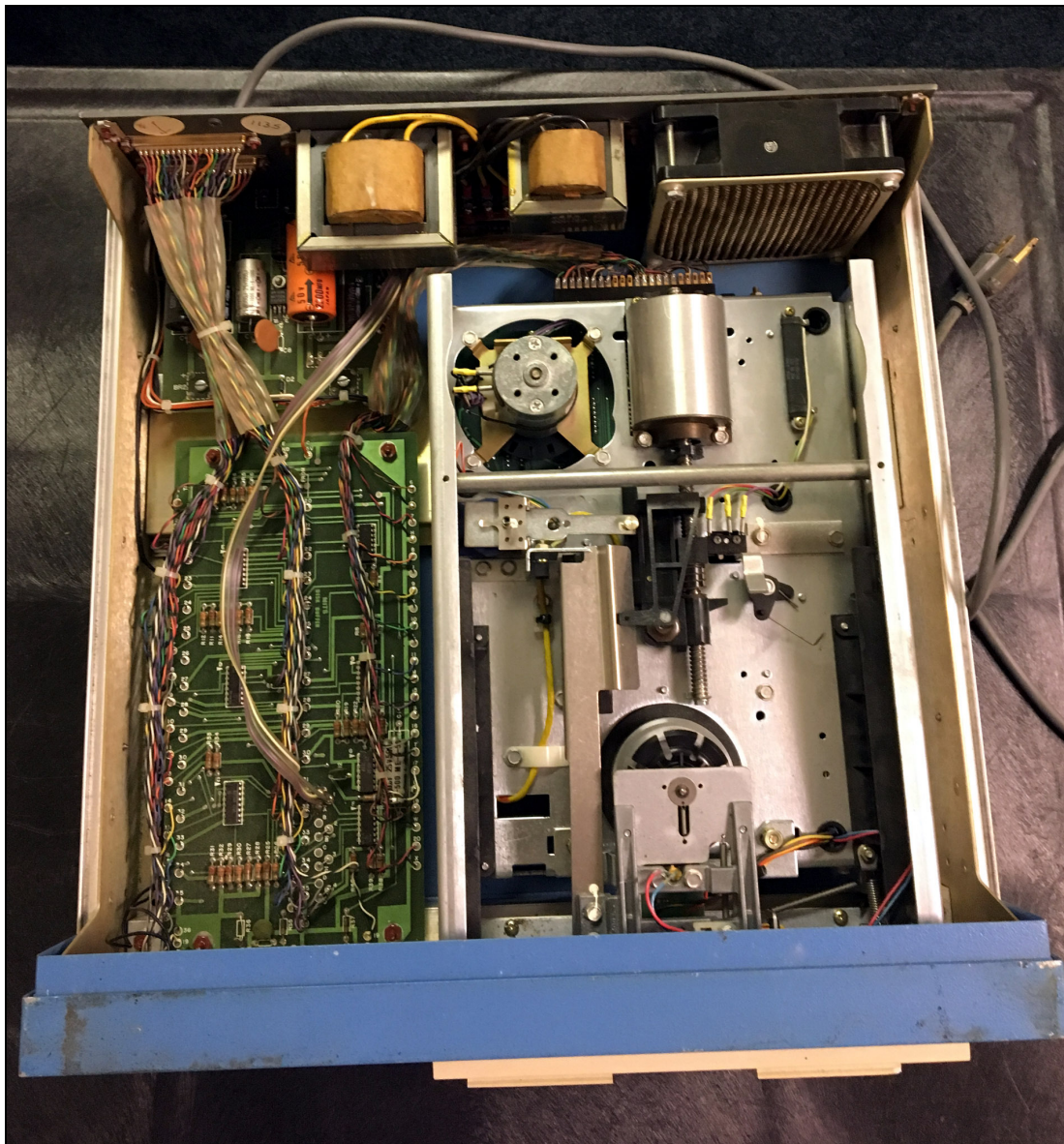


## Altair Floppy with Pertec FD-410 (DC Belt Drive Hub Motor)

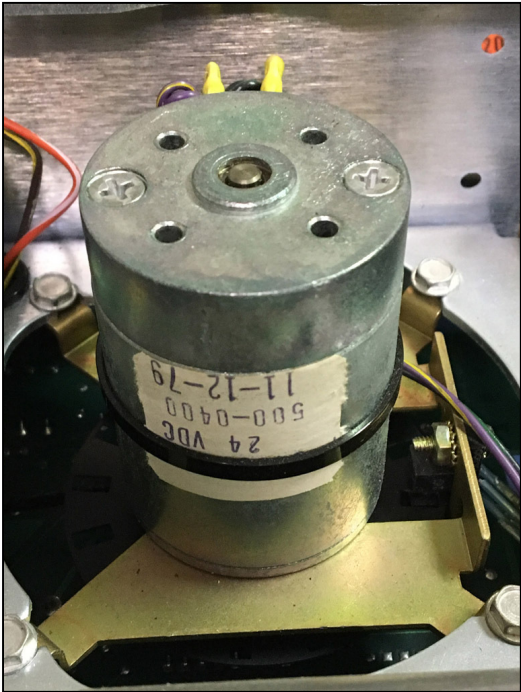
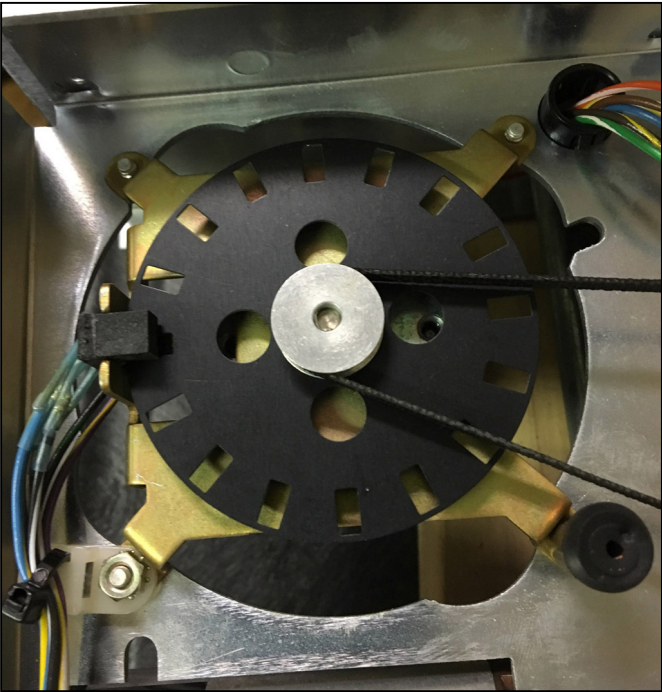
The Pertec FD-400 drive that is typically found in the Altair disk cabinet uses a direct-drive DC hub motor. The Altair cabinet provides 24 vdc to the drive to power the hub motor as well as the head stepping motor. The use of a DC motor allows the drive to be independent of the AC supply voltage and line frequency.

Unfortunately, it was not uncommon for the FD-400 hub motor to seize up and stop spinning. If this was not quickly noticed and power turned off, it didn't take long to damage one or more of the phase drive transistors. In 1979, Pertec released the FD-410 drive that used a DC motor and belt to drive the hub spindle instead of a direct drive DC motor.

