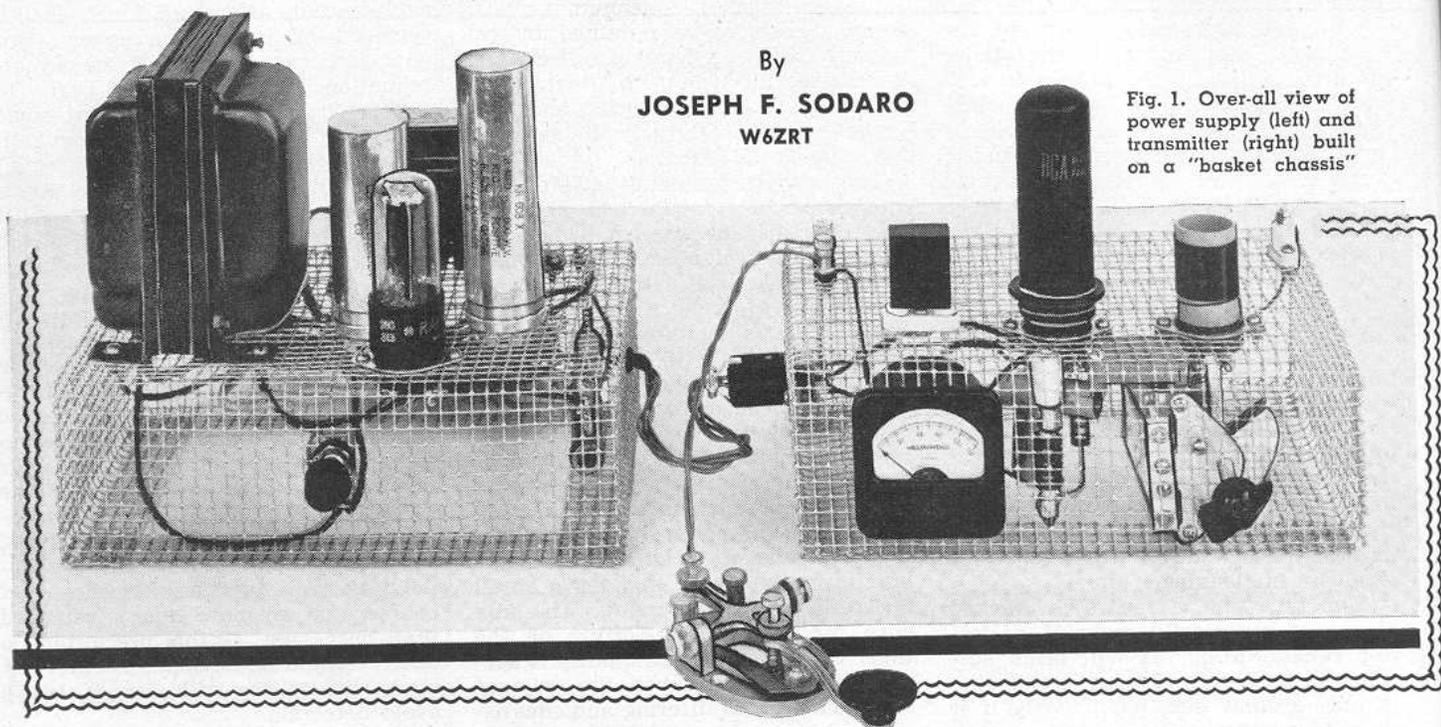


# A "BASKET CHASSIS" TRANSMITTER

By  
**JOSEPH F. SODARO**  
W6ZRT

Fig. 1. Over-all view of power supply (left) and transmitter (right) built on a "basket chassis"



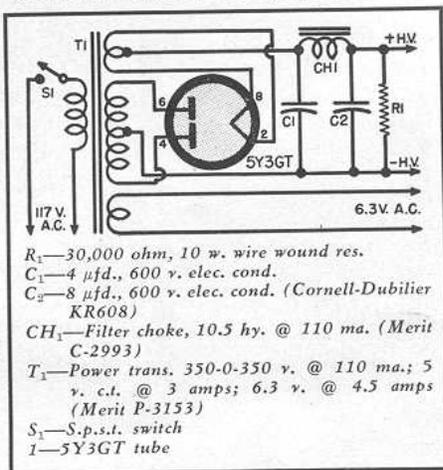
*A simple construction technique that can be applied to a variety of experimental projects at minimum expense.*

