flight of harmony

Voltage-controlled power starvation Eurorack Module kit
v1

Contents

(1) Front Panel
(1) PCB
(1) Resistor Card
(1) Semiconductor Card
(1) Capacitor Card

(1) Hardware bag
- (8) 0.25" QC PCB tabs
- (2) 2x8 box header
- (2) M3x0.5 eurorack mounting screw
- (2) M3 nylon washer
- (2) 3mm (T1) LED, red

(1) Wire bag
- (8) 13” 18AWG wire (2 each: Green, Red, Black, Blue)
- (16) Insulated quick-connect (QC) crimp receptacles
- (3) 4" Nylon cable ties
- (1) 14"L x 0.125"I.D. Braided wire sleeve
- (2) 0.5"L heat-shrink tubing

(1) Potentiometer bag
- (2) B10k Potentiometer
- (2) Washer
- (2) Nut
- (2) Knob

(1) Jack bag
- (2) 3.5mm TS jack
- (2) Washer
- (2) Nut

(1) Switch bag
- (2) SPDT (Single-Pole, Double-Throw) toggle switch with nut
- (1) DPDT (Double-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)
- Wire strippers
- Insulated connector crimper

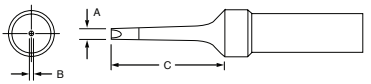
Skills

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

- For the 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.
- Good, fine-tip tweezers are a must. The Wiha 4b and 7a tweezers are great[2].



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

- 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

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) IMO, their 5abb were the best, but they discontinued them so FML. No, you can't have mine.

Kit Notes (cont.)

your soldering iron tip to the pre-soldered pad to reflow the solder. Then you can solder the other side normally.

- *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. You can also use no-clean flux.
- *Smallest first.* Solder the components in increasing order of size.
- *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. You may have to attach and remove the panel a few times with this kit because of the component density.

Assembly Order

The easiest build order is as follows:

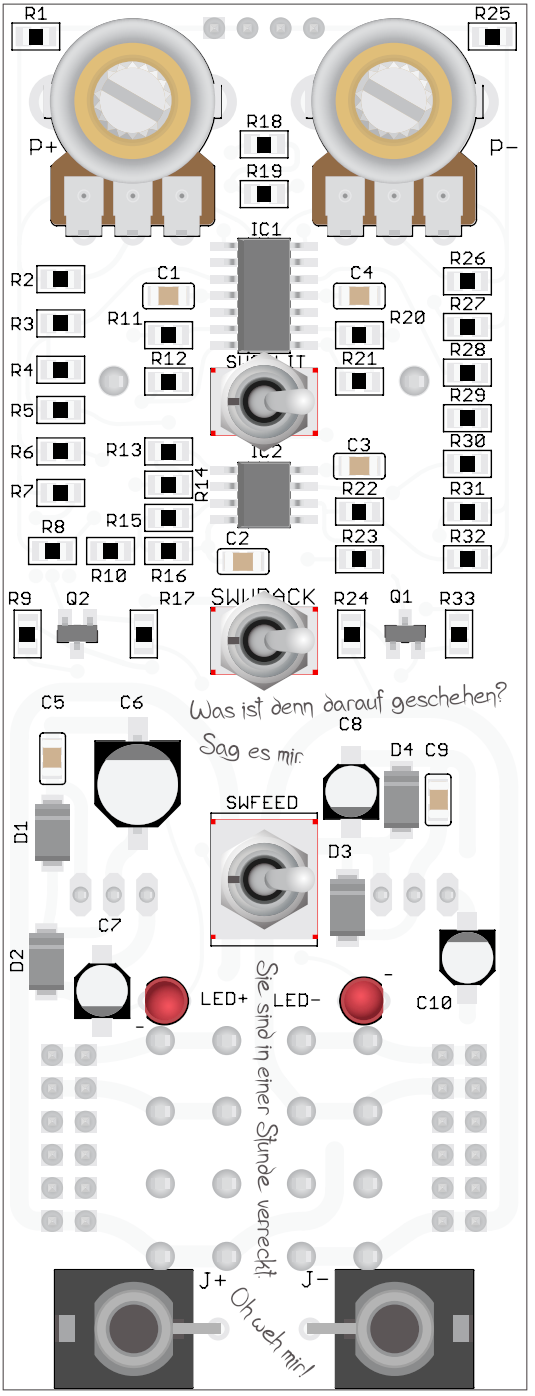
1. All SMD. For the rest, follow the order shown on Page 7:
2. Install & solder the rear chaining header.
3. Install & solder the potentiometers, switches, and LEDs. Trim the LED leads.
4. Assemble the regulators and heat sinks (see graphic, p.9), then install them on the PCB. Install & solder the quick-connect tabs.
5. Install & solder the 2x8 shrouded headers. NOTE THE ORIENTATION. Due to the cramped board layout, there wasn't enough room for the CV and Gate pins, so they have been removed from the headers (see graphic p.5).
6. Install & solder the jacks.
7. Attach the panel - see toggle switch jam nut instructions on p.14.

