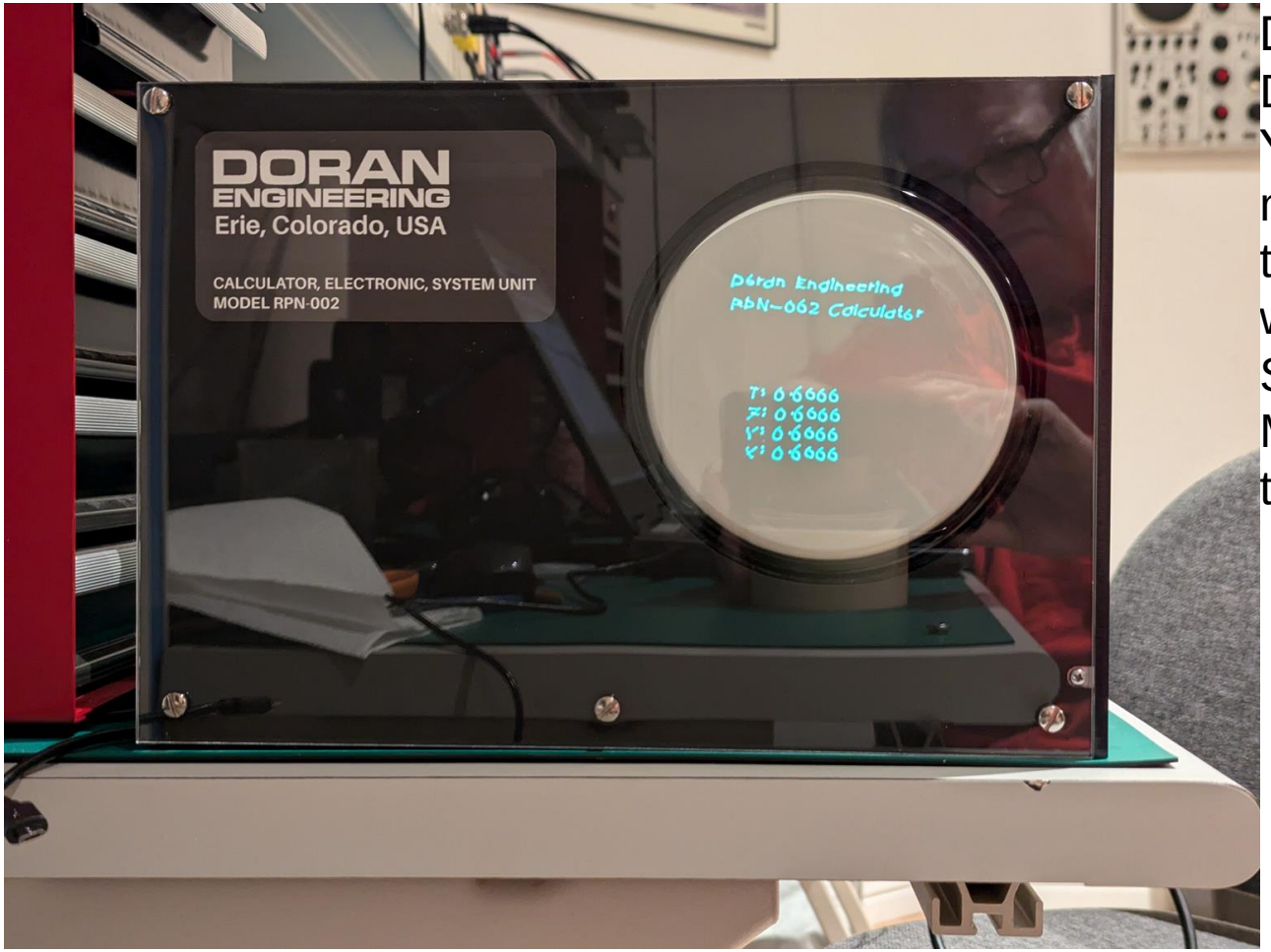
HHC2024

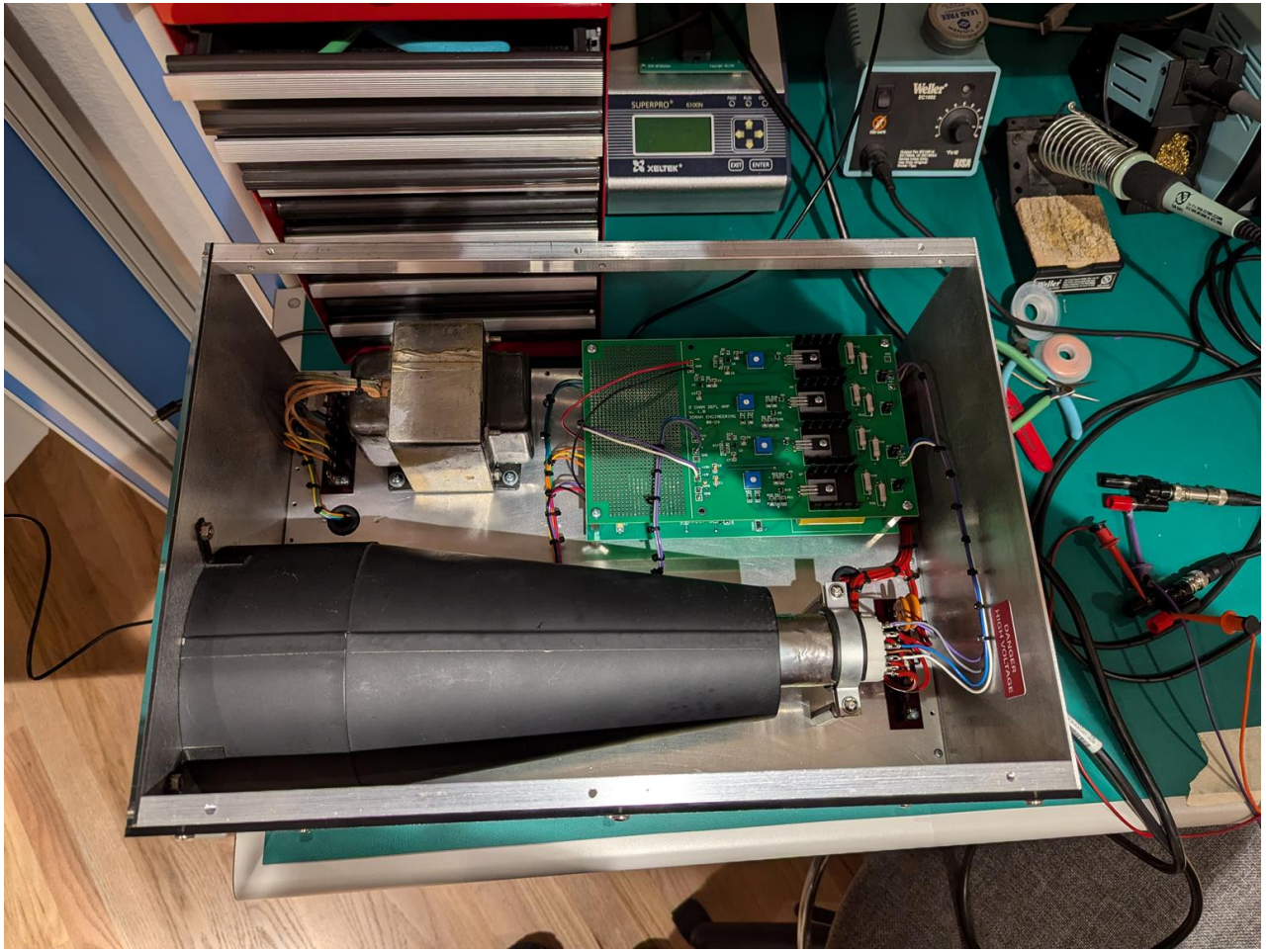
It Escaped From the Lab – Part IIIA

John Doran and Eric Smith

This one didn’t come out of an HP calculator R&D lab, but rather, out of our own lab.



Didn’t we see something out of Doran Engineering last year? Yes, I think it’s coming back to me. Something about Nixie tubes? Yeah, that was it. But what is this big, weird thing? Some kind of round display? Must be the latest and greatest technology!



