

A SIMPLE MICROWIND GENERATOR



Here's a practical use for those large stepper motors that turn up surplus from time to time. I built this Microwind genny from some old pipe fittings, some scrap angle iron, and a stepper motor left over from the CNC DRILLING MACHINE project. The plastic fan came from a dead 20" box fan thrown in the trash by a neighbor down the street. Stepper motors become PM alternators when you spin them, and since they have LOTS of poles (needed to make tiny, precision steps) they generate power at fairly low RPMs, making them perfect for a wind generator.



Obviously, you're not going to power your house with a genny this size, but the one in the picture is putting out 15 watts of charging current as storm clouds gather in the background. That's plenty to charge emergency batteries, or supplement a small solar array. So far, we've seen some very intense windstorms with no damage to the little wind generators. In fact, I'm wondering if many small microwind generators might make sense in an area where high winds would cause a single large generator to be feathered and shut down when power is needed the most!



The stepper motor was mounted to a piece of angle iron which was welded to a 3/4" pipe flange. A short piece of 3/4" pipe threaded into the flange forms the pivot. This assembly fits over a piece of 1/2" electrical conduit which sticks out of the end of the mast, which was also made from 3/4" pipe. A large flat washer forms a bearing surface.

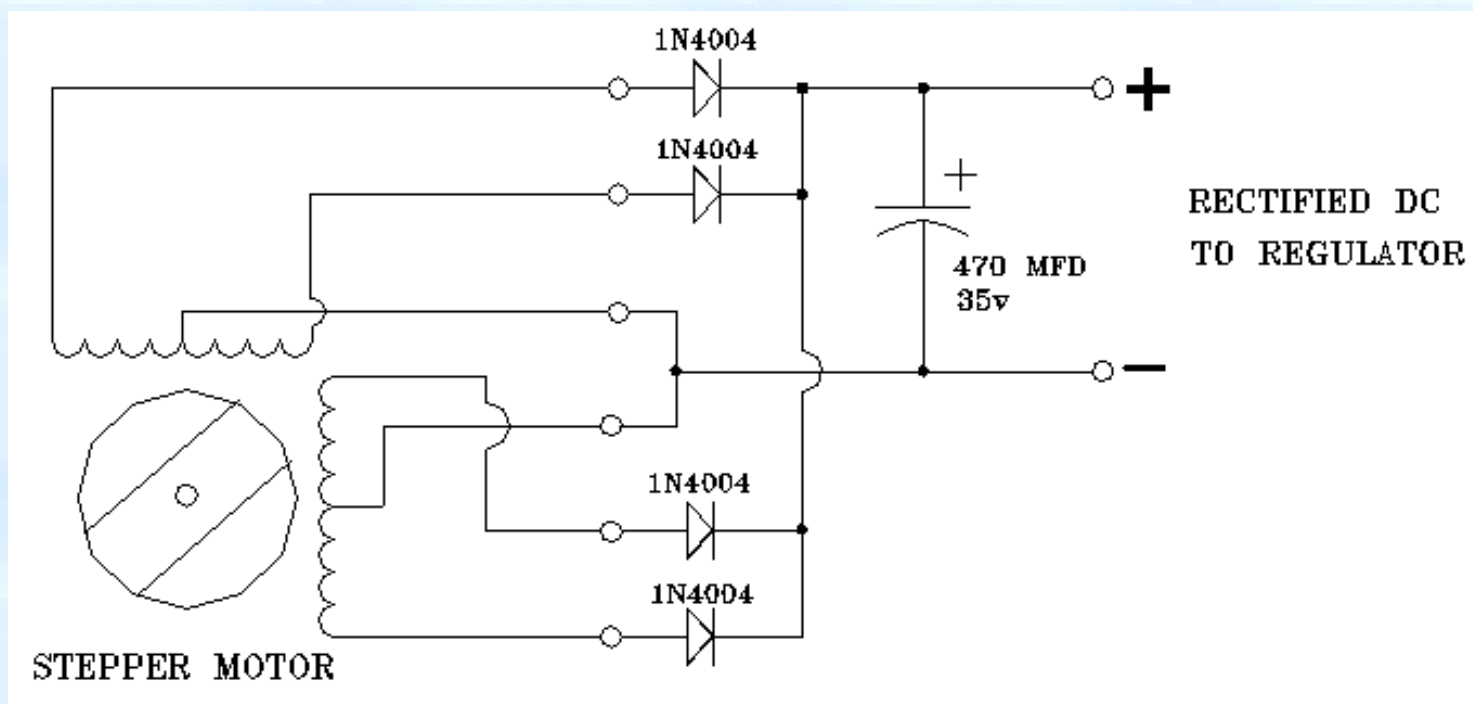


