

Don't Be Afraid of Color TV

By ART MARGOLIS

Many troubles resemble those in black-and-white sets; others start to become familiar quickly.



One of the most important jobs required of the color TV technician—one he will have to understand thoroughly—is performance of the A-to-Z convergence procedure.

THE service call was timed perfectly. The setting up and convergence of the new 21-inch RCA color receiver had been completed a good ten minutes before the colorcast was scheduled to start. The set owner, a new car dealer, perched on the edge of his chair awaiting his first look at color TV.

The pre-show time was consumed by last-minute chores—packing up the test equipment and closing the tube caddy. Then, on the screen, the MC entered through parted curtains and announced, "You are now watching color TV." The program may have been transmitted in color but there was no rainbow on the screen!

The color and hue controls were turned all the way up—still no color. A cursory inspection revealed no obvious source of the trouble so the tubes were checked. After about the fifth tube substitution, the light began to dawn. Why was there no color when the dot-bar generator produced beautiful hues on the screen? The only difference between the two set-ups was the outdoor antenna! A hastily procured rabbit ears solved the problem long enough to avert a heart attack by the owner until the rooftop antenna could be inspected.

Finding the lightning arrester burned and shorted, this was replaced and the color flowed over the screen. Evidently the lightning arrester had been faulty for some time but in this prime signal location its absence was of no importance to monochrome reception but it made a vast difference where color was concerned.

Service technicians approaching color television for the first time are more or less faced with the same problems the old timers tackled when black-and-white first came on the scene.

There is one redeeming feature, however, and that is that those who have coped with monochrome sets will find that color troubles fall into similar categories. There are the obvious tube replacements and adjustments to be made. Then there are some hard-to-figure symptoms that ultimately resolve themselves into tube changes and adjustments. There are the normal bench-type repairs and, inevitably, the familiar "dogs" and intermittents.

One great difference in the two types of service is in the importance of the role played by the antenna. Antennas that are performing well on monochrome may not work satisfactorily for colorcasts. Of the twenty-two color service calls handled by the author thus far, ten involved tube replacements, two called for adjustments of various types, five were antenna jobs, and five involved bench-type repairs. Although no real conclusions can be drawn from this breakdown, it does indicate some sort of a trend.

Monochrome Experience Helps

Color TV today stands on familiar ground. Most of the circuitry and many of the troubles are the same as for monochrome. In many instances black-and-white servicing experience will prove adequate.

For example, the author was called upon to service a 15-inch set that had snowy pictures. Although it was "Technicolor" snow, there was no mistaking the familiar flakes. The 6BQ7 r.f. amplifier tube had shorted and burned out two resistors in the tuner. The installation of new resistors and a tube replacement set things aright.

Another 15-inch set brought the

familiar "no raster but sound" complaint. Like its monochrome counterpart, the high voltage rectifier was cracked, killing the high voltage. A 21-inch set whose owner reported raster but no sound or video turned out to be a simple case of a burned out 6AQ5 audio output amplifier tube. It killed the video, too, for the screen of the 3rd I.F. draws "B+" from the 6AQ5's cathode circuit.

On another 21-inch set where the strong stations blacked out and the weak ones trickled in, the 6U8 a.g.c. amplifier tube proved defective—just as it might in a monochrome receiver.

Another "case" which required a slight variation in black-and-white theory involved a report that the picture disappeared only during commercials! The program was received OK but when the commercial came on the picture bloomed, defocused, deconverged into a rainbow of colors, and then disappeared. At the end of the commercial, the program came back in fine shape.

A decrease in the high voltage appeared to be the trouble so the rectifiers were checked first—to no avail. A new 6BD4 high voltage regulator tube was installed and that did the trick. The commercial held firm. It seems that when a high level of white is sent into the tri-color tube, as during the commercials, the CRT draws more current. The high voltage regulator tube is supposed to allow more current to be drawn without a drop in high voltage. With the tube defective, as the current was drawn the high voltage decreased and the multicolor blooming occurred.

While the service jobs thus far cited



needed no more than normal black-and-white theory plus common sense, some troubleshooting chores involve a thorough understanding of theory.

To demonstrate this point, take the case of the set where the top half of the picture was blue with retrace lines, the bottom yellow. The first step was to adjust the color gun controls. This operation resulted in the blue changing to black and the yellow to near-white. The reason was obvious. This was a classic case of 60-cycle hum in the video. The r.f. amplifier, a 6BQ7, had a filament-to-cathode short.

Another complaint involved a low brightness level and a brownish picture during a black-and-white transmission. The 6BC7 d.c. restorer was dead.

Another problem which came up about this time involved the color set cited first—the new car dealer of the shorted lightning arrester. Timing the service call for a scheduled colorcast, it was found that only the top few inches of the picture were affected. The top sparkled with all colors, red predominating. The hero of the scene, whose head reached the top of the screen, looked as though his ears were bleeding badly. It was an extreme case of misconvergence at the screen top. A second symptom, the "pointy" head, was a tip off that this was, indeed, a familiar problem. Replacement of the vertical output tube restored the picture. The weak vertical output tube was causing vertical stretching and misconvergence.

Training a Must

With a bit of luck, any TV technician worth his salt could undoubtedly



Even an antenna that is adequate for color reception may have to be reoriented for optimum performance.

ly have scraped through all of the cases mentioned so far. However, there are still plenty of color jobs that require formal and thorough color training. For the past year the author's firm has been on active lookout for all the color information and training being offered. All available articles have been studied carefully and the technicians have been attending the RCA lectures and taking the Philco color course. We have found that certain color jobs require formal training. One absolute "must" for every color technician is complete familiarity with the convergence procedure.

Among the unusual problems that arise in convergence cases are the ef-

fect of weak or defective 12BH7 red adder and output tubes, a loose or defective field neutralizing coil, and the misadjustment of the bandpass a.g.c. control. The effect of these components on the color picture would have been lost on a technician unfamiliar with color theory.

Another component, unique with color sets, is the additional oscillator running at 3.58 mc. This may prove to be a headache to technicians. One case involved the hue control which wouldn't permit the color to be turned up bright enough. In order to place this control in the center of its range, it was necessary for the technician to phase align the oscillator. This same symptom on a second set proved to be caused by a bad oscillator tube. So it goes!

Color Antenna Troubles

With the advent of colorcasting, antenna orientation troubles have again reared their ugly heads. While many existing installations are OK for color reception, more are going to require work. Antenna rotators will be needed in some locations in order to provide good color reception.

Technicians who thought their problems of ignition interference were a thing of the past with the newer black-and-white circuitry and keyed a.g.c. will be encountering this old bugaboo with color receivers. There is little that the technician can do to eliminate this trouble; it is just a matter of "sitting it out" until the manufacturers whip the problem on the drafting board.

Color TV, like all good things, is here to stay. Eventually refinements will be made, the circuits will be simplified, and repairs will be easier to make. At this pioneer stage, servicing is strange and sometimes rough. This doesn't mean it can't be handled—because, eventually you are the fellow who will have to cope with it. Sooner or later color is your problem—so don't be afraid of color TV. —36—

Circuits may differ—but the technique of changing tubes is an attempt to localize a fault is a familiar procedure that works with any type of equipment.