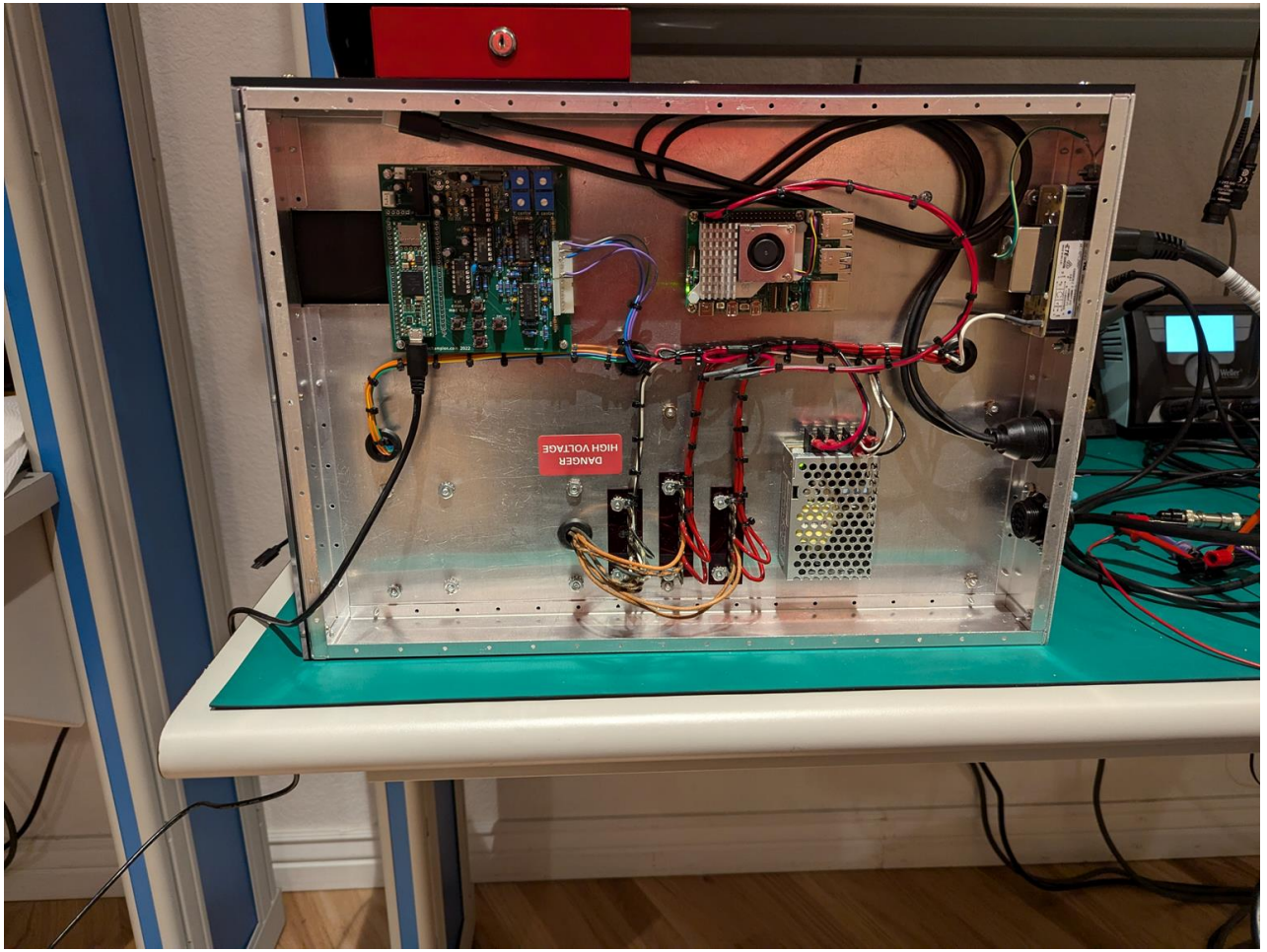
Top view.

That thing is crazy deep! I thought flat displays were all the rage?

It must be a five-inch electrostatically-deflected CRT, as was commonly used in oscilloscopes way back when. And in fact this tube came out of an oscilloscope.

