History of the Solid-State Tuning Eye Project

July 2022

The goal of this project is to create a direct replacement for the tuning eye tube. The replacement is solid-state, should last essentially forever, fits physically into the original form factor, and requires no modifications to the host radio.

I developed the first version of the solid-state tuning eye in spring 2021. The assembly consists of 2 boards: a circular LED board with 120 green LEDs, and a rectangular driver board. They interface to each other with a 14-pin connector. It is designed to replace tuning eyes like the 6E5, 6G5, 6N5, 6U5, and other similar tubes. With minor modifications, it will replace many other tubes that have a fan-shaped display at the end of the tube.

Version 1 consisted of just the LED board. The driver board was just built on a standard perforated board (call this version 0). This proved that the concept worked. I was overly cautious about the placement of the SMD LEDs on the LED board, so I quickly re-spun the LED board to version 2. Version 2 features more uniform LED placement. I also made the first version of a proper circuit board for the driver.

Version 2 of the round LED board plus version 1 of the rectangular driver board was introduced in spring 2021, and what existed for the first year. I had 20 boards of each made, and sold them all.

In spring 2022, I had run out of these original boards, so I decided to order more. The LED board (version 2) was rereleased unmodified, but I decided to modify the driver board. The original driver required that one filament/heater pin be connected directly to the cathode, which is not always the case (for example with center-tapped heater circuits). The new driver board has separate filament and cathode connections with “Common mode rejection”. Although it is a little more complex, an alternative BOM allows it to be made without the common mode rejection just as easily as version 1. Furthermore, this design eliminated the need for the 5Meg potentiometer which was difficult to source. Version 2 and 1 are the same size, and compatible with either of the 6E5/6U5 LED boards. So, version 2 offers only advantages over version 1; I can see no reason to go back. As of June 2022, I will be selling only version 2 6E5/6U5 driver and version 2 6E5/6U5 LED boards.

I have one regret: I believe the LED board is too large to fit into the EM3x family of tubes, some of which appear to be slightly smaller in diameter. My apologies to my European friends.

I had some requests for a 6T5 replacement (a variable width annular ring rather than the fan pattern, often found in Zenith radios, and very scarce), so I developed a 6T5 replacement along the same lines as the 6E5/6U5 replacement. Again, there are 2 boards, the round 6T5 LED board with 175 LEDs and the rectangular 6T5 driver board. They are both the same size as the respective 6E5/6U5 boards. Although the boards are similar in design to the 6E5/6U5 boards, they are not compatible, as they use an 8-pin connector. Both of these 6T5 boards are at version 1.