Help

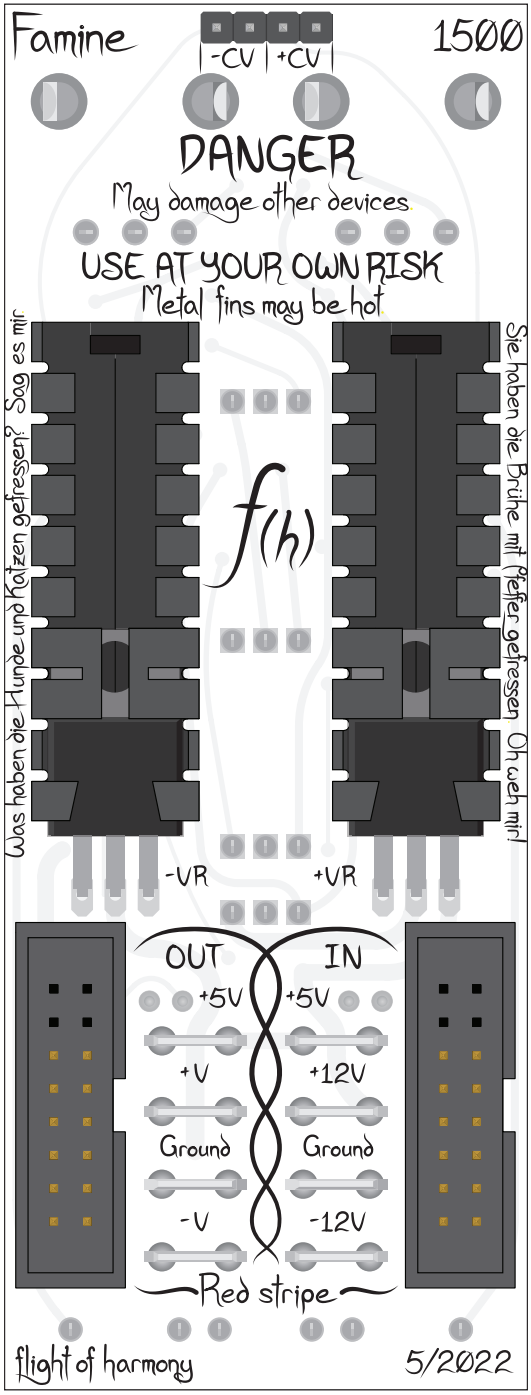
If you're still having problems, email me! I am always happy to help. When emailing, please include high-resolution pictures of your circuit boards.

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.

