

# Vent-a-Fume

*This project has produced more than its share of fans.*

*The weekend was here, and I had plans to spend the entire time planning and building a QRP project worthy of national acclaim! I could almost hear the DX returning my call with, "599, OM, sig FB hr QTH — (insert your own rare DX desire here)." But reality burst the bubble of dreams, when I remembered that today was the day I had promised to "clean up" all that junk in the cellar.*

**G**ads, what an ugly thought! There's got to be the proverbial "ton" of stuff down there. We (I mostly) hate to throw things away, surely there has to be another use for most of it. And what it cost when it was new! It's like throwing away an investment! No matter that the technology has entered the "Dark Ages." Hefting "stuff" into the trash pile was going good, until my old 286 computer surfaced. The "mental light bulb" began to glow. Hey, now there's an idea! Why not use the fan as a "ventilator" to move the soldering fumes away from the bench while building projects! It has a twelve-volt DC motor, and the power supply to operate it is the "heart" of the building project. Hot stuff! I love it when work becomes fun, and trash turns into another valuable ham radio project!

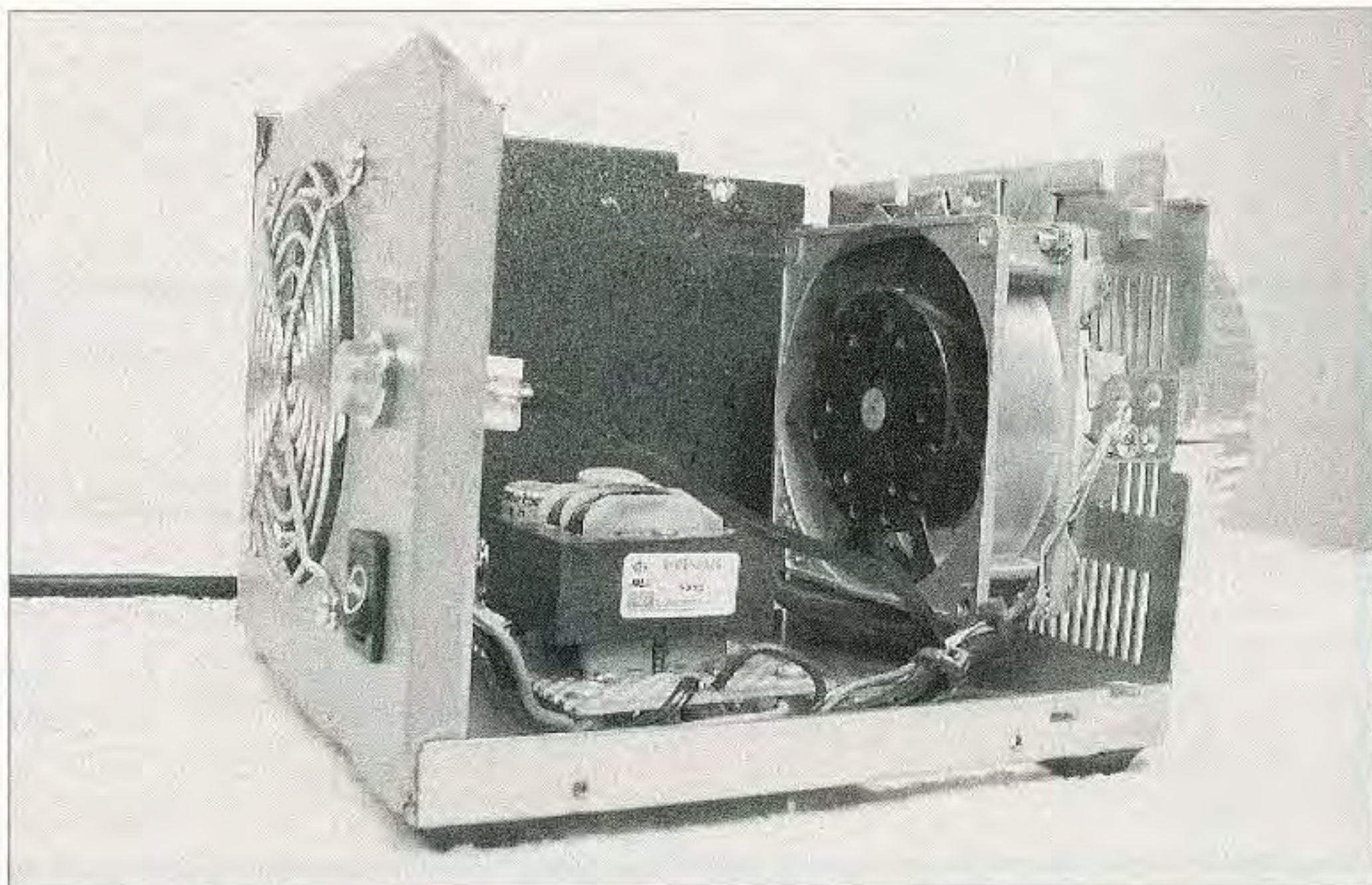
The "plan," as it were, was to create a device to remove solder fumes from the workbench area to a nearby window, where they would be released. The ventilation fan used in the computer power supply is a 12-volt DC model; a small fixed voltage supply would be required to operate it. The original supply, while functional, was

