Need an Inexpensive Test Jig?

by Bob Rose

If you service large screen TVs, you may have thought about how handy a test jig would be, especially if there's only one technician in your service center: you. Let's assume that you have just gotten a call from a customer who has a problem with the 35-inch RCA television set in her living room. You load your van and arrive at her house to discover (surprised?) that you need to bring the unit to the service center for repair. You have two choices: try to load the monster by yourself, or remove the chassis from the cabinet, and leave the cabinet in the home. If you have a test jig in your service center, you naturally choose option two. If you don't have a jig, you are faced with option one, which even under the best of circumstance involves an almost inhuman amount of work!

A jig comes in handy in other ways. It permits you pull the chassis out of a TV you have in your service center and work on it in an ergonomically beneficial setting. There is nothing like trying to work on a chassis while it is in, let us say, a large cabinet that is too big to put onto a table. Moreover, a test jig has fantastic diagnostic potential. For example, I had in my service center a 27-inch Zenith that I thought might have a defective picture tube. If I tapped on the video output circuit board, I could make the symptoms of gray raster with white retrace lines come and go. However, I couldn't make them come and go if I just tapped on the neck of the tube. Was the problem with the tube or the sophisticated video output circuit board? I pulled the chassis and hooked it up to my test jig and found that it had the same symptoms there as it did in the TV. The problem was the CRT socket. A defective CRT socket used to be a reasonably common fault. I have now seen it just twice in the last ten years. My jig, you see, kept from installing a new picture tube to solve a problem that was located elsewhere in the chassis.

What is a Test Jig?

If you are a newcomer to the world of television repair, you may not be familiar with the piece of test equipment about which I am writing. I will, therefore, take a few minutes to describe it to you. A jig is essentially a 19-inch picture tube mounted inside a cabinet that has been configured to permit you hook a television chassis to it. You configure the chassis to the jig by connecting the yokes, CRT socket, and the high voltage lead from the chassis to the jig by using a set of cables. When the connections have been established and checked, you simply fire up the chassis and use the CRT inside the jig to make whatever repairs to the chassis are necessary.

You may be wondering how the vertical and horizontal deflection circuits of, for example, a chassis from a 35-inch set could be hooked to a 19-inch picture tube. Telematic, the premier manufacturer of the jig, used a matching network, which was basically a ferrite-core transformer and a series of yoke plugs designed to mate the transformer to the chassis under repair. It also incorporated two wafer switches that permitted the tech to choose among a number of impedance settings, ensuring as smooth a match between the two as possible. The match was never perfect, but it was workable in almost all instances.

The drawback was price. Telematic sold its basic test jig for slightly less than a thousand dollars. The impedance matching transformer, focus block, and yoke connectors, of which there were dozens, were sold separately. It was possible to get a set-up that could be used for many different chassis for about $1,500.

I debated for a long time about whether to buy a Telematic jig. After all, $1,500 is a nice chunk of change. Moreover, I couldn't justify the expense because we weren't getting that many large screen TV's to repair. But I did locate a used jig what was several years old. It worked with the newer chassis, but it didn't work well. My relationship to it was tenuous, and I didn't shed a tear when it expired. When our business changed and we began to repair more and more of the larger sets, the need for such a piece of equipment became apparent, agonizingly apparent. It was then that I discovered that Telematic had gone out of business. It was a case of having the dollar, but being the proverbial day late.

A Home Brew Jig

I don't give up easily,and I kept thinking that there had to be an alternative to Telematic. I belong to two repair groups (NESDANet and Repairworld) that share information among members on a daily basis. To coin a phrase, "If you've got a question, somebody's usually got an answer." I often have to wade through 300 emails in a day, but I consider the time well spent because I get to meet lots of interesting people and have the pleasure of exchanging ideas. If you don't belong to either group, why not get off your duff and join us? Check out www.repairworld.com and www.nesda.com. You will naturally have to spend a little money to join either organization, but you'll get your money back the very first time somebody helps you to fix that dog on which you have been working. And you'll meet some really great people in the process.