**A**MONG other problems which confront the newcomer to the amateur ranks is that of equipment construction. He has the choice of either building his first transmitter on a wooden breadboard or on a sheetmetal chassis. The breadboard lacks shielding and presents exposed wiring and shock hazard. Furthermore, some parts cannot be conveniently mounted on this type of chassis without special brackets and angles. On the other hand, the metal chassis requires special tools and a knowledge of the use of these tools. Even when drills, hand-saws, hole punches, and other tools are available there's the problem of irregularly shaped openings which usually require drilling around the periphery of the opening followed by filing. If a prefabricated chassis of suitable dimensions is not available, the sheetmetal cutting and bending problems are added to this complex procedure.

With these problems in mind a search was made to find a chassis material which would simplify electronic equipment construction for those with limited facilities. The basket chassis described in this article was developed and used in the construction of a low power transmitter as a first application. This construction technique requires only simple hand tools and a minimum of effort. It goes together like "a Christmas toy designed for any eight year old boy."

The material used in the construction of the basket chassis is ¼-inch hardware cloth. This material seems to have the desired electrical and mechanical characteristics. It is easy to cut with tin shears or diagonal cutting pliers. It can be formed by hand and "woven" into a solid structure by bending or wrapping the wire ends using long nose pliers. Mounting holes are simply opened with diagonal cutters. Mounting screw holes and feed-through holes are available everywhere. It is sufficiently continuous to provide electrical shielding at most

Fig. 2. Power supply suitable for use with transmitter described. Any supply which gives 400 volts at 100 ma. can be used.



frequencies. It is inexpensive and readily available.

Although any size hardware cloth can be used, the ¼-inch spacing probably gives maximum strength and shielding without excessively close wire spacing. The cross-hatch design is helpful in layout, and the ¼-inch units afford an approximate measure which is often adequate for parts location.

Parts mounting and hookup is simpler with the basket chassis because this process can be observed through the loops in the hardware cloth. This transparency eliminates dark corners and permits a higher concentration of parts. In addition this feature allows the observance of almost all parts on either side of the chassis during proven. Thus, overheating or arcing can be quickly detected. Furthermore, this feature makes the equipment particularly well suited for demonstration or instruction purposes. Finally, the mesh material allows better ventilation.

## Chassis Construction

The only tools required for the construction of the chassis are tin shears, long nose pliers, and diagonal cutters. As a first step, the material is cut to size. For the 9-inch by 6-inch chassis used for this transmitter and power supply the over-all dimensions are 17 inches by 14 inches. This allows three inches for depth and one inch for a flange. In this first cut the material should be close trimmed to remove all wire stubs. In the second cut remove four inch squares from the four corners. In this case maximum wire stub length is allowed. These stubs

are later used to weave the corners together.

Next, bend up the one inch flange at right angles as shown in Fig. 3. The line of bend can be made straight by following the wire one inch from the edge. The edge straightness and sharpness can be improved by working against a wooden block as shown in this photograph. For the chassis shown, bending was done entirely by hand. Edge sharpness can be further improved, if desired, by using a light hammer.

After the chassis has been bent to approximate shape the corners can be formed. Draw together those wires which will form the vertical edge of the chassis, and wrap around the wire stubs so as to fix this edge. Repeat this procedure for each corner. The overlay of the flange can be fixed in the same way with stubs wrapped about either horizontal or vertical wires. The transmitter chassis was completed from sheet material in 45 minutes.

Heavy components were mounted on the power supply chassis without excessive sag. However, if in a larger size chassis this should become a problem, the surface can be reinforced with small stiffeners at the points of weight concentration.

Screen compartments can be added in a similar manner, if desired. For example the transmitter coil can be shielded by a hardware cloth enclosure. Similarly, sections of the chassis could be isolated by weaving in hardware cloth enclosures. Another possibility would be the addition of a front panel if desired. The only precaution to observe in designing these adjuncts is that of allowing stub length wherever a joint is to be made to the chassis proper.