deemed "overkill" for this project. The finished product should be functional and have a "finished" appearance.

The most difficult portion of this project is locating a suitable exhaust connector and cutting the hole necessary for mounting. A trip to the local homeowner store provided a four-inch galvanized connector called a "starting collar" (\$2.90). It was found in the area serving clothes dryer tubing, etc.

The connector has "tabs" for bending on one end and allows tubing to be attached to the other.

After emptying the power supply of all parts, use the "starting collar" as a template and trace its outline on the rear panel. I used a "nibbler" to cut the four-inch hole for the collar. Next, place the fan squarely over the four-inch hole and mark the location of the four mounting holes of the fan. I



*Photo A. The fan is positioned to the rear of the cabinet to facilitate optimum air flow.*



Photo B. This front panel has been finished with shelf liner paper rather than paint.



Photo C. Rear view.

moved the fan from its front location in the cabinet to the rear, to facilitate a more positive flow of air through the flex pipe and to provide cooling for the new 12-volt power source. Then I drilled the four holes to mount the fan and also drilled a suitable hole to mount the strain relief for the 115 VAC power lead (see **Photo A**).

To mount the collar, insert the tabs into the four-inch hole and bend them over. I used a small hammer to bend the tabs securely against the sheet metal housing. Before mounting the fan inside the chassis on the rear wall, check for desired rotation. The fan should "draw" air from the front to rear, and not blow air into the room. My power supply fan was mounted "off center" on the front panel, thus leaving a wide metal portion for mounting the power switch and indicator lamp.

After marking and drilling these holes, I checked for proper fit of the

switch and lamp. The front panel of my project is not painted, but has a covering of adhesive-backed "shelf liner paper" available at department stores in the housewares department. When you build this project, you can paint or apply shelf paper to the front panel as desired. The paper can be easily removed from the front "intake" hole, switch, and indicator holes using a razor knife. This is a good time to apply labeling if you desire it (see **Photo A**).

Mount the switch, AC indicator, and front wire form fan guard. The outer panels of the chassis, a flat panel and an "L"-shaped piece will be visible when assembled. I painted them with primer and Rust-Oleum Hammered Metal Finish. This paint dries to a "dimpled" finish, looks good, and is excellent for covering blemishes.

A 12-volt DC power supply to operate the fan has been described many times. A schematic for a suitable one is

shown in **Fig. 1**. All parts were salvaged from the original power supply. Your "junk box" may have to supply parts not available from your particular device. See **Fig. 1**.

Using threaded spacers, mount the new power supply, taking care to allow room for the protruding switch, indicator, and fan. Marking the location of the threaded spacers to facilitate drilling the holes is a "snap." With the spacers attached to the power supply board in their final location, paint the bottom of the spacers with red nail polish. While the polish is wet, place the board "gently" into position inside the cabinet. Remove the board, and the wet polish will have left "doughnuts" where the necessary holes are to be drilled for the screws. The polish is easily removed if desired. Attach suitable rubber feet to the bottom of the

