

Parts and Tool List

1. Acquire these parts

- Floppy drive with motor and stepper motor still working

(check with Computers for Schools, Thames Valley DSB Warehouse, or Local computer store)

- Other parts
 - 1 - axle 1/8" steel rod 4 1/2" long (Building Box has 36" @ \$2.23 will make 8)
 - 4 - wheels (can use dragster type wheels used in tech class) \$??
 - Bolts (4 - 40 X 1") \$1.10 for pkg of 18 (for mounting dragster wheels)
 - 1 - Floppy Ribbon Cable (again check used supplies)
 - 1 - Power Cable from old power supply (P3 for the floppy drive)
 - 1 - 9 volt battery (we will use rechargables)
 - Battery clip @ 0.25 at Forest city or Electronic Surplus)
 - Rubber wire grommets 1/8" center to fit over axle @0.55 from Building Box or HomeDepot
 - Rubber bands
 - Optional: 10' of wire to create extension cable and give "floppy" some freedom
- Assuming you can use recycled floppy drive, cable and power connectors, depending on the wheel selection, cost will be approximatley \$5.00 + battery and extension cable

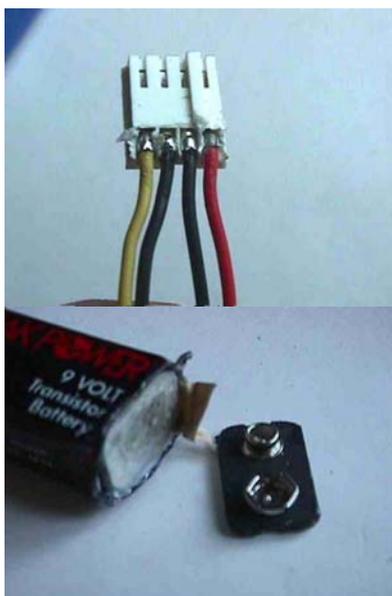
2. Tools you need

- Drill with 1/8" bit
- Solder gun and resin core solder
- Multimeter (test for continuity)

Making the Power Cables and Floppy Cable

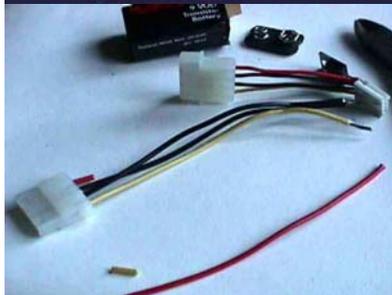
• Step 1: Making the power supply

- Identify the pins starting on the left as 1, 2, and 3.
- Pin 1 is the 12 volt line (yellow wire) and usually NC (no connection)
- Pin 2 is ground and will connect to the black wire of the battery clip.
- Pin 3 is the 5 volt and will connect to the red wire of the battery clip.



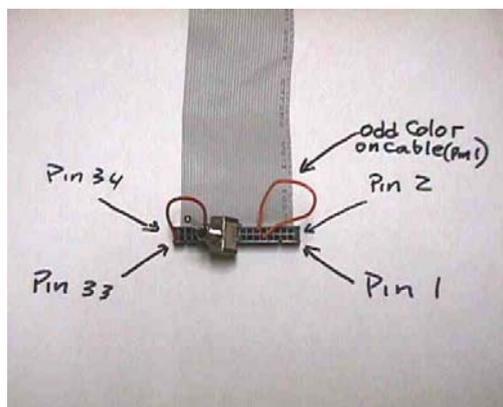
Step 2: Solder the battery clip

- Strip 1/4" insulation off the ends of the wires and solder battery clip to molex.
- if you want to power off a power supply, keep the large molex and cut back part of the mini-molex to allow you to solder the bater clip.



Step 3: Making the Floppy cable and Testing

- Floppy cable pinouts are described [here](#).
- Using a floppy cable with 34 pin female at each end, with a wire, connect pin 16 to ground (low) and pin 12 to ground (low)
- With power source and floppy cable attached, the light should come on.
- Holding down the write protect microswitch (either side of motor at front), the motor should run continuously. If it turns on then stops, there is something wrong with the floppy cable. Check for twisted cables and proper ground.
- Pin 18 changes direction of the read/write head. Set pin 18 to low (ground) then with another wire connect pin 20 to low using pulsing action (low/high), the stepper motor should move forward each time low is applied. If it does not it may already be at the end (although you should hear some clicking sounds), reverse and set pin 18 to high (take it out of the ground) and apply the pin 20 pulsing to low again. The stepper should move in the other direction.



