RADIO & TELEVISION NEWS

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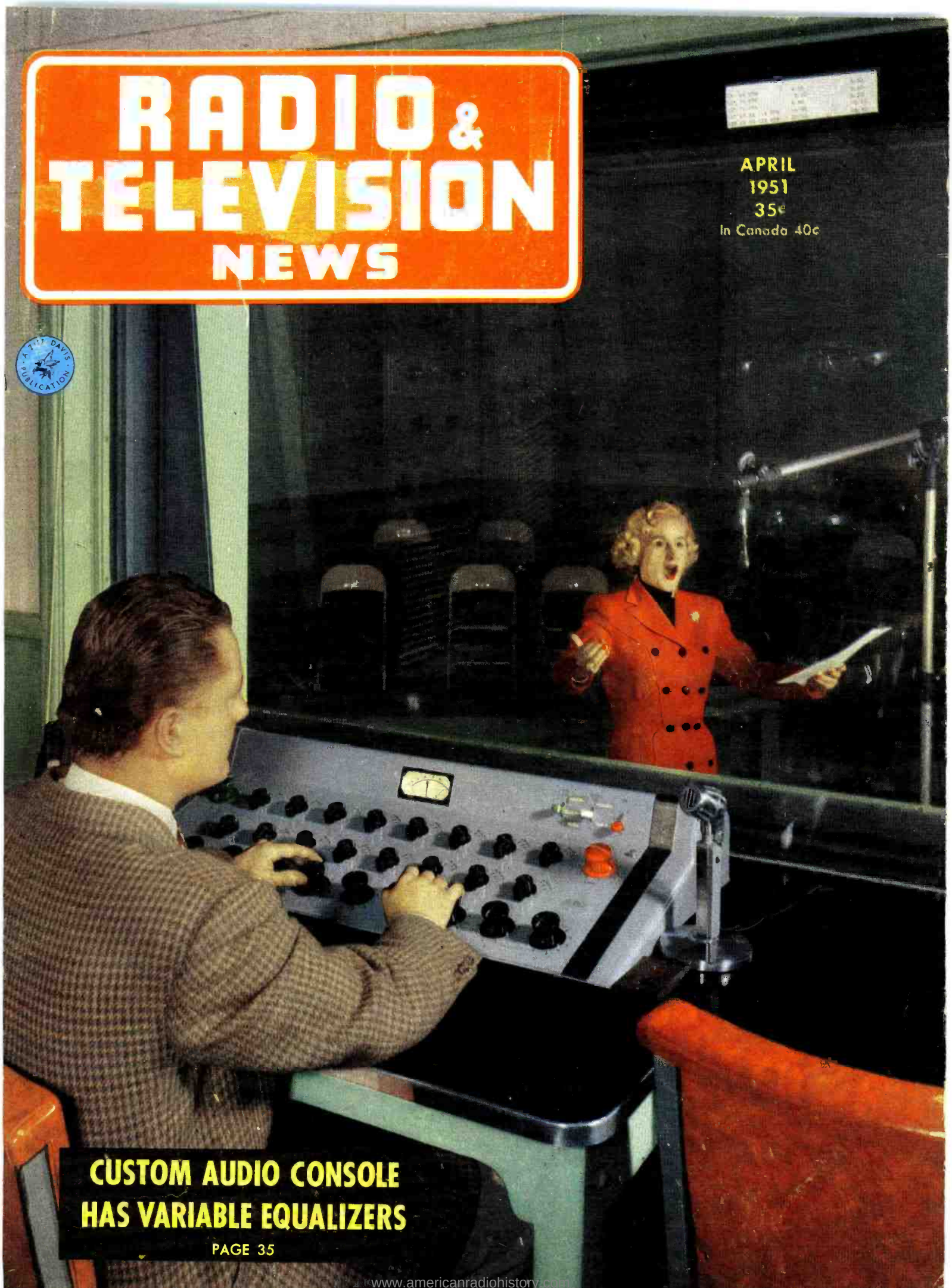

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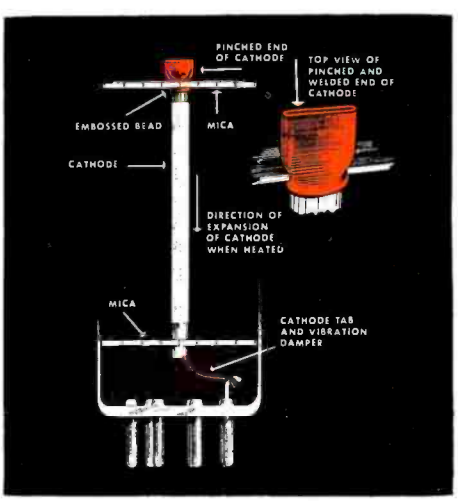

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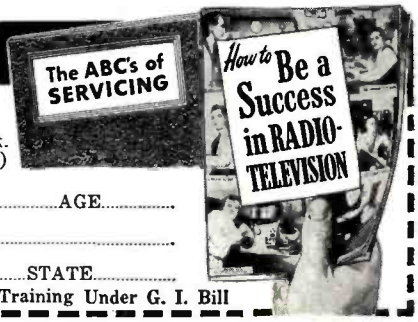

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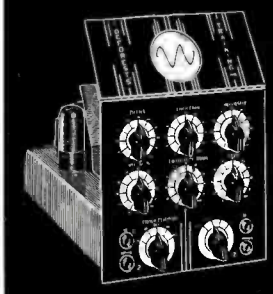
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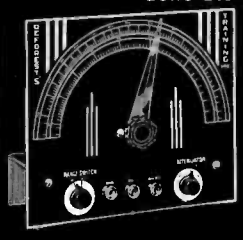
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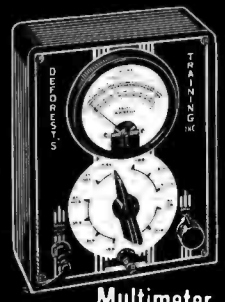
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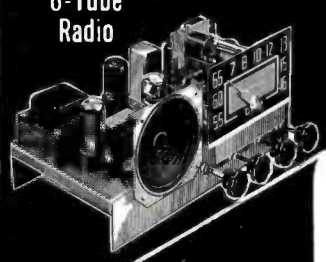
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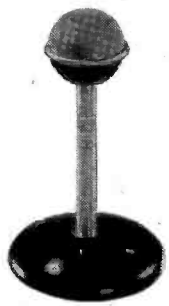

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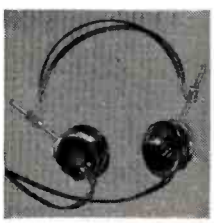

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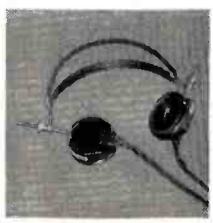

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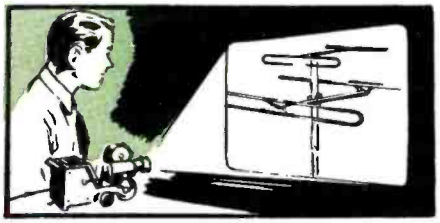

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For the RECORD

BY THE EDITOR

CIVILIAN DEFENSE AND MRO SUPPLY

TO THOSE of us who are active in Civil Defense planning comes the realization that one of the greatest obstacles facing an adequate communications system for emergencies is the lack of supplies vitally needed to maintain, repair, and operate hundreds of transmitters, receivers, transceivers, and associated equipment. Essential items, normally purchased from distributors, are already scarce as the result of production cut-backs, scare buying, and "hoarding" of hard-to-get items.

Recently we needed a set of 22½ volt "B" batteries for a BC 221 frequency meter for calibrating emergency mobile frequencies on a mobile converter. In spite of the fact that there are several large component distributors in Chicago, we were not able to locate this stock item. It took more than a week to dig up three batteries. Other items, equally vital to emergency communications, are likewise conspicuous by their absence.

A resolution to the *Electronics Products* division of the *National Production Authority* was made recently by committees of the *Association of Electronic Parts and Equipment Manufacturers*, proposing that distributors who purchase MRO (maintenance, repair, and operating) supplies from a manufacturer be restricted to a 180 day inventory; that distributors sell such MRO supplies only to customers who certify in writing that the material will be used for repair and replacement.

With many services requiring electronic equipment, it is imperative that action be taken to insure that this equipment be maintained in good working order and repair. Such action is essential to the national defense program and vital to the public interest. Communication requirements are many and varied:

The Armed Forces require vast quantities of replacement components for signal, communication, and navigation equipment, as well as for fire control and other military uses. Defense Agencies and Departments need material for monitoring, testing, communicating, policing, and other government functions. State and local governments require a backlog of components for sundry municipal purposes and laboratories for testing, research, development, and experimental uses. Much equipment is used also at technical schools. They need repair parts and equipment for development, construction, research, and similar academic projects.

In civilian defense, particularly fire, police, health, and public welfare agencies, need special equipment and a well-stocked replacement source for the maintenance of good order and the health and well-being of the community. Common carriers, too, need equipment for the conduct of vital transportation functions.

In case of serious trouble it is essential that broadcasting facilities be maintained in good operating condition for the dissemination of news and for the civilian defense effort.

Radio amateur operators play an important part in any civil defense planning. They will require material for the maintenance of a radio network vital to civil defense. Then there are the civil defense agencies which require the use of home and automobile radio and home TV receivers for the dissemination of news, information, and instruction in the event of dire or national emergency. Manufacturers of military equipment and components that require test instruments and electronic operating supplies to fabricate their products will also require allocation of critical material for civil defense purposes. Existing governmental orders, regulations, and requirements have curtailed the use of critical raw materials in the manufacture of new electronic equipment, thereby putting a greater burden on equipment now in use. This existing equipment will continue to deteriorate and cease to function unless kept in good working order and repair. Some governmental agencies have already recognized the desirability and necessity of keeping such equipment in operation by permitting a greater use of critical raw materials for the manufacture of maintenance, repair, and operating supplies than is permitted for the manufacture of new equipment. However, no regulations have, at this writing, been promulgated by which manufacturers of such supplies can acquire the critical functional raw material necessary for fabrication.

The amount of critical raw materials required to produce such maintenance and repair parts is infinitesimal in relation to the entire consumption by the industry of such critical raw materials. Yet the use of such a negligible quantity could result in keeping in good working order and repair, millions of dollars of vital electronic equipment.

The "case history" of the "B" battery is a good example of what can and will happen a thousandfold if provisions are not made now for a supply of parts and equipment for the specific needs of Civil Defense . . . . O.R.

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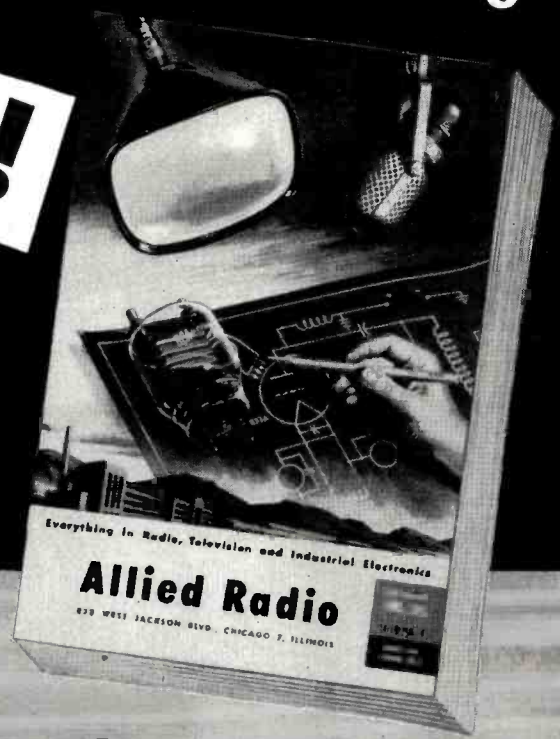

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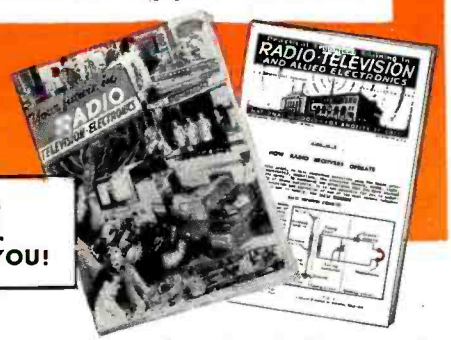

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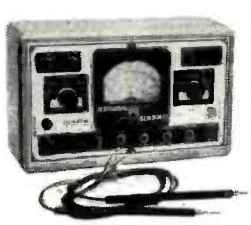

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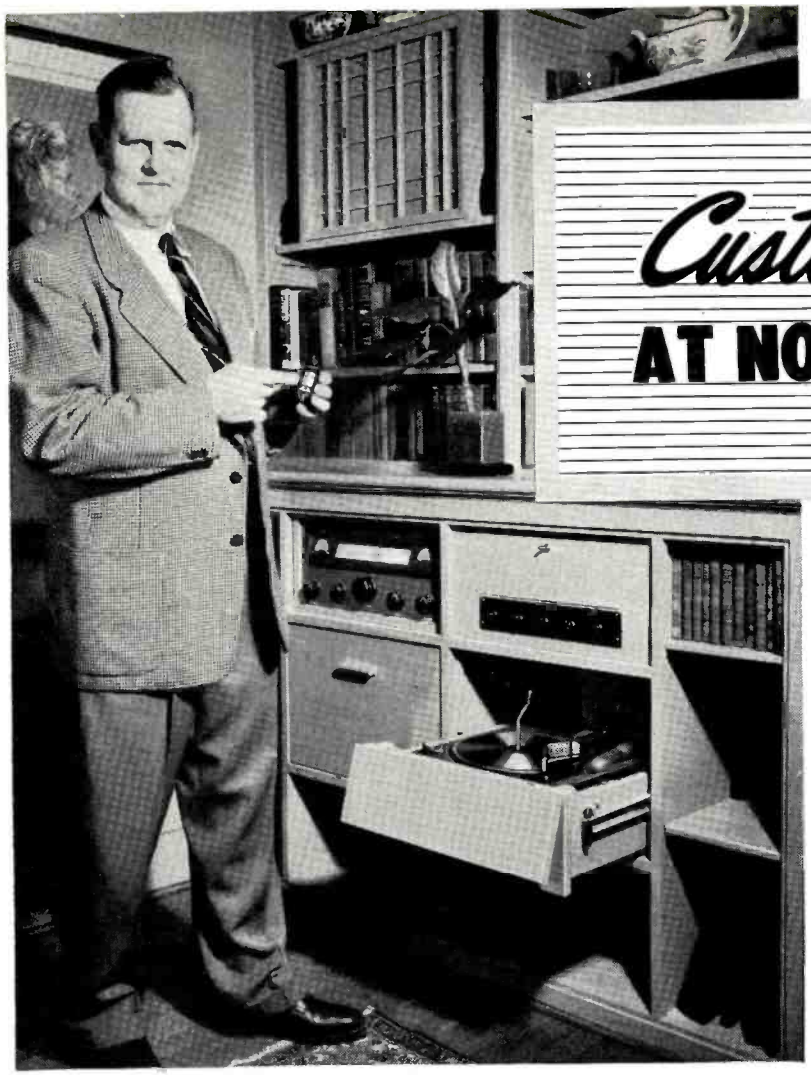

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WHERE cost is no problem, custom designers specify the best. Philip C. Kelsey of Guilford, Connecticut, shown here beside one of his made-to-order FM phonograph installations, says:

> "Customer satisfaction means everything in my business. That's why G-E cartridges are standard in all my installations. I know they are the best."

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Spot Radio News

★ ***Presenting latest information on the Radio Industry.***

By RADIO & TELEVISION NEWS' WASHINGTON EDITOR

RADIO AND TV, repeatedly cited as a striking defense-program accessory, capable of providing limitless types of service, has now found itself accused of being a possible deterrent, too, and requiring a series of tight controls, even more stringent than those proposed during World War II. This time legislation, calling for a control of all types of electromagnetic radiations which might be used to guide an enemy plane or missile in an attack on the country, has been routed through the Department of Defense to the Senate and House, and not just from the floors of the Congress, as in the days of '41.

The proposed law, prepared by Assistant Secretary of Defense Marx Leva, was submitted to the chairmen of the Senate and House Committees on Armed Services, with a recommendation that it be enacted immediately. In a letter to the Congressional leaders, Leva said that the purpose of the new law was . . . "to provide the necessary Executive authority to control electromagnetic radiations, not only during hostilities or a proclaimed emergency, but also during time of strained international relationships, when a surprise attack on the United States is a possibility." He pointed out that the control would extend to anything . . . "capable of emitting electromagnetic radiations between ten thousandths and one-hundred thousand (.010-100,000) megacycles." Current concepts of warfare and recent experience, Leva continued, demonstrated the necessity to control such radiations, for the purpose of denying their use to a potential enemy for navigation of piloted or pilotless aircraft or missiles directed toward targets in this country.

The authority provided in the Communications Act of 1934 for a control of a similar nature is inadequate at this time, the Defense representative declared. The new approach must be adopted now, he said, in order that planning and preparations may be completed so that air defense plans may be implemented without delay in the event of an air attack.

The urgent need for the law was slated to be stressed during secret sessions with members of the Congressional committees, who will be presented with a detailed analysis of air defense problems and their relation to radiation control. The legislators were also scheduled to be told that the proposed ruling, which is part of the Defense Legislative Program, had been approved by the Bureau of the Budget as in accord with the President's program.

Senator Edwin Johnson and Representative Carl Vinson, who introduced the measures to their respective bodies, felt that the proposals were too drastic, and broadcasters agreed, adding that radio and TV silencing in the manner suggested was not only undesirable, but unnecessary. In their opinion the stations should be kept on the air to boost morale and aid in sounding an alarm in case of an attack. Both the FCC and the Continental Air Command have in the past expressed a similar sympathetic feeling and, as a result, studied the possibilities of continued operations.

The versions of the bills offered to the Congress, were substantially milder than the originals sent to the committee leaders. Particularly missing from the measures was the phrase indicating that official controls could be invoked in times of . . . "strained international relationships", which proved to be quite disturbing to everyone, implying that even under present conditions there could be a cessation of transmission of any or all types.

Seething debates on the measures have been forecast by members of both chambers.

DEFENSE RADIO ACTIVITIES were not only accented on Capitol Hill but in the offices of many departmental administrators. At Civil Defense headquarters, FCDA Administrator Millard F. Caldwell, Jr., was busy briefing civil defense directors. During a special one-day session, the heads of State units received a comprehensive review of the functions of air-raid warning systems, communications-control centers, the Continental Air Command, the FCC and the civil defense office from Robert Burton, communications director for FCDA. He discussed the controversial silence problem, as well as the use of the ham bands during emergencies, operation of interceptor commands, air raid warning devices, the operation of mobile systems and financing of centers.

The civil-defense planners of the District of Columbia were also involved

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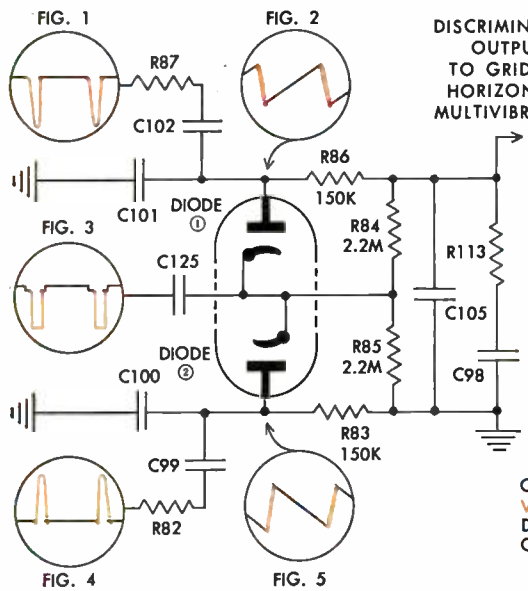
Automatic Frequency Control is essential for stable horizontal synchronization under the various signal and interference conditions encountered in field operation.

The A.F.C. Discriminator shown below utilizes both negative and positive pulses (Figs. 1 & 4) from the horizontal output. These pulses are integrated to form the sawtooth sloped waveshapes (Figs. 2 & 5) that are applied to the diode plates across R83 and R86. The station sync. pulses (Fig. 3) are applied to the diode cathodes across R84 and R85.

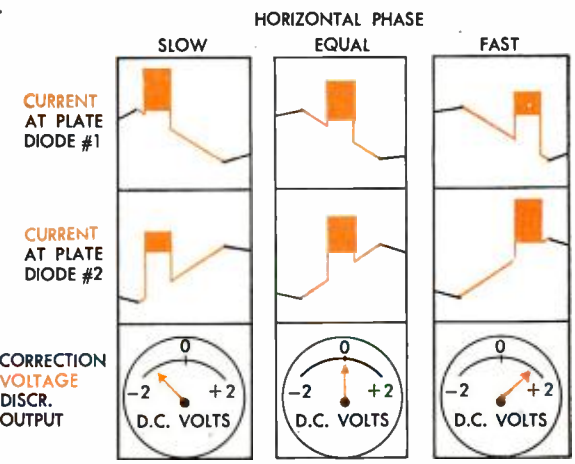


Horizontal Frequency Compensation results from the combined series phase relationship of voltages across R84 and R86 and across R83 & R85. These voltages appear across both diodes as illustrated in the chart above and will cause current to pass in opposite directions through R84 and R85. This creates a D.C. voltage drop in both R84 and R85 of a polarity such as to cancel in the output when the horizontal frequency is in phase with the station.

Sync. Stability of the A.F.C. discriminator used in Raytheon TV receivers provides a picture in perfect synchronization with the television camera and is free of tearing or side waver.

The Horizontal Multivibrator is so designed as to slow down when positive D.C. voltage is applied to the grid and to speed up with negative D.C. voltage. Thus, an unbalance in D.C. output from the discriminator as a result of phase difference will provide corrective compensation to the grid of the horizontal multivibrator.

Chart below illustrates the hold-in range phase relationship between the interated pulses (Figs. 2 & 5) and the station sync. pulse as they appear across the diodes.



Condenser C105 provides a multivibrator grid by pass to grd. completing the multivibrator feedback loop. R113 & C98 serve as a 60 cy. filter with a recovery time-constant capable of following station horz. frequency variations and with proper pull-in characteristics.

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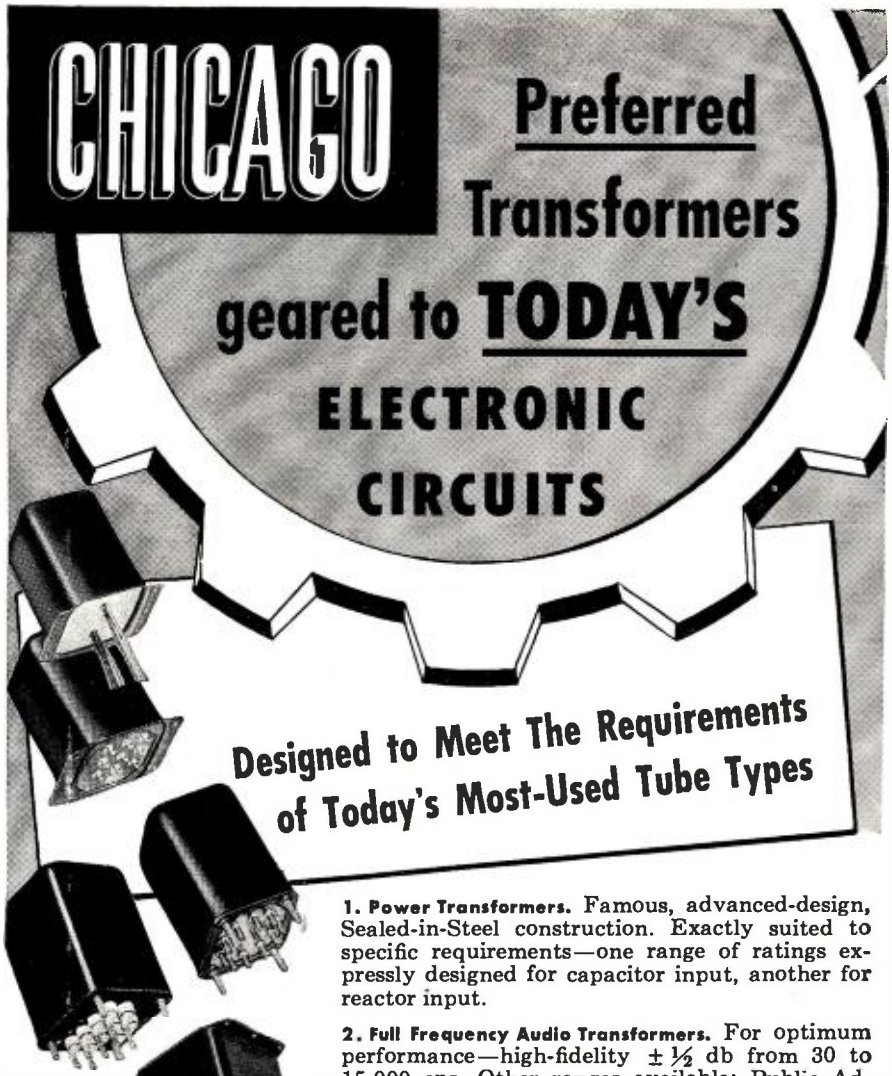

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5. Television Transformers. A complete catalog line in a range of designs that are the exact duplicates of units used in leading TV sets. Built by CHICAGO —the largest single manufacturer of original equipment TV transformers.

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in quite an active preparation program, conferring with broadcasters and setting up definite plans of operation. After one series of meetings, orders for six transmitters were rushed out; two 250 watters for command centers and four 50-watters for geographical-control centers. In addition, orders were placed for standby-power generators and an assortment of walkie-talkie units.

Special equipment has also occupied the attention of specialists during the conferences. One unit, discussed at length, has been the alert receiver, which offers an air-raid warning to broadcasters, and can be applied to control-centers. Announced in '41, the device is said to have been considerably improved. The unit, about the size of a portable receiver, turns on automatically when it receives a special sub-audible signal from a broadcast station, rings a bell, turns on a red or yellow light, according to the kind of an alert being sent, and a white light when the all-clear signal is flashed. The device may be fixed tuned to any one broadcasting station. At the transmitting station, the alert's signal-generating unit is connected to the transmitter, the output being connected to the microphone circuit of the transmitter. When a button is pressed it releases an *on* sub-audible signal which turns on all alert receivers equipped to be activated by it.

In other defense-role programs, emergency communications for plant protection has become a favored topic, with many plans following a pattern suggested in an intriguing report by Ken Piper, former special agent in charge, FBI. Piper pointed out in his review of the situation that radio is the . . . "one means of communications that penetrates walls and traverses distances without the use of wires, without time delay. In this virtue lies its strength, value and dependability." Describing how the systems can be used, he said that a central transmitter and receiver could be installed in a central protected area, with remote control established in the normal office of the superintendent. Small battery-operated portable receivers and transmitters could then be located at the watchman's headquarters and his posts through the grounds. In addition, disclosed Piper, materials-handling trucks, run-about wagons, jeeps, and other similar vehicles could be equipped with two-way FM transmitters and receivers. Also recommended was a receiver tuned to the frequency of the local police department, who in turn should also have a receiver tuned to the frequency of the plant. By placing radio units strategically about an area, with operators assigned to each post, complete obliteration of vital information transmission facilities would be almost impossible, both within a given plant and between nearby plants, viewed Piper in his report. By the adoption of two-way systems, Piper declared, manu-

(*Continued on page* 76)

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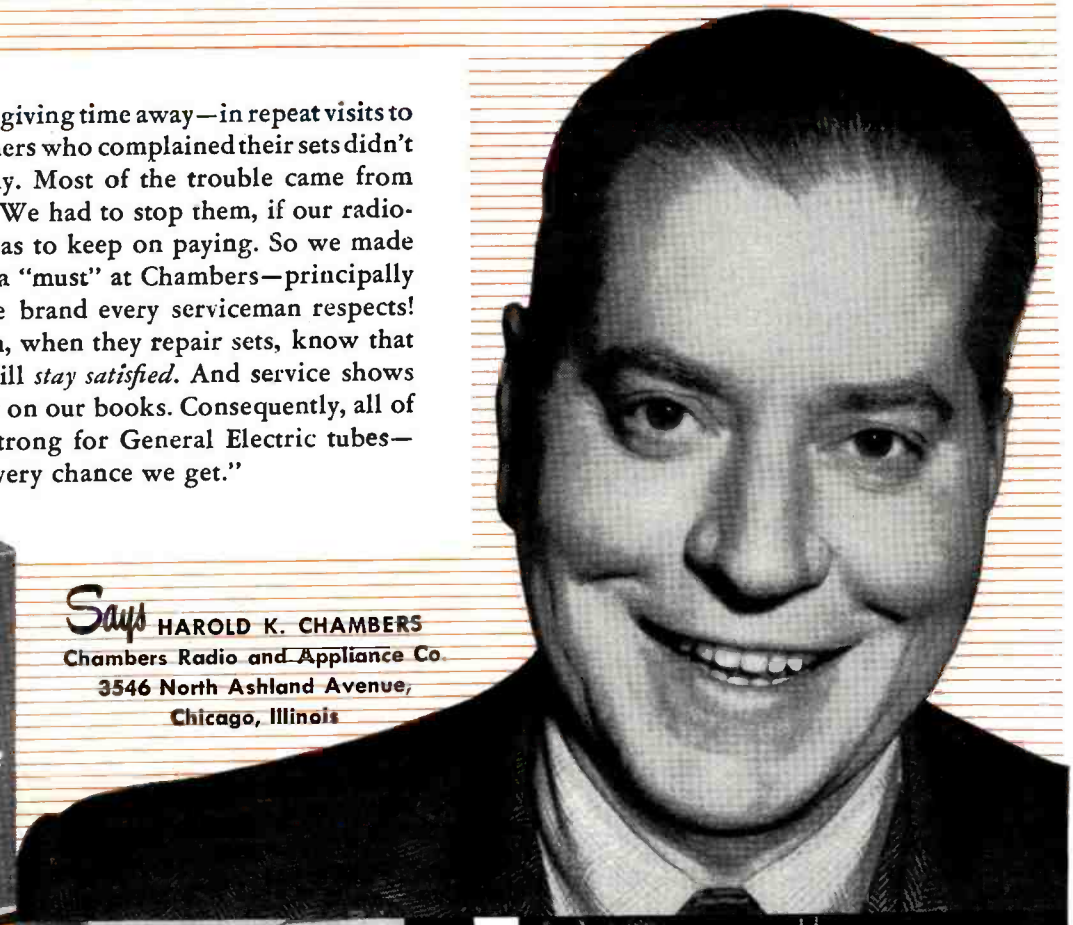

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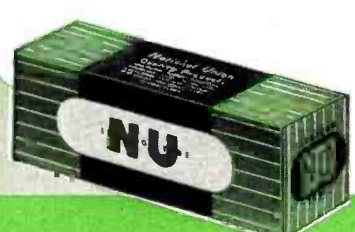

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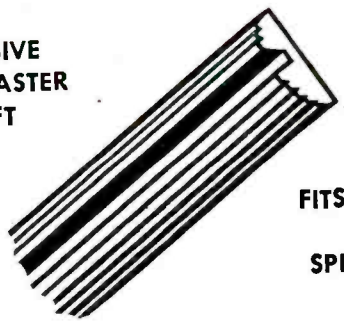

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Here's the shaft you've dreamed of for years—a shaft that will fit virtually all your standard knob requirements without inserts or modification—a shaft you can just cut to length and use.

IRC's Knob Master Shaft is shown in exploded view above. Note these points of construction:

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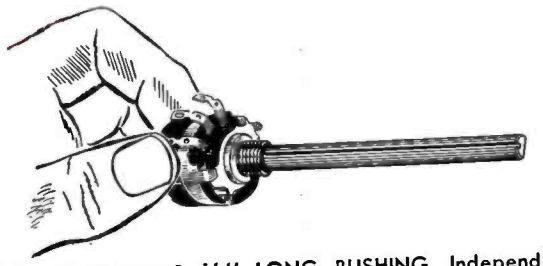
3. Groove simulates narrow flat for spring-type knobs requiring 1/32" deep flat. Also provides guide for slotting where needed.

Knob Master Shaft is standard with *all* Type Q Replacement Controls. Eliminates need for stocking several different controls of the same value because of shaft differences. Far more expensive to make than ordinary replacement shafts, Knob Master is exclusive with IRC.



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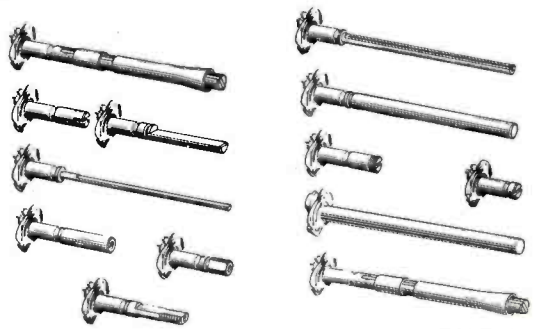

INTERCHANGEABLE FIXED SHAFTS give you widest coverage of control replacements with a far smaller stock of controls. Resilient Retainer Ring lets you remove Knob Master Fixed Shaft and replace with any of 13 special fixed shafts. Interchange takes less than a minute, using only a pocketknife or screwdriver. You meet almost any special requirement without expanding control stocks.

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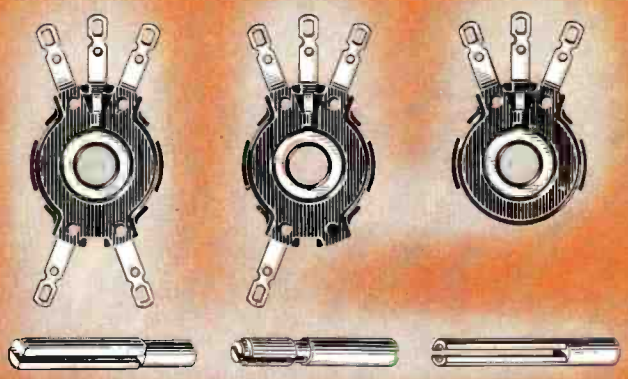
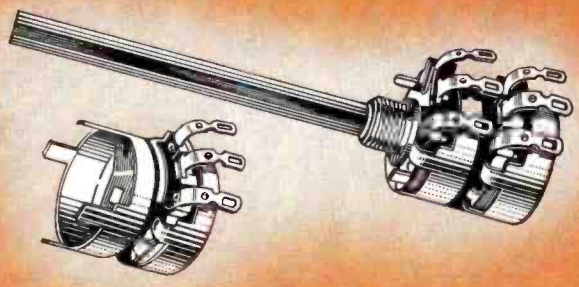
NO MORE WORRYING ABOUT EXACT DUPLICATES. In a matter of minutes you can assemble your own concentric duals—with IRC's original CONCENTRIKIT. Each CONCENTRIKIT contains 11 *universal* parts which you combine with separate shaft ends and base elements. Step-by-step instructions, included in each kit, make CONCENTRIKIT fool-proof. It's the practical answer to television's ever-increasing need for concentric duals.



LIMITLESS OPPORTUNITIES for adapting controls to specific requirements—that's what you get with these Interchangeable Base Elements and shaft ends. Each unit contains molded base, element, terminals and collector ring—no loose parts. Designed for use with CONCENTRIKIT, these base elements are available in a wide assortment of resistance values and a variety of taps. They may also be interchanged in any standard Q Control.



STANDARD GANGED CONTROLS ARE EASY TOO. For standard duals, triples, quadruples, add IRC MULTISECTIONS just as you would switches. 20 of these units provide over 11,000,000 variations—give you coverage from 500 ohms to 10 megohms. No need to stock or search for standard duals. Flexible, easy-to-use MULTISECTIONS are *the* answer to ganged-control problems.

New Type 76 Switches are quickly and easily attached to any IRC Q Control. In addition to Type 76-1 Single Pole, IRC now provides a double pole unit as well—Type 76-2. IRC Q Controls are so designed that switch throw takes place after contactor reaches terminal adjacent to switch toggle. This makes electrical rotation of control the same with or without switch.

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Please send me additional IRC Q Control information in latest issue of Catalog Bulletin DC-1.

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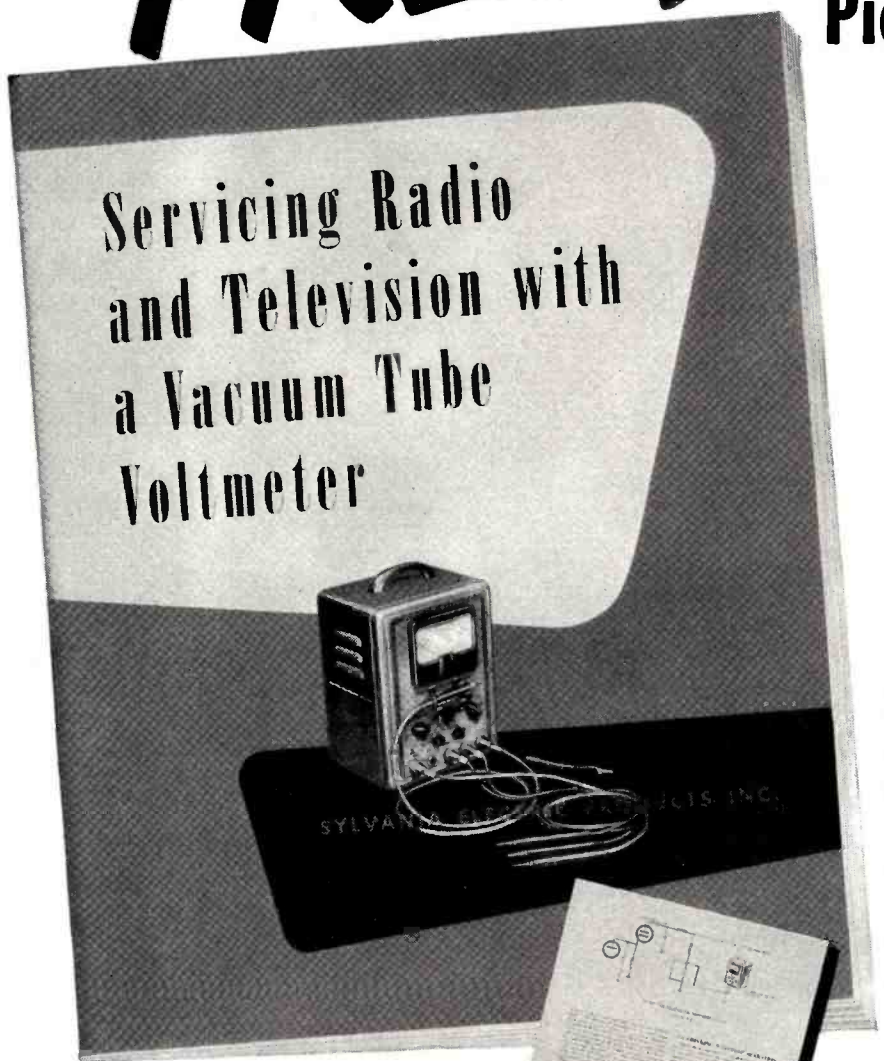

- 48 pages of pictures and diagrams.
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- **COVERS TV SERVICING**—Signal Tracing, Bandwidth Measurements, Wavetrap Checking, Sound Channel Tests and Alignment, Low and High Voltage Checks, Signal and Deflection Voltage Measurements etc.
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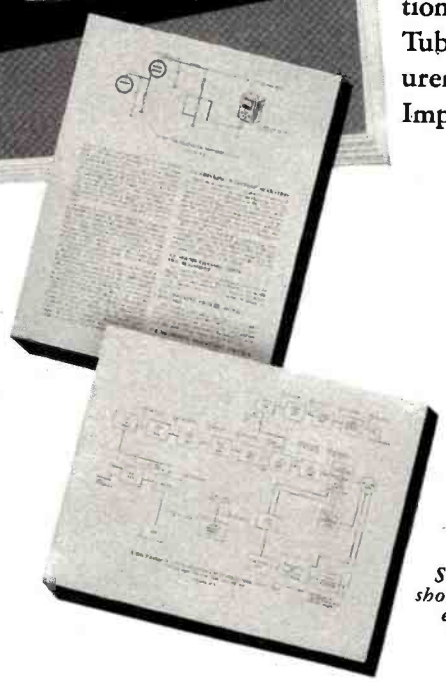
- Covers 19 Miscellaneous Applications of VTVM—Detecting Gassy Tubes, Checking Capacitors, Q Measurement, Turns Ratio Measurement, Impedance Checking.

ACT NOW! Offer good only April 1st to May 31st

Here's a book that will save you hours of service time every week. You'll be amazed how it will simplify everyday service problems. You can't buy this book! It comes to you FREE with the purchase of just one Sylvania TV Picture Tube from your regular Sylvania Distributor. That's all, simply buy a Sylvania Picture Tube, of any type, and your Distributor will give you a copy free. See or write him today.



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One of Washington's largest television installation companies has an opening for a thoroughly experienced crew. This is a permanent job averaging better than
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Must have car, ladders, tools. EDWARD M. MEYER CO., 6230 3rd st. n.w., No. 7.
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can help you to better jobs in servicing or Armed Services!

ADS like these testify to the demand that exists for qualified TV technicians. As one well-informed industry spokesman puts it, "Technicians may soon be as scarce as certain tubes." With the electronics industry expanding, and with growing military demands cutting sharply into the available supply of skilled personnel, now is certainly the time to improve your electronics know-how. And if you're headed for the Armed Services, your improved technical ability can be recognized and rewarded with interesting supervisory work at higher ratings in vital radar, navigation, or communications units.

Anyone already in the field—if he is to get ahead— can't depend on hit-and-miss methods for TV servicing. Practical knowledge is required. CREI home study offers just the practical course you need to qualify for the well-paid technical jobs. Designed by teaching specialists—the same group which has made the CREI Residence School outstanding—this practical course is kept up-to-date through daily contact with CREI's affiliated retail sales-and-servicing stores (one of Washington's largest TV retailers).

Now is unquestionably the time to prepare. If you want promotion, more money, and the kind of training that is respected by industry and the Armed Services, investigate CREI. Send for—and study—the free booklet offered below. The sooner you begin your training, the better off you'll be—in TV servicing work, or in military service. The cost is nominal for this training, the terms easy. Send for complete data—right now!

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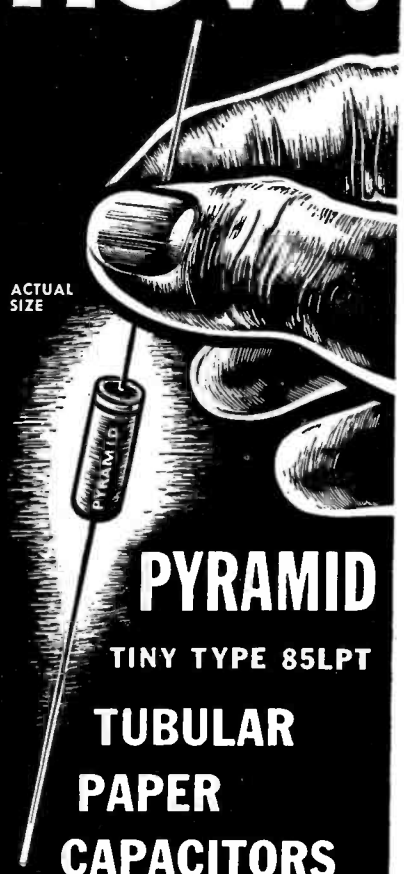

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TUBULAR PAPER CAPACITORS

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Within the INDUSTRY

EVERETT S. LEE has been appointed editor of the *"General Electric* Review," monthly engineering magazine published by the *General Electric Company.*

Mr. Lee succeeds Edward C. Saunders who retired recently from the company after serving as executive editor of the publication since 1926. The new editor was formerly executive engineer of the company's General Engineering Laboratory in Schenectady and is a past president of the American Institute of Electrical Engineers. In addition to his editorial duties he will continue his active work in professional engineering and engineering educational circles.

* * *

THE ELECTRIC ASSOCIATION of Chicago has announced that due to the current international situation and its effect on the availability of television sets and other electrical merchandise the association's Fourth Annual National Television & Electrical Living Show held each year in Chicago has been postponed.

This event which has stimulated considerable consumer interest in the past three years may be resumed in 1952 depending on the conditions prevailing at the time.

Announcement of the postponement of this year's show was made jointly by the Electric Association and the Chicago Coliseum, home of the Show.

* * *

WILLIAM F. HALSEY, JR., has been elected president of *International Telecommunication Laboratories, Inc.,* associate of the *International Telephone and Telegraph Corporation.* Admiral Halsey is also a member of the board of *I.T.&T.* and chairman of the board of directors of *All America Cables and Radio, Inc.* . . . **WILMER T. SPICER** has been named chief engineer of maintenance services by the *Bendix Radio Division.* He will be responsible for the administration of the technical publications and field engineering departments of the division . . . **DAVID C. PRINCE,** vice-president of *General Electric Company,* has been named to the staff of the company's president . . . **MORTON P. ROME** has been elected vice-president in charge of the contract division of *Emerson Radio & Phonograph Corporation* . . . **N. J. PETERSON** has been named sales manager of the *General Electric Company's* Tube Divisions and will be responsible for the sale of all products of the divisions to the federal government . . . **OAKLEY F. HOYT** is the new director of defense production for *Hudson Wire Company* . . . **HENRY T. HEALD,** president of Illinois Institute of Technology, has been elected to the board of directors of *Stewart-Warner Corporation.* He fills a newly-created seat on the board . . . **EDWIN WEISEL, JR.,** is the new advertising and sales promotion manager of *Air King Products Company, Inc.* He was formerly associated with *Tele-King Corporation* . . . **STANLEY K. WEBSTER** has been named chief engineer of *Beltone Hearing Aid Company* . . . The radio and television division of *Stewart-Warner Corporation, Stewart-Warner Electric,* has named **IVAR G. BLACKBERG** chief purchasing agent . . . **ALLAN EASTON** is the new head of the microwave section of *Radio Receptor Co., Inc.* He was formerly chief engineer of the production engineering division of *Teletone Radio Corporation* . . . The new director of purchases for *Capehart-Farnsworth Corporation* is **ROBERT B. BROWN** . . . **WILLIAM HARGREAVES** has been named vice-president in charge of engineering for the *Transicoil Corporation* of New York.

* * *

WILLIAM D. STROBEN has been appointed to the post of advertising and promotion manager of the Radio & Television Division of *Sylvania Electric Products Inc.*

Mr. Stroben was formerly the advertising and sales promotion manager for the *Thor Corporation* in Chicago and prior to that served as promotion manager for the Range and Water Heater Division of *Hotpoint, Inc.,* also of Chicago.

At the same time the company announced the promotion of Arthur A. Currie to the position of Field Sales Manager for the Radio & Television Division. He was formerly the district sales manager for the New England-Eastern New York State sales territory.

* * *

NATIONAL ELECTRONIC & SERVICE DEALERS ASSOCIATIONS, a new national organization of associations representing servicing technicians and service dealers, was recently launched in Washington, D. C., by 22 technician and service dealer association delegates.

The aims of the new organization include the furtherance and improvement of the electronic servicing industry, the promotion of the welfare of service dealers and technicians, the fostering of a better understanding between the electronic service industry and the electronic industry, the promo-

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THE CATHODE—
THE WORLD'S GREATEST PAINTER—
SHARES
RAYTHEON'S 101

RAYTHEON TELEVISION PICTURE TUBES

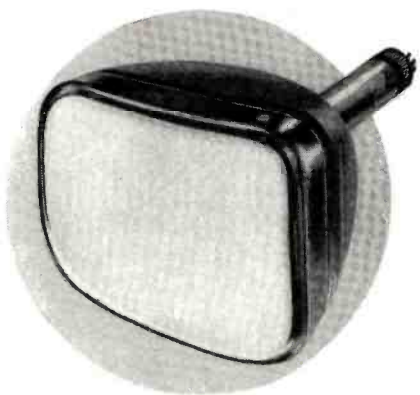
ACTUAL SIZE

are given *101* basic tests and checks to insure their quality. The cathode pictured produces the electron ray that paints the picture on the tube's screen and will perform perfectly, because it has passed its share of Raytheon's *101* Tests.

This strict control of quality means Raytheon Picture Tubes, like all Raytheon Products, are precisely right both electrically and mechanically. As pioneers in the development and manufacture of almost every type of electronic tube, Raytheon has the know-how and skill that makes Raytheon Picture Tubes *Right for Sight!*

Add precision workmanship to advanced design and you'll readily realize why you're always right if you use Raytheon Picture Tubes for every replacement and conversion job.

Ask your Raytheon Tube Distributor about these Quality Raytheon Picture Tubes.



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RAYTHEON MANUFACTURING COMPANY

Receiving Tube Division

Newton, Mass., Chicago, Ill., Atlanta, Ga., Los Angeles, Calif.

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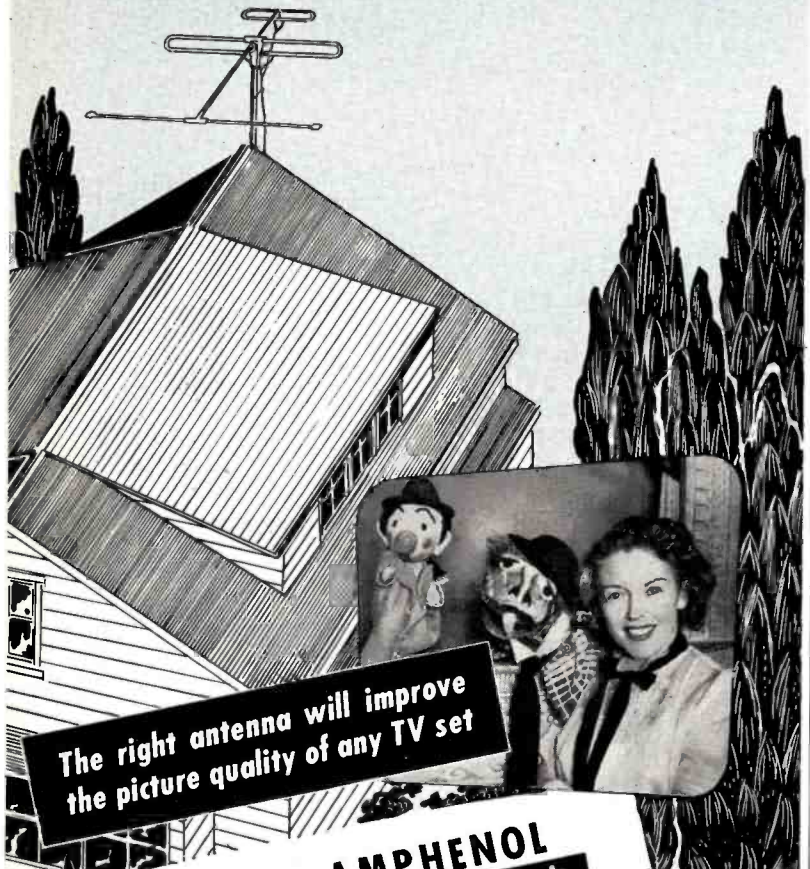
Peak

the Picture Power with an INLINE* ANTENNA



Specify AMPHENOL -INLINE* TV ANTENNA

The Amphenol Inline Antenna has a single forward lobe. This means it intercepts peak signal power from one direction. Numerous minor lobes, which are absent from the Amphenol Inline Antenna, frequently pick up reflected signal causing "ghosts" and poor picture quality.

Everyone judges the performance of his set by the picture on the screen. However, it is the receiver plus the antenna that creates the picture. To get the most from any set specify Amphenol Inline Antenna!

*REISSUE PAT. NO. 23,273

AMPHENOL

AMERICAN PHENOLIC CORPORATION
1830 SOUTH 54TH AVENUE CHICAGO 50

tion of better relations with the public, a provision for educational facilities for its members, the raising of standards of the electronic servicing profession, and cooperation with federal, state, and municipal agencies.

Temporary officers were named at the meeting and include Max Leibowitz of New York as president, Norman R. Selinger of Washington, D. C., as vice-president, Richard R. Devaney of Philadelphia as corresponding secretary, Roger K. Haines of Haddonfield, New Jersey as recording secretary, and Vance E. Beachley of Harrisburg, Pa. as treasurer.

Samuel L. Marshall of New York City was appointed chairman of the publicity and inter-organization relations committees, James L. Burns of Washington is the head of the membership committee, while Frederick J. Schmidt of Steelton, Pa., has been named chairman of the steering committee.

Organization headquarters have been set up at Dorchester House, located at 1625 Kolorama Road, N.W., in Washington, D. C.

* * *

EDWIN DORSEY FOSTER, former chief of naval material in the office of the Secretary of the Navy and holder of the rank of vice-admiral, has been named director of the newly-established Mobilization Planning Department of the *RCA Victor Division* of the *Radio Corporation of America.*

The new department which Admiral Foster heads is designed to assure the most effective operation to meet the government requirements for the research, development, and manufacture of vital electronics equipment for the defense program. The new department supersedes the company's Mobilization Planning Committee which was established after the outbreak of the war in Korea and functioned until a short time ago.

* * *

GLEN McDANIEL, 39-year-old lawyer and vice-president of the *Radio Corporation of America,* was elected president of the Radio-Television Manufacturers Association—the first full-time, paid president in the association's history.

Robert C. Sprague who has been serving as both president and chairman of the board of RTMA has resigned as president but will continue as chairman of the board. His resignation became effective upon Mr. McDaniel's taking office on April 1st. James D. Secrest, who has been serving as general manager and secretary of the association since August 1, 1950, will continue in this capacity under the reorganization program.

The board of directors, at the same session, authorized the establishment of a committee to act on material shortages, voted to continue its fight against the proposed excise levy on radio and television sets, took up the matter of technician training and servicing complaints, and discussed other matters vital to the industry, including the establishment of a committee to confer with government officials on the allocation of scarce materials.

* * *

CHANNEL MASTER CORPORATION has recently completed a 25,000 square foot addition to its Ellenville, New York plant . . . **RAYTHEON MANUFACTURING COMPANY** opened a new pilot tube plant in Quincy, Massachusetts recently. The new factory is being operated by the receiving tube division of the company and is located approximately 15 miles from the main plant at Newton . . . **ELECTRO-CONNECTOR MANUFACTURING CORP.** has recently increased its production facilities almost five-fold with the completion of a new plant at 190 W. Glenwood Ave. in Philadelphia . . . **GENERAL ELECTRIC COMPANY** has begun construction on a new four-story tube manufacturing building in Owensboro, Ky. The plant is expected to be in operation some time in July. The company is also building a million dollar electronics plant at Auburn, New York for its Receiver Division . . . The Department of the Army has announced that construction will soon start on a new Army

(*Continued on page* 115)

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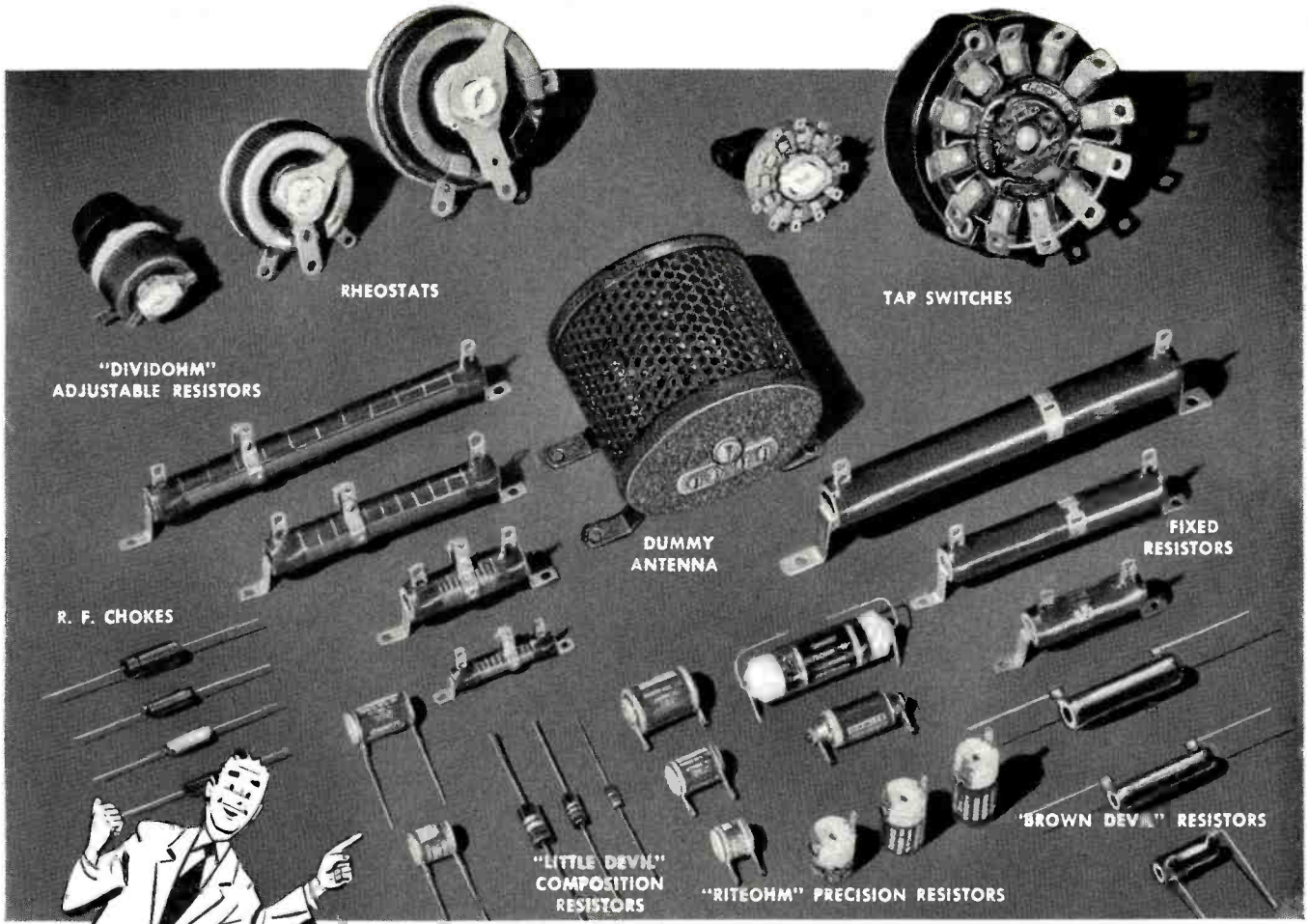

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Every Ohmite product is designed and constructed to stand up under the most severe service conditions . . . to give extra performance . . . to withstand the effects of shock, vibration, temperature extremes, altitude, and humidity. And, it is this extra performance Ohmite products give that so often makes the difference between satisfactory and unsatisfactory operation.

