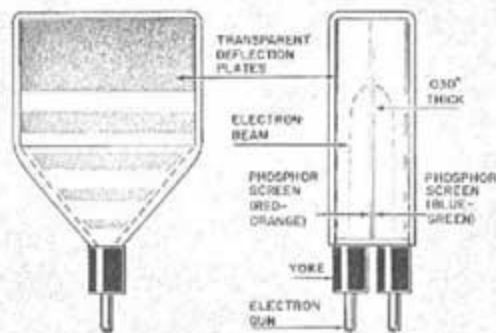


Fantastic new portable color tv set has flat picture tube you can watch from both sides. New flat-tube development is first step toward practical hang-on-the-wall television for your living room. BY Larry Steckler



THINNEST COLOR picture tube gives up its secrets in detailed PM sketches

FLAT TV PICTURE TUBES ARE REALLY HERE.

There are both color and black-and-white versions. I know. I've seen them in action. I've held them in my hands. And you'll soon be seeing them in a new breed of portable TVs sporting a famous maker's label around the end of this year.

Now settle back and we'll let you in on the news. Out in the suburbs of Los Angeles are the business offices of the Intertel Corp. And inside these offices some remarkable things have been going on. They've developed a flat color-picture tube like the one diagramed above. It has a 6-inch screen that gives a perfectly rectangular viewing area, $4\frac{3}{4} \times 3\frac{1}{2}$ inches. Best of all it's a tiny $2\frac{3}{8}$ inches thick. When combined with a transistor color TV chassis it makes a color set that's a mere $10 \times 6 \times 3\frac{1}{2}$ inches, weighs six pounds and costs about \$200. Just the right size to take along on your next trip. They've come up with a monochrome (black-and-white) portable too, and it's even smaller— $9 \times 4\frac{1}{2} \times 2\frac{1}{4}$ inches—and costs \$150.

While only small-screen versions of the flat picture tubes have been built so far, there is no limit to the size tube that



can be built. Scaling-up, a 23-inch rectangular tube would be about 4 inches thick. You could certainly hang it on your living room wall and probably will.

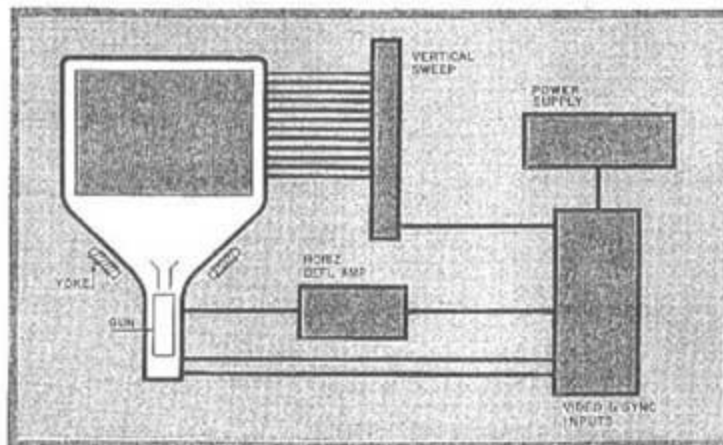
The Intertel sets are unique in several ways other than their use of the flat tube. To me, the most fascinating feature of all is that the picture can be viewed from either side of the tube. Of course, it appears in reverse on the back side, but it's a great way of making a small-screen portable viewable by a greater number of people.

Early models of the set will be viewable only from the front as the space behind the picture tube will be taken up by some electronic circuitry. Later versions may include the two-sided viewing if the public demands it. I think it will. The cabinet will be enlarged slightly to make room for the wiring that would otherwise block off the rear of the tube.

The color tube is unique in itself. It is a two-color tube that uses two electron guns and two phosphor screens instead of the three-gun system now accepted as the standard. It does this by combining the colors (red orange and blue green), following a specially developed additive system inside the tube, to give full color reproduction. Actually, at least to my eye, there are some discrepancies in the color reproduction. The two-color flat tube cannot deliver a true purple or a dark, intense blue. But flesh tones are more real than anything I've seen before and if these tones are right I doubt if you'll even know that the female staging star is wearing a purple dress and not the reddish-blue one you see.

Even more important is that the two-color tube gives a considerably brighter picture than the conventional color tube. This is vital to a portable TV that will be used outdoors every so often. The picture on a standard color set can barely stand up against normal room lighting. Outdoors it would be completely washed out and impossible to view.