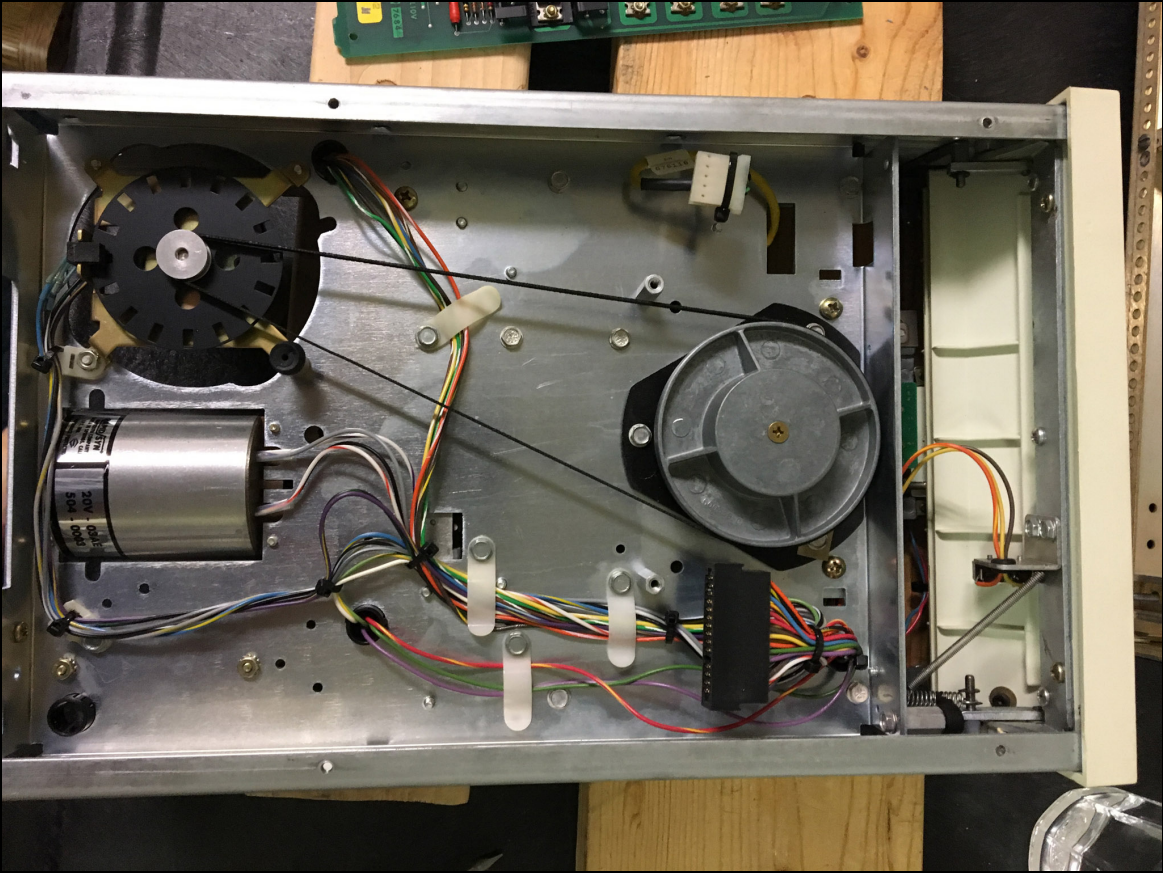
Since the Altair product line was cancelled prior to the introduction of the FD-410, this drive would not have been original equipment in an Altair drive cabinet. However, the drive could be used as a drop in replacement for the original FD-400 drive. Below is an Altair drive I received in which an FD-410 drive was installed. The DC hub motor can be seen in the back left corner of the drive in the large hole that is present for the AC motor used in the FD-5xx series of drives.



Close-ups of the motor from the bottom and top of the drive chassis are show below. The slotted disk and optical encoder can be seen in the left picture.



The bottom of the drive with the logic PCB removed is shown below. The hub flywheel and cone is the same as used with the FD-5xx series of AC motor drives.



## Drive Repair

This drive is the cleanest and newest looking Pertec drive I've ever restored. After typical clean and lube steps, I proceeded to perform index and radial alignment. However, I determined the drive was spinning way too fast – about 436 rpm instead of 360 rpm. In addition, the hub motor spun all the time, and according the manual, it should turn off when the drive door is opened.

The PCB part number for this drive is 600281 and the schematic is 600280. These can be found in the downloads section at <http://deramp.com>. In the download tree follow: downloads > floppy\_drives > pertec > Pertec 8in Schematics.

After studying the schematic and probing with a scope, it became clear the final power transistor that sources current to the motor had failed (Q1, TIP32). I replaced the transistor and the motor speed returned to nominal and the motor also turns off as expected when the door is opened.

## External Drive Address Switch

The thin ribbon cable seen below runs from the A0 drive address line (near the front of the PCB) to a switch mounted in the rear panel. This allows selection of drive address zero or one without having to open the cabinet and de-solder/solder a jumper.