The Ohmite line includes ten sizes of close-control rheostats ranging from 25 to 1000 watts . . . fixed and adjustable wire-wound vitreous-enameled resistors from 5 to 200 watts . . . composition resistors, precision resistors, non-inductive resistors, tap switches, and R. F. and power line chokes . . . all in a wide selection of types and sizes. When you need dependable electrical components, play safe and specify Ohmite!

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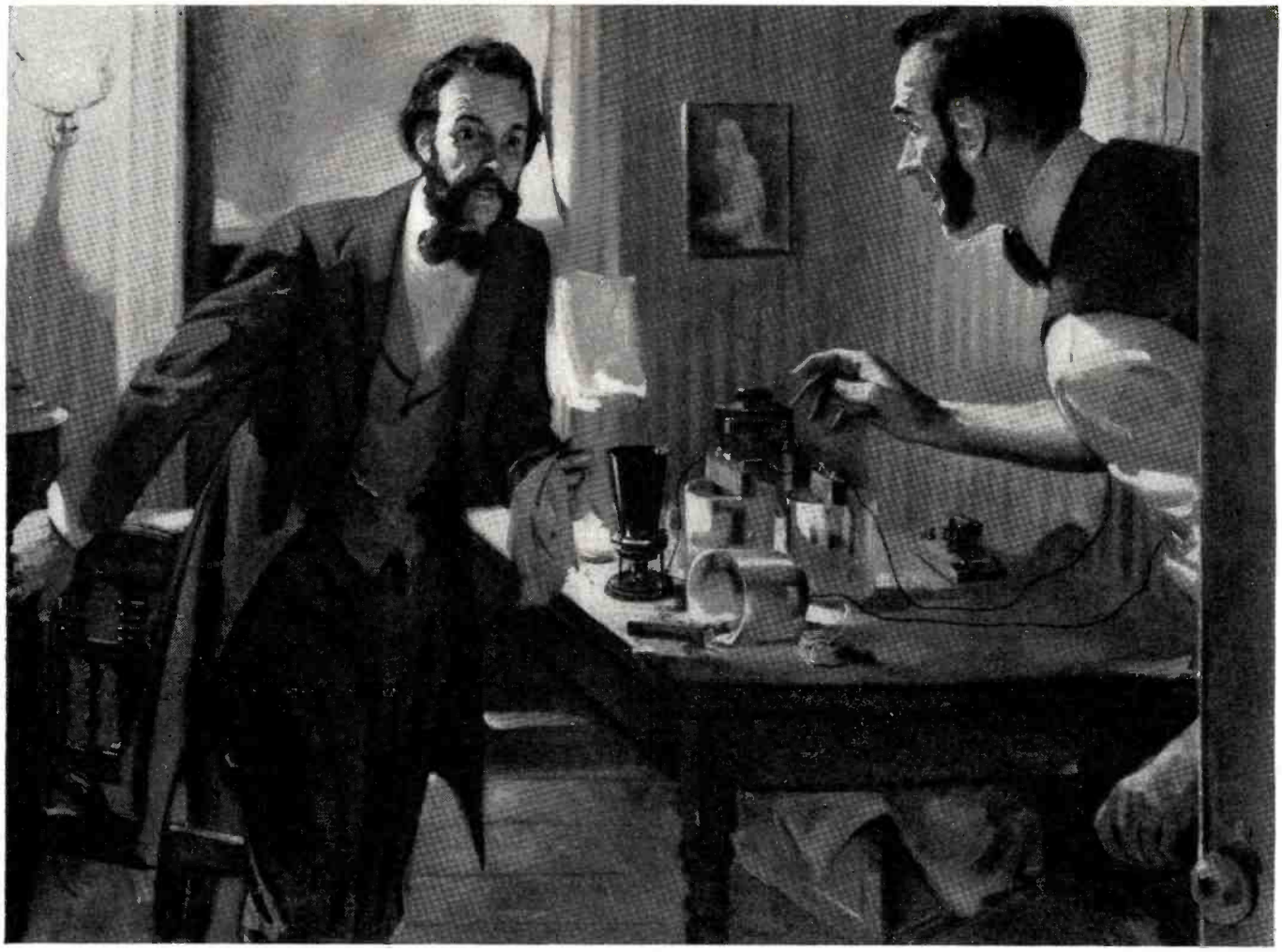

"Mr. Bell, I heard every word you said — distinctly!" Thus, on March 10, 1876, Alexander Graham Bell (left) learned that his invention had transmitted the first intelligible speech.

75 Years of Tomorrows

Like today's telephone, Alexander Graham Bell's invention was a product of research. For several years Bell had been investigating speech and hearing, and devising methods and apparatus for the electrical communication of intelligence. No one had transmitted speech sounds electrically but Bell saw that it must be possible—given the proper instruments.

One day, while experimenting with his harmonic telegraph, Bell's alert ear caught an unexpected sound in the receiver. His trained mind told him that here at last was the proof that sound waves could travel as their facsimile in electric waves. Then followed a year of development, and in 1876, as shown above, he transmitted the first intelligible speech by telephone.

During the next three-quarters of a century, the telephone research which Bell started has grown and expanded to serve your telephone system . . . often fruitfully overflowing into other fields of electrical communication. In today's Bell Telephone Laboratories, promising ideas find the right skills to bring them to life. Through skilled manufacturing by Western Electric Company and skilled operation by the telephone company they are brought to the service of the telephone user.

The high quality of your telephone today, its fine, swift service at reasonable cost, are the products of work in the telephone laboratories in the past. The greater value you may expect in the future is taking form there already.

BELL TELEPHONE LABORATORIES

Exploring and Inventing, Devising and Perfecting, for Continued Improvements and Economies in Telephone Service

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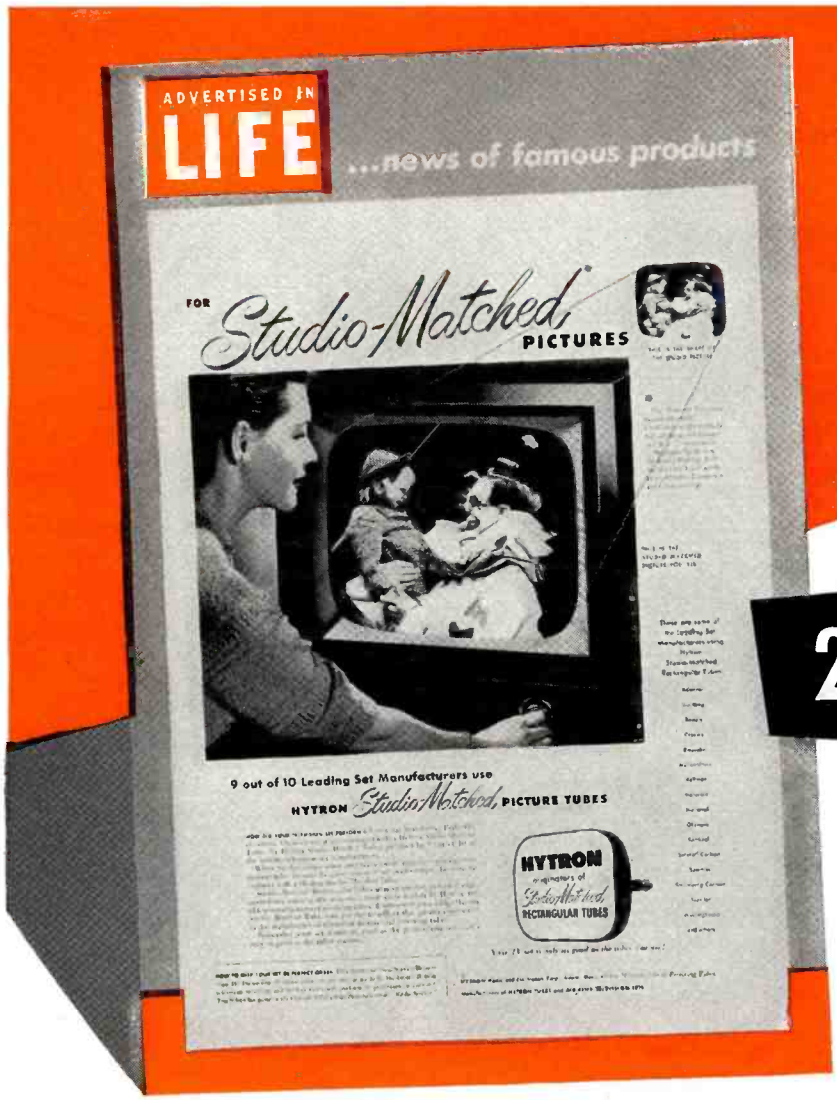

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How many will you sell!

LIFE for March 12, starts the ball rolling: 26,000,000 readers. This timely full-page ad. An ideal sales package — original Hytron *studio-matched* rectangular tubes. The choice of 9 out of 10 leading TV set makers. All backed by this *free,* sure-fire "Advertised in LIFE" display card for *your* window and *your* counter. Play safe. Call your Hytron jobber *today.* Make sure you don't miss this tie-in display card. Get your share of those 26,000,000 potential customers!

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HERMETICALLY-SEALED *Miniature* TUBULAR PAPER CAPACITORS by PYRAMID

Pyramid Type PG "GLASSEAL" miniature paper capacitors are assembled in metal tubes with glass-metal terminals. They will fully meet the most exacting demands of high vacuum, high pressure, temperature cycling, immersion cycling and corrosion tests.

TEMPERATURE RANGES: −55° to +125°C.

CAPACITANCE RANGE: .001 mfd. to 1.0 mfd.

VOLTAGE RANGE: 100 to 600 v.d.c. operating

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RADIO—RADAR—SONAR in NAVAL Applications

Fig. 1. A radar-equipped PT boat.

By SAMUEL FREEDMAN
Technical Products and Services Co.
Santee, California

Radio-electronics plays a vital role in all naval operations. Vast laboratories work night and day to keep the U. S. Navy ahead in such developments.

A DISCUSSION of radio, radar, and sonar equipment in naval applications must, of necessity, be confined to declassified information at this time. Nevertheless, naval electronics today embraces all phases of radio and its offshoots, as developed during the past half century. It is used extensively on land, on the sea, under the surface of the sea, and in the air. It includes infrared, guided missiles, and atomic developments. It covers the entire frequency spectrum from very high powered, very low frequency stations (below 20 kc.) through the various frequency bands used for radiotelegraphy, radioteletype, radiotelephony, facsimile, and television. It extends to the microwave region for radar and communications. It continues still further to infrared or invisible light and even to the radioactive band of the electromagnetic spectrum where frequencies may be as high as 100 trillion megacycles or more—regions where electromagnetic waves are also known as rays or particles.

Although many of these naval applications are paralleled or even exceeded by the Army and the Air Force, the use of electronics extends into the activities of the Bureau of Ships, Bureau of Aeronautics, Bureau of Ordnance, training activities of the Bureau of Personnel, and, on a small but expanding scale, into the activities of the Bureau of Medicine and Surgery.

The Navy today has many major multi-million dollar laboratories and test centers which are wholly or primarily concerned with electronics. Their work overlaps only because electronics affects every phase of naval operations in such a way that so far it has been impractical to establish a single "Bureau of Electronics." These major laboratories and test centers include such installations as: The David Taylor Model Basin near Washington, D. C.; The Naval Research Laboratory of the Office of Naval Research in Anacostia, D. C. and its annex on Chesapeake Bay; The Naval Ordnance Laboratory in White Oak, Maryland, for the Bureau of Ordnance; The Special Devices Laboratory of the Office of Naval Research at Sands Point, Long Island; The Underwater Sound Laboratory of the Bureau of Ships and the Office of Naval Research at New London, Conn.; The Naval Air Development Station at Johnsville, Pa.; The Naval Air Test Center at Patuxent, Maryland; The Naval Air Missile Test Center at Point Mugu, California; The Naval Ordnance Test Station at Inyokern, California; and The Navy Electronics Laboratory of the Bureau of Ships at San Diego, California.

The staffs of these laboratories, which are made up of both naval and civil service personnel, range from a few hundred to several thousand employees. In addition, this force is backed up by other activities in common with other defense services and the large laboratories of the National Advisory Committee on Aeronautics, such as the Ames Aeronautical Laboratory at Moffett Field, California. Their work is further reinforced by contracts and subcontracts for research, development, and production which are awarded to various industrial firms, universities, and laboratories in the United States. University contracts may cover strictly naval research problems or may be awarded

Fig. 2. A naval communication room at the Cheltenham, Maryland, Naval Radio Station. In this installation both manual equipment and the newer radioteletype units are used.

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Fig. 3. Radar equipment in operation at the Naval Research Lab.

Fig. 4. Loran receiver indicator aboard a Coast Guard vessel.

in conjunction with the parallel requirements and interests of the other defense services.

This research program also reaches into such activities as those of the Radio Technical Committee for Aeronautics, the Air Navigation Development Board, the Research and Development Board, and the Radio Technical Committee for the Marine Services, etc., all of which are primarily civilian in nature.

Although the United States is singularly blessed in having a vast production potential, the Armed Services have not left their development programs to chance. Hundreds of millions of dollars have been spent in the past five years on research, development, and the production of prototypes.

Those who were familiar with the Navy electronics organization during World War II will find that the Navy's dominant electronics organization, the Bureau of Ships, has continued to operate more or less intact although with a skeleton force. There have been practically no changes in the code organization setup other than those necessary to take care of new developments. The Bureaus of Aeronautics and Ordnance have likewise developed programs to take care of the electronics requirements of their particular branches. The small wartime Office of Patents and Inventions and the subsequent Office of Research and Inventions has been greatly expanded and is currently operating under the designation of the Office of Naval Research with a fine field laboratory of its own. Electronics, originally confined to naval communications apparatus, has now grown until it reaches into every phase of naval activity. In addition to its communications uses, electronics now serves in the fields of navigation and ordnance.

The advent of radar on naval vessels, including several different types which perform specialized tasks, has skyrocketed the number of electron tubes in operation aboard such craft. This same condition also applies to aircraft and submarines. During World War II, the average submarine carried equipment using considerably more than 500 electronic tubes, but today that number has been increased and the range of the craft has been expanded as a result of improved and increased radio, radar, and sonar equipment aboard such vessels.

Fig. 1 is an example of the use of radar equipment aboard even the smallest naval craft. Visible on top of the mast is the "thinking cap" of the PT boat. This so-called "Radome" bulb houses the antenna of the radar set aboard the vessel. Radar has proven invaluable to the hard-hitting PT boats because they operate chiefly under the cover of darkness. Under such conditions, radar's electronic eye pierces this Stygian gloom for a horizon and indicates targets as to direction and distance, in addition to providing warning of navigational hazards. When a PT boat operates against a large enemy vessel, it enjoys the advantage in that the larger ship yields a much stronger indication on the PT's radar screen and for a greater distance than the PT registers on the larger ship's screens. The PT because of its smaller dimensions and because it is fabricated of wood has poorer reflective properties and is, therefore, harder to pick up on the radar screen of the enemy vessel.

Many devices, usually considered as "land-based," have now been adapted to aircraft and seagoing uses. One such unit is the radioteletype. Fig. 2 shows a battery of radio apparatus and the radioteletypes used in naval communications. The Navy has adapted teletype to radio operation and has produced a workable combination which eliminates the need for an operator to decode a series of dots and dashes. The unit is an ordinary teletype which is connected by means of a converter to the radio transmitting and receiving apparatus. When receiving, the converter changes radio impulses into electrical energy which actuates the teletype. The transmitting process is identical. The unit has a gross speed of 60 words-per-minute as compared with 25 words-per-minute for fast radiotelegraphy. Radioteletype was first used under combat conditions during World War II at Iwo Jima and later proved itself at Okinawa and during the air strikes against the Japanese mainland. It is widely used now and,

Fig. 5. The loran timing sequences.

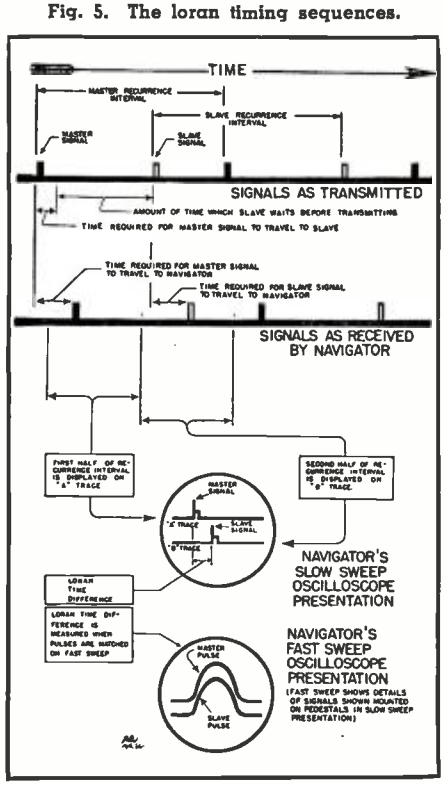
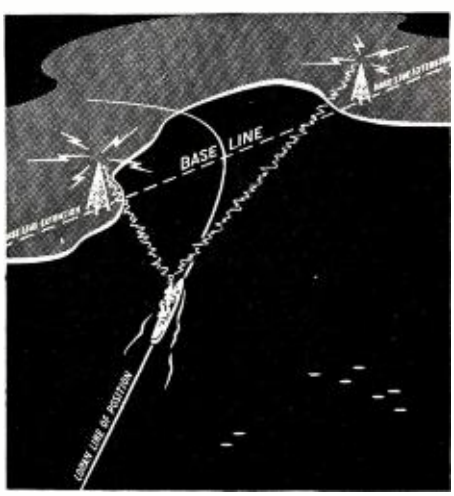


Fig. 6. The loran line of position.



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for example, when the President of the United States travels on a naval vessel, radioteletype is used to maintain constant contact with his office in Washington.

Fig. 3 shows one of the many types of radar installations likely to be encountered on naval vessels. More compact versions have been developed for use on submarines and in aircraft. Developed independently by American, British, French, and German scientists during the decade preceding World War II, the refinement of radar equipment received its greatest impetus upon the opening of hostilities. First used in the detection of surface objects in the near distance and under conditions of poor visibility, radar's range and versatility was extended to provide long range detection of airborne as well as surface objects, improve accuracy in fire control, provide safety in navigation, and facilitate the identification of distant and unrecognizable planes and ships. Present day equipment is now practically foolproof.

Figs. 4, 5, and 6 show a loran installation (LOng-RAnge-Navigation) which developed as an offshoot of radar for sea and air navigation. Kept under wraps during World War II, it was declassified after the war to permit its use by merchant marine vessels and civilian aircraft. The Coast Guard operates the necessary land stations required for its use. Fig. 4 shows a navigating officer aboard ship operating a loran receiver-indicator to obtain data regarding the position of his vessel. Fig. 5 illustrates the principle of operation of the device. Two stations in the prewar 160 meter radio amateur band transmit in such a manner that the master station (the one which initiates the pulsing event) actuates and is followed by a pulse transmission (40 microseconds later) by another station (called the slave station) which may be as much as 300 miles distant. There can only be one place within the radio receiving range of about 600 miles ground wave or 1400 miles skywave where a predetermined time difference in reception of those two pulses will exist. By reference to a loran-type of map, a line of position can be determined for that pair of stations whose signals arrive with that specified time difference. With this arrangement, the location of a ship can be pinpointed to within a quarter of a mile. The use of low frequencies and high intermittent pulsed power makes reception of the loran signals possible for hundreds of miles. By picking up another pair of stations (the slave station for one pair can also serve as the master station with respect to a station beyond it) another loran line of position can be provided so as to give another positional reference line. This second line can then intersect with the one plotted for the first pair of stations. If a third pair of stations can be received, the location of the ship can be determined beyond doubt. Many pairs of loran stations can utilize the same frequency channel by using different pulse repetition rates. In this way only one pair of pulses will show up as stationary ones for a particular group selection when viewed on the cathode-ray tube indicator. Fig. 5 shows how this information looks on the cathode-ray tube indicator. By selecting increasingly faster sweep rates for the CR tube of the receiver-indicator, the two pulses (master and slave) are measured first coarsely and then minutely down to the last microsecond difference of the time of arrival. The received pulses are first lined up on their respective pedestals. The master pulse is made to stop on the stationary pedestal either at the left end or the beginning. The slave pulse is then similarly lined up on the adjustable pedestal by means of an electronic knob control. The unit is then switched to a faster sweep of the tube to magnify the two pulses in question. The amplitude of one is increased or decreased as necessary so that one is fully superimposed on the other. When they merge to resemble a single pulse without overlap, the time difference is read directly in microseconds on a veeder counter. By knowing which pair of stations was used (shown on the station selector switch), for example, Pair 2, and the time difference (as shown on the veeder counter), for example, 1220 microseconds, the ship's line of position may be established by referring to loran line of position 2-1220 on the map. Experienced personnel can take such a reading in a matter of seconds. They can also per-

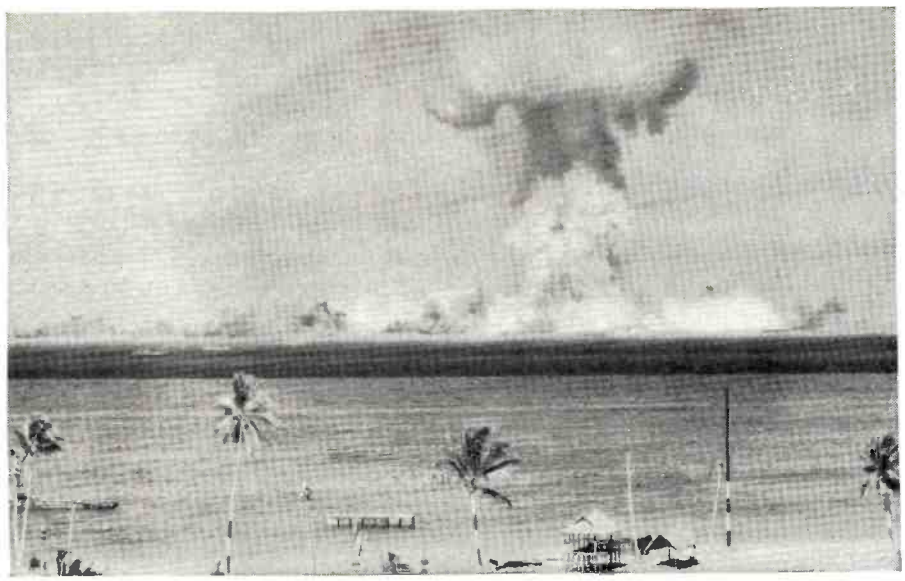
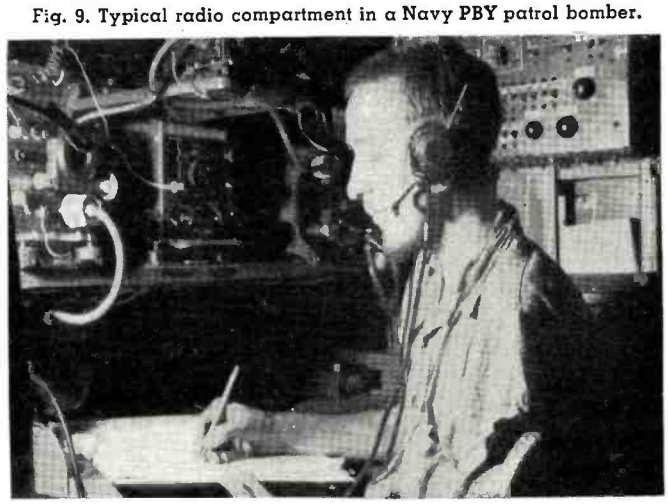


Fig. 7. The atomic shock wave. A few seconds after the "Able Day" bomb exploded at Bikini, a camera in the tower on the atoll recorded the atomic pressure wave thusly.

Fig. 8. A v.h.f. direction finder on an aircraft carrier deck.

Fig. 9. Typical radio compartment in a Navy PBY patrol bomber.



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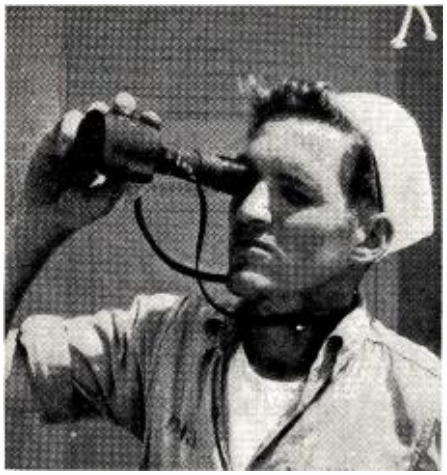

Fig. 10. A simple type viewer used by signalmen to read messages sent with the otherwise invisible infrared light.

form this operation continuously or as often as required.

Fig. 7 portrays one of the greatest and most important applications of electronics in warfare—the atomic bomb. This weapon represents new frontiers in electronics since every step of the bomb's development as well as its control involves the use of electronic apparatus and techniques.

One heavy utilization of electronics is peculiar to the Navy. That is in the field of underwater sound detection, known as sonar. Sonar utilizes both audible (sonics) and inaudible sound (supersonics), chiefly the latter. This sonar equipment is used to detect submarines and surface vessels by means of the sound waves they set up in the water. It is the submarine's most useful electronic device when it is submerged. A fathometer is also considered a sonar device but this equipment operates only in a vertical plane. Sonar is comparable to radar inasmuch as it sends out a pulse and waits for the pulse to return before sending out further pulses. The time taken for the pulse to travel to its target and return is calculated and calibrated on an indicating dial in terms of distance. This is approximately 5000 feet-per-second with corrections for sea water density, salinity, and temperature. Sonar is also used in a modified form by aircraft in detecting submarines.

One example of this is the sonobuoy. An airplane drops a sonobuoy into the water where it floats on the surface and releases a water-protected cable terminating in a hydrophone (equivalent of a waterproof microphone) into the water for a depth of several feet. The sounds picked up by the hydrophone modulate a radio transmitter in the sonobuoy which, in turn, radiates the information from the sonobuoy antenna. This signal is picked up like radiotelephone signals by aircraft within a horizon of range.

The basic components of a shipboard sonar system include a driver unit to produce the sound signal to be transmitted, a projector to transmit the signal to the water and pick up the sound signals from the sea, a receiver-amplifier which amplifies these signals, and indicating equipment which gives the range of the target which reflected the outgoing signals. The bearing of such signals is determined by rotating the projector back and forth for maximum indication. A dome protects the projector and prevents water noise. Retracting gear hoists and lowers the projector as well as trains or rotates it in order to determine the direction of the sound. The receiver-amplifier, the indicating equipment, and controls are grouped together in an assembly called the "stack" which is located near the maneuvering controls of the vessel. Auxiliary equipment such as the BDI (bearing deviation indicator) and the attack plotter facilitate the use of sonar information in tactical applications. The driver is located close to the projector and retracting gear in order to keep the leads to the projector short. It is remotely controlled from the "stack." The projector is, of course, under water. When the projector is in operating position it extends beneath the keel of the vessel so that the sound beams may be directed in any horizontal direction without obstruction by the ship itself. Placing the projector a substantial distance below the keel helps to avoid interference produced by the noises of the ship itself. The retracting gear, mounted on a sea chest, is built into the hull of the ship. It raises the dome into the sea chest for protection when there is danger of damage by underwater obstructions or heavy seas. The motors for operating the retracting gear can be controlled from either the stack location or from the lower sound room. Extraordinary problems may arise from the fact that the projector dome protrudes below the vessel. Often submerged objects or even large fish collide with the dome, damaging it or puting it entirely out of commission.

Other applications of electronic equipment as used by the Navy include the radio gear carried by a Navy PBY patrol bomber of the Catalina type. See Fig. 9. Such craft did effective work in rescuing pilots and crews of other planes shot down or forced into the sea by engine trouble. They were also used to good advantage in patrolling missions and in flashing radio intelligence to other naval units.

Fig. 8 is a high frequency direction finder on an aircraft carrier. This unit is used for locating the source of high frequency radio transmissions. It proved particularly useful in pinpointing the exact location of any submarine using high frequencies to transmit to other such craft. The information picked up by this equipment is then used to dispatch ships and aircraft to the scene for appropriate action.

Fig. 11 is a photograph of the "Loon," one of the many guided missiles whose operation is dependent on electronics. The word "guided missile" is replacing the term "pilotless aircraft." It is an aircraft without a human pilot whose functions have been replaced by electronics. In addition to not jeopardizing a human life, the guided missile is faster in response than human endurance and reaction time would otherwise permit.

Fig. 10 shows a simple infrared unit used for communication by means of invisible light. Its ability to function with light waves that are invisible to the naked eye (electromagnetic frequencies lower than 375,000,000 megacycles) permits secret communication, particularly at night. This technique was used on most of the major fleet units at the time of the Mariannas campaign in World War II. Subsequently these units have been installed on all surface ships of the active fleet. Special filters and hoods have been developed to convert the standard Navy blinker light into an invisible light. These filters screen out all but the infrared component, thus the transmission is invisible to any observers except those equipped with specially-designed infrared receivers.

Technical officers and enlisted technicians in our modern Navy are receiving training and experience with all of these diversified types of electronic equipment. The training they are getting would be virtually impossible to

(*Continued on page* 82)

Fig. 11. A guided missile is launched at the pilotless aircraft base of Naval Air Missile Test Center, Point Mugu, Cal. Guided missiles are high on the research priority list.

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VERSATILE EQUIPMENT Key To Good Recording

By
WILLIAM MILLER
General Recording Manager
Capitol Records, Inc.

Engineer John Kraus inspects an LP during cutting process. Note automatic head lifting mechanism at rear of cutting head pivot.

Flexible recording studios and a variety of modern cutting equipment characterize Capitol's operation.

FLEXIBILITY is the keynote of all recording and dubbing operations at the Hollywood recording studios of *Capitol Records, Inc.* Shown on this month's cover in Studio C with engineer John Block at the controls, is vivacious singing star Margaret Whiting, as she records her song hits, "Over and Over and Over" and "The Moon Was Yellow." Besides frequent recording sessions, the popular gal singer, who has won "Top Vocalist" awards for the past five years since her disc of "It Might As Well Be Spring" was released, is heard twice weekly on a network radio show with Jack Smith.

In explaining the versatility of all the studios and equipment used on a *Capitol* recording session, first, one of the four available studios is selected by agreement between the musical producer and the recording department manager, according to orchestra size, whether it is vocal or instrumental, etc. After an agreement is reached on studio, type of pickup and placement and over-all sound needed, the microphones for the job are then picked from the seven available types. In the case of this particular Margaret Whiting session, the *Stephens* MI-CIC microphone was chosen for its extreme cleanness throughout the entire range, and for its absence of "pops" on certain letters such as "p" in the lower frequencies.

All original recording is done on *Ampex* tape machines. The studios are equipped with four of the 200 series (large, custom-built models) and three of the 300 series (small, broadcast type). After the number has been recorded, the original tapes are intercut according to the producer's direction, and a final "A" tape is placed on the storage reel ready for dubbing. Since *Capitol* produces a great part of its catalogue on all three speeds, special tapes must be assembled from the originals with proper pauses or spacing for the LP 33⅓ r.p.m. sides, which of course run from 12 to 26½ minutes for a single side.

The console, (see cover) one of the two custom-built for *Capitol* by Art Davis of *Cinema Engineering,* has a very desirable feature; *i.e.,* eight of its ten channels can be either boosted or attenuated nine db. at the high or low end. This feature alone is one of the most versatile aids in getting any desired sound, and is extremely valuable for music, vocals, or sound effects.

To the left of the console but not shown are the eight channels of echo which control the mixer output to the speakers in one or both of the two specially constructed echo chambers located on the roof of the building.

(*Continued on page* 109)

General view of Capitol Record's dubbing room No. 2 showing two Scully lathes tied together (by means of the dural bar at rear of lathes) for producing two identical processing masters simultaneously. These machines normally produce LP's and are equipped with semi-automatic groove deepeners and automatic head lift at master tail out.

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TV Receiver Conversion for Velocity Modulation

By
M. A. HONNELL
and
M. D. PRINCE
Georgia Institute of Technology

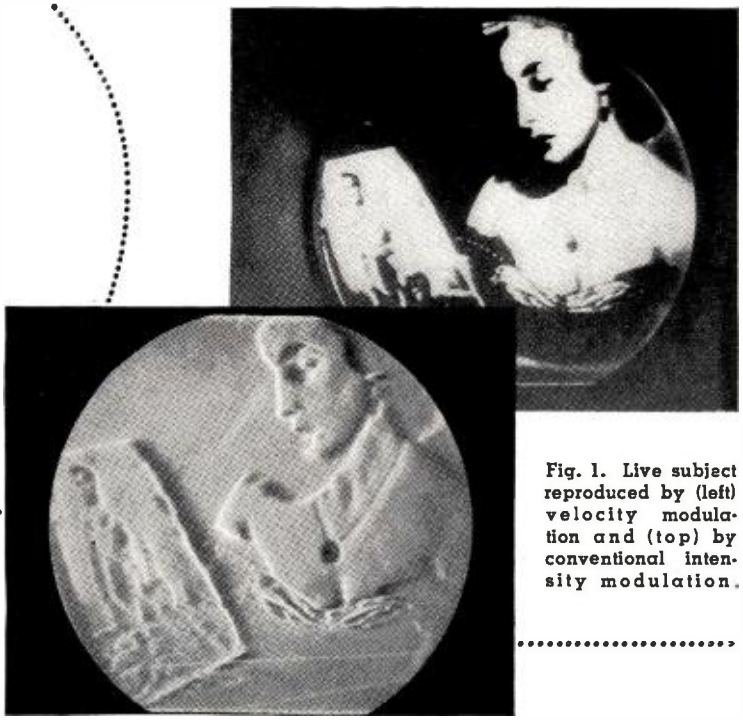

Fig. 1. Live subject reproduced by (left) velocity modulation and (top) by conventional intensity modulation.

By merely adding a single switch and a few wires any electrostatic deflection type set can be converted.

ALTHOUGH the operating principles of television systems are now well established, in the early stages of the art a television system was developed which operated quite differently from those in use today. Prior to the perfection of the modern high-vacuum kinescope, the early gas-filled version of the cathode-ray tube was incapable of adequate grid control. In view of this fundamental limitation, the idea was conceived of operating the cathode-ray tube with constant beam current and applying the video voltage to the horizontal deflection circuit so that the picture information was supplied by changes in the horizontal scanning velocity of the fluorescent spot on the screen of the cathode-ray tube. This deflection-modulation principle was first proposed by Boris Rosing, a Russian teacher, in 1911, and a satisfactory working system was demonstrated by the German scientist, Von Ardenne, in 1931. Later, in 1933, the British workers Bedford and Puckle perfected an ingenious system which utilized a combination of deflection-modulation and intensity modulation.[1] Following this period the field of deflection-modulation lay dormant; beam-intensity modulation had proved more advantageous and was developed to its present state of perfection. However, this field was recently reopened when research by the authors revealed that standard television programs transmitted by commercial stations could be reproduced with unusual results by use of deflection-modulation. A description of this work and a basic analysis of the underlying principles was presented to the 1950 National Convention of the Institute of Radio Engineers. In this present article, the circuitry is described and receiver modifications are shown so that the amateur experimenter can demonstrate this deflection-modulation reproduction on his own television set.

[1] Deflection-modulation is customarily referred to as "velocity modulation" since the lateral velocity of the scanning spot is modulated in the horizontal direction. Unfortunately, however, the term "velocity modulation" has also gained acceptance in an entirely different sense, as the "velocity-modulated" klystron tube. When used with this latter meaning, it applies to the change in velocity of the electrons in the electron beam itself, such as would be produced by modulating the second-anode voltage in a cathode-ray tube.

Fig. 2. An example of printed material as reproduced by (left) velocity modulation as described in the text and (right) conventional intensity modulation techniques.

This discussion is confined to the consideration of an electrostatic-deflection receiver, although deflection-modulation has also been demonstrated in the laboratory using magnetic deflection. However, since the high-voltage is usually obtained by flyback pulse rectification, the conversion of a magnetic-deflection receiver is not recommended. In a receiver employing this type of power supply, any video signal inserted in the deflection circuit interacts with the anode voltage and causes distortion of the picture raster.

The conversion of a *National* type NC-TV7M electrostatic-deflection receiver will now be considered in detail. The diagram shown in Fig. 3 illustrates the modifications which provide deflection-modulation reproduction. When the two-position switch S_1 is in position 1, the circuit operates in the usual manner, in which case the video signal is coupled from the video amplifier V_8 through coupling condenser C_{34} to the cathode of the kinescope. It is to be noted that in this receiver the kinescope is cathode-driven.

When the switch is in position 2, the receiver is converted to velocity modulation reproduction. In this mode of operation, the video signal is removed from the kinescope circuit by opening the video signal lead immediately to the right of C_{34}, and is then connected to the horizontal-deflection amplifier V_{14} through a small condenser C_6. This adds the video signal to the saw-tooth sweep voltage so that it is amplified along with the normal horizontal sig-

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nal. Due to the amplification provided by the sweep amplifier, a value of C_a on the order of 3 $\mu\mu$fd. provides ample coupling between the video and deflection circuits. This value is not critical and a capacitance of 1 to 10 $\mu\mu$fd. will prove satisfactory. This capacitance may be provided by twisting together several inches of insulated wire.

Since the kinescope beam current is no longer modulated by the video signal some other reasons must be provided for blanking the kinescope spot during the time required for retrace. During the vertical retrace period the spot is readily blanked by coupling the vertical sweep signal from V_{12} through C_b into the kinescope cathode circuit. A value of $C_b = 1000$ $\mu\mu$fd. was found satisfactory although the optimum value depends upon the receiver and can best be determined experimentally. The horizontal retrace lines were not objectionable so blanking was not provided for them. If the capacitance C_b is omitted, the velocity-modulated image will still be produced although the vertical retrace lines will be visible.

It will now be instructive to consider the magnitude of video signal required to produce a deflection-modulated picture. Let us assume that the 7JP4 kinescope requires a peak-to-peak voltage of 800 volts for full horizontal deflection. Since a velocity-modulated image is produced by spot excursions on the order of one spot width, which corresponds to approximately 1/1000 of the raster width, a video signal voltage on the order of (800)/(1/1000) = 0.8 volt on the deflection plates will produce the desired image. If the deflection amplifier has a gain of 18, the desired voltage on the deflection plates is supplied by a voltage of 0.8/18 = .044 volt on the grid circuit of the deflection amplifier.

By following the suggestions in this article, the experimenter will find that deflection modulation is capable of reproducing printed material and line drawings with acceptable legibility, although it does not achieve the fine contrast gradation produced by conventional television systems. A consideration of possible applications indicates that deflection modulation may offer some advantages for specific industrial and military applications due to its unique presentation of the subject matter. Furthermore, the possibility of circuit economy should be considered, since the numerical example worked out in a previous section indicates that the required video signal is of such a small magnitude that it could easily be obtained directly from the video detector, thus eliminating the video amplifier in the receiver.

The preceding discussion naturally suggests the possibility of combining conventional beam modulation with deflection modulation in a television receiver. This type of presentation has been investigated in the laboratory and can easily be demonstrated on a receiver of the type shown in Fig. 3. This is accomplished by leaving the video signal lead connected to the kinescope circuit as in normal operation and at the same time coupling the video signal through C_a to the horizontal deflection amplifier to produce the velocity modulation. The images produced by this modified circuit exhibit an outlining edge on one side of bright objects and adds a crispness to the picture which seems to improve the apparent resolution.

Deflection modulation is of further importance from a standpoint of standard receiver performance due to the fact that stray capacitances may exist in a conventional television receiver and produce some degree of spurious deflection-modulation in combination with the conventional presentation. In other words, due to faulty receiver design or failure of component parts, an undesired deflection-modulation image may be superimposed on the regular television picture, thus causing some positional distortion and loss of contrast. This type of distortion may result in a halo effect similar to that caused by overshoot in the video section, or by ghost images caused by reflections and may therefore be improperly diagnosed.

Research in the laboratories and by the experimenter may reveal additional points of interest since the full implications of the combination of deflection modulation with beam modulation are not completely apparent at this date.

The writers are grateful to the Engineering Experiment Station at Georgia Tech for its financial support of the investigation of deflection-modulation television systems.

REFERENCES

Wilson, J. C.; "Television Engineering," Pitman and Sons, Ltd., London. p. 102, 1937.

Zworykin, V. K. and Morton, G. A.; "Television," Wiley & Sons, Inc., New York, p. 238, 1940.

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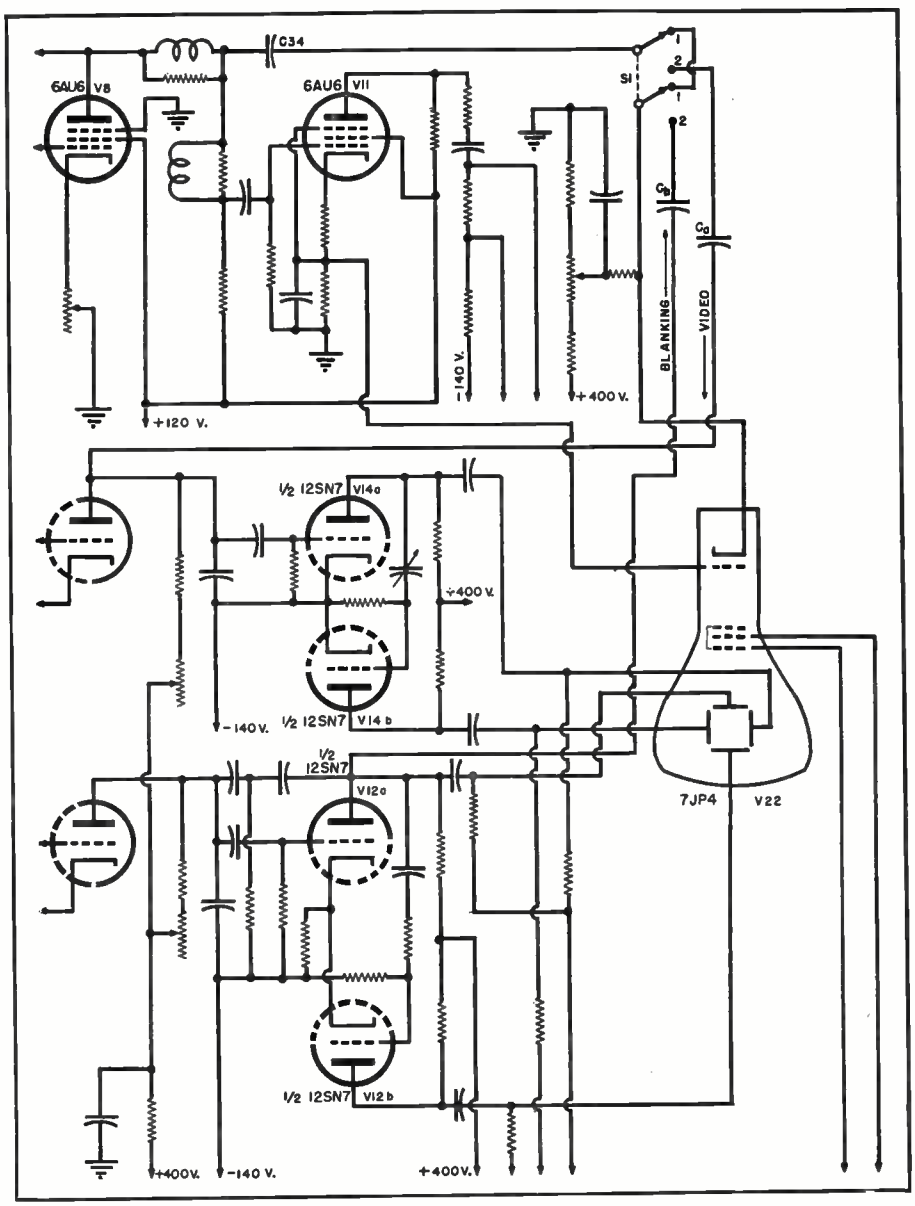
Fig. 3. Circuit diagram showing modifications of an electrostatic deflection receiver required to provide deflection modulation reproduction. When switch S_1 is in position 1, the receiver operates in the normal manner. When S_1 is in position 2, receiver is converted to deflection modulation reproduction. The only changes involved in converting the receiver are those connected directly with the switch.



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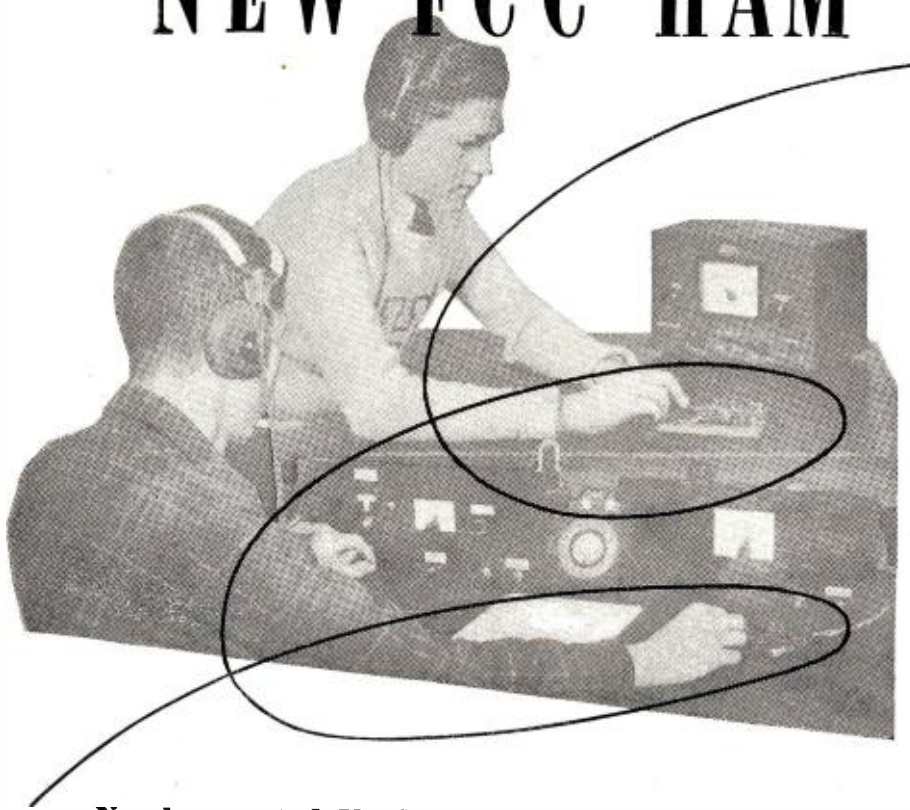
NEW FCC HAM RULES

By
RAY FRANK, W9JU
Associate Editor
RADIO & TELEVISION NEWS



Newly-created Novice and Technician classes of licenses open ham radio to more hobbyists.

THE long-awaited changes in the ham regulations became a reality on January 31, 1951 when the FCC adopted the revised rules. The proposal to revise the rules caused much speculation and some controversy in ham circles.

Probably of greatest interest to a large number of prospective amateurs are the provisions establishing the new Novice and Technician classes of licenses. These new categories open the field of ham radio to a large, new group of operators.

On April 21, 1949 the FCC published a notice of proposed changes in amateur rules, an announcement which was the cause of much comment, pro and con. As a result of the widespread interest, an informal conference attended by interested parties was held at the FCC offices on October 10 and 11, 1949.

Representing the organized amateurs were delegates from ARRL, NARC, and SARA. NARC and SARA, in spite of widely divergent views, resolved their differences and agreed to support the League. There were a great many comments on the various proposals and the meeting was concluded with a feeling that the rules, if revised to remove objectionable features, would have general support.

An amended set of proposals was published by the FCC on November 16, 1949. The ARRL asked for an oral argument on these new proposals and this meeting was held on June 2, 1950, attended by NARC, SARA, ARRL, and many of those who had appeared at the previous meeting. Several points were discussed at length including the wording of Section 12.0 dealing with basis and purpose, as well as the provision for a new class of license to be known as "Amateur Extra Class."

The revised regulations, as finally adopted by the FCC, are summarized below. Commissioners George Sterling, W3DF, and Frieda Hennock dissented in part with the wording of 12.0 and the provision for the Amateur Extra Class license, as well as the Commission's failure to provide for greater use of NBFM in the phone bands.

These new rules became effective March 1, 1951 except as noted. A brief outline of the major provisions of the new regulation is given below:

12.0 *Basis and Purpose.* These rules and regulations are designed to provide an Amateur Radio Service having a fundamental purpose as expressed in the following principles:

(*a*) Recognition and enhancement of the value of the amateur service to the public as a voluntary noncommercial communication service, particularly with respect to providing emergency communications.

(*b*) Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art.

(*c*) Encouragement and improvement of the amateur radio service through rules which provide for advancing skills in both the communication and technical phases of the art.

(*d*) Expansion of the existing reservoir within the amateur radio service of trained operators, technicians, and electronics experts.

(*e*) Continuation and extension of the amateur's unique ability to enhance international goodwill.

License Classes Revised

The following revisions were made in the license classifications.

Amateur Extra Class—Available Jan. 1, 1952.

Advanced Class—(Previously Class A). No new Advanced Class licenses will be issued after Dec. 31, 1952.

General Class—(Previously Class B). Effective March 1, 1951.

Conditional Class—(Previously Class C). Effective March 1, 1951.

Technician Class—Effective July 1, 1951.

Novice Class—Effective July 1, 1951.

Classes and Privileges

The new classifications and the privileges accorded each class of operation are as follows:

Amateur Extra Class: All authorized amateur privileges including such additional privileges in both communication and technical phases of the art which the Commission may consider as appropriately limited to holders of this class of license.

Advanced Class: All amateur privileges except those which may be reserved to holders of the Amateur Extra Class license.

General and Conditional Classes: All authorized amateur privileges except the use of radiotelephony on the frequency bands 3800 to 4000 kilocycles, and 14,200 to 14,300 kilocycles, and except those which may be reserved to holders of the Amateur Extra Class license.

Technician Class: All authorized amateur privileges in the amateur frequency bands above 220 megacycles.

Novice Class: Those amateur privileges as designated and limited as follows: The d.c. plate power input to the vacuum tube or tubes supplying power to the antenna shall not exceed 75 watts, crystal-controlled, on the following frequency bands: 3700 to 3750 kilocycles, and 26.960 to 27.230 mc. radiotelegraphy using only type A1 emission. 145 to 147 megacycles, radiotelegraphy or radiotelephony using any type of emission except pulsed emissions and type B emission.

An amateur operator license, except

(*Continued on page* 111)

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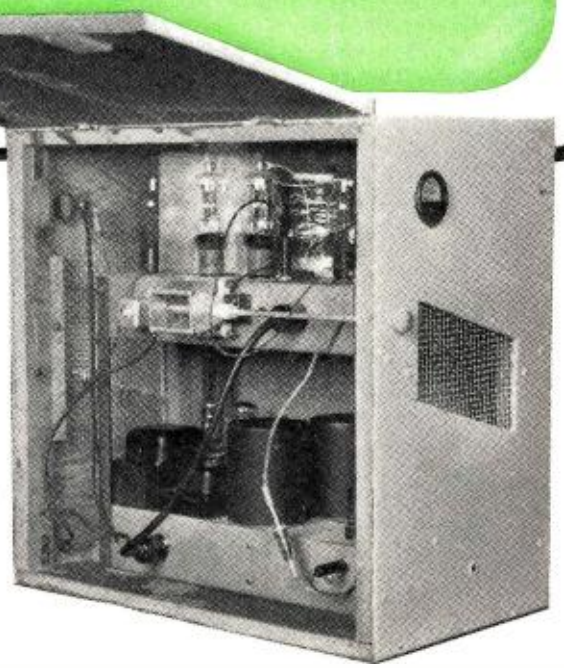
A Carrier CURRENT TRANSMITTER

By
JOHN GORT
Engineer, Station KWOA

Complete construction details on a practical unit which may be operated by laymen without license.



Over-all view of the home-built carrier current transmitter. The unit uses 5U4's to eliminate a two-step operation in putting the transmitter into service.

CARRIER current transmission development was given a real impetus because of the restrictions on radio communications that were in effect during World War II.

The system described in this article was developed for a church whose membership included a large number of persons who were unable to attend services due to illness or the infirmities of old age. Originally these people were served over telephone company lines which were connected from the public address system in the church to the various homes. When the telephone company put all their cables underground and no longer wanted to carry this high audio level material through these cables, it was necessary for the church to seek some other means of transmitting the services to the shut-ins.

When the author was approached by the church committee, various solutions to their problem were considered and discarded. A short-wave transmitter would require the services of a licensed engineer whenever the station was on the air. Citizens Radio service equipment is still in the experimental stage and would, in addition, require a separate high frequency receiver in each of the homes. This requirement would place an unnecessarily heavy financial burden on the church's shut-in members, most of whom were in the low-income bracket and not in a position to make such an investment.

After considering and rejecting these ideas, it was decided to try carrier current transmission. To test the practicality of such a scheme a "haywire" experimental unit was built using a 6L6 modulated oscillator, modulated by a pair of 6V6's, push-pull driven by a 6SJ7.

A check of reception in various places in the different homes led us to believe that such a plan was feasible and work was begun on a permanent unit. The unit is a m.o.p.a. using a 6L6 as a crystal-controlled oscillator, driving push-pull 807's in the r.f. final. These are modulated by a pair of 6L6's which are driven by a 6C5. A 6J5 is used as the audio input. This unit gives a coverage of about one-half mile radius.

Perhaps at this time a resumé of FCC rules and regulations pertaining to carrier current equipment would be in order.

"*SEC.* 15.2. *Apparatus excepted from requirements of other rules.* With respect to any apparatus which generates a radio frequency electromagnetic field functionally utilizing a small part of such field in the operation of associated apparatus not physically connected thereto and at a distance not greater than $157{,}000/f_{kc}$. feet (or $\lambda/2\pi$) the existing rules and regulations of the Commission shall not be applicable, provided:

"(a) That such apparatus shall be operated with the minimum power possible to accomplish the desired purpose.

"(b) That the best engineering principles shall be utilized in the generation of radio frequency currents so as to guard against interference to established radio services, particularly on the fundamental and harmonic frequencies.

"(c) That in any event the total electromagnetic field produced at any point a distance of $157{,}000/f_{kc}$. feet (or $\lambda/2\pi$) from the apparatus shall not exceed 15 microvolts per meter.

"(d) That the apparatus shall conform to such engineering standards as may from time to time be promulgated by the Commission.

"*SEC.* 15.3. *Exceptions: interference to radio reception.* The provisions of sections 15.1 and 15.2 shall not be construed to apply to any apparatus which causes interference to radio reception."

As can be seen from the formula, $157{,}000/f_{kc}$. feet, the lower the working frequency the greater the distance for a level of 15 μv./m., which of course would allow greater power output. In this respect the 200 kc. to 400 kc. band would allow the greatest coverage. However, in this instance that would require separate receivers or low frequency converters in all the homes. To avoid this expense, the broadcast band was chosen. Our choice was 690 kc. as there were no stations operating at this frequency anywhere in the vicinity. A radio log of stations is a big help in setting up the spot on the dial.

The problem of carrier current transmission breaks down into three separate problems.

1. Frequency stability and the matter of not exceeding the permissible power output level of 15 μv./m.
2. Coupling r.f. energy into the line.
3. Line attenuation and coupling.

In building the transmitter it is best to start with the power supply. As

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can be seen from the schematic (Fig. 1), separate high voltage and filament transformers are used. There is no special reason for this except that these electrostatically-shielded transformers were available on the surplus market. For good regulation, a choke input filter system was chosen. An 8 μfd. electrolytic condenser could have been used, however we chose oil-filled units in order to reduce the possibility of breakdown.

