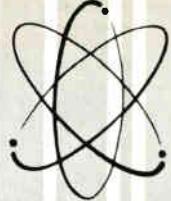




# Techni-talk

COMPLETE ELECTRONIC SERVICING INFORMATION

radio • tv • hi-fi



Vol. 15, No. 4

Winter, 1963

## THE OSCILLOSCOPE—A VALUABLE SERVICE TOOL—1

The oscilloscope is used for making measurements in those areas of troubleshooting beyond the limits of the ordinary service voltmeter. Possibly 40% of the receivers containing defects other than faulty tubes fall into this group which emphasizes the importance of utilizing the oscilloscope in these instances. If the scope is not being used to its full advantage there is no doubt but that valuable troubleshooting time is being wasted. Peak-to-peak voltage measurements of complex waveforms, hum levels, pulses of various types and the visible display of wave shapes are a few of its many uses.

Accurate alignment of R-F and I-F stages cannot be accomplished without the scope. The oscilloscope lends itself readily to various forms of a signal tracing. The source of the test signal can be the station signal itself or as an alternative, a cross hatch generator which includes synchronizing signals. Signal tracing through R-F and I-F circuits can be accomplished simply by using a sweep generator and following a procedure somewhat similar to that used in aligning those circuits.

### THE HIGH IMPEDANCE PROBE

The average service oscilloscope, in most cases, is suitable for alignment work and use in the area of troubleshooting where wave shapes and peak-to-peak voltage measurements must be obtained. For this purpose, a high impedance probe is practically a must. Due to its inherent characteristics, it presents little or no loading effect on the circuits under test, and in addition, provides the flexibility required for making rapid point-to-point checks.

As this type of probe attenuates the input signal to the scope in the order of 10 to 1, the vertical sensitivity of the scope should be approximately .02 volts rms per inch deflection. This will result in a sensitivity at the probe input of about .2 volts

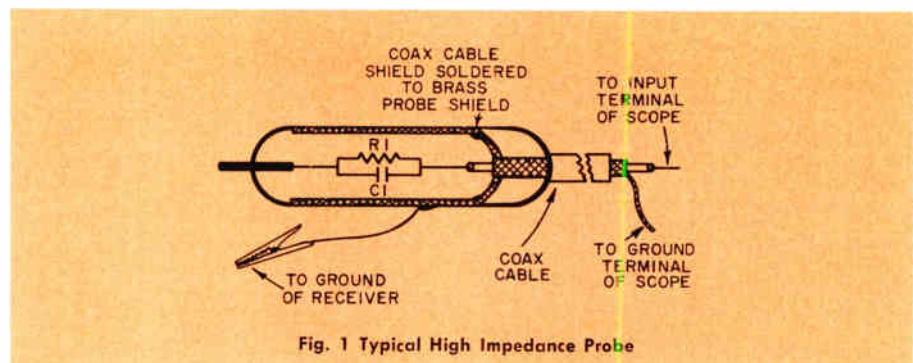


Fig. 1 Typical High Impedance Probe

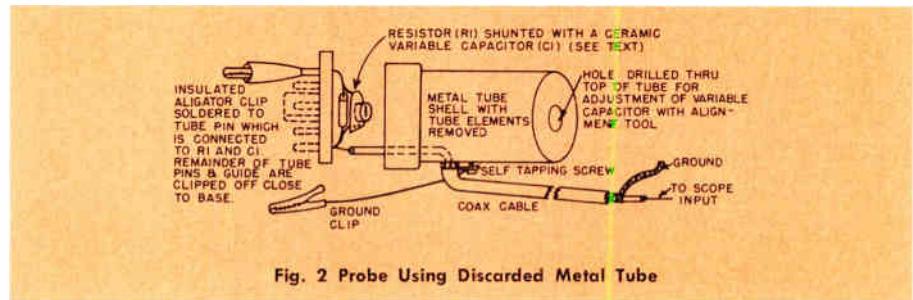


Fig. 2 Probe Using Discarded Metal Tube

rms per inch deflection which is ample for troubleshooting applications. If the scope you now have is not equipped with such a probe, you may purchase one; however, before doing so, make certain it is suitable for your particular type of scope.

Possibly, the most economical method is to purchase a probe in kit form. Several very good kits are available which are priced at less than \$5.00. Follow the assembly instructions that are furnished with these kits, however, a suitable series resistor should be selected depending upon the input resistor contained in the scope to which the probe will be attached. The probe furnished with one type of scope is illustrated in figure 1.

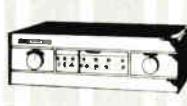
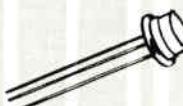
If you desire to build a probe and do not have the equipment necessary to turn-down the probe shell, a discarded metal tube can be used as illustrated in Figure 2.