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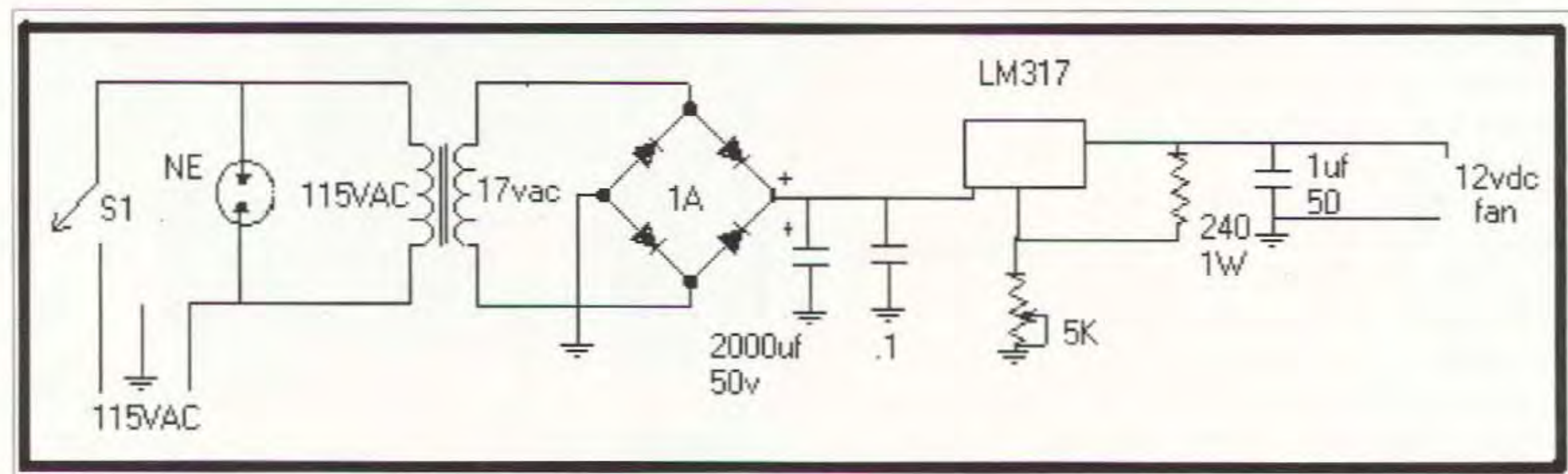


Fig. 1. 12 VDC power supply. Adjust for 12 VDC output. NE = salvaged neon indicator; S1 and bridge rectifier also salvage.

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## Switched Mode Power Supplies

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MBR1045 Schottky diodes and D3 and D4 are MUR110 ultrafast silicon rectifiers. The MOSFETs, Q1 and Q2, are TEMIC Si4980DY. They have an  $R_{DSon}$  of about 0.070 ohms and a total gate charge of 15 nC with an 80 volt drain voltage. With a 13.8 V supply, the Miller effect will be less and  $Q_T$  correspondingly less.

**Fig. 6** shows an SMPS with an output of 28 volts at 1 ampere. The line regulation is about 14 mV while the load regulation is about 3 mV. The efficiency is about 70%. 73

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cabinet to protect your work surface from scratches and to prevent the unit from vibrating across the surface of the bench.

Wiring completed, metal pieces assembled, and suitable duct hose attached, your new fume removal device is ready for operation. And there you have it! One power supply recycled to perform a needed health function, while providing the enjoyment of creating

another useful project. The total cost: \$2.90 for the "starting collar," plus the shelf paper (?), plus the paint (?), plus the feet (\$.90), equals \$3.80. Add another \$7.00 or so for the flex tubing and you're up to about \$11.00. Your cost may vary depending on the power supply available for "recycling" and how "full" your junk box is. The paint and paper used were orts from previous projects; the paint sells for about five bucks and the paper is about two bucks a yard.

Alas, now it's back to the chore of "clean-up." Hey, I wonder what else is there that can be remolded into another project? 73

## One Repeater to Go, Please!

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For the most portability I recommend carrying the box, a gel cell and a magnetic mount antenna. If you can access a building rooftop and set the antenna on a metal structure such as an air conditioner, you should significantly improve your coverage area. If you are lucky enough to have access to a vehicle at a high point you can use the vehicle as an antenna mount and the battery as your power source.

While FCC rules can be ignored when there is an immediate threat to life or property, disaster recovery does not qualify. In fact, it is even more important to follow the regulations as well as good amateur practice during rescue and recovery efforts. As such, it is not a good idea to set this repeater up and walk away. Without automatic or remote control and an identification method, this system needs to have a control operator. Besides, during disaster situations looters are known to steal anything not nailed down. I'd use a location close to the repeater as the command and control site and use the control operator for other duties as well.

While this is not the most exotic repeater you'll ever see, in a pinch it just might prove its worth. Besides, it's a quick and easy project that has some real-world applications. 73