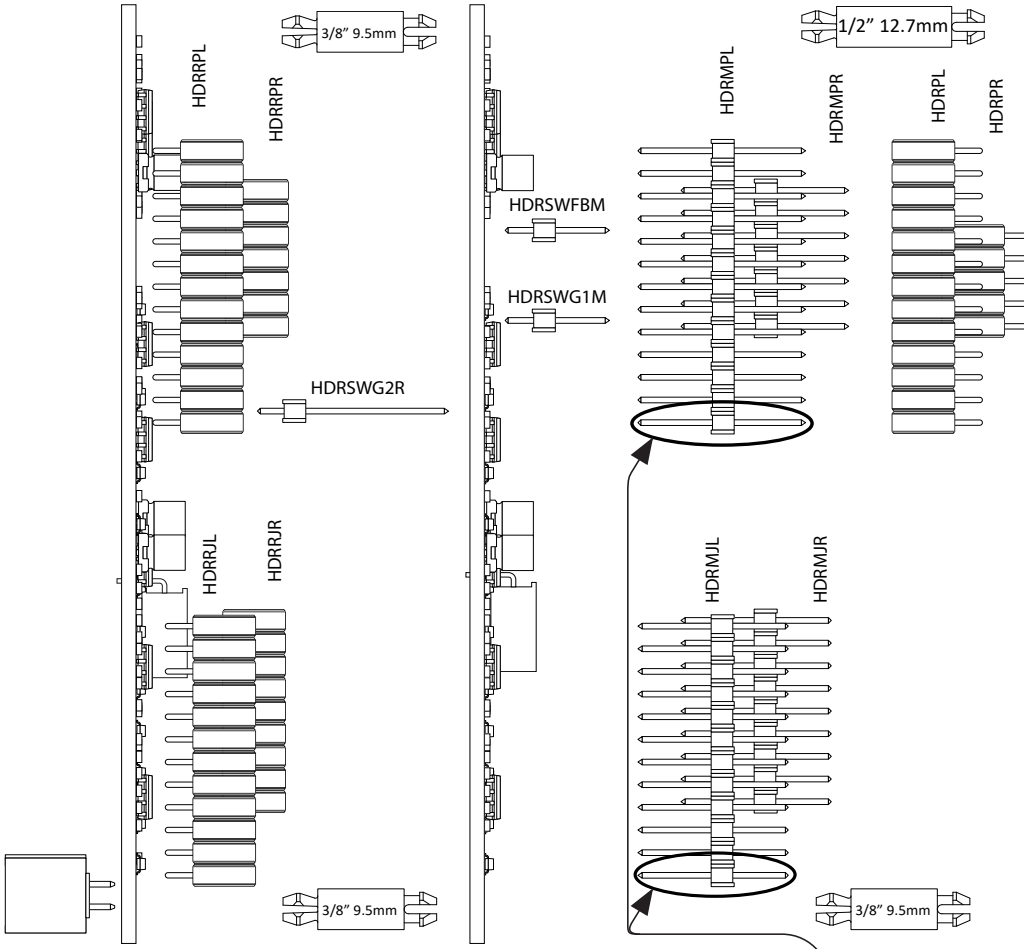
Main PCB SMD Reference



Rear PCB SMD Reference

