

SaV64 Assembly

Bill of Materials



Qty	Loc	Markings	Description
1	C1	105	CAP CER 1UF 10V 10% RADIAL
2	C2,C3	104	CAP CER 0.1UF 25V 10% RADIAL
1	C4	106	CAP CER 10UF 10V 10% RADIAL
1	D1		DIODE GEN PURP 100V 200MA DO3
2	F1		FUSE CLIP CART 250V 6.3A PCB
1	F1		FUSE GLASS 3.15A 125VAC 5X20MM
2	J1/J2		CON PWR JCK HIGH CUR
1	K1		RELAY TELECOM DPDT 3A 5V
1	LED2		LED IND 5MM RED/GRN WHT DIFF
1	LED2		HOLDER LED PANEL 5MM BLACK NYLON
1	R1	433	RES SMD 43K OHM 0.1% 1/10W 0805
1	R2		RES SMD 232K OHM 0.1% 1/4W 0805
1	R3	4700	RES SMD 470 OHM 1% 1/8W 0805
1	R4	182	RES SMD 1.8K OHM 0.1% 1/10W 0805
1	R5	Y,V,BR,G	RES 470 OHM 1/2W 5% AXIAL
1	R6		RES SMD 698 OHM 0.1% 1/4W 0805
1	R7	103	RES SMD 10K OHM 0.1% 1/8W 0805
1	S1		SWITCH TACTILE SPST-NO 0.05A 12V
1	T1		TRANS PNP 40V 0.2A TO-92
1	U1		IC OVERVOLT PROT CTRLR SOT23-6
1	U2		OPTOISOLATR 5KV TRANSISTOR 4-SMD
1	X1		CONN DIN 7 PIN FEMALE PCB
1	X2		TERMINAL BLOCK 5.08MM 2POS PCB
1			Circular DIN Connectors 7P MALE PLUG - DIN 270 NICKEL/GOLD REAN
1			CABLE 4COND 18AWG BLACK 20 Inch
1			6cm BLACK 3/32" Polyolefin 2:1 Heat Shrink Tubing

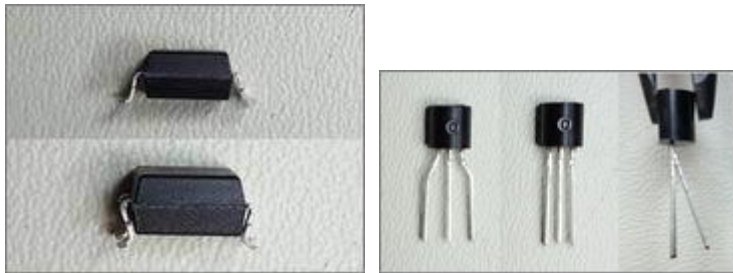
2	PCB (Main, Daughter Board)
1	Case
4	3M Rubber Bumper Pads Self Adhesive Anti Skid Feet
1	Mini Rubber Strain Relief Cord Boot Protector Cable Sleeve Hose
1	Stickers

Daughter Board Assembly

Use the daughter board PCB, Optoisolator (U2), 470 Ohm Resistor (R3), 10K Ohm Resistor (R7), and Transistor (T1) to assemble the daughter board.



The legs of the Optoisolator need to be bent in towards the chip so they will fit on the daughter board PCB pads. Prepare the transistor by straightening the outside legs then bend the center leg towards the back of the resistor.

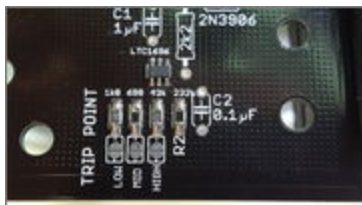


When soldering the Optoisolator, be certain you do not let solder fill the holes in the PCB. Next, attach the resistors. Finally, insert the transistor into the daughter board. DO NOT cut the legs. Solder the transistor while not allowing too much solder to build up around the legs. Solder build up will keep the daughter board from sitting flush against the main PCB.