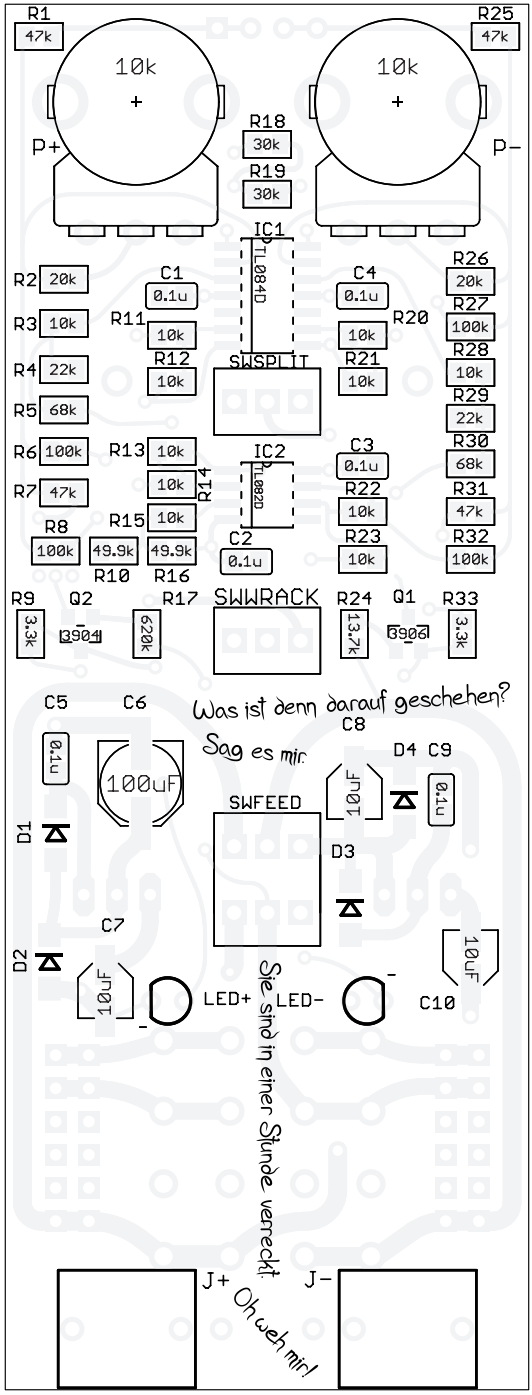
PCB Assembled Front View



PCB Assembled Rear View

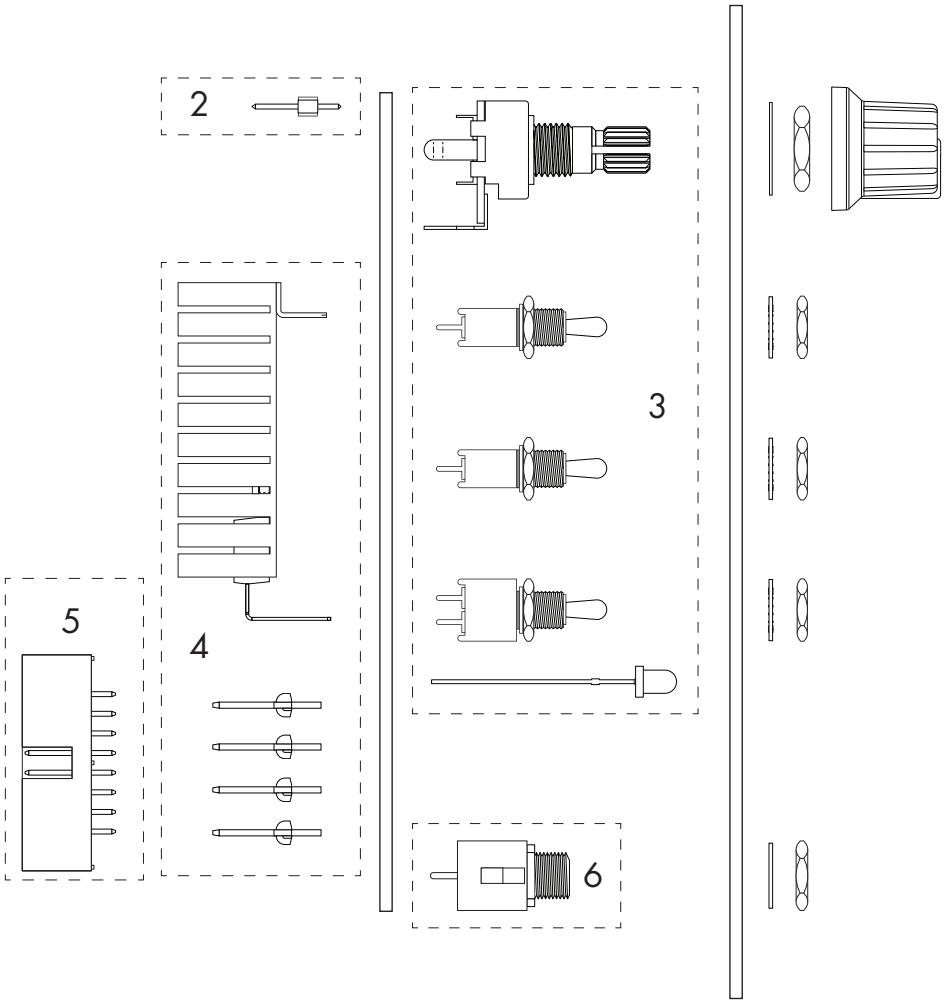


SMD Reference