Values of R1 and C1 are dependent upon the input characteristics of the

scope to which the probe is attached. Usually, R1 is ten times the value of the input resistor. This offers a high impedance to the circuit under test, however, the loss in over-all scope gain will be in the order of 10 to 1. If this reduces the scope gain below a usable level, a lower value, such as 5 times the value of the input resistor will be acceptable, keeping in mind that the lower value may cause a slight loading effect upon the circuit under test.

C1 is shunted across R1 and is usually a ceramic button type capacitor, variable from 3 to 30 mmf. This capacitor is adjusted to correct for any undesirable characteristics which mainly affect the high frequency response. Information concerning the correct adjustment of this capacitor will be given in the next issue.

Regardless of whether you purchase or build the probe, its frequency response should be checked as suggested in the next issue.





## BENCH NOTES

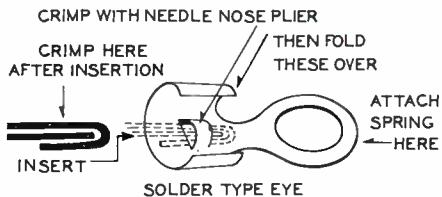
### GE "M4" CHASSIS

**Symptom:** Picture size (vertical) too great even with height and linearity controls set for minimum size. Top portion of picture stretched too high and cannot be brought down.

**Cause:** C205 .033/200v condenser (in 6DN7 circuit) slightly leaky. Replace with 400v unit.

**Bill Fisher**  
FISHER TV  
760 S. 5th Ave.  
Mt. Vernon, N. Y.

### DIAL CORD CLAMP



I have found a handy substitute for clamping dial cord ends together where the spring on the dial drum attaches. By using a solder type eye and inserting the dial cord into it as illustrated below makes a strong and efficient connection stronger than the original.

By using this arrangement you keep the strain off the dial cord where the spring attaches.

**Curtis E. Denmark, Jr.**  
P. O. Box 8291  
Orlando, Florida

### SPEAKER CONE REPAIR

I have found that some of the newer cements that come in tubes do a much better speaker repair job than the conventional lacquer based glues. Lacquer based cements dry hard and sometimes affect response of speakers, especially mid range and woofer. The newer cements (check the information on the tube), dry with a rubbery affect. A large tube sells for about \$.39.

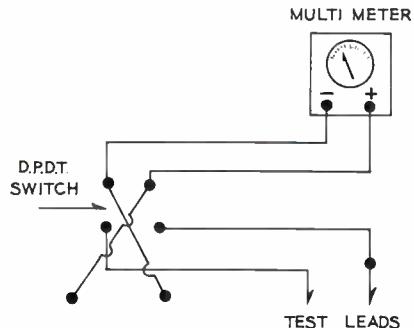
**Fred W. Rivette**  
120 Percy St.  
Syracuse 4, N. Y.

### TUBE SOCKET CONTACTS

A quick remedy for an octal tube socket not making good contact is to use the slotted end of a soldering aid (G-E ETR-2377) to bend the socket lugs to a smaller diameter. They will then contact the tube pins properly.

**Russell V. Book**  
6803 Navarre Rd., S.W.  
Massillon, Ohio

### REVERSE METER POLARITY



In trouble shooting two-way mobile radio receivers, it happens that while measuring negative voltages with the multimeter, you run across positive voltages or vice versa. This means having to unplug and replug in the leads at the meter each time, which shortens the life of the meter jacks. To prevent this and the annoyance of switching leads at the meter, I have a pair of leads hooked to the jacks of the meter, then to a double pole double throw switch. From the center connections I run my test leads for test probing. Thus as voltages shift from positive or negative, I simply flip the switch to get the right-direction reading at the meter and this avoids need for unplugging and plugging the leads into the meter.

**S. Clark**  
Box 2162  
East Bradenton, Florida

### SUBSTITUTE SPRAY CAN NOZZLES

The Polyethylene insulation used in HV lead wire is a perfect fit for most spray can caps and much more pliant.

**Burton A. Cobb**  
Dave's Radio & TV  
4800 MacArthur Blvd.  
Oakland, Calif.

### REMOVING IRON CORES

Select the Philips screwdriver for the proper size and cut the blade to fit an electric drill and use the Philips screwdriver for a bit to drill out adjustable iron cores in R. F. coils that have been frozen or cracked. This is the easiest way to remove the old core without breaking the coil form for replacing new cores.