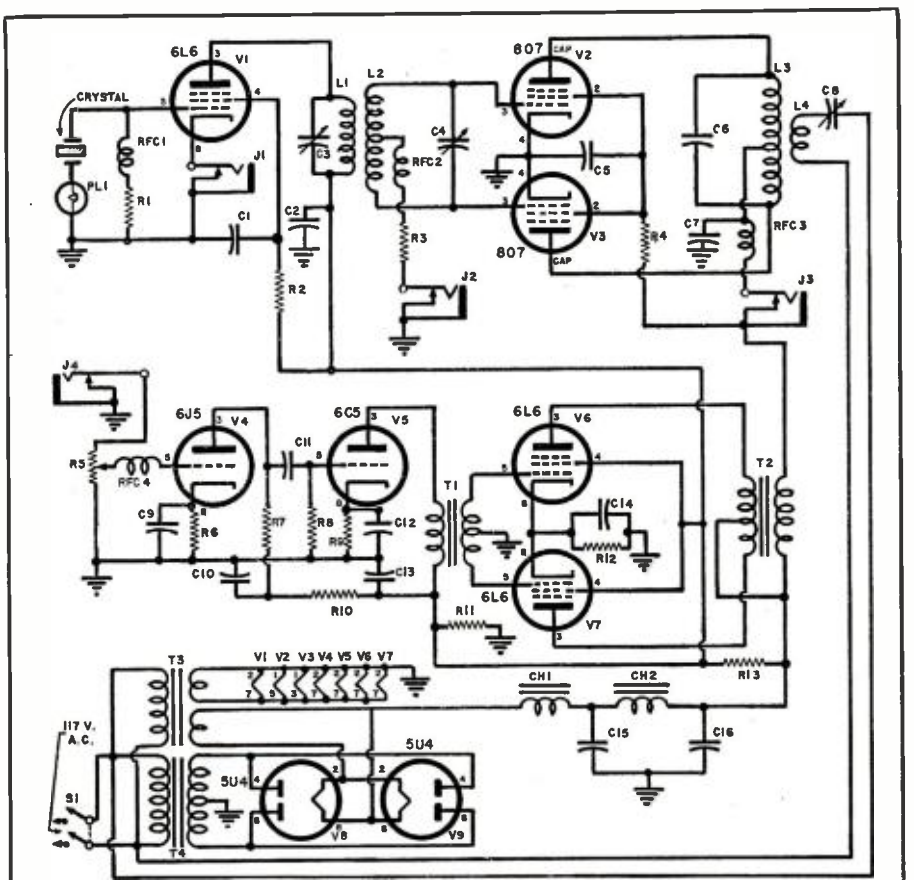
Due to the high current drain and in order to eliminate the need for a separate transformer for the 866A's (there is another reason we will go into later), two 5U4G's are being used in parallel. One tube can be used but that works the tube at about maximum ratings and an approximate 10 volt drop in the output voltage results.

The audio circuit is straightforward and should give no trouble. On the input we tried using an electrostatically-shielded line to the grid transformer and got a terrific hum that had us baffled until we removed the transformer and used the circuit of Fig. 1.

The reasons for the 2.5 mh. r.f. choke in the grid of the 6J5 is to reduce r.f. pickup due to the r.f. field around the transmitter. The line from the public address system in the church is isolated from the equipment by an isolation transformer.

The circuits shown do not include a volume compressor. However, a simple volume compressor, as described in the article "An Electronic Loss Compressor" (November 1950 issue) would be advantageous. The 807's were chosen because they didn't require neutralization, operating push-pull to eliminate the 2nd harmonic.

Fig. 1. Complete circuit diagram of the carrier current transmitter unit.



R_1—20,000 ohm, 2 w. res.
R_2—50,000 ohm, 1 w. res.
R_3—20,000 ohm, 1 w. res.
R_4—15,000 ohm, 10 w. wirewound res.
R_5—1 megohm pot
R_6—1500 ohm, 1 w. res.
R_7—220,000 ohm, ½ w. res.
R_8—1 megohm, ½ w. res.
R_9—1000 ohm, 1 w. res.
R_{10}—47,000 ohm, ½ w. res.
R_{11}—20,000 ohm, 25 w. wirewound res.
R_{12}—250 ohm, 10 w. wirewound res.
R_{13}—2000 ohm, 10 w. wirewound res.
C_1, C_2, C_{11}—.01 μfd., 600 v. cond.
C_3, C_4—250 μμfd. var. cond. (Johnson Type 250 H15)
C_5, C_7—.002 μfd., 2500 v. mica cond.
C_6—200 μμfd., 1500 v. mica cond.
C_8—244 μμfd. var. cond. (Johnson Type 250 E20)
C_9—25 μfd., 25 v. elec. cond.
C_{10}, C_{13}—8 μfd., 450 v. elec. cond.
C_{12}—10 μfd., 25 v. elec. cond.
C_{14}—10 μfd., 50 v. elec. cond.
C_{15}, C_{16}—8 μfd., 600 v. oil-filled cond.
S_1—D.p.s.t. sw.
PL_1—60 ma. #48 pilot lamp
RFC_1, RFC_2, RFC_3—2.5 mh. r.f. choke
RFC_4—2.5 mh., 250 ma. r.f. choke
J_1, J_2, J_3, J_4—Closed circuit jack (Mallory A2A)
T_1—Interstage trans., single or p.p. pri. to p.p. grids, 3:1 over-all ratio (Thordarson T20A19)
T_2—Mod. trans., p.p. 6L6's, 6600 ohm pri. to 4000 ohm load (Thordarson T21M54)
T_3—Fil. trans., 5 v. @ 6 amps.; 6.3 v. @ 6 amps.
T_4—Plate trans. 380-0-380 v. @ 305 ma.
CH_1, CH_2—4.2 hy., 300 ma. filter choke
L_1—60 t. #22 en. closewound on 3½" form
L_2—60 t. #22 en. closewound on 3½" form, half on each side and spaced ⅛" from L_1
L_3—60 t. #18 en. closewound on 3½" form, center-tapped
L_4—Output link of #18 rubber covered wire, over center of L_3 (See text)
1—Crystal for operating freq. (See text)
V_1, V_6, V_7—6L6 tube
V_2, V_3—807 tube
V_4—6J5 tube
V_5—6C5 tube
V_8, V_9—5U4 tube

The 60 ma. #48 bulb in series with the crystal is to keep excessive currents from damaging the crystal since the bulb will burn out before the crystal is damaged.

The jack in the cathode of the oscillator is used to measure total stage currents which should read about 15 ma. at resonance. The oscillator tank coil consists of 60 turns of #22 enamel wire. No buffer stage is used but its use would increase the stability of the oscillator. The grid windings for the 807's are split, one half on each side of the oscillator tank, center-tapped, with the center tap grounded through a 2.5 mh. choke and a 20,000 ohm resistor. Here again a jack is provided for measuring the grid drive, which should be about 5 ma. at resonance. Bias on the 807's should be about —90 volts.

All windings are on 3½ inch cardboard forms. We used quart ice cream cartons which worked very well. They should be varnished or shellacked a couple of times before using. To prevent interaction between coils, they should be mounted at right angles. However, due to the small space available, we mounted ours vertically and put a metal shield between the oscillator tank and the 807's and final tank.

The final tank is 60 turns of #18 enamel wire closewound, with 30 turns on each side of the center tap. The coupling link (L_4 in Fig. 1) to the 115 volt line is a few turns of rubber covered wire wound around the center of the coil which is the "cold" part of the coil. The exact number of turns depends on the 115 volt house circuit and the correct coupling will have to be found by experiment.

The jack in the plate circuit is used when measuring plate current and checking circuit resonance. The meter should read about 27 ma. at resonance. By using jacks in different circuits only one meter is needed. This may be mounted on the outside of the cabinet and used to tune the final. A d.p.d.t. polarity-reversing switch is used when measuring the current in the grids to the 807's as the polarity is reversed there. As grid leak bias is used, a lack of excitation voltage from the oscillator produces no grid current or voltage for the 807's.

The reader may wonder why fixed condensers were used in the final tank and how the tank can be tuned to resonance. The coupling of r.f. energy to the line can be accomplished in different ways. Fixed condensers can be used. Experiments with different sizes of condensers will be necessary to determine the correct size as the capacity required will depend on the frequency chosen, the line load, etc.

Various methods of coupling to the line are shown in Fig. 2. In all cases C_1 serves to isolate and tune the line circuit. L_1 should be tapped, or the number of turns varied by experiment, in order that the coil can be correctly tuned to the line. Due to changing line loads, we are using a different method which will be discussed later. Perhaps it should be mentioned here that it is

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illegal to couple to the line side of the meter. It is only permissible to couple to the load side of the meter. The electric meter is a shunt to the r.f. energy but that cannot be avoided. To avoid the shunting effect of the lighting and power load across the line a parallel-tuned circuit (L_2-C_2 in Fig. 2C) is connected in series with the load side of the line.

No exact specifications can be given for the coil L_2 as it will be necessary to wind this coil with wire heavy enough to carry the entire load. The needed inductance will also be determined to some extent by the transmitter frequency.

In most cases there is a relatively low voltage developed across this circuit so the condenser C_2 (Fig. 2C) may be of the ordinary broadcast receiver type.

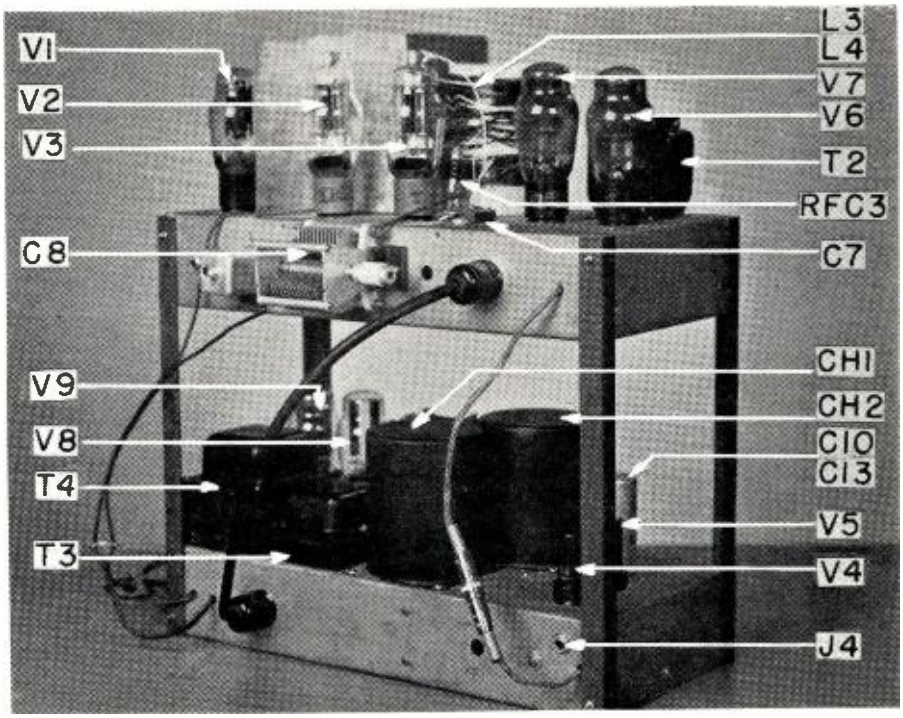
Due to the changing line loads from day-to-day and night-to-day, we decided to couple one side of the link to the 115 volt line and the other side through a variable condenser (C_8 in Fig. 1). In this way it was possible to compensate for the differences in the line load and at the same time tune the final tank by varying the reflected load. A variable condenser could have been used in the final tank circuit but such an application would require the use of a high voltage variable component and add an unnecessary tuning operation.

The second harmonic (1380 kc.) was strong enough to be troublesome so a series-tuned wave trap tuned to this frequency is used. It is connected from the 115 volt line side of the variable coupling condenser to neutral or ground. It is not shown in the diagram as it isn't required in all cases.

Our original plan called for the transmitter to be installed in the church. This idea was abandoned, however, due to the shunt effect of the lighting circuits and motors operating in the church. Since the church was located at some distance from the homes of those who would receive the transmission, it was decided to locate the transmitter in a more centrally located private home and run a remote line from the church p.a. system to the r.f. unit. This line must be balanced and an isolating transformer, the telephone company calls them repeating coils, should be used. For the protection of the equipment, lightning arresters should be used.

In order to tune the unit the 0-200 ma. meter is left in the final stage and a shaft on an insulated coupling is brought outside the cabinet so the operator can tune the final for resonance by noting the readings on the meter.

Now for the additional reason for not using 866A's. As these units were designed to be used in private homes and were to be operated by persons with no specialized knowledge of electronics, the requirement of a time delay between the application of the filament voltage and the high voltage had to be considered. Rather than entrust this two-step operation to inexperienced persons we chose 5U4's which don't require the time delay.



Over-all view of the transmitter with cabinet removed to show construction details.

The transmitter cabinet was constructed of plywood. Openings were left in the top and on the sides to permit ventilation. These openings were covered by ¼ inch mesh screen to keep inquisitive fingers out of the "innards". The door is hinged and equipped with a lock to prevent unauthorized access to the transmitter.

In the matter of line attenuation and coupling it should be realized that attenuation occurs in any line and that there is a tremendous loss in the transfer of r.f. energy in a power transformer designed for the power frequencies. If condensers could be used between the primary and secondary terminals of the transformer, the r.f. would have a low resistance path. This is done on some power lines to permit communication by linemen and in such cases it works very well. In our case this technique was not practical. When we hit a "dead spot" where the signal level was too low to work, we installed an outdoor long-wire antenna in parallel with the power lines feeding the house and carrying the r.f. energy we wanted. This increased the signal pickup at the receiver to a satisfactory level.

The mechanical arrangement of parts can be clearly seen in the photographs. The reader should note the interstage shield between the oscillator tube and tank coil and the r.f. final.

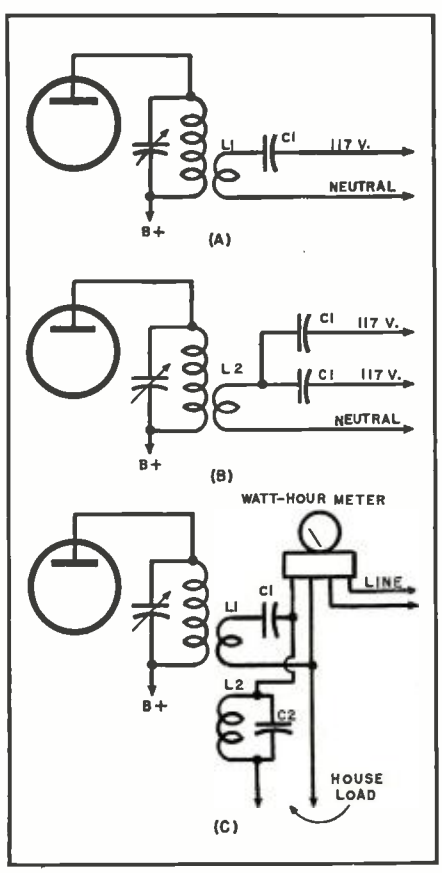
The transmitter is built on two 7x 17x3 inch chassis. The lower chassis carries the power supply and audio stages. The upper chassis houses the r.f. stages and the modulator stage. As shown in the photograph, two separate cables connect the two chassis. The larger of the two cables carries the power and filament wires while the other cable is the shielded lead from the driver transformer on the lower chassis to the grids of the 6L6 modulators on the top chassis.

Tuning Up

Insert the plug of the milliammeter into J_1 and tune for minimum reading.

(*Continued on page* 124)

Fig. 2. Three methods for coupling the transmitter unit to the line. See text for explanation on proper use of these couplings.



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SATURABLE REACTORS and CONTROL OSCILLATORS

By
ED BUKSTEIN

Core saturation, normally an undesirable characteristic, is used to control the performance of electrical devices.

CORE saturation, which in many applications is undesirable, provides a key to the solution of a number of industrial electronics problems. These solutions utilize the fact that when the iron core of a coil becomes saturated, the inductive reactance decreases. The physical structure of a saturable core reactor is illustrated in Fig. 1. The inductance, and consequently the reactance, of the a.c. winding depends upon the degree of core saturation. The degree of saturation, in turn, depends upon the value of current flow through the d.c. winding. Thus, by varying the d.c. current, the inductive reactance of the a.c. winding can be controlled.

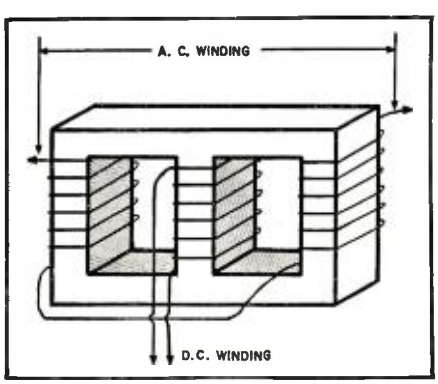


Fig. 1. Winding arrangement of the saturable reactor. The inductive reactance of the a.c. winding can be controlled by varying the current through the d.c. winding.

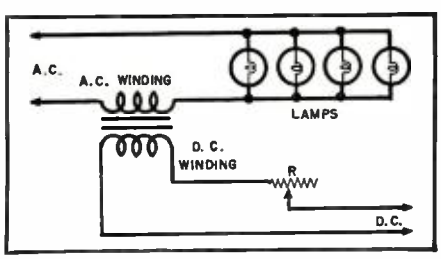


Fig. 2. Light dimming control. When the current through the d.c. winding is decreased the core becomes less saturated. The resultant increase of reactance of the a.c. winding causes the lamps to dim.

Fig. 2 shows a diagram in which a saturable reactor is used as a light-dimming control. This type of circuit is often used in theaters and auditoriums. When the value of the variable resistor R is increased, a smaller value of current flows through the d.c. winding of the saturable reactor. The decreased current lessens the degree of core saturation and increases the reactance of the a.c. winding. The greater reactance limits the current flow through the lamps, causing them to dim.

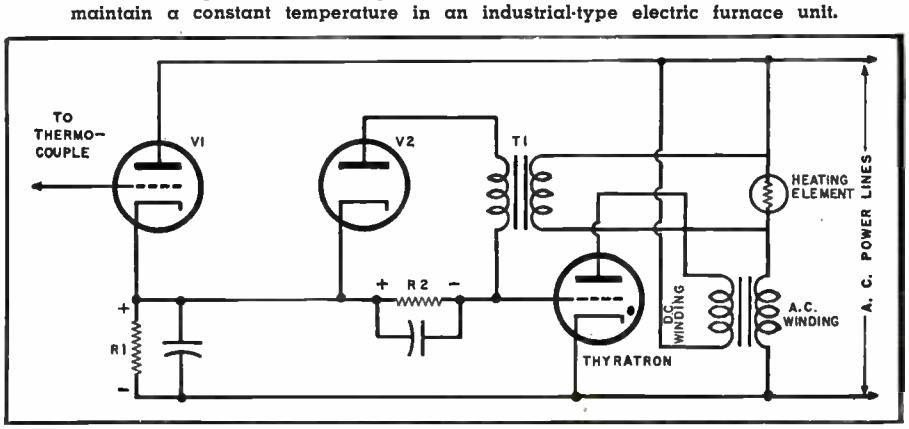
Another application of the saturable reactor is illustrated in Fig. 3. This circuit is designed to maintain a constant temperature in an electric furnace. The heating element of the furnace is connected in series with the a.c. winding of the reactor. The voltage across the heating element is therefore equal to the line voltage minus the drop across the a.c. winding. The d.c. winding of the reactor is connected in the plate circuit of the thyratron. The degree of core saturation is therefore dependent upon the current flow through the thyratron. The grid voltage of the thyratron consists of the voltage across R_1 in series with the voltage across R_2. R_1 tends to make the thyratron grid more positive, and R_2 tends to make it negative. The grid of V_1 receives its bias from a thermocouple located in the furnace.

If the temperature of the furnace should tend to drop, the voltage of the thermocouple (bias of V_1) would decrease. As the bias decreases, V_1 draws more current and the voltage drop across R_1 increases. R_1 then supplies a greater positive potential to the thyratron grid. The increased current of the thyratron, passing through the d.c. winding of the reactor, increases the degree of core saturation. When the core becomes more saturated, the reactance of the a.c. winding decreases. The smaller voltage drop across the a.c. winding leaves a greater voltage across the heating element so that the furnace temperature is raised to its original value.

If the voltage across the heating element should tend to increase excessively, transformer T_1 would apply a greater voltage to rectifier V_2. The resultant increase of voltage across R_2 makes the thyratron grid more negative. The thyratron now draws less current through the d.c. winding, and the core becomes less saturated. The reactance of the a.c. winding increases and reduces the voltage across the heating element to its original value.

(*Continued on page* 120)

Fig. 3. Wiring diagram showing how a saturable reactor is used circuit-wise to maintain a constant temperature in an industrial-type electric furnace unit.



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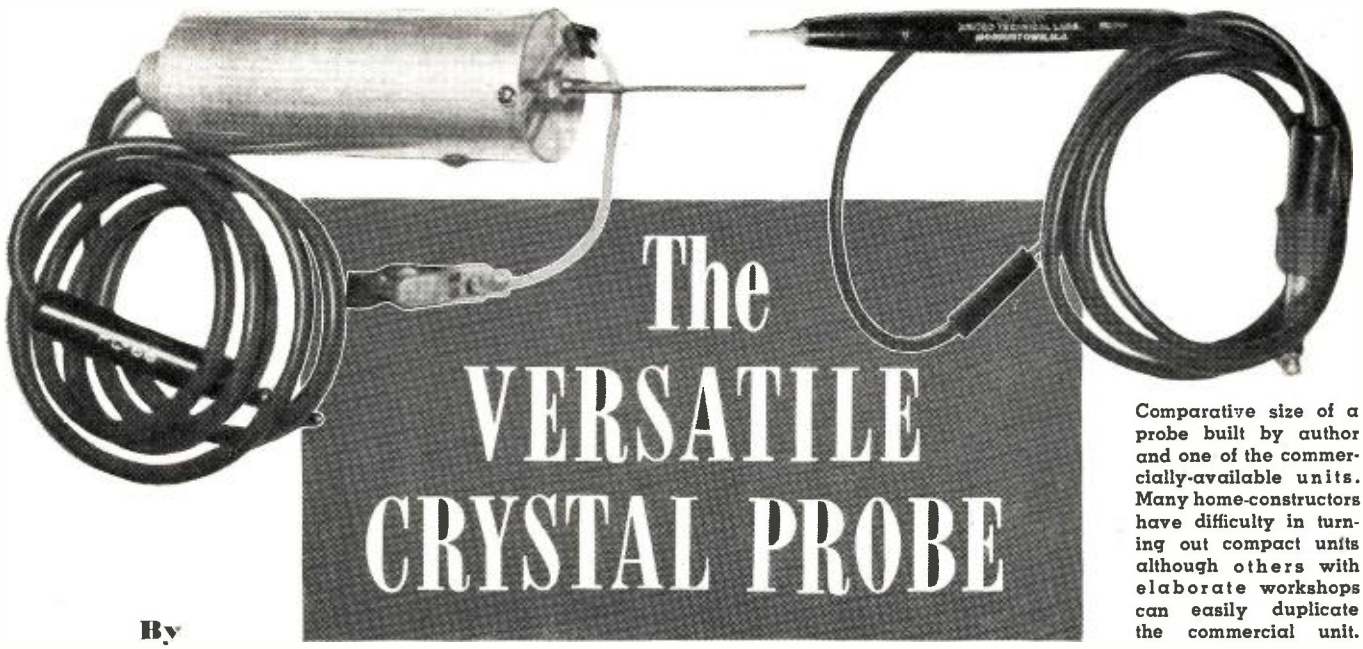


The VERSATILE CRYSTAL PROBE

Comparative size of a probe built by author and one of the commercially-available units. Many home-constructors have difficulty in turning out compact units although others with elaborate workshops can easily duplicate the commercial unit.

By
JOHN T. FRYE

Here, in one article, are presented all the practical uses for crystal probes in radio and TV servicing.

SUPPOSE someone offered you a gadget that would give you ten more miles to the gallon when used on your car; wash the dinner dishes in half the usual time if hooked to the kitchen sink; and, when fastened to your TV set, expand your 12½" picture to three-by-four feet. You would eagerly snap up such a bargain that enabled you to obtain so much *extra* benefit from equipment you already owned, wouldn't you? Yet a surprising number of technicians fail to take advantage of an inexpensive little apparatus that will perform equal aiding-and-abetting miracles when employed with standard service instruments now sitting on their benches.

I refer to the crystal diode probe. The technician who builds or buys a couple of crystal probes like the ones pictured and learns how to use them will quickly discover that the usefulness of his v.t.v.m., v-o-m, scope, and service amplifier has been multiplied many times; and he will be able to do things with these familiar instruments that he never dreamed possible before.

Let's consider an example. Suppose a probe having a circuit similar to Fig. 1 is obtained. This particular crystal probe is designed to be used with a v.t.v.m. Condenser C_1 bars the passage of d.c. and allows only a.c. to appear across the germanium crystal. This crystal, being a rectifying device, acts as a short circuit for one-half of any alternating current wave appearing across it but presents a high resistance to the other half. As a result, the voltage appearing across the crystal is in the pulsating form shown in Fig. 2B. This is simply the positive peaks of the waveform of Fig. 2A, and it consists of pulsating direct current. The resistor R, in connection with the usual ten megohm resistance of the

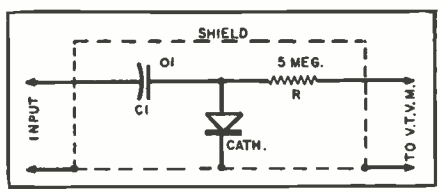


Fig. 1. Diagram of crystal probe designed for use with a vacuum tube voltmeter.

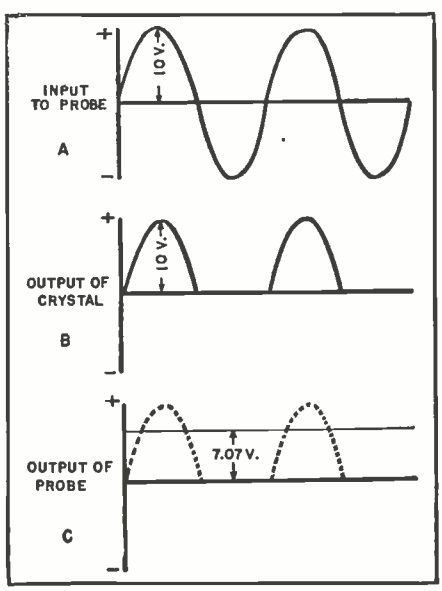
v.t.v.m., serves as a voltage divider so that only approximately .707 of this peak voltage actually appears at the input of the vacuum-tube voltmeter. The distributed capacity of the cable, together with the filtering action of R, serves to smooth out the pulses of current and delivers a steady d.c. voltage to the v.t.v.m. The end result is that the d.c. scales of the v.t.v.m. will now indicate the r.m.s. values of the r.f. voltages presented to the crystal probe.

Such a probe will measure alternating current frequencies up to 200 megacycles with an accuracy of plus or minus ten per-cent. Its input capacity is only 3.5 $\mu\mu$fd., and the a.c. input resistance is ¼ megohm at 500 kc., 150,000 ohms at 10 megacycles, and 25,000 ohms at 100 megacycles. This means that the probe can be applied to circuits carrying r.f. currents with a minimum of "loading" or detuning.

The first thing you can do with such a probe and your v.t.v.m. is use *all* of the point-to-point "gain" information given in modern service manuals. Before, you could only measure the gain of the audio stages with your v.t.v.m.; but now, employing the crystal probe, you can actually measure and compare the r.f. voltage on the grid of a tube with that present on the plate. This ability to compare the actual gain of a receiver stage with the normal gain given in the service manuals is of invaluable aid when trying to run down the cause of poor sensitivity in a receiver.

Another important check that can quickly be made is on the operation of the oscillator. To make such a check with a crystal probe you do not actually have to touch the probe to the "hot" portions of the oscillator circuit. It is sufficient merely to bring the probe near the stator of the oscillator tuning condenser, for if the oscillator is operating, enough r.f. can be picked up in this fashion to get a substantial reading on the meter. This method causes no detuning of the oscillator and usually can be performed without

Fig. 2. Waveforms of probe shown in Fig. 1.



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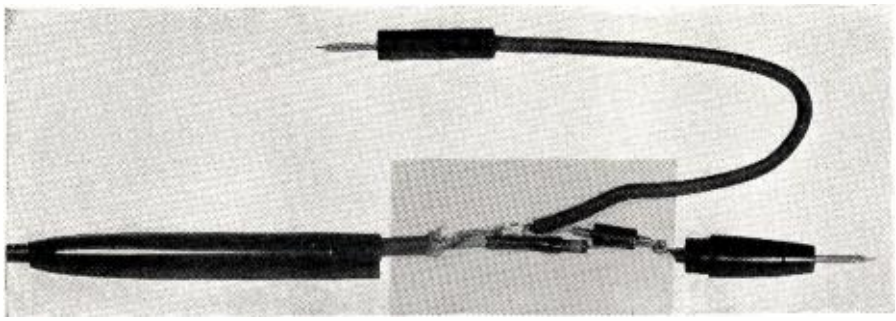

Disassembled view of "Klipzon" probe showing how compactness is achieved. The rectangular piece of foil in the final assembly is folded around the unit for shielding.

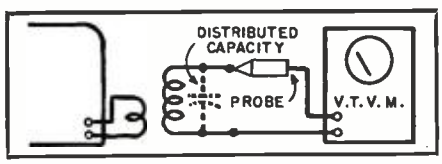

Fig. 3. Wiring arrangement used to check "Q". As mentioned in the text, this method is subject to error and is rather crude when compared with laboratory methods of determining "Q". It does, however, provide the technician with a simplified method of comparing performance of two identical coils.

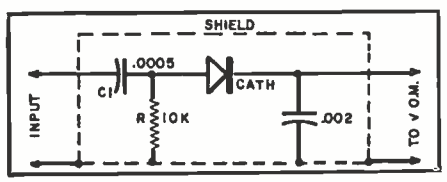

Fig. 4. Wiring diagram of crystal probe intended to be used with any v-o-m of at least 5000 ohms-per-volt sensitivity.

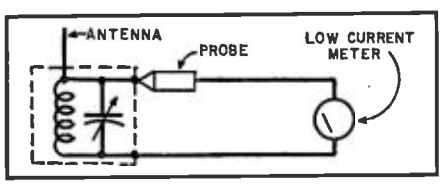

Fig. 5. Circuit diagram of a sensitive and easily-assembled field strength meter for making radio transmitter adjustments.

removing the chassis from the cabinet. Any faltering of the oscillator as the receiver is tuned through the band is instantly shown on the v.t.v.m.

Even the "*Q*" of coils can be roughly measured in the circuit shown in Fig. 3. Here the signal generator is connected to the primary of the coil and the crystal probe is touched to one end of the secondary while the ground lead of the v.t.v.m. goes to the other. Then the signal generator is adjusted for maximum voltage, which will be the resonant frequency of the coil tuned by the various stray capacities. Then the signal generator is moved lower in frequency until the voltage reading is only 71% of the maximum value and the frequency noted. Next the frequency of the generator is increased through resonance and past until the meter again reads 71% of the resonant value. The "*Q*" of the coil is determined from the formula: Coil "*Q*"= the resonant frequency in kc. divided by kc. down from resonance plus kc. up from resonance.

As an example, suppose the coil resonated at 1600 kc., and the downward frequency that gave a 71% reading was 1555 and the upward frequency that gave this reading was 1635. Then the formula would be:

$$Q = 1660/45 + 35 = 20.$$

While admittedly this method is subject to considerable error and is crude when compared with laboratory methods of determining "*Q*," it will give the technician a method of determining coil merit sufficiently accurate for his needs. After a little experience in measuring coil "*Q*" in this manner, the technician will be able to spot quickly a coil whose "*Q*" has been lowered by a shorted turn or a high resistance in the winding.

Quite often the signal generator will not put out enough r.f. voltage to give a satisfactory reading on the meter. In that case I recommend that a broadband r.f. amplifier, such as the one described by Rufus P. Turner on page 78 of the March 1949 issue of RADIO & TELEVISION NEWS, be used either between the signal generator and the coil or between the coil and the probe.

When the amplifier is inserted between the voltage being measured and the crystal probe, the meter reading is no longer the r.m.s. value of the voltage but must be divided by the amplification factor of the amplifier. The amplifier mentioned has an over-all amplification of 85 from sixty cycles to two megacycles; so this means that an r.f. voltage of only five millivolts will produce a reading on the v.t.v.m. of nearly one-half volt.

Such sensitivity makes the amplifier-crystal-probe-v.t.v.m. combination a fine gadget to check the effectiveness of bypass condensers right in the receiver and without disconnecting them. A strong, modulated r.f. signal is run into the receiver and then the input probe of the amplifier is touched to the ungrounded ends of the bypass condensers in both the r.f. and a.f. portions of the receiver. (And it does not hurt to probe the tube shells, grounded lugs, and other parts of the receiver that are supposed to be tied fast to ground, either!) The presence of a signal at any of these points is an indication that something is amiss. This system is the best the writer has found for running down the cause of oscillation and instability in a receiver.

The circuit of Fig. 4 shows a crystal probe that is intended to be used with a v-o-m of at least 5000 ohms-per-volt sensitivity. C_1 again is an isolating condenser, but now the crystal allows one-direction pulses to pass through it and charge the .002 μfd. condenser. This condenser discharges through a current-reading meter connected across the output. Such a probe can be used with a 50, 100, or 200 microampere meter to indicate the presence of r.f. voltage and to indicate changes in this voltage.

It is possible to calibrate such a combination so that the current meter reading will actually indicate a.c. voltage applied to the probe. The method of doing this is given in the article "Extending Multimeter Utility" by Rufus P. Turner in the December 1950 issue (see pages 134 and 136). In practice, however, such calibration is of little value because the input resistance of the combination is necessarily quite low. As a result, it loads heavily any voltage source to which it is applied, and most sources of r.f. voltage —and that is what the crystal probe is ordinarily used to measure—have very poor voltage regulation, consequently, actual voltage readings obtained are likely to be far below the potentials actually present before the probe-meter combination is applied. But the crystal probe and v-o-m can be employed to indicate the presence of an irregular voltage of almost any wave shape and to show any changes in the amplitude of such a voltage. The ability to do this makes it a very handy article around the service shop.

For example, a small 100 or 200 microampere meter connected to this probe through any kind of two conductor cable can be carried up on the roof with you while the probe is connected to the control grid of the video tube of a TV set that is tuned to the station wanted. Then you can rassle the antenna around to your heart's content and see every move immediately reflected in the reading of your little meter. You, all by yourself, can quickly orient the antenna to the optimum position without any short-distance telephone, shouted instructions, etc., to foul up the operation.

The writer, when attacking an intermittent set, likes to hit it with everything he has. For that reason he tries to monitor as many points as possible in the receiver. One of these crystal-probe-and-microammeter combinations is connected to the oscillator section. Another is set across the output of an i.f. stage. The v.t.v.m. is hooked to the a.v.c. bus or across the input of the audio section, and finally the output meter of the v-o-m is connected across the primary of the output transformer. A receiver in such a straight-jacket can hardly make a false move without giving a tell-tale indication on one of these meters. The time and wear-and-tear on your disposition saved by cracking a few intermittents in jig time more than pays for the crystal probes and the extra meters.

If you are a ham, the crystal probe and microammeter can be connected

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across a tuned circuit with a short antenna, as is shown in Fig. 5, to make a sensitive and easily assembled field-strength meter for making transmitter adjustments. And, if you replace the meter with a pair of high-impedance earphones, you can easily check the quality of your phone transmitter while it is working into a dummy antenna.

Just an isolating condenser, a resistor and a crystal are needed to make the probe shown in Fig. 6. It can be used with an audio amplifier, or, if you have a very strong local signal, with a pair of sensitive headphones. Since this probe is intended to deliver audio pulses rather than pure d.c., no smoothing filter arrangements are needed and the probe can be reduced to the bare essentials shown.

Such a probe in combination with a high-gain amplifier forms that most modern and efficient of servicing tools —the signal tracer. With it you can follow a signal from the antenna post to the detector, and then, by switching out the crystal, from the detector to the speaker. Any distortion, noise, or variation in signal strength is immediately apparent and can be quickly tracked to its source. Anyone who has ever used the signal-tracing method of shooting trouble long enough to become proficient at it knows that it is one of the quickest methods of running down the more obscure receiver faults, for it enables the technician to check on distortion, noise, and gain all at one fell swoop.

A crystal probe can also be used with your oscilloscope to enable you to *see* the audio portion of the signal at any place you wish to examine it in the r.f. or i.f. part of the set. Since the probe "shucks" the audio portion of the signal out of the r.f. carrier and then feeds this demodulated signal into the scope amplifier, this means that an ordinary oscilloscope that cannot handle signals of much more than 100,000 cycles-per-second through its amplifier can still be used to good advantage in examining the high-frequency parts of the receiver that, without the probe, would be impossible.

A radio frequency signal, modulated by a 400 cycle note such as the ordinary signal generator puts out, can be traced right through the receiver with a probe similar to the one diagrammed in Fig. 6 and any serious changes in this composite signal will be immediately apparent in the distortion of the 400 cycle sine wave being viewed on the scope screen.

An ordinary scope equipped with a crystal probe can also be used for stage-by-stage alignment of TV receivers. With a high-output sweep generator connected to the grid circuit of the preceding tube, as is shown in Fig. 7, and the crystal probe touched to the plate of the tube fed from the secondary of the i.f. transformer, the voltage actually delivered to the scope will be a regularly rising and falling voltage that, when spread out on a linear time base by the synchronized sweep voltage, will indicate the response curve of the i.f. transformer. While the i.f. frequency is likely to be around 25 megacycles, the recurring voltage delivered by the crystal has a frequency equal to the sweep rate, usually either 60 or 120 cycles-per-second, and almost any scope can handle this frequency faithfully.

At first the writer made his own crystal probes. One of his manufacture, housed in an old electrolytic condenser can, is pictured and it works very well. Recently, however, he discovered the "Klipzon" probes manufactured by the *United Technical Laboratories* of Morristown, New Jersey; and he is willing to admit that they manufacture a much neater, more compact, and usable probe than he can make with the materials available to him.

These probes have two especially attractive features: one is a clever tiny clip built right into the probe tip that enables the probe to be clipped to a wire in quarters so close that only the tip itself can be inserted. The other is a needle-sharp point on the tip that can be used to penetrate insulation. These features, plus the fact that the probes are reduced to the size of a fountain pen, make the writer yield the palm to "Klipzon."

Their "V" type probe is intended for use with the v.t.v.m. and has the characteristics described in that connection. It can also be used with a scope or high-gain amplifier for signal tracing. The type "C" can also be used with scope or amplifier, but it is designed for use with a v-o-m of 5000 ohms-per-volt sensitivity or better. The circuit is shown in Fig. 4.

A word of caution should be added lest the probe be damaged by excessive voltage. The series condenser will protect the crystal from d.c. in the circuit but the a.c. is not blocked by this condenser. Care should be taken that the probe is not connected to points where high a.c. voltages are present or the crystal will be ruined.

In general crystal probes should not be used where the a.c. or r.f. voltage exceeds 20 volts r.m.s.

While the author makes no claim to the presentation of anything new or startling in the use of crystal probes in radio and television service work, he is hoping to achieve one goal—namely, stimulating the technician's interest in this versatile aide.

There are still thousands of technicians who are not familiar with the instrument at all while other thousands own such probes but haven't fully explored their possibilities in day-in, day-out servicing jobs.

It is in the hopes of interesting the "have-nots" in trying them and the "haves" in using their probes that this article was written.

In conclusion, the writer is not going to be guilty of uttering that fly-blown saw that "the things that can be done with this device are only limited by the ingenuity of the user," but he will wager that any technician who uses a crystal probe for a couple of weeks will never be without at least one in the shop from then on. —30—

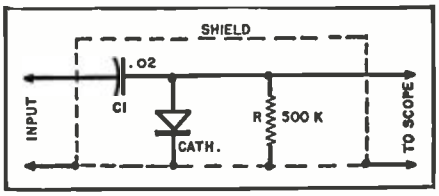


Fig. 6. A condenser, a germanium crystal and a resistor are all that are required in the construction of this probe. It can be used with an audio amplifier, or, if you have a very strong local signal, a pair of sensitive headphones will suffice. This probe, as mentioned in text, is designed to deliver audio pulses rather than pure d.c.

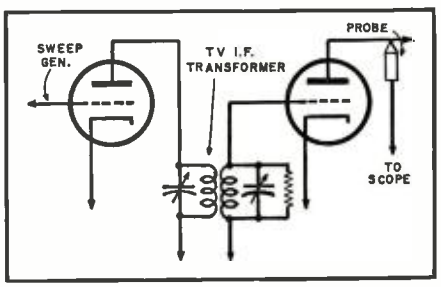
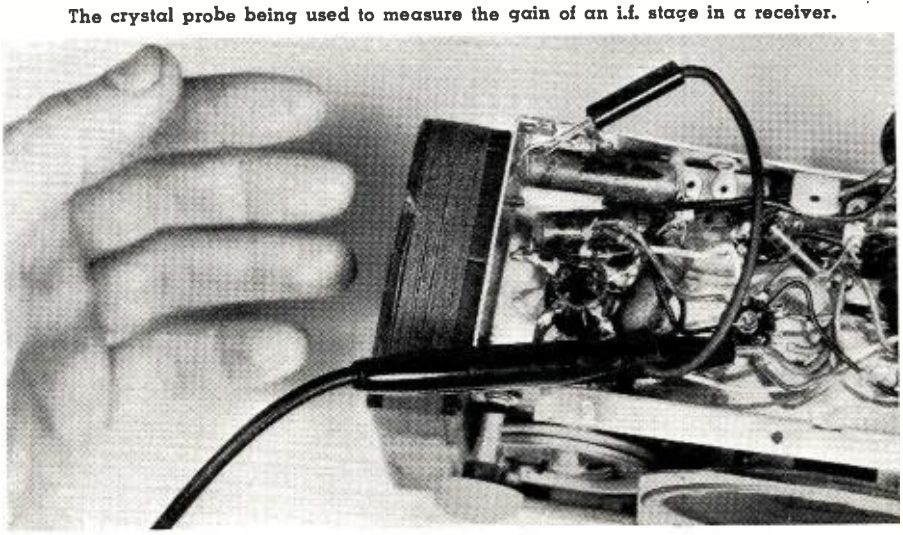


Fig. 7. An ordinary oscilloscope equipped with a crystal probe can be used for stage-by-stage alignment of television receivers.

The crystal probe being used to measure the gain of an i.f. stage in a receiver.



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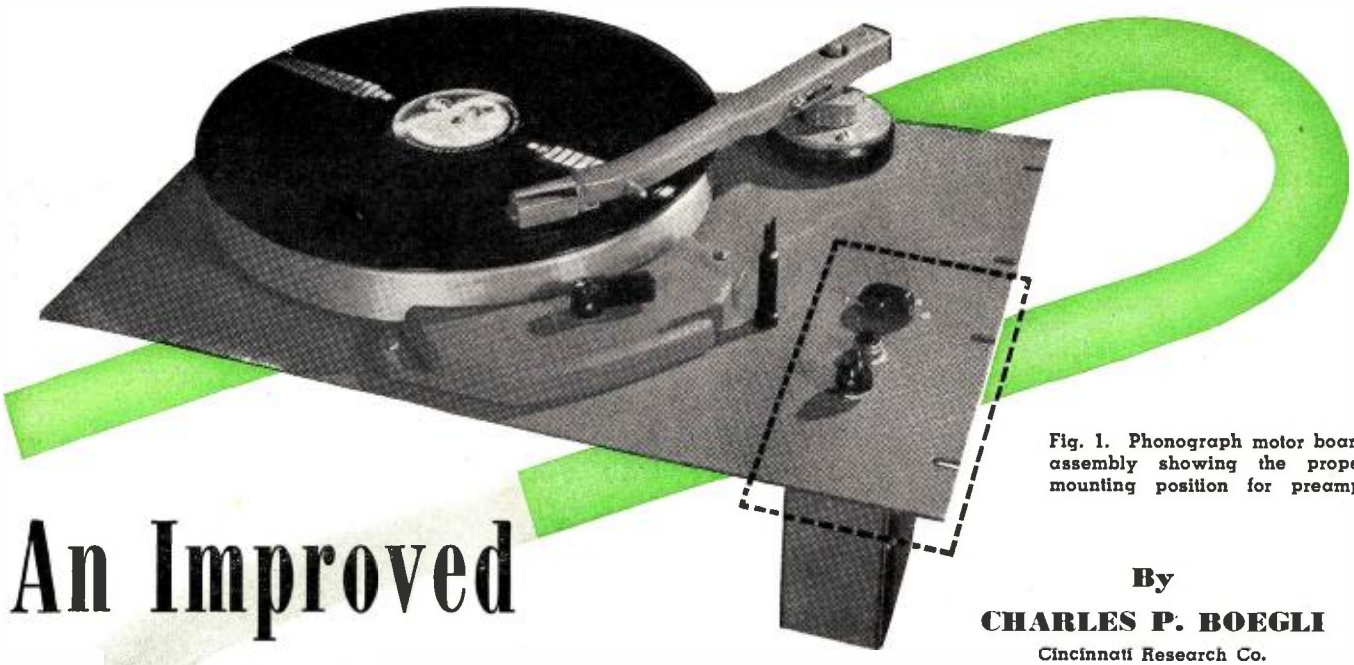


Fig. 1. Phonograph motor board assembly showing the proper mounting position for preamp.

An Improved EQUALIZER-PREAMP

A novel single-tube preamp incorporating a practical equalizer switching circuit.

By

CHARLES P. BOEGLI

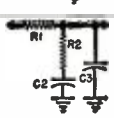
Cincinnati Research Co.

A PREVIOUS article[1] described a preamplifier, incorporating a 6SL7GT tube, which is suitable for use with either crystal or magnetic pickups. This unit gives very satisfactory service in conjunction with pickups of relatively high output voltage but it leaves a little to be desired in the way of freedom from hum and noise when used to amplify the output of very low-voltage cartridges. For that reason the design of a preamplifier providing the ultimate in convenience, freedom from distortion, and absence of noise and hum was attempted.

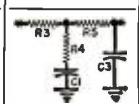
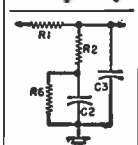
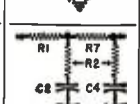
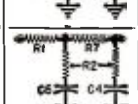
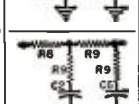
The 12AY7 tube recently marketed by *General Electric* is specifically tailored for low-level audio service.[2] When properly utilized it is superior to ordinary triodes, especially with respect to freedom from hum and microphonics, and it was therefore selected for this application. For low-hum service the two heater sections of this tube are paralleled and connected to 6.3 volts, and for this reason the convenience of using the preamplifier with sets having 6.3 volt tubes is not lost.

Fig. 2 is the circuit diagram of the preamplifier. R is the pickup load resistance specified by the manufacturer of the magnetic cartridge to be utilized, while for most crystal pickups R should be around 15,000 ohms. With a 300 volt "B+" supply the maximum voltage input to each section is 3.5 volts. The signal to the first section is normally so small that distortion in this stage is negligible. The gain of

Table 1. Various equalizer designs and their applications. All popular make discs are covered.

EQUALIZER	CIRCUIT	ACCURATE COMPENSATION FOR	MAY ALSO BE USED FOR
(A) Flat 250 c.p.s.		H.M.V. English Columbia	
(B) Flat 500 c.p.s.		Capitol-Telefunken; most European and earlier American.	H.M.V.
(C) NAB		Capitol; Artist; most late American except RCA, Columbia.	Columbia 78 Columbia 33.3

R_1 is 820,000 ohms or over (see text)
R_2 is 33,000 ohms
R_3 is approximately .8 x R_1
R_4 is 27,000 ohms
R_5 is 5600 ohms
R_6 is 150,000 ohms
R_7 is 18,000 ohms
R_8 is approximately 1.2 x R_1
R_9 is 39,000 ohms
C_1 is .02 μfd.
C_2 is .01 μfd.
C_3 is .003 μfd.
C_4 is .001 μfd.
C_5 is .006 μfd.
C_6 is 250 μμfd.

EQUALIZER	CIRCUIT	ACCURATE COMPENSATION FOR	MAY ALSO BE USED FOR
(D) Columbia 78		Columbia 78	
(E) Columbia 33.3		Columbia 33.3	
(F) RCA 78 RCA 45		RCA Victor 78 RCA Victor 45	RCA Victor 33.3 Concert Hall 78
(G) RCA 33.3		RCA Victor 33.3	RCA Victor 78 RCA Victor 45
(H) FFRR		London FFRR Decca FFRR	

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the stage is 30; if no equalizer were provided between stages a signal of 110 mv. to the first grid would drive the second stage to capacity. The effect of the inserted equalizer is to reduce high-frequency signals to the point where distortion in the second stage is also negligible. Lower frequencies are of course passed with less attenuation but since those below the turnover are attenuated on commercial recordings, no additional distortion results. The net result is that almost complete freedom from distortion is attained without the employment of feedback.

The chassis, Fig. 4, is designed to be mounted on the phonograph motor board, Fig. 1. The equalizers are mounted underneath the chassis on a terminal board which facilitates removal or replacement. If desired, they can be potted in the manner previously described[1] and this has the advantage of stabilizing them against the effects of moisture.

The equalizers are substantially the same as those designed for the earlier unit with the exception of the input resistors, which are reduced to the smallest size consistent with good response. The specified input resistance establishes the gain of the entire unit at approximately 36. If the preamplifier is to be used with a high-output (50-100 mv.) magnetic cartridge or a crystal pickup it will be advantageous to make the input resistors 1.5 megohms because this size results in slightly better bass response. It is not possible to reduce the input resistors to less than 820,000 ohms without seriously affecting bass response; the gain of 36 can, therefore, be considered the maximum attainable from a phonograph preamplifier utilizing a single 12AY7 tube.

Table 1 shows equalizers for a variety of purposes and gives examples of well-known discs for which each is designed. Although it is entirely possible to incorporate the complete set into the preamplifier, the writer presently feels that satisfactory compensation can be made for the majority of pressings with a smaller number of equalizers. The last column has been included in the table to aid the constructor in making a sensible selection. It should be mentioned that *RCA Victor* does not publish its recording characteristics, and equalizers for its discs are based on curves determined from listening tests by a number of observers. If any uncommon equalizers are desired they can be calculated easily and rapidly by means of a recently-published design chart.[3]

Some writers have advocated the use of two-section, instead of single-section, equalizers for bass compensation, holding that in this manner a sharper turnover is obtained.[4] Calculation seems to show, however, that this is not the case and furthermore that the two-section equalizer suffers from some special disadvantages. Fig. 3 illustrates the characteristics of each type for a 500 c.p.s. turnover. If

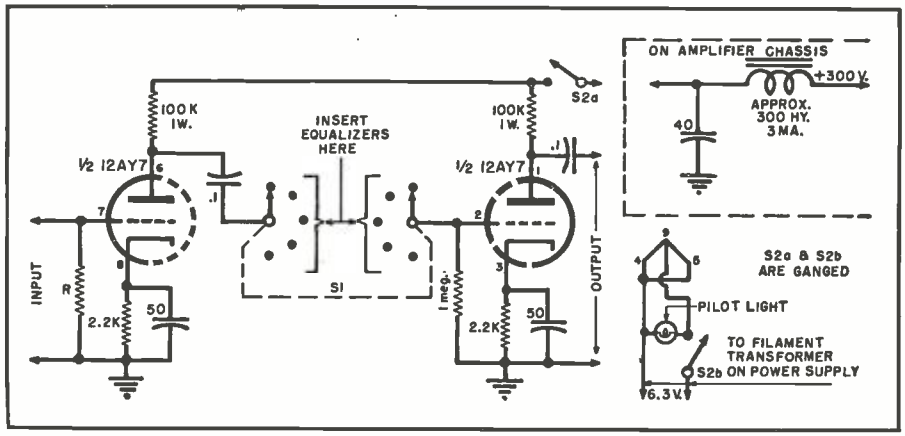

Fig. 2. Circuit diagram of preamplifier. Equalizers connect to switch S_1.

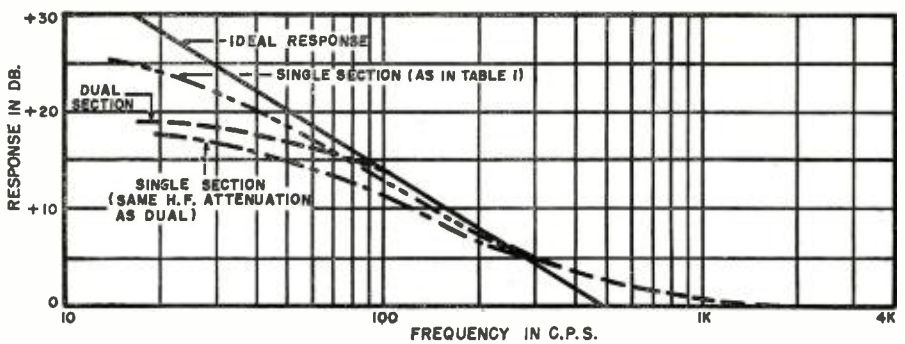

Fig. 3. Comparison of response curves for flat, 500 c.p.s. equalizer shown in Table 1B.

the high-frequency attenuation for the single section is fixed at that which automatically results for a two-section equalizer, the latter provides a more desirable response than the former; the low-frequency response is down 3 db. from the ideal at 90 c.p.s. for the single and at 50 c.p.s. for the dual. The performance of the single section can be improved, however, by accepting greater high-frequency attenuation; this is not possible with the two-section unit. For the equalizer shown in Table 1B the response is down 3 db. at 25 c.p.s., as indicated by Fig. 3.

The output impedance of the last 12AY7 section is about 20,000 ohms. If the signal is fed from this stage into a low-mu triode with an input capacitance of approximately 50 $\mu\mu$fd., an additional 110 $\mu\mu$fd will bring the treble response down 3 db. at 50 kc., which is not considered objectionable. This capacitance is equivalent to about four feet of single-conductor shielded microphone cable. If a very much longer wire than this is required, special low-capacity cable may be needed or resort may be had to a cathode-follower output stage at the preamplifier.

REFERENCES

1. *Boegli, Charles; "A Preamp for Magnetic and Crystal Pickups,"* RADIO & TELEVISION NEWS, *July, 1950.*
2. *Knight, C. R. and Haase, A. P.; "A Low-Noise Input Tube."* RADIO-ELECTRONIC ENGINEERING, *March, 1949.*
3. *Boegli, Charles; "Equalizer Design Chart." Electronics, April, 1950.*
4. *McProud, C. G.; "Recording Characteristics." Part 2, Audio Engineering, January, 1950.*

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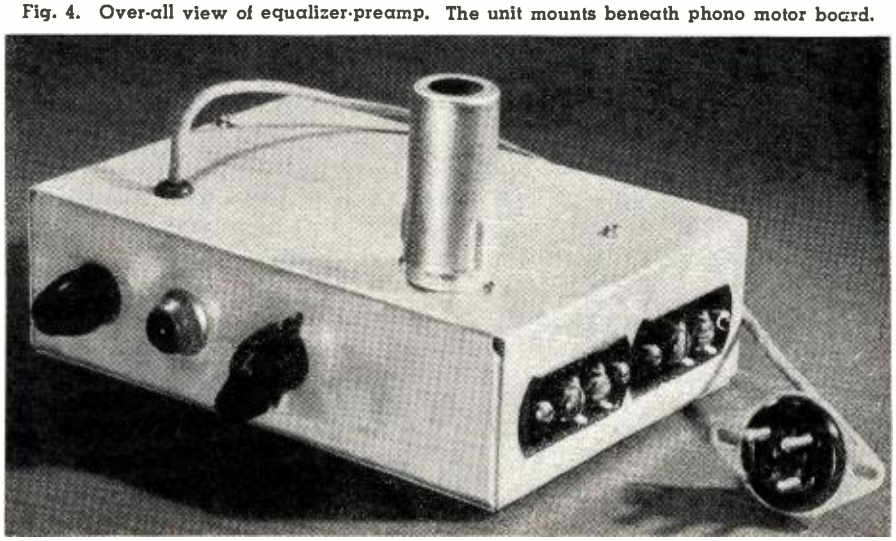
Fig. 4. Over-all view of equalizer-preamp. The unit mounts beneath phono motor board.