In this closeup you can see the small collar made from 3/4" pipe and drilled and tapped for a setscrew. The collar retains the pivoting head on the conduit. Mounted on a small angle bracket behind the motor, a small piece of plywood serves as a place to mount the two-phase rectifier board which turns the high-frequency AC into DC. Mounting the rectifier at the generator head lets us bring two wires down rather than six. The two-wire cable is simply passed down through the center of the mast and allowed to drop straight down. The circuit board, plywood and motor should be sprayed with several heavy coats of urethane to seal and protect them from moisture. A simple U-shaped cover was bent from light gauge aluminum sheet to cover everything from direct rain, held in place with two small sheet metal screws threaded into the edges of the plywood.

I've built many wind generators, and so far I've never built one with slip rings. Instead, I just pass the wires straight down through the mast. No slip rings or brushes are needed, since if the genny should rotate a full 360 degrees, it will only put a single twist in a long drop of wire, not a big deal. The wind seems to even out, at least around here... I had a large wind generator up for over a year and only had to untwist the wires once! Hooking a plug and socket at the bottom of the tower or mast makes this simple, and is a lot easier than building slip rings.

Since the fan blades had a deep hub that hit the motor flange, I made a blade adapter out of a piece of aluminum bar stock. I

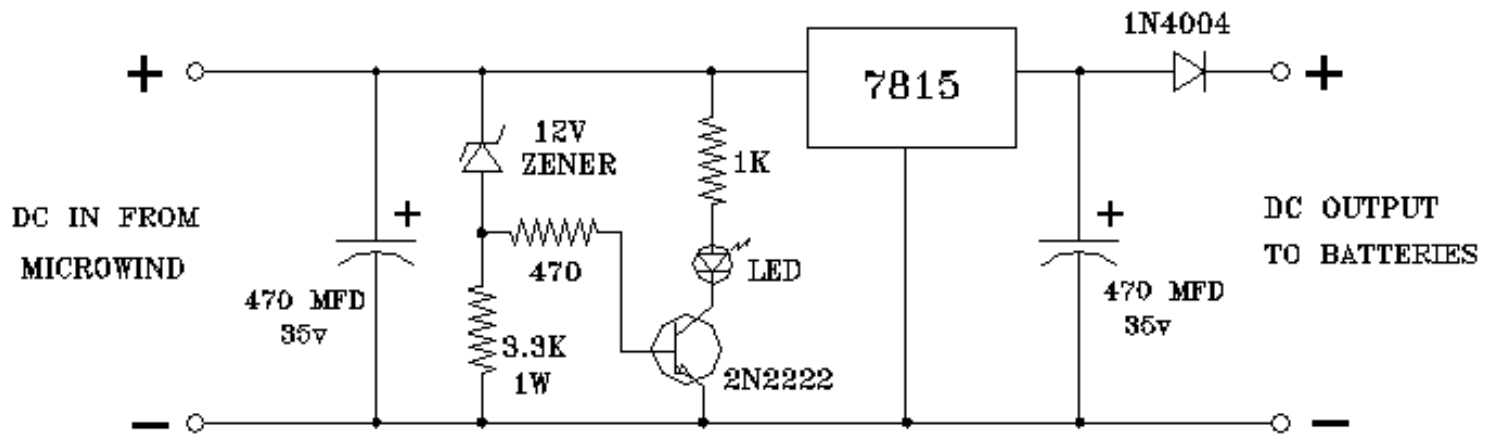
drilled through the center on the lathe, then added a couple of setscrews to hold it on the motor shaft. I tapped the other end for a 5/16" bolt, which holds the fan blades onto the adapter.



