## Replacement Table Feed Motor Drive, version 1.1

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I have owned one of these mill/drill power feeds from Enco<sup>®</sup> for over 20 years. Those have not all been happy years as the electronics burned out a few times and I then designed and built my own SCR based motor controller.

My motor controller worked fine until I replaced my spindle motor with a Variable Frequency Drive and 3 phase motor. Then my homemade SCR controller started to act strange whenever the VFD was running.

Rather than fight the radiation incompatibility, I replaced my SCR motor controller with a variable DC supply. The circuit is so simple and small that it easily fits inside the cast aluminum box. I picked up a 100-240V AC input, 32V DC output wall wart at Goodwill for \$3. The rest of the parts cost under \$8. Sure hard to beat those prices.

The current price for one of these X axis table drives is around \$600! So if you have one and it is burned out, you may want to seriously consider making your own motor controller electronics package.

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My local Goodwill has a rack filled with oddball wall warts. Definitely bring your voltmeter because about 1/3 of them were either out of spec or dead. The one I bought outputs 32V DC at 1.1 amps plus 16V DC at 1.6 amps. I used the 32V output to drive the motor and the 16V output to drive an LED power indicator.

By experimenting, I found that I got useful feed rates for voltages between 8.6 and 27V. I use the 27V output for my fast forward. It is not as fast as applying about 40V but is good enough.

Resistor R3 sets the minimum output voltage so enables me to use the full range of the speed control pot, R2. Diodes D1 and D2 protect against inductive kicks that can, and did, fry my voltage regulator.

My voltage regulator, an NTE 956 is similar to an LM317. Expect to pay around \$3 for it at Radio Shack<sup>®</sup>. I used an insulating mounting kit so heat from this part was conducted to the cast aluminum housing of the motor drive. The tab on the NTE956 is electrically connected to Vout and I didn't want that to also be my case voltage. However, getting rid of the heat is essential.

High frequency noise suppressing cap, C1, may not be needed but is far easier to put in from the start than to add later. Same goes for low frequency noise suppressing cap C2.

The limit switch prevents the motor drive from destroying the X axis lead screw. The forward/reverse switch lets me set the table direction.

The forward/reverse switch is Double Pole Double Throw with center off. It must be able to switch 1 amp DC at up to 30V.

To use the drive, I first power up the wall wart. Then I move the drive handle in either direction. This engages the gears. I then use the forward/reverse switch to set my table direction. The speed control can be set to move my table at between about 0.5 inches per minutes up to about 4 inches per minute.

The motor draws about 0.5 amps but my motor drive can supply 1 amp so there is plenty of reserve.

I welcome your comments and questions.

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