There’s a big, heavy transformer to get the various required voltages, including the high voltage for the CRT anode.

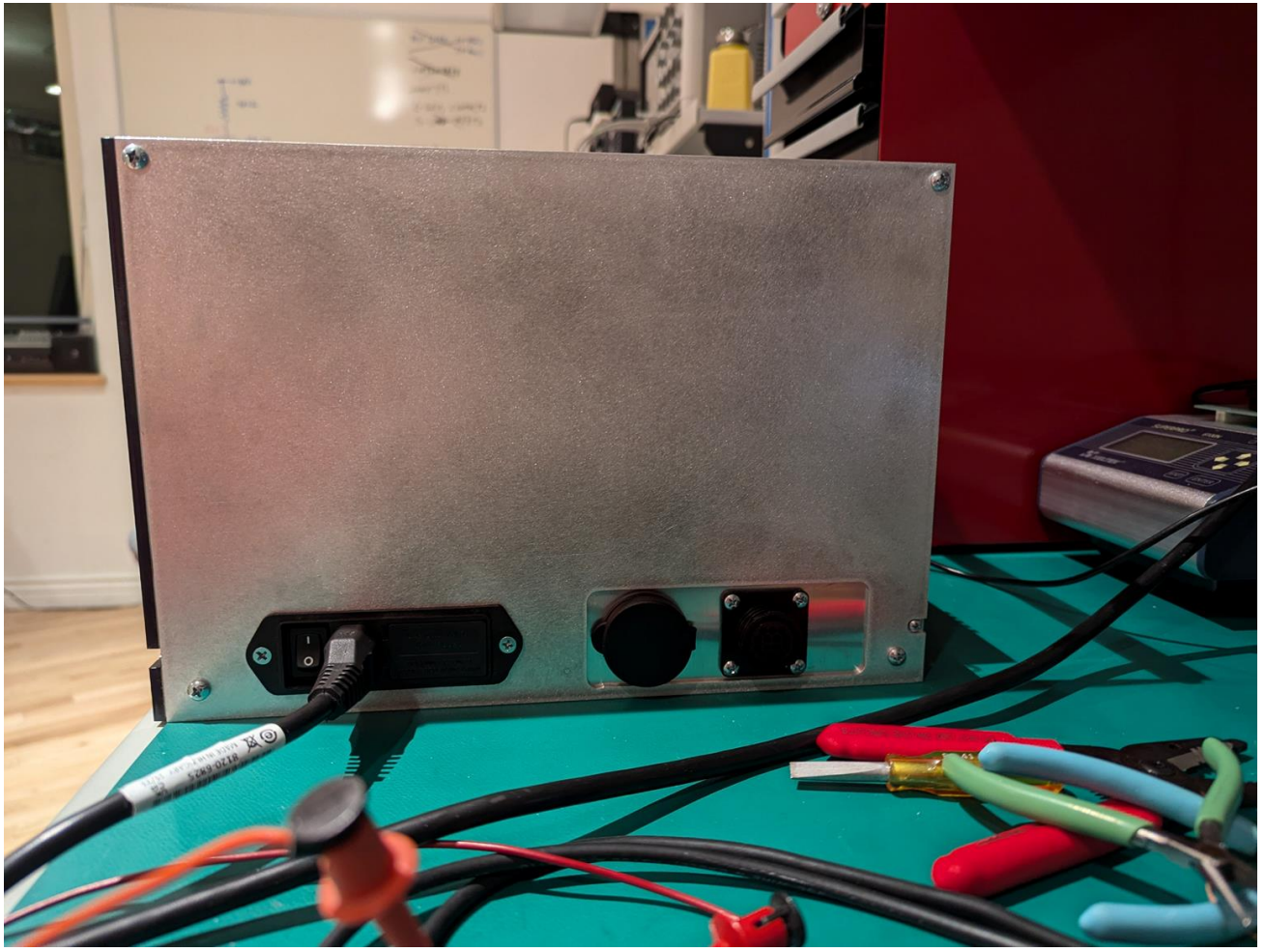
The top PCB is the X and Y



Bottom view.