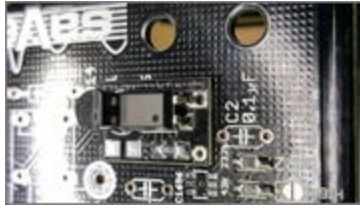


Primary Board Assembly

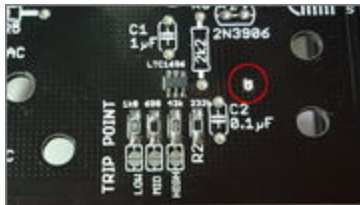
Attach the SMD components (R1, R2, R4, R6, and U1) to the primary PCB.



Fit the daughter board to the primary PCB by inserting the transistor pins from the daughter board into the transistor location on the primary PCB (T1).



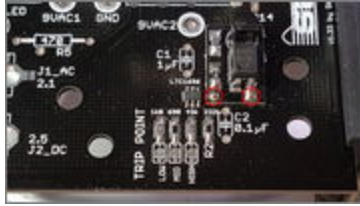
The daughter board requires a Ground connection that can be obtained in one of two ways. The first (recommended) way is by scraping away some solder mask under the daughter board to get to the ground plane. With the daughter board in place, use a pin to scratch into the ground plane through the hole in the daughter board near the Optoisolator. Remove the daughter board to scrape away a good size area.



Once the solder mask is scraped away, place a solder blob on the ground plane in the scraped off area. Re-attach the daughter board then place a pin in the opposite hole (near the LTC chip) to hold the daughter board in place. I use a pin like the following:



While pushing the daughter board towards the primary PCB, heat the ground pad with your soldering iron. The solder blob on the ground plane below will melt and attach to the daughter board. Fill the rest of the hole with solder. Solder the transistor to the primary PCB and trim the legs. Remove the pin you used to hold the daughter board in place then fill the hole all the way through the daughter board and primary PCB with solder.



An alternative way to get ground to the daughter board is to run a jumper wire from Ground on the daughter board to another Ground location. The closest suggested attachment point is the ground side of C2. The ground side is the side closest to the edge of the PCB.

Attach the capacitors (C1, C2, C3, C4), resistor (R5), Diode (D1), and fuse holders. When attaching the fuse holders, be sure the end of the each holder that has the tab is facing towards the outside of the PCB. Wiggle the fuse holders while inserting them into the PCB in order to get them straight and flush with the PCB.



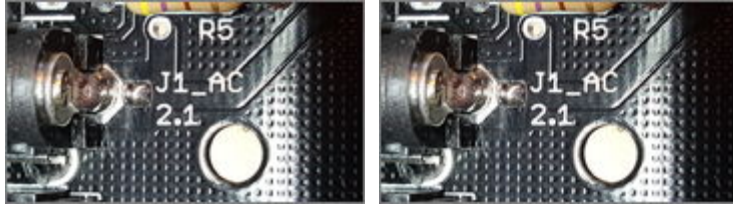
Next, attach the relay (K1) and the terminal block (X2). Completely tighten the two screws on the terminal block before soldering it to the PCB.



Attach the DIN connector (X1), reset switch (S1), and barrel jacks (J1, J2).



The AC and DC barrel connectors are disconnected by default. In order to connect them, use solder blobs to bridge across the gaps in the tracks. The AC gap is on the top of the PCB and the DC gap is on the bottom.

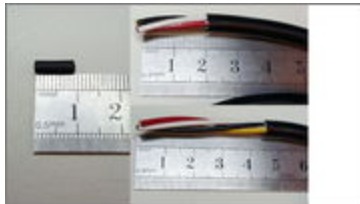


Output Cable Assembly

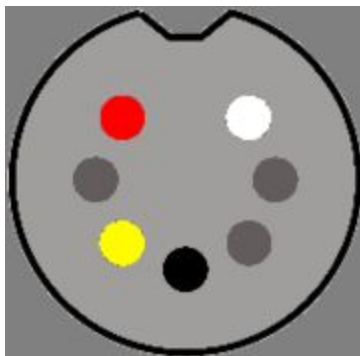
Find the end of the 4-Wire cable that has the colors in the same order as the image below.



