

The images show partial frames, exposing internal design. Actuators and pins are shown as semi-transparent 'ghosts' for reference, except in the second image (tctct2-frame-open-std-1coil-opdetail.png), where they are rendered as solid for clarity.

The curved finger plate (shown in blue) at the top is part of the upper frame and has holes for the pins, and optional dimples (small depressions in the surface) around pins. The first image (tctct2-frame-open-std-1coil.png) shows standard Optacon R1 6x24 layout, the second image (tctct2-frame-open-std-1coil-opdetail.png) shows a closeup of the same (this time rendered with solid actuator tubes and pins). The third image (tctct2-frame-open-symm-2coil.png) shows the symmetric version with the same 144 pins, now in staggered finger plate distribution. For the upcoming prototype the finger plate will be manufactured as a high precision plastic part and cover the top of the display.

The curved base plate for mounting actuators (shown in green) is part of the lower frame and has a larger radius but is concentric with the finger plate. The base plate has holes for mounting actuator tubes; actuators can be mounted above and below the base plate (below is as shown). The distribution of actuators at the base plate is not simply a scaled version of the distribution of pins at the finger plate; rather, the distribution at the base plate is constrained by actuator shape. Finger plate pin positions are mapped to corresponding actuators via a simple pattern which results in minimal normal angle deviations for the pins as shown (see second image, tctct2-frame-open-std-1coil-opdetail.png). The angles at which actuators are mounted are not necessarily normal to the base plate surface, nor in line with the actuator pin from the finger plate; the optimum angle is generally in between these two. For the upcoming prototype the lower frame will be manufactured as a cast brass part.

The moving magnet actuators mounted at the base plate may use a single coil (coils shown in red) around one permanent magnet pole per actuator (as shown in first and second image) or use two coils encompassing both permanent magnet poles per actuator (as shown in third image). Actuator coils for the upcoming prototype will be wound around brass tubes, the brass material allowing for heat and electricity conduction. Heat dissipated in the coils will be (partially) conducted to the brass lower frame which also acts as a heat sink. Also, electrical conductivity of the actuator tubes and lower frame allows for the formation of a common electrical node (e.g. ground) for the actuators so that only one external connection per actuator is needed besides the shared node.

Around the active actuator array mounted at the base plate is a border of inactive actuator cores containing permanent magnets which provide for a suitable boundary to limit sideways (radial) forces for the active actuator array.