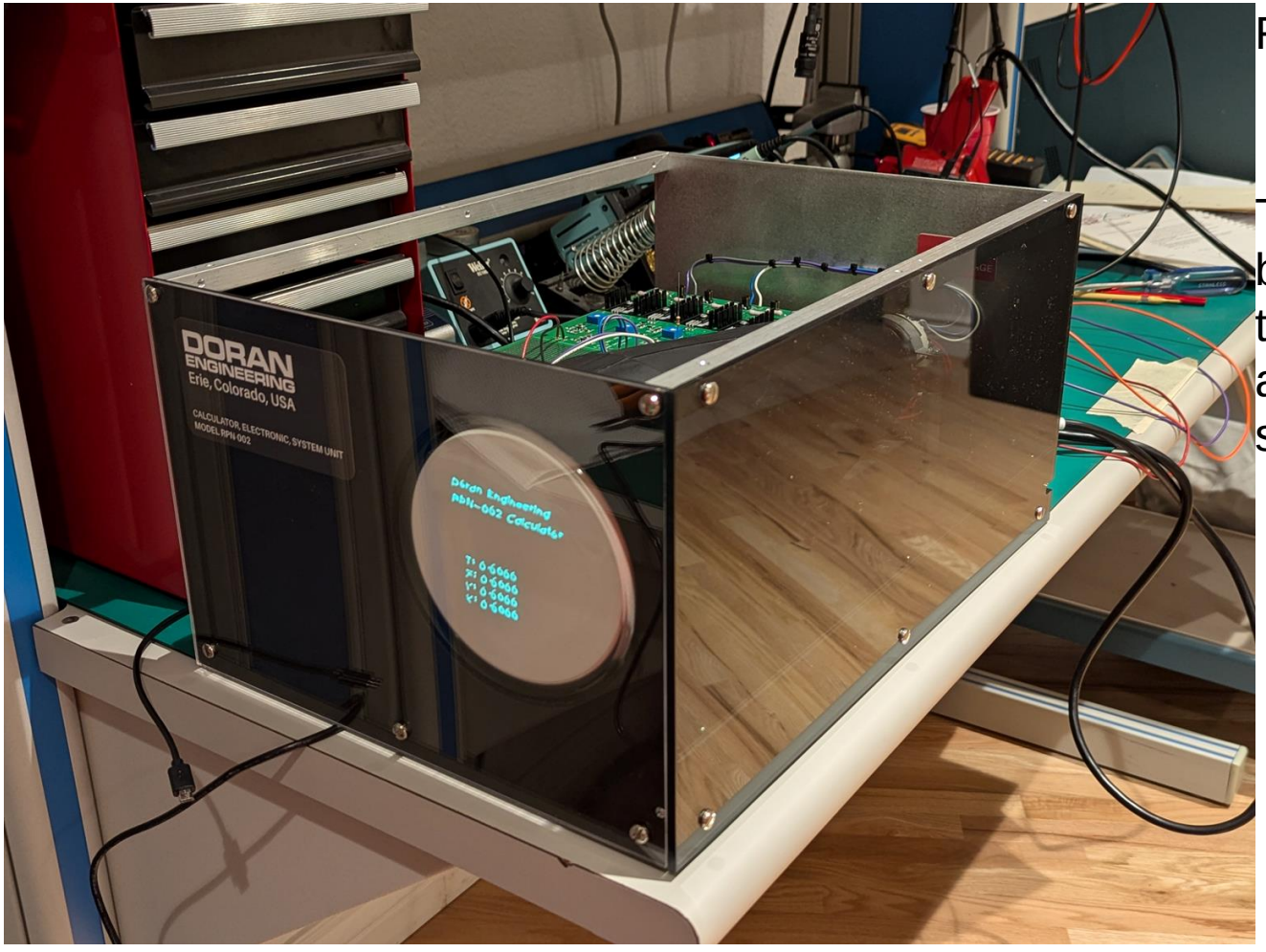
Now that looks more like modern stuff. A teensy 5V power supply, a large board the size of a small board (we're from Colorado) with a Teensy 4.1 ARM microcontroller board plugged in, and a Raspberry Pi 5 (not fully wired in this photo).