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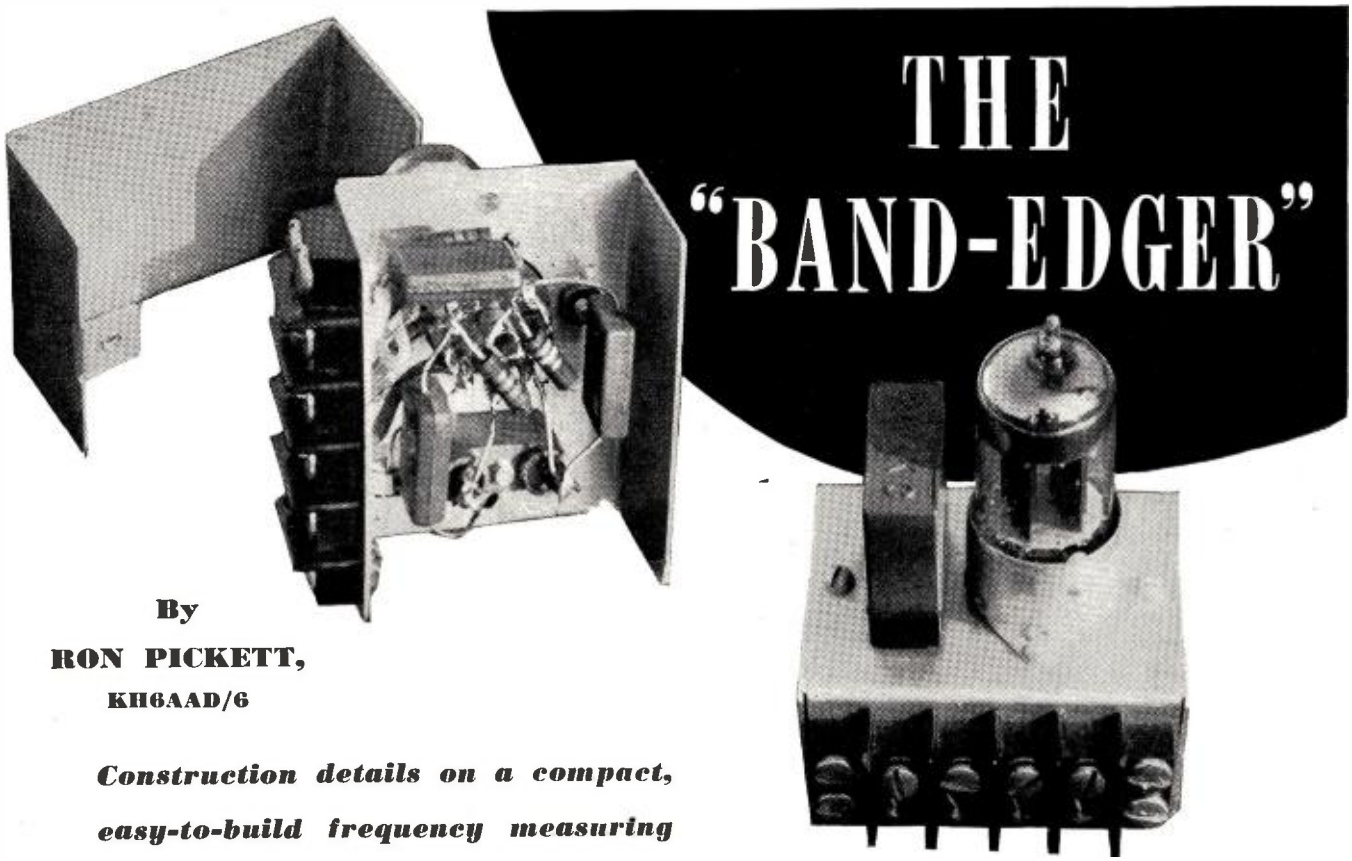
THE "BAND-EDGER"



By
RON PICKETT,
KH6AAD/6

Construction details on a compact, easy-to-build frequency measuring test unit. A "must" for every ham.

Fig. 1. Over-all view of "Band-Edger." Chassis was formed from a .020" aluminum sheet.

FREQUENCY measurement in the ham shack has become a vital necessity. Not only are we required by regulation to have adequate frequency measuring equipment on hand, but good operating practice demands some form of frequency measurement.

A large percentage of hams have come to rely on the calibration of their receivers to accomplish this, and in some cases a sufficient degree of accuracy can be achieved in this manner. From some of the remarks one hears on the amateur bands, however, altogether too many of us are content to rely on the other fellow's frequency checks, and this method is unsatisfactory at best.

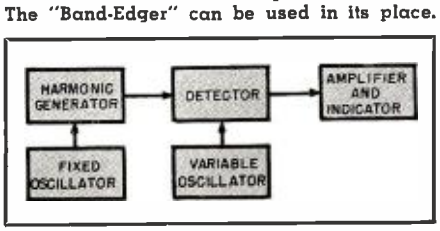
One of the basic methods of frequency measurement, and one which has been successfully used for many years by many radio services, is shown in the block diagram of Fig. 2. A standard oscillator, which is capable of being adjusted to a precisely known frequency, is fed into a harmonic generator which sets up multiples of the oscillator frequency throughout the range in which measurements are to be made. Another oscillator, of calibrated variable frequency, is used to interpolate between the marker signals produced from the fixed oscillator. This may be done either directly or at harmonics of the variable oscillator. The marker signals and the variable frequency oscillator output are fed into a detector, together with the signal whose frequency is to be measured. The output from the detector is amplified and fed into some sort of indicating device, such as a pair of headphones.

In using this sort of frequency measuring equipment, it is only necessary to establish a beat note between the unknown and the interpolation oscillator, and read the frequency from the calibration of the interpolation oscillator as a difference frequency from the nearest marker signal. The marker signals establish the major points, and the interpolation oscillator provides the fine divisions, much in the same manner as the hour and minute hands of a clock.

Such frequency measuring equipment is sometimes quite complicated, particularly when the accuracy requirements are high and when it is desired to have the equipment completely self contained. If, however, the accuracy required is not too great, and if we can combine portions of the equipment with other apparatus already in service, we can simplify our frequency measuring equipment considerably.

The station receiver should be able to serve as the interpolation oscillator, since it is variable over the required range and is usually calibrated to within a few kilocycles. In fact it also contains a detector and amplifier, as well as provision for some form of an indicator.

Fig. 2. Block diagram of one of the basic methods used for frequency measurements. The "Band-Edger" can be used in its place.



So, aside from the power supply (for which, in most cases, the receiver can be called upon) adequate frequency measurement can be made simply by adding a precision fixed oscillator and harmonic generator.

At this point we begin to see the light. All we need to do is add, say, a 100 kc. crystal oscillator which is rich in harmonic output to mark the band edges, and use the calibration of the receiver itself for closer measurement.

But there's a catch to it. Using a 100 kc. crystal marks the amateur bands adequately, but what do we do about the edges of the phone sub-bands which fall on multiples of 50 kc.? It is true that we can use interpolation with the receiver, but accuracy will suffer because at the odd multiples of 50 kc. the receiver is tuned furthest from a marker signal, and may be calibrated so poorly as to make out-of band operation easy.

It would be much better to use 50 kc. or better still 25 kc. for the fixed oscillator frequency. Then the calibration accuracy of the receiver or interpolation oscillator need not be as great, since the band edges, including the phone sub-bands, are marked with the same accuracy as the crystal oscillator. Inaccuracies introduced in interpolation are then of much less consequence, since they will not result in out-of-band operation.

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It is not necessary for the oscillator to operate on a fundamental frequency of 50 or 25 kc., since it is relatively easy to divide a 100 kc. or even a 200 kc. oscillator frequency into the desired lower frequency with a multivibrator. At the same time the multivibrator will function as the harmonic generator since it is a prolific source of harmonic energy.

In reviewing the current crop of catalogues and surplus advertising, it is apparent that while 100 kc. crystals appear to be readily available they are quite expensive. The 200 kc. crystals are advertised at 69 cents each, however, and look like a good bargain. To reach 25 or 50 kc. from an oscillator frequency of 200 kc. appears to require at least two tubes—one for the crystal oscillator, and one dual triode for the multivibrator. Miniature tubes will materially reduce the space requirements, but let's see what can be done to make this thing really simple.

As a starter, we can eliminate the usual tuned circuit in a conventional crystal oscillator by means of either circuit shown in Fig. 3. In both cases, the usual *LC* circuit is simply replaced by the crystal which is capable of behaving in much the same manner. Fig. 3B is the familiar Pierce crystal oscillator which resembles the "Ultraudion" self-excited oscillator, and Fig. 3A is simply a push-pull Hartley oscillator with the coil and condenser replaced by the crystal.

On closer examination, though, Fig. 3A also resembles a multivibrator to which the crystal has been added from plate-to-plate. And right here is the clue which will enable us to combine the crystal oscillator, the multivibrator frequency divider, and the harmonic generator all in one dual triode tube.

A little experimenting with various values of *R* and *C* in the circuit of Fig. 3A leads us to the conclusion that this is not the complete answer to our present problem. It is easy to make the multivibrator lock in at the crystal frequency, but it seems determined not to do so at an even harmonic of the multivibrator. At this point we recall that in balanced push-pull circuits the even harmonics are greatly reduced in the output circuit, so it appears that the crystal is behaving as a pretty well balanced tuned circuit. If we had wanted to divide the crystal frequency by an odd number, say 5 or 7, the circuit of Fig. 3A would perform very well. But starting with a 200 kc. crystal, to arrive at 50 or 25 kc. output, it is necessary to divide by 4 or 8.

However, we have now established the point that our original plan is sound, that is, it is quite practical to combine the crystal oscillator and multivibrator in one tube. So let's try another combination, such as that shown in Fig. 4. In this case, it appears that we have a Pierce oscillator circuit to which has been added another triode section connected to the oscillator in the same way a multivibrator is connected.

Again, a little experimenting with various *R* and *C* combinations shows that the circuit performs as expected and, in addition, the even harmonics of the multivibrator appear to synchronize with the crystal frequency as readily as the odd harmonics. In *Terman's* "Radio Engineers' Handbook" we find that the natural frequency of the multivibrator is approximately:

$1/(R_1C_2 + R_2C_1)$ cycles-per-second.

Also we find that by making the *RC* constants for each triode different, it is possible to emphasize synchronization for one particular harmonic. A little more experimenting brings us to the parts values shown with Fig. 5, which is the circuit of the "Band-Edger" as it was finally evolved, for 50 kc. output.

During all of these experiments, an oscillograph and a calibrated oscillator covering the range of 20 to 200 kc. are invaluable. It is possible to use other means, but the process is quite involved and can get tedious.

Construction of the "Band-Edger" is as simple as its circuit indicates. The chassis can be laid out as shown in the photographs, and is readily formed from .020 inch aluminum sheet with an ordinary bench vise. The size and positions of some of the holes will be dictated by the parts used, of course, but those incorporated in this model seem to be readily available and inexpensive. The terminal strip shown need not be used. Instead, the connecting leads can be brought through a grommet.

The plate supply lead to the multivibrator triode was brought out to a separate terminal in this model so that the crystal oscillator alone could be used to provide check points at 200 kc. intervals. When the 50 kc. intervals are required, it is only necessary to switch on the plate supply to both sections.

The "Band-Edger" requires 6.3 volts at .3 ampere on the filament and 200 to 300 volts at about 8 milliamperes plate supply. Most receivers can readily supply these voltages, and usually an unused corner can be found where the unit can be mounted inside the receiver.

Harmonic output from the "Band-Edger" is sufficient for use through the 10 meter band, with only a short piece of wire connected to the output terminal and placed near the first detector tube in the receiver. If greater signal strength is required, it is possible to couple the "Band-Edger" more closely to the receiver input by using a 3 to 30 $\mu\mu$fd. trimmer condenser connected between the "Band-Edger" output and the receiver input terminals.

In checking out the "Band-Edger" to be sure it is operating properly, couple some signal from the "Band-Edger" to the input of the receiver. Usually all that is necessary is to use a few inches of wire as antennas on both units. With the crystal oscillator only in operation, a signal should be heard every 200 kc. across the receiver dial. Switch on the multivibrator tri-

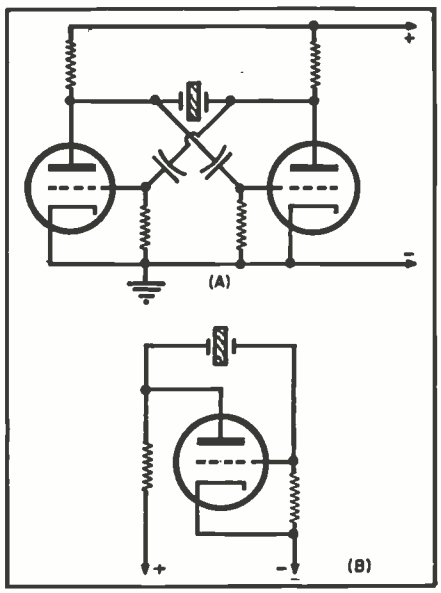

Fig. 3. The first transition from the basic design (Fig. 2) to author's final form was to omit the usual LC circuits. Diagrams of A and B show the designs after transition.

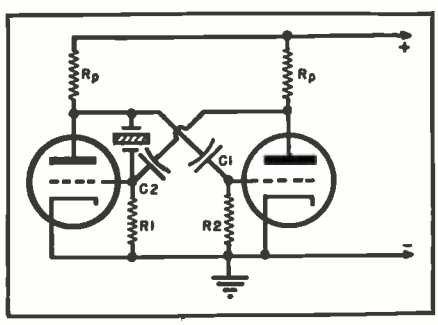

Fig. 4. Circuit diagram of a combination crystal oscillator and multivibrator.

ode and if it is operating properly, additional signals will be found at 50 kc. intervals. It is possible that the multivibrator will tend to synchronize at some other frequency, probably either 40 kc. (division by 5) or 66⅔ kc. (division by 3). If this occurs, it will be necessary to change the value of one of the grid resistors until the proper division rate is obtained consistently.

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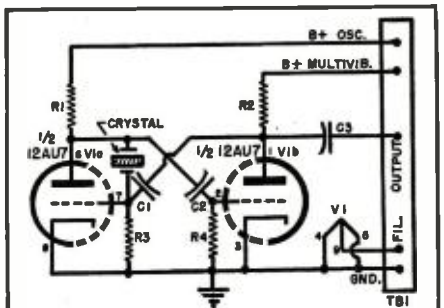
Fig. 5. Diagram of "Band-Edger." Power requirements are 6.3 volts at .3 ampere and 200 to 300 volts at 8 milliamperes.



R_1, R_2—18,000 ohm, ½ w. res.
R_3—51,000 ohm, ½ w. res.
R_4—160,000 ohm, ½ w. res.
C_1—68 $\mu\mu$fd. mica cond.
C_2, C_3—180 $\mu\mu$fd. mica cond.
TB_1—Terminal block (Jones #4-140 or #4-140Y)
Crystal—200 kc. crystal
V_1—12AU7 tube

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HORIZONTAL PULLING

By
JOHN R. MEAGHER
Tube Department, Harrison, N. J.
Radio Corporation of America

Part 2. Concluding article covering additional causes of and remedies for horizontal pulling.

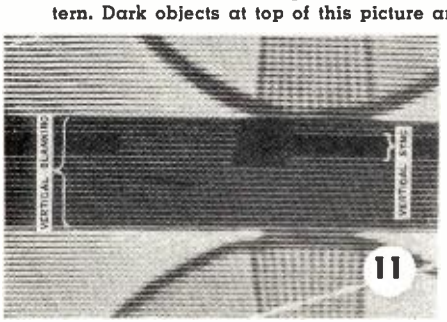
FORTUNATELY for the television technician, any appreciable loss of low-frequency response in the r.f., i.f., and video amplifiers and any appreciable undesired limiting action in the video amplifier can be detected very quickly by visually checking the *relative* intensity (blackness) of the vertical sync, vertical blanking, and picture signals, as they appear on the picture tube. To observe these signals, it is necessary to adjust the vertical hold control so that the picture rolls slowly downward out of vertical sync. It is necessary also to adjust contrast and brightness to make the vertical blanking and sync signals visible, as shown in Fig. 11, which represents approximately the correct *relative* darkness of these signals. For inspection purposes, it is preferable to increase the brightness slightly or decrease the contrast slightly in order to make the vertical sync appear as a dark grey, instead of the dead black shown in Fig. 11. We suggest that the reader carefully study the photographs and captions in Figs. 11, 12, 13 and 14.

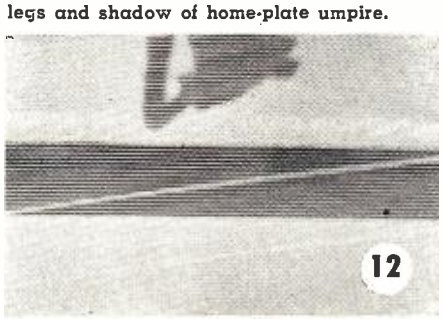
In all cases of horizontal picture pulling, it is a worth-while practice to check the relative intensity of sync, as shown in Fig. 11. If the inspection reveals that the low-frequency response is poor, check the alignment of the r.f. and picture i.f. amplifier, using a good sweep generator and a crystal-calibrated marker oscillator. If the alignment is satisfactory, check the tubes, components, and voltages in the video amplifier. If the inspection reveals limiting action, check the video amplifier and the a.g.c. output voltages.

If the relative intensity of the sync, blanking, and picture signals appears normal, it may be assumed that the picture pulling is not caused by trouble in the r.f., i.f., or video amplifiers. Attention should then be concentrated on the sync separator and the horizontal a.f.c. circuit.

Fig. 11. Portion of vertical blanking and sync signals for single field. In making this picture and those of Figs. 12, 13, and 14, the contrast was reduced and brightness increased in order to "unblank" the blanking lines. Camera shutter was opened for only 1/60th second, which is time required for electron beam in picture tube to trace a single field of approximately 262 lines, consequently every other horizontal scanning line is absent in this photo, which otherwise represents normal signal conditions. As clearly shown, the blanking is slightly darker or stronger than darkest picture signals. Sync is considerably darker or stronger than blanking. If receiver has poor low frequency response, or if there is undesired limiting action, amplitude of sync signals is reduced with respect to higher frequency picture signals and, as a result, receiver becomes more susceptible to horizontal pulling. Examples of reduced sync amplitude are shown in Figs. 12, 13, and 14.

Fig. 12. In this case, sync signals are only slightly darker or stronger than blanking and dark-picture signals. This trouble is caused by excessive signal input and consequent limiting action in the video amplifier due to incorrect setting of a.g.c. threshold adjustment. Fig. 8 (Part 1) shows the result of same condition on test pattern. Dark objects at top of this picture are legs and shadow of home-plate umpire.





Localizing the Cause

The writer suggests a simple check that is occasionally helpful in isolating the cause for picture pulling. Briefly, this check consists of removing horizontal sync input from the horizontal a.f.c. circuit, free-wheeling the horizontal oscillator to obtain a momentarily stationary picture, and noting whether the pulling is still present on the picture. The check is helpful in showing whether the trouble is in the a.f.c. circuit or ahead of it. The procedure is as follows.

Make a mental note of the position and amount of horizontal pulling. Temporarily disconnect the condenser that connects horizontal sync pulses (from the sync separator) into the horizontal a.f.c. circuit. Disconnecting the condenser will throw the horizontal oscillator completely out of sync. With the horizontal hold control set at its midposition, turn the main frequency adjustment of the horizontal oscillator to bring the oscillator to the correct frequency, as indicated by the momentary appearance of a complete picture. Then carefully adjust the horizontal hold control in an attempt to keep the picture from rolling horizontally for at least a second, or just long enough to inspect the picture and to determine whether the picture pulling has disap-

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peared. If (with horizontal sync removed) the picture pulling is still present, the cause of the pulling is probably in the horizontal a.f.c. circuit. But if (with horizontal sync removed) the pulling is not present on the picture it indicates that the trouble is ahead of the horizontal a.f.c. circuit.

Occasionally extraneous signals from an adjacent video amplifier, audio amplifier, or other source may be coupled into the horizontal a.f.c. circuit. This possibility should be considered in cases where the previous check indicates that the cause for picture pulling is in the horizontal a.f.c. circuit.

In Part 1 of this article, mention was made of the possibility that voltage surges in the vertical oscillator circuit might be coupled back into the horizontal a.f.c. circuit and result in horizontal pulling at the top of the picture. One method of checking for the presence of such trouble is to open the condenser that couples the vertical sync pulses (from the sync separator) into the vertical integrating network and free-wheel the vertical oscillator, by careful adjustment of the vertical hold control, to keep the picture from rolling vertically. If the horizontal pulling disappears when the condenser is opened, it may indicate that additional isolation is required between the vertical oscillator and the horizontal sync input circuit.

A general method of determining whether the vertical oscillator and deflection circuits are in any way responsible for horizontal pulling is to remove the vertical oscillator and output tubes and drive the vertical deflection coil from the vertical output of another receiver which is tuned to the same station.

In many receivers, the amplitude of sync input to the sync separator is rather critical; either too much or too little sync input may cause picture pulling. In cases where all components have been checked and appear to be normal and the cause for pulling cannot be localized by the methods suggested, it may be advisable to try changing the level of the sync input to the sync separator. If the sync signal for the sync separator is taken from across a resistor in the video amplifier, it may be feasible to alter the value of the resistor or temporarily substitute a carbon potentiometer to determine the optimum value.

The tubes, voltages, and load resistors in the sync separator are usually critical with respect to picture pulling. Occasionally, it may be helpful experimentally to alter the value of a plate-load resistor in the sync separator. The writer offers these comments reluctantly, because he is definitely not in favor of the practice of altering the value of one component to compensate for a defect in another component that has escaped detection.

When picture pulling is common in all receivers of a particular model, the logical procedure is to find out whether the manufacturer has issued information on modifications to correct or improve the condition.

Many technicians have learned through actual experience that the best and fastest way to locate sync troubles is by the use of a scope with adequate frequency response which is designed for use with an isolating probe.

External Interference

When external interference is present, it frequently causes horizontal pulling or weaving. Usually, in such cases, the interference is clearly evident in the picture and is obviously responsible for the pulling. Occasionally the cause and effect may be confused.

Diathermy interference produced the pulling effects shown in Figs. 15 and 16. These particular examples were photographed because they lack the pronounced herringbone pattern that normally characterizes diathermy interference and for that reason might be mistaken for internal trouble in the receiver.

Any interference that produces beat-frequency bars of sufficient intensity in the picture can result in unstable horizontal sync with accompanying horizontal pulling or weaving, particularly in cases where the beat is a low frequency signal that can readily pass through the narrow-band sync separator.

Obviously, the correct remedy for picture pulling in cases of interference is to eliminate the interference.

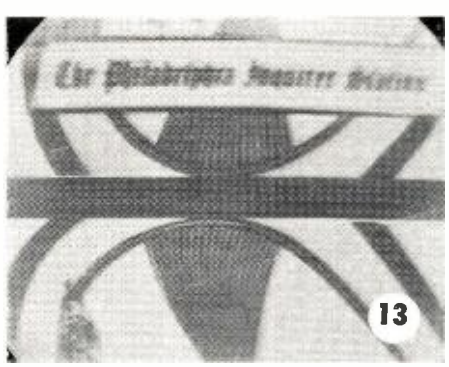
In all puzzling cases of horizontal pulling, it is a good practice to observe that cardinal rule of television service —"Check for presence of the same effect on other receivers in the area." This excellent rule requires modification in some cases of horizontal pulling, because it is advisable to check sets of the *same model,* or at least sets that have the same type of horizontal

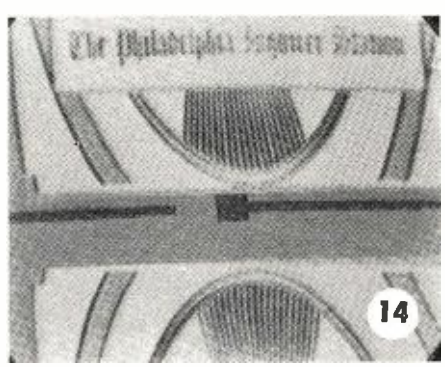
Fig. 13. Here the sync signals are completely wiped out or reduced to blanking level by undesired limiting action in video amplifier. Trouble is caused by low plate voltage on 2nd video tube. The same condition can result from excessive signal input to video amplifier, as shown in Fig. 12, or incorrect bias and other troubles in the video amplifier. There is horizontal pulling at top and bottom of picture and sync is extremely unstable. With complete absence of sync the horizontal and vertical oscillators may tend to sync on the leading edge of the blanking signals.

Fig. 14. Instance where sync amplitude is reduced to approximately same level as the darkest picture signals. Trouble is caused by poor r.f.-i.f. alignment, the picture carrier is too low on the slope of the response curve. Also refer to Fig. 7 (Part 1).

Fig. 15. Horizontal pulling resulting from diathermy interference. Beat in this case is a low frequency and therefore does not exhibit herringbone pattern (due to frequency modulation) usually characteristic of diathermy interference. Interference might be mistaken for another type of trouble. See Fig. 16 for high-frequency diathermy beat.

Fig. 16. Horizontal pulling resulting from diathermy interference. In this case beat is a high frequency (about 4 mc.) which makes the fine-line herringbone pattern almost invisible in some receivers. This variety of interference might be mistaken for 120 cycle hum trouble. With diathermy interference, light and dark areas may remain stationary or may move up or down depending on whether or not the power supply for TV camera and diathermy equipment are synced. Unlike heater-cathode leakage, reversal of 117 volt plug on receiver does not shift position of interference.





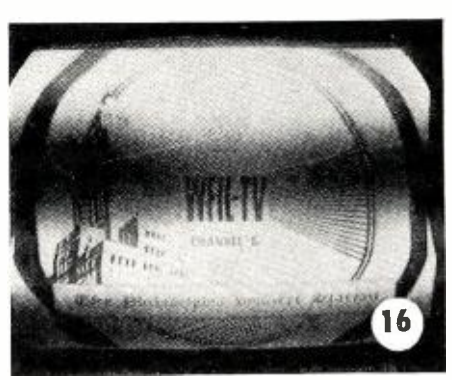


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Fig. 17. Slight horizontal pulling at top of picture evidenced by bending of vertical wedge, caused by inoperative d.c. restorer (in a receiver where sync input for sync separator is taken from d.c. restorer circuit). When photo was taken, contrast and brightness controls were adjusted to show horizontal blanking signals at right side of picture. With normal contrast adjustment, bending is decidedly more pronounced. See text for other details.

a.f.c. circuit. Certain rare troubles, such as phase variation in the transmitted horizontal sync signals, may produce noticeable picture pulling in some types of horizontal a.f.c. circuits, but may have only slight effect in other types of a.f.c. circuits.

Microphonic Pulling

Picture pulling may show up momentarily whenever the horizontal a.f.c. tube is mechanically shocked or jarred, as by deliberately tapping the tube or through transmitted vibrations from persons walking or dancing near the set. Any relative motion of the elements in the a.f.c. tube results in a variation in the gain, or control action, which produces a variation in horizontal sync phasing. The socket of the a.f.c. tube is usually shock-mounted to minimize such microphonic action. In cases where microphonic horizontal pulling is evident and objectionable, it is advisable to try a new tube in the a.f.c. socket.

Troubleshooting Procedure

It may be helpful to summarize some of the facts that we have discussed. We can accomplish two objects by presenting the summary in the form of a troubleshooting procedure.

1. Determine whether the condition is raster pulling or picture pulling. Raster pulling affects the shape of the raster. Picture pulling does not affect the shape of the raster.

2. If it is a case of raster pulling, make checks (depending on the particular symptoms) for trouble in:

(a) The "B" supply filter circuit

(b) The horizontal deflection circuits

(c) The deflection yoke

(d) Undesired magnetic field near the picture tube.

3. If it is a case of picture pulling, remember that the horizontal sync signals must pass through the r.f., i.f., and video amplifiers and through the sync separator in order to reach their final destination in the horizontal a.f.c. circuit. Ordinarily, any trouble that causes picture pulling must be in the r.f., i.f., video, sync separator, horizontal a.f.c., or power supply sections of the receiver. With this fact in mind, apply the following checks:

(a) Check the amplitude of sync (in relation to the amplitude of blanking and picture signals), as seen on the picture tube, to determine whether poor low-frequency response or undesired limiting action has reduced the relative sync amplitude. The sync must be definitely stronger, or darker, than the blanking and the darkest picture signals, as shown in Fig. 11.

(b) If the relative amplitude of sync appears normal on the picture tube, it means that the trouble is unlikely to be in the r.f., i.f., or video amplifiers. (One of a few exceptions to this statement is illustrated in Fig. 17, where an inoperative d.c. restorer in the video amplifier has caused slight picture pulling without affecting the relative sync amplitude as seen on the picture tube.) If the sync amplitude appears normal, it leaves the sync separator and the horizontal a.f.c. circuit under suspicion.

(c) Check to determine whether the trouble is in the horizontal a.f.c. circuit, or ahead of it, by temporarily removing sync input from the horizontal a.f.c. circuit, free-wheeling the horizontal oscillator, and inspecting the picture to determine whether the pulling is still present. If the pulling is still present, the trouble is probably in the a.f.c. circuit. If the pulling disappears when sync input is removed, the trouble is probably ahead of the a.f.c. circuit; possibly in the sync separator.

The writer wishes to thank the management of WFIL-TV for permission to reproduce the station's test pattern.

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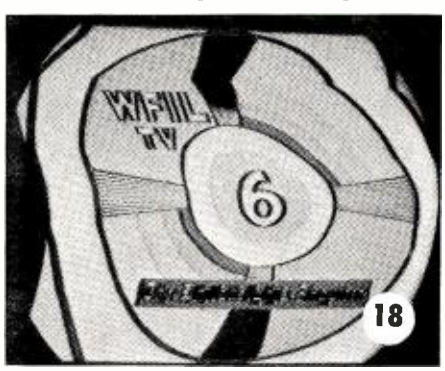
The photographs of Figs. 18, 19, 20, and 21 are not referred to in the text. Their inclusion is for the purpose of amplifying the text and providing additional data.

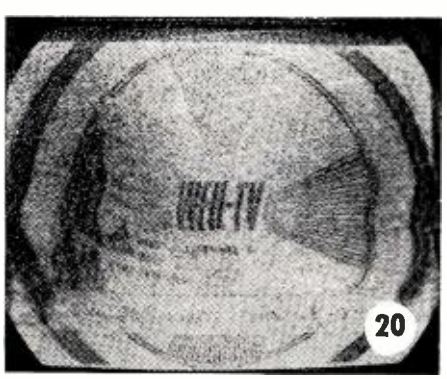
Fig. 18. Horizontal pulling caused by poor low frequency response (or excessive high frequency response) in picture i.f. amplifier. Black smearing of vertical wedges is one indication of regeneration in amplifier which requires realignment. Regeneration in this case results from tuning grid and plate circuit of one stage in amplifier to same frequency instead of staggering tuning as required in stagger-tuned amplifier.

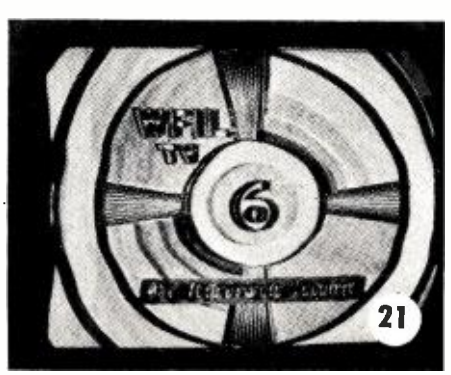
Fig. 19. Horizontal pulling, or in this case, horizontal damped ripple, caused by the electrical hunting action in horizontal frequency control circuit. Condition shown is produced by an open .05 μfd. condenser connected from the grid circuit to the chassis in RCA "syncrolock" horizontal frequency circuit. Amplitude and the duration of the ripple change with the adjustment of the horizontal hold control.

Fig. 20. Horizontal pulling may be expected on extremely weak signals. Realignment is almost always helpful in weak-signal areas. The r.f. and picture i.f. amplifiers should be aligned so that picture carrier falls at 70% or higher on slope of overall response curve when receiver tuning control is adjusted for best sound. It is also advisable to use best available antenna and booster with good signal-to-noise ratio.

Fig. 21. Horizontal pulling and unstable horizontal sync may result from certain conditions of reflections or ghosts. Ghost signal in this example is almost merged with direct signal, resulting in poor picture quality and horizontal pulling. Occasionally, when intensity of a close-in ghost is approximately the same as direct signal, the two may alternate in taking control of horizontal oscillator. In such cases, picture shifts erratically a distance equal to spacing between the ghost and direct signal.







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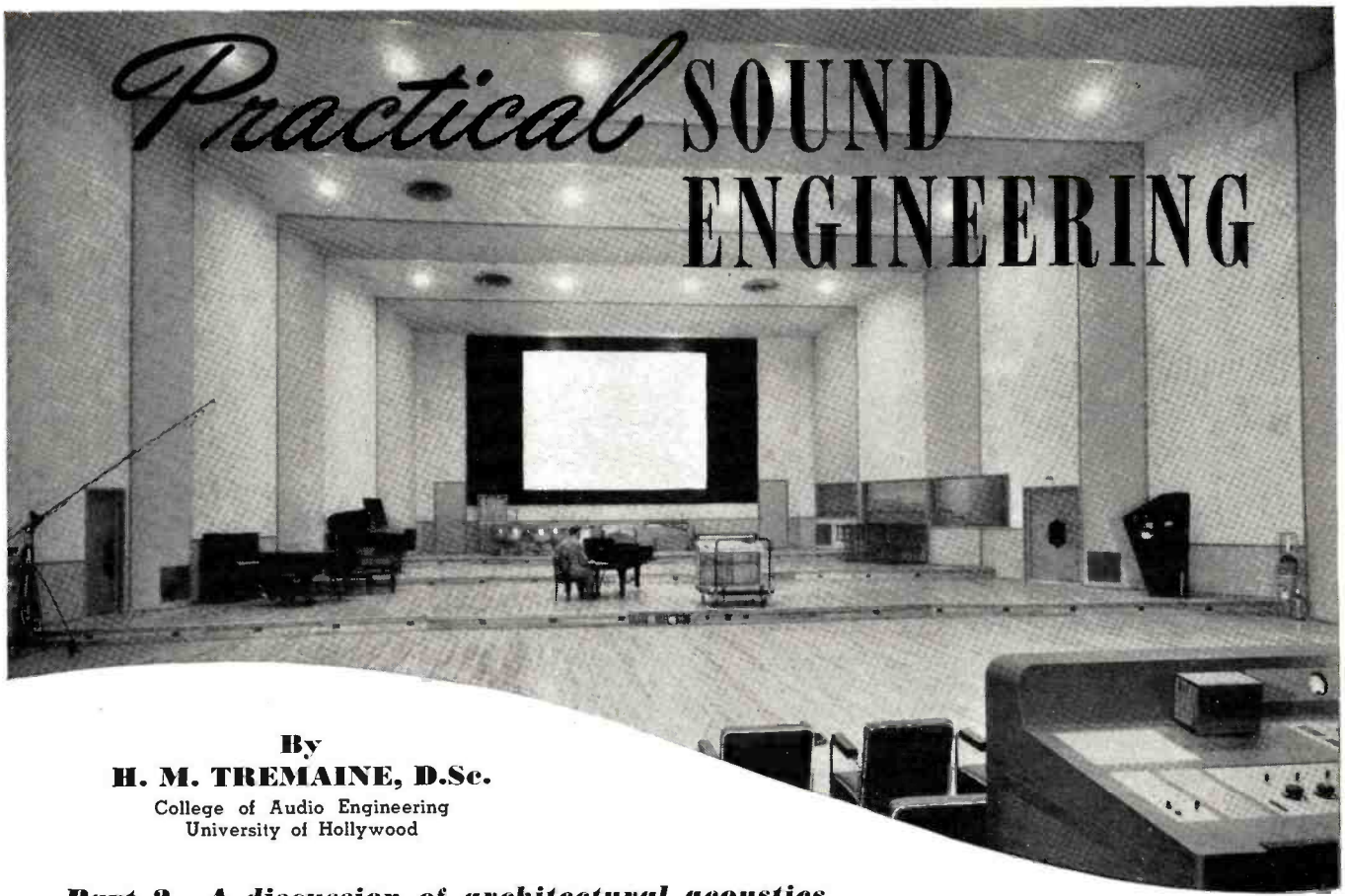


By
H. M. TREMAINE, D.Sc.
College of Audio Engineering
University of Hollywood

Part 2. A discussion of architectural acoustics as they affect broadcast and recording studios.

Fig. 1. The recording end of the scoring stage used by Republic Productions of Hollywood for recording movie sound tracks.

THE behavior of sound waves has given rise to a whole new field of endeavor—Acoustical Engineering.

The architectural acoustics of broadcasting and recording studios and theaters are of extreme importance, since they are the vital links in the chain connecting the original source of sound with the listener.

Vast sums of money have been spent in research for the development of motion picture broadcasting studios to achieve the ultimate in acoustical design. The primary factor to be overcome is frequency distortion, which is caused by the design and the effect of the materials used in the studio construction.

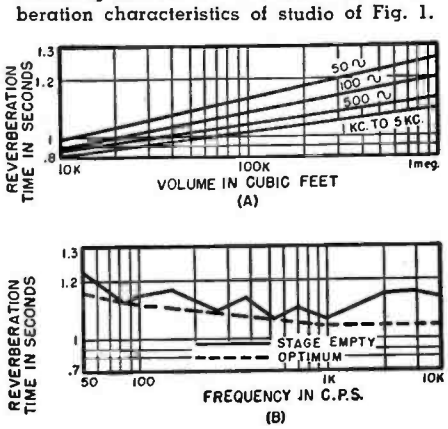
Any distortion which originates within the studio, due to acoustical design, will be transmitted along with the original program material. A modern electrical recording and reproducing system contributes only a small percentage of distortion; however, acoustic defects in the studio, such as excessive dead spots, structural vibration, external noises, reflection, etc., give rise to frequency discrimination and distortion which cause unintelligible and unnatural sounds to be transmitted. Seldom does the listener hear program material which has not been altered in some manner, either intentionally or unintentionally, during its transmission to him.

Sound absorbing materials react differently at the high and low frequencies. Generally, there is much less absorption at the low frequencies than at the high frequencies. Physical dimensions of the surfaces in the studio may be such that they reflect the high frequencies, but not the low, which are bent around the edges of obstacles in the studio resulting in sound eddies which set up interference patterns.

Improperly designed studios may be extremely "live" to some frequencies and "dead" to others. In addition to these characteristics, the room may be resonant to certain bands of frequencies, due to its physical dimensions.

Frequency distortion may also be added by the media, including air, through which the sounds are transmitted; however, this is negligible for all but intense sounds. Distortion is present in the air at all times since air follows the action of gas under pressure.

Fig. 2. (A) Optimum reverberation time for recording and broadcast studios. (B) Reverberation characteristics of studio of Fig. 1.



Sounds originated in open spaces are heard as direct sounds. When the listener moves away from the source, the intensity drops off as the square of the distance. In a room this is not true; the sound may decrease irregularly, and depending on room conditions, may increase because of interference patterns. Interference is the result of multiple reflections from the enclosure walls. Sound remains in an enclosure until it is completely dissipated, the intensity being reduced by each reflection. The reverberation time of a room is measured by emitting a sound, then measuring the time required for the sound to die away to one-millionth of its original intensity or a reduction of 60 db.

The reverberation time of a studio should vary at a rate which will produce maximum intelligibility, give "presence" to the program material, and still preserve its original characteristics. This means the studio must have enough reflective surfaces to lend brilliance to the program material yet have adequate absorption to prevent excessive reverberation.

Sound when confined to an enclosure becomes quite complex in its action, when compared to that in free air. In free air only the direct sound from the source is heard, while in an enclosure,

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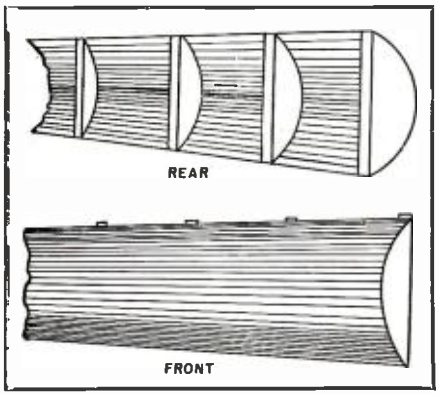

Fig. 3. Rear and front views of the polycylindrical diffusers discussed in the text.

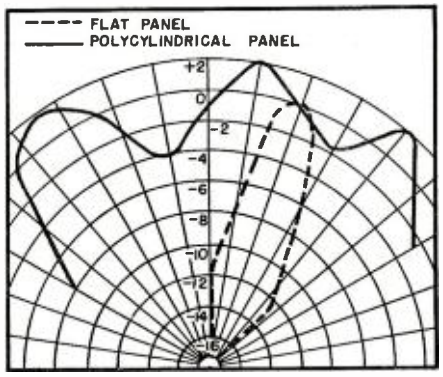

Fig. 4. Polar response curve of a polycylindrical diffuser used in the studio.

it consists of both the direct and reflected sound.

Stages designed for broadcasting and the recording of speech and music differ in construction mainly in their size and interior treatment. Frequently diffusers are placed at intervals along the walls and ceilings to break up "standing waves," with additional insulation around the base to deaden the effect of footfalls and the movement of equipment. The ventilation system is baffled, and the interior of the air ducts treated acoustically to prevent outside noises from entering the room.

When a sound wave leaves its source in a room, it expands spherically until it meets the enclosure walls. It then suffers partial reflection, absorption, and transmission. The reflected wave continues to travel and is again reflected, and the process is repeated until the wave energy is completely dissipated. In rooms constructed of hard plaster or similar materials, several hundred reflections take place before the energy is completely spent.

Table 1. Optimum number of musicians for various sized studios based on type of program material being recorded or broadcast.

VOLUME (cu. ft.)	BROADCAST STUDIOS	AUDITORIUMS	MOTION PICTURE SCORING STAGES
10,000	12	—	—
20,000	25	8	10
50,000	50	9	22
100,000	130	19	36
200,000	250	31	70
500,000	—	62	140
1,000,000	—	105	240

Echo chambers are built using this principle.

The speed of sound is considered to be 1120 feet-per-second. This tells us that for a large room the reverberation time may run into several seconds. Excessive reverberation time causes overlapping of successive sounds, making the program indistinct and sometimes unintelligible.

The reverberation time of a room depends on both the intensity level of the emitted sound and the absorption coefficients of the acoustic materials in the room. The optimum reverberation time for broadcasting and recording studios is shown in Fig. 1A. Experience over many years has determined that there is also an optimum number of musicians for each size room, depending upon the type of program material. This data is given in Table 1.

It will be noted from Table 1 that fewer musicians are used for auditorium work than for either broadcasting or motion picture recording. For broadcasting the tendency is to use more musicians in a given space.

Of primary importance to the sound engineer are the over-all results produced in the studio by reflections, refraction, diffraction, absorption, and "standing waves."

When sound is generated in a room in which the walls are parallel, standing wave systems are set up at certain frequencies, which are dependent on the physical dimensions of the room. The lowest frequency that will produce a standing wave is one whose wavelength is equal to twice the distance between the enclosure walls. Parallel walls will also cause resonant effects at harmonic frequencies. Thus, for a room with a ceiling height of 11¼ feet, resonance may occur at frequencies of 50, 100, and 150 cycles-per-second, and others which are multiples of the fundamental frequency. The wavelength may be determined from the equation $\lambda = V/f$.

Resonance in a room introduces frequency distortion, resulting in peaks and valleys in the over-all response characteristic. It also creates a hangover effect near the resonant frequencies.

Standing waves are produced in a room by prolonged tones, and are the result of two waves traveling in opposite directions. A standing wave is characterized by its production of nodes or nodal points within the room.

The effect of standing waves may be minimized or controlled by increasing the absorption of the room or changing the spacing and shape of the reflecting surfaces.

If the absorption of the room is increased, it may be detrimental to the over-all results by making the studio too "dead," and if the acoustic treatment is selective to frequency the room may become quite "bassy."

To reduce the possibility of standing waves, studio dimensions should be chosen that are not integral to each other. For small rooms the ratio of height to width, to length, is 1 to 1.25 to 1.60. For average size studies, the ratio should be on the order of 1:1.6:2.5.

The reverberation time characteristic not only depends on the decay period of the room but also the diffused distribution of the sound around the room. Dispersion of the sound is obtained by the use of non-parallel walls, and convex or projecting surfaces, which will disperse the reflections in all directions. Dispersion of the sound does not lessen the energy in the room but tends to increase the number of reflections in a given time, thus reducing the intensity of the individual reflections. This results in a smoother decay period for all frequencies, making the placing of microphones less critical.

Figs. 1 and 6 show the interior of the scoring stage built by *Republic Productions, Inc.,* Hollywood, California for recording music for motion pictures. This stage has approximately 250,000 cubic feet of space and covers an area of 65 x 112 feet.

In Fig. 1 are seen several polycylindrical diffusers, or convex reflectors, spaced along the wall extending from the floor to the ceiling. Several more are shown across the rear wall and ceiling. At the front end of the stage, the floor is raised to three different levels to facilitate the proper placement of the orchestra. Motion picture projection equipment and screen are provided for cueing purposes. The mixing console is used for rerecording and special "dubbing" projects. Normally all rerecording is done on another stage.

At the right of the screen is a glassed-in room which is used for recording large choral groups or for other type pickups requiring separation from the orchestra. On the left side is an organ vault.

In Fig. 6 is shown a rear view of the stage and the monitor room where the sound mixer, with the aid of the musical director, monitors and mixes the final recording, which is then carried over lines to the recording department in another building.

Polycylindrical diffusers are constructed of one-quarter or three-eighths inch plywood, and bent into a segment of a circle, as shown in Fig. 3. Each diffuser has a different radius. The sound is dispersed by reflection from its curved surface and by radiation, due to its resonant action or panel vibration, which is set in motion either by the direct action of the original sound or by partial absorption and reradiation of the sound striking its surface. This is illustrated by the "polar curve" response, Fig. 4, which shows the dispersion characteristics of a flat panel compared to a convex panel.

The dispersion by reflection will depend on the size and curvature with respect to the wavelength of the sounds striking its surface. The resonance frequency depends on the damping factor of the material and the spacing of the internal bracing, etc. Flat panels, if placed too close to a microphone, may produce interferences due to the phase differences between

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the source of sound and the reflections. Concave surfaces should be avoided as they act as sound concentrators, focusing the sound and causing echoes.

The walls and floor of the *Republic* scoring stage are of interest, and a cross section of their construction is shown in Fig. 5. The vertical walls are several inches thick, covered on the exterior with a heavy layer of stucco cement. Between the exterior wall and the inside wall is a layer of building paper and a 4 inch layer of rock wool, then a 6 inch air space, another 4 inches of rock wool, and an interior finish of wallboard and acoustic tile. A concrete floor is laid on a layer of loose dirt. Atop the concrete floor is an asphalt base in which railroad ties have been imbedded, to give strength to a hardwood floor which is laid atop the asphalt. This type construction reduces the possibility of low frequency rumble and earth noises being transmitted to the stage.

Although the walls are quite thick and will provide 40 to 50 db. of attenuation for noises originating outside the stage, this is still not sufficient attenuation to reduce the noise of low flying aircraft. To obtain any greater amount of attenuation is not practical from an economical standpoint.

The reverberation characteristics of this stage are shown in Fig. 2B. The solid line is the response obtained by measurement with the stage empty. The dotted line is the optimum response for a stage its size.

The reverberation time was measured using a loudspeaker, at the orchestra end of the stage, supplied with frequencies from an audio oscillator. The oscillator is a special motor driven device. As the frequencies are produced, they are "warbled" by the action of a four-sided cam mounted on the oscillator frequency dial. The tone is warbled approximately four times per second, ± 10 per-cent of the mean frequency. A calibrated microphone picks up the tones from the loudspeaker which are then recorded by a special high speed automatic level recorder on a wax-coated paper tape.

The purpose of the warbled tone is to prevent the formation of standing waves in the room, which might occur if steady tones were used. The warble tone is only required for frequencies below 1000 cycles.

So far, our discussion of sound stages has been confined to those used for the recording of music and broadcasting. But what about stages used for housing motion picture sets and the production of television shows, where the principal pickup is dialogue?

Stages of this type, insofar as general construction is concerned, are about the same as music stages, except that it is unnecessary to go to the expense of isolating the foundation and the floor. Also, no convex splays or similar devices are necessary.

Like the music stage, the walls should be quite thick to reduce interference from the outside. The doors to the exterior are generally constructed along the lines of an ice-box door, with interlocking edges similar to a bank vault door to prevent leakage around the jambs.

The interior walls of the stage are treated with rock wool, blown in between the risers and covered with muslin. Over the muslin is placed a single layer of common fly-screen to protect the muslin from damage. The thickness of the rock wool will vary from 2 to 6 inches depending on the isolation required.

As this type stage is used principally for dialogue pickup, the ambient noise level must be low and the ventilation system well insulated, otherwise a low-frequency rumble may be picked up during low-level passages in the dialogue.

When dialogue is recorded over a flat recording channel from a stage of the type just described, the reproduced sound may have an unnatural quality, and lack intelligibility. This results from the materials used in the set construction, and the reverberation characteristic of the stage. Even the actors' clothing has its effect.

All materials used in the construction of sound stages have a greater absorption at the high frequencies than at the low; thus, reflections increase the low-frequency response, causing the reproduction to become "tubby". This condition varies with set construction, the microphone placement, and distance from the source of sound.

Microphones should be suspended from a "boom" in front of and over the actor, and just out of the camera angle. Means should also be provided to "gun" the microphone towards the actor, as his movements are followed. This will tend to keep the sound quality uniform.

It is the practice in the motion picture industry to use a "dialogue-equalizer" in the dialogue microphone circuit to reduce the low-frequency response. The amount of equalization will depend on the type of microphone used, the set acoustic characteristics, and the type of recording system. Usually, these equalizers are designed to attenuate the low frequencies starting about 700 c.p.s. and tapering downward to around 12 db. at 100 c.p.s.

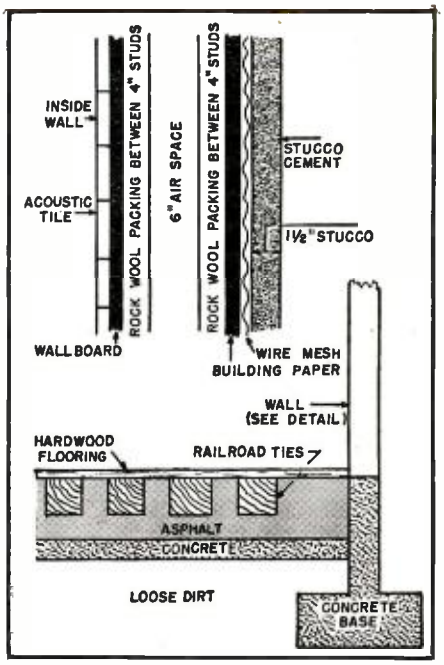

Fig. 5. Cross section of the construction used for the walls and floor of the Republic Production, Inc.'s scoring stage.

Low-frequency accentuation is also created by the fact that actors on sound stages speak more softly than normal. This increases the low-frequency components in their voices over their normal manner of speaking. To secure a normal reproduction of the actor's voice under these conditions, a dialogue equalizer is used.

It might be desirable under certain conditions to inject a small amount of high frequency equalization into the dialogue, particularly for film recording, to compensate for processing loss. Again this will be determined by the system, and microphones employed. Approximately 4 to 6 db. of equaliza-

(*Continued on page* 114)

Fig. 6. Opposite end of the studio shown in Fig. 1. The monitor room where the "sound mixer" and musical director monitor and mix the final recording is in center at rear.

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SPLITTING PADS

By
H. C. CARMICHAEL
Consulting Engineer

Details on how various resistor combinations can be used to provide the proper matching networks.

IT IS sometimes necessary in communication and television work to apply two alternating currents such as speech, carrier, or music currents to one channel. This may be done by means of a transformer, but owing to the electromagnetic fields and frequency losses from the transformer, this method is not always desirable, and another method using combinations of non-inductive resistances is sometimes used. This method involves the formation of resistance networks, called pads, from non-inductive resistances. In the case of 600 ohm circuits it is usual to make matching pads from 1200 to 600 ohms and to connect the 1200 ohm outputs in parallel. There is a third method, shown in Fig. 1A, using a network of standard non-inductive resistors which involves a small power loss but is less expensive than the other methods.

An application of this method is shown in Fig. 1A, where it is used to connect two sources of alternating current to one channel or *vice versa*. For purposes of matching, it is necessary to make the values R_1, R_2, R_3, shown in Fig. 1A, such that when channels 1 and 2 are terminated in their correct impedances (600 ohms), then channel 3 will also be 600 ohms. Fig. 1A may be simplified to the arrangement shown in Fig. 1B. Now, when two resistances, R_1 and R_2, are connected in parallel, their joint resistance may be found by the aid of the formula:

$$R_T = \frac{R_1 \times R_2}{R_1 + R_2} \quad . \quad . \quad . \quad . \quad (1)$$

If this formula is applied to Fig. 1B, then the joint resistance of the two paths (600 ohms and x ohms) from A to C is:

$$\frac{600x}{600 + x}$$

Similarly, the joint resistance of the two resistances (600 ohms and x ohms) between B and C is:

$$\frac{600x}{600 + x}$$

These two joint resistance values are in series with respect to the line and thus their total resistance is:

$$\left(\frac{600x}{600 + x}\right) + \left(\frac{600x}{600 + x}\right) = \frac{1200x}{600 + x}$$

The other resistor from A to B (x ohms) is in parallel with this combination as shown in Fig. 1C which is a further simplication of Fig. 1A. Thus, if formula (1) is applied to this circuit, then the joint resistance of the combination will be:

$$\frac{\left(\frac{1200x}{600 + x}\right) x}{\left(\frac{1200x}{600 + x}\right) + x}$$

This, of course, must equal the resistance of channel 3 and thus:

$$\frac{\left(\frac{1200x}{600 + x}\right) x}{\left(\frac{1200x}{600 + x}\right) + x} = 600$$

This may be simplified to show that $x = 1800$ ohms.

Figure 1D shows the resistance network to satisfy the conditions shown in Fig. 1A.

Power Loss of Pad

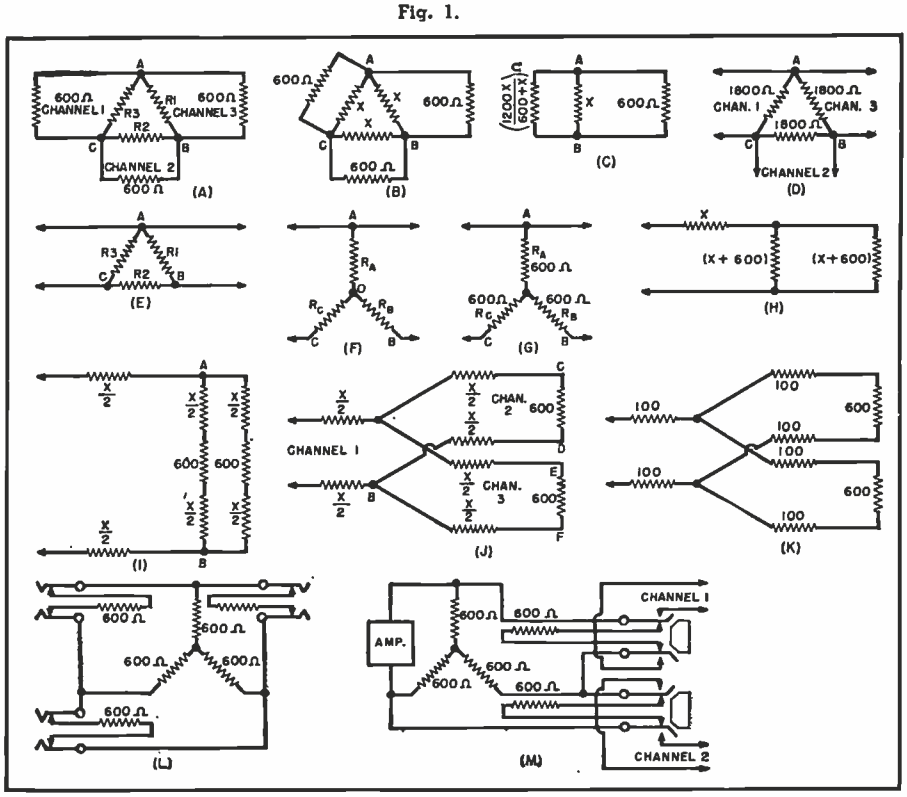
The power loss from each channel to the mixer channel resulting from the use of this pad can be calculated as follows. Assuming a voltage of 10 volts across a source of 600 ohms in channel 3, then the voltage across points A and B in Fig. 1D would be 10 volts and the voltage across points A and C would be 5 volts, as the resistance of the combined resistor AC is equal to the combined resistor CB. The power loss equals:

$$20 \log \frac{E_1}{E_2}$$

and if the information supplied in the

(*Continued on page* 86)

Fig. 1.



