ANTIQUE RADIOS

Antique test equipment

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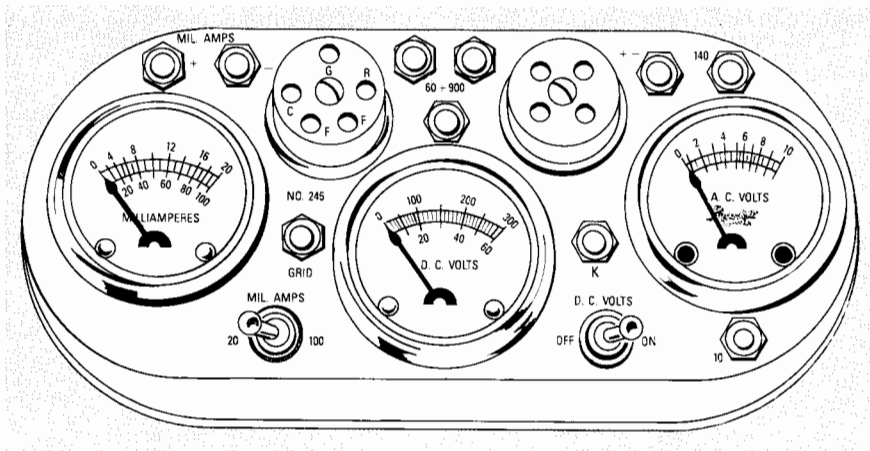

FIG. 1

TEST EQUIPMENT HAS BEEN NECESSARY as long as there have been radios, and advances in test equipment have paralleled advances in radio. But in many respects, early test instruments differ little from much of the equipment we still use every day.

Of course, when antique service equipment is mentioned, the first thing that comes to mind is the tube tester. However, many other types of service equipment were used in the early days, too. Because we've discussed tube testers in previous columns, we'll focus on other types of test equipment and early service techniques this time.

Typical problems

Opens and shorts were probably the most common problem with antique radios, but weak batteries and inadequate antennas were also very troublesome to the radioman of the 1920's and the 1930's. But during the 1930's battery problems were becoming less common due to greater distribution of AC power. And built-in antennas helped increase signal pickup without the use of an outdoor antenna.

There were then, as there are now, specific procedures for troubleshooting. Those procedures could be learned in a technical or vocational school, or even in a correspondence school. Some schools pre-date the first commercially-scheduled broadcast.

There were two types of repairmen in the early days. The trained radio repairman or "radiotrician" (of which I am one) followed specific procedures for diagnosing various symptoms. The untrained man was referred to as a tube changer. No matter what the problem was, he would immediately begin changing tubes. The radioman of the 1920's needed to carry about a dozen tubes on a service call. Those tubes took up about as much space as 100 of the miniature tubes that became available later.

Most early radiomen had little in the way of test equipment. And even a well-equipped shop didn't always have a well-trained service man. Often a radioman settled for one "pet" instrument which he mastered.

Among the equipment available was a shirt-pocket sized "illumination tester." That interesting device was very advanced for its day. It was handy for preliminary testing, anyone could afford it, and it could even test the spark plugs in your Model A! A built-in neon lamp could be used to indicate a short, an open, or the polarity of a DC voltage source.

Another valuable test instrument was the hydrometer. Yes, in the early days, when battery receivers were popular, the hydrometer was an important piece of test equipment. It is used to check the specific gravity of the electrolyte (the acid) in a battery. A weak "A" battery was the primary suspect when a radio appeared to be dead. Often a battery could be rejuvenated by adding distilled water. More than half of the problems with battery sets originated from the batteries, so most service calls were relatively routine.

And, in the later 1920's, a furniture touch-up kit was necessary to keep the elaborate cabinets that were being produced then in good shape.

Many early radiomen preferred working on battery-powered sets. They were used to them, and they felt safer working on a battery set than on an unfamiliar "electric" set. If a radio didn't operate after the batteries were serviced, the radioman would have to resort to

more sophisticated means of locating the problem.

To do that, he might use one of several test meters, or, more likely, a combination meter called an analyzer. The analyzer was the "in" piece of equipment for the radioman in the mid and late 1920's. An analyzer could cost $10, which was a great deal of money at the time.

The analyzer, which is still popular (and still expensive) for TV and other servicing, combined several meters and a component tester. Part of the reason that the analyzer was popular in the early days was that few radiomen had a car to lug a complete kit of instruments and parts on a service call. Some analyzers were so complicated to use that many servicemen never got the full benefit of them. Many analyzers were transportable.

