Bring back some of the nostalgia of the golden age of radio with this tuning indicator.

BY LARRY LISLE

Anyone who enjoyed radio in the 1940s might remember sitting in front of a big console radio, watching its green, glowing, magic-eye tuning indicator and listening to those great programs. Of course, the golden age of radio faded away in the fifties, taking big consoles and magic-eye tubes with it, but that doesn’t mean you can’t recapture some of the magic of that bygone era.

The Magic Eye described in this article lets you add a for-display-only magic eye (with the same green glow) to your modern stereo. Or, you can add a few parts and use your Magic Eye as an actual tuning indicator for an AM radio. Because the tube used in the project will work on AC as well as DC, no rectifier or filter is needed. For that reason, the project is really simple to build. And best of all, it really looks great in the dark while playing an old-time radio tape!

Magic-Eye Tubes

Invented in the mid-1930s, the magic-eye tube is basically a triode vacuum tube
with a fluorescent target in the dome of its glass envelope. The target operates at a positive voltage and attracts electrons from the cathode. As a result of those electrons striking the target, a characteristic green glow is formed. A "ray-control" electrode between the cathode and target casts a wedge-shaped shadow on the target, varying from zero to about 100 degrees, depending on its voltage, which is determined by the voltage on the grid of the triode.

In practice, the grid was connected to the automatic-volume-control (AVC) circuit of a superheterodyne receiver. When a station was centered in the IF bandpass, the AVC voltage would be maximum and the eye would close. Magic-eye tubes were also used in a variety of test instruments because of their very-high input impedance and because they wouldn’t be harmed by a momentary over-voltage.

If you recall, it was mentioned that the tubes work on AC as well as DC. While that is true, when a magic eye is operated with AC on the plate and target, the tube is turned off on the negative peaks. That isn’t noticeable, however, and shouldn’t affect the application described here.

Some types of magic eyes, such as the 6G5 and 6U5, are getting scarce and expensive, and should be reserved to keep radios designed for them glowing. However, the 1629 type used in the Magic Eye described in this article, which was made for the "command-set" transmitters of World War II as a calibration indicator, is fairly plentiful.

**Circuit Description**

Figure 1 shows the schematic diagram for the Magic Eye. The version of the circuit shown in that figure can be used only for show. Transformer T1 steps the 117-volts AC from the wall outlet down to 12.6-volts AC for the filament of the 1629 tube, V1. The other transformer, T2, then steps the voltage back up to 117-volts AC for the target and plate (pins 4 and 3). The two transformers isolate the 1629 tube from the power lines for safety.

Figure 2 shows how a few additional components can be added to make the circuit a real tuning indicator for old radios. While the grid of the tube in Fig. 1 is grounded, in Fig. 2 it’s connected through resistor R2, capacitor C1, and potentiometer R3 to the circuit ground and AVC line of a radio. Potentiometer R3 lets you calibrate the circuit so that the tube’s eye will close when a station is properly tuned.

**Construction**

The author’s prototype of the Magic Eye was built in an 8- by 6- by 3-inch project box, but it could just as easily be built in a wooden box or in the bottom of a speaker enclosure. You can use any project building method as well, because layout is not critical. However, you really don’t need to use a circuit board for the project; simply use the transformers and tube socket as tie points for the few other components.

Begin wiring the circuit by mounting a socket for the magic-eye tube on a couple
of hardware-store, 1-1/2-inch brass-corner "irons." The "shadow area" of the tube is oriented between pins 1 and 8. Keep in mind when mounting the tube that it’s customary to have that area pointing down. You will need to cut a 15/32-inch-diameter hole in the front panel to accommodate the tube.

Go on to wire the rest of the circuit. If you are planning on using the circuit for show only, you will only need to wire the components shown in Fig. 1. Add the components shown in Fig. 2 if you would like to use the Magic Eye as a tuning indicator.

Whichever version you build, keep the following in mind: The center-tap connection to the 12.6-volt windings of T1 and T2 isn’t used and can be trimmed short and either taped or curled out of the way. Tie a knot in the power cord so an inadvertent pull won’t tear the wiring. If you’re using the Magic Eye as a tuning indicator, make sure that the input wires are kept short. Also, use grommets to protect them at their points of entry to the project box.

Using the Magic Eye

If you built the version of the Magic Eye shown in Fig. 1, then using it is simple. Just place it on top of your stereo or radio and plug the Magic Eye into the wall. Then, when you shut off the lights, you’ll be ready to relive the old days.

If you built the version of the circuit shown in Fig. 2, you will need to connect your Magic Eye to your radio’s circuit ground and AVC line. In most radios, the AVC line is connected to the end of the loop antenna or to the antenna coil opposite the end connected to the grid of the input tube.

**Note:** Never attach any accessory to a radio without isolating the radio first. A so-called AC-DC radio can be made safe by using an inexpensive isolation transformer between the radio and power outlet.

Once the Magic Eye is connected to the radio, turn on both units. Then, adjust potentiometer R3 so that the eye closes as stations are tuned in. That’s all there is to it.

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**PARTS LIST FOR THE MAGIC EYE**

**RESISTORS**
(All fixed resistors are 1/2-watt, 5% units.)
R1—470,000-ohm
R2—1-megohm*
R3—1-megohm potentiometer*

**ADDITIONAL PARTS AND MATERIALS**
C1—0.1-µF, polyester capacitor*
V1—l629 vacuum tube
T1,T2—117-volt to 12.6-volt, 450-mA or greater, power transformer
PL1—AC plug, 2-terminal
Project enclosure, octal tube socket, 1-1/2-inch brass corner irons, power cord, grommets, nuts, bolts, wire, solder, hardware, etc.

All parts marked with an asterisk (*) are only necessary for the tuning-indicator version of the Magic Eye shown in Fig. 2.

**Note:** The following items are available from Antique Electronic Supply
6221 So. Maple Avenue
Tempe, AZ 85283
Tel. 602-820-5411; Fax 602-820-4643
A complete kit of all above parts (K-PE-EYEKIT)—$29.95; a magic-eye vacuum tube—$5.30.
Contact Antique Electronic Supply for shipping and handling information.

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