Back to my story. Reading the e-mail and chatting with fellow technicians, I discovered that some were using RCA picture tubes as jigs. The more I thought about it, the more logical the practice sounded. Here's why. I have been using a Sencore CRT tester for ten years. I noted that almost all of the picture tubes I have checked use the same CRT socket, the same filament, focus, G1, and G2 settings. In other words, almost every picture tube that I have seen in the last ten years has the same base and pin-out configuration and voltage requirements. That might not be a revelation to you, but it was to me. I had just never thought about it. Moreover, my somewhat limited experience with Telematic jigs indicated that the chassis I deal with on a day-to-day basis have the same yoke impedance, which is the impedance of the vertical and horizontal yokes that you find on most any

RCA picture tube on the market. (I assume you know that RCA picture tubes come with the yoke attached that is, bonded to the neck of the tube.)

Given these facts, I decided to try my hand at it. I had a 27 inch tube (A68AEG10X01) already mounted in a bezel, the chassis having been destroyed by lightning. I dug it out of the recycle bin (I used to call it my junk pile), tested the tube, and cleaned it up. Since my recycle bin usually has what I need, I located two RCA chassis and cut the yoke connections off them.

You probably should know that I live in the heart of Zenith and RCA country. Toshiba, Hitachi, JVC, Sharp, Sanyo, and a few other brands, like Mitsubishi, show up on occasion, but the folks in this area show partiality to RCA and Zenith. I don't live in the Bible belt; I live in "the Zenith belt. I also cut the plug off a Zenith yoke and wired it to one set of the RCA yoke connections. Just to round out the connections, I configured the speakers so that I could hook them up either to Zenith or RCA chassis. If you have followed me, you know that I needed one other connection, namely a way to connect the dag of the CRT to the video output module of the chassis to be tested. I just soldered a clip lead to the existing ground strap on the RCA picture tube, making connecting the two as easy as possible. That completed, I was ready to test the setup.

I began by using a series of RCA chassis that ranged from one out of a 25-inch set to one out of a 31-inch unit. The homemade jig performed flawlessly. What do I mean? I monitored the high voltage, the temperature of the heat sink on which the horizontal output transistor was mounted, and the quality of the picture and found nothing amiss. As a matter of fact, the homemade jig worked better than my old Telematic ever did. Finally, I turned my attention to Zenith and experimented with the same number of chassis and had the same results.

I don't know about the chassis other manufacturers have put out, but at this stage I don't see why the jig wouldn't work as well with them as it did with RCA and Zenith chassis. I'll find out when I get an opportunity.

The Hook Up Arrangement

I think I need to say a few words about the hookup between the jig and chassis to be tested. Some of my acquaintances use clip leads to make the necessary connections. If it works and is safe, that's great. I prefer to use a more stable connection than a clip lead is capable of giving. That is why I cut the plug off a Zenith yoke and soldered it onto the vertical and horizontal leads I salvaged from a defunct RCA chassis. The same goes for speaker connections which, by the way, are optional. You can get by without using them. I prefer to have the speakers connected because the audio constantly reminds me that the chassis I have in front of me is "live." However, to each his own.

A Reservation

I have real reservations about hooking up a chassis in this manner and letting it play for hours on end, but I have no problems letting it play for maybe an hour at a time. I still have the thought in the back of my mind that a technician at the very least ought to do no harm. So, I monitor the chassis under test as closely as I can with that admonition in mind.

The Jig Isn't Perfect

The homemade jig isn't perfect. You can't, for example, hook a 19-inch or 21-inch chassis to it. If you do, the chassis will shut down. But then we don't pull chassis to work on those sets, do we? Most of the chassis I hooked to the jig had vertical height problems. For instance, the 25-inch ones exhibited a slight overscan, but that's no problem as long as you are aware of it. However, the chassis out of the larger sets have an underscan problem and are pulled in on the sides. The picture looks like a neat rectangle in the middle of the picture tube. That's not a problem either as long as you are aware of it. The only adjustment I had to make was to turn the G2 down, usually as far down as I could get it.

Conclusion

Now, I am not an engineer and don't pretend to be one. Which is to say I may have overlooked something of which I need to be aware. I don't think I have, but it is possible. I am a person who has always had an interest in building and experimenting. If my project works, then I am happy. If it doesn't—well, I move on to another. I am delighted with the setup I have. It's cheap; it is easy to use; and it works. What more can I say? I would, however, appreciate your feedback on my little project. I am interested in what you think and in your experience if you have tried such a set up. Let me also emphasize that I am sharing my experience with you, not telling you that you ought to go and do likewise. You'll have to make that decision for yourself.

I want to close this article with a hearty "thank you" for those who not only got me to thinking about the project but also shared their experiences with me, especially the technicians who frequent the Repairworld forum. As one of them says, "Good fixin." ■