Here's a quick and easy-to-build device that certainly will come in handy during emergencies.

How To Keep Your Emergency Back-up Station Battery Charged

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Surplus 12 volt, lead-acid gel-cells are becoming fairly abundant. These are great for emergency backup power for your station, or as a supplement to a low-current power supply so that you can take up any necessary power peaks required by your equipment with the battery. As an example, I've been using a 12 volt, 6 amp-hour battery across the output of a 12 volt, 10 amp small switching power supply. This permits me to run my ICOM IC-706 at full power, since the battery provides the additional peak current requirements (20 amps peak required by the IC-706).

Recently, I found a good deal on a 12 volt, 15 amp-hour lead-acid gel-cell battery. (It cost me $10!) I wanted to use this for emergency power back-up for my station. Unfortunately, these batteries can be ruined if you let them completely discharge. Therefore, you need to make sure you keep at least a partial charge on your battery. To accomplish this, I occasionally had been hooking up one of those cheap 12 VDC, 500 milliamp wall transformers to the battery in order to keep it charged. However, this has been kind of a hassle, and the battery is not convenient from an emergency-use point of view. So how do you keep these batteries charged and readily available for emergency power for your station?

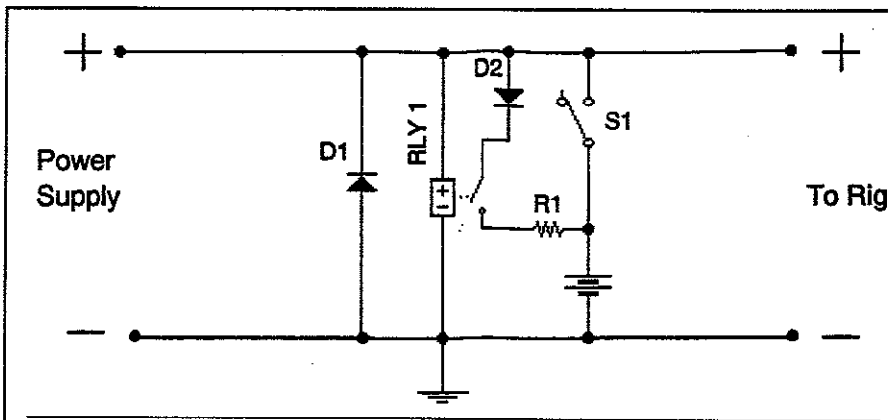
My solution is shown in fig. 1. The circuit is designed such that the battery is disconnected from the power supply when the power supply is turned off (the relay normally-open contacts are used). I did this because some power supplies have a finite output resistance even when they are off, and we don't want to discharge the battery when everything is off! The charging current is limited to about 6 amps by the 0.47 ohm resistor (this would only occur for a totally discharged battery). The relay contacts can easily handle the 6 amp maximum charging current (RadioShack mini 10 amp relay—RS 275-248). Diode D1 eliminates negative voltage pulses when the relay is de-energized. Diode D2 is needed to make the relay de-energize when S1 is OFF and the power supply is also turned off.

I built everything into a small plastic box (RS 270-231). I mounted the switch on the long side of the project box. I brought 12-gauge pendant cables (RS 278-1268) out of the project box for the power supply, battery, and station connection. I connectorized the cables with RadioShack nylon 20 amp connectors (RS 274-151 male, RS 274-154 female). These connectors are heavy-duty versions of the standard "RACES-style" connectors. I attached a short 12-gauge cable directly to the battery and connectorized it with a female connector. The battery and power-supply interface cables from the project box should have male connectors on them. The "to the rig" cable from the project box should have a female connector on it.

Normally, you'll leave S1 in the OFF position. When you want to use the battery to power your station, flip S1 ON. This switch is rated for 30 amps, and it does need to have a high current rating, since it must supply the full current demanded of the battery. You'll notice that when you turn S1 ON, the relay coil will draw current from the battery. This is only around 35 milliamp however. Incidentally, the switch is a ligh ed switch, but **don't use the internal lam** If you connect the switch ground termir (required for the switch to light), the cent pin of the switch is shorted to ground whe the switch is OFF. This would short th external power supply in this application

That's it. This circuit can now stay pe manently in line with your station powe Every time you turn on your power suppl you'll be keeping the battery topped o Don't worry about over-charging the g cell. It will just "float" charge if your pow supply stays on for extended periods (flo voltage for these batteries is 13.8 VDC, th same as your power-supply output vo age). Also, don't worry about the diode vo age drop in series with the battery. As th battery approaches full charge, reduce current flows into the battery, and ther fore the current through the diode drop As the diode current drops, the diode vo age drop also becomes less. Theoreticall when the battery is fully charged, no cu rent will flow, so there is no voltage drop

Now you're all set if you need eme gency power!



Parts List

D1—1N4001
D2—6A 50PIV (RS 276-1661)
RLY1—SPDT 10A (RS 275-248)
S1—30A switch (RS 275-712)
R1—0.47 ohm 5W (RS 271-130)

Fig. 1– The battery charger circuit.

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