### Transmitter Construction

The transmitter is a 6L6 in a conventional crystal oscillator. The schematic and parts list are shown in Fig. 4. Shunt feed is used to keep high voltage within the chassis. A 0-100 mil-

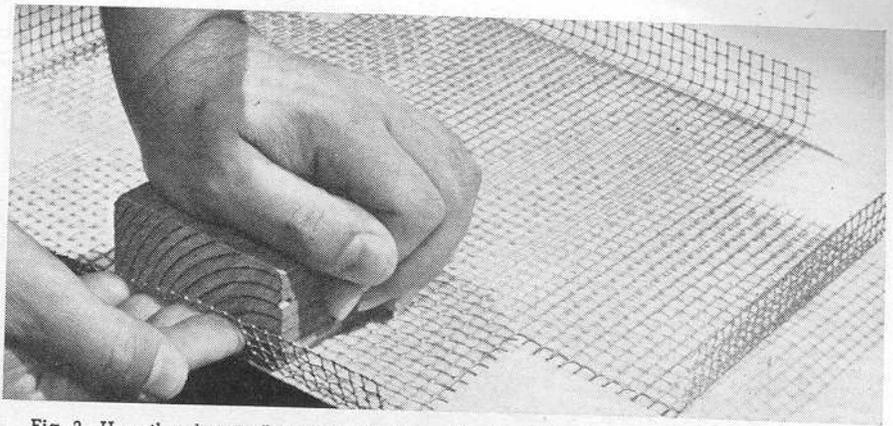


Fig. 3. How the chassis flange can be formed by hand by bending the material against a wooden block. If unusually heavy components are to be mounted on a "basket chassis" stiffeners, in the form of additional pieces of the hardware cloth, may be fixed to the chassis by working the wire stubs into the chassis surface. These structures could also be used to form shielded compartments within the chassis proper.

liammeter is used for tuning and loading indications. The plate circuit coil is tapped for coupling to a simple voltage feed antenna. Keying is in the negative high voltage lead. Any power supply capable of approximately 400 volts at 100 milliamperes with good regulation and 6.3 volts at 0.9 ampere can be used. A power supply, Fig. 2, has been included for those who wish to build one.

The power supply uses a full-wave rectifier and simple filter with bleeder resistor. The schematic and parts list for the power supply are shown in Fig. 2.

### Construction

The arrangement of component parts is shown in Fig. 5. First, lay out the parts for short lead length, then make the openings for mounting. Openings are cut by means of diagonal cutters. No difficulty was encountered in opening mounting holes for any of the parts. The tube and crystal sockets were held on the opposite side while openings were cut. By this means each opening was cut to the required shape without outline markings.

Parts were mounted with 6-32 or

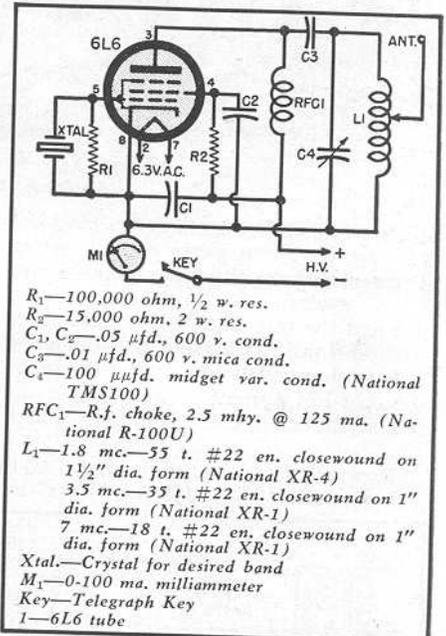
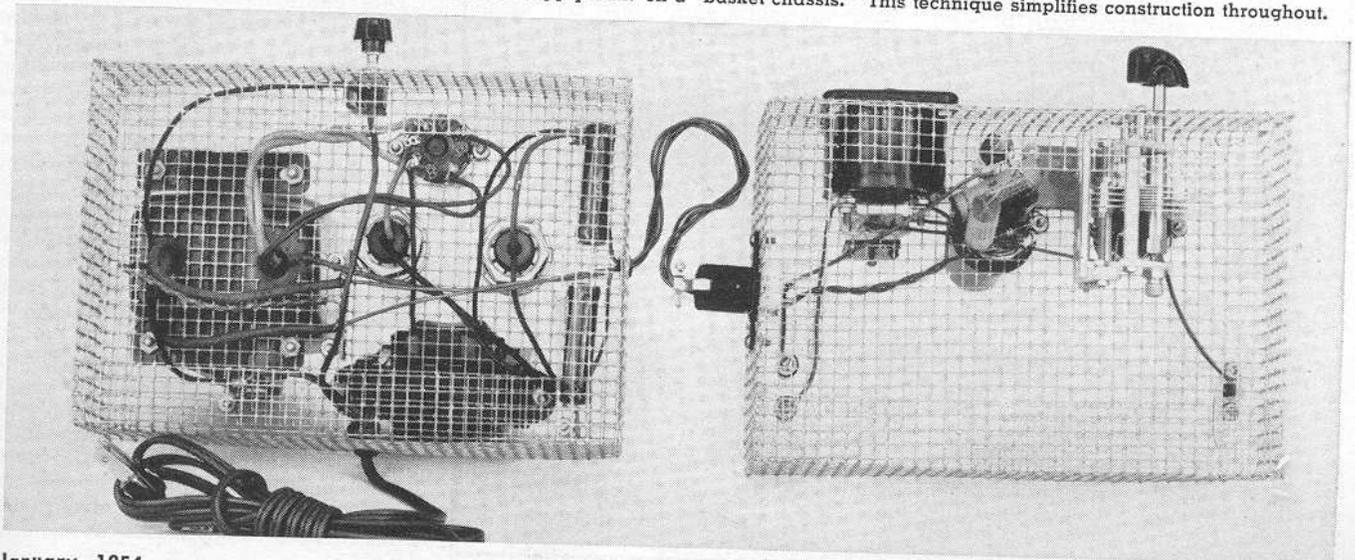