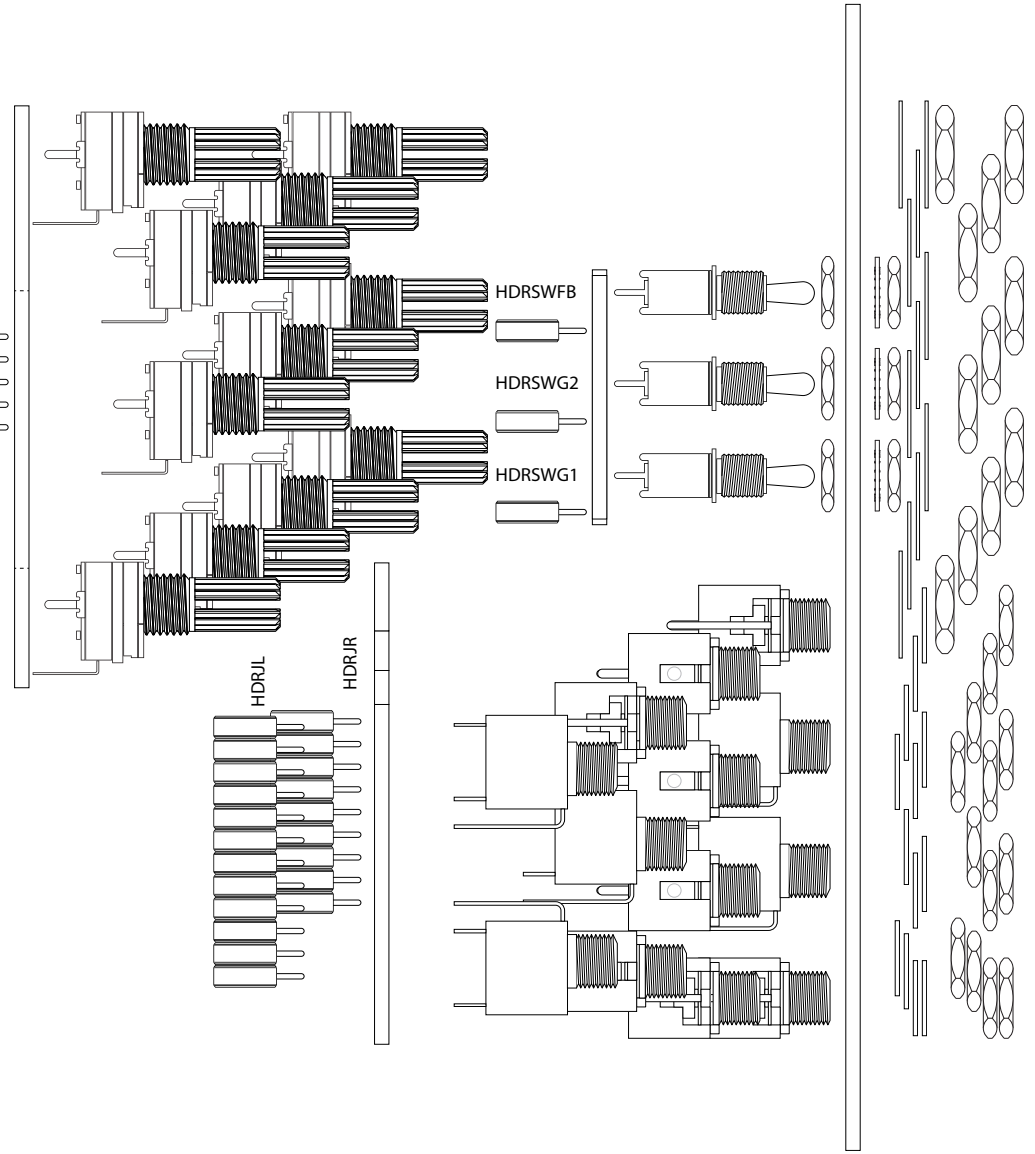


Exploded View

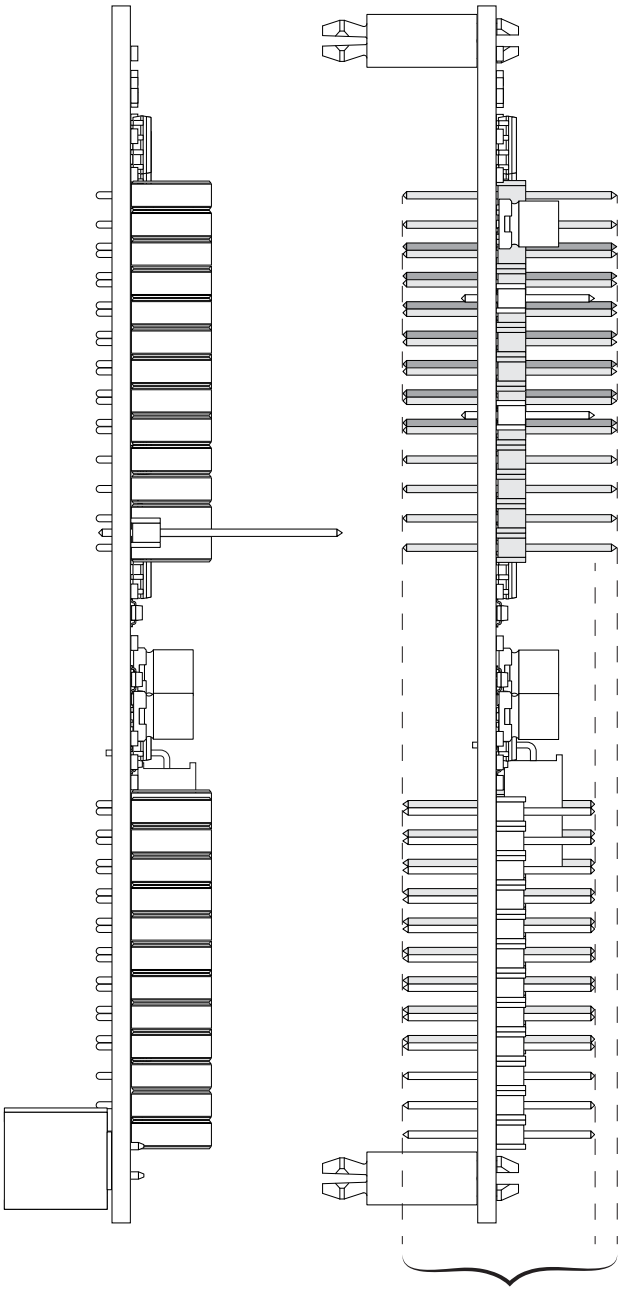


HDRMJL, HDRMJR, HDRML, and HDRMPR have long side toward PCB.

Exploded View (cont.)

