

Fabrication of a "QUICK TEST" of the EE-TFG Concept

NOTE: This is NOT A RECOMMENDATION - JUST AN IDEA that might work for you. I will try something like this as time permits, but first I'll simulate the idea and see if it has any merit on paper!

This is a "Design Intent Document (DID)" and subject to change as needed.

There are many ways of fabricating this device. One approach is outlined below to gain an appreciation of how such a build might be achieved using easily available, "off-the-shelf," hardware and tools.

Fabricating the "U" shaped 1/2 Pole pieces

Material:

- 2" wide X 3/8" thick (36" long) [Everbilt] {A1011 ?} [HD \$48]
- 1" wide X 1/4" thick (36" long) [Everbilt] {A 1008-1010} [HD \$20]
- Small gauge magnet wire (~20AWG) for the Pole electromagnets [~ \$25]
- Large gauge electrical wire (~14AWG) for the Loop Output coil [~ \$15]

Tools:

- 1 - 1 Ton Arbor Press (Harbor Freight \$70) [Ram Square 1", Max Height 5-1/2"]
- 1 - 4" Drill Press Vise (Harbor Freight \$20) [throat depth ~ 1"]
- 1 - Transfer Punch Set (Harbor Freight \$12 {28 piece - 3/8" to 1/2"})
- 1 - 6" Cut-Off Saw (Harbor Freight \$40) [cut 1" ?] {w/wo blade ?}
- 1 - Cut-Off Discs for Saw (Harbor Freight 6" 5 pack \$ 9)

Controller:

- 1 - Your favorite Microprocessor (used to drive Full H-Bridge N-S-N-S sequence) or
 - use your Function Generator to drive the Full H-Bridge module, as required
- 1 - Full H-Bridge (e.g. - Infineon BTS7960-DS (Amazon 4PCS BTS7960 43A H-bridge \$22)

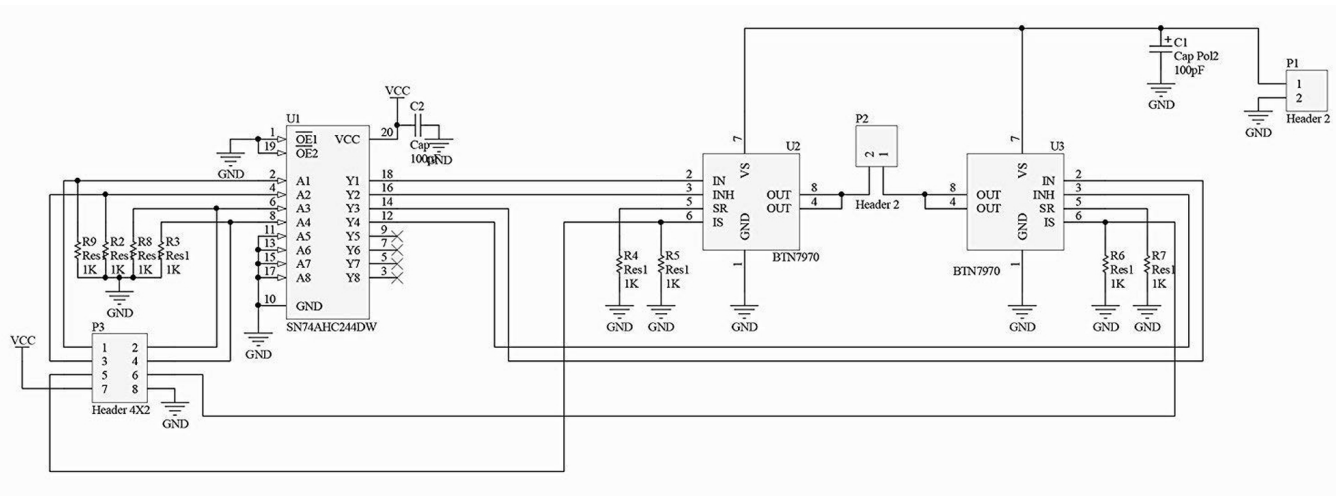
Project Estimated Budget Cost (\$US):

Material	~ \$ 108.00
Tools	~ \$ 151.00
Electronics	~ \$ 22.00

Total	~ \$ 281.00

(If you already have some of the items, subtract those)

Typical Full H-Bridge Circuit:



"U" 1/2 Pole Bending:

Cut the 1" or 2" Plain Steel Flat Bar a bit larger than the final shape needed. Place the Vise on the Arbor Press and open to a bit larger than the final U fold.

Place the cut Flat Bar perpendicular to the Vise opening in the center, offset for Pole leg extension. Having one or more Bars place on the Vise spaced apart such that they strattle the Arbor Shaft might avoid any interference between the Bars as they fold with the ends moving upward and the Shaft as the Arbor Shaft moves downward. It might also allow making a number of "U" folds at once.

Tip: Soaping or waxing one side of the Flats might also help the Flats more easily slide along the Vise jaws as they fold. The Vise opening can also be adjusted to assist the folding, as needed.

Using one of the Transfer Punch Rounds (say 3/8"); place it perpendicular over the Flat Bar, parallel to the Vise opening. Some tape may help keeping it in place. Lower the Arbor shaft onto the Transfer Punch Round.

Ensure everything is aligned properly and your safety gear is in place.

Now slowly apply the Arbor Press to force the Flat Bar into the Vise space between the jaws. This should "fold" the Flat Bar around the Transfer Punch Round and into the Vise. Once the Round and Bar are a bit below the top of the Vise jaws begin to close the Vise with the Round still in place.

Depending on the Round height spacing; a separate Flat might need to be used to force the folded flats to the bottom of the Vise. When the folded flats are bottomed, close the Vise securely to "set" the fold in place. If the fold tends to spring open a bit, flip the U in the Vise and carefully adjust until each leg is parallel.

This should produce a "U" or horse-shoe shaped Flat Bar. If the Bar is crooked a bit it can be straightened by placing it in the Vise sideways, with the U hump to the bottom, and closing the Vise on it.

Fabrication and Wiring

Next, carefully measure and then cut the "U" shaped bar to the required lengths. Ensure the ends are flat and square since they will butt up to the other "U" shaped 1/2 Pole to form a full Pole.

Wrap the longer end of the 1/2 Pole with the required coil turns to form each electromagnet. Secure the coils.

Wrap the Loop Output coil(s) and insert them into the center of the "U's".

Now butt the two 1/2 Poles together, with the Loop Coils at each apogee of the U Poles and you're done.

Wire the N and S coils as required, connect the H-Bridge.

Dimensions

Once the CAE Analysis is complete, and assuming the results appear viable, most of final dimensions will be known.

Test

Now test, and "play with" the device!

Good Luck,

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