Floppy Drive Carriage with Wheels

Step 1: Floppy drive Disassembly

- Obtain a 3 1/2" drive that has a working spindle and head stepper motor.
- Remove the top cover and face plate.
- Remove the inside disk assembly. Just make sure to leave the head stepper and head assembly in place



Step 2: Drive system, Pulley Assembly and Front Wheels

- Using Epoxy, glue a small grommet (or other pulley system) to the center of the drive motor.
- Drill 1/8" axle holes in both sides of the drive at the right level to line up the pulley with the axle. Optional: Place another grommet on the axle and glue in the center.
- Insert axle, slipping in a rubber band of the proper size (should be tight from pulley to axle)
- Attach the wheels (tight fit)



Step 3: Rear Wheels

- **Drill holes through the plastic wheels.**
- **Using the existing screw holes, attach the wheels with the bolts (don't tighten too much, must be able to spin freely)**



Floppy Ribbon Cable Connections

To test or run the floppy you will need to apply the proper logic levels to the pins on the ribbon cable. The following list shows what all of the signals are on the floppy interface connector and what they do.

Pins 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33, are all grounds.

Pin 2 - High Density Select

Pin 8 - Index Pulse (produced by the spindle motor for timing)

Pin 10 - A: Motor on

Pin 12 - Drive Select B:

Pin 14 - Drive Select A:

Pin 16 - B: Motor on

Pin 18 - Direction of the head stepper motor (A low here moves in one direction, high moves the other direction)

Pin 20 - Step Pulse (Each pulse here cause the head stepper to make a step)

Pin 22 - Write Data

Pin 24 - Write Enable (A low turns on the write circuit)

Pin 26 - Track 0 (A low puts the head stepper over track zero)

Pin 28 - Write Protect

Pin 30 - Read Data

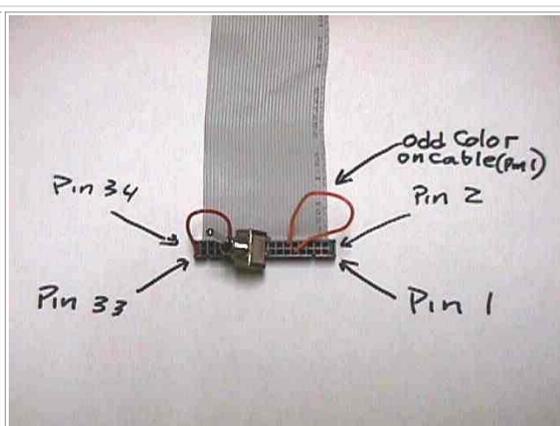
Pin 32 - Select head (A Low selects head zero)

Pin 34 - Disk Change Switch

Use Pins 12, 16 and ground to control the spindle motor. (Turns the diskette)

1. Put one end of a jumper wire into pin 12 and the other end into any ground pin.
2. Put one contact of the switch into pin 16 and the other contact into a ground pin. (can place a switch here)
3. Connect the power cable and battery to the drive.
4. Connect the other end of the ribbon cable to the floppy drive. (Cable pin 1 to floppy pin 1)
5. Locate the write protect switches and tape them down.
6. You should see the spindle motor turn on when you flip the switch.

Use pins 18, 20 to move stepper motor back and forth.



Connecting to the Computer

Step 1: Connecting the Parallel Cable

- Using a parallel cable with ends stripped back 1/4", tin the ends with a small amount of solder.
- Isolate the computer input using a 74SL245 buffer chip, connecting D0 to A1, D1 to A2, D2 to A3, D3 to A4, and 25 to ground.
- Connect B1 through B4 to pins 16, 12, 18 and 20 on the floppy cable.
- Connect one of the grounds from the floppy cable to ground on your breadboard.
- Test by sending the proper low/high from the computer. Example Low to pin 16 turns motor on.



Step 2:

- Floppy will be relegated to a desk if you don't build a cable to connect to the computer.
- If the 9V battery is able to power the wheels, then you simply need a cable (cat5 UTP would probably do) to go between the floppy cable and your breadboard.
- To get the motor turning and the stepper motor moving back and forth you need only 5 wires (4 input and 1 ground). The other three could be used to get input from photosensors or whatever else you can figure out.



Desk bound: Floppy elevated so "his" wheels can spin. Connected to a breadboard via a short floppy cable.