## PowerPole Connector PC Boards

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Many microwavers enjoy roving or mountaintopping with our radios. From painful experience, at least 50% of the problems in the field are power problems – just getting 12 volts to the electronics. Many of the others are between the headphones...

One thing that helps a lot with power is good, reliable, connectors. Anderson PowerPole (<u>www.andersonpower.com</u>) connectors have become the ham standard – robust, reliable, and almost foolproof, even in dark, wet and cold. When PowerPoles first came to our attention, I started making PC boards for power distribution using PowerPoles. Many vendors now offer a range of accessories featuring PowerPole connectors, but one thing still missing is a good chassis-mount option for homebrew gear – I hate hanging pigtails. And some of us would like to customize our own power distribution.

The currently available PC boards are shown in Figure 1, a nine-position, a six position, and a small one suitable for chassis mounting a single PowerPole. Also shown is a completed distribution board in a rugged diecast box, suitable for a rover or mobile setup.



Figure 1 – PowerPole distribution boards and complete unit

Assembly is simple: take some #10 bare copper wire (from household wiring), solder it to the PowerPole contacts, assemble the connector, push the other end of the wires through the board so the plastic housing sits flush, and solder to the board. Use a real soldering iron, not one of those tiny point ones we use for chip capacitors.



Figure 2 – Assembly sequence for PowerPole in PC board

Figure 3 shows the back side of the distribution board in the diecast box, with the wires soldered in place. The soldering isn't much work, but the metalwork is tedious – I don't have a square drill, so the rectangular holes take a lot of filing. Notice the idiot diode and bypass capacitor at one end – cheap precautions. The LED is useful to tell when power is connected. And don't forget a fuseholder in the line somewhere as well.



Figure 3 – PowerPole distribution board backside, in die-cast box

For a distribution box without the metal work, the Powerplate is available from <u>http://www.qsradio.com</u>, as well as the snap-in mounts. The four outer locations on the six-position PC board in Figure 1 align the PowerPoles with this plate. And the whole thing fits in a standard electrical outlet box – a grey plastic one is shown in Figure 4. I used the center hole for an indicator LED.



Figure 4 – Elegant PowerPole distribution box

## **Higher Power**

There are bigger PowerPole connectors available as well, if you need more power, although the 30-amp rating of the standard ones should be adequate for most ham use at 12 Volts. Many transceivers and the common "170 Watt" brick amplifiers draw more than 20 amps, and only provide full power at full voltage. Some installations have inadequate wiring with significant voltage drop, resulting in distorted signals unless the engine is running to increase the voltage source.

Some of the bigger PowerPoles are shown in Figure 5. The 75-amp version is at the lower right – I use these with heavy cables on my rover batteries – they are much easier to swap with gloves on in the dark and wet (everything works better in warm sunshine, I hear). The upper row shows the SB-50 series PowerPoles, rated at 50 amps, which come in different colors. A good source for the larger ones is <u>www.powerwerx.com</u>.



Figure 5 – PowerPoles: PP30, P75, and SB-50 in several colors

If you look closely, the different colors also have keying between the contacts so that different colors can't be mated. I chose to use the red ones for 48 volts, yellow ones for 28 volts, and blue for other voltages. 48 volts at 50 amps will supply a legal-limit amplifier. For distribution, shown in Figure 6, I use the boards in Figure 1 – the outer pairs of holes match the SB-50 PowerPoles. Connectors from different sources have some color variation; the center one is not marked "Anderson" and is probably a Chinese copy, but it mates with the others.

Large and small PowerPoles can be mixed on the same PC distribution board, if desired. For instance, a large battery connector and small ones for equipment.



Figure 6 – SB-50 PowerPoles on distribution PC board

For test connectors, able to mate with all colors, I use the grey ones and cut out the key, as shown in Figure 7. Unlike the other colors, one half of the key is clear, so it is just a matter of cutting out the key on the side away from the contacts – easily accomplished with a sharp chisel. Then the now universal connector can be used with things like the Turnigy wattmeter-power analyzer in Figure 8. This inexpensive instrument, shown reading the idling current on an LDMOS amplifier, reads voltage from 5 to 60 volts, plus current and power.



Figure 7 – Grey SB-50 – two on left have key removed to make Universal connector



Figure 8 – Turnigy Wattmeter with grey universal connectors for measuring all voltages

## Contacts

The larger PowerPoles have much beefier contacts, shown in Figure 9. Anderson rates the large ones at 75 amps, while some of the ham vendors advertise the small PowerPoles as good for 45 amps, which seems optimistic to me.



Figure 9 – PowerPole contacts – large PP75 or SB50 top, small PP30 bottom