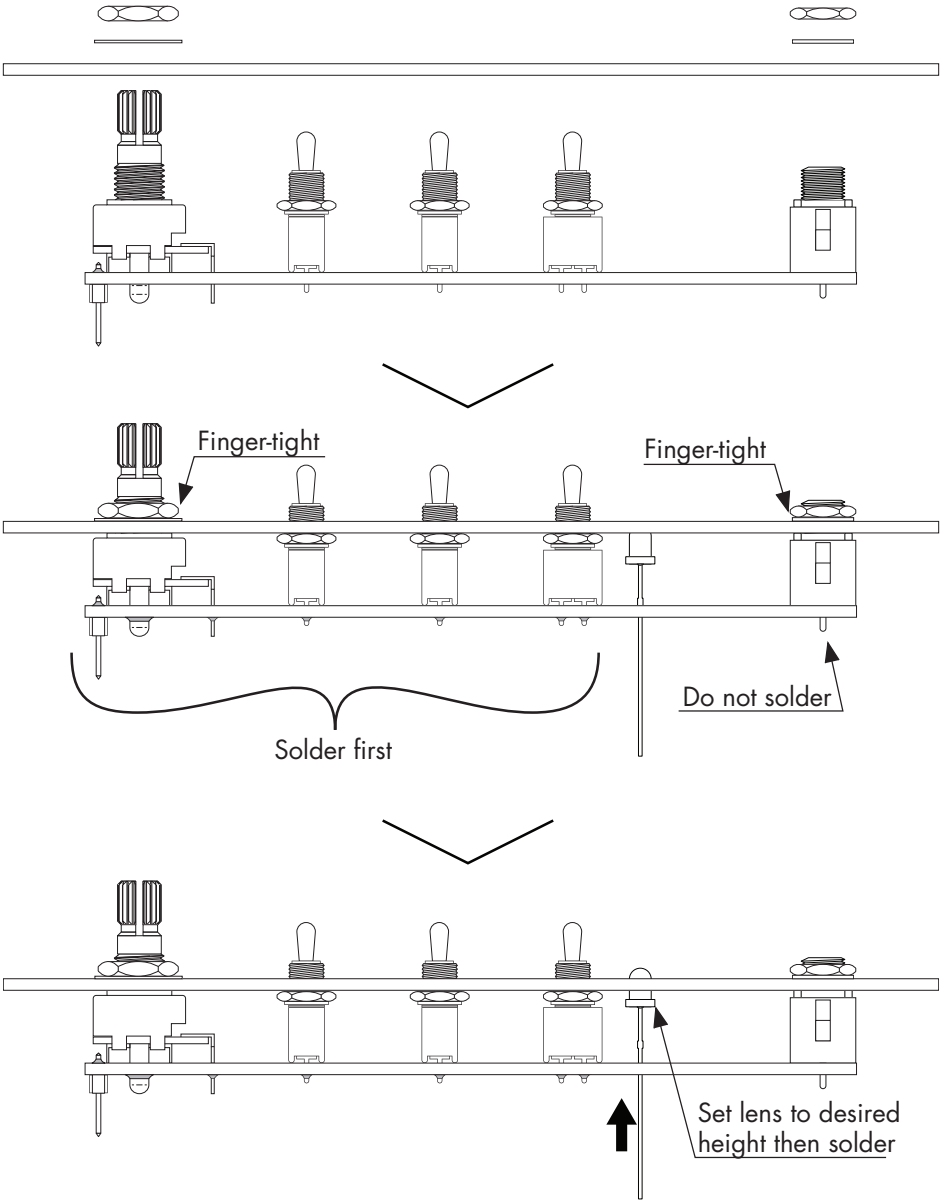


Exploded View

Numbers indicate easiest (in regard to soldering) order of assembly; see instruction list on p.3.

