Art's TV Shop

By Art Margolis

CHECKING TUBE NATIONALITY

AS SOON as I cut the engine of my van, I could hear voices coming from my service shop. I recognized one loud bellow as my bench assistant's war cry. And if that was Harry Harris, the other kung-fu style yells had to be coming from Joe Wong, chief chef from the diner up the street.

As I ran into the shop, sure enough, little Harry was squared off with an even littler Joe. The two looked like caricatures of old enemies determined to relive World War II.

"Hold it!" I yelled. "Okay, what's the problem this time?"

Harry was quick on the uptake. "Art, this guy is trying to make me look like a dope. He says I did something to his TV set." Harry pointed to a 17-inch, made-in-Japan Magnavox TV receiver sitting on the service counter.

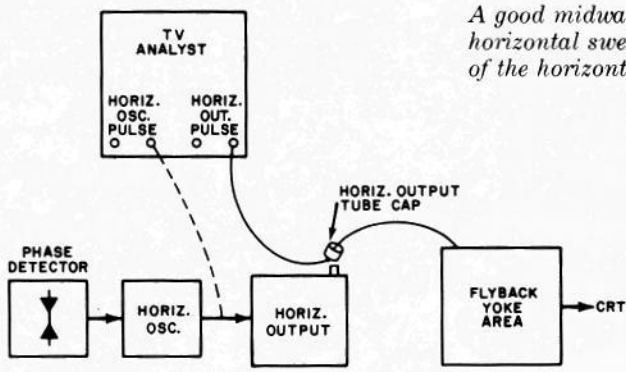
Joe threw out his chest and snarled, "*Look* like a dope — you *are* a dope! You can't even change a tube without breaking something."

Holding up my hand, I yelled, "Peace!" Harry went behind the counter, while Joe glared belligerently, hands firmly planted on hips.

Sound But No Picture. The back of the black-and-white receiver was off, and the horizontal output tube was out of its socket. A couple of new replacement tubes lay alongside the set. Before I could get in a question edgewise, Joe said angrily, "The picture went out last night, leaving just the sound. So, I brought the set in a little while ago and checked out the tubes. The 21KA6 tested bad. Then I made the mistake of asking this dunce to change it for me. He must have broken something because now the new tube won't work."

I looked at Harry, who answered defensively, "Honest, Art, all I did was pull the old one and put in a new tube. In fact, I even tried three new tubes. None of them worked." Casting a glance at Joe, Harry continued with a miserable expression on his face, "He said when I come for lunch he's gonna slip something into my soup."

Tuning out Harry and Joe, I slipped a new tube into the empty socket and turned on the receiver. After a slight warm-up period, the sound blasted out loud and clear. I turned down the volume to a listenable level. The replacement 21KA6 tube's filaments were glowing, but there was no brightness on the TV screen.



A good midway test point in the horizontal sweep system is cap of the horizontal output tube.

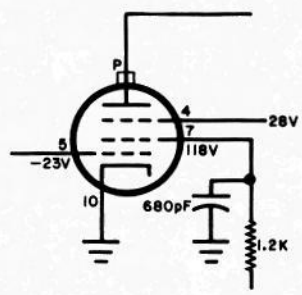
Picking up a neon lamp fastened to the end of a long stick, I poked around the cap of the horizontal output tube to test for r-f emanations. The lamp didn't fire. That meant the high-voltage system wasn't producing.

Since the HV system encompasses the horizontal phase detector, oscillator, output, and flyback-yoke circuits, I now had to narrow down the suspect area. I brought my B & K Analyst over to the workbench. I knew through long experience that a good midway test point would be the cap of the horizontal output tube. So, I put a substitute horizontal pulse from the Analyst on the tube's cap. When I turned on the Analyst and receiver, a bright raster appeared on the picture tube screen. Obviously, the flyback-yoke area was operating properly — with the substitute signal. Somehow, the receiver's own signal was being lost.

Next, I took a horizontal control grid signal from the Analyst, injecting it into the pin-4 control-grid lug on the tube socket. This time no raster. Since a raster did appear during injection to the plate but not during injection to the grid, the trouble had to be between these two points.

Harry was looking morose, and Joe had an ear-to-ear grin that neatly displayed his pearly-whites. Suddenly, Harry disappeared into the inner sanctum, as I reached for my voltmeter. Without a word, Harry returned and handed me the schematic of the TV receiver.

It was time to check the B voltages being applied to the 21KA6 tube. Setting the receiver on its side so that I could get at the bottom of the tube socket, I once again turned on the power. The tube's cathode pin was grounded, and the socket itself looked to be in good condition. Pin 4, the suppressor grid, according to the schematic was supposed to be at 28 volts. On the meter, it was 80 volts. Pin 7, the screen grid, was supposed to be at 118 volts; it measured 125 volts. Aha! A couple of differences — one of them rather large — from what the schematic prescribed.



Voltages measured on the 21KA6 in the set.

All this time, Harry and Joe stared silently, waiting for some word. It was

hard to do, but I kept a straight face All I did was grunt, "Uh huh."

Voltage Symptoms. The two grid had elevated voltages. Now, how could that occur. I took a voltag check on the other side of th 1200-ohm screen-grid resistor. Th voltmeter read 125 volts. There wa no voltage drop across the resisto and that meant that no current wa being drawn. There was obviously n tube conduction. But why?

If the control grid has too high negative bias, I reasoned, this coul occur. Taking a voltage reading a control grid pin 5, I noted that it regis tered the proper −23-volt level Scratch that possibility.

I rearranged the tubes and boxe Harry had left on the counter an thought over the problem and symp toms. The cathode and all three gri circuits in the TV receiver were good So, the trouble had to be in the tube themselves.

I pulled the RCA tube manual fron beneath the counter and looked u the 21KA6 tube. The manual directe me to refer to the type 16KA6 tube which I did. And then I saw the prob lem. The RCA tube had the scree grid tied to pin 3. The Magnavo schematic showed the 118-volt lin tied to pin 7, while pin 7 on the RC tube was blank. The B voltage on pi 7 of the receiver's tube socket was a a dead end! This line had to be sol dered to pin 3 to turn on th American-made tube.

Here were two tubes, one Japanese and one American-made, with the same number, same characteristics and switched around screen-gri connections.

As I soldered a small length of wire from pin 7 to pin 3 of the tube socket I didn't say a word. With the modifica tion made and power turned on, a good bright picture appeared.

Harry came alive first. "See, there was more trouble than just the tube Right, Art?"

Joe gritted his teeth and shot back "If there was, you caused it."

My turn. "You're both wrong. There was no extra trouble, except that the Japanese and American tubes have different pin configurations. The volt age had to be rerouted."

Both men were appeased and stopped yelling at each other. Harry picked up the back of the receiver and screwed it into place. Then he pushed the repaired receiver toward Joe with a shrug.