There were many styles of portable analyzers. The tester shown in Fig. 1, for example, measures about 8 inches across and it has a leather top in which probes and test leads could be stored. The instrument could be carried in a coat pocket. It allows you to measure voltage and current in several ranges; the two sockets are for testing four- and five-prong tubes.

It's easy to see how such a light, compact unit was suitable for many of the early radioman's needs on a house call. The power supply voltage(s) could be verified, tubes could be tested either out of circuit or in (by connecting a cable from the tube socket to the analyzer). And the continuity test (even today) is the easiest method of locating shorts and opens.

After batteries, tubes were the most likely suspect in a non-functional radio. Tubes could be checked in-circuit with an analyzer, or continuity could be measured between suspected filaments. Ohmmeters were not usually a separate instrument; often a small battery was wired in series with a voltmeter to check continuity.

Often a weak tube could be rejuvenated. There's a real art to rejuvenating tubes; except for rejuvenating picture tubes, that art has gone by the wayside. Not all types of tubes were worth rejuvenating; nor could all tubes be rejuvenated. Tube filaments that were coated with oxide would emit electrons as long as some oxide remained. After the oxide evaporated, the remaining element required a greatly increased temperature to emit electrons, and that was impractical. That type of tube was usually disposed of with no attempt at rejuvenation.

On the other hand, tubes with thorium-coated elements could be rejuvenated several times. Even when the thorium coating was spent, rejuvenation was possible, because some thorium that had mixed with the metal in the filament could be brought to the surface to extend tube life. That process could be repeated until there was no thorium left. Early radiomen destroyed their share of tubes by applying an excessive voltage to the filament (a process known as flashing) trying to "wake up" some electrons that simply weren't there.

Flashing (and a similar, slower process called aging) was done with the B+ supply disconnected. That prevented the "new" electrons from being emitted right away rather than being stored for emission later. Tubes such as the WD11, the WX12, the UX171, and the UX227 have oxide-coated filaments; those tubes cannot be rejuvenated.

Even after restoring a set to minimal operation, the early radioman might find that the customer had tried to fix his own set by tampering with the set's alignment. One way of restoring alignment was to tune in a weak station and then slowly adjust trimmers for the best signal. A meter could be helpful in judging signal strength.

But for accurate alignment a test oscillator is required. Test oscillators that deliver modulated signals have been available since the 1920's. Some models then could operate from commercially-distributed AC, DC, and batteries.

Much early test equipment was well-built and housed in a fine cabinet. Much of it is still around and in perfect working condition. And it is as collectable as the antique radios we're used to talking about. Just make sure that the insulation on the wires is intact. Replace all suspect wires before attempting to use *any* antique.

As time passed, analyzers became even more important. Most radio components and terminals were moved under the chassis. Inserting test leads through holes in the tube socket became the only practical way to make measurements without removing the chassis. By 1930, a chassis might consist of three or more bulky sections that would require considerable effort to remove.

Haves and needs

Again, thanks to everyone who took time to write. Your suggestions and corrections are welcome. Please understand that I am unable to supply tubes, parts, schematics, etc. Try contacting one or more of the individuals and firms listed below for those.

- Maurer TV Sales (tubes), 29 S. 4th St., Lebanon, PA 17042.
- Byron Ladue (tubes and schematics), 13 Revere Drive, Rochester, NY 14624.
- John Grey (new and used tubes), 3348 Wildridge Rd. NE, Grand Rapids, MI 49505.
- E. G. Roundtree (parts and information), Box 269, Norris City, IL 62869.
- Antique Radio Tube Co. (tubes, parts, information), 1725 W. University, Temple, AZ 85281.
- The Vestal Press (books and information), Box 97, 320 N. Jenson Rd., Vestal, NY 13850.
- Scaramella (schematics), 37 Earl St. P. O. Box 1, Woonsocket, RI 02895-0001.
- Comtech Electronics (pre-1939 Rider manuals), P. O. Box 686, Wyandotte, MI 48192.
- Richardson Electronics (antique tubes), 3030 North River Rd., P. O. Box 424, Franklin Park, IL 60131, Attn. Ian Stewart.
- Alvin Sydnor (information), 806 Meetinghouse Rd., Boothwyn, PA 19061.
- Unity Electronics (tubes), P. O. Box 213, 107 Trumbull St., Elizabeth, NJ 07026.
- Carlos Queitoz (exchange parts and information), P. O. Box 1064, Belo Horizonte, MG Brazil.
- E. V. Schwartz (Firestone, Silvertone information), 4277 Motor Ave., Culver City, CA 90232.
- B. R. Pohue (information on antiques), Rte. 1, Box 786 No. 8, Thatcher, AZ 85552. **R-E**