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QST

DIGITAL EDITION

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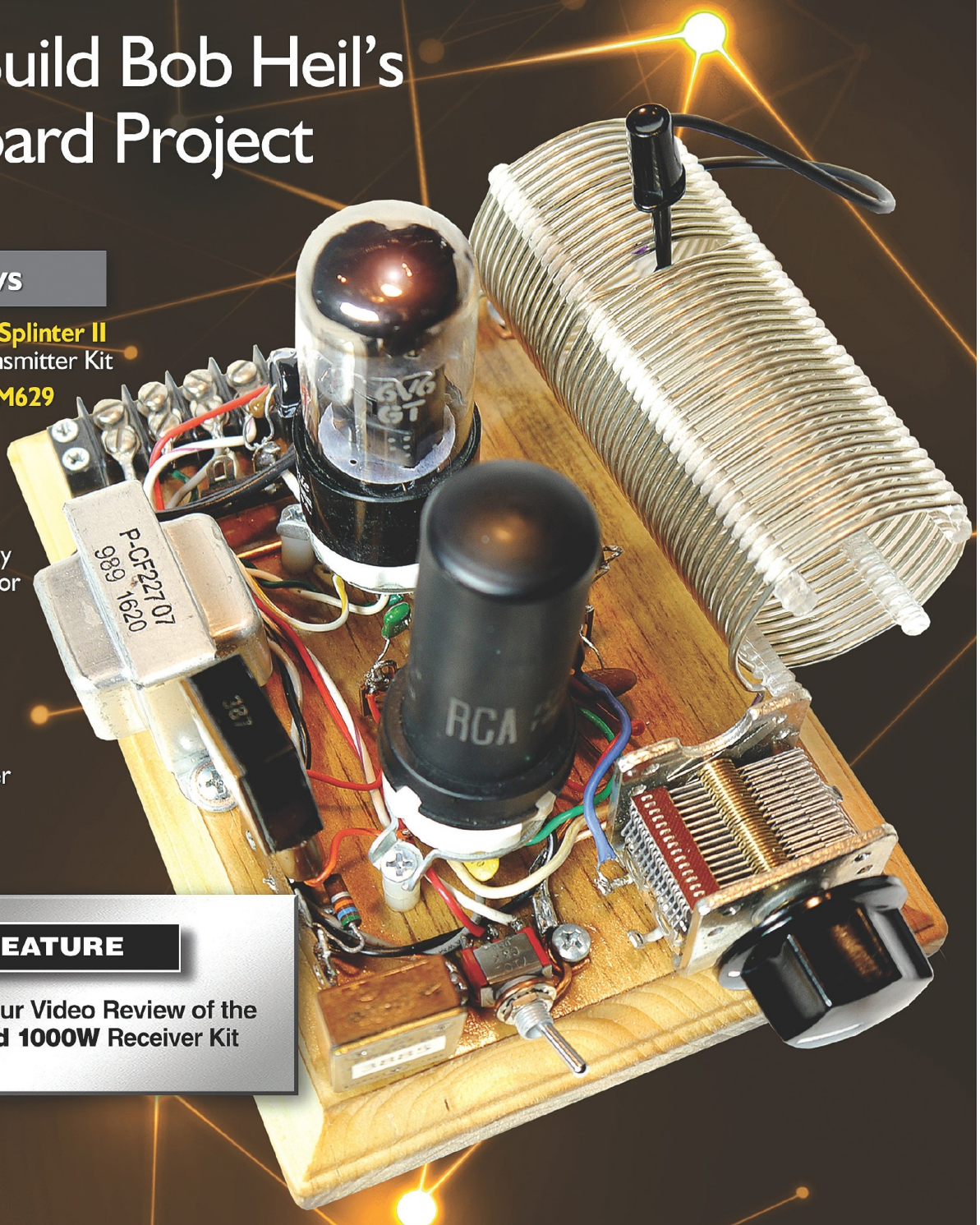
DIY–Build Bob Heil's Pine Board Project



QST Reviews

Breadboard Radio Splinter II
QRPp Receiver/Transmitter Kit

INRAD M628 and M629
Desk Microphones

Elenco SP-1A
Practical Soldering Project Kit

Pacific Antenna Easy Field Strength Indicator

Rexwood 1000W Receiver Kit

Hayseed Hamfest
Re-Cap Kit

Aven Adjustable Circuit Board Holder

DIGITAL FEATURE

57 | See our Video Review of the **Rexwood 1000W** Receiver Kit

Hints & Hacks

Improving SWR and Battery Isolators

Improving SWR, a Little at a Time

If you run vintage gear with a separate receiver and transmitter, one thing you usually need is an outboard transmit/receive (TR) relay. With vintage equipment, this relay usually has to multitask between switching the antenna, muting the receiver, and keying an outboard amp or other ancillary device. Many folks use a commercial coaxial relay, originally known by the company that made them, Dow-Key. But, after having to maintain communication sites with 50 or 60 relays in this style, I came to appreciate the simplicity of a common open-frame relay.