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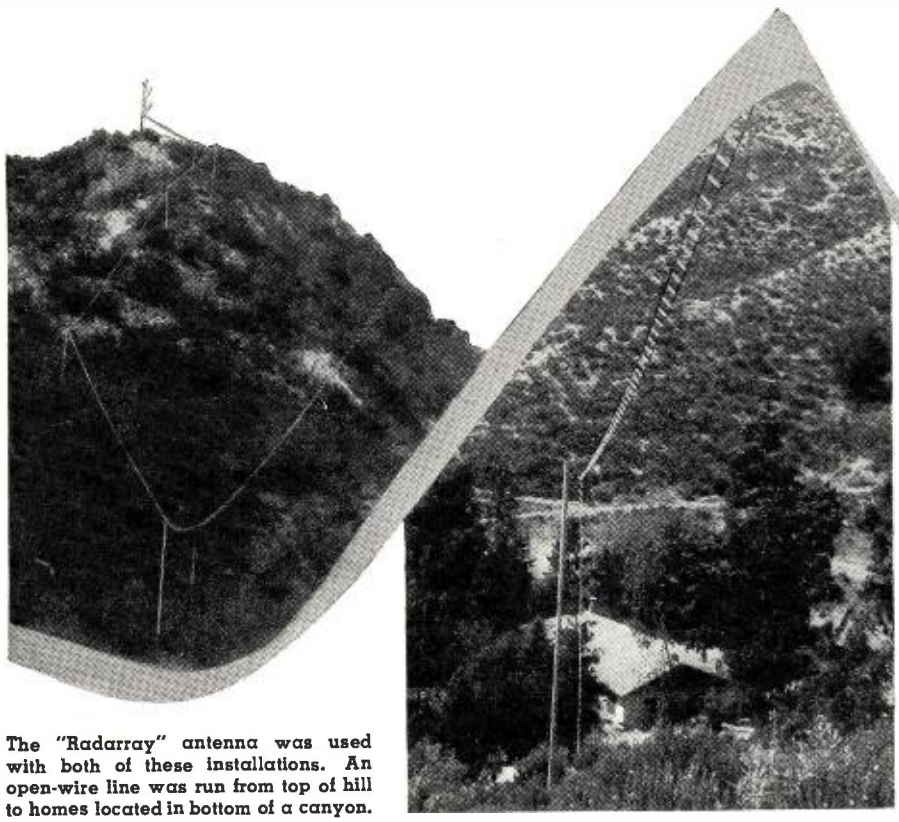
Novel TV Antenna Installation Overcomes Mountain Terrain

By
ALBERT E. COMBS



The "Radarray" antenna was used with both of these installations. An open-wire line was run from top of hill to homes located in bottom of a canyon.

An open-wire line 490 ft. long paid dividends. It was the only answer to this installation problem.

EVERY television technician no matter where he operates encounters the challenge of fringe area reception. The three major problems are usually signal strength, interference, and reflection—causing ghosts.

Because the signal strength is liable to be variable, the first step is to locate the strongest signal. A portable TV set or a field strength meter with a half-wave dipole on the end of an eight foot mast should be used to probe the rooftop and surrounding territory. Strength of signal does not necessarily depend upon height; many times the best signal will be found eight feet or so off the ground. The important thing is to locate the strongest signal area and place the antenna there.

V-cone antennas, up to four stacks, are practical if there is no interference or ghost. Experience has shown that the V-cone is adequate for gathering signal, but its directional characteristics are not comparable with other systems. For directional characteristics to eliminate interference and ghosts, the best type of antenna is the "Radarray." It is a high gain, stacked dipole with multiple reflectors, and has a very narrow frontal lobe with almost a complete null to the rear, and is made by the Gon-Set Co. of Burbank, Calif. This antenna requires careful orientation.

Mountainous terrain presents other problems in addition to weak signal. The only possible signal may be on a hilltop far from the receiver location. For such long runs, twin-lead has too great a loss, and an open-wire line is the only alternative. There is available on the market packaged open wire line suitable for this purpose. To suspend this long line, ten foot thin-wall 1" or 1¼" electrical conduit tubing can be used, and the line fastened to the pole with mast insulators hooked over the line spreaders. Open-wire line should be kept taut by springing the steel poles, and should be kept as far as practical from fences, power lines, and trees.

Proper impedance matching must be maintained between the antenna and the line, and between the line and the set. With long transmission lines, any mismatch will affect reception a great deal more than the short lines ordinarily used. Time may be saved by figuring out the line terminations before going to the job. For example, if the job has been surveyed and it is known that a line five hundred feet long will be required, open-wire line is the obvious choice. This line is commercially available in 450 ohm impedance and will have to be terminated by a matching transformer on at least one end. If the "Radarray" antenna is to be used it will match the line; if not, a matching section of line must be used. In any case, a matching section will be required at the set. A bad standing wave ratio, caused by mismatch, will ruin an otherwise good installation. To match a 450 ohm line to a 300 ohm antenna, connect a 3.5 ft. piece of 300 ohm twin-lead between the antenna and line, and solder the remaining end to the open-wire line. This matching section will give a better energy transfer. In general, mismatch between the antenna and the line is not as serious as mismatch between the line and the set. In most cases, matching sections can be made from short pieces of commercially available line. Two useful equations for figuring matching sections are as follows: $Z_s = \sqrt{Z_1 Z_2}$ where Z_s is the section impedance, Z_1 is the line impedance, and Z_2 is the antenna center impedance (or input impedance) of set. To find the length of line (in feet) required for the section, $L = 234/\text{freq. (in mc.)}$.

If it is necessary to make up a section of line, use the charts in one of the handbooks, either "Reference Data for Radio Engineers," or the "A.R.R.L. Antenna Handbook," either of which is good.

The main points to remember in mountainous areas are that the an-

(*Continued on page* 108)

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Over-all view of the Hallicrafters SR-75.

TRANSCEIVER for the NOVICE HAM

Details on a compact unit which is suitable either for Novice hams or as an emergency rig.

By
CLARK E. JACKSON

THERE are many Novices who will elect to build their own transmitters and receivers for use after July 1, 1951, providing they have received their Novice Licenses by that time. Others will take advantage of commercial products such as the one to be described.

The equipment illustrated is the *Hallicrafters* Model SR-75 Receiver-Transmitter which includes a complete all-wave radio receiver and a five-band, plug-in coil, c.w. transmitter rated at 10 watts input. Experience has shown that reliable contacts are made by amateurs using extremely low powered units. It is expected, therefore, that units used by the Novice will allow many DX contacts. Complete rules and regulations covering the new Novice and Technician classes of stations and licenses are given on page 38 of this issue. The transceiver to be described meets the requirements as set forth for these classifications.

The SR-75 may be used either as a fixed or portable amateur station as well as an auxiliary or emergency station. The unit may be powered from a 6 volt automobile storage battery in conjunction with a 6 volt d.c. to 115 volt a.c. vibrator pack capable of furnishing a minimum output power of fifty watts at from 40 to 125 cycles.

The receiver is electrically identical to the *Hallicrafters* Model S-38B receiver with the exception of the rectifier tube which is a 117Z6GT. This tube is used in a conventional voltage doubler circuit as shown in Fig. 2 which is the complete schematic of the transceiver.

Transmitter

When connected as a transmitter, the unit comprises a c.w. crystal controlled oscillator employing a type 12BA6 pentode, controlled by a plug-in type crystal. A slide switch, located on the rear lip of the chassis, is used to operate the oscillator in a fundamental Pierce oscillator circuit or as a frequency doubler in a tri-tet circuit. The output of the crystal-controlled oscillator drives a class C amplifier comprising a 50L6GT and plug-in type tank coils. This same r.f. amplifier tube is also used as the audio power amplifier when the transceiver is switched to the "receiver" position. The output circuit consists of condensers C_{20}, C_{21} while the tank coil is a pi-network composed of the two tuning condensers and the plug-in coil selected for the operating frequency. This pi-network assures substantial harmonic reduction as well as flexibility in feeding various types of antenna systems with resistances ranging from 30 to 600 ohms. In the case of balanced systems, these may be fed with power if the transmission line is at least a quarter wave or longer at the operating frequency.

To eliminate electrical shock hazard, the keying of the final amplifier is accomplished by means of a relay whose power is supplied by two standard 1½ volt flashlight cells. A holder for these cells is contained within the receiver-transmitter cabinet. Because flashlight cells deteriorate with age, the transceiver comes from the factory without these batteries.

On the rear chassis lip is a 4-prong socket for connecting to the keying relay and to the plate circuit of the final amplifier. A 36" four-wire cable with plug for insertion into this socket is supplied and the two metering leads are provided with an insulated socket which mounts a pink bead, 2 volt, 60 ma. pilot bulb. Under resonant, no-load, key-down conditions, the class C

Fig. 1. (A) Details for constructing a single-wire antenna suitable for use with the SR-75 transceiver. (B) Data for building and connecting a half-wave doublet antenna.

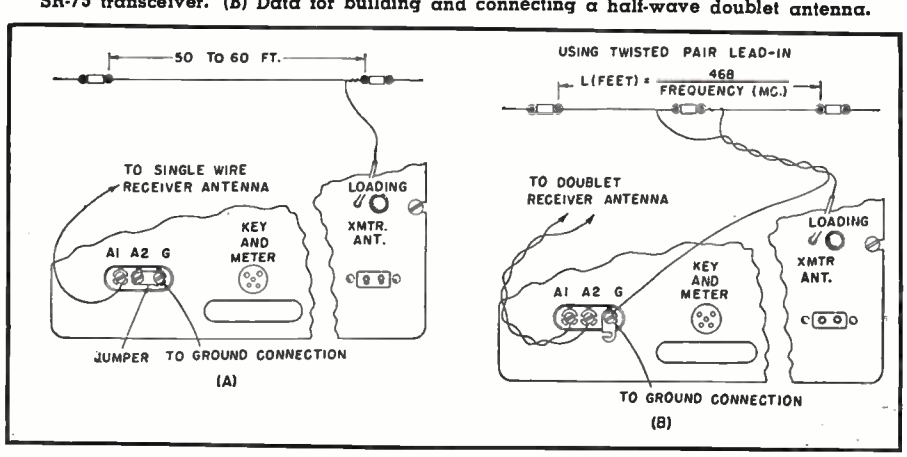

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plate current is approximately 15-20 ma. which is not sufficient to light the indicator bulb. However, under off-resonance and load conditions the plate current is about 45 ma. which provides almost full brilliancy.

If the Novice wishes a more accurate indication of plate current and tuning resonance, it is recommended that he use a 0-100 ma. meter connected in place of the pilot lamp.

Antennas

It is necessary to use two separate antenna systems with the transceiver in order to obtain optimum results. The transmitting antenna may be in the form of a single-wire installation or a half-wave doublet. It is recommended that the doublet be used when transmitting on the higher frequency bands. Antenna heights between 35-75 feet are usually suitable for all bands. However, it is necessary to erect the antenna clear of surrounding objects if at all possible. Complete information on the design, construction, and application of many types of antennas has been given in past issues of this publication or may be found in any of the amateur radio handbooks.

(*Continued on page* 136)

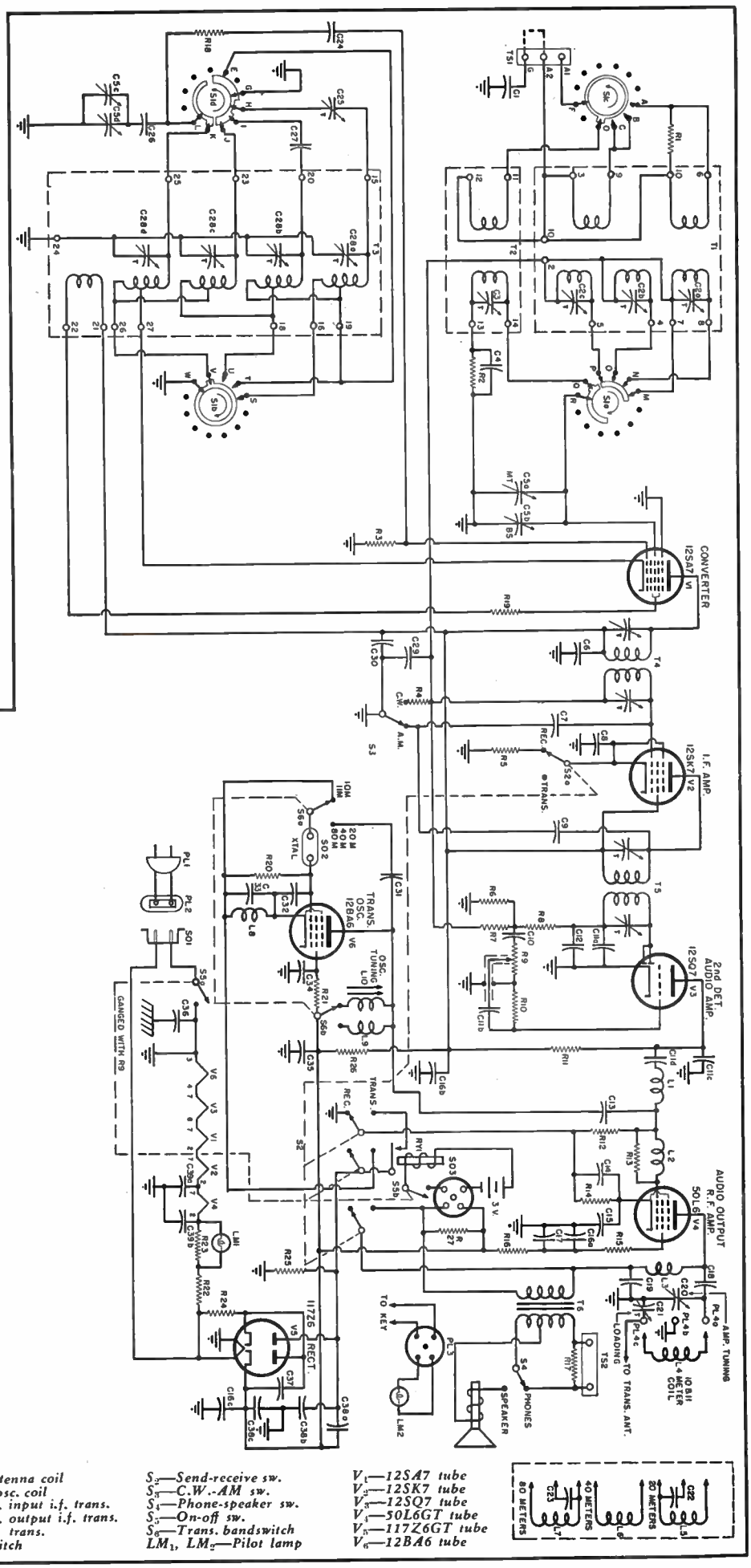

Fig. 2. Complete circuit diagram of the Hallicrafters model SR-75 transceiver.

R_1—10,000 ohm, ½ w. res.
R_2, R_6, R_{12}—470,000 ohm, ½ w. res.
R_3—22,000 ohm, ½ w. res.
R_4—470 ohm, ½ w. res.
R_5—390 ohm, ½ w. res.
R_7—2.2 megohm, ½ w. res.
R_8—47,000 ohm, ½ w. res.
R_9—2 megohm, ½ w. pot.
R_{10}—10 megohm, ½ w. res.
R_{11}—220,000 ohm, ½ w. res.
R_{13}—100,000 ohm, ½ w. res.
R_{14}—150 ohm, ½ w. res.
R_{15}, R_{16}—47 ohm, ½ w. res.
R_{16}—4700 ohm, ½ w. res.
R_{17}—15 ohm, ½ w. res.
R_{19}, R_{24}—22 ohm, ½ w. res.
R_{20}—56,000 ohm ½ w. res.
R_{21}—27,000 ohm, ½ w. res.
R_{22}—39 ohm, 2 w. res.
R_{23}—39 ohm, ½ w. res.
R_{25}—47,000 ohm, 1 w. res.
R_{26}—1200 ohm, ½ w. res.
R_{27}—100 ohm, ½ w. res.
C_1, C_{10}—.01 µfd., 600 v. cond.
C_{2a}, C_{2b}, C_{2c}, C_3, C_{21}, C_{25}, C_{28a}, C_{28b}, C_{28c} C_{28d}—Trimmer cond.
C_4—2700 µµfd., 400 v. cond.
C_{5a}, C_{5c}—Two-gang main tuning cond.
C_{5b}, C_{5d}—Two-gang bandspread cond.
C_6—.25 µfd., 400 v. cond.
C_7, C_8—Capacity formed by placement of wiring
C_9, C_{30}—.05 µfd., 400 v. cond.
C_{11a}, C_{11c}, C_{24}—220 µµfd. mica cond.
C_{11b}—.002 µfd., 400 v. cond.
C_{11d}, C_{15}, C_{17}, C_{31}, C_{34}, C_{35}—.005 µfd., 400 v. cond.
C_{12}—100 µµfd. mica cond.
C_{13}—110 µµfd. mica cond.
C_{14}—30 µfd., 25 v. elec. cond.
C_{16a}, C_{16b}, C_{16c}—40/40/60 µfd., 250 v. elec. cond.
C_{18}—.001 µfd., 400 v. cond.
C_{19}, C_{29}—.02 µfd., 400 v. cond.
C_{20}—Var. air cond.
C_{22}—47 µµfd. mica cond.
C_{23}—120 µµfd. mica cond.
C_{26}—.003 µfd., 400 v. cond.
C_{27}, C_{37}—.0022 µfd., 400 v. cond.
C_{32}—24 µµfd. mica cond.
C_{33}—50 µµfd. mica cond.
C_{36}—.1 µfd., 600 v. cond.
C_{38a}, C_{38b} C_{38c}—40/40/40 µfd., 250 v. elec. cond.
C_{39a}, C_{39b}—Two-sec. .004 µfd., 400 v. cond.
L_1, L_2, L_3, L_8—R.f. choke
L_4—10 & 11 meter amplifier coil
L_5—20 meter amplifier coil
L_6—40 meter amplifier coil
L_7—80 meter amplifier coil
L_9—20, 40, & 80 meter osc. coil
L_{10}—10 & 11 meter osc. coil
T_1, T_2—Antenna coil
T_3—Conv. osc. coil
T_4—455 kc. input i.f. trans.
T_5—455 kc. output i.f. trans.
T_6—Output trans.
S_1—Bandswitch
S_2—Send-receive sw.
S_3—C.W.-AM sw.
S_4—Phone-speaker sw.
S_5—On-off sw.
S_6—Trans. bandswitch
LM_1, LM_2—Pilot lamp
V_1—12SA7 tube
V_2—12SK7 tube
V_3—12SQ7 tube
V_4—50L6GT tube
V_5—117Z6GT tube
V_6—12BA6 tube

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Helpful Hints on Servicing A.C.-D.C. Sets

By T/SGT. JAY J. LUCAS, USAF

Simple test gadget speeds both "B" voltage and filament checks. It is fool-proof, and easy to use.

A TEST prod connected to ground through a 6 watt, 110 volt lamp, and a neon lamp will prove to be a real time saver when servicing radios of the a.c.-d.c. variety, as well as being useful for locating trouble in appliances. Although this article will be confined to describing procedures for use in repairing a.c.-d.c. sets, the reader will readily visualize its applications in other jobs.

The tester is shown schematically in Fig. 1A. It consists of two lamps, a *Mazda* type S6 6 watt, 110 volt lamp and a ¼ watt type NE-45 neon lamp. They may be mounted on the test panel by using standard 1 inch diameter pilot lamp assemblies with candelabra sockets, located where they are easily seen while peering in and around the radio being serviced. The connections for the test leads should be brought out through the panel. The other side of the lamps must terminate in a good ground. Either the neutral side of the house wiring or a good water-pipe ground should suffice. The effectiveness of the ground should be checked by connecting a test lead through the 6 watt lamp to the "hot" side of an outlet. The lamp will light with normal brilliancy if the ground is satisfactory. Obviously, the lamp will not light if the lead is connected to ground side of the outlet.

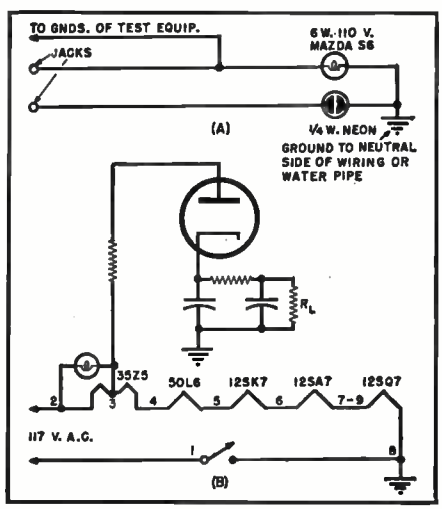

Fig. 1. (A) Wiring arrangement of test unit. (B) Conventional a.c.-d.c. series-type filament wiring. Numbered test points refer to Table 1. Line cord switch must be in closed position when making these tests.

While installing the lamps, it would be wise to connect ground leads to the signal generator, signal tracer, scope, etc., terminating them at the lead side of the 6 watt lamp. This will indicate when these instruments have been connected to a "hot" chassis, which is the usual cause of the annoying hum modulation experienced when using such instruments on a.c.-d.c. sets.

Little need be said about the theory involved in this simple device. The 6 watt lamp provides a low-resistance path to ground for small currents, but lights and limits the current to a safe value when the lead is connected to a hot-spot. When checking for burned out filaments in a series circuit. the lamp will light as long as all the tubes between the probe and the high side of the line are OK. The limiting action of the lamp eliminates any appreciable voltage drop through the tubes during the test. The neon lamp is essentially a voltage-operated device which will light with the presence of voltage without drawing appreciable current. It is used in cases where the current drawn by the 6 watt lamp would "upset" circuit conditions.

For the purpose of explanation, a typical a.c.-d.c. power circuit is shown in Fig. 1B. A large percentage of sets is represented by this basic diagram. The test points are numbered in logical sequence. Minor deviations from the procedures outlined will have to be made for other circuits, but after a little practice the reader will readily develop his own procedures.

Assuming the circuit given is applicable to the set being tested, the following steps should be followed:

Turn the set on, then plug it into the outlet. With the test probe connected to the 6 watt lamp jack, touch the prod to the chassis. If the lamp lights, the chassis is connected to the "hot" side of the line.

An exception to this will occur if the line switch is defective and does not close. A line cord or plug that is open between the switch and plug will also cause the lamp to light.

Trouble of this type may be detected by watching the test lamp when it is touched to the chassis. If the switch, line cord or plug is open, the lamp will light to almost full brilliancy and then gradually dim as the tube heaters warm up. A condition of this type would indicate that the polarity of the line cord is correct. It will also show that the filament string is operating properly but that there is an open in the grounded side of the line cord or switch.

If the lamp lights and holds its full brilliance, it would indicate that the line cord had not been properly polarized and we strongly recommend reversing the plug to avoid becoming an unwilling conductor of 110 volts. (A rubber safety mat is a good precautionary measure if the floor isn't "shockproof.") After re-

Table 1. Test procedure for checking open filaments, cord, and switch. Test points mentioned refer to those shown in Fig. 1B.

TEST	LAMP LIGHTS	DOES NOT LIGHT	REMEDY
1	See text		
2	OK	Line cord open	Replace cord or plug
3	OK, Check with pilot lamp temporarily removed.	35Z5 Fil. burned out at pilot tap	Replace tube, and check output tube (See text)
4	35Z5 Fil. OK	35Z5 Fil. burned out	Replace tube and check output tube (See text)
5	50L6 Fil. OK	50L6 Fil. burned out	Replace tube
6	12SK7 Fil. OK	12SK7 Fil. burned out	Replace tube
7	12SA7 Fil. OK	12SA7 Fil. burned out	Replace tube
Reverse line plug temporarily for tests 8 and 9.			
8	Line cord & switch OK ("Hot" chassis)	Defective switch or cord	Repair or replace defective part
9	12SQ7 Fil. OK	12SQ7 Fil. burned out	Replace tube
Return plug to original position so chassis is connected to neutral side of line and filaments are connected to "hot" side.			

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versing the plug, recheck the chassis to make sure that there is no voltage present. If the tubes do not light, proceed with the tests outlined in Table 1.

Upon completion of the tests outlined, or if tubes warm up, indicating that all filaments are OK, the following "quickie" tests will show up the most common failures in a.c.-d.c. sets:

Check rectifier plate voltage. Connect probe to plate of rectifier. If lamp does not light, check the surge resistor.

Check rectifier output. Using the 6 watt lamp, connect probe to cathode of rectifier tube. If normal voltage is present, the lamp should light to normal brilliancy. The lamp will draw approximately 55 ma., so this test should not be prolonged. If the rectifier is good, it will withstand this test momentarily. If the emission is low, or if there is a defective filter, the lamp will not light brightly.

Check filter output. Place the probe on the screen connection of the output tube (pin 4 of the 50L6, in this case). Anything less than normal brilliancy in the 6 watt lamp indicates low capacity filters. If the set plays, this fault will usually show up as hum modulation and low volume. Checking the voltage with a meter usually indicates less than 90 volts when this trouble occurs. Replacing the filter condensers is the best remedy for this.

Check output transformer. If the set is dead and voltage is present at the screen of the power output tube, the output transformer is a logical suspect. Placing the test probe on the plate pin should light the lamp. (Don't be fooled by a shorted condenser between plate and screen of the output tube.)

Check output tube for filament-to-cathode leakage. This is a common cause of distortion. Although a tube checker will usually reveal a leakage, it may also be checked by connecting the test lead to the neon lamp, disconnecting the cathode bias and bypass, and connecting the probe to the cathode pin. Momentarily remove any of the tubes except the rectifier and output tube. This will cause the neon lamp to glow if there is a leakage. Another method is to leave the cathode circuit undisturbed, and let the set get warm. Then pull out one of the tubes farther down the line (12SA7 or 12SQ7) and carefully watch the 35Z5 and 50L6 filaments. If they continue to light or glow unusually long, there is a leakage in the output tube. The author always makes this check whenever a rectifier tube is replaced, as leakage in the output tube causes excessive voltage across the rectifier filaments and shortens the life of the tube. The latter check can be made without removing the chassis from the cabinet.

Check for plate and screen voltages on other tubes. The neon lamp will indicate the presence of practically all normal voltages in a.c.-d.c. sets as they are in the neighborhood of 90 to 120 volts, which is just sufficient to ionize

(*Continued on page* 135)

Mac's RADIO SERVICE SHOP

By JOHN T. FRYE

TV AND THE LITTLE GUY

BARNEY, the "electronic assistant" as he liked to call himself of Mac's Radio Service Shop, stepped inside the front door of the establishment and then stopped dead in his tracks and began to sniff the air like a retired fireman getting a whiff of shingle smoke.

"Oh-oh, Miss Perkins," he exclaimed accusingly to the office girl, "you've been splurging on a new perfume again. No, don't tell me what it is. Let me guess. I'm pretty good at this sort of thing: Hm-m-m-m," he said with his eyes tightly closed and his freckled face screwed up in a look of intense concentration, "it could be either *My Secret Sin* or *Mantrap,* but I seem to be getting just a *soupçon* of *Night of Love—*"

The topic of large TV service operations vs. the small is a controversial one. In the past we have presented the case for the large operation (see "Is the One Man TV Shop Doomed?" in the February 1950 issue and "TV Servicing is Big Business" in the March 1950 issue).

With this article we present the other side of the story with John T. Frye going to bat for the small operator.

We do not believe that there is any cut-and-dried answer to this question at the present. Only time will tell which type of operation can make the grade most successfully.

"I hate to throw your *'soupçon'* out of joint," Matilda interrupted with a giggle, "but you're not even warm. If you will stop making that noise like a punctured bellows and open your eyes, you will see that what you are smelling is *First April Hyacinths,* and they are right here in a vase on my desk."

"Yeah, M'sieu Jacques," Mac yelled from the service room, "quit waving that anteater proboscis of yours around and come on back here and put your nose to the grindstone where it belongs."

"Okay, okay!" Barney said amiably as he strolled back into the service department, "but I have a little matter I want to talk over with you before we start to work."

"Very well, Junior," Mac said as he shot an amused look at the youth, "but don't think you're fooling anybody. I'm hep to this business of your getting me started on a long-winded lecture just to stave off going to work; but what is the gimmick this time?"

"Oh *no,* Boss," Barney denied with a pained expression. "You've got me all wrong. This thing really has me worried. Remember those magazines you told me to take home and read? Well, just before coming to work I finished an article in one of the publications intended for large service shop owners. This writer said television was finally spelling out the end of the 'screwdriver mechanics.' At first I thought the writer simply meant poorly-trained and sloppy technicians, but as I read on I found him calling these same people 'individual technicians' and 'one-man alley operators.' To him, apparently, a screwdriver mechanic and the operator of a one-man shop were the same person, and he was convinced that these characters were going to be about as common on the American scene as wild bison."

Mac lighted his pipe before he answered. "This *is* serious," he said with with a grin that belied his words. "Did the prophet of doom give any reasons for his pessimism?"

"Well, for one thing, he said the little-shop operator did not have either the equipment or the technical knowledge needed for TV servicing."

(*Continued on page* 137)

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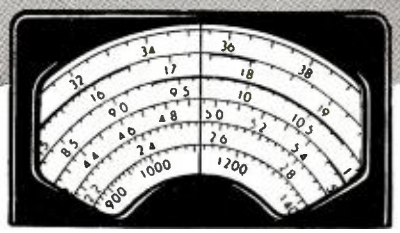
International SHORT-WAVE



Compiled by **KENNETH R. BOORD**

ACCORDING to a release from the International Monitoring Service, San Carlos, California, its "free service to International Broadcasters, in and outside the United States" was discontinued as of January 1, until further notice. "Resumption of these services, which were performed in the interest of goodwill and better understanding between the peoples of one nation and another, will commence as soon as practical with relation to the necessary reorganization of our group caused by the current conflict and the ensuing national defense preparations. IMS extends its sincere appreciation to the hundreds of short-wave listeners throughout the world who so willingly and unselfishly cooperated with us in the past years in helping us to enable our services to cover a broader scope and serve a greater number of our friends who broadcast the world over."

* * *

Radio Club Notes

England—The International Short Wave Club, 100, Adams Gardens Estate, London, S.E. 16, in a recent monthly bulletin, said: "We will send details and a specimen copy of our publication to any address."

* * *

This Month's Schedules

(*NOTE*: This is the time of year when some stations will be going on *Summer Time*; in such cases, you may find schedules *advanced one hour* from those listed herein.—KRB)

Andorra—Radio Andorra, 5.992, noted with good level when tuned 1615. (Ferguson, N.C.) Logged recently by Oskay, N.J., on measured 5.9902 at 1648; severe CWQRM; man announced in French, woman announced in Spanish.

Angola—CR6RO, 7.582, Silva Porto, is heard in Sweden 1400-1500; CWQRM. (*Nattugglan,* Sweden) *Radio Australia* says this one is heard in South Africa at 1200-1505; QRA is P.O. Box 33, Silva Porto, Angola. Also reports CR6RE, 7.165, is heard in South Africa from 1300. Says CR6RG transmits daily at 1300-1500 on 9.760; that CR6RB, 9.165, is heard in South Africa at 1230-1500, fairly good strength; and that Louanda, 9.470, is heard from 1300 onwards.

CR6RD, 11.922.7, Nova Lisboa, noted 1340. (Oskay, N.J.)

Argentina—New SIRA schedules from Buenos Aires are listed—9.690, Spanish 1000-1100; French 1100-1200; Italian 1200-1300; Swedish 1300-1400; *English* 1400-1700; German 1700-1800; Spanish 1800-1900; *English* 1900-2100 and 2100-2400. On 15.290, Spanish 2100-0100, 1215-1545. On 11.880, Portuguese 0800-1300; French 1300-1430; *English* 1430-1600; French 1600-1700; Portuguese 1700-2230. On 9.455, *English* 1600-1750, 2130-0100. Still desires reports from listeners all over the world.

LRS, 9.315, Buenos Aires, *Radio Splendid,* noted in Spanish 2110-2133 and later. (Patterson, Ga.) LRT, 11.839, Tucuman, heard signing off 2258 after a march. (Russell, Calif.)

Australia—Latest schedules of *Radio Australia* are 1500-1655, VLC, 15.20, to New Zealand; 1500-1800 (Sat. to 1815), VLA8, 11.76, to British Isles, Europe; 1529-1800 (Sats. from 1559 to 1815), VLB11, 15.16, to Japan, N. Pacific; 1713-1950 (Fri. to 2100; Sat. 1729-2100), VLC9, 17.84, to South and Southeast Asia; 1815-1950 (Fri. to 2100; Sat. 1828-2100), VLA6, 15.20, to Southeast Asia, N.W. Australia; 1950-2230 (off Fri., Sat.), VLG11, 15.21, to Southeast Asia, N.W. Australia; 2145-2315 (Fri. 2056-2145; Sat. 2056-2315), VLB5, 21.54, to Japan, N. Pacific; 2330-0045, VLC9, 17.82, to South and Southeast Asia; 2330-0045 (off Fri.), VLB5, 21.54, to Africa; 2330-0045, VLA6, 15.20, to N. America (West Coast); 0045-0230, VLG11, 15.21, to Southeast Asia (including Thai language program Fri. 0200-0230); 0100-0140, VLC4, 15.32, to French Indo-China (in French); 0100-0140 (Tue.-Fri.), VLH5, 15.23, to Tahiti (in French); 0100-0140 (Sun., Mon.), VLA6, 15.20, to Tahiti (in French); 0100-0400 (except Sun., Mon.), VLA6, 15.20, to China (United Nations broadcast); 0155-0315, VLC10, 21.68, to British Isles, S. Asia; 0140-0315, VLB9, 9.58, to New Zealand, British Isles; 0200-0230 (Fri. only), VLG11, 15.21, to Thailand (in Thai); 0245-0345, VLG11, 15.21, to New Caledonia (in French); 0328-0450, VLB4, 11.85, to Japan, N. Pacific; 0400-0630 (Sun. and Mon. from 0328), VLA6, 15.20, to Japan, N. Pacific; 0328-0530, VLC4, 15.32, to South and Southeast Asia; 0500-0630, VLB4, 11.85, to Southeast Asia; 0530-0600, VLC4, 15.32, to Indonesia (in Indonesian); 0600-0630, VLC4, 15.32, to South and Southeast Asia; 0700-0900, VLC7, 11.81, to N. America (East Coast); 0900-1000, VLA6, 15.20, to British Isles, Europe, VLB4, 11.85, to South and Southeast Asia, and VLC7, 11.81, to N. America (Central and Mountain Time Zones); 1000-1115, VLC7, 11.81, to N. America (West Coast), and VLB4, 11.85, to South and Southeast Asia; 1015-1115, VLA6, 15.20, to Africa. Unless otherwise stated, all broadcasts are *English.*

Radio Australia's 11.76 channel noted 1645-55 with news; fair to good level in South Dakota. (Lane) Also reported by Hoffman, N. Y.

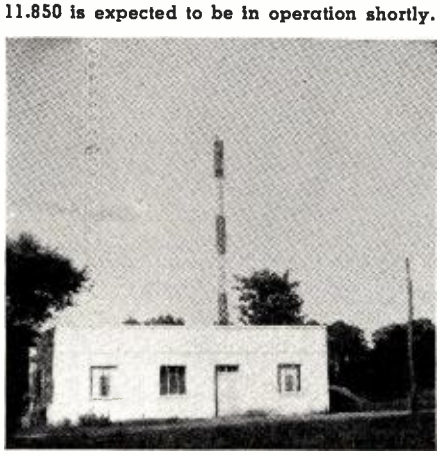
VLX (or is call VLX2?), 4.897, Perth, has news 0400, 0645, 0800; nice signal in Va. (Saylor) This one noted by Pearce, England, at 1035 with dance music, giving local time as "25 minutes to 12 a.m.;" signed off 1100 with "God Save the King."

VLQ3, 9.660, Brisbane, sends new QSL card depicting map of Australia; heard at 1450 with test before 1500 regular sign-on; reports should be sent to Box 293E, G.P.O., Brisbane, Queensland, Australia. (ISWC), London)

Bechuanaland—ZNB, 8.230, Mafeking, noted R-6 but with bad CWQRM at 1315; orchestral recordings. (Pearce,

(*Continued on page* 99)

Front view of transmitter building at TGNA (Telling the Good News Abroad), missionary station in Guatemala City. The station has been licensed to operate on channels of 1180 kc., 6.040, 9.660, 11.850, 15.100, and 17.870 meters. The first three frequencies have been in use for some time and the 11.850 is expected to be in operation shortly.



(Note: Unless otherwise indicated, all time is expressed in American EST: add 5 hours for GCT. "News" refers to newscasts in the English language. In order to avoid confusion, the 24 hour clock has been used in designating the times of broadcasts. The hours from midnight until noon are shown as 0000 to 1200 while from 1 p.m. to midnight are shown as 1300 to 2400.) The symbol "V" following a listed frequency indicates "varying." The station may operate either above or below the frequency given. "A" means frequency is approximate.

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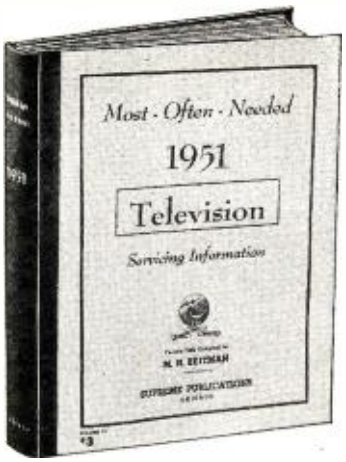
New SUPREME 1951 TV Manual



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This newest giant volume of the series covers 1951 factory data on all popular television sets of all makes. There are circuit explanations, 192 pages of alignment procedure, test patterns, response curves, pages of waveforms, voltage charts, service hints, and dozens of large double-page circuit diagrams. Manual style binding. At your parts jobber or by mail, only..... $3

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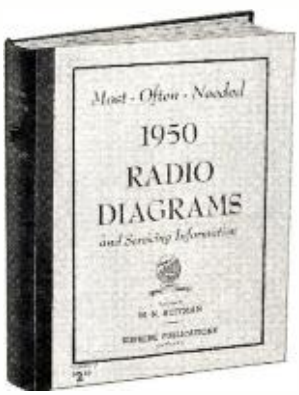

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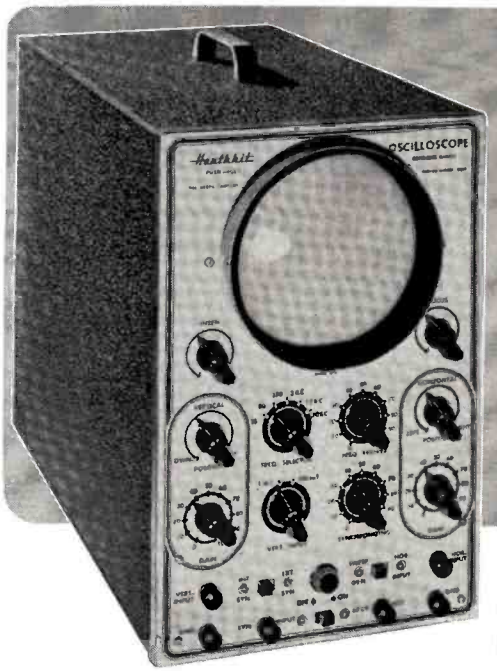

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The new Heathkit 5" Push-Pull Oscilloscope Kit is again the best buy. No other kit offers half the features — check them.

Measure either AC or DC on this new scope — the first oscilloscope under $100.00 with a DC amplifier.

The vertical amplifier has frequency compensated step attenuator input into a cathode follower stage. The gain control is of the non frequency discriminating type—accurate response at any setting. A push-pull pentode stage feeds the CR tube. New type positioning control has wide range for observing any portion of the trace.

The horizontal amplifiers are direct coupled to the CR tube and may be used as either AC or DC amplifiers. Separate binding posts are provided for AC or DC.

The multivibrator type sweep generator has new frequency compensation for the wide range it covers: 15 cycles to over 100,000 cycles.

The new model 0-6 scope uses 10 tubes in all, including 5" CR tube. Has improved amplifiers for better response useful to 2 megacycles. Tremendous sensitivity .04V RMS per inch horizontal — .09V RMS per inch vertical. Only Heathkit Scopes have all the features.

New husky heavy duty power transformer has 50% more laminations. It runs cool and has the lowest possible magnetic field. A complete eletrostatic shield covers primary and other necessary windings and has lead brought out for proper grounding.

The new filter condenser has separate sections for the vertical and horizontal screen grids and prevents interaction between them. An improved intensity circuit provides almost double previous brilliance and better intensity modulation.

A new synchronization circuit allows the trace to be synchronized with either the positive or negative pulse, an important feature in observing the complex pulses encountered in television servicing.

The magnetic alloy shield supplied for the CR tube is of new design and uses a special metal developed by Allegheny Ludlum for such applications.

The kit is complete, all tubes, cabinet, transformer, controls, grid screen, tube shield, etc. The instruction manual has complete step-by-step assembly and pictorials of every section. Compare it with all others and you will buy a Heathkit.

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Use the switch to see distortion, phase shift, clipping due to improper bias, both the input and output traces of an amplifier, — as a square wave generator over limited range.

The kit is complete; all tubes, switches, cabinet, power transformer and all other parts, plus a clear detailed construction manual.

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A new 30,000 V DC Probe Kit to handle high voltages with safety. For TV service work and all other high voltage applications. Sleek looking — Two color molded plastic — Red body and guard — jet black handle. Comes with connector, cable, and PL55 type plug. Plugs into Heathkit VTVM so that 300V scale is conveniently multiplied by 100. Can be used with any standard 11 megohm VTVM.

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This RF Probe Kit comes complete with probe housing, crystal diode detector, connector, lead and plug and all other parts plus clear assembly instructions. Extends range of Heathkit VTVM to 250 Mc. ± 10%. Works on any 11 megohm input VTVM. Specify No. 309 RF Probe Kit.

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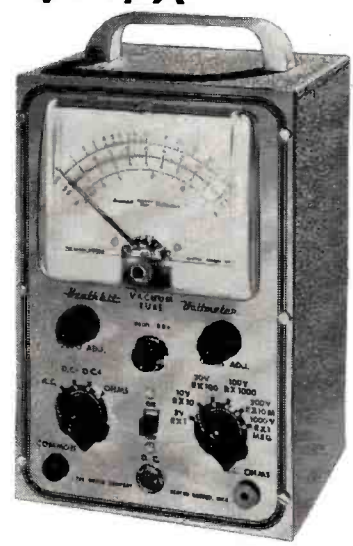

The new Heathkit Model V-4A VTVM Kit measures up to 30,000 Volts DC and 250 megacycles when used with accessory probes — think of it, all in one electronic instrument more useful than ever before. The AC Voltmeter is so flat and extended in its response (± 1 db from 20 cycles to 2 megacycles) that it eliminates the need for separate expensive AC VTVM's.

The new 200 microampere, 4½" streamline meter with quality Simpson movement (five times as sensitive as the commonly used 1 MA meter) has a shatter proof plastic meter face for maximum protection. Meter has all the desirable scales and indicates AC volts, DC volts, ohms, db (direct reading), and even has a special zero center marking for quick FM alignment.

There are six complete ranges for each function. Four functions give total of 24 ranges. The 3 volt range allows 33⅓% of the scale for reading 1 volt, as against only 20% of the scale on the 5 volt types.

New ½% ceramic precision resistors are the most accurate commercial type available — you find the same make and quality in the finest laboratory equipment selling for thousands of dollars. The entire voltage divider decade uses these ½% resistors.

Model V-4A .....Shipping Wt. 8 lbs.

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Both AC and DC voltmeter measurements use a push-pull electronic voltmeter circuit, and the meter circuit makes the meter burn-out proof. Electronic ohmmeter circuit measures resistance over the amazing range of 1/10 ohm to one billion ohms, all with internal 3 volt battery. Ohmmeter batteries mount on the chassis in snap-in mounting for easy replacement.

Voltage ranges are full scale — 3 Volts, 10 Volts, 30 Volts, 100 Volts, 300 Volts, 1000 Volts. Complete decading coverage without gaps.

The DC probe is isolated for dynamic measurements. Negligible circuit loading. Gets the accurate reading without disturbing the operation of the equipment under test. Kit comes complete: cabinet, transformer, Simpson meter, test leads, complete assembly and instruction manual.

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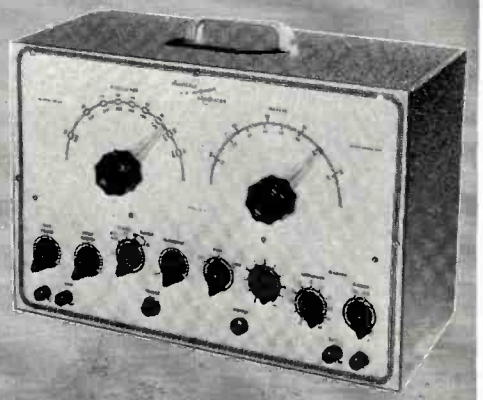
The instrument provides a frequency modulated signal covering, in two bands, the range of 10 to 90 Mc. and 150 to 230 Mc. — thus, ALL ALLOCATED TV CHANNELS AS WELL AS IF FREQUENCIES ARE COVERED.

An absorption type frequency marker covers from 20 to 75 Mc. in two ranges — therefore, you have a simple, convenient means of frequency checking of IF's, independent of oscillator calibration.

Sweep width is controlled from the front panel and covers a sweep deviation of 0-12 Mc. — all the sweep you could possibly need or want.

And still other excellent features are: Horizontal sweep voltage available at the front panel (and controlled with a phasing control) — both step and continuously variable attenuation for setting the output signal to the desired level — a convenient instrument stand-by position — vernier drive of both oscillator and marker tuning condensers — and blanking for establishing a single trace with base reference level. Make your work easier, save time, and repair with confidence — order your Heathkit TV Alignment Generator now!



$39.50

Model TS-2
Shipping Wt.....20 lbs.

Heathkit SIGNAL GENERATOR KIT

Model SG-6
Shipping Wt. 7 lbs.

$19.50

The new Heathkit Signal Generator Kit has dozens of improvements. Covers the extended range of 160 Kc to 50 megacycles on fundamentals and up to 150 megacycles on useful calibrated harmonics; makes this Heathkit ideal as a marker oscillator for TV. Output level can be conveniently set by means of both step attenuator and continuously variable output controls. Instrument has new miniature HF tubes to easily handle the high frequencies covered.

Uses 6C4 master oscillator and 6C4 sine wave audio oscillator. The kit is transformer operated and a husky selenium rectifier is used in the power supply. All coils are precision wound and checked for calibration making only one adjustment necessary for all bands.

New sine wave audio oscillator provides internal modulation and is also available for external audio testing. Switch provided allows the oscillator to be modulated by an external audio oscillator for fidelity testing of receivers. Comes complete, all tubes, cabinet, test leads, every part. The instruction manual has step-by-step instructions and pictorials. It's easy and fun to build a Heathkit Model SG-6 Signal Generator.

Heathkit SIGNAL TRACER and UNIVERSAL TEST SPEAKER KIT

Model T-2
Shipping Wt.....7 lbs.

$19.50

The popular Heathkit Signal Tracer has now been combined with a universal test speaker at no increase in price. The same high quality tracer follows signal from antenna to speaker — locates intermittents — finds defective parts quicker — saves valuable service time — gives greater income per service hour. Works equally well on broadcast, FM, or TV receivers. The test speaker has an assortment of switching ranges to match either push-pull or single output impedances. Also tests microphones, pickups and PA systems. Comes complete: cabinet, 110V 60 cycle power transformer, tubes, test probe, all necessary parts, and detailed instructions for assembly and use.

Heathkit TUBE CHECKER KIT

Model TC-1
Shipping Wt. 12 lbs.

$29.50

Test your tubes the modern way — dynamically — the simplest, yet fastest and surest method— your Heathkit has a switch for each tube element and measures that element — no chance for open or shorted elements slipping by, all the advantages of the mutual conductance type without the slow cumbersome time consuming setups. Checks for opens, shorts, each element individually, filament and filament tap continuity, and emission.

This Tube Checker has all the features — beautiful 3 color BAD-?-GOOD meter — complete selection of voltages — roller chart listing hundreds of tubes including the new 9 pin miniatures — finest quality Centralab lever switches — high grade birch, counter-type cabinet — continuously variable line adjust control — every feature you need to sell tubes properly. The most modern type tube checker with complete protection against obsolescence. Uses only the best of parts — rugged oversize 110V 60 cycle power transformer, finest of Mallory and Centralab switches and controls, complete set of sockets for all type tubes with blank spare for future types. Fast action, gear driven roller chart quickly locates the setting for any type tube. Simplified switching cuts necessary testing time to a minimum and saves valuable service time. Simple method allows instant setup of new tube types without waiting for factory data. No matter what the arrangement of tube elements is, the Heathkit flexible switching method easily handles it. Order your Heathkit Tube Checker Kit today and see for yourself that Heath again saves you two-thirds and yet retains all the quality. Complete with instructions, all parts, and cabinet.

Heathkit CONDENSER CHECKER KIT

$19.50

Checks all types of condensers — paper, mica, ceramic, electrolytic. All condenser scales are direct reading and require no charts or multipliers. Covers range of .00001 MFD to 1000 MFD. A Condenser Checker that anyone can read. A leakage test and polarizing voltage for 20 to 500 V provided. Measures power factor of electrolytics between 0% and 50% and reads resistance from 100 ohms to 5 megohms. The magic eye indicator makes testing easy.

The kit is 110V 60 cycle transformer operated and comes complete with rectifier tube, magic eye tube, cabinet, calibrated panel and all other parts. Has clear detailed instructions for assembly and use.

Model C-2..... Shipping Wt. 6 lbs.

NEW Heathkit

HANDITESTER KIT

$13.50

A precision portable volt-ohm-milliammeter. Uses only high quality parts — All precision ½% resistors, three deck switch for trouble-free mounting of parts, specially designed battery mounting bracket, smooth acting ohm adjust control, beautiful molded bakelite case, 400 microamp meter movement, etc.

DC and AC voltage ranges 10-30-300-1000-5000V. Ohms range 0-3000 and 0-300,000 Range Milliamperes 0-10 Ma, 0-100 Ma. Easily assembled from complete instructions and pictorial diagrams.

Model M-1..... Shipping Wt. 3 lbs.

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The HEATH COMPANY

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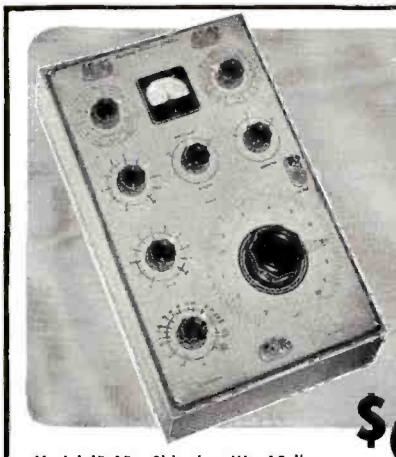
NEW *Heathkit*

IMPEDANCE BRIDGE KIT



This Impedance Bridge Kit is really a favorite with schools, industrial laboratories, and serious experimenters. An invaluable instrument for those doing electrical measurements work. Reads resistance from .01 Ohms to 10 megohms, capacitance from .00001 MFD to 100 MFD, inductance from 10 microhenries to 100 henries, dissipation factor from .002 to 1, and storage factor from 1 to 1000. And you don't have to worry about selecting the proper bridge circuit for the various measurements — the instrument automatically makes the correct circuit when you set up for taking the measurement you want. Bridge utilizes Wheatsone, Hay, Maxwell, and capacitance comparison circuits for the wide range and types of measurements possible. And it's self powered — has internal battery and General Radio 1000 cycle hummer. No external generator required — has provisions for external generator if measurements at other than 1000 cycles are desired.

Kit utilizes only highest quality parts, General Radio main calibrated control, General Radio hummer, Mallory ceramic switches, excellent 200 microamp zero center galvanometer, laboratory type binding posts with standard ¾ inch centers, ½% precision ceramic-body type multiplier resistors, beautiful birch cabinet and ready calibrated panel. (Headphones not included.)

Take the guesswork out of electrical measurements — order your Heathkit Impedance Bridge Kit today — you'll like it.

Model IB-1B....Shipping Wt. 15 lbs.

$69.50

Heathkit LABORATORY

RESISTANCE DECADE KIT

Model RD-1

Ship. Wt. 4 lbs.

$19.50

An indispensable piece of laboratory equipment — the Heathkit Resistance Decade Kit gives you resistance settings from 1 to 99,999 ohms IN ONE OHM STEPS. For greatest accuracy, ½% precision ceramic-body type resistors and highest quality ceramic wafer switches are used.

Designed to match the impedance bridge above, the Resistance Decade Kit has a beautiful birch cabinet and attractive panel. It's easy to build, and comes complete with all parts and construction manual.

Heathkit LABORATORY

POWER SUPPLY KIT

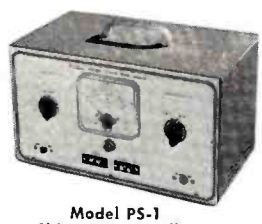
Every experimenter needs a good power supply for electronic setups of all kinds. This unit has been expressly designed to act as a HV supply and a 6.3 V filament voltage source.

Voltage control allows selection of HV output desired (continuously variable within limits outlined), and a Volts — Ma switch provides choice of output metering. A large, plainly marked, and direct reading meter scale indicates either DC voltage output in volts or DC current output in Ma. (Range of meter 0-500V DC, 0-200 Ma DC). Instrument has convenient stand-by position and pilot light.

Comes with power transformer, filament transformer, meter, 5Y3 rectifier, two 1619 control tubes, completely punched and formed chassis, panel, cabinet, detailed construction manual, and all other parts to make the kit complete.

LIMITS:

No load	Variable	150-400V DC
25 Ma	Variable	30-310V DC
50 Ma	Variable	25-250V DC
Higher loads	Voltage drops off proportionally	



Model PS-1

Ship. Wt. 20 lbs.

$29.50

Heathkit

BATTERY ELIMINATOR KIT

Model BE-2

Ship. Wt. 19 lbs.

$22.50

A few auto radio repair jobs will pay for the Heathkit Battery Eliminator Kit. It's fast for service. The voltage can be lowered to find sticky vibrators or raised to ferret out intermittents. Provides variable DC voltage 5 to 7½ Volts at 10 Amps. continuous or 15 Amps. intermittent.

Also serves as storage battery charger. A well filtered, rugged power supply uses heavy duty selenium rectifier, a husky choke, and a 4000 MFD electrolytic condenser for clean DC. 0-15V voltmeter indicates output which is variable in eight steps. Better be equipped for all types of service — it means more income.

NEW *Heathkit* SINE and SQUARE WAVE

AUDIO GENERATOR KIT

Model AG-7

Ship. Wt. 15 lbs.

$34.50

We proudly present the NEW MODEL Sine and Square Wave Audio Generator Kit. Designed with versatility, usefulness, and dependability in mind, the AG-7 gives you the two most needed waveshapes right at your fingertips — the sine wave and the square wave.

The range switch and plainly calibrated frequency scale give rapid and easy frequency selection, and the output control permits setting the output to any desired level.

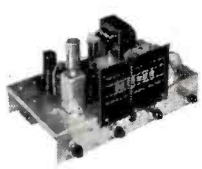
A high-low impedance switch sets the instrument for either high or low impedance output — on high to connect to high impedance load, and on low to work into a low impedance transformer with negligible DC resistance.

Coverage is from 20 to 20,000 cycles, and distortion is at a minimum — you can readily trust the output waveshape.

6 tubes, quality 4 gang tuning condenser, power transformer, metal cased filter condenser, ½% precision resistors in the frequency determining circuit, and all other parts come with the kit — plus, a complete construction manual. A tremendous kit, and the price is truly low.

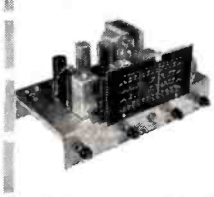
TWO HIGH QUALITY *Heathkit* SUPERHETERODYNE

RECEIVER KITS



Model BR-1 Broadcast Model Kit covers 550 to 1600 Kc. Shipping Wt. 10 lbs.

$19.50



Model AR-1 3 Band Receiver Kit covers 550 Kc. to over 20 Mc. continuous. Extremely high sensitivity. Shipping Wt. 10 lbs.

$23.50

Two new Heathkits. Ideal for schools, replacement of worn out receivers, amateurs and custom installations.

Both are transformer operated quality units. The best of materials used throughout — six inch calibrated slide rule dial — quality power output transformers — dual iron core shielded I.F. coils — metal cased filter condenser. The chassis has phono input jack, 110 Volt output for phono motor, and there is a phono-radio switch on panel. A large metal panel simplifying installation in used console cabinets is included. Comes complete with tubes and instruction manual incorporating pictorials and step-by-step instructions (less speaker and cabinet). The three band model has simple coil turret which is assembled separately for ease of construction.

Heathkit

FM TUNER KIT

Model FM-2

Ship. Wt. 9 lbs.

$22.50

The Heathkit FM Tuner Model FM-2 was designed for best tonal reproduction. The circuit incorporates the most desirable FM features — true FM.

Utilizes 8 tubes: 7E5 Oscillator, 6SH7 mixer, two 6SH7 IF amplifiers, 6SH7 limiter, two 7C4 diodes as discriminator, and 6X5 rectifier.

The instrument is transformer operated making it safe for connection to any type receiver or amplifier. Has ready wound and adjusted RF coils, and 2 stages of 10.7 Mc IF (including limiter). A calibrated six inch slide rule dial has vernier drive for easy tuning. All parts and complete construction manual furnished.