Fig. 4. Schematic of the low power transmitter which can operate on 1.8 mc., 3.5 mc., or 7 mc. See Fig. 2 for power supply.

8-32 machine screws of  $\frac{3}{8}$  to 1 inch  
(Continued on page 107)

Fig. 5. Underchassis view of the transmitter power supply built on a "basket chassis." This technique simplifies construction throughout.



that one or the other of these tube grids can have the vertical scanning frequency impressed on it.

To remedy this, redress this lead away from the audio grids. —50—

### The "Basket Chassis" (Continued from page 43)

lengths. Round head screws were used, but binder head screws probably are preferable.

Feedthrough leads should be protected by forcing ¼-inch rubber grommets into the mesh at the feedthrough point. This method was used to protect the a.c. input and power output cables on the power supply.

#### Adjustment

After constructing the power supply, operate this unit without connection to the transmitter. If there are no indications of overheating it is probable that the unit has been correctly wired. If a voltmeter is available this conclusion can be verified by measuring output voltages. These may measure slightly high since load currents are not being drawn. A d.c. output of 440 volts was measured for the power supply shown.

After connecting the transmitter to the power supply wait for about a minute for the tube to warm up. Without the antenna connected and with the proper plate coil in the socket, press the key and rotate the tuning condenser, C., until oscillation is indicated by a dip in the plate current reading.

This transmitter was designed for use with a simple voltage feed antenna. This type of antenna consists of a single wire cut to the operating frequency. The approximate lengths are 260 feet for the 1.8 mc. band, 126 feet for the 3.5 mc. band, and 66 feet for the 7 mc. band.

The antenna can now be connected, and the key closed. Once more rotate the tuning condenser until the plate current dips. With maximum coupling this dip will be slight. To increase the coupling move the tap toward the plate end of the coil. To decrease the coupling move the tap away from the plate end of the coil. The tap connection is made by carefully sanding away the enamel insulation from the turns and soldering the tap to a suitable turn. Be careful not to short adjacent turns.

Power output is dependent upon applied voltage and the ability of the transmitter to accept loading. Excessive loading may stop oscillations. This limitation is dependent upon circuit components and arrangement. After loading and tuning, key the transmitter to be sure that the circuit keys well. If keying is poor decrease antenna coupling slightly. An output of 15 to 20 watts can be expected in most cases. The unit shown draws approximately 15 milliamperes unloaded and 60 milliamperes with the antenna attached. —50—

January, 1954

# MAKE MORE MONEY ON SERVICE!

## TELEVISION • RADIO • ELECTRONIC



Learn to handle ANY job easier, better and lots FASTER this modern professional way!

ONLY \$12 FOR THE COMPLETE TRAINING *You Save \$125*

THESE two big, fact-packed Ghirardi training books make it easy for you to become expert on all types of home radio and television receiver service—at absolute minimum cost!

Ask the men who already have good-pay jobs! They'll tell you that Ghirardi training is the finest—AT ANY PRICE—because it is so outstandingly complete, and because it makes even the

toughest subjects so easy to understand.