The basic open-frame relay does the trick just fine, even if there is an impedance bump. That bump is not really an issue below 30 MHz, but can be a problem as you go up in frequency. This tip focuses on relays I have in service on 6 or 2 meters.

I use a standard plug-style 4PDT relay with an Ameco TX-62 transmitter and Hammarlund HQ-170A receiver. Two of the four sets of contacts are paralleled for antenna switching, and the remaining sets have one to mute the receiver and the other to key an amp. I do not use the socket to plug these into because those often have screw terminals and are nothing but signal-loss generators. These relays are hardwired to coax and control lines. I needed to redo my TR relay enclosure because the Altoids box it was housed in turned out to be too flimsy, so I took the time to see if I could improve the loss in the relay. With a good UHF dummy load on the SWR meter, I read 1:1. But with the TR relay inline and terminated, I got 1.5:1, with the SWR occurring within the relay. I thought eliminating the common contact from the terminals and going directly to the coax connector might help.

Because this relay was intended to plug into a socket, it has all the fixed contacts exiting via their eye terminal/plug-in contact directly. However, the movable contact has a small, flexible wire soldered to it, and this wire loops down to be soldered to the terminal in the relay base. I opened the relay case, unsoldered one of the flexible wires from the movable contact, moved it out of the way, unsoldered the other movable contact wire from the relay base lug, and added a jumper across the two paralleled moving contacts, because they are doubled up for the antenna. This essentially makes it a 3PDT relay.

I guesstimated location, then drilled a small hole in the plastic case opposite the point where the remaining attached common contact wire was affixed, and slid the plastic cover back on, fishing the wire out of the hole. You must have a flexible wire going to this style relay, because anything rigid will prevent free movement of the relay armature. I assembled the relay in its new metal enclosure (see Figure 1) and soldered the relay wire directly to the antenna connector. A re-check of the relay-only SWR revealed my effort brought it down to 1.2:1. Every little bit helps! — *73, Charlie Liberto, W4MEC,* **w4mec@arrl.net**

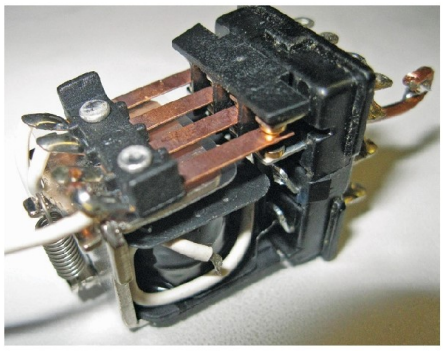


Figure 1 — The relay ready to go into its new metal enclosure, with a flexible wire soldered to the antenna connector. [Charlie Liberto, W4MEC, photo]

Battery Isolators for Safe Charging

In the November 2016 edition of "Hints & Kinks," Scott, N5MJQ, wrote about the real danger of the crowbar circuit in a power supply shorting out a backup battery placed across the output of the supply. I believe it is poor practice to place a battery directly across a power supply that is not designed for floating a battery. Many years ago, when I first tried a backup battery across a power supply, I noticed that there was current flow from the battery into the power supply when the power supply was off. Not even considering the crowbar danger, it was not the result I would want if my house lost power and the power supply slowly drained the battery.

The easy solution is to use a boat/RV/auto battery isolator, which is essentially two high-current diodes in a heat-sunk case, designed for isolating batteries from an alternator (see Figure 2). The power supply should then be adjusted to compensate for the diode drop of the isolator, and the voltage at the output of the