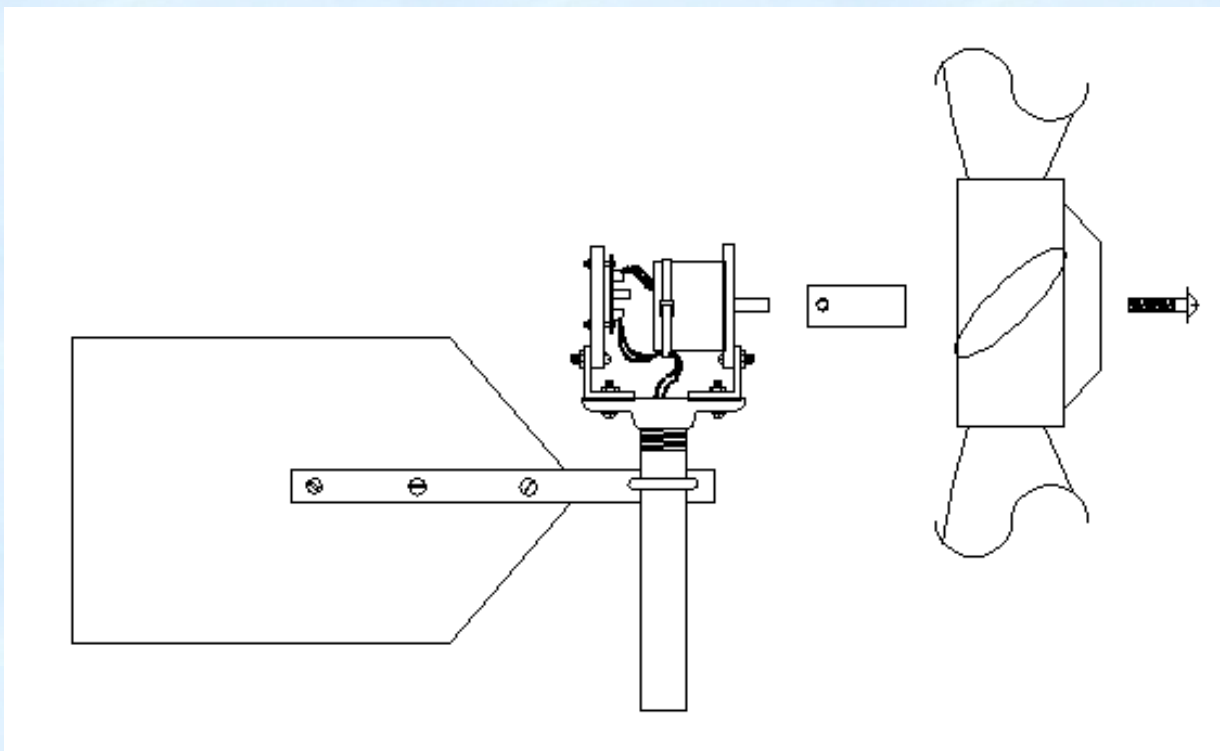
Here's a schematic of the stepper motor and the two-phase rectifier, which is built on a small circuit board and mounted behind the motor.



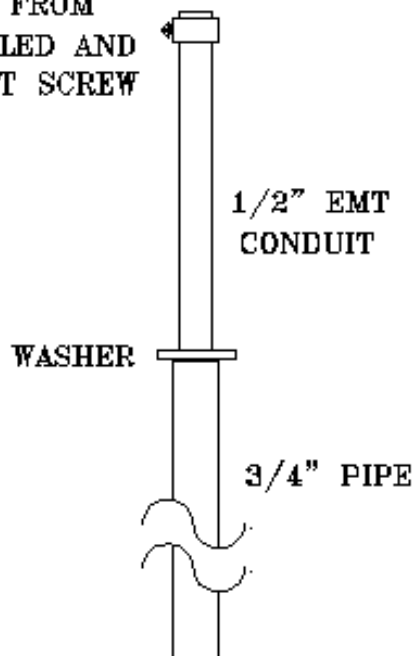
Here you can see the Microwind generating enough power to nearly blow out a 12 volt trailer light. Even with the light bulb as a load, it's cranking almost 20 volts at 620 milliamps. In peak winds it can produce 35 volts or more, and I've seen 750 milliamps going into the load.



Since these peaks would fry any electronic equipment connected to your batteries once they are fully charged, a simple regulator clamps the voltage at 15 volts. Also, a zener fires a transistor, lighting an LED when the voltage exceeds 12 volts, indicating that the generator is charging the batteries.



