

An open mind is one of the most important tools in fault analysis.

JACK DARR, SERVICE EDITOR

ONE OF THE LAST LETTERS IN A BIG batch of Clinic mail was a simple one. A young man in Virginia had a Sanyo with what seemed to be two obvious faults. The trouble was that he didn't recognize them! I answered the letter, giving him what seemed to be the most likely causes, and suggesting some test methods. After I got through though, I began to get mad!

Not at the young reader. He had located the key symptoms, but he did not know what caused them. I get a lot of letters just like that; the writers already have the keys but they don't know it. That's what made me angry; not at them but at the *training* they had received. Either the school they went to, the person who wrote the correspondence course, or someone else, had failed to give them the one important technique they needed: fault analysis! So, due to this gap in their education they were unable to complete the troubleshooting process.

Let's go over the actual case. The reader from Virginia said: "I've got a

Sanyo 91C78 with power-supply problems. All the DC voltages from the fly-back are missing, and the +120-volt source reads about +160 volts. What's causing this?"

Ever since the first article I ever wrote (in 1947) I've preached one thing: "Check the DC power supply *first!*" If that is bad, nothing else can work.

This set has the customary regulated DC power supply, supplying about +155 volts from a half-wave rectifier (see Fig. 1). Pass transistor Q901 drops that voltage to +120 volts and it's controlled by the usual error amp and driver (Q002 and Q001). If the B+ voltage is the full supply value, the pass transistor is either dead-shortened or turned on so hard that it is saturated. The most common problem is a shorted transistor. I told him to check this stage first, and find out why it wasn't working.

With the DC power supply at that level, it seemed to be running with no load at all. That usually blows up the horizontal-output transistor. From the

no-load symptom, I suspected that it had been blown open. A shorted transistor would have loaded the DC-power supply down and possibly blown the line fuse. I suggested he take the horizontal-output transistor out (which would make it easier to test anyhow), and leave it out until he could get the DC power supply working. For safety's sake, I recommended that he plug the set into a variable-voltage line transformer, and bring the line voltage up slowly, monitoring the +120-volt source.

There's one and, as far as I know, just one practical way to attack problems like this. Note the symptoms, take some test voltage readings (he did that) and sit back and think about it. Look at the symptoms, figure out what could have caused them, and then check those things out. If your initial idea was right, great! If not, simply say to yourself: "Well, that eliminates those parts. Now, what else could be doing that?" Keep checking and thinking until you find the source of your problem. That takes far less time than it sounds. The one indispensable tool you must have, and *use* is a completely open mind! Do not make up your mind in advance that the fault has to be one particular thing. If you do, you'll spend your precious testing time trying to prove that you're right and not trying to find out what's really wrong. What's wrong makes no difference; your job is to find the problem and fix it.

It isn't easy! I can assure you of that after many years' experience of doing things the hard way. However, if you will give it a fair try, you'll find that things go a lot more smoothly.

More on Zenith 19EC45 vertical problem

In the February Service Questions (*Radio-Electronics*, February 1981) we had a query dealing with a repeated vertical problem on a Zenith 19EC45.

John B. Richards of Aurora, CO says that "the repeated transistor failure in the vertical board of Zenith 19EC45 is a 'generic' problem! Zenith has noted that and has redesigned the board with a better heat-sink. A re-manufactured PC board from Zenith is almost a must to clear up the problem."

Thanks a lot, John. That kind of feedback from the field is a great help to all of us.

R-E

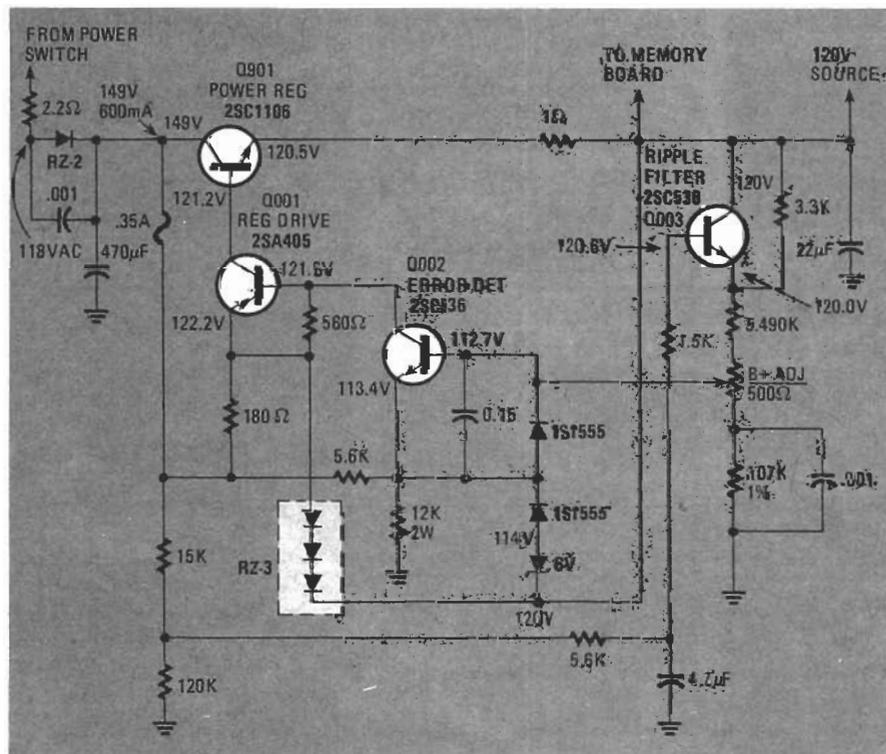


FIG. 1