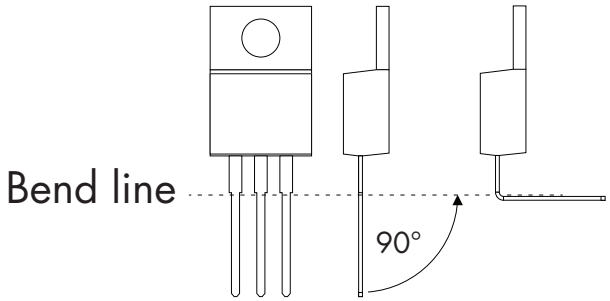


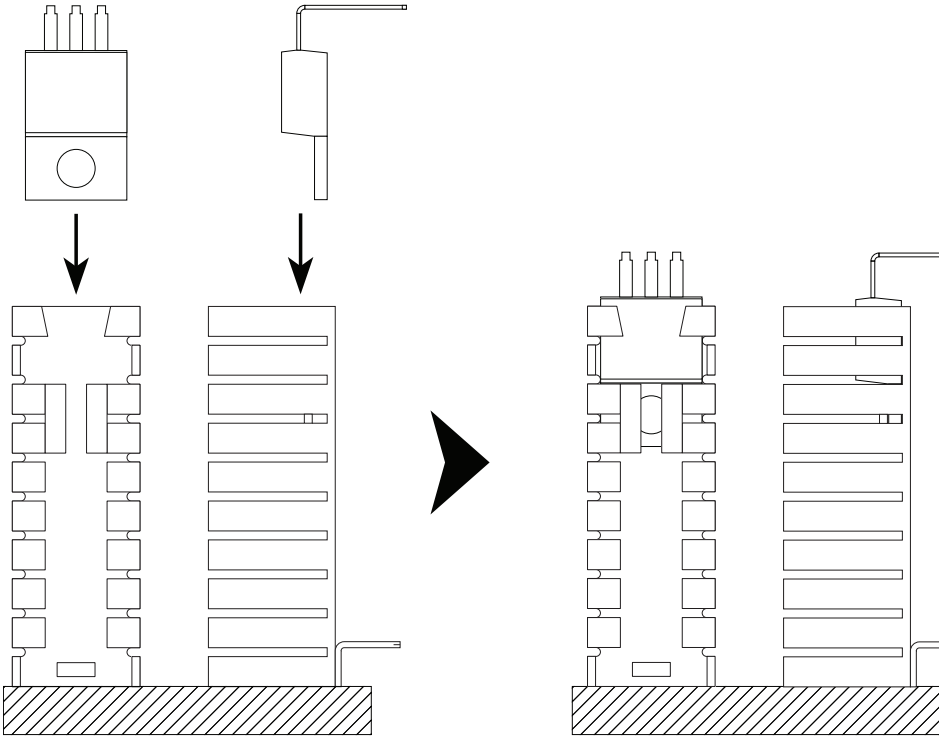
LED Installation



Regulator Installation

Note: It takes a bit of force to get the regulator into the heatsink. The heatsink is pretty delicate, however, so be careful. Brace it against something solid and gently but firmly push the regulator in. Try to not squeeze or bend the heatsink.