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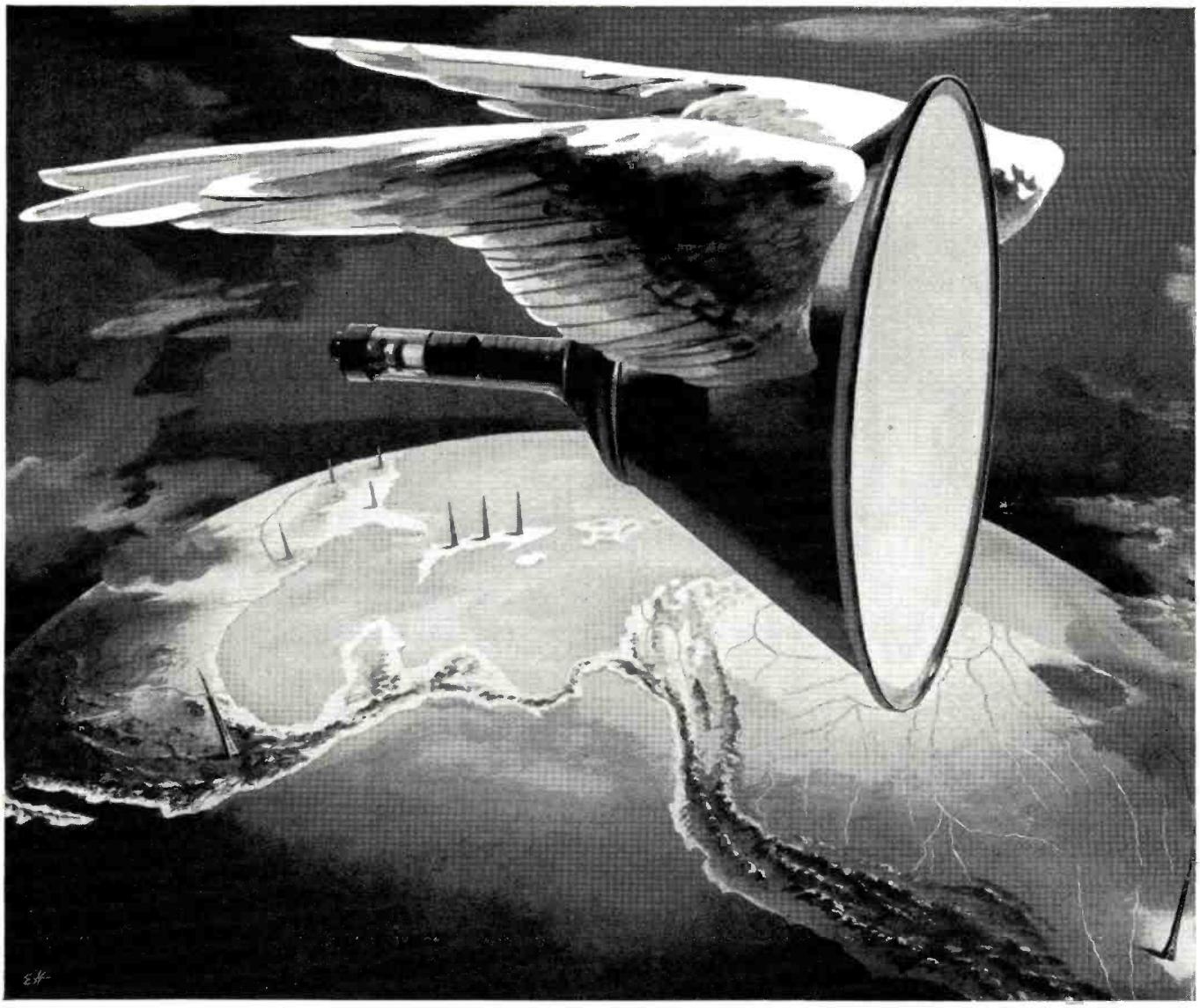


Five new RCA-equipped stations in Mexico, Brazil, and Cuba, add television to the forces which make Good Neighbors of all the Americas.

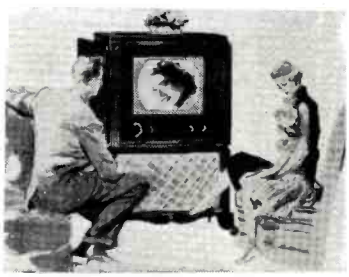
Now television goes "Good Neighbor"

As little as 10 short years ago, television—to the average man on the street—seemed far away. Today, television is in 10,500,000 homes.

Newest demonstration of TV's growth is its leap to Latin America. Three RCA-equipped stations are now in Cuba, one in Mexico, another in Brazil—and more are planned. They are contributing to television progress by following a single telecasting standard. They also use developments from RCA Laboratories: the image orthicon television camera, electron tubes, monitoring equipment, and antennas.

And as our neighbors to the south watch television at home, they see another development of RCA research—the kinescope. It is the face of this tube which acts as the "screen" in all-electronic home TV receivers . . . on which one sees sharp, clear pictures in motion.

See the latest wonders of radio, television, and electronics at RCA Exhibition Hall, 36 West 49th St., N. Y. Admission is free. Radio Corporation of America, RCA Building, Radio City, New York 20, New York.



Results of RCA Research are seen in the magnificent pictures produced on the screens of the new 1951 RCA Victor home television receivers.

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"U" TYPE for TAPE or WIRE ERASE, TV. MOTORS. ¾"x9/16" sq. 39c; 15/$5.00
ALNICO MAGNET KIT . . assstment of Bar, Block, "U" Ring. Kit of 10 magnets. $1.98
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TUBE CLAMPS . . Birtcher-type, 1-3/16" or 1 5/16. 8c; 100/$6.50
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or inventory sheets. The unit is constructed of plywood with leatherette covering.

Jobbers will handle this item and

full details may be obtained from them or from the company at 4753 N. Broadway, Chicago 40, Ill.

"SUPER-TRACER"

Precision Electronics, Inc. of 641-643 Milwaukee Avenue, Chicago 22, Illinois has introduced a new deluxe signal tracer which is designed to speed television and FM servicing.

The "Super-Tracer" features high gain, low input capacity, and a frequency range coverage from 20 cycles to over 300 mc. The instrument is isolated from the a.c. line so that it may be used to check both a.c. and d.c. sets. A large 5" speaker checks for 60 and 120 cycle hum. The probe, which is furnished with the unit, has a polystyrene tip, an aluminum barrel, and measures 6" x ⅞" in diameter.

A data sheet giving full specifications on the Model 201A signal tracer is available from the company on request.

STAMPED TV TUNER

The *Franklin Airloop Corporation* of 43-20 34th Street, Long Island City 1, New York has recently developed a new television station selector having an intermediate frequency output of 41.25 to 45.75 mc.

The tuner is of the rotary switch type employing inductances for each of the twelve channels. Inductance and wiring are die stamped on low-loss bakelite wafers. Tuned circuits are employed in the input, r.f., oscillator, and mixer circuits. The r.f. stage uses a 6BC5 tube while the mixer and oscillator use a 6J6.

Specifications and quotations are available on request.

CR TUBE REACTIVATOR

The House of Television, Inc., 40 West 4th Street, New York, New York has started delivery on a new picture tube reactivator which is said to restore the brightness to most television picture tubes ranging in size from 10 to 20 inches.

This pocket-size electronic unit plugs into any 105-115 volt, 50-60 cycle outlet and requires very little operating skill. No parts or materials are necessary to reactivate the tube. Removal of the tube from the cabinet or chassis

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THE *FULLY AUTOMATIC* TV-FM BOOSTER

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The ITI AUTOBOOSTER turns itself on and off and is automatically tuned by the normal operation of the TV receiver. No confusing array of knobs — no unsightly mess of wires — You can install the ITI AUTOBOOSTER in the back of the receiver, out of sight. You get all the improved performance, all the fine picture quality that this precision-engineered booster can give you with none of the trouble of tuning, none of the exposed wiring usually involved in booster operation.

Customer acceptance is assured, too, because no customer instruction is needed. After it's installed, all you can see is the improved picture.

- AUTOMATIC ON-OFF
- AUTOMATIC TUNING
- CONCEALED INSTALLATION
- SINGLE OR DUAL INPUT
- HIGH UNIFORM GAIN

BUY THE BOOSTER THAT SAYS "YES" to all your PROBLEMS

WRITE FOR SPECIFICATION SHEET
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LIST $44.95 F. O. B. CLIFTON, N. J.

BOOSTER CHECK LIST

	AUTOBOOSTER	OTHER BOOSTERS TESTED					
		A	B	C	D	E	F
Automatic On-Off	YES	YES	YES	NO	NO	NO	NO
Automatic Tuning	YES	NO	NO	NO	NO	NO	NO
Concealed Installation	YES	NO	NO	NO	NO	NO	NO
Full Bandwidth (All Channels)	YES	NO	YES	YES	NO	YES	NO
Amplifies FM Band	YES	YES	NO	NO	YES	NO	NO
Single or Dual Input	YES	NO	NO	NO	NO	NO	NO
Gain 19db on Low Channels 2 - 6 FM	YES	NO	NO	NO	NO	NO	YES
Gain 14 db on High Channels 7 - 13	YES	NO	NO	NO	NO	NO	YES
Made by a TV Receiver Manufacturer	YES	NO	NO	NO	NO	NO	NO

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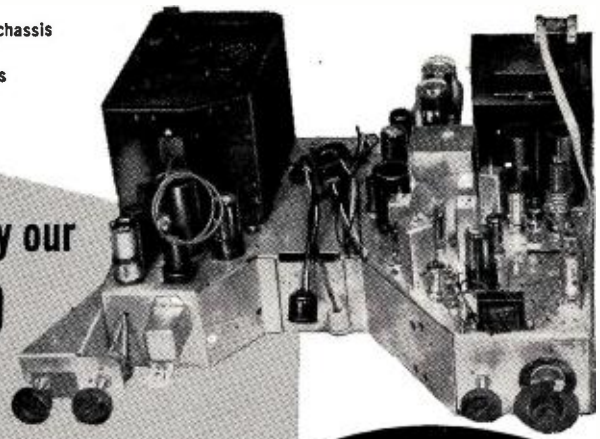

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8. Original 630 sync chain for maximum picture stability
9. Molded condensors throughout
10. Full complement of electrolytics as specified in original design
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0-20 MA, S*	1.95
0-25 MA, SU*	1.95
0-50 MA, SU*, SQ.	1.95
0-1 AMP RF, GE.	2.95
0-2 AMP RF, S, SQ.	2.95
0-4 AMP RF, GE.	2.95
0-9 AMP RF, W	2.95
0-30 AMP DC, GE	2.95

3" Meters

0-150 VAC, GE, SQ.	$7.95
0-5 KVDC, S	9.95
0-2 MA, S	4.50
0-5 MA, GE, SQ	3.95
0-20 MA, WH*	2.95
0-20 MA, S	3.95
0-20 MA, GE, SQ.	3.95
0-30 VOLT DC, DA.	2.75
0-200 MA, GE	4.50
0-15 KV DC, GE SQ. (500 UA Movement) with 30 Meg 1% Multiplier	$15.75

OIL CONDENSERS

1.75 mfd	400 vdc	$0.39
6 mfd	600 vdc	.95
8/8 mfd	600 vdc	1.79
10 mfd	600 vdc	1.95
4 mfd	1000 vdc	1.95
2 mfd	2000 vdc	2.95
10 mfd	2500 vdc	5.95
2 mfd	4000 vdc	6.50
1 mfd	5000 vdc	4.50
.1/.1 mfd	7000 vdc	2.95
.1	7500 vdc	1.25
2 mfd	6000 vdc	12.95

PIGTAIL MICAS

MMF: 5, 20, 50, 60, 100, 250, 300, 400, 500, 750, 800, 1000, 2000, 3000, 4000, 5000, 6000, 10000 ..... $0.09 ea.

Ceramicons

MMF: 20, 120, 500 ..... $0.05 ea.

Silver Mica Capacitors

MMF: 10, 50, 60, 340, 750, 780, 1000. $0.12 ea.

CHOKE BARGAINS

6 Hy,	400 MA, C	$3.95
6 Hy,	250 MA, C	2.95
5 Hy,	170 MA, C	1.75
8 Hy,	50 MA, C	.49
8 Hy,	175 MA, C	1.95

PANEL METER KIT

Here's what you get:
- 2" Sq. bakelite cased meter, Gov't. Surplus
- Scales for all the following ranges: 0-50 ma, 0-100 ma, 0-200 ma, 0-500 ma.
- Pre-calculated shunt sizes for all ranges.
- Complete instructions.

Only $2.50 ea.; 3 for $6.75

WESTON METERS 4" SQ. 1% ACC

0-300 VAC	$8.95
0-1½ AMP DC	7.95
0-2 AMP DC	7.95
0-500 MA DC	7.95
0-12 KV DC	9.95
0-20 Volts DC	6.95
0-15 AMP RF	8.95

HIGH CURRENT MICAS

Tolerance 5%.

CAP MFD	TYPE G1 Amps. 1 Mc	KV DC	Price Each
.00024	4	6	$4.95
	TYPE G3		
.0006	10	20	$19.50
.0008	12	20	19.50
	TYPE G5		
.0001	6	35	$32.50
.00015	10	35	37.50
.0005	20	35	42.00
	TYPE G4		
.08	60	4	$27.50
.02	40	9	29.50

1% W. W. Resistors

Ohms: 2K, 5K, 8500, 50K, 100K ... $0.45 ea.

Non-Inductive Resistors

Ohms: 250, 500, 12,500
100 watts $0.75

RAYTHEON SWINGING CHOKE

2 to 12 Henrys, 1 Amp to 100 Ma. 15 Ohms DC fully cased. High voltage insulation, ceramic insulators. Very conservatively rated. Weight 60 Lbs. ..... $16.95 ea.

Meter Multipliers

1 Meg. 1/5 of 1% Cage Enclosed 1 KV.	$2.95
2 Meg 1/2 of 1% Tubular 2 KV	$2.95
4 Meg 1/2 of 1% Tubular 4 KV	$3.95

Weston Portable AC VOLTMETER

Model 433, 0-150 Volts AC, 25 to 2400 cycles, ¾%, mirrored hand calibrated scale. Bakelite case with leather handle $27.50

BAKELITE CASED MICAS

MFD	VDC	Price	MFD	VDC	Price	MFD	VDC	Price
.001	600	$ .18	.024	1500	$ .65	.00045	5 KV	$1.10
.002	600	.24	.033	1500	.75	.001	5 KV	1.60
.01	600	.26	.02	2 KV	.90	.0015	5 KV	1.60
.02	600	.26	.005	2500	.55	.003	5 KV	1.90
.027	600	.26	.002	2500	.45	.005	5 KV	2.50
.01	1 KV	.45	.004	2500	.50	.0003	8 KV	2.50
.002	1200	.35	.005	3 KV	1.00	.0005	8 KV	2.90
			.0001	5 KV	.70			

WIRE WOUND RESISTORS

5 watt ohms: 25-50-200-2500	$ .09 ea.
10 watt ohms: 25-40-84-400-1325-2K-4K	.15 ea.
20 watt ohms: 50-70-100-300-750-1K-1.5K-2.5K-2.7K-5K-15K-20K	.20 ea.
30 watt ohms: 100-2500-5300-18K	.22 ea.
100 watt ohms: 100-3750-1500-2K, 10K, 20K, 25K-50K, 75K	.59

GUARDIAN LATCHING RELAY

SPDT, 110 V 60 cy Coil, 15 Amp Contacts $1.95

ADJUSTABLE SLIDER RESISTORS

20 Watt: 1, 5, 50, 300 ohms	.25
50 Watt: 500 Ohms	.35
75 Watt: 100, 150, 200 Ohms	.39
100 Watt: 20, 50, 75, 100, 500 Ohms	.49

MISCELLANEOUS BARGAINS

25 ohm 675 watt Rheostat	$2.95
50 meg 35 watt Resistor	.99
250 mmf Midget Var. Ceramic Ins	.69
15 mmf Midget Var. Ceramic Ins	.39
4PST Lever Switch Mossman	.89
Ceramic RF Switch SP 11 Pos.	.89
4PDT Relay, 4500 Ohm DC Coil	1.95
.02 600V Tubular	15 for .99
.05 600V Oil Tubular	12 for .99
10K, 15K Pots	4 for .99
16 mfd 450 V. Electrolytic	.39
5-20 mmf Ceramic Variable	.24
1.5—7 mmf Ceramic Variable	.24
SPST Push Button Switch	.29
5x5 MFD 400 VDC Oil	.39
1x1x1 MFD 1200 VDC	.59
100 mmf Air Paddle APC 100	.49
50 mmf Air Paddle APC 50	.39
Fil Transf. 2½V CT, 40 AMPS, 110V CY	6.95

POWER TRANSFORMERS

Fully Cased. Pri. 110 Volts 60 cy.

1110 volts CT 60 MA; 920 volts CT 160 MA, 6.3V, 18A, 6.3V, 1.25V, 5V2A, 5V2A	4.95 ea.
940 Volts CT 425 MA, 65V BIAS	7.95

is unnecessary. The reactivation process requires approximately 30 minutes.

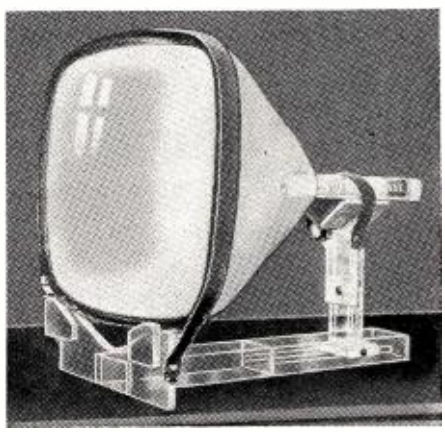
The unit is housed in a hammertone steel gray case which measures 5" wide by 5" high by 2¼" deep and weighs only 3 pounds.

Complete details on the operation of the unit, price, and other information will be supplied by the company on request.

PLASTIC TUBE HOLDER

A new item which has been designed especially for the television technician has been announced by *Precision Plastic Products, Inc.*, 628 West Lake Street, Chicago 6, Illinois.

Tradenamed the "Tube Vise", the new device safely and securely holds



any size television tube in a rigid, adjustable frame. According to the company, this holder eliminates or minimizes the danger of breakage when the tube is on the bench and speeds servicing by permitting easy access to the tube. —30—

DISASTER COMMUNICATIONS SERVICE RULES

RULES governing the Disaster Communications Service, which became effective March 21, 1951, have been issued by the FCC.

A station license for operation in the Disaster Communications Service may be granted to any person eligible for a station license under the Communications Act providing that the station is a member of a bona fide disaster net.

When there is more than one such net in any area, available frequencies must be shared under a coordinated plan.

Applications for station licenses to operate in this service shall be submitted on FCC Form No. 525, signed by the applicant and countersigned by the local authority in charge of the local disaster network.

Licenses will be issued for a term of from one to five years.

Stations will be operated only in emergencies or during practice drills, and then only to handle messages in connection with the emergency.

Special call signs consisting of four letters followed by one digit will be issued for these stations.

Operators must hold either a valid amateur or commercial license. The operator's license will only be valid for the same type of operation under emergency service as the basic license limitations. For example, a radiotelephone license will only be valid for operation using A3. —30—

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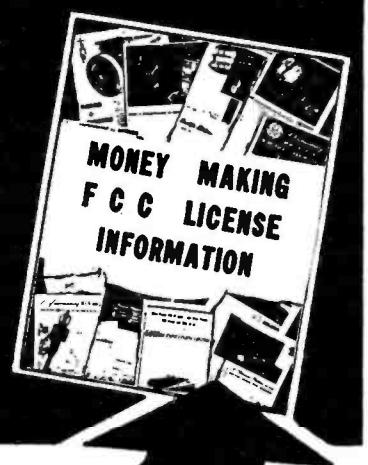
Want To Double Your Pay?

How To Pass FCC COMMERCIAL RADIO OPERATOR LICENSE EXAMINATIONS



GET THIS AMAZING NEW BOOKLET FREE!

TELLS HOW—

WE GUARANTEE

TO TRAIN AND COACH YOU AT HOME IN SPARE TIME UNTIL YOU GET

YOUR FCC LICENSE

If you have had any practical experience—Amateur, Army, Navy, radio repair, or experimenting.

TELLS HOW— Employers make JOB OFFERS like These to Our Graduates Every Month!

Telegram, August 9, 1950, from Chief Engineer, Broadcast Station, Pennsylvania, "Have job opening for one transmitter operator to start immediately, contact me at once."

Letter, August 12, 1950, from Dir. Radio Div. State Highway Patrol, "We have two vacancies in our radio Communication division. Starting pay $200; $250 after six month's satisfactory service. Will you recommend graduates of your school?"

Letter, August 24, 1950, from radio-television sales and service company, Ohio, "We are in need of a good television man. The pay will be good, also good surroundings to work in. Please let us hear from you."

Telegram, Sept. 7, 1950, from Chief Engineer, Broadcast Station, Georgia, "Have immediate opening first phone engineer. Prefer one with usable voice, experience not necessary. Prefer man from small town. Beginning pay $48 for 48 hours."

These are just a few of the examples of job offers that come to our office periodically. Some licensed radiomen filled each of these jobs; it might have been you!

HERE'S PROOF FCC LICENSES ARE OFTEN SECURED IN A FEW HOURS OF STUDY WITH OUR COACHING AT HOME IN SPARE TIME:

Name and Address	License	Lessons
Lee Worthy, 2210½ Wilshire St., Bakersfield, Calif.	2nd Phone	16
Clifford E. Vogt, Box 1016, Dania, Fla.	1st Phone	20
Francis X. Foerch, 38 Beucler Pl., Bergenfield, N. J.	1st Phone	38
S/Sgt. Ben H. Davis 317 North Roosevelt, Lebanon, Ill.	1st Phone	28
Albert Schoell, 110 West 11th St., Escondido, Calif.	2nd Phone	23

TELLS HOW—

Our Amazingly Effective JOB-FINDING SERVICE Helps CIRE Students Get Better Jobs

Here are a few recent examples of Job-Finding results:

GETS JOB WITH CAA

"I have had a half dozen or so offers since I mailed some fifty of the two hundred employment applications your school forwarded me. I accepted a position with the Civil Aeronautics Administration as a Maintenance Technician. Thank you very much for the fine cooperation and help your organization has given me in finding a job in the radio field."

Dale E. Young, 122 Robbins St., Owosso, Mich.

GETS FIVE JOB-OFFERS FROM BROADCAST STATIONS

"Your 'Chief Engineer's Bulletin' is a grand way of obtaining employment for your graduates who have obtained their 1st class license. Since my name has been on the list I have received calls or letters from five stations in the southern states, and am now employed as Transmitter Engineer at WMMT."

Elmer Powell, Box 274, Sparta, Tenn.

OURS IS THE ONLY HOME STUDY COURSE WHICH SUPPLIES FCC-TYPE EXAMINATIONS WITH ALL LESSONS AND FINAL TESTS.

GETS CIVIL SERVICE JOB

"I have obtained a position at Wright-Patterson Air Force Base, Dayton, Ohio, as Junior Electronic Equipment Repairman. The Employment Application you prepared for me had a lot to do with me landing this desirable position."

Charles E. Loomis, 4516 Genesee Ave., Dayton, Ohio.

Your FCC Ticket is always recognized in all radio fields as proof of your technical ability.

Get All 3 FREE

CLEVELAND INSTITUTE OF RADIO ELECTRONICS
Desk RN-28—4900 Euclid Bldg.
Cleveland 3, Ohio
(Address to Desk No. to avoid delay.)

I want to know how I can get my FCC ticket in a minimum of time. Send me your FREE booklet, "How to Pass FCC License Examinations" (does not cover exams for Amateur License), as well as a sample FCC-type exam and the amazing new booklet, "Money-Making FCC License Information."

Name .....

Address .....

City .....Zone.....State.....

Paste on penny postcard or send air mail.

www.americanradiohistory.com

OLSON AKRAD

Olson Radio Warehouse, Inc.

73 E. Mill St. • Akron 8, Ohio

FREE—SEND FOR OUR LATEST RADIO AND TELEVISION BARGAIN CATALOG

PHILCO 1951 AUTO RADIO

THE ONLY UNIVERSAL ONE-PIECE AUTO RADIO FOR ALL CARS

FITS ANY CAR OLD OR NEW

A brand new Philco 6-tube super-het auto set with 30% more undistorted sound output for rich, clear-voiced volume and greater range. New 3-gang permeability tuner. Built-in interference filtering.

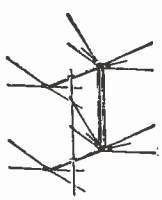
New streamlined design, with slide-rule dial encased in gleaming chrome finish to harmonize with modern cars. Rugged, compact steel case finished in dark blue hammer-type lacquer, has sloping front—neat, attractive, space-saving—out of passengers' way. Installed in a few minutes beneath the instrument panel of the car. Controls are easy to reach and tune . . . yet set is out of the way and virtually out of sight like a built-in part of the car. Complete with tubes, mounting bracket, generator condenser and distributor suppressor. Size: 5¾" x 5⅜" x 7¼". Shpg. wt. 20 lbs.

Model CR-501

$34.37

OLSON'S GREAT VALUE!

TV INSTALLATION MEN



If you install TV Antennas, Olson wants you to take advantage of this terrific Antenna Value. High gain Stacked Conical Array with high frequency stubs. Ideal for "Fringe" Area Reception. Sturdily constructed, elements are aluminum. Easily assembled.

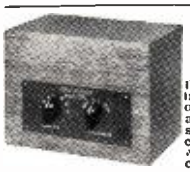
This Is a Terrific Value! Each Antenna consists of two conical bays plus a pair of matching Q bars. Less mast. Packed—3 Antennas to a carton. This gives you six bays and 3 pairs of Q bars.

Sold Only In Boxes of 3 Antennas

AU-66. In lots of 3, each..... **$8.66**

Carton of 3..... **$25.98**

Weight 25 lbs.



TV BOOSTER KIT RA-26 **$9.95**

Complete

Build your own TV-FM booster. Improves reception on low-signal, "fringe" areas. 3 to 5 db gain in signal to noise ratio. All channel tuning. Complete with 6AK5 tube, pre-aligned coils, etc. Shpg. wt. 5 lbs.

TV COMPONENTS

Deflection Yoke for use with 10BP4, 12LP4, 16AP4 and all similar kinescopes, same RCA 201D1 WT. 2#. T-84, Olson's Price, only....$3.59

Deflection Yoke for use with kinescopes requiring 70 degree magnetic deflection such as Rectangular 14BP4, 14CP4, 16RP4, 16TP4, 16KP4 and round 16GP4. WT. 2#. T-86, Olson's Price, only.....$4.49

$3.99 Hi-Voltage Flyback output transformer for 10" & 12" kinescopes. Provides 9KV. Same as RCA 211T1. WT. 4#. T-82. Olson's Price, only.....$3.99

300-Ohm Lead-in **$4.00** High grade, low loss. For all TV installations. Ship. wt. 3 lbs. W-68, 100 ft. coil.

FAIRCHILD GRINDER

TL-3 **$9.98** each

Every service shop needs one of these handy tools made by Fairchild, famous manufacturer of precision electric grinders. Regular nationally advertised price is $19.75. The set consists of 1—115 volt high speed, air cooled grinder, 6 assorted grinding wheels, 1 circular saw blade, 1 hardened steel reamer, 1 buffing brush, 1 abrasion stone and a natural finish wood case size 10"x5"x 3" to house the grinder. Shipped in original factory sealed cartons.

AKRAD TUBULAR ELECTROLYTICS

Olson "Akrad" Condensers are becoming more widely used by radio servicemen everywhere—and for a good reason! They're made to take hefty surges and overloads and pack a mighty wallop. They cost so little, too! Every "Akrad" condenser is backed by Olson's famous Satisfaction or Your Money Back Guarantee! Always get "Akrad." Compact size with superior characteristics. Easily mounted. Sealed aluminum inner tubes insure maximum life. Tinned copper leads. Give long, trouble-free service.

Packed 10 of a size to a box. Order 10 of a size.

Stock No.	Cap.	W.V.	Each
C-136	10	25	$0.25
C-137	25	25	.30
C-138	20	150	.39
C-139	40	150	.45
C-140	20-20	150	.59
C-200	50-30	150	.69
C-141	8	450	.39
C-211	8-8	450	.69
C-142	16	450	.57
C-197	20	450	.69
C-198	30	450	.79
C-199	40	450	.89

AUTO RADIO ANTENNAS

RUSTPROOF BRASS TUBING! INSTANTLY ADJUSTED! Triple Chrome Plated Highest Quality Insulators. SIDE COWL MOUNT 3 section: extends to 66". Includes low loss lead-in cable. AU-1 **$1.99**

TRIPLE CHROME PLATED HIGHEST QUALITY INSULATORS! TOP COWL MOUNT 3 section; extends to 54". Includes low loss lead-in cable. AU-8 **$2.99**

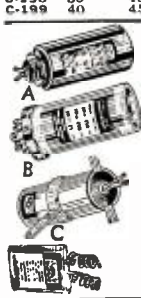
RCA "FIRE GLOW" FLUORESCENT SIGN

$8.95

Bigger, brighter, and whiter. The new RCA Fire Glow has high daytime visibility and brilliant luminous white glow at night. The plastic face is three-dimensional, cased in steel. Sign stands on rubber protectors, or can be hung from ceiling with chain supplied. 110 Volt, 60-cycle AC operation. Complete with fluorescent lamp. Shpg. Wt. 15 lbs. 2F-985 ..... **$8.95**

CLOSE-OUT ENTIRE STOCK!

CORNELL-DUBILIER CONDENSERS



Save big money during Olson's big C-D close-out sale. Over 35,000 brand new shiny electrolytic condensers will be purchased by Olson's customers. Be sure of getting your share. Order early.

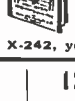
Stock No.	Fig.	Capacity	Volts	Close-out Price
C-530	A	8	450	$0.59
C-510	B	15	300	.29
C-501	B	10-10-20	450-450-25	.39
C-617	B	20-10-10-10	450-450-450-450	.99
C-502	C	32	350	.39

Cornell-Dubilier Paper Filter Block

Hard to get, but Olson has these 4 MFD 400 volt tough condensers. Not Electrolytic. Dry construction throughout. Size 3¼"x2"x1". Reg. list price $2.95. **49c**

C-523 Olson's Price, each.....

PHONOGRAPH RECORDS



"TIME TO SLEEP." A 12" 78 RPM, unbreakable disc in album form recorded by World Famous magician Ralph Slater. Designed to put anyone to sleep. Save money. Thousands sold at $3.75. Shpg. wt. 3 lbs.

X-242, your cost, per album only. **$1.29**

AM-FM RADIO CHASSIS

IT'S A BEAUTY

COMES TO YOU WITH EIGHT TUBES

Stock No. RA-52

$49.95 each

Olson's Great Bargain of the Year

It's new! Never offered before by any jobber! A high quality, high-fidelity radio that you will be proud to own. You'd expect to pay more but Olson made a remarkable deal with the manufacturer. When present stock is gone, there will be no more. This receiver can be used in combinations selling from $350.00 to $500.00. It's a perfect unit for custom building into cabinets, shelves, etc.

This amazing set is equipped to receive standard broadcasts from 540 to 1650 KC and FM reception from 87.5 to 108.5 mc. Two dual controls are provided for simplicity of operation.

Phono connection on rear of chassis. Wide vision, easy to read dial. This radio cannot be beat for quality and precision.

Any PM speaker can be used with this set. Choose one from this flyer. Set is supplied with 8 tubes: 1—12AT7, 1—6BE6, 2—6BA6, 1—6AL5, 1—6AV6, 1—6V6GT, 1—5Y3GT, less speaker. Individually packed in factory-sealed cartons. Chassis size 13⅛"x7¹⁄₁₆"x8⅞".

12" CO-AXIAL SPEAKER

Woofer-Tweeter design. Response 40 to 17,500 CPS

AN OLSON VALUE

$12.95

S-122

ORDER NOW!

Months of research went into the design of these high efficiency speakers. The 12" woofer section is driven by a heavy Alnico 5 6.8 oz. magnet and this part delivers the bass notes. The 3" tweeter which is built into the center of the speaker is driven by a 2.15 oz. Alnico 5 magnet and delivers the treble notes. The high pass filter is built into the speaker and the entire combination gives you tone you never dreamed possible. There are only two wires to connect to any radio or amplifier and the speaker is ready to play for you. Voice coil impedance is 8 ohms. This high quality speaker should not be confused with inferior makeshift units. Olson sells these speakers on an ironclad money-back guarantee if you are not 100% satisfied. Order today. Shpg. wt. 8 lbs.

3-SPEED PHONOGRAPH

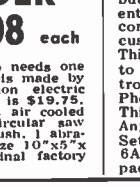
Special **$19.97**

RA-56

Plays 78-45-33⅓ RPM Discs

Complete

Finest components in the manufacture of these gorgeously designed phonographs. Features include: 3 speed Alliance motor, heavy flocked turntable, 5-volt output tone arm with precision-tip needle, volume control, 2 tube built-in amplifier, Alnico 5 PM speaker, leatherette covered case with rounded corners, convenient carrying handle. Order early and order enough. Every phonograph 100% guaranteed. Original factory-sealed cartons. Operates 115 volts AC. Shpg. wt. 15 lbs.



OLSON'S GIGANTIC NEW AKRAD KIT —WITH 4-DRAWER STEEL CABINET FREE

Reg. List Price $18.38.

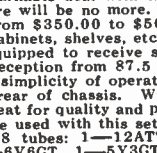
AS-36. Olson's Special Price **$6.95**

We have a limited quantity of Olson Akrad "Super Sealed" by-pass condensers available in 4 drawer steel cabinets, size 6¼x5¾x8½. Drawers have compartments. Condensers are designed to give long dependable service even in the tropics.

Kit Contains 42 Condensers

You get the 4 drawer steel cabinet and the following 42 Olson Akrad "Super Sealed" by-pass condensers.

Qty.	Cap.	Volts	Qty.	Cap.	Volts
2	.001	600	10	.05	600
2	.002	600	10	.1	600
2	.005	600	2	.005	1600
5	.01	600	2	.008	1600
5	.02	600	2	.01	1600



ASTATIC PROFESSIONAL

Has all advantages of low pressure design. For Broadcast and Recording Studio use. Ball bearing swivel base, accurately counter balanced arm for one ounce needle pressure. Plays up to 16" discs. Astatics Model No. HP-16. Overall length 15 in. Equipped with Astatic LP-21 cartridge and precious tipped stylus. Regular list price $25.00.

Stock No. M-72 each.... **$5.95**

OUTPUT TRANSFORMERS

T-87 **99¢** UNIVERSAL OUTPUT TRANSFORMER—Matches any single tube to any 3.2 ohm voice coil. Primary tapped at 2,000, 7,000, 10,000 ohms. 2 inch mounting centers. List Price $2.50.

T-21 Matches single 50L6, 35L6, 35A5, 25L6, to voice coil; 2000 ohms pri., 2" mtg. ctr..... **69c**

T-57 Matches single 6V6 to voice coil. 2¾" mtg. ctr..... **69c**

T-58 Matches push-pull 6V6's to voice coil. 2¾" mtg. ctr..... **79c**

T-59 Matches single 6F6 to voice coil. 2¾" mtg ctr..... **69c**

T-60 Matches push-pull 6F6's to voice coil. 2¾" mtg. ctr..... **79c**

OLSON AKRAD CRYSTAL CARTRIDGES

3-VOLT OUTPUT

XC-50, Standard crystal Cartridge, each..... **$1.99**

XC-51, 3-way cartridge with built-in 2 mil needle for 33⅓, 45 and 78 RPM Discs, each..... **$2.79**

The crystal phono cartridge you've been waiting for—and at a price which enables you to use them in your service work profitably. The new Olson Akrad cartridge is interchangeable with any standard cartridge since the mounting centers are ½". Its high output, 3 volts and wide range response of 50-6000 cps are obtained by advanced methods used in driving the crystal element. The cartridge is supplied with pin plug connectors for ease of connecting leads. Each cartridge is individually packed in a handsome red, white, and blue shelf carton. Order some of each model today.

10-WATT RESISTOR KIT

RK-2 **$4.95**

All wire wound resistors, 10 watt, fully insulated. Long leads. You get 20 resistors ranging from 25 ohms to 25,000 ohms.

www.americanradiohistory.com

GIANT COMBINATION DEAL

$10 Worth of RCA Records and Phonograph

$19.97 RA-60

Compact beautifully performing phonograph for all 78 RPM records. Amplifier employs 2 tubes, 50-L-6 and 35-Z-5. Only the finest components are used, such as Alliance Rim-Drive Motor, Astatic Phono arm with L-82 cartridge, PM speaker, full range volume control, etc. The case is decorated with colorful circus figures. Operates on 115v. AC. Weight 11 lbs.

RCA VICTOR NON-BREAKABLE RECORDS INCLUDED. Yes, with the phonograph you get approximately $10.00 worth of RCA Victor non-breakable discs for children. Titles include "Happy the Humbug," "The 500 Hats of Bartholomew Cubbins." "Rapunzel," "Aladdin and His Lamp," etc. Discs are enclosed in beautifully illustrated colored folders giving each story so that the child can follow the recording. Quantity Limited—ORDER NOW!

OLSON AKRAD

THE HOUSE OF RADIO AND TELEVISION BARGAINS

BUY ALL YOUR RECORDING NEEDS FROM OLSON

STEEL RECORDING WIRE

For all standard wire recorders. Frequency response is excellent. Stainless steel wire.

X-165 ½ hr. spool..... $1.98

X-166 1 hr. spool..... $2.98

Tape

Fine magnetic recording tape. Frequency response, 50 to 8,600 cycles at 7½" per second. Uniformly coated with red oxide. Available in paper base and plastic base which is stronger. Order your recording tape from Olson. Get the best for less.

Stock No.	Size	Type	Olson's Price, ea.
X-203	¼"x 600 ft.	Paper	$1.35
X-204	¼"x 600 ft.	Plastic	2.10
X-205	¼"x1200 ft.	Paper	2.10
X-206	¼"x1200 ft.	Plastic	3.30

ASTATIC "TURNOVER" PICK-UP ARM

$4.95 M-64 Olson's Great Value

Cartridge turns by means of knob on front. One side plays 33⅓ and 45 RPM records and other side plays 78 RPM. Only 8 grams needle pressure. Employs the famous ASTATIC LQD-1 Double needle cartridge. Die cast curved arm. Equipped with 2 long life needles. Frequency response 50-7000 cps output 1.2 volts. Shpg. wt. 2 lbs. Reg. list price $15.00.

RCA 8" PM SPEAKER

S-123 **$3.99** EACH

Known as the RCA "Mighty 8." Delivers tremendous volume because of advanced engineering design and super-size Alnico 5 magnet. For radio and PA use. Voice coil 3.2 ohms. Shpg. wt. 6 lbs.

MUSICAL INSTRUMENT MIKE

Famous quality! Sells for twice our sale price. Easily attached. Delivers brilliant tone from string instruments. With 4' shielded cable and volume control.

M-61 ..... $6.95

Olson's Special

NEW CRYSTAL MIKE

$4.29 M-71

Nationally famous make. Smart New Design, easy to hold. Used in many tape, wire and disc recorders. Can be used on P. A. systems, amplifiers, etc.

HOOK-UP WIRE KIT

How can we give you so much high grade wire for so little? Olson bought all the wire in sight and is passing the bargain on to you. Kit contains 5 rolls, each 100 ft.—total 500 ft. Various colors, push back, plastic and rubber insulation; solid and stranded copper. Shpg. wt. 3 lbs.

AS19. 500 feet $4.95

$2.19 X-199 4-DRAWER STEEL CHEST

For small parts, etc. Knob on each drawer; various size compartments. Each drawer 1¼" deep. Size: 6¼" H., 5¾" W., 8⅛" D. Shipping weight 5 lbs.

KIT OF THREE VARIABLE CONDENSERS

A $3.50 value. Perfect for the experimenter. Brand new stock. Quantity limited.

Get a kit containing 3 assorted variable condensers. Popular values. 2-gang and 3-gang. Some have trimmers, vernier drives, AM and FM styles.

Olson's Price X-226 Carton of 3 asst. $1.29

4 Drawer Steel Cabinet FREE with OLSON'S *Gigantic* AKRAD CONDENSER KIT

Olson's Price AS-20 **$16.95**

You get $45.20 (list) worth of "Akrad" condensers plus cabinet, 8½"x7½"x10½".

42 "AKRAD" By-Pass Condensers!

Qty.	Cap.	Volts	List ea.	Total
2	.001	600	$.25	$.50
2	.002	600	.25	.50
2	.005	600	.25	.50
5	.01	600	.30	1.50
5	.02	600	.30	1.50
10	.05	600	.40	4.00
10	.1	600	.45	4.50
2	.005	1600	.55	1.10
2	.008	1600	.55	1.10
2	.01	1600	.60	1.20

27 "AKRAD" Electrolytic Condensers

Qty.	Cap.	Volts	List ea.	Total
2	10	25	$ .75	$1.50
2	25	25	.85	1.70
5	20	150	.95	4.75
5	40	150	1.10	5.50
4	20-20	150	1.30	5.20
5	8	450	.95	4.75
4	16	450	1.35	5.40

69 Total List Value $45.20

GENUINE ASTATIC PICK-UP ARM

With crystal cartridge . . . at less than you'd normally pay for the cartridge alone.

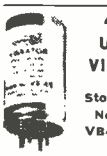
OLSON'S SPECIAL M-58.. $2.99

ASTATIC MICROPHONE

High output crystal mike for PA systems and recorders. Equipped with handle base and 7' shielded cable. Shpg. wt.—5 lb.

M-67, each $5.95

M-66, same but with on-off switch built into handle..... $6.95



4 Prong Universal VIBRATORS

Stock No. VB48 **$1.49**

The most popular vibrator in use today. Replaces Mallory 294, 850, 901M, Radiart 5300, 5301. Size 1⅛" dia. by 2⅞" high. Reg. list price $4.10. Brand new, individually boxed. Shpg. wt. 8 oz.

PANEL LAMPS

Westinghouse, GE, and Tung-Sol bayonet panel lamps, 100 of a type to the box.

Stock No.	Type No.	Price per 100
X-161	47	$5.59
X-174	44	
PL-25	51	$4.29

BATTERY ELIMINATOR

MODEL P **$10.95** Each

Converts portable battery sets to all-electric AC. Will give years of dependable, trouble-free service. Supplies 1.4 volts "A" and 90 volts "B" power for 4 to 6 tube sets.

GE RPX-040

XC-45 EACH **$3.49**

Variable Reluctance Cartridge with Removable Stylus

Regular price is $9.95 on this GE Phono Cartridge with removable 3 mil Stylus for 78 RPM discs. Stylus pressure ¾ oz.

FP CONDENSER KIT

OLSON'S Bargain AS-24, each **$3.98**

Assortment of 15 popular FP condensers, double and triple sections. Capacities from 10 mfd to 50 mfd; from 25 to 450 volts. Shpg. wt. 3 lbs.

BATTERY CHARGER

4 Amps Olson's Price RA-55 **$8.50**

Highly efficient storage battery charger. Automatically decreases charging rate as battery becomes charged. Housed in sturdy steel case with 117 volt AC cord, plug and battery leads with heavy-duty clips.

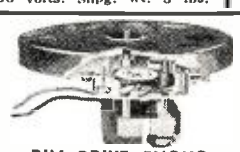
Build a Receiver Set of Basic Components

Kit of 5 parts... AS-38 **$1.89**

You get this kit of 5 basic parts to build an AC-DC set or portable:

Parts	Reg. List Price
Loop	$0.95
R. F. Coil	1.10
I.F. Transformer (456 KC) Input	1.60
Output	1.60
Oscillator Coil	.75
List Price of Set...	6.00

Use any 365 mfd variable for tuning. Covers 535-1625 KC.



RIM DRIVE PHONO MOTORS

Famous Makes! Real bargains at these low prices. Self-starting; complete with turntable. All parts included. Shpg. wt. 4 lbs.

M-52, 78 rpm for 115 volts AC..... $3.79

M-63, 3-speed, 33⅓, 45 and 78 rpm..... $5.99

RA-19

PHONO AMPLIFIER **$3.98**

Connect to phono or speaker or just the thing for a portable. Uses: 12SQ7, 50L6, 35Z5 tubes. 2 controls: on/off volume and tone. 7"x3¼"x2". Shpg. wt. 2 lbs.

TUBES FOR ABOVE SET. AS-22..... $2.64

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How to order: Order directly from this ad. For convenience use this order blank. Fill in columns below with quantity desired, stock number, description and price. You may send remittance with order (include enough for postage or parcel post shipment), or if you prefer SEND NO MONEY. Olson will ship C.O.D. and you may pay mail or expressman for merchandise and postage.

MONEY BACK GUARANTEE: *Everything you order from Olson is guaranteed as advertised. If you are not more than satisfied, you may return merchandise for cash refund.*

Please Minimum Order $3.00

QUANTITY	STOCK NUMBER	DESCRIPTION	PRICE EACH	TOTAL

NAME _____ TOTAL

ADDRESS _____ ADD: POSTAGE

CITY _____ ZONE ____ STATE _____ TOTAL AMOUNT

RN.451

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A versatile new Chicago Vacuum Tube Volt Meter with more ranges and greater utility—at the lowest price in the industry!

$39.00 net

RANGES

DC VOLTS
0-5,10,50,100,500,1000,5000. Input impedance: 20 megohms (including 10 megohms in the DC probe)

AC VOLTS
0-5,10,50,100,500,1000,5000
Input impedance: 10 megohms

OHMS
0 to 1000 megohms in 6 ranges with center scale readings of 10,100,1000,10K,1Meg.,10Meg.

CAPACITANCE
50 MMF to 5000 MF in 6 ranges. Low voltage power source enables testing of electrolytic condensers.

MILLIAMPERES
DC 0-1,10,100,500
(Not electronic) 50 millivolt drop.
Operates on 115 V.A.C. Dimensions: 6¾" Wide x 9 15/16" High x 6" Overall Depth

The big 5½" meter is mounted in a handsome brown Hammerloid case slanted for easy reading.

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New!
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only 1.25 LIST

The new VEE-D-X Model RW-200 is the popular low-priced arrester. Similar in design and construction to the RW-204. Two saw tooth contact points assure positive protection for any 2-wire installation.

4-WIRE RW-204
only 1.50 LIST

The first and only arrester that will accommodate 4-wire rotator line as well as regular 2-wire transmission line.

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The Original 2-Wire RW-300

For use with 2-wire standard transmission line. An air gap plus resistor provide double protection. RW-300 is manufactured of moisture resistant Mica-fill Bakelite. RW-300A — highest quality thermo-setting plastic.

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Easy, fast way to cut "Key" and "D" openings in chassis

...with new GREENLEE Radio Chassis Punches

Now, in 1½ minutes or less make perfect "Key" or "D" holes for sockets and other equipment. Simply insert GREENLEE Punch and turn with an ordinary wrench . . . get a "clean" opening in a hurry! Write today for details on these as well as GREENLEE Radio Chassis Punches for round and square openings. Greenlee Tool Co., 1884 Columbia Ave., Rockford, Illinois

No. 732 "Key" Punch

No. 733 "D" Punch

TOOLS FOR CRAFTSMEN
GREENLEE

Spot Radio News
(*Continued from page* 16)

facturers could feel more sure that their war contribution would continue unabated.

HAMS will soon be obliged to operate under a new set of rules, which in the main features six classifications of licenses, instead of three: amateur extra class, advanced class, general class, conditional class, technician class, and novice class. The advanced, general and conditional classes represent the new identities for the class A, B, and C licenses. (The amateur-extra tickets will not become available until the first of the year in '52.) The advanced type license is really nothing but a different title for the class A affair, while the others all have requirement variations of one form or another from previous standards. For the complete story on the new setup see page 38 of this issue.

EDUCATION IN TV continued to be quite a topic along Commission row and particularly during on-the-road group meetings and conferences, as the hearings on this thorny issue came to a temporary halt. Madame Commissioner Hennock starred in a personal-appearance campaign for TV channels for the educators. Before a session of the Adult Educational Council of Philadelphia, she said that the teachers of our nation should have twenty-five per-cent of the channels or room for 500 stations, a move which would prove . . . "a sound investment in education and cultural development."

Describing the reasons for her firm belief in the urgent need for substantial room for the educators, the Commissioner said: "We have long been proud of our position as a pioneer nation and people. Technologically, this pioneer spirit has developed American television far ahead of the efforts of any other country. And in keeping with our traditions, the enjoyment of this great new achievement has not been limited to the rarest strata of society, to the rich and influential. In fact, TV is found today in more homes of modest and small means than it is in the homes of those who are able to afford the best of everything, including education. . . . A reservation of television channels for educational purposes will be a major factor toward strengthening our educational system and our democratic institutions. In advocating such a reservation, I believe I am advocating the preservation of our sacred American heritage."

ABOUT ONCE A YEAR, the Commission prepares a series of notes commenting on the progress achieved in the art. This year, they included what might be called a *looking-backward* section, tracing events back as far as 1912 when the Navy began using the waves in a rather intensive way and

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OUTSTANDING VALUES NOW AVAILABLE

ORDER AUTO RADIO PARTS AND EQUIPMENT NOW!

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TOP COWL: 3 section staff, 58″ extension. Bakelite insulator, chrome trim. Single hole mount. Simple installation. Complete with lead. **$2.19** each. Case of 25.....**$1.95** each

SIDE COWL: 3 section staff, 63″ extension. Complete with tenite insulators. Static ball and tip shielded. Low loss lead.

$1.89 each. Case of 25.**$1.75** each

STANDARD MANUFACTURE VIBRATORS

Standard 4 prong..... **$1.45** each.
10 for.....**$14.00**

Offset 4 prong—Delco type. **$1.55** ea.
10 for.....**$15.00**

Buick type 5 prong.....**$2.95** each.
10 for.....**$28.00**

Generator Condensers.....**25c** each
10 for.....**$2.20**

BUFFER CONDENSERS

.005 —2000 V...
.006 —1600 V...
.0075—2000 V...
.01 —2000 V...

25c each
10 for **$2.25**
100 for **$19.50**

GUARANTEED RECTANGULAR PICTURE TUBES

A real bargain for these first-rate tubes.

16″—16RP4.....**$28.50** each
17″—17BP4.....**$29.95** each
20″—20CP4.....**$52.50** each

PHONO CARTRIDGES—Brand New —Will replace 95% of all cartridges.
1 volt—Standard Mounting.**$1.75** ea.
3 volt—Standard Mounting.**$1.85** ea.

GT TUBE CARTONS

Sturdy—Many Uses

Box bulk tubes, spare parts, nuts and bolts. **79c** per 100. **$4.95** per 1000.

CHIMNEY MOUNTS—2 piece heavy-duty, rust-proof brackets. No drilling or guy wire needed. Includes strapping. **$1.45** each 12 for **$1.30** each

NOW! LARGE 14″ or 17″ PICTURE FROM YOUR 10″ or 12″ TELEVISION SET

Servicemen: Convert customers' sets for extra profits! 90% of all conversions can be made by use of the RAPARCO conversion kit.

14″ Kit—14BP4 CR tube, 70° Deflection yoke. Attractive Lucite mask. **$34.95**

17″ Kit—17″ Rectangular CR tube, 70° Deflection yoke. Attractive Lucite mask, 17″ HV Flyback transformer.....**$39.95**

TV COMPONENTS

Standard Manufacture. All New. All Guaranteed.

16″ HV Flyback transformer..... **$4.50** ea.
12½″ HV Flyback transformer..... **2.95** ea.
GE type 16″ to 19″ Flyback transformer..... **4.50** ea.
Vertical Output transformer. **1.59** ea.
500 MMFD—20 KV. **$1.11** ea., 10 for.....**$10.00**
500 MMFD—10 KV. **79c** ea.,10 for.....**$7.00**
Single Magnet Ion traps **49c** ea., 10 for.....**$4.50**
Double Magnet Ion traps **79c** ea., 10 for.....**$7.50**
.001 MFD—6 KV Condenser **59c** ea.,10 for.....**$5.50**
.005 MFD—6 KV Condenser **59c** ea., 10 for.....**$5.50**
14″ Attractive Lucite mask, Gold trim.....**$3.95**
16″ Attractive Lucite mask, Gold trim.....**$4.50**
19″ Attractive Lucite mask, Gold trim.....**$5.25**
20″ Attractive Lucite mask, Gold trim.....**$5.95**

CUSTOM BUILT AUTO RADIOS

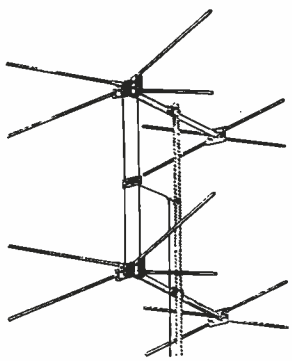
Easily installed. Fine, top quality. Ready to place in your car. Designed for each specific car.

All sets—6 tube. 3 gang; super heterodyne. Extra sensitive circuit. Low battery drain. Beautiful finish and dial. These models now available:

1951—Ford
1949-50—Ford
1951—Chevrolet
1949-50—Chevrolet
1950-51—Studebaker
1948-49-50-51—Hudson
1951—Henry J
1951—Dodge, Plymouth
1949-50—Dodge, Plymouth

List Price, **$59.95**
YOUR PRICE.....**$41.95**

CONICAL TV ANTENNAS



Single.....**$3.99**
Stacked conicals including stacking bars—as pictured.....**$8.49**
4 ft. TV Antenna Mast—Heavy Gauge Steel—rustproof coating. 1½ OD. **$1.25** each. 10 for.....**$11.50**

INDOOR TELEVISION ANTENNA

Now TV reception without the outdoor antenna. Effective range 20 to 25 miles from station. Excellent reception. Easily installed—takes 5 seconds. Easily orientated. Heavy base—will not tilt. Attractive. Friction clutch-type action on the rods. Complete with lead in.....**$2.49**
Case lots of 25.....**$2.25**

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Everything you need to do a complete installation . . . all in one package! Saves Time Reduces Labor Costs.

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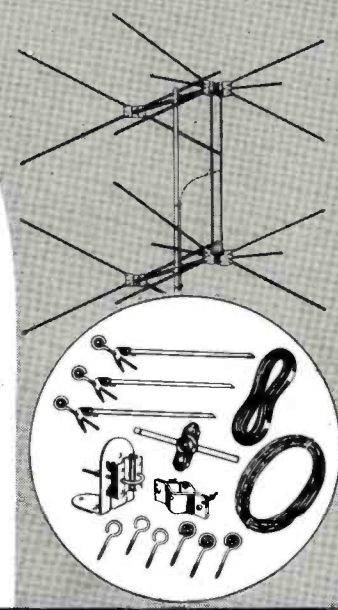
Installing antennas when you have all the necessary elements is a comparatively simple job. That is why Insuline's Installation Kits are meeting such widespread acceptance. These packaged TV installation kits include single and stacked array antennas for fringe area reception, masts, lead-in wire, and all hardware. Excellent reception for every type or make receiver.



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Everything needed to install any type outdoor antennas — Kits for roof, wall and chimney mountings.

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FREE BOOK

COLOR TONE ON YOUR TELEVISION

Simply attach TELECOLOR FILTER to the front of your set, and enjoy favorite programs in a glorious color tone instead of dull black and white.

TELECOLOR FILTER is one of the latest discoveries, its special formula coloring gives brilliant pleasing color tone, life-like color depth, reduced eyestrain and glare.

TELECOLOR FILTER manufacturer does not claim to give three colors but it guarantees to transform a dull black and white picture into many shades of a glorious color tone. It is also guaranteed to work on any make and model television set.

TELECOLOR FILTER will give contrast similar to the black tube and color tones the high lights on black tubes. It is perfect for daylight or lighted room viewing. Children love the color toned pictures. Wonderful as a gift. Can be enjoyed now and for years to come.

No matter which color system is adopted, TELECOLOR FILTER will still continue to give you color toning enjoyment on the stations broadcasting black and white pictures. Results are better than you get with filters costing four times as much. You will find new interest and happiness in favorite programs with the life-like color depth and clarity that is missing n dull black and white. Free information.

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Please send TELECOLOR FILTER
Enclosed: Cash ☐ Check ☐ Money Order ☐

10 inch	$3.00	16, 17 inch	$6.00
12, 14 Inch	4.00	19, 21 inch	10.00

Quantity.....Screen Size.....Amount.....
NAME.....
ADDRESS.....
CITY.....STATE.....

several hundred hams were in on the scene listening to the marine gossip and official messages, and often doing a bit of transmitting themselves. As early as 1916, the FCC records show, radio was used by the New York City police to communicate with the harbor patrol boats. In '21, Detroit became police-radio conscious, and Pennsylvania set up the first state system in '23. Railroads became active in radio in '27. And as long ago as '23, the first photo was sent over a radio circuit by Jenkins. A year later *RCA* made the first transatlantic radiophoto transmission when a photo of Charles Evans Hughes was received in New York from London.

Nearly four decades have passed since the sparks began to race through the ether to serve mankind. Today those sparks, now slightly converted and altered, are still speeding through the airlanes, informing, instructing, and bringing cheer to millions. L.W.