COLLAR MADE FROM
3/4" PIPE DRILLED AND
TAPPED FOR SET SCREW



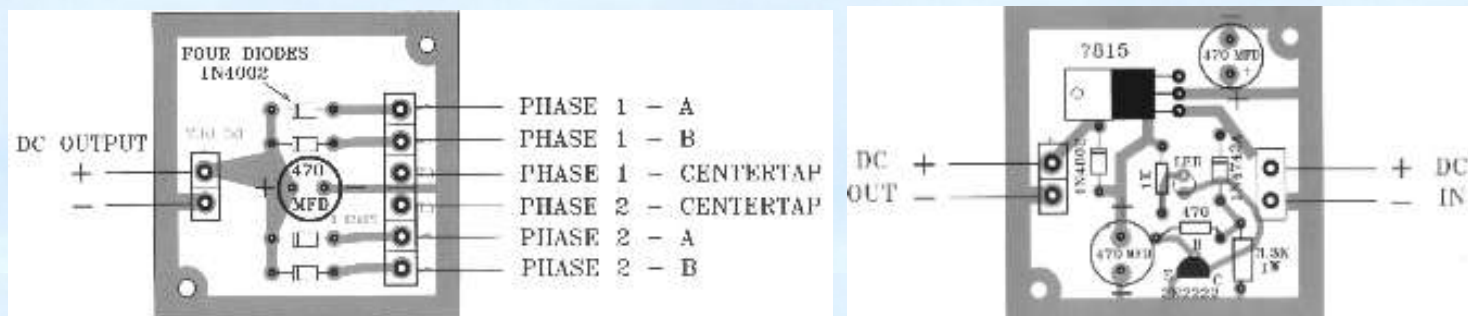
Here's some drawings of the Microwind. Since it was literally built from scraps and leftovers (along with the fan I found on the curb) there's nothing sacred about the construction. Use what you have, and modify it accordingly. I made the tail boom from a short section of slotted shelf bracket, and cut a nice tail fin from plastic sign board. I bent a U-bolt from a piece of #6-32 threaded rod to mount the boom to the generator head.

This Microwind generator project ended up as an article in the December 2001 issue of 73 AMATEUR RADIO TODAY magazine. From the response, I'd say that a lot of hams are going to be scrounging for old box fans and adding wind power to their emergency stations. The article in 73 goes into much more detail about the construction of the little genny, so you might want to look it up. Call (603) 924-0058 to subscribe or to request back issues.

PARTS!

While most of the parts for this project were mined from the junkbox and the local "Spring Cleanup", the more critical components are easy to purchase. The NEMA-34 stepper motor I used are made by Sanyo, and my original surplus source no longer lists them. However, you can order them from [DEAN'S HOBBY CNC website](http://www.deanshobby.com) either used or new.

I can supply the two printed circuit boards, etched and drilled, for \$5 for the pair. You can use [PayPal](https://www.paypal.com) or drop me snail-mail with a check, whichever you prefer.



The electronic components are installed on the circuit boards as shown. You can find the parts at Radio Shack, or order them from [CIRCUIT SPECIALISTS](http://www.circuitspecialists.com) or [MOUSER](http://www.mouser.com).



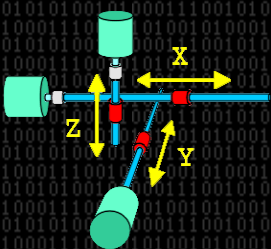
Here's a site that will give you a LOT of ideas on wind generator construction, including a discussion board where you can ask questions and receive replies from some people with a lot of experience with alternate energy.

WWW.OTHERPOWER.COM

Here's another site that will give you a dozen new ideas every time you visit: WWW.WINDSTUFFNOW.COM

[HOME](#)

Axxus Technologies



These Pages Contain Information About Automated Manufacturing and CNC

Home made CNC router projects

Below are some examples of what can be accomplished on a limited budget. The routers are shown at various levels of completion. Low cost and functionality are the major design factors here. I will continue to post pictures as the projects progress.

Home

Support

order

Parallel Interface

AXY300 Controller

links

surplus



M1 Metal Framed Router



M2 Oak Framed Desktop CNC Router Table



Another Wood Framed Router