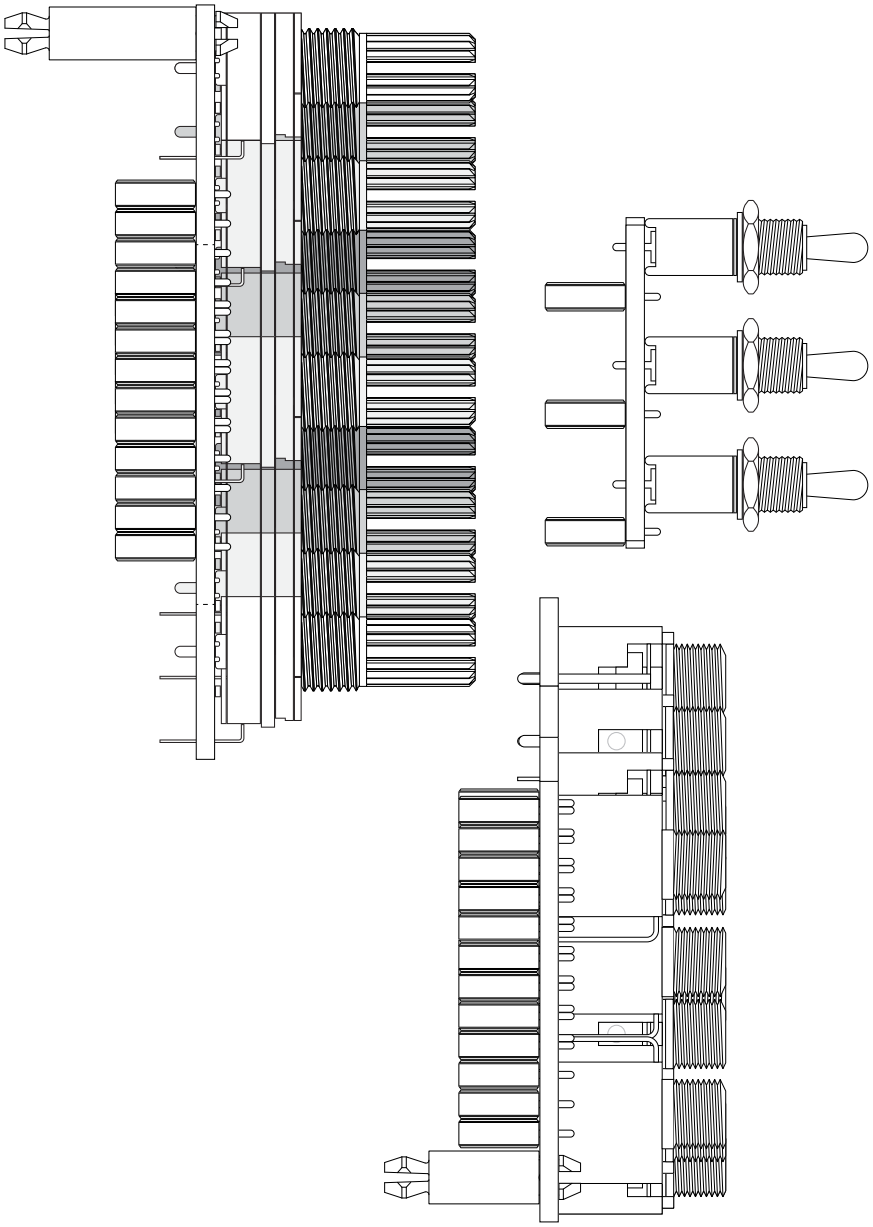


Subassembly View

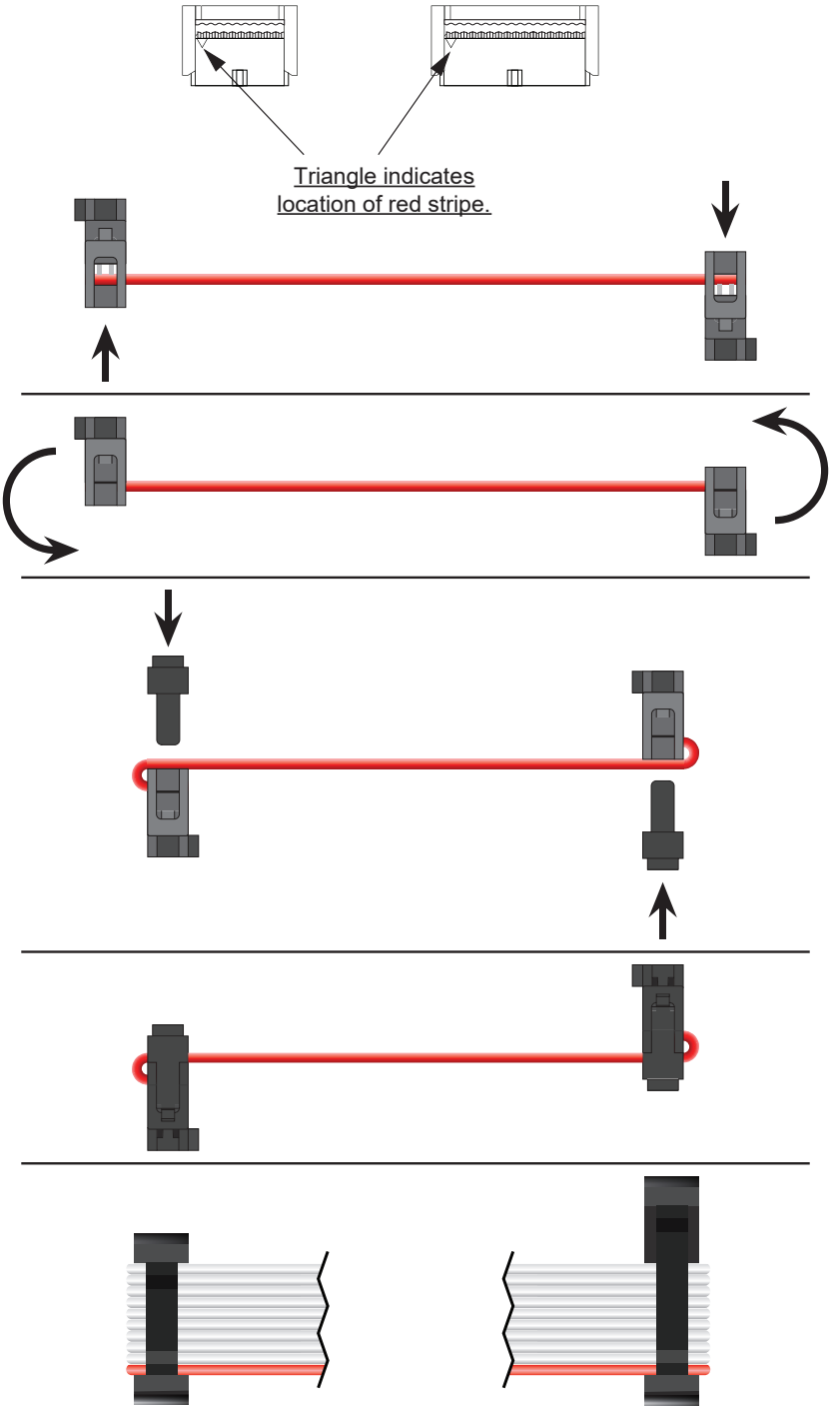


Note relative final heights.

Subassembly View (cont.)



Power Cable Assembly

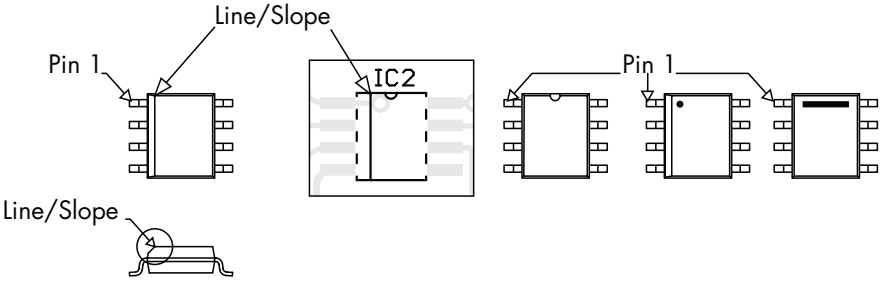


Miscellaneous

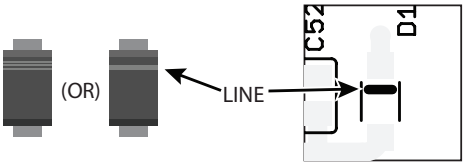
IC Orientation

There are many ways to mark proper orientation on ICs. Manufacturers keep changing the marks, and some may use combinations of them, but they all tell the same thing: where pin 1 is.

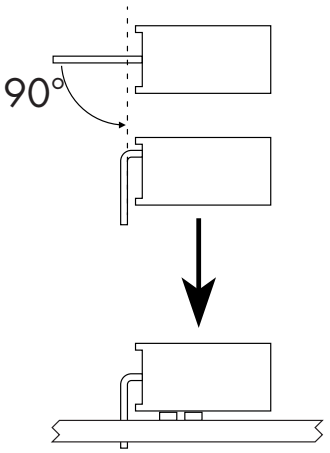
They all orient in the same direction relative to the mark.



Diode Orientation



Film capacitor Installation



Miscellaneous (cont.)

Tightening toggle switch jam nuts.

Toggle switches are slightly shorter than the jacks and potentiometers, so the jam nut (rear nut) must be run flush with the panel before tightening the outer nut to prevent deforming the panel.