CONSTRUCTION TIPS

By JOHN V. NEAL, W6JUZ

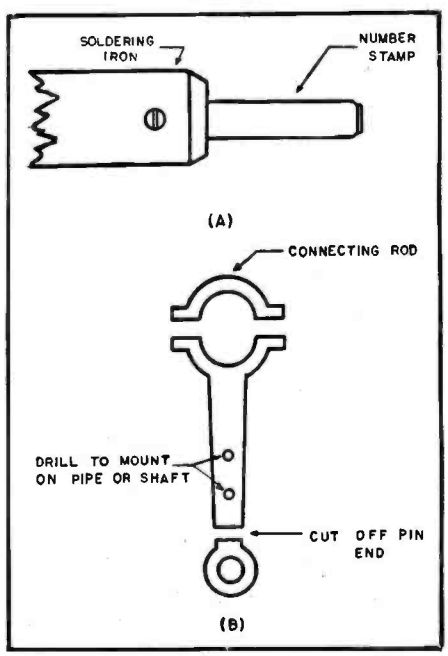
AFTER many years of reading and enjoying the magazine I have come up with a couple of ideas that might interest other readers.

Marking of coil forms, plastic or bakelite, is not always easy and is sometimes impossible. Number coils for wavemeters, bakelite and plastic strips, etc. can be marked by replacing the tip in the soldering iron with one of the number dies which are usually used with a hammer. This method (Fig. 1A) really works and the heating doesn't soften the stamps or impair their effectiveness when used on metal.

The second suggestion is that of using an old connecting rod from a discarded motor to make a good mount for a "plumber's delight" rotary beam. Cut off the wrist pin end (see Fig. 1B) and use the crankshaft bearing end for a saddle or mount for the boom in the center of the beam.

30

Fig. 1.



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Beats a "Surprise" TRADE-IN ALLOWANCE ON YOUR USED TEST AND COMMUNICATION EQUIPMENT

In exchange for a new

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Get your trade-in deal working today! Wire, write, phone or use handy coupon.

HALLICRAFTERS S-72

Shpg. wt. 16 lbs. Price ONLY

$109.95 (less battery)

Buy it for less by applying our liberal Trade-In Allowance against the purchase price.

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Shpg. wt. 44 lbs. .....Only **$169.50**

All prices f.o.b. St. Louis
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HALLICRAFTERS S-77

Improved AC-DC version of the famous S-40B —the world's most popular Ham receiver. And with a "Surprise" trade-in you can save plenty.

Shpg. wt. 32 lbs.....Only **$99.95**

NOVICE AND TECHNICIAN LICENSES
Available July 1st

Here's an easy way to get started in amateur radio. And with "Surprise" Trade-In Allowances Walter Ashe makes it possible for you to get your new Hallicrafters Receiver at big savings. Hallicrafters Receivers are truly precision instruments. Sold in 89 countries, used by 33 governments, they are remembered by veterans, prized by experts and preferred by radio amateurs throughout the world who want a radio that is all radio. Buy with confidence at Walter Ashe, headquarters for Hallicrafters Precision Radio—famous throughout the world.

HALLICRAFTERS SX-71

Shpg. wt. 33 lbs.....Only **$199.50**

For the very thriftiest way to buy your new SX-71, trade your used equipment. Profit with a "Surprise" trade in!

Values are better because trades are higher at Walter Ashe, originators of "SURPRISE" trade-ins. Take advantage now of the one and only "SURPRISE" allowance on used factory-built equipment. Remember, there is nothing else to compare with it, absolutely nothing. So act now!

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SUPERIOR'S new model 770

AN ACCURATE POCKET-SIZE VOLT-OHM MILLIAMMETER

(SENSITIVITY: 1000 OHMS PER VOLT)

FEATURES

★ Compact-measure 3⅛" x 5⅞" x 2¼".
★ Uses latest design 2% accurate 1 Mil. D'Arsonval type meter.
★ Same zero adjustment holds for both resistance ranges. It is not necessary to readjust when switching from one resistance range to another. This is an important time-saving feature never before included in a V.O.M. in this price range.
★ Housed in round-cornered, molded case.
★ Beautiful black etched panel. Depressed letters filled with permanent white, insures long-life even with constant use.

The Model 770 comes complete with self-contained batteries, test leads and all operating instructions.

SPECIFICATIONS

6 A.C. VOLTAGE RANGES:
0—15/30/150/300/1500/3000 VOLTS

6 D.C. VOLTAGE RANGES:
0—7.5/15/75/150/750/1500 VOLTS

4 D.C. CURRENT RANGES:
0—1.5/15/150 MA. 0—1.5 AMPS.

2 RESISTANCE RANGES:
0—500 OHMS 0—1 MEGOHM

$14.90 NET

Superior's new model 670

SUPER-METER

***A COMBINATION* VOLT-OHM MILLIAMMETER PLUS CAPACITY REACTANCE INDUCTANCE AND DECIBEL MEASUREMENTS**

SPECIFICATIONS:

D.C. VOLTS: 0 to 7.5/15/75/150/750/1,500/7,500 Volts
A.C. VOLTS: 0 to 15/30/150/300/1,500/3,000 Volts
OUTPUT VOLTS: 0 to 15/30/150/300/1,500/3,000 Volts
D.C. CURRENT: 0 to 1.5/15/150 Ma. 0 to 1.5 Amperes
RESISTANCE: 0 to 500/100,000 Ohms 0 to 10 Megohms
CAPACITY: .001 to .2 Mfd. .1 to 4 Mfd. (Quality test for electrolytics)
REACTANCE: 700 to 27,000 Ohms 13,000 Ohms to 3 Megohms
INDUCTANCE: 1.75 to 70 Henries 35 to 8,000 Henries
DECIBELS: — 10 to +18 +10 to +38 +30 to +58

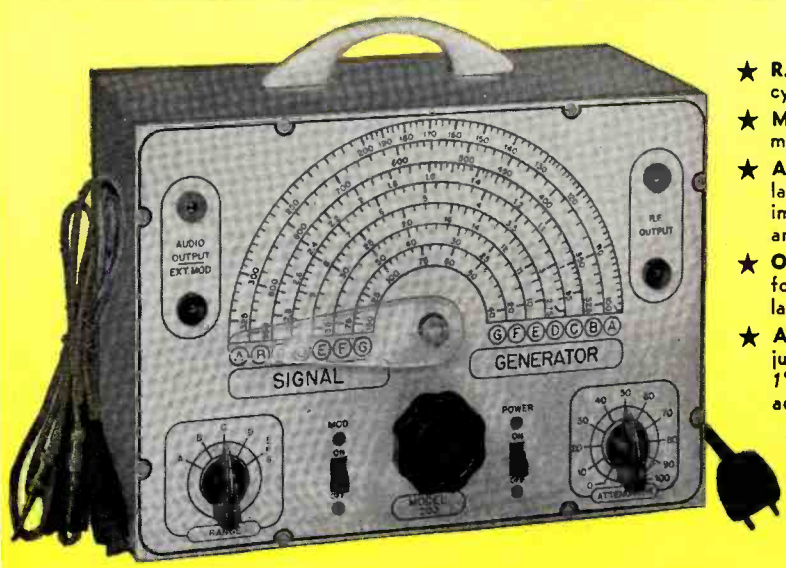
ADDED FEATURE:

The Model 670 includes a special GOOD-BAD scale for checking the quality of electrolytic condensers at a test potential of 150 Volts.

The Model 670 comes housed in a rugged, crackle-finished steel cabinet complete with test leads and operating instructions. Size 5½" x 7½" x 3".

$28.40 NET

The New Model 200 **AM and FM SIGNAL GENERATOR**



SPECIFICATIONS

★ **R.F. FREQUENCY RANGES:** 100 Kilocycles to 150 Megacycles.
★ **MODULATING FREQUENCY:** 400 Cycles. May be used for modulating the R.F. signal. Also available separately.
★ **ATTENUATION:** The constant impedance attenuator is isolated from the oscillating circuit by the buffer tube. Output impedance of this model is only 100 ohms. This low impedance reduces losses in the output cable.
★ **OSCILLATORY CIRCUIT:** Hartley oscillator with cathode follower buffer tube. Frequency stability is assured by modulating the buffer tube.
★ **ACCURACY:** Use of high-Q permeability tuned coils adjusted against 1/10th of 1% standards assures an accuracy of *1% on all ranges from 100 Kilocycles to 10 Megacycles* and an accuracy of 2% on the higher frequencies.
★ **TUBES USED:** 12AU7—One section is used as oscillator and the second is modulated cathode follower. T-2 is used as modulator. 6C4 is used as rectifier.

The Model 200 operates on 110 Volts A.C. Comes complete with output cable and operating instructions.

$21.85 NET

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Superior's New Model TV-11

TUBE TESTER

Specifications

- Tests all tubes including 4, 5, 6, 7, Octal, Lock-in, Peanut, Bantam, Hearing-aid, Thyratron, Miniatures, Sub-Miniatures, Novals, Sub-Minars, Proximity Fuse Types, etc.
- Tests for "shorts" and "leakages" up to 5 Megohms.
- Uses the new self-cleaning Lever Action Switches for individual element testing. Because all elements are numbered according to pin-number in the RMA base numbering system, the user can instantly identify which element is under test. Tubes having tapped filaments and tubes with filaments terminating in more than one pin are truly tested with the Model TV-11 as any of the pins may be placed in the neutral position when necessary.
- The Model TV-11 does not use any combination type sockets. Instead individual sockets are used for each type of tube. Thus it is impossible to damage a tube by inserting it in the wrong socket.
- Free-moving built-in roll chart provides complete data for all tubes.
- Newly designed Line Voltage Control compensates for variation of any line voltage between 105 Volts and 130 Volts.

Extra Service

The Model TV-11 may be used as an extremely sensitive Condenser Leakage Checker. A relaxation type oscillator incorporated in this model will detect leakage even when frequency is one per minute.

***NOISE TEST** — Phono Jack on front panel for plugging in either phones or external amplifier will detect microphonic tubes or noise due to faulty elements and loose external connections.*

The Model TV-11 operates on 105-130 Volt 60 Cycles A.C. Comes housed in a beautiful hand-rubbed oak cabinet complete with portable cover. Size 11½" x 13" x 6". Shipping Weight 15 lbs.

$47.50 NET

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(*Continued from page 34*)

duplicate elsewhere since the equipment on which they work is out of the range of most educational budgets. Electronic technicians now receive training comparable to that given pilots when the elaborateness of facilities and cost of the courses are taken into consideration. This same thing applies to similar educational facilities offered by the Army and Air Force and to some extent the Coast Guard and the Marine Corps. Very few of the men who received such training will dispute its value in civilian life. There are openings in the merchant marine, with civilian airlines, the CAA, and the various branches of the FCC as well as industry for men who fully understand the operation of such equipment.

In time of peace or demobilization, radio or electronic technicians with military training enjoy excellent civilian employment opportunities. In time of national emergency they insure national security. And when war comes, they enable our country to substitute technology for human lives to win the only battle that really counts —the "last one."

-30-

A PORTABLE FUSED POWER OUTLET BOX

By JOHN W. SPONSLER

HERE is one of the handiest gadgets around the shop since the invention of the "cube-tap." But unlike its predecessor, this portable power distribution box has several useful auxiliary features such as power switch, fuse, and cord grip, not to mention rubber bumper feet.

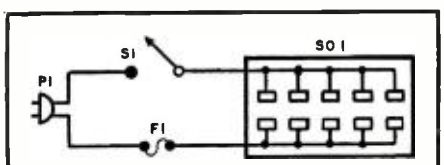
The base of the unit is a 3x4x5 inch black wrinkle finished steel utility box. The covers were removed and in one of them was cut a hole large enough to allow the seating of an ordinary five outlet baseboard receptacle. Although only one receptacle is shown in the photo, similar units can be installed on the sides of the box frame. However it is the author's opinion that a much neater appearance would result by adding another box to one end of the existing case and installing a second receptacle in it.

Four holes were drilled near the corners of the other cover and rubber bumper feet were attached. These feet give the finished box a "dressy" appearance as well as making it scratch- and skid-proof.

Three holes were drilled in the box frame on the 3x4 inch side. The center hole was punched out to ¾ inch while the two outside holes were reamed to allow mounting a fuse post on the left and a s.p.s.t. toggle switch on the right.

The box is wired as shown in Fig. 1. The switch, fuse post, and the cord grip are installed in the three holes provided and after stripping about six inches from the rubber cord jacket, the cord is passed in through the cord grip and the grip is screwed down tight, firmly clamping the cord in place.

One conductor is soldered to the rear terminal of the fuse post while the other conductor is soldered to one side of the toggle switch. Wires of the same gauge and insulation are run from the shell of the fuse post and the remaining side of the toggle switch to the receptacle as shown in Fig. 1. By wiring the box in this fashion, when the toggle switch is turned off and the fuse is removed, any device which is plugged into the receptacle will be completely isolated from the line. (We know it's just as easy to pull out the plug at the wall socket, but that's usually way down under the bench in a dark corner). Although not included in this box, a safety suggestion is made here. Three conductor rubber cord could be used. The third conductor could be bonded to the case at one end, while the other end of the conductor appearing at the rubber power plug could be equipped with an alligator clip for grounding. This would prevent the box from ever getting "hot."



F_1—Push-twist fuse post and fuse (value to suit)
P_1—Line cord plug
S_1—S.p.s.t. heavy-duty, bathandle toggle sw.
SO_1—5-outlet baseboard receptacle
12 ft.—#18, #16, or #14 SJ cord
1—3" x 4" x 5" steel utility box

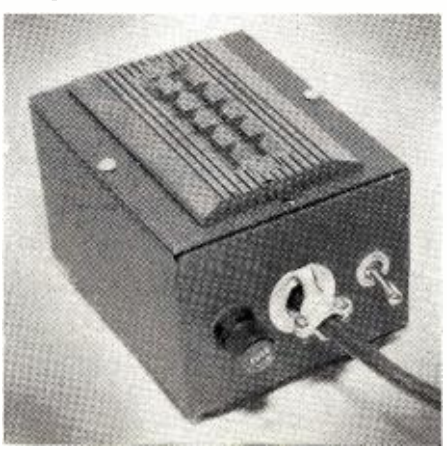
Fig. 1. Diagram for wiring power outlet box.

In the final analysis, you exclaim—"Why so many outlets?"

The answer is simple. Count up all the equipment usually in operation while building and testing. There's the soldering iron, signal generator, oscilloscope, test lamp, the device you are working with, etc. The switch on the box has the added advantage that by turning off one switch everything is shut off. There'll be no more coming into the shop the next morning to find that the soldering iron ran all night because it was plugged in at that outlet down the bench behind the tool box.

-30-

Fig. 2. Over-all view of completed unit.



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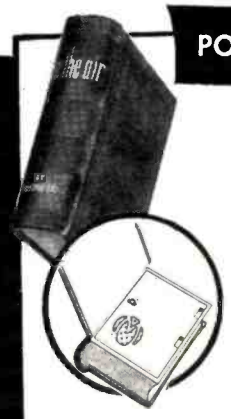

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20-19818R - 67-1/2 volt Battery for above. Ea. 1.59

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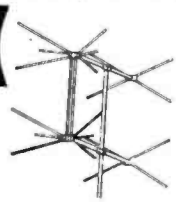

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Heavy duty Duro Hand Grinder... Complete with accessory tools for grinding, buffing, polishing, or engraving work. Shaped to fit the hand, grinder is 7" long... ideal for close precision work. Chuck capacity 1/8". Grinder has grease-sealed ball bearing. Durable light weight metal housing encloses all working parts. Complete with 7 standard tools, 7-1/2' rubber covered cord and plug. Operates on 110 volts, 60 cycles AC or DC. Shpg. wt. 5-1/2 lbs.

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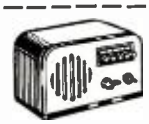

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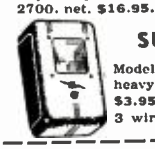

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XX-100. 3½ ft. Trumpet only, shipping weight 15 lbs.
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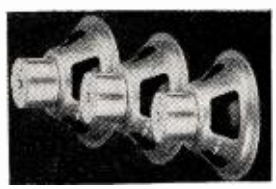
XX100-RM35. combination trumpet and driver complete. Net price..$28.95

SUPER HEAVY DUTY 10" PM $6.95



We made a special purchase on several hundred 20 watt, 10". 32 oz. Alnico 3 magnet PM speakers. Deep throat and easy moving cone. Ideal for all high fidelity sound systems and radio replacement. The magnet on this speaker is usually used on a 15" size. Very efficient, good high and bass response. You'll appreciate it when you get your hands on this speaker. Attractive copper finish. 8 ohm voice coil. Stock No. 1025PS. Weight 7 lbs. Net price $6.95 each.

Order three of these and use them in a cluster of three. They will take 60 watts of audio and have more cone area than any 15" speaker. For high power, top quality P.A. work. Think this over. 3 No. 1025PS speakers for only $19.95.

50 8 MFD. 450 VOLT COND. MONTHLY SPECIAL $16.95

McGee's serviceman's monthly special for April. You get 50 of our regular 39c MN8 8 MFD 450 Volt Tubular Electrolytics for only $16.95. Full one-year guarantee. Aluminum Tubular construction with cardboard insulating sleeves. Fresh stock 1951 production. 2nd to none. Shipping weight 3 lbs. Deal No. NPL-58 50 8MFD 450 Volt Tubulars for $16.95.

BIG SALE ALUMINUM CAN ELECTROLYTICS

McGee offers you Nationally known brands of FP type electrolytic condensers at a tremendous saving. After these are gone, we don't know where we can buy any more to sell at these prices. Order a good supply now. Unconditionally guaranteed.

40-40 mfd.	25v.	FP cond. 1	x2"	$0.19	40-40 mfd.	150v,40-40 25v.	FP cond. 1½x2"	$0.39
250 mfd.	25v.	FP cond. 1	x2"	.29	60-40 mfd.	150v. 10 25v.	FP cond. 1	x3"	.49
20-20 mfd.	150v.	FP cond. 1	x2"	.29	40 mfd. 300v, 50 250v, 20 200v.		FP cond. 1½	x3"	.59
20-20 mfd.	150v, 25 25v.	FP cond. 1	x2"	.34	15 mfd.	400v,10-5 350v.	FP cond. 1	x3"	.49
20-20 mfd.	150v, 100 25v.	FP cond. 1	x2"	.44	8 mfd.	450v.	FP cond. 1	x3"	.29
40 mfd.	150v, 200 10v.	FP cond. 1	x2"	.29	10 mfd.	450v.	FP cond. 1	x3"	.34
30-30 mfd.	150v.	FP cond. 1	x2"	.39	16 mfd.	450v.	FP cond. 1	x3"	.34
40-20 mfd.	150v.	FP cond. 1	x2"	.39	20 mfd.	450v.	FP cond. 1	x3"	.39
80 mfd.	150v.	FP cond. 1	x2½"	.29	24 mfd.	450v.	FP cond. 1	x3"	.39
50-50 mfd.	150v, 25 25v.	FP cond. 1	x2½"	.49	30 mfd. 450v, 30 350v, 40 25v.		FP cond. 1	x3"	.49
80-40 mfd.	150v.	FP cond. 1	x3"	.49	20-10 mfd.	450v.	FP cond. 1½	x3"	.69
80-40 mfd.	150v, 25 25v.	FP cond. 1	x3"	.59	20-20 mfd.	450v.	FP cond. 1½	x3"	.89
40-40-20 mfd.	150v.	FP cond. 1	x3"	.59	32 mfd.	450v.	FP cond. 1	x3"	.39
15-15 mfd.	150v,120 01½v.	FP cond. 1	x2"	.49	30-15-10 mfd.	450v, 20 25v.	FP cond. 1	x3"	.69
30 mfd.	250v.	FP cond. 1	x2"	.19	10-10-10 mfd.	450v, 20 25v.	FP cond. 1	x3"	.59
40 mfd.	250v.	FP cond. 1	x2"	.19	80 mfd.	450v.	FP cond. 1½	x3"	.59
15-15 mfd.	250v.	FP cond. 1	x2"	.29	20-20-20 mfd.	450v.	FP cond. 1½	x3"	1.19
40-20 mfd.	150v, 100 15v.	FP cond. 1	x3"	.39	40-30-10 mfd.	450v. 20-25v.	FP cond. 1½	x3"	1.49
30-50 mfd.	150v, 20 50v, 100 10v.	FP cond. 1½	x2"	.49	40-40-40 mfd.	450v.	FP cond. 1½	x3"	1.49

V.M. 3 SPEED Record Changers

VM Model 406 deluxe 3 speed automatic record changer—plays them all—intermixes records of the same speed—equipped with a flip over crystal pickup with twin needles—a very sleek designed record changer—base size 12¼x13. Ship. weight 12 lbs. VM-406. Net $33.21.

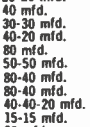
Buy the VM-950 changer with or without base. Choice of G.E. VR or crystal cartridge. We think the VM-950 record changer is the finest in America. It automatically plays all records all speeds and all sizes; 12 10-in., 33⅓ or 78 rpm. 10 12-in., 33⅓ or 78 rpm and 12 and 10-in. records of the same speed intermixed. 12 7-in. 33⅓ or 12 7-in. 45 rpm. Automatically shuts off after the last record. Size 13 13/16x11⅞x7¼ in. high. Offered with crystal cartridge, G.E. VR cartridge, or either with a base. VM-950. 3 speed changer with standard output crystal cartridge and needles for 1 and 3 mil. (78 rpm, 33⅓, 45 rpm.) Net $29.62.

VM-950GE. 3 speed changer with the new RPX-050 magic button, all-in-one variable reluctance cartridge with stylus. Net $32.80.

VM-955. 3 speed changer with crystal cartridge on a base. Net $32.01.

VM-955GE. 3 speed changer with RPX-050 VR cartridge and stylus; with base. Net $35.19.

UNIVERSAL OUTPUTS

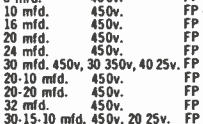


Universal replacement output transformers for push-pull or single plate. 2500 to 13,000 ohms, from 2 to 16 ohm voice coil. Standard size strap mounting with long leads and lugs for voice coil connections. U-5, 5 watt universal.

Net .....$ .99
U-8, 8 watt universal..... 1.19
U-15, 15 watt universal..... 1.39
U-20, 20 watt universal..... 1.79

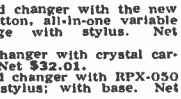
5 watt, single universal output transformer. Any tube to 3.2 ohm voice coil. It pays to have some of these around the shop. They come in handy. No. JJ-4, ea. 79c; 10 for $7.50; 25 for $17.50.

GE. VR $5.95



G.E. variable reluctance pickup arm with separate 1 and 3 mil needles for playing all records. The finest General Electric ball bearing pickup arm, UPX-004 with RPX-041 microgroove variable reluctance cartridge and replaceable 1 mil stylus; furnished with an extra 3 mil G.E. stylus for playing 78 RPM records, at no extra charge. Total value over $11.00. Stock No. 0042. Net price $5.95. 3 speed phono motor and turntable. for 33⅓, 45 and 78 RPM $5.95 extra.

2-STATION INTERCOM $16.95



Complete, top quality two station intercom system. $14.95. With 50 feet of connecting cable. New 1951 production, housed in matching walnut plastic cases. Master has push-to-talk switch. May be used on wall or desk. Conventional amplifier using 12SJ7, 50L6 and 35Z5 tubes. Stock No. MG-3S. weight 8 lbs. Net price $16.95. Extra sub for use in parallel with other sub as a non-selective 3 station system, $3.95.

12" 32 OZ. PM SPEAKER $7.95

12", 32 oz. magnet. 20 watt PM speaker. with 8 ohm voice coil. A regular $17.00 list Consolidated speaker. Weight 8 lbs. No. CN-1232, $7.95 each, 4 for $29.95.

10" HEAVY DUTY P.M. WITH BAFFLE RED HOT SPECIAL $8.95

Super heavy duty 10" 32 oz. Alnico 3 PM speaker, with 8 ohm voice coil. Ideal for music box operators and all sound installations. A lucky purchase makes this possible. The baffle is of the slanting wall type mounting, made of plywood and covered with leatherette. Stock No. MP-10. Net price $8.95 each. In lots of 3 or more, $8.50 each.

4-PRONG VIBRATORS $1.29 IN ALUMINUM SERRATED CANS

10 FOR $11.90

4 MILLION AUTO RADIOS BUILT IN 1930 AND HERE IS THE PERFECT REPLACEMENT VIBRATOR FOR MOST OF THEM.

Latest 1951 production by a top quality manufacturer. Fully guaranteed one year. Quiet running. A result of modern vibrator engineering and research. Replaces Motorola, Chrysler and any standard 4 Prong non-sync Vibrator. McGee contracts for a tremendous quantity to take care of your 1951 needs. Stock #V-53 Standard 4 Prong Vibrator $1.29 each. 10 for $11.90. Offset 4 Prong for Delco, etc., $1.39 each. 10 for $12.90.

Buick Replacement same as Delco 5050500. Fits all Buicks. 1937 thru '47, etc. $1.95 each. 10 for $17.90.

Mallory 534C 7 Prong Reversible Sync.. $1.95 each. 10 for $17.90.
Offset 4 Prong for Delco. etc..$1.39 each

RED HOT ELECTROLYTIC SPECIALS

ORDER 100 ASSORTED FOR $37.50

Stock No. EC-4. Capacity 40-40-20, voltage 150v. Net each 40c
Stock No. EC-552. Capacity 50-50, 200; voltage 150-50v. Net each.....40c
Stock No. EC-3132. Capacity 40-40, 200; voltage 150-15v. Net each 40c

Tubulars in cardboard tubes with long flexible leads. Fully guaranteed.
10,900 to sell at this bargain price.

McGEE RADIO COMPANY Prices F.O.B. K.C. Send 25% Deposit with Order, Balance Sent C.O.D. With Parcel Post Orders, Include Postage

TELEPHONE VICTOR 9045. WRITE FOR FLYER
1422 GRAND AVE., KANSAS CITY, MISSOURI

www.americanradiohistory.com

McGEE HAS COMPLETE KITS FOR SCHOOLS AND CUSTOM BUILDERS

7-TUBE FM-AM TUNER

★ AC SELF POWERED $29.95

★ 3 GANG TUNING ★ A COMPLETE KIT

McGee has ready for delivery, this self powered AC, 7 tube FM and AM superhet tuner kit. Build yourself a professional looking tuner that may be connected to any audio amplifier. Receives broadcast 550 to 1650 kc and FM 88 to 108 mc. A 3 gang tuning condenser is used on both FM and AM. This extra stage of TRF makes a smoother working tuner. 2 IF stages on FM and one IF stage on AM (I.F. frequency 456 and 10.7 mc). Lighted slide rule dial with metal escutcheon plate. Our own lab designed and wired an original tuner using these parts. Chassis is ready punched and painted. Everything furnished including tubes and diagrams. Shipping weight 12 lbs. Stock No. RAL-8. net price $29.95.

MODEL ME6-2 $19.95

NEW MODEL 6-TUBE, 2-BAND RADIO KIT

A FULL 2-GANG SUPERHET KIT

RECEIVES 550-1600 KC PLUS 6-18 M.C.

McGee's new 1951, 6 tube; AC-DC 2 band radio kit. Receives broadcast, 550 to 1600 kc and short wave, 6 to 18 mc. A straight forward superhet circuit with 2 gang tuning condenser, 456 kc I.F. transformers, etc. 5" PM speaker illuminated slide rule dial. Everything furnished, including tubes, diagram and a photo showing view of underside of completely wired chassis. The chassis pan and dial parts are factory production. With this kit, you can build a commercial looking and factory quality 2 band radio, housed in a streamlined plastic cabinet. Size: 13 x 6¾ x 6¼". Stock No. ME6-2, shipping weight 10 lbs. Net $19.95.

5-TUBE BROADCAST SUPERHET RADIO KIT $12.95

Model NS-5X 5 tube AC-DC superheterodyne radio kit. Has loop antenna and 2 gang condenser, with lighted slide rule dial and attractive plastic cabinet. Receives broadcast, 550 to 1650 kc. Full size dynamic speaker, matched 456 I.F.'s, automatic volume control. This is a complete radio kit. Everything furnished, including diagram, photos and tubes: 14B6, 14Q7, 14A7, 50B5 and rectifier. Shipping weight 7 lbs. Stock No. NS-5X. Net price $12.95.

Build Your Own Phono-Mike Oscillator Kit $7.95

Kit Model DE-6R. With this simple kit, you can build a 3-tube phono oscillator that also has a mike input. Will broadcast over any radio, within your home, (about 75 feet) from 800 to 1500 kc. Inputs for crystal mike or crystal phono pickup. Fader control fades from mike to record. Ideal for a home P.A. system, baby listener and home entertainment. A complete kit of parts including tubes. Kit Model DE-6R. Net price, $7.95. DE-6WWT, wired and tested. Net price, $9.95. Crystal mike and desk stand, $4.95 extra. Concealed microphone unit, only 1" in diameter and ¼" thick. Specify hidden mike when ordering. Stock No. T-001. Net. $3.95 extra.

New 16 Watt Utility Amp Kit $16.95

Kit Model TM-16, push-pull wide-range 16 watt amplifier kit. Ideal for a high quality record player, as a P. A. system or recording amplifier. Matched component parts, ready punched chassis. One control fades from phono to mike. Input compensation for G.E. variable reluctance, or crystal pickup, fully shielded. Output matches 8 ohm voice coil. 100 mil power transformer. Complete with tubes, photos and diagram. 2—7C5, 7F7 and rectifier. Variable tone control. Model TM-16. Weight 10 lbs. Net $16.95.

3-SPEED RECORD PLAYER KIT $13.95

Complete record player kit to build a 3 speed player. Heavy 3 speed phono motor, universal crystal pickup, all parts and tubes to build a 7QL7 type amplifier in an attractive walnut case with grill for speaker cut on top. Kit model D-3378, net price $13.95.

SELF POWERED AC Broadcast Tuner Kit. 3-Gang Tuning. Complete Kit, $12.95

A self-powered, 3-gang superhet tuner kit with R.F. stage. When wired according to our diagram will make the best possible broadcast tuner (550 to 1650 kc), for use with any amplifier. Don't class this with ordinary tuners; this has its own power transformer. This complete kit is furnished with a diagram, photos and tubes: 6SH7 R.F., 2—7E5 converter-mixer oscillator, 6ST7 I.F. detector, and 7Y4 rectifier. Connect to any audio amplifier. Ideal for use with our S-2020, TM-16 or 7X5 amplifier kits. Chassis size, 9½x4x 4¼" high. Shipping weight, 7 lbs. Broadcast tuner kit Model BT-38X. Net price, $12.95.

8-TUBE 22 WATT Wide Range Amp. Model 7x5 Kit Only $37.95

A complete kit, including tubes (3-7E5, 2-7F7, 2-6A3 or W.E. VT-52, plus rectifier), diagram and photos. All triode circuit makes for minimum harmonic distortion. Inputs for radio tuner any kind of phono pickup (crystal or G.E. variable reluctance) and either crystal or dynamic mike. Output transformer matches 8 ohm voice coil. Twin electronic tone controls, bass and treble with range selector switch for either juke box quality with heavy bass response or brilliant symphonic range. The best quality amplifier kit we know how to make. Has a very wide range output and heavy power transformer. Response 18 to 20,000 CPS. 8 tube all triode amplifier kit, complete with tubes. Weight 25 lbs. Net $37.95.

$19.95 BUYS THIS ALL PURPOSE 18 WATT AMP KIT

High fidelity amplifier kit. Model S-2020. Has inputs for radio tuner, any phono pickup, crystal or G.E. variable reluctance as well as crystal or dynamic mike. Controls can be mounted on the chassis or on extension leads, as pictured. Has broadcast quality shielded $10.00 value output transformer. Matches 8 ohm speaker. A complete amplifier kit with tubes: 3-7F7, 2-7C5, plus rectifier. A fine amplifier for the home music system. Model No. S-2020. weight 16 lbs. Net $19.95.

BUY YOUR WIDE RANGE COAXIAL SPEAKER AT McGEE

12" COAXIAL PM $13.95

A $32.50 retail value, 20 watt 12" coaxial PM speaker of quality used on radios of the $300 to $500 bracket. Hook up like any PM speaker. High pass filter is built on speaker. Matches 8 ohm output of radio or amplifier. Wide range response, 20 to 17,500 CPS. Model No. CU-14X, weight 10 lbs. Special sale price, $13.95, or two for $27.00.

15" COAXIAL PM $17.95

Only $17.95 buys a full 15", 20 watt coaxial PM speaker, with built-in high pass filter. Hook to any 8 ohm output on radio or amplifier. Response below 20 to above 17,500 CPS. Good bass response. A lucky purchase makes this price possible. Full 32 oz magnet in the woofer. 5" tweeter. Model P15-9, Weight 14 lbs. Sale price, $17.95, or two for $34.00.

PUSH PULL TRIODE OUTPUT TRANS. $4.95

High fidelity push-pull 2A3 to 8 ohm voice coil transformer. Wide range response, upright mounting. Use with push-pull 2A3 or 6A3 tubes, 3,000 ohms plate to plate. No. K-94157, weight 2½ lbs. Net $4.95. High fidelity push-pull 6V6 output transformer to 8 ohm voice coil. Upright, shielded. Matches push-pull 6V6 or any 10,000 ohm plate to 8 ohm voice coil. Weight 2½ lbs. No. K94241. $3.95.

UTAH SCOOP!

12" Utah 25 watt PM speaker. 14½ oz. Alnico V magnet. 8 ohm voice coil. A red-hot value, only 100 to sell at $12.95 each. Stock No. 1202. Shipping weight, 5 lbs. Net price, $12.95 each.

15" Utah 35 watt PM speaker. 31½ oz. Alnico V magnet, 8 ohm voice coil. Only 50 of these super quality PM's to sell at $22.95 each. Stock No. 15-LS Utah. Shipping weight, 12 lbs. Net price $22.95 each.

MAHOGANY BAFFLE $32.95

Mahogany armchair height speaker baffle for 12 and 15" speakers, 24" high, 27" wide and 16" deep. Specify whether baffle is needed for 12 or 15" speaker. Beautiful matched mahogany, furniture quality finish. High quality, non-rattle construction. Baffle No. LS-4, weight 40 lbs. Net price $32.95.

Mahogany Armchair radio-phonograph cabinet with blank panels. 24" high, 27" long and 16½" wide. Will hold record changer up to 14" square; radio compartment 14" long, 9" high and 10" deep. Baffle cut for 12" speaker. Top quality furniture construction. Weight 40 lbs. Net price $34.95.

G.E. RECORD PLAYER ATTACHMENTS

SALE PRICE $6.95

General Elec. 78 RPM Record Players to attach to any radio or amplifier. Heavy duty motor and standard crystal phono pick-up. Volume control and off-on switch. Shpg. weight 8 lbs. (No pre-amp necessary.) 78 RPM Model. Stock No. GE-78, $6.95.

McGee's Super High Fidelity *Best Value In U.S.A.* OUTPUT TRANS. 20-20,000 CPS. $7.95

Model A-403 High fidelity output transformer. Why pay $20 or $30 for an output, when our A-403 is available at $7.95? Impedance, 6600 ohms plate to plate, (for PP 6L6 or 6V6), 10% feedback winding, 4-8-15-250 and 500 ohm secondary. Housed in a potted case. Net weight 6 lbs. Recommended for all amplifiers up to 34 watts. Size 3⅞x4½x3". Suggested diagram furnished. Shipping weight 8 lbs. Net price A-403 $7.95.

BRAND NEW R. C. A. TELEVISION FRONT END-TUNERS

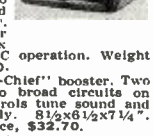
Sale Price $14.95

A fortunate purchase from a T.V. set manufacturer makes this value possible. RCA 13 channel completely wired, tested and aligned T.V. tuner. A 13 channel selector switch with outer sleeve fine frequency control. Converter output transformer is attached for direct coupling to video and sound I.F. stages. Shaft length, 3⅜". Original dealer's cost on this item was over $30.00. McGee offers them to you brand new (they have never been soldered to or in sets) for only $14.95, less tubes. (3 6J6 tubes required). Shipping weight 2 lbs. Stock No. RCA-13P, less 3 6J6 tubes. Net $14.95, two for $27.95.

5-ELEMENT YAGIS $9.80

Yagi TV aerial. Top quality. We offer you pre-assembled, 5-element Yagi antennas, cut to the channel that you need. Maximum gain folded dipoles with bisecting element, give perfect 300 ohm match. This antenna is 2nd to none. Low channel 2 and 3, net price, $10.45; channels 4, 5, and 6, net price, $9.80 each. Specify, when ordering, which channel you want. Packed 2 to a carton. Minimum order, 2 antennas. Phone us for quantity prices. We have plenty of 300 ohm lead in stock. Phone VIctor 9045. Antennas priced less mast and lead.

T.V. BOOSTER REGENCY $19.10



Regency DB-410 television booster. A real engineered unit, small and compact. Slug tuned, using 1—6J6 tube as neutralized push-pull amplifier. Dollar for dollar, your best booster buy. 5¾x 4¾". For 110 volt AC operation. Weight 6 lbs. Net price $19.10.

Astatic AT-1, "Channel-Chief" booster. Two tuned circuits and two broad circuits on all channels. Dual controls tune sound and picture independently. 8½x6½x7¼". Weight 6 lbs. Net price, $32.70.

Astatic BT-1 television booster. Continuous variable tuning on all channels; simplified single knob tuning; low noise design, uses single 6AK5 tube and selenium rectifier. For either 72 or 300 ohm input and output. Woodgrain metal cabinet. Weight 4 lbs. Net $19.10.

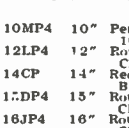
Koenig Tele-Beamer Antenna Rotator. Most dependable made today. Any weight antenna from ¾" to 2" mast. Takes winds up to 80 mph. Indicator shows exact position every instant. A precision instrument completely weatherproof. Electrical stops, machine-cut steel and bakelite gears. Uses TWO heavy motors. Net price, $32.30.

T.V. AND RECEIVING TUBES

This is a sample of our tube offering. Most types are available at 50% off standard list, on orders of reasonable quantity.

0Z4	$0.83	1B3	$1.32
5Q03	1.00	1R5	1.00
1X2A	1.32	1T4	1.00
5Y3GT	.63	3S4	1.00
14Q7	1.10	6W4	.90
6K6GT	.83		

GOOD QUALITY PICTURE TUBES! EVERY TUBE GUARANTEED 90 DAYS



Look over these picture tube prices and you will see that for set replacement, conversion and builders, McGee offers you more for your money. Check our price before you buy a picture tube. NOTE: 10MP4 replaces 10BP4 without any circuit changes.

			Net Each	3 Lot Price
10MP4	10"	Perfect sub for 10BP4	$17.95	$17.00
12LP4	12"	Round, Glass, Clear	17.95	17.00
14CP	14"	Rectangular, Blackface	25.95	24.95
15DP4	15"	Round, Glass, Clear	34.95	32.95
16JP4	16"	Round, Glass, Clear	24.95	22.95
16GP4	16"	Round Metal, Blackface	27.95	25.95
16RP4	16"	Rectangular, Blackface	29.95	27.95
17CP4	17"	Rectangular, Blackface	29.95	27.95
19AP4A	19"	Round Metal, Blackface	59.95	none
20CP4	20"	Rectangular, Blackface	59.95	none

Scoop! 16" rectangular mask—gold color finished plastic. $2.95 each.
70° deflection yoke for rectangular tubes, $3.95.
14 KV flyback transformers, $3.95.
When ordered with picture tube.

BUY YOUR TELEVISION MATERIAL AT McGEE

20 MATCHED VIDEO COIL KIT $7.95

20 matched TV video and sound I.F. coils. Intended for use with the RCA circuit. You get 6 peaking coils, 4—25.75 mc picture I.F.'s, 2—21.25 mc sound I.F.'s, discriminator and converter coil and 5 filament chokes. Stock No. 205-XX, weight 3 lbs. Net price, $7.95. $6.95 if purchased with a Sarkes-Tarzian TV tuner; all coils identified.

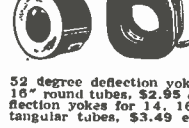
SARKES-TARZIAN TV TUNER $9.95

Sarkes-Tarzian 13-channel television front end tuner. Factory-wired. Rotary switch type, popular today on many TV sets. Also good for building purposes. 6C4 oscillator, 6BH6 RF and 6AG5 mixer. Output of tuner feeds your converter coil, I.F.'s, etc. Stock No. T-3, weight 3 lbs., has converter coil built on. Our 205-XX video coil kit, $6.95 extra, when ordered with tuner.

BRAND NEW GENERAL INST. TELEVISION FRONT END-TUNERS

Sale Price $7.95

All completely wired, brand new and prealigned, 13 channel selector incorporating fixed inductance and variable capacitance. Converter output transformer is attached to be coupled direct to separate sound and video I.F.'s. 3 6J6 tubes are required. Shaft length 2¼". Built in fine frequency control. Original factory cost over $20.00. Weight 4 lbs. Stock No. GI-13P, less tubes. Net price $7.95.



T.V. FLYBACKS YOKES, ETC.

52 degree deflection yokes, for 10, 12 and 16" round tubes, $2.95 each. 70 degree deflection yokes for 14, 16, 17 and 19" rectangular tubes, $3.49 each.

New small horizontal output (flyback) 14000 volt, $3.99. Philco 12 or 16" horizontal output (flyback), $3.49. Vertical output transformer, strap mounting, $1.95. Vertical oscillator transformer, strap mounting, 99c. Single magnet ion trap, 49c. Double magnet ion trap, 89c.

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Splitting Pads

(*Continued from page* 56)

data is substituted in this formula, then:—

$$\text{Power loss} = 20 \log \frac{10}{5} = 20 \log 2 =$$

6.02 decibel

Delta to Star Conversion

Another connection called the "star" connection has the advantage over the "delta" connection of being a simpler combination, and the delta circuit shown in Figs. 1D and 1E may be converted to the star or "Y" connection shown in Fig. 1F. Now if these circuits are to be equivalent, then the resistance between points *AB*, *BC*, and *CA* in Figs. 1E and 1F must be similar. At a glance it may be clear that in Fig. 1F the resistance from *A* to *O* will equal 600 ohms, the resistance *O* to *B* will also equal 600 ohms, making *A* to *B* equal to 1200 ohms as required. It may be mathematically proved, however, that:—

$$R_A = \frac{R_1 R_3}{R_1 + R_2 + R_3}$$

$$R_B = \frac{R_1 R_2}{R_1 + R_2 + R_3}$$

and

$$R_C = \frac{R_2 R_3}{R_1 + R_2 + R_3}$$

For example, to convert the delta formation in Fig. 1D to an equivalent star or "Y" formation, then:—

$$R_A = \frac{1800 \times 1800}{1800 + 1800 + 1800}$$

$$= 600 \text{ ohms.}$$

and likewise, R_B and R_C will be equal to 600 ohms respectively. The equivalent star or "Y" connection would be then as shown in Fig. 1G.

Practical Application

This type of network has practical application in circuits such as the one shown in Fig. 1L where three balanced channels are connected together via the star connection. This circuit enables two sources of alternating current to be fed into one channel or one source of alternating current to be split into two channels.

Another practical application of the star pad is shown in Fig. 1M where the output from an amplifier may be:—

(a) Disconnected from both channels,

(b) Connected to both channels, or

(c) Connected to either channel.

This arrangement may be also used to mix the output of two amplifiers into the one channel.

There are many and varied applications of this simple circuit arrangement but it must be remembered that the loss of 6.02 decibel is a disadvantage. The use of standard 600 ohm non-inductively wound bobbins considerably simplifies the construction of

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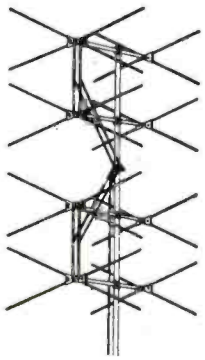


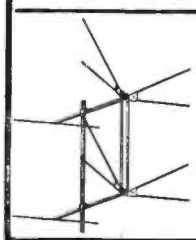
FOUR BAY CONICAL

Quantity	No. 1226 ⅜" seamless aluminum tube elements Price Each	No. 1231 ⅜" butt seam aluminum tube elements Price Each	No. 1234 ½" butt seam aluminum tube elements Price Each
1	$23.87	$20.85	$24.86
6	22.28	19.53	23.21
12	19.25	16.83	20.08

NO. 1905 MAST SNAP-ON FOR 1¼" MAST
1, .06, 100, .04, 1,000, .036 ea.

NO. 1860 CHIMNEY MOUNT

1	$1.92
12	1.54
48	1.31
96	1.20



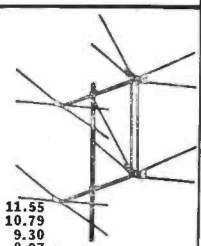
SINGLE REFLECTOR CONICALS

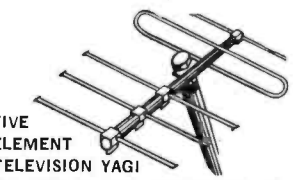
No. 1259 Single Bay ⅜" elements	$3.90
No. 1256 Single Bay ½" elements	4.69
No. 1254 Double Bay ⅜" elements	8.15
No. 1258 Double Bay ½" elements	9.65
No. 1257 Four Bay ⅜" elements	18.15
No. 1253 Four Bay ½" elements	20.99

DOUBLE BAY CONICAL

No. 1214 ⅜" seamless aluminum tube elements.
No. 1230 ⅜" butt seam aluminum tube elements.
No. 1233 ½" butt seam aluminum tube elements.

Quantity			
1	11.29	9.56	11.55
6	10.54	8.92	10.79
24	9.08	7.72	9.30
18 bulk pack	8.75	7.39	8.97





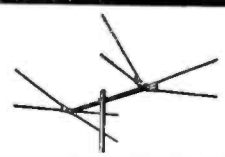
FIVE ELEMENT TELEVISION YAGI

No. 1302 to 1313 Order as follows: 1302 for Channel 2, 1303 for Channel 3 etc.

Quantity	1	3	10	24
1302 to 1306	13.62	12.71	12.10	10.75
1307 to 1313	5.45	5.08	4.72	4.30

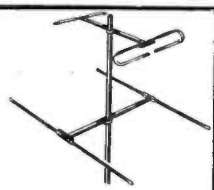
ECONOMY FIVE ELEMENT TV YAGI
(Butt seam elements)

Quantity	1	6	12
2002-2006	10.62	9.90	8.60
2007-2013	3.93	3.70	3.10



SINGLE BAY CONICAL

Quantity	No. 1213 ⅜" seamless aluminum tube elements Price each	No. 1229 ⅜" butt seam aluminum tube elements Price each	No. 1232 ½" butt seam aluminum tube elements Price each
1	$5.45	$4.58	$5.57
6	5.08	4.28	5.21
24	4.38	3.69	4.51
36 Bulk Pkd.	4.05	3.36	4.18



NO. 1219 FOLDED-HI STRAIGHT-LO ALL CHANNEL ANTENNA

1	$4.92
6	4.60
24	3.85

NO. 1244 FOLDED-HI STRAIGHT-LO BUTT SEAM ELEMENTS

1	$4.26
6	3.98
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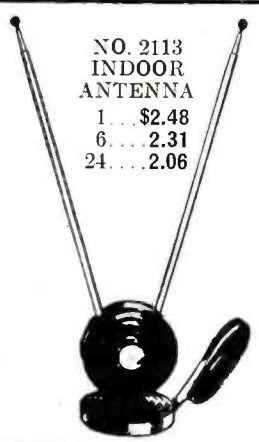
1222	Hi Channel Conical	24	2.26 ea.
1225	Hi Channel F.D. stacked array	24	2.75 ea.
1227	4 Bay Hi Channel conical	24	9.89 ea.
1228	Straight Low and Ref.	12	2.88 ea.
1238	F.D. & Ref. Hi Channel.	24	1.51 ea.
1240	Single section conical	24	1.67 ea.
1246	Folded Low and Ref.	12	3.47 ea.
2109	⅛" carbide drill	1	1.20 ea.
2110	⅜" carbide drill	1	1.43 ea.
2111	½" carbide drill	1	1.80 ea.
2112	2½" lead anchor bolts	100	5.09 c.
1801	3½" turnbuckle	12	for 1.00
1802	4½" turnbuckle	12	for 1.06
1803	5" turnbuckle	12	for 1.58
1804	7½" turnbuckle	12	for 3.95
1886	12" wallbracket Aluminum	6	1.89 pr.
1889	¼"x1½" lag bolts	10	for .35
1890	¼"x2" lag bolts	10	for .40
1891	¼"x3" lag bolts	10	for .45
1896	4/20 steel guy wire	.55	per 100 ft.
1911	Straight High and Ref.	12	1.40 ea.
	Antennas below have ⅜" butt seam elements		
1245	Straight Low and Ref.	12	2.42 ea.
1247	Folded low and Ref.	12	2.95 ea.
1248	Hi Channel F.D. & Ref.	12	1.27 ea.



NO. 2113 INDOOR ANTENNA

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6	2.31
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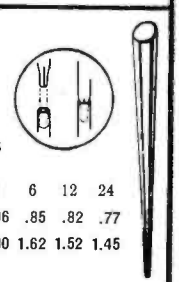

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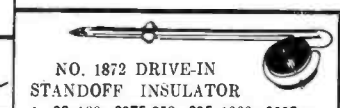
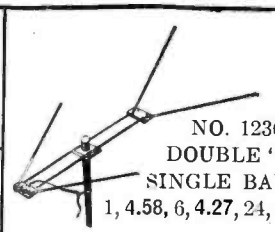
No. 1862 10 ft.	1.80	1.62	1.52	1.45



NO. 1872 DRIVE-IN STANDOFF INSULATOR
1, .03 100, .0275 250, .025 1000, .0225 ea.

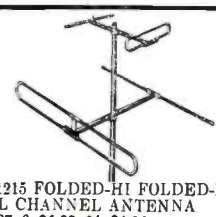
WOOD SCREWEYE STANDOFF INSULATOR

Quantity	1	100	250	1000
No. 1870	3½"	.03	.0275	.025	.0225
No. 1871	7½"	.05	.045	....	.035

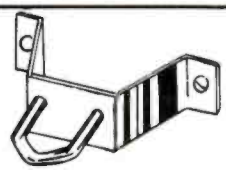


NO. 1236 DOUBLE "V" SINGLE BAY
1, 4.58, 6, 4.27, 24, 3.75

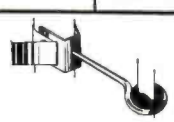
No. 1237 Double "V" Double Bay, 1, 9.15, 6, 8.55, 12, 7.50



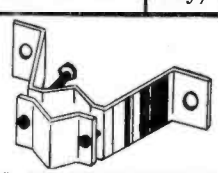
NO. 1215 FOLDED-HI FOLDED-LO ALL CHANNEL ANTENNA
1, $5.37, 6, $4.98 24, $4.24.
NO. 1243 FOLDED-HI FOLDED-LO BUTT SEAM ELEMENTS
1, $4.75 6, $4.43 24, $3.87.



NO. 1887 7" HEAVY DUTY WALL BRACKET
1, $1.10 6, $1.00 24, $0.90 pr.



NO. 1873 3½" MAST STAND-OFF INSULATOR
1. .08 50, .07 100, .065 1,000, .06 each.



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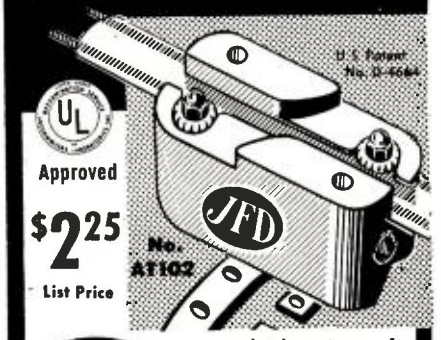

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the pads and carbon resistors of suitable value may also be used.

Matching with Series Resistors

Another method of matching is by the use of series resistances in each branch of individual circuits as shown in Fig. 1J. In this circuit, channels 2 and 3 are assumed to be terminated in their correct impedances, and thus channel 1 must look like 600 ohms. Now the circuit shown in Fig. 1J may be simplified to that shown in Fig. 1I, and Fig. 1I, in turn, simplified to that shown in Fig. 1H. The joint resistance of two equal resistances in parallel may be found by dividing the resistance of one by the number of resistances connected in parallel, and in the case of the two equal resistances shown in Fig. 1H, the joint resistance will be:—

$$\frac{(x+600)}{2}$$

The impedance of the network shown in Fig. 1H must match the impedance of channel 1 (that is, 600 ohms) and thus:—

$$x+\frac{x+600}{2}=600$$

therefore $x = 200$ ohms.

This value of 200 ohms represents the sum of the values of both resistors in each branch of the network and thus each resistor will be:—

$$\frac{x}{2} \text{ or } \frac{200}{2} \text{ or } 100 \text{ ohms}$$

The completed circuit will then be as shown in Fig. 1K. This circuit has an approximate loss of 4.44 decibels in each channel which, however, is not a very serious disadvantage. The same circuit arrangements may be used with this method as shown in the previous circuits, and, while not as simple as these, it is nevertheless simpler than the standard matching pad. Another feature of the split pad is that the pad does not affect the frequency response, provided that non-inductive resistors are used.

The author wishes to thank Mr. Charles Smith for his assistance in the mathematical development of various equations.

—30—

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1C7G	1.92	6AC7	2.25	6K8GT	1.44	7B8	1.08	12SJ7GT	1.08	36	1.59
1D5GP	2.34	6AG5	1.59	6L5G	1.59	7C4	1.92	12SK7	1.08	39/44	1.59
1D7G	1.92	6AG7	1.92	6L6	2.12	7C5	1.08	12SK7GT	1.20	41	.99
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1G6GT	1.59	6AL7GT	1.59	6Q7	1.20	7E7	1.59	12SR7	1.32	46	1.59
1H6G	1.92	6AQ5	1.20	6Q7GT	1.08	7F7	1.32	12SR7GT	1.32	47	1.44
1J5G	1.59	6AQ6	1.08	6R7GT	1.59	7F8	1.59	12Z3	1.59	50	2.34
1J6G	1.92	6AQ7GT	1.44	6S4	1.08	7G7	1.59	14A7	1.32	50A5	1.32
1J6GT	1.92	6AR5	.99	6S7GT	1.92	7H7	1.20	14AF7	1.44	50B5	1.20
1LA4	1.59	6AS5	1.20	6S8GT	1.59	7J7	1.59	14B6	1.32	50C5	1.20
1LC5	1.59	6AT6	.90	6SA7	1.20	7K7	1.59	14B8	1.32	50C6G	1.74
1N5GT	1.20	6AU5GT	1.59	6SA7GT	1.20	7L7	1.59	14E6	1.32	50L6GT	.99
1P5GT	1.59	6AV6	1.20	6SC7	1.20	7N7	1.32	14E7	1.59	50X6	1.32
1Q5GT	1.59	6AV6	.90	6SD7GT	1.74	7Q7	1.08	14F7	1.32	50Y6GT	1.08
1R5	1.20	6AX5GT	.81	6SF5	.99	7R7	1.32	14F8	1.32	55	1.32
1S5	1.08	6B4G	1.92	6SF5GT	1.08	7S7	1.59	14H7	1.44	56	1.08
1T4	1.20	6B5	1.92	6SF7	1.20	7V7	1.59	14J7	1.59	57	1.20
1T5GT	1.59	6B8GT	1.92	6SG7	1.20	7W7	1.59	14N7	1.59	58	1.20
1U4	1.20	6BA6	1.08	6SH7	1.32	7X7	1.59	14Q7	1.32	59	2.12
1U5	1.08	6BA7	1.44	6SH7GT	1.32	7Y4	1.08	14X7	1.59	70L7GT	2.34
1V	1.32	6BD5	1.20	6SJ7	1.08	7Z4	1.08	14Y4	1.44	71A	1.20
1X2A	1.59	6BC7	1.32	6SJ7GT	1.08	10	2.34	19BG6G	3.60	75	.99
2A3	1.92	6BE6	1.08	6SK7GT	1.20	12A	.81	19T8	2.25	76	.99
2A5	1.32	6BF5	1.32	6SL7GT	1.44	12A6	1.74	20	2.34	77	.99
2A7	1.59	6BF6	.99	6SN7GT	1.32	12A7	1.92	22	1.92	78	1.20
2E5	1.08	6BG6G	2.88	6SQ7	.90	12A8GT	1.20	24A	1.32	79	1.59
3A8GT	2.88	6BH6	1.20	6SQ7GT	.99	12AT6	.90	25A7GT	3.60	80	.81
3B7/1291	1.59	6BJ6	1.20	6SR7GT	1.08	12AT7	1.74	25AC5GT	1.74	81	2.34
3C6	1.92	6BN6	1.92	6S57	1.08	12AU6	1.20	25BQ6GT	1.92	82	1.59
3E6	1.59	6C4	.99	6T7G	1.32	12AU7	1.44	25C6G	1.74	83	1.59
3LF4	1.59	6C5GT	.99	6T8	1.92	12AV6	.90	25D8	2.34	84	1.08
3Q4	1.32	6C6	1.20	6U5	1.20	12AV7	1.92	25L6GT	1.08	85	1.32
3Q5GT	1.44	6CB6	1.20	6U6GT	1.20	12AX7	1.44	25W4GT	1.20	89Y	1.32
3S4	1.20	6CD6G	3.60	6U7G	1.08	12BA6	1.08	25Y5	1.74	117L7	2.34
3V4	1.20	6D6	1.20	6V6GT	1.20	12BA7	1.44	25Z5	1.59	117N7GT	2.34
5T4	2.34	6D8G	1.92	6V7G	1.08	12BE6	1.08	25Z6GT	.90	117P7GT	2.34
5U4G	.99	6E5GT	.99	6W4GT	1.08	12BH7	1.85	26	1.08	117Z3	.90
5V4G	1.44	6F6GT	.99	6W6GT	1.08	12F5GT	1.08	27	.90	117Z6GT	1.44
5W4	.99	6F8G	1.92	6X4	.90	12H6	1.08	30	1.20	VR150	1.50
5W4GT	.99	6G6G	1.59	6X5GT	.90	12U5GT	.90	31	1.59	482B	.30
5X4G	1.08	6H4GT	1.59	6Y6G	1.44	12K7GT	.99	32L7GT	1.92	483	.30
5Y3GT	.75	6H6	.99	6Y7G	1.92	12Q7GT	1.08	33	1.92	199V	.30
5Y4G	.90	6H6GT	.99	7A4	1.20	12S8GT	1.59	35/51	1.20	807	1.50
5Z3	1.08	6J5GT	.90	7A5	1.20	12SA7	1.20	35B5	1.20	813	6.75
5Z4	1.59	6J6	2.90	7A6	1.08	12SA7GT	1.20	35C5	1.20	1619	.25
6A3	1.92	6J7G	1.20	7A7	1.08	12SC7	1.32	35L6GT	1.08	1622	1.75
6A4	1.92	6J8G	1.92	7A8	1.08	12SF5GT	1.20	35W4	.75	2050	1.75
6A7	1.20	6K5GT	1.44	7AF7	1.08	12SF7	1.20	35Y4	1.08	2051	1.25
6A8GT	1.20	6K6GT	.99	7B4	1.08	12SG7	1.20	35Z3	1.08	7193	.18
6AB4	1.20	6K7G	.99	7B5	1.08	12SH7	1.32	35Z4GT	.90	VT 52	.30

0Z4 ..... $0.99
0Z4G ..... .99
1A5GT 1.08
1A6 ..... 1.92
1A7GT 1.20
1B3GT 1.59

INDIVIDUALLY BOXED—STANDARD FACTORY GUARANTEE.