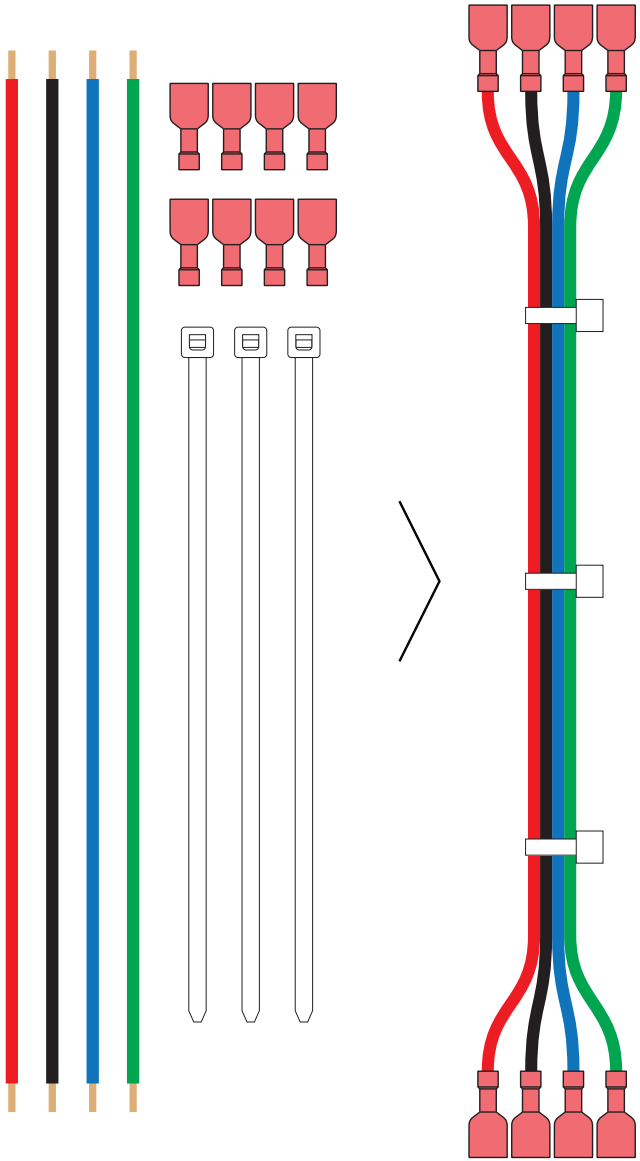




Power Cable Assembly

Quick & Easy option

1. Strip about 0.25"/6.5mm from each end of wire.
2. Place quick-connect terminal over end of wire and crimp securely.
3. Use nylon cable ties to keep wires together & orderly.