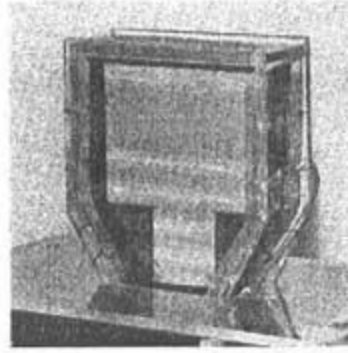
Since the flat tube is quite different from conventional picture tubes, it works a bit differently too. Look at the diagram at the top of page 91. You'll note that



SCANNING CIRCUITS ARE DIFFERENT. Block diagram shows the basic arrangement of horizontal and vertical sweep circuits required by the new flat tube. Each corner of the screen is perfectly square.



MONOCHROME TUBE IN ACTION. Mirror behind tube lets you see image on the rear. It appears right side up as mirror inverts reverse picture



FLAT COLOR TUBE is two monochrome tubes back-to-back. Dual phosphor screen is in middle. Electron beams are directed to it from both foci



INVENTOR WITH HIS BRAINCHILD. Leo Shanofelt, top-notch engineer behind the flat tube, works at his laboratory bench where he has the monochrome tube set up for another round of experiments

there are two electron guns at the bottom of the tube: one for each of the two phosphor screens. These screens are deposited on opposite surfaces of a thin (.030-inch) sheet of glass.

This dual screen is firmly fastened in the exact center of the tube. The electron guns fire a beam of electrons straight up behind the screen from either side. The yoke around the neck of the tube deflects the beam from side to side. The transparent deflection stripes on each face of the tube, directed by signals from the set's deflection circuits, deflect the beams against their respective phosphors to produce a picture.

The monochrome tube is a bit simpler as it has only one electron gun and one set of deflection stripes. On the crude handmade tubes I watched, these stripes are just barely visible as slightly darker portions of the screen while a picture is being viewed. In production versions of the tube these stripes should be completely invisible.

The advantages of a flat tube are many and varied. Some are quite obvious;



some not quite so apparent. Here are the most important ones:

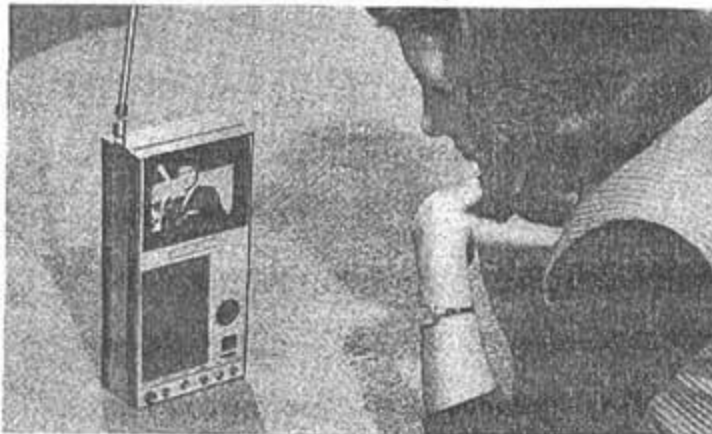
- Flat-tube sets are extremely thin, especially when compared to present-day models. They are easier to fit into a crowded room, and do not take up floor space.
- Smaller, more compact TVs are possible. This means greater portability, lighter weight.
- Picture tubes are less complex. Specially blown glass envelopes are no longer needed. Ordinary plate-glass screens are easy to make.
- Two-sided viewing can be provided, if desired.
- Truly miniature, book and pocket-size sets become feasible. You may be looking for one soon.

Now let's look at a tiny flat-tube portable and see what we can do with it. Like a transistor radio, it can go anywhere. It's light and extremely portable. You can pass it to the kids to keep them occupied during long auto trips. You can take it with you to the beach or take it along on your winter ski tours. Or, for that special-occasion telecast you would give anything to see, bring it with you to your job—if you have an understanding boss.

In your home, large-screen sets will be built into the walls; they can be that thin. Those who like to watch TV in bed will be able to fit a set into the ceiling. Exotic styling for tabletop sets will become standard and remote controls for operating the set from your seat will be a must.

Other changes in set design resulting from the flat tube, as well as innovations in the tube itself, are bound to outreach my imagination. I'm sure that one day we'll have wall-sized screens made out of a flexible luminescent material that we can roll up out of sight when not in use. We may even end up with three-dimensional color TV.

But no matter which direction TV may take in the future, the industry is—right now—accomplishing a major breakthrough. The set manufacturers have been given a new ball to play with and I, for one, intend to keep tabs on what they do with it. ★★★



HER FIRST CLOSE-UP GLIMPSE of a flat TV portable in action utterly fascinates pretty FM secretary Millie Federsen. Now, all she wants to know is how soon she can get one and how much it will cost