This is the end of the cable that attaches to the DIN connector. Trim 20mm of the outer casing from this end of the cable. Trim 45mm of the outer casing from the other end of the cable. Cut the heat shrink tubing into 9mm pieces.



Solder the DIN side of the cable to the output DIN connector using the following layout. This image shows the connector on the solder side. Be sure to put a piece of heat shrink tubing on each wire before attaching them to the DIN connector.



After attaching all the wires, push the heat shrink tubing over the solder joints then heat them to shrink the tubing. I would also suggest wrapping all the wires in a little electrical tape or a large piece of heat shrink tubing to add a little extra protection as parts of the DIN stain reliever may have slightly sharp

edges. Attach the strain reliever then carefully bend the tabs over the wires. Slide the cover onto the wire then screw it down to the strain reliever.



Drill a hole into either end plate depending on where you want the output wire to come out of the SaV64. I would suggest using a bit that is between 9mm and 10mm. A larger hole is easier to insert the rubber grommet into but provides a looser fit. A smaller hole has a tighter fit but is more difficult to get the rubber grommet into without marring the rubber.



From the inner side of the end plate, insert the rubber strain relief into the hole you drilled. Lightly attach a zip tie around the rubber boot. Do not tighten it. Run the output cable through the boot.



Trim 5mm off each of the four output wires except the yellow wire.



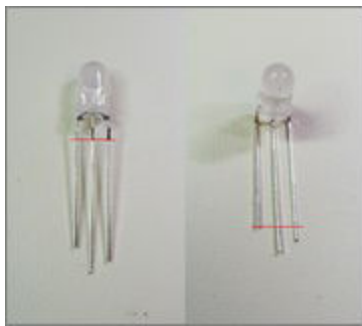
Attach the wires to the PCB as shown below. The wires are a very tight fit in the PCB. Simply strip the wire then insert it into the PCB. Do not tin or twist the wires because it will make the wires bigger and more difficult to insert in the holes.

Black: Ground
Yellow: 5VDC
White: 9VAC

Red: 9VAC



Hold the LED with the long leg on the right hand side then bend the LED at a 90 degree angle towards you. The bend point is marked in red. After that, cut all the legs to the same length and attach the LED to the PCB. The LED should only be inserted far enough into the PCB to be soldered.



Insert the fuse and attach the output cable to the PCB using a zip tie. If the output wire is going out the same end as the inputs then you can tighten the zip tie completely. If going out the opposite end, attach the cable tie very loosely until later when the end plate is in place.

Add a solder blob across the two pads for the LOW trip point.

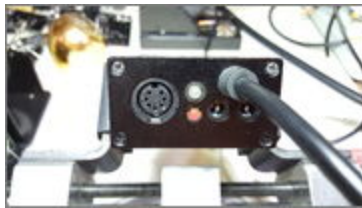


Case Assembly (Input & Output Same Side)

Attach the LED holder to the end plate then slide the plate and stress reliever on the output cable towards the PCB. Move the rubber stress reliever on top of the barrel connectors. Align the LED with the LED holder and push it forward into the holder. Once the cable is where you want it, tighten and trim the zip tie.



Attach and screw in the blank end plate to the main case then slide the PCB into the other end of the case. You will have to wiggle and adjust the output cable to get things to line up. You can get everything centered fairly well with a little effort.



Attach the SaV64 sticker.



Case Assembly (Input & Output Opposite Sides)

Slide the plate and stress reliever on the output cable towards the PCB. Move the rubber stress reliever on top of the PCB then tighten and trim both zip ties.



Insert the PCB into the case and tighten down the end plate. Pull the LED a little ways out of the other end of the case.



Attach the LED holder to the end plate then push the LED into the holder. You can use a small screwdriver on the back plastic area of the LED to make it easier. Once the LED is attached, screw the end plate to the case.



Attach the SaV64 sticker.



Final Steps

Attach the rubber feet and layout sticker to the bottom of the case.