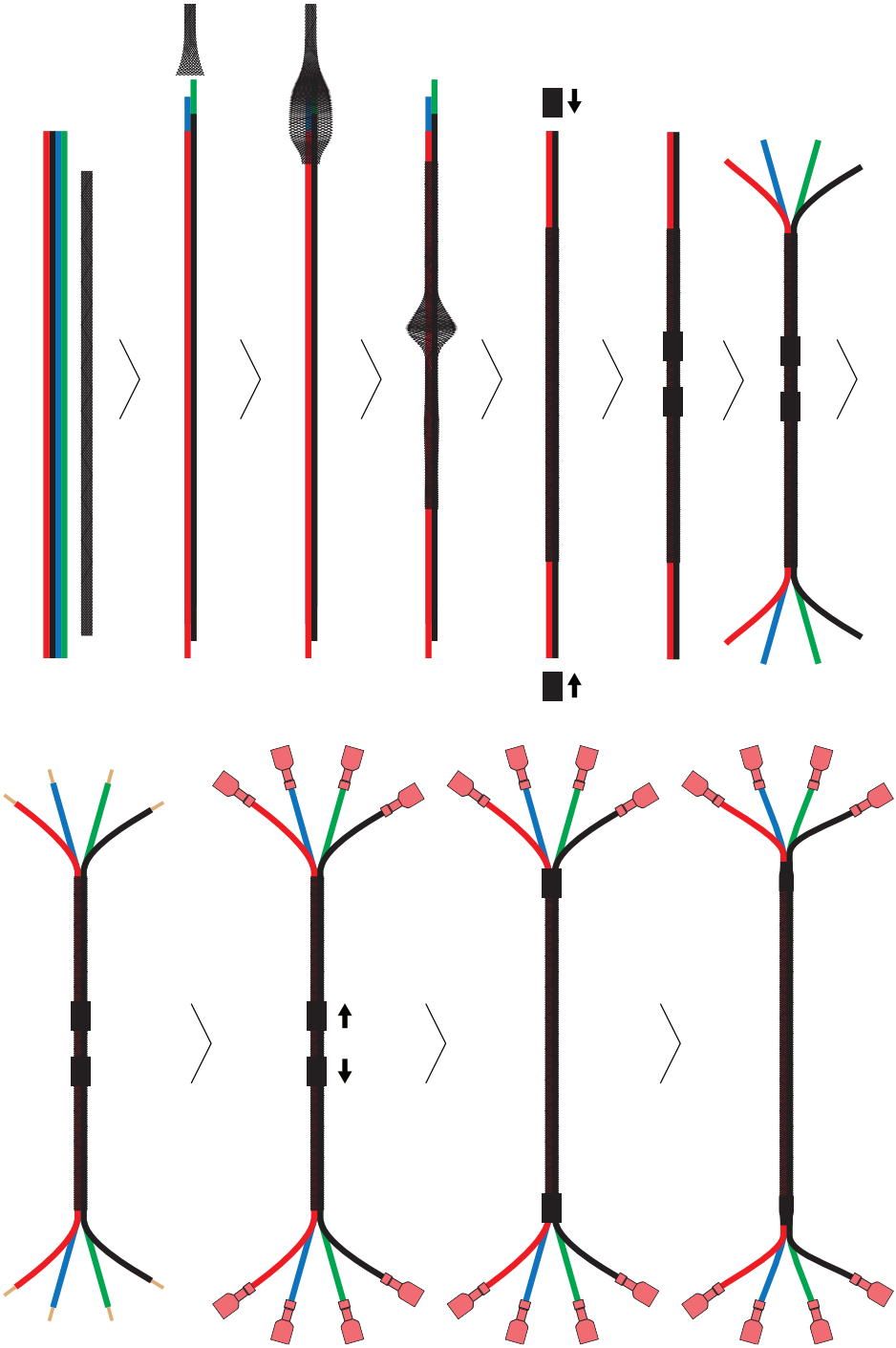


Power Cable Assembly

Pretty & Painful option

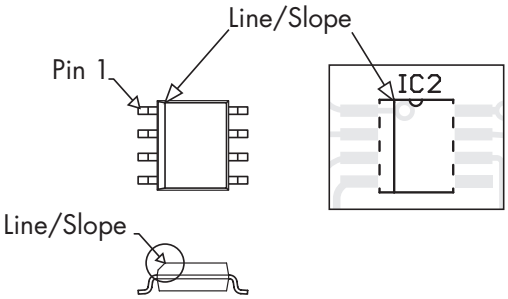
1. Group the wires together & stagger the ends a bit to give the overall profile a taper. (If you have some electrical tape, taping the ends together can make it even easier.)
2. Work the braided sleeving over the wires.
3. Slide heat-shrink tubing over braid. If the braid ends are frayed, wrap a piece of tape around the circumference to get the tubing over it. Slide the tubing to the middle of the cable.
4. Separate the wires and strip about 0.25"/6.5mm from each wire end.
5. Place quick-connect terminal over wire ends and crimp securely.
6. Slide heat-shrink tubing towards cable ends until middle of tube is aligned with end of braided sleeve.
7. Use heat source to shrink tubing. A hot air gun or boiling water[1] is best, a lighter or match also work but can leave scorch marks and possibly melt or ignite the sleeving.

1) Make sure to dry it before use if you use boiling water. Don't use Famine wet.

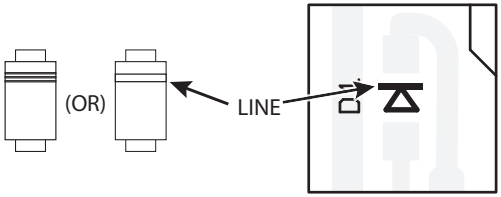


Miscellaneous

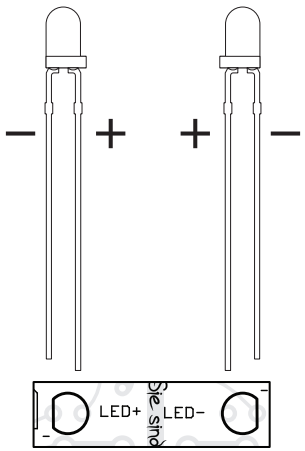
IC Orientation



Diode Orientation



LED and capacitor Orientation



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.