ORDER from "PREMIER"
Your reliable source since 1926

SPEAKERS

Very Best Quality—NATIONAL BRANDS—Individually Packed

	10 or more each	Price Each
3"	$1.14	$1.26
4"	1.55	1.65
5"	1.69	1.79
8"	2.94	3.23
10"	4.74	5.10
12"	5.94	6.54

5 x 7 ... $2.25 ea. 6 x 9 ..... $3.25 ea.

5" PM with 50L6 o. p. Xformer $1.99

SPECIAL—6" PM Speakers, big Alnico 5 magnet
In lots of 10 ..... each $1.55
individual 1.67

World's Best Indoor TV Antenna

A beautiful antenna which is the ultimate in reception, highest signal gain, nothing to adjust.
List price $9.95 ..... Each **$4.78**

TV Antennas:

Twin V Antenna with 8 ft. mast $6.95
In-line Antenna $8.95
All band YAGI with 8 ft. mast can be used in-line or hi-low **$10.74**
WORLD'S BEST DELUXE CONICAL **$10.74**
with 8-ft. mast and heavy cast fittings.
100 ft. of twin lead with any TV antenna $2.39
100 ft. of twin lead .. $3.45 1000 ft .. $32.50

VIBRATORS

Standard small size, 2⅛" in height (the popular small size), bright and shiny Stock up while they last, all 4-prong Universal Vibrators. **$1.59** each

OUTPUT TRANSFORMERS STANDARD REPLACEMENT

For 50L6, 35L6, 50A5, 35A5, 117L7 ..... **74c** ea.
For 6V6, 6F6, 3Q5, 3Q4, 3S4, 3V4, 41, 42, 6K6, 2A3, 45, 6L6 **79c** ea.

UNIVERSAL OUTPUT TRANSFORMERS SPECIAL
Up to 12 watts to any speaker (while they last) ..... ea. **$1.18**

VOLUME CONTROLS

VERY BEST BRANDS	10 or more Each	Price Each
½ meg. or 1 meg. or 1/10 meg. with switch—long shaft	52c	59c
2 meg. for battery sets—switch, long shaft	52c	59c
½ meg., 1 meg., 1/10 meg. or 2 meg., long shaft, less switch	24c	28c
1000 ohm	19c	23c
5000 ohm	19c	23c
½ meg. with 6" shaft	59c	71c

Special on #47, #44 and #51 **$4.74**
100 PILOT LIGHTS . . .
Box of 10 ..... 59c

PILOT LIGHTS #40 #41 #46 **$5.88**
100 Bulbs
Box of 10 Bulbs 65c

TV Discriminator Transformers ..... ea. .83

TV Screen Filters with suction cups—best quality INDIVIDUALLY BOXED for highest re-sale value ..... 10" ..... 1.40, 12" 2.34

OCTAL SOCKETS ..... 10 for **59c**
7-PIN MINIATURE SOCKETS ..... 10 for 59c
9-Pin Miniature Sockets ..... 10 for 59c
Loctal Sockets ..... 10 for 59c

TV PICTURE TUBES

10BP4 ..... $10.95	16RP4 ..... $29.95
12LP4 ..... $19.95	16TP4 ..... $29.95
14BP4 ..... $22.95	17BP4A $31.95

FILTER CONDENSERS Very best brands. Fresh stock

450 Working Volts

8—450 V ..... ea. 29c
10—450 V ..... ea. 35c
20—450 V ..... ea. 47c
30—450 V ..... ea. 59c
30—450 V w/ 20-20—25 V ..... ea. 35c
10-10—450 V ..... ea. 52c
20-20—450 V ..... ea. 59c
10-10-10-20—450V-150-25 V ..... ea. 59c
30-30—400 V-350 V ..... ea. 47c
30-30-25—400 V-25 V ... ea. 47c

150 Working Volts

8—150 V ..... ea. 23c
8-8—150 V ..... ea. 23c
10—150 V ..... ea. 23c
10-10—150 V ..... ea. 29c
10-10-10—150 V ..... ea. 35c
15—150 V ..... ea. 25c
20—150 V ..... ea. 30c
30—150 V ..... ea. 35c
40—150 V ..... ea. 35c
15-15—150 V ..... ea. 35c
20-10—150 V ..... ea. 35c
20-20—150 V ..... ea. 35c
30-20—150 V ..... ea. 47c
30-30—150 V ..... ea. 47c
35-35—150 V ..... ea. 47c
40-20—150 V ..... ea. 47c
40-40—150 V ..... ea. 47c

40-40—150 V
20-25 V ..... ea. 47c
50-30—150 V ..... ea. 47c
20-16-16—350 V
Sprague type ..... ea. 47c
25-25—150 V-200-10 V .. ea. 47c
15-15-40-20—150 V-25 V ..... ea. 35c
20-20—150 V-25 V ..... ea. 47c
30-30-200—150 V-10 V .. ea. 47c
20-16-16—150 V ..... ea. 47c

Cathode Condensers
10-25 V ..... 20-20—25 V ..... 20-20-20—25 V ..... 30-50 V ..... 100—25 V ..... **19c** ea. ....29c ea.

BY-PASS CONDENSERS

100 Condensers assorted in package **$7.14**

.001	6c	.0005		
.002	6c	.00025		
.005	6c	.0005		
.01	600 V. 8c	500 mmf	**7c**	600 V.
.02	8c	250 mmf		MICA
.05	10c	100 mmf		
.1	11c	50 mmf		

BYPASS SPECIAL—SOLAR
In lots of 25 or more ..... ea. 11c
.25 mfd. 600 V. ..... Less than 25 ea. 14c

400-VOLT BY-PASS CONDENSERS
.05 mfd. ..... ea. 7c
.2 mfd. ..... ea. 7c
.25 mfd. ..... ea. 12c
.5 mfd. ..... ea. 18c

BUFFER CONDENSERS
.005 mfd. 1600 WV
.008 mfd. 1600 WV
.01 mfd. 1600 WV
..... ea. **18c**

VARIABLE CONDENSERS
Two-gang for superhet or TRF ..... ea. **53c**

SPECIALS

IF TRANSFORMERS

Standard Replacement Regular size 455 Kc ..... ea. **35c**
Midget 455 Kc ..... ea. 47c
Midget 10.7 AM-FM 59c

OSCILLATOR COILS

for any 5-tube AC-DC **23c**

HOOK-UP WIRE

100 ft. **69c**

6-FT. LINE CORDS

Good Rubber with plug 10 for .. **$2.13**
Underwriters' Approved. 10 for **$2.79**

10 % deposit with order, balance C.O.D. $1.00 handling charge for orders less than $5.00. All shipments F.O.B. Chicago. Our parts and tubes are warranted to be 100% replacements for the prototypes in the listings above. Prices are subject to revision without notice. Satisfaction Guaranteed. Illinois residents add 2% sales tax. ORDER TODAY!

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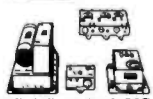
Say, friend, if you live in New York City or if you come up to the big town on business or vacation, why not drop in at PLATT'S VALUE-PACKED RETAIL STORE? Platt has so many bargains (unfortunately, space does not permit him to list them all here) that it's really a shame to pass them up. The savings are yours—so pay PLATT a visit and bring your friends, too.

TUBES

Brand New Standard Brands

5BP4	$ 2.75
3CP1	.59
10Y	.39
801	.69
4AP10	2.50
100TH	17.50
807	1.79
211	.49

SCR-27N COMMAND and ARC-5 EQUIPMENT



RECEIVERS

	USED	NEW
BC-453—190 to 550 KC	$12.95	
BC-454—3 to 6 MC	7.95	
BC-455—6 to 9 MC	6.95	$11.95
R-23—ARC 5—190-550 KC		21.95

TRANSMITTERS

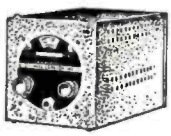
BC-457—4 to 5.3 MC	5.95	
BC-458—5.3 to 7 MC	5.95	10.95
BC-696—3 to 4 MC	14.95	24.95
T-19—ARC 5—3 to 4 MC		24.95
BC-459—7 to 9.1 MC	12.95	24.95
T-22—ARC 5—7 to 9.1 MC	12.95	24.95

ADDITIONAL EQUIPMENT

BC-456 Modulator	2.25	3.25
BC-450 Control Box (3 Receiver)	.98	1.95
BC-451 Control Box (Transmitter)	.89	1.49
BC-442 Relay Unit (ANT)	1.95	2.95
Plugs: PL-147, 148, 151, 152, 153, 154, 156—EACH	.75	
Flexible Shafting with gear to fit Receivers		1.69
3 Receiver Rack	2.25	
2 Transmitter Rack	1.69	

BEACON RECEIVER BC-438

Manufactured by Detrola



Frequency Range—200 KC to 400 KC. IF Frequency—142.5 KC Receiver Sensitivity — 5 Microvolts for 10 Milliwatts output. Output Impedance—300 Ohms and 4000 Ohms to be selected internally. Power Output—150 Milliwatts. Volume Control—RF Gain Control. Power Supply — 24-28 Volts Aeroplane Battery. Current—1.0 Amperes. 6 tubes.

BRAND NEW—ONLY **$10.95**

DYNAMOTORS

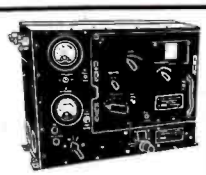
	USED	NEW
DM-32A—Input 28V. output 250 VDC. .06 amps	$2.95	$ 4.95
DM-34—Input 12V or 14V at 2.8 amps. output 220 V at 80 MA	8.95	
DM-25A—12 V. input 2.3 amps. 250V output at 50 MA. Ideal for use on command receivers for mobile use		4.95
DA-1A—Input 28 VDC at 1.6 amps. output 230 VDC at 1 amp		6.95
DY-12—for ART-13 Power Supply. 12V, 9.4 amps. 1 output 275V @ 110 MA. 2-500V @ 50 MA		6.95
DM-53A—24V input. 220 VDC. output at 80 MA		2.95
PE-125 Vibrator Power Supply. 12 or 24 VDC designed for BC-223 Transmitter. output 400V at 200 MA. 8V at 4.5 amps		18.95
PE-103A Dynamotor with power unit. Ideal for mobile use. input 6V at 21A, output 500W 1.6A or 12V at 11A, output 500V 1.6A. Used with SCR-284		24.95
BD-86—Input 14V 2.2 amps. output 600V .3 amps. With fuse and Cond. Box on Mount		7.95
DM-36 Dynamotor. input 24V to 28V 1.4A, output 220V at .08 amps. Complete with mounting base and Jones Plug	2.95	
PE-94—input 28V. output 14.5V at 4.9 amps, 150V at 10 MA. 300 V at 260 MA. Used with SCR-522	5.95	9.95
MP-28BA—A dynamotor power supply unit, input 25 to 28V 14, 8 amps DC. output 540V 450 MA DC. With a transmitter modulation section using 1—6N7, 1—6F6 and a pair of 807 tubes in push-pull. Also includes modulation transformer. Used for Bendix TA-12		45.00

Multitester Foundation BIAS METER 1-97A

Contains a zero center 3½" round Marion voltmeter calibrated 0-100 volts each side. Movement is one mill each side of center. The unit is mounted in a steel box 7"x5"x 4½" and contains 8 contact push buttons, line cord dual 100 MFD at 200 V DC condenser, a potentiometer 6 1RC 1% wire wound non-inductive resistors: one 400 ohm, two 2500 ohm, one 5000 ohm, one 10,000 ohm, one 15,000 ohm.

Excellent for building a zero center multitester with ranges of 1, 10, 100, 1000 volt.

COMPLETE BRAND NEW **$5.95**



BC-223 TRANSMITTER

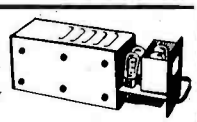
A 30 watt Transmitter, ideal for ship-to-shore or Ham Rig. Crystal or MO control on four pre-selected channels. 2000 to 5250 KC. Use of 3 plug-in coils, five tubes: 2—801 and 3—46, and TU 17-18-25 tuning units.

TRANSMITTER	$25.95
TUBES	3.75
TUNING UNITS	2.25 ea.
PE-125 VIBRATOR POWER SUPPLY FOR BC-223	$18.95

20 POUNDS OF ASSORTED RADIO PARTS

ONLY **$3.39**

TURBO AMPLIFIER



4 tube Amplifier used by U.S. Air Force. 115 V, input at 400 cyc.

Without tubes—BRAND NEW $1.49

FIELD TELEPHONES

Army surplus, completely reconditioned and electrically tested, using 2 flashlight cells and a pair of interconnecting wires. GUARANTEED—like new.

ONLY **$15.95**

Control Box BC-434-A

Used with Radio Compass receiver R5-A R N - 7, Bendix ADF Equipment. Only **$2.95**

Control Box BC-648-A

Excellent condition. Made by Westinghouse. Terrific value!

Only **$3.29**

BC-221 FREQUENCY METER

This is a Terrific Value! QUANTITY IS LIMITED—so first come, first served. They are just like new, with original calibration charts. Range 125-20,000 KC with crystal check points in all ranges. Complete with crystal and tubes.

ONLY **$99.50**

WOOD CASES for 221 FREQUENCY METERS

Brand New .....$3.95 Used $2.25

MINIMUM ORDER $2.00

Immediate Delivery—Send 25% deposit on C.O.D. orders. All shipments F.O.B., N.Y.C. (N.Y.C. residents add sales tax to your remittance.)

BC-1066 RADIO RECEIVER

Receives radio frequency signals for checking frequency and operation of other radio equipment. Coverage is obtained by 2 bands, I and G. Battery operated. New with tubes..... **$8.95**

MN-26Y INSTALLATION

MN-26Y Receiver—Remote control commercial type navigational. Indicates direction of any desired transmitting station. 3 bands—frequency range: 150 KC to 1500 KC; has 12—6 V type tubes, BRAND NEW (Original Cost $600.00) **$22.95**

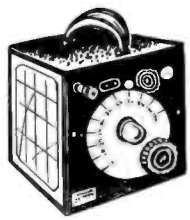
TYPE MN-20E ROTATABLE LOOP UNIT

8" diameter, used with MN-26 Compass and RA 10DB. Manufactured by Bendix. A TERRIFIC BUY! ONLY..... **$11.95**

FL-8 RADIO FILTER

Can be converted for use with many types of transmitters and receivers. Complete write-up in May, 1950, Issue of CQ Magazine.

EXCELLENT CONDITION **$1.29**



BC-1255 MONITOR

A battery-operated receiver, 75-150 MC range. Used as monitor in operation and calibration of radio transmitters.

BRAND NEW **$14.95**

TS-268/U CRYSTAL RECTIFIER TEST SET

Brand New—complete with set of spare parts..... **$39.95**

AN80A ANTENNA

for BC-645.. **30c**

HEAVY DUTY LINE CORD

8 ft. rubber covered, UL approved.....29c

SPECIAL BARGAINS!

BC-348 Receiver—Guaranteed, CAA Tested, Like New $150.00

BC-224 Receiver—Guaranteed, CAA Tested, Like New 119.50

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DEPT. A, 489 BROOME ST., NEW YORK 13, N. Y.
PHONES: WO 4-0827 and WO 4-0828

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ARMY TEST UNIT 1-236

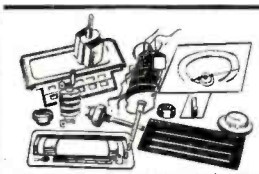
Meter is contained in a metal box 5½" long x 3¾" wide x 3¼" deep. Comes complete with test leads and instruction book. Can be used for testing between AC & DC measuring resistances of circuits, checking fuses, and testing capacitors. ONLY **$7.95**

RADIO RECEIVER BC-1023-A and MOUNTING FT-161

UHF aircraft receiver with frequency range from 62 to 80 MCS for receiving 75 MC marker beacon signals ....BRAND NEW! **$7.95**

WIRE WOUND RESISTORS

50,000 ohms 100 watt....79c
14 ohms 25 watt....15c
8.3 ohms 25 watt....15c
1700 ohms 15 watt....15c
1000 ohms 10 watt....15c
11,500 ohms overall, tapped at 3000 ohms, 7500 ohms, 23 ohms, 750 ohms, 200 watt....$1.19



SPECIAL! A BUNDLE OF KITS

Unfortunately space does not allow us to list all the individual parts of these sensational kits, but take Platt's word—they're value-packed!

1 Kit of 25 assorted metal and plastic ESCUTCHEON PLATES....$2.49
1 Kit of 25 assorted DIAL FACES, finished in various stages and used on present high priced broadcast receivers. (Can be used with above kit)....2.79
1 Kit of 100 assorted RADIO KNOBS—push-on, screw-on, pointer-type, long neck....3.89
1 Kit of 12 assorted SWITCHES—many uses: TV, electrical, circuit breakers, wafers, etc....3.49
1 Kit of 25 assorted COILS AND CHOKES—IF's, antenna, broadcast and short wave....1.79
1 Kit of 6 WAFER SWITCHES....69
1 Kit of 4 VOLUME CONTROLS—consisting of dual half meg long shaft, 1 meg short shaft, 100,000 ohm short shaft, 1 on and off switch....59

IF COILS

456 KC with adjustable Trimmer, special type ceramic base, round can....29c
465 KC, large cans....29c
455 KC....29c

PUSH BUTTON SLUG TUNER for AC-DC Sets....only **99c**

SWITCHES

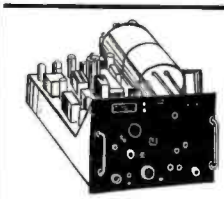
3 amps @ 125 V—push button switch....15c
Toggle Switch, Bat Handle, SPST....19c

ANTENNA LOOPS for AC-DC Sets

Antenna Loop—RMA Approved, eliminates aerial and ground, equipped with .01-400 V Paper Tubular Condenser and 120 MMF Mica Condenser....59c
Built-in Antenna for local or powerful stations, no other antenna is needed. If reception of distant stations is desired, there is an external outlet for outside antenna. Equipped with 1000 ohm resistor....49c
Antenna Loop with mount—has one clip for ground, one clip for external antenna....39c
Antenna Loop less mount....15c

MICROPHONES

T-17-B, Hand-held carbon microphone for use in voice communication. Effectively covers the audio frequency range from 300 to 2600 CPS. 200 ohms, with press-to-talk switch, 5 ft. rubber cord and plug. NEW....$5.95
T-30 Microphone suitable for aircraft use. Responds to frequencies in the range of 400 CPS to 2000 CPS. Complete with cord and plug. Original Packing. NEW....1.29
T-44C Magnetic type mike with cord, plug and jack. Brand New....69



T-85/APT-5 UHF TRANSMITTER

Frequency range 300-1500 MC. 20 watts output, band width 2.5-3 MC. Complete with 8 tubes and 110 V 60 cyc. fil. transformer. Calibrated in centimeters. New in original box with operating Instruction Manual.. **$79.50**

APN/1 RADIO ALTIMETERS

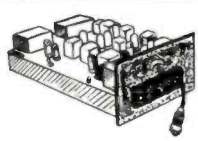
A complete NEW 14 tube Radio Altimeter. Contains 420 MC Transmitter and Receiver, Power Supply, Range Switches, Two Antennas, Meter Indicator, All Plugs and Instruction Manual. This unit makes an excellent amateur station as it is right in the band.....BRAND NEW—ONLY **$24.95**

PRE-AMPLIFIER MODEL K-1

The K-1 is used to amplify output level for microphones and phonographs. Operates on 24-28 VDC, can be converted to 110 AC. Comes complete with PL 55 plug and 2 foot 119-B cord, 2 terminal blocks and instruction book.
BRAND NEW ....SPECIAL **$3.95**

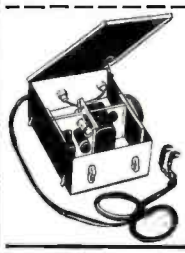
HEADSETS

HS-83 low impedance with cord and plug, used, fine condition....$1.39
HS-23 high impedance, BRAND NEW with ear pads....3.25
HS-33 low impedance, BRAND NEW with ear pads, cord and PL54 plug....3.50
TH-37A—1200 ohms with dual plugs....2.95
HS-30 with ear plugs, low impedance, used, good condition....89



BC-620 RECEIVER-TRANSMITTER

2 crystal channels — 20 to 27.8 MC, FM-13 tubes. Metered, Plate and Filament.
NEW **$24.95**



PE-97 POWER SUPPLY for BC-620

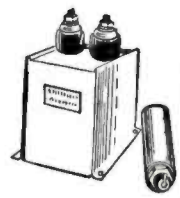
6 or 12 V vibrator type. NEW—less tubes, vibrator.

$3.95

CORDS AND PLUGS

CD 508A Cord Assembly with SW 14-U Switch and 2 cord attachments with JK 48 Jack and PL 68 Plug. Value—$5.00. Our Special Low Price, Brand New....59c
CD307A with PL 55 and JK. New....$1.29
JK 26 Jack only—Brand New....20c
PL 55 Plug—NEW....35c
PL 68 Plug—NEW....25c
Jones plug 8 contact male and female....25c
PL-Q-59....49c
PL-P-60....49c
PL-Q-61....49c
PL-Q-62....49c
PL-Q-77....69c
PL-Q-171....89c
PL-153-A....69c
PL-172....89c

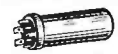
CONDENSER SALE!



OIL FILLED CONDENSERS

.1 MFD—3000 VDC, round can....$0.79
1 MFD—1000 VDC, rect. can....69
1 MFD—600 VDC, rect. can....49
2 MFD—600 VDC, rect. can....69
2 MFD—600 VDC, round can....69
.25 MFD—3500 VDC, rect. can....1.29
.25 MFD—6000 VDC, rect. Can. G.E....1.29
2 MFD—4000 VDC, G.E., large....3.97
30 MFD—90 V, 3 phase, G.E., large, 60 cycles....1.39
1.25 MFD—220 VAC, Western Electric Motor cond....29
TLA 6040—4 MFD 600 V....1.29

FILTER CONDENSERS



15x15 MFD—450x350 V....59c
8x8x20 MFD—300x300x150 V....59c
10x50 MFD—450x25 V....39c
1000 MFD—15 V—EP Type....33c
3000 MFD—3 V—FP Type....48c
4x10 MFD—400 V—FP Type....89c
100 MFD—50 V—FP Type....49c
1000 MFD—10 V—FP Type....39c
3x20 MFD—25 V—FP Type....39c

BATHTUB CONDENSERS

.5—.5 MFD—100 VDC (Top Terminals)....9c
20 MFD—350 VDC (Side Terminals)....29c
2 MFD—400 WV-600 Peak V (Side Terminals)....29c
.5 MFD—100 VDC—2.6 MFD—400 VDC (Side Terminals)....39c
2x1 MFD—600 VDC (Bottom Terminals)....39c

TRANSMITTING MICA CONDENSERS

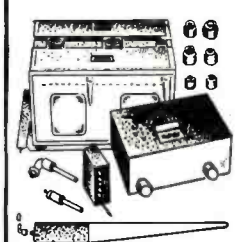
.00075 MFD—5000 V....79c
.0015 MFD—5000 V....89c
.09 MFD—1500 V....79c

ELECTROLYTIC CONDENSERS

3x20 MFD @ 100 WVDC....39c
16 MFD @ 350 WVDC....59c
4-6-6-5 MFD @ 250-200-150-25 WVDC....69c
8-8-20 MFD @ 300-300-150 WVDC....59c
8-12-12-5 MFD @ 250-200-150-25 WVDC....69c
10-50 MFD @ 450-25 WVDC....39c
15-15 MFD @ 450-350 WVDC....59c

TRIMMER CONDENSERS

Dual Capacitor—30 to 110 MMF....15c
Single Capacitor—20 to 80 MMF....12c



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With New Components

Very High Frequency TRANSMITTER-RECEIVER

100-156MC, 4 Channels, Crystal-Controlled, Amplitude Modulated Voice. Electrically Tested.

Complete as shown
Only **$84.50**

BRAND NEW—$92.50

SCR-522C—Complete as above—Brand New..$129.50

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DEPT. A, 489 BROOME ST., NEW YORK 13, N. Y.
PHONES: WO 4-0827 and WO 4-0828

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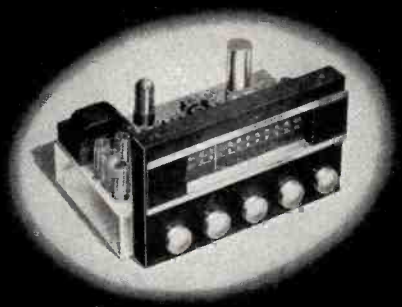
this is it—
this is the tuner
you designed!



the
CRAFTSMEN RC-10
HIGH FIDELITY
FM-AM TUNER

This new tuner was your idea. It is the precisely engineered answer to hundreds of questions . . . the solution to scores of problems . . . the outgrowth of countless suggestions we've received from you. Developed from your ideas—and a few of ours—the RC-10 retains every feature of the famous RC-8. And it offers a host of innovations.

- Built-in pre-amplifier compensated for reluctance pickups.
- Automatic Frequency Control entirely eliminates drift, simplifies tuning.
- 5 microvolt sensitivity on both FM and AM.
- 10 kc filter on AM eliminates inter-station squeals.
- Base and treble tone controls for boost, cut, or 20—20,000 cycle flat response.

SEE . . . the RC-100A ultra-sensitive, custom TV with built-in booster.

HEAR . . . the RC-2 high fidelity amplifier. All units finished in chrome.

Write for information—or send 50¢ for instructions and schematics.

THE RADIO craftsmen INCORPORATED

Dept. R 11, 1617 S. Michigan Ave., Chicago 16, Ill.

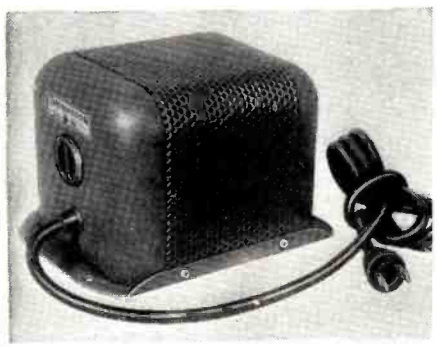
What's New in Radio

For additional information on any of the items described herein, readers are asked to write direct to the manufacturer. By mentioning RADIO & TELEVISION NEWS, the page, and the issue number, delay will be avoided.

VOLTAGE REGULATOR

The *Thordarson-Meissner Mfg. Division* of *Maguire Industries,* 500 West Huron Street, Chicago 10, Illinois has developed a new, low-cost automatic voltage regulator which is designed to protect electric motors and other electrical appliances from damage resulting from excessive line voltage fluctuations.

The new "Power Guard" is rated at 750 va., uses a power transformer with tapped windings, and is electrically



adjusted to keep the output voltage within certain prescribed limits. The relay used in the unit is chatterproof and the unit itself is filtered to prevent interference to radio or TV reception.

Available in a conduit box type housing, the regulator meets certain electrical codes for permanent installations. The semi-portable unit is housed in a well-ventilated gray wrinkle-finish steel case.

NEW NATIONAL RADIO

The National Company of Malden, Massachusetts is currently in production on a new, compact, and low-priced radio receiver, the SW-54.

A general coverage receiver, the set measures 11" long, 7" wide, and 7" deep and covers the entire range from 540 kc. to 30 mc., voice, music, or code. Designed especially for the short-wave listener and for standby amateur use,

the dial has police, foreign, amateur, and ship bands clearly marked. The set features a unique plastic band-spread dial, new miniature tubes, and simplified operation.

Complete details on the SW-54 are available from the company.

TEST LIGHT

A new test light which features a wide voltage range and is constructed to withstand the most rugged usage is now being offered by *Industrial Devices, Inc.* of Edgewater, New Jersey.

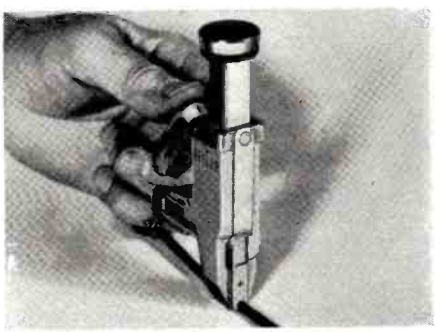
Designated as the "Lo-Volt" test light Model #1300, the new unit is encased in a plastic housing that will stand abuse that would break the average glass test light. Flexible leads with durable coverings 10" long are terminated in spring clips.

The plastic bulb lights up on any voltage from 3 to 25 volts a.c. or d.c. A second model, the #1310, covers a range of from 6 to 50 volts a.c. or d.c.

AUTOMATIC TACKER

The Heller Company of 2153-N Superior Avenue, Cleveland 14, Ohio has come out with a new pocket-size staple tacker which is especially designed to save time and money in making wire installations.

The new tacker staples braided, rub-



ber-coated, single and double strand wire, and hollow tube lines. Front and rear guides circle the wire and permit rapid drawing around difficult angles or corners, along baseboards, plaster walls, window frames, ceilings, door jambs, and rafters.

The tacker uses a special staple which is available in several colors. The driving point of these staples is designed to penetrate plaster, composition board, and hard and soft woods with a holding power up to 64 pounds. The staples may be driven to any desired depth without marring or injuring the wire.

VEHICULAR CONDENSERS

Cornell-Dubilier Electric Corp. of South Plainfield, New Jersey is now offering a new line of bypass and feed-through vehicular condensers which are designed to suppress radio frequency interference.

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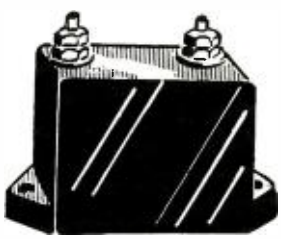
TRANSMITTING *Mica* CONDENSERS

SPECIAL LOW PRICES FOR IMMEDIATE SALE AND DELIVERY

We have literally hundreds of thousands of these top quality standard type transmitting mica condensers in stock for immediate delivery at a fraction of their original cost. Every condenser is brand new and carries the name of a fine nationally known manufacturer.

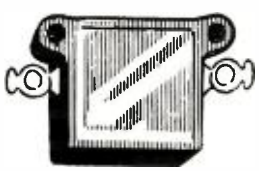
Despite the unusually low prices, these mica condensers, like all Wells Components, are fully guaranteed. Be sure to order sufficient quantities for your requirements.

STYLE "A"



STYLE "B"

STYLE "C"



STYLE "D"

STYLE "E"

CAPACITY	WORKING VOLTAGE	MFG. LEGEND	UNIT PRICE
TYPE A			
.000025	10MV	8	$1.95
.000025	7MV A.C.	2	1.95
TYPE B			
.00007	1140	6	$ .85
.00015	5000	8	1.45
.0002	1430	6	1.05
.0002	5000	1-8	1.50
.00025	2500	7	1.35
.00025	5000	1-7	1.55
.0004	5000	2-7-8	1.65
.0004	6000	1	1.75
.00052	2000	7	1.35
.00055	5000	3	1.90
.0006	2500	7	1.35
.00072	5000	2	1.85
.00075	2500	2	1.40
.0008	5000	2	1.85
.001	5000	7	1.95
.0011	5000	7	1.95
.002	3000	2	1.75
.002	6000	6	2.20
.0024	1500	3	1.45
.003	2000	7	1.55
.004	3000	8	1.75
.005	2000	2	1.70
.005	3000	8	1.95
.006	3500	8	2.00
.0068	3000	8	1.85
.008	3000	7-8	1.95
.01	2000	3	1.85
.015	2000	1	1.75
.02	500	7	1.50
.02	2000	8	1.95
.024	1500	3	1.85
.033	1500	3-7	2.10
.056	1000	3-7	2.10
.06	1000	8	2.20
.1	1000	8	2.25
TYPE B (Small Size)			
.00003	2000	2-7-9	$1.10
.00005	3000	2-7	1.20
.00008	3000	9	1.25
.00009	3000	2-7-9	1.25
.0001	3000	2-7-9	1.30
.000107	3500	1	1.75
.000110	3000	8	2.10
.000175	1500	8	1.30
.0002	3000	7-8	2.05
.0004	3000	2-7-9	$1.45
.0005	3000	3	1.55
.00055	3000	7	1.75
.000625	3000	2-7	1.95
.0008	3000	7	1.70
.00125	2000	1-2-7	1.65
.0024	3000	8	1.95
.0025	2000	1-2-7	1.85
.00275	2000	1-7	1.90
.005	2000	2	1.75
.006	2000	8	1.85
.006	2500	7	2.10
.01	1000	7	1.65
.01	2000	1	1.85
TYPE C			
.000005	2500	2	$ .50
.0001	600	2-7	.35
.0001	1200	6	.45
.0001	2500	6-7-8	.60
.0002	600	2	.35
.0002	2500	7	.50
.0003	2500	7	.60
.00039	2500	7	.75
.0004	2500	2-7	.55
.0005	600	7-8	.45
.0005	1200	2-7	.55
.0005	2500	2	.75
.001	600	8	.45
.001	1200	2-7	.50
.001	2500	2	.75
.0035	2500	7	.85
.004	2500	2-7	.75
.0046	500	9	.55
.0047	2500	8	.80
.005	600	2	.45
.005	1200	7	.55
.0051	2500	8	.85
.0056	2500	8	.85
.006	600	7	.50
.006	1200	2	.75
.008	600	8	.65
.01	600	1-8-9	.50
.01	1200	1-2-7-8	$ .65
.01	1250	9	.70
.01	2500	7	.80
.0115	600	8	.65
.013	1200	3	.65
.015	1200	7	.65
.015	2000	8	.75
.0175	1200	2	.80
.02	600	7	.45
.04	600	7-8	.45
.00005	1200	1-7	$ .35
.00005	2500	2-7-8-9	.40
.0001	1200	7	.40
.0001	1250	1	.45
.00015	2500	6	.50
.0002	2500	2-9	.45
.00024	2500	6	.50
.00025	1200	8	.35
.00025	2500	8	.45
.0005	1200	7	.40
.00051	2500	1	.50
.0007	600	2	.35
.001	600	1-2-7	.35
.001	1000	9	.40
.001	1200	5-8	.45
.001	2500	2-6-8	.55
.0011	2500	8	.55
.002	600	1-7-9	.35
.002	1200	1-2-7-8	.45
.0022	1200	7-8	.45
.0022	2500	7	.55
.0025	1200	1-2	.40
.0027	600	1	.35
.003	1200	1-6-7	.40
.0033	1200	6	.45
.004	1200	8	.45
.0044	600	8	.35
.0047	2500	6	.50
.005	600	6	.35
.005	2500	2	.45
.006	750	1	.40
.01	300	1-4	.30
.01	600	2-8	.35
.01	1100	6	.45
.01	1200	6-8	.50
.01	1250	1	.55
.02	600	1-2-4	.35
.022	600	7	.40
.025	600	7	.35
.027	600	1-7	.40
.03	600	1-2-7	.45
TYPE D Lug Mtg.			
.004	2500	3	$ .30
.01	1200	3	.25
.03	600	3	.20
TYPE E			
.00025	500	5-7	.25
.0008	750	2	.30
.001	500	5	$ .25
.001	750	7	.30
.002	750	7	.30
.003	750	7	.30
.004	500	7	.30
.005	1000	5	.40
.006	750	5-7	.30
.01	500	5	.30
.01	1200	7	.40

NOTE:

Order by capacity and type number—specify choice of manufacture.

Wide Selection of Electronic Components at

WELLS

Tubes • Resistors
Condensers
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Volume Controls
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LEGEND:

1—Aerovox	6—Micamold
2—C-D	7—Sangamo
3—Faradon	8—Solar
4—Elmenco	9—Sprague
5—Illini	

This is only a partial listing. Write or wire for information on types not shown and for receiving set micas and silver micas.

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We advise distributors to order immediately from this ad. Our standard jobber arrangement applies.

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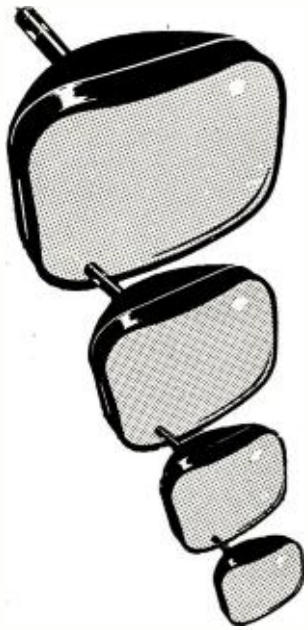

ELECTRONIC BUSINESS MACHINES

That's what we call the 16", 17" and 20" rectangular neutral-density-filter tubes that Reeves Soundcraft Corp. is manufacturing as successors to Remington Rand's TV Picture Tube Division.

IT IS GOOD BUSINESS to INCORPORATE Reeves Soundcraft "TRU-LUMES" as the BUSINESS end of TV sets you manufacture, service, convert, or for which you stock tubes.

In the coming months more and more of these fine rectangulars will become available. An inquiry NOW will enable us to tell you how YOU may sooner become one of our happy kinescopic beneficiaries.

Dictate an inquiry today.

Reeves — 20 YEARS WITH ELECTRONICS IN PEACE AND WAR: *Optical and magnetic film sound recording facilities, equipment, and supplies; "acetate" discs and magnetic tape; transformers; projection TV; crystals; electronic computors.*

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COLORCRAFT PICTURE TUBE DIV.
35-54 36th STREET, LONG ISLAND CITY 6, N. Y.
SUCCESSORS TO REMINGTON-RAND TELEVISION PICTURE TUBE DIV.

OUTSTANDING - TV - VALUES

MODEL #300
Folded dipole complete with reflector and high frequency adapter. Covers 13 channels. All alum. construction. Less mast. Shpg. wt. 7 lbs. PRICE $5.25

MODEL #200-D
Stacked array. Consists of 2 complete conicals and connecting bars. Very rigid construction. Covers all 13 channels. Matches 300 Ohm or 72 Ohm. Center impedance 150 Ohm. Ideal for low signal areas. An outstanding buy. Shpg. wt. 12 lbs. SENSATIONAL OFFER at, less mast. $9.50

MODEL #200-S
Single array. Same construction as above. Shpg. wt. 7 lbs. Price, less mast..... $4.50

MODEL #500
All-band folded dipole antenna. Ideal for rotator use. Maximum gain on any channel; Alum construction. Less mast. Shpg. wt. 8 lbs. Price..... $5.25

MODEL #Y-100
3 element Yagi Hi-Gain beam designed specifically for fringe area use. All alum. construction. Cut to specific channels. Shpg. wt. 4 lbs. Channel #7, $5.80; Channel #9, $5.20; Channel #11, $4.60; and Channel #13, $4.00. The prices are less mast. "V" type antenna. Price $4.25

FULLY AUTOMATIC BOOSTER—automatic on-off, automatic tuning, concealed installation, single or dual input, full band width on all channels, high uniform gain, 19 db on low 2-6, FM and 14 db on high 7-13. Specially priced $29.95

ANTENNA ACCESSORIES

CM-100 Chimney Mount	$ 1.50
WM-104 Wall Mount 4"	.98
WM-107 Wall Mount 7"	1.25
U-100 "Universal" Ant. Mtg. Bkt. Offset to 8" Price	3.95
U-200 Same as U-100 but Offset to 12". Price	6.95
3½" 300-ohm stand-off insulators fit coax cable). Per 100, $3.00; per 500, $12.00; per 1000,	20.00
Folded Dipole Hi-Frequency Adapters	1.50
Straight Dipole Hi-Frequency Adapters	1.50

Best Quality 300-ohm twin lead—Send for prices. High Quality 72-ohm Coax Cable—Send for prices.

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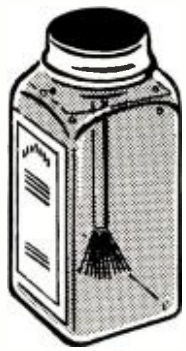
those costly service calls with . . .

ELECTRO ANTENNA KOTE

For better reception use Antenna Kote; a newly developed chemical compound. Recommended for safely coating all exposed exterior television and high frequency connections.

Dielectric Strength — Volts/Mil 1050.
(May be used for arrest of voltage leakage)
Dries hard in 8 hours.
(A non-electrical conductor)
Eliminates rust and corrosion.
(Does away with the use of tape)
Excellent resistance to heat, oil, acid, salt water, chemicals and moisture.



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ELECTRONIC CHEMICALS DIVISION
357 Atlantic Ave., Brooklyn 2, N. Y.

These units are hermetically sealed and built to withstand extremes of vibration, shock, and operation over a temperature range of from —55 degrees C to +85 degrees C. Non-inductively wound with short internal connections results in low impedance over a wide frequency range.

The MC series is provided in three bracket styles. The NF 10072 is equipped with a universal mounting bracket. All have terminal studs with fastener screws. The MC series is for bypass applications while the NF series is designed for feedthrough. A bulletin, NB-140, covering these units is available from the company.

REMOTE MIXER-PREAMP

Rauland-Borg Corporation of 3515 Addison Street, Chicago 18, Illinois has recently introduced a new self-contained remote mixer and preamplifier, the Model 1904.

This unit is designed to mix four inputs (high or low impedance mikes and crystal pickups) and to feed the program over a remote line to the

main amplifying equipment located at any required distance away, even though the distance is up to several miles.

The Model 1904 may be converted for use with from one to four low impedance mikes by inserting the company's R1002 plug-in transformers. The unit also features a master gain control, separate bass and treble controls, and a self-contained 24 volt a.c. supply and switch for remote relay control of the main amplifying equipment.

Details on the Model 1904, which is housed in a light green hammerloid cabinet measuring 13½" x 8" x 7", are available from the company.

"COBRA"-TYPE HORN

Racon Electric Co., Inc. of 52 East 19th Street, New York 3, New York has announced the development of a new "cobra"-type horn, the COB-11.

Designed for public address systems requiring a high degree of clarity with maximum concentration of sound in the horizontal plane, the horn provides a uniform sound field over a horizontal angle of 120 degrees and a vertical angle of 40 degrees. The unit is of "straight" horn design and is exponentially flared throughout for maximum transfer of energy. The low frequency cut-off design point is 250 cycles.

The horn is built of a heavy two-piece, non-vibratory aluminum casting designed to withstand hard usage

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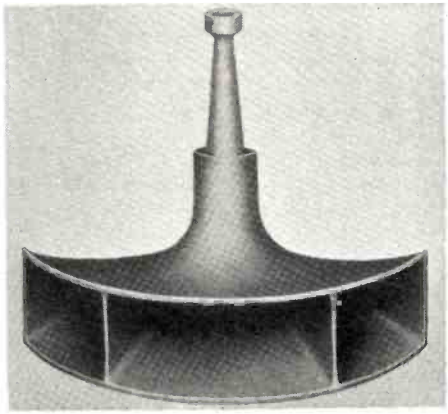
both indoors and out. It is provided with a rib-reinforced, two-section serrated mounting bracket which permits coupling to a standard 1¼" mounting



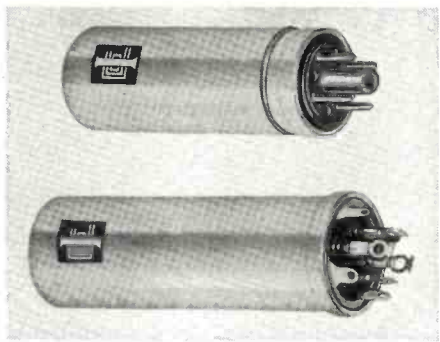
flange. Finish is in weather-resistant gray hammertone over a zinc chromate primer.

Complete details on the COB-11 will be furnished by the company on request.

ELECTROLYTIC CONDENSERS

Illinois Condenser Company, 1616 North Throop Street, Chicago 22, Illinois is now marketing a new line of plug-in and twist-prong electrolytic condensers which have been designed to meet the most exacting commercial and JAN specifications.

The new units feature a completely new phenolic molded cap structure that hermetically seals the containers. The hermetic seal, employing molded-in terminals, permits the unit to be



used in all types of installations from adverse marine operations to stratosphere use.

The line is available in both high and low voltage ratings and is suitable for TV and other usual electronic applications in addition to aircraft, fire, police, and other related emergency services for new installations as well as replacements.

NEW INTERCOM

A new type of intercommunication system has been developed by *Talk-O Products, Inc.* of Allen Street, Rochester 6, New York.

Featuring simplified installation and operation, the new units use only one amplifier. Electric current is drawn only during actual conversations as the amplifier is normally in the "off" position. When a call is put through the amplifier is turned on by a pat-

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Instantly Gives You High Fidelity or Rising Characteristic . . . as you want it!

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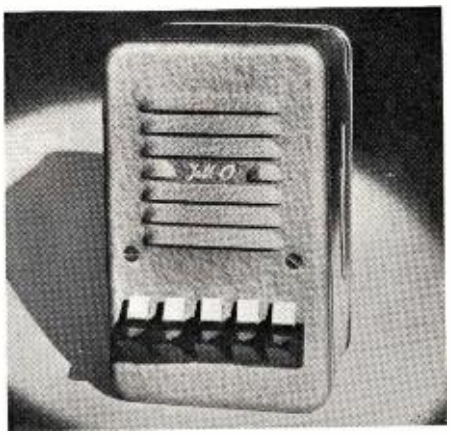
ented "on-off" switch. According to the company, the amplifier is entirely free from power line hum and electrical interference noises.

The units are housed in small cabinets whose light grey finish will har-



monize with most surroundings. The master stations are available in either desk or surface models while the remote stations may be had in call box, door, or trumpet styles. Shielded wire is not required and grounding and connecting precautions are not necessary.

A booklet describing the new units is available from the company on request.

SUBMINIATURE RELAY

The *Hufco Industries,* 2815 West Olive, Burbank, California has announced the development of a new subminiature, dynamically balanced relay for weight-critical electronic applications.

Tradenamed the "Wizard of Oz," this relay weighs less than ⅓ ounce and is designed to meet the specialized requirements for aircraft and missile installations.

The unique design of the dynamically balanced armature gives the Model 1001 high resistance to vibration and shock and sudden changes in acceleration and direction. It is a s.p.d.t., 28 volt d.c. unit with contacts rated at 1 ampere non-inductive load.

COAX LINE TERMINATIONS

New London Instrument Company, P.O. Box 189, New London, Connecticut has announced a new termination for coaxial transmission lines.

The unit which features low stand-

ing wave ratios from d.c. to over 3000 mc. is designed to be used in testing cables, slotted lines, r.f. bridges, sweep generators, and random noise sources. Impedance is 50 ohms.

The female fitting has been designated Model F-50 while the male fitting is known as the Model M-50.

PROBING TWEEZERS

Hytron Radio & Electronics Corp. of Salem, Massachusetts, has just released the eighth in its series of servicing tools for the technician.

The latest addition is a probing tweezer made of tough polystyrene of good electrical and mechanical characteristics.

The jaws of the tweezers grip firmly and are equipped with both fine and coarse serrations for different sizes of wires, resistors, etc.

The high dielectric properties of the polystyrene minimize detuning while servicing. The tweezers resist strong magnetic fields. The new tool is long enough for safe use in TV circuits and compact enough for application in crowded chassis.

DYNAMIC MIKE

The newest addition to the company's line of microphones is the 50D "Aristocrat" dynamic unit, according to word received from the *Turner Company* of Cedar Rapids, Iowa.

The new mike is finished in satin chrome and is suitable for TV, broad-

cast, recording, and public address work. The unit is individually calibrated in the laboratory to a response of 50 to 15,000 c.p.s., flat within ± 2.5 db.

A swivel-type mounting permits the microphone to be tilted in any direction for stand or boom use. A *Cannon* "Quick-Disconnect" plug makes it quickly detachable for hand use. The mike is omnidirectional and available in 15, 200, 500 ohm or high impedance. The sensitivity is 56 db. below 1 volt/-dyne/ sq. cm.

MINIATURE TUBULARS

Pyramid Electric Company of 1445 Hudson Boulevard, North Bergen, N. J. has just released a new line of miniature tubular paper condensers which have been especially designed for 85 degree C. applications.

Known as the Type 85LPT series, the units are built into phenolic-impregnated tubes with plastic end-fills.

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	FILAMENT	
T-2	2.5V 10A	$4.95
52B049	5 VCT-3A. 5VCT-10.5A. 6.3 VCT-3.5V	4.50
475-T201	5 VCT-15A	5.95
P-4091	7.5 V-5A	2.49
D-161917	6.3 V-3A. 2.5V-2A	2.85
	MODULATION	
ARC-3	807 R.F. to PP 6L6 Mod.	$2.49
A-3866	200. 500 Ohms to 5. 6. 7. 8. 9. 10 K. Ohms. 150 MA.	3.49
T-101	(ART 13) 813 R.F. to PP 211	7.95
900716	5500 Ohms "AB" Mod. (P.P.) to 2600 Ohms R.F. 150W. R.F. (RCA)	4.95
T-47171	"AB" PP 807 to "C" 425V. —240 MA	3.50
	POWER	
511-T2	350-0-350V-150MA., 6.3V.-6A.	$2.15
466-T1R	110-0-110V-225MA., 5V-3A	1.95
PC-110	300-0-300V-125MA., 6.3V-3.8A. 5V-3A	2.95
P-6010	325-0-325V-40MA., 6.3 VCT-2A, 5V-3A	2.49
P-6001	325-0-325 40MA., 5VCT-2A. 2.5 VCT-4A	2.25
P-6009	275-0-275 70MA., 5V-5A. 2.5V-10.5A	3.00
T-47165	135-0-135 90MA., 5V-3A, 5V-3A	2.49
	DRIVER	
A-4205	10,000 OHM Plate to Single Grid.	$0.89
A-4404	P.P. 6L6. 2A3. etc., to P.P. Grids	1.65
	OUTPUT	
SP-10	6V6 to 2. 4. 8 OHMS	$0.69
SP-12	P.P. 6V6 to 8 OHMS	.79
T-46255	P.P. Par. 6N7 "B" to 8000 OHMS	1.49
511-T1	6V6 to 8 or 600 OHMS	.85
11666	6V6 to Voice Coil or 500 Ω Line	1.89
	INPUT	
T-47368	600 OHM C.T. to 300 OHM Mike.	$1.29
	MIKE TO LINE	
T-47369	30 OHM Mike to 600 OHM C.T. Sec.	$1.65

	CHOKES			
L-143	1.72 HY	4 AMPS		$8.95
C-2303	2.5	100 MA.		1.10
475-CH301	3.8	75 MA.		1.25
32584	8	200		2.35
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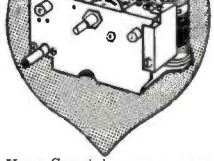
RCA No. M1-2475 Navy Type "Q". You can actually hold two-way conversations over wired circuits up to TEN MILES with these Sound Power phones. Any number of these units may be paralleled on same line without loss of power. Ample volume—excellent tone quality—rubber cushioned earphones, mouthpiece microphone attached. Massive construction, multiple adjustments, 22-ft. rubber cord, push-to-talk switch, navy waterproof plug. Ideal for TV antenna installations, fieldtests, hunting, mining, games, etc. Cat. No. N-300.

Your Cost, each unit, comprising 1 pair headphones, microphone, cord and plug, as illustrated **$9.95**

Same as above with mike on chest plate. **$4.95**

Type "O" RCA M1-2454B .....



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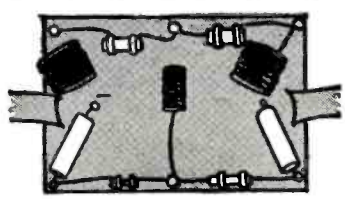

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PE-103. Exc.	24.95
PE-103 Connecting Cables	4.95
ART-13 Exc.	175.00
BC-221 Freq. Mtr. Exc. Cond.	75.00
ATD Xmtr. New	49.95
Dyn. for Above	24.95
ATD Spare Parts Kit	19.95
BC 906c Freq. Mtr.	32.50
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.01	6,000	143-806	7.50
.15	2,500	26F345	1.10
.2	5,000	C8B2784	2.98
.25	4,000	P9717	3.10
.25	10,000	14F192	19.50
.6	2,500	72041-503	1.25
1	440 AC	KG4010	.59
1	2,500	482616-10	2.55
1	3,000	A1089	2.75
1	3,600	C8B3062	2.95
1	5,000	23F49-G2	3.15
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2	440 AC	67x21	.79
2	600	A14109-2	.85
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2	2,000	324-138	2.20
2	3,000	2538-16	4.50
2	5,000	G-8B2784	6.50
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4	330 AC	KG3040	.85
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4	600	B8B1253-1	1.10
4	1,000	10365	1.75
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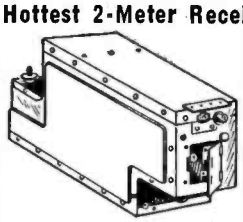

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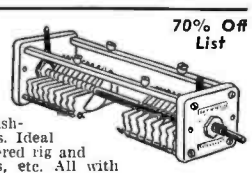

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35-35	4.30	1.39
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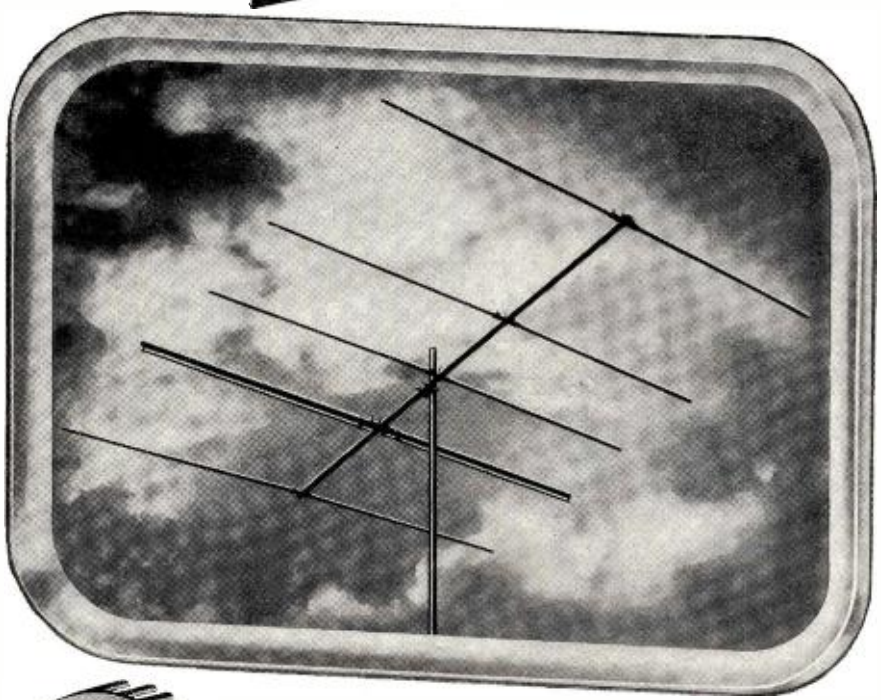

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