The larger board with the Teensy 4.1 ARM microcontroller has SPI DACs and opamps, and functions as a vector generator for the CRT display. The Raspberry Pi 5 will eventually be



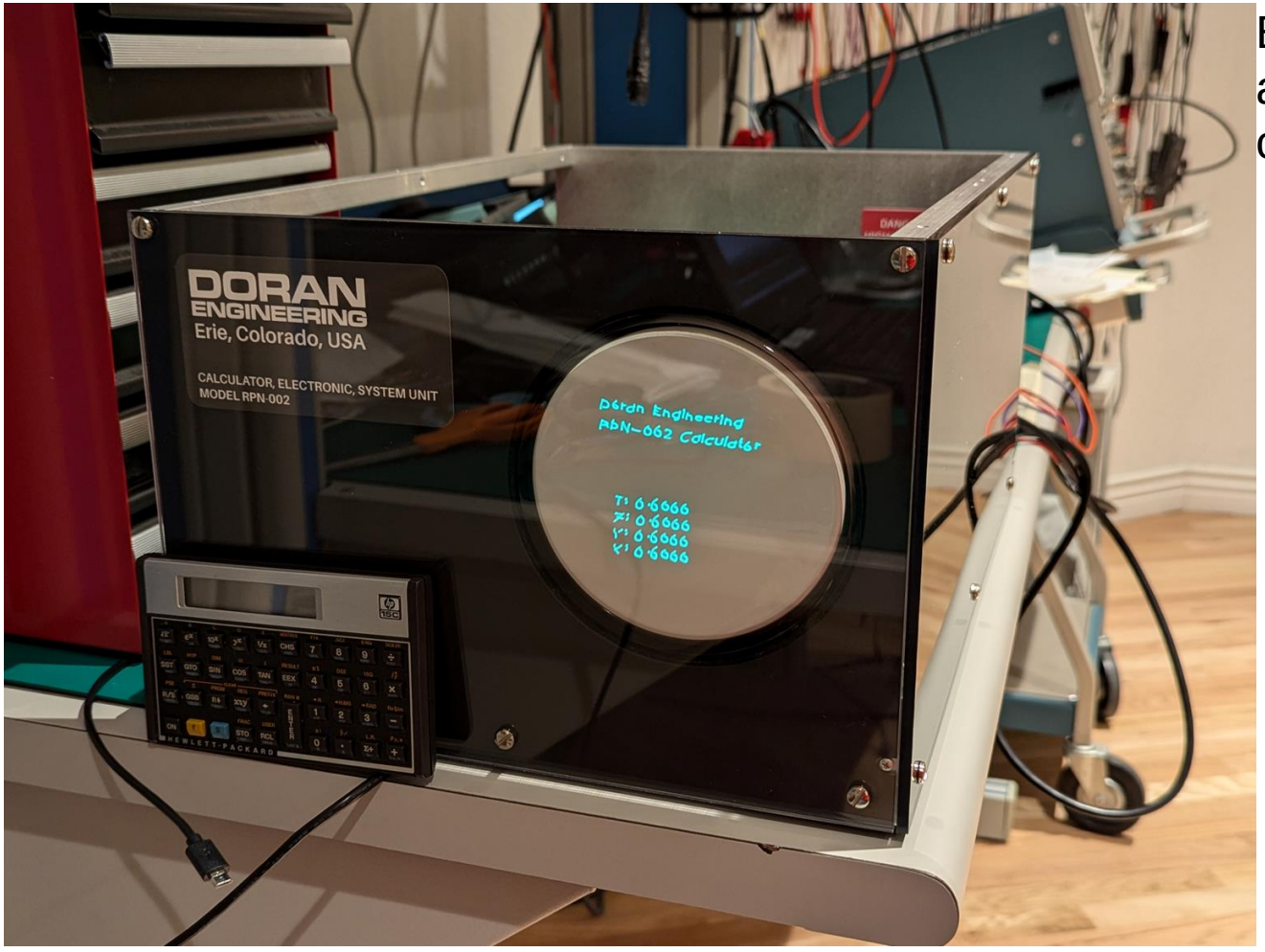
Rear view.

Back panel has an AC power inlet module with fuse and double-pole switch, a dual USB-C bulkhead connector, which will be used for the custom USB keyboard, and a circular connector of the type we used for the Nixie tube calculator.

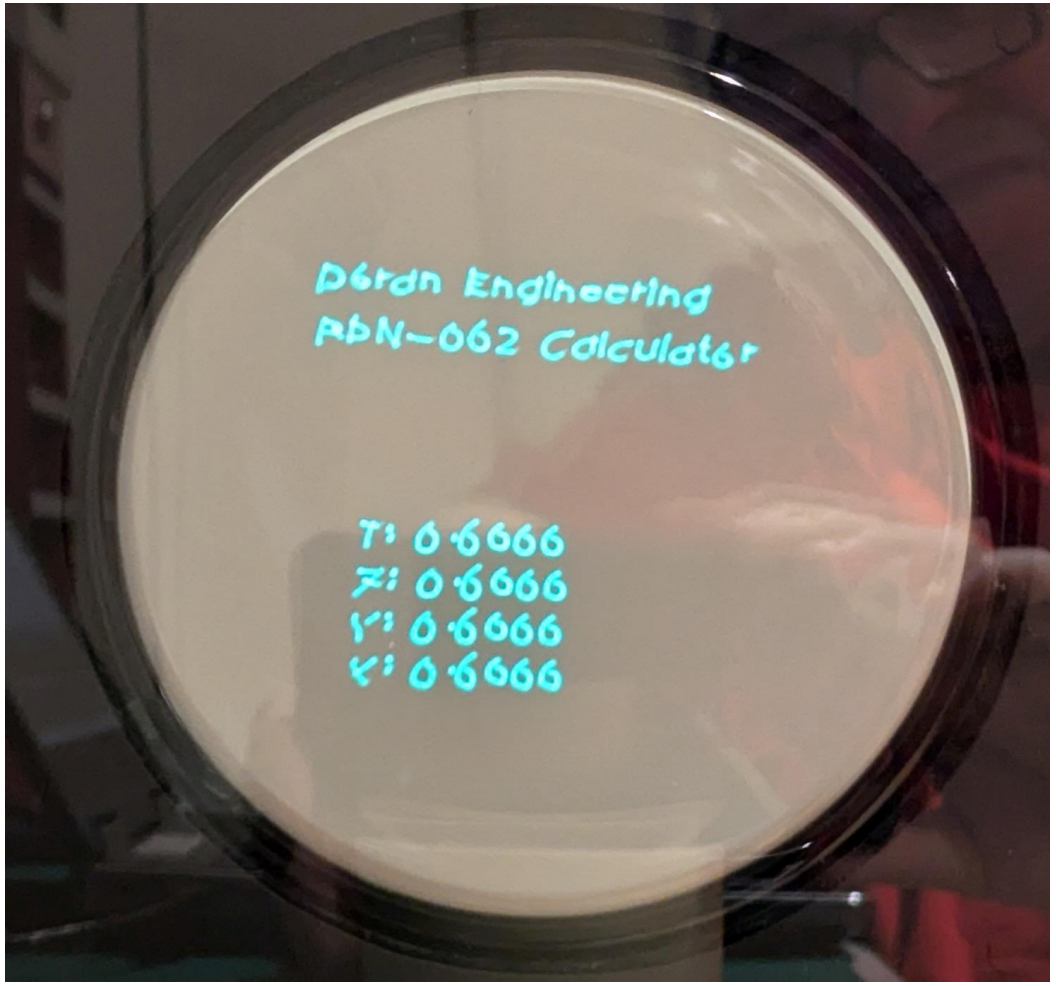


Front and right side view.

The front panel is metal with a big circular hole for the face of the CRT, a label printed on vinyl, and covered with a protective sheet of transparent acrylic.



Back to a mostly front view, with an HP 15C calculator for size comparison.



This is a crop of the first photo, giving a closeup of the CRT face.

What this is _supposed_ to say:

Doran Engineering
RPN-002 Calculator

T: 0.0000

Z: 0.0000

Y: 0.0000

X: 0.0000

Project Status:

We intended to bring a working CRT calculator to the conference, but despite our push to get it completed, some issues remain.

The keyboard PCBs are expected to arrive on Monday. There is more software development work needed.