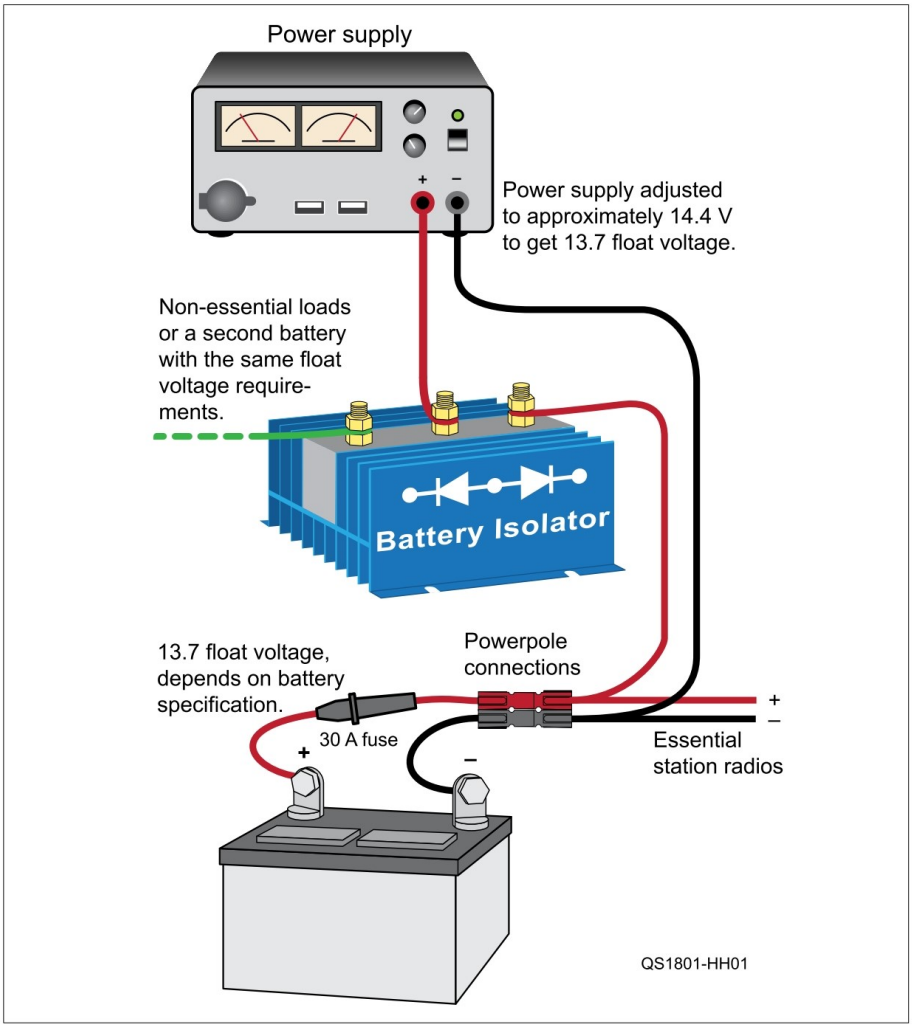


Figure 2 — A diagram of how this simple battery backup works.

isolator set for the appropriated battery float voltage. The backup battery is now totally isolated from the supply. The supply could fail in any number of ways and still the battery would not cause problems. Here's how I went about making a battery isolator.

A battery isolator is just as it sounds — a way to isolate two batteries from each other. In a motorhome, one battery is the start battery and the other is the house battery. Without the isolator, you may run both batteries down when dry camping. With the isolator, the deep-cycle house battery may be depleted, but the start battery (being isolated) remains in a charged state.[1,2]

A more sophisticated system has the alternator charge-sense wire connected to one of the batteries, driving the alternator voltage higher, accounting for the diode drop in the isolator. In my situation, all the isolator is doing is acting as a diode in a heatsink package and preventing the battery draining back through the power supply when the ac fails. From the other terminal (AUX), non-essential loads can be attached. That way, when the power is lost, the non-essential loads are not powered by the battery.

I use an Alinco DM-330FXT switching power supply that delivers 25 A continuous or 30 A surge, which can be set for a voltage output of 9 to 15 V dc. Previously, I used an Astron, for which the output voltage is also adjustable (however, the adjustment is inside the case).

Setup

1) Adjust the power supply without a battery, using a light load like an auto headlight (3 A) or a base station VHF radio on receive (about 400 mA). Once the voltage across the load is adjusted to 13.7 to 13.8 V (depending on the battery float voltage rating), you can shut everything off and connect the battery.

2) After the battery is connected without additional loads, continuously monitor the battery voltage. When the current on the power supply drops to zero, the battery should be at its float voltage.

3) Once at float, connect your radios up to the battery and turn the power supply back on.

With this circuit, the radios will work normally with or without a battery connected. — *73, Allen Wolff, KC7O,* **kc7o@arrl.net**

Notes

[1]See **www.globalserve.net/~jrivers/jr/pictures/aux-batt.htm** for more details on wiring an auxiliary battery relay that will charge while driving.

[2]Visit **www.bluewatermarinesvc.com/html/bat_isolator.html** to learn more about battery isolators.

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