**Dave Benton**  
College T. V. & Electronics  
Lubbock, Texas

### CABINET BACK ALIGNMENT

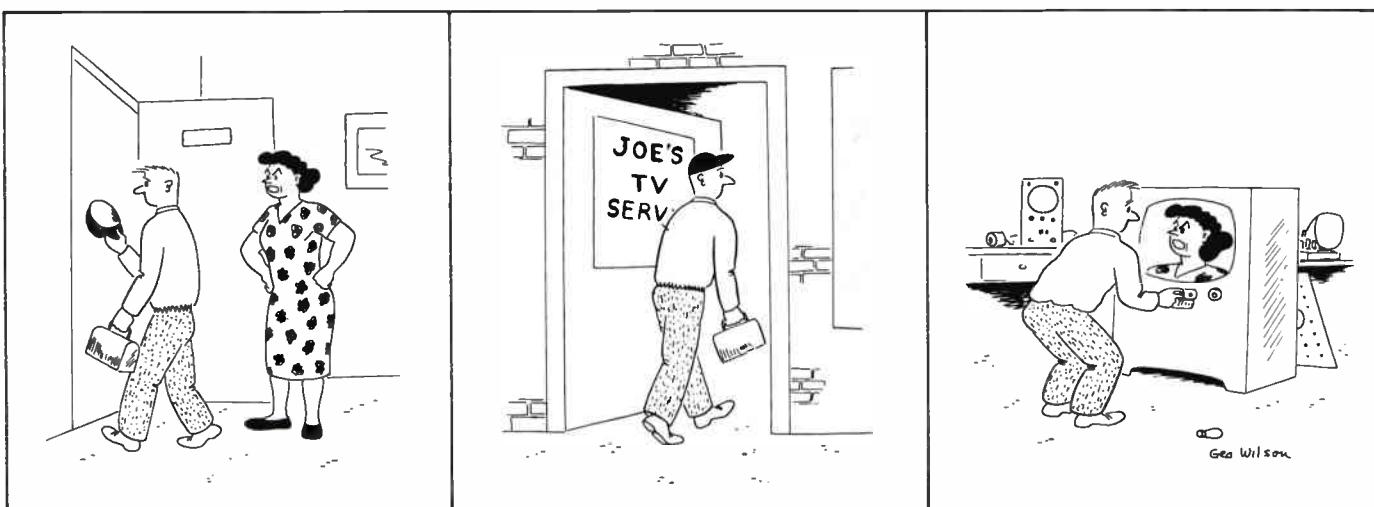
Considerable difficulty and time loss arises when attempting to replace the television cabinet back, on models using plastic extensions for the rear adjustment knobs. Reference: G. E. Model 17TO27.

The problem exists due to the plastic extensions not re-aligning properly with the adjustment holes in the cabinet once the cabinet back has been removed. This difficulty is easily solved by slipping small lengths of plastic tubing (spaghetti) over the extensions, then slipping these extensions through the correct holes as the back is brought close to the fastening position at the cabinet. When cabinet back is secured, slip protruding spaghetti off—job done!

**J. G. Hamlett**  
330 Everingham Rd.  
Syracuse 5, New York

### Note:

Those desiring to have letters published in this column should write the Editor, Techni-Talk, Electronic Components Division, General Electric Company, Owensboro, Kentucky. For each such letter selected for publication you will receive \$10.00 worth of General Electric tubes. In the event of duplicate or similar items, selection will be made by the Editor and his decision will be final. The Company shall have the unlimited right without obligation to publish or otherwise use any idea or suggestion sent to this column. Caution: The ideas and suggestions expressed in this column are those of the individual writers. These ideas and suggestions have not been tried by the General Electric Company and therefore are not endorsed, sponsored or recommended.



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All hardware and attachments, corners, hinges, reinforcements, catches, handle posts, etc., are made of heavy nickel plated steel stock guaranteed to give long wear. A new type of nickel plated "spring up and spring down" snap catch is easy to operate. The solid Bakelite handle is heavier and stronger and is guaranteed against breakage.

The new G-E armored vinyl Service Case ETR-3750 has been designed to look like a fine piece of luggage and at the same time give long wear and satisfactory service. If you want a service case that can really "take it" ask your distributor for ETR-3750 or use the order coupon on page 11. The price is only \$16.95.

## New Tele-Clue Publication



If you don't already have a copy of the new General Electric 101 Tele-Clue booklet, you may be wasting good service time. ETR-3700 is pocket size, 4 1/2" x 8 1/2", so it can be carried with you on all service work.

This publication is a new 60-page booklet containing 101 Tele-Clues plus "M4," "MX" and "U4" schematics. Tele-Clues are actual unretouched photographs of picture distortions caused by defective circuit components.

Get this useful booklet from your General Electric tube distributor and carry it with you on all service calls. More than half the time required to service a TV receiver is spent in determining the circuit and component causing trouble. The 101 Tele-Clue booklet should considerably reduce this time. Ask your distributor for a copy of ETR-3700 or use the coupon on page 11. The price is only \$1.00 per copy.



## Techni-talk



Vol. 15, No. 4

Winter, 1963

### In this issue:

	Page
The Oscilloscope — A Valuable Service Tool — I.....	1
Bench Notes .....	2
Complete Index of Techni-Talk Vol. 1, No. 1 through Vol. 15, No. 4.....	3
Dealer Business Aids.....	5
1964 TV Service Manual	
Subscription Plans .....	11

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