Each of these two books is entirely new, completely modern in every respect—NOT a re-hash of old, outmoded material. Together, they form a complete service library written so you can easily understand every word—and designed to serve either as a complete training course or as a handy reference for experienced servicemen who want to look up puzzling jobs or develop new and faster methods.

### Learn all about Circuits... AND WATCH SERVICE "HEADACHES" DISAPPEAR

Years of experience plus hundreds of talks with service technicians proved to Mr. Ghirardi the need for a book that got right down to earth in explaining the basic circuits and operation of modern radio and television receivers. Radio & Television Receiver Circuitry and Operation is the result. Backed by what you can learn from it, you'll find that 9 out of 10 service jobs are tremendously simplified. You'll work faster with less testing—and make more money in the bargain! Guesswork is eliminated.

Starting with AM and FM processes and characteristics, the book

progresses to a complete understanding of basic circuits, how they operate, how to recognize them quickly and what is likely to go wrong with them. By making it easy for you to understand each circuit and its relation to other circuits, the book helps you go right to the seat of trouble in far less time. You'll know what different trouble symptoms mean—and you'll know how to repair troubles lots faster and more efficiently.

Sold separately for \$6.50. Try it for 10 days on our FREE examination offer.

### Complete Training in MODERN, PROFESSIONAL SERVICE METHODS

This big book makes the tough service jobs easy, makes the easy ones a cinch!

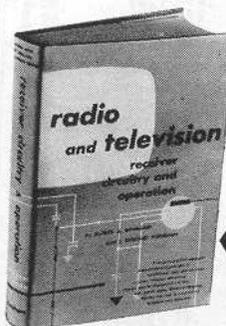
Actually, Radio & Television Receiver TROUBLESHOOTING AND REPAIR is a complete guide to modern professional service methods.

First you get a full analysis of components, their functions, their troubles and their remedies. Next you learn modern troubleshooting methods—from "static" tests to dynamic signal tracing and injection techniques. You learn basic procedures and how to interpret performance data. Four big chapters show how to realign Television, FM and AM receivers in less time. You'll learn how a glance at a TV set may quickly tell you what is wrong. Special hard-to-fix service problems are explained. Puzzling "intermittent" troubles and their remedies are clearly outlined. Step-by-step service procedure charts

demonstrate many operations almost at a glance. In short, from the simplest troubles to the most difficult ones, nothing has been omitted—nothing has been condensed. Everything is carefully explained—and the entire book is fully indexed so you can find exactly what you want in a jiffy.

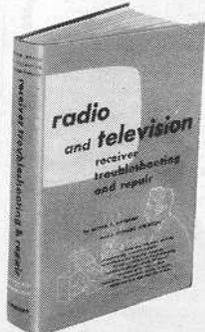
Read it 10 days FREE! See for yourself how this great book can pave your way for bigger pay. Sold separately for \$6.75. Save money by ordering special combination offer.

**PRACTICE 10 DAYS FREE!**



Radio and Television Receiver **CIRCUITRY AND OPERATION**

By Ghirardi and Johnson  
669 pages, 417 helpful illustrations



Radio and Television Receiver **TROUBLESHOOTING AND REPAIR**

By Ghirardi and Johnson  
822 pages, 417 clear illustrations

## SPECIAL money-saving OFFER!

Save \$1.25 by ordering both of the above big books. Make your service library complete!

Dept. RN-14, Rinehart Books, Inc., Technical Division, 232 Madison Ave., New York 16, N. Y.  
Send books below for 10-day FREE EXAMINATION. In 10 days, I will either remit price as indicated or return books postpaid and owe you nothing.

Check here to order books singly:  
 Radio & TV Receiver **CIRCUITRY & OPERATION** (Price \$6.50 separately)  
 Radio & TV Receiver **TROUBLESHOOTING & REPAIR** (Price \$6.75 separately)  
 Check here for MONEY SAVING COMBINATION Save \$1.25!

Both of the above big books at the special price of only \$12.00 for the two. (Regular price \$13.25—you save \$1.25.) Payable at the rate of \$3 after 10 days if you decide to keep books and \$3 a month thereafter until the total of \$12 has been paid.

Name .....  
Address .....  
City, Zone, State.....  
OUTSIDE U. S. A.—\$7.25 for TROUBLESHOOTING & REPAIR book; \$7.00 for CIRCUITRY & OPERATION; \$13.00 for both books. Cash with order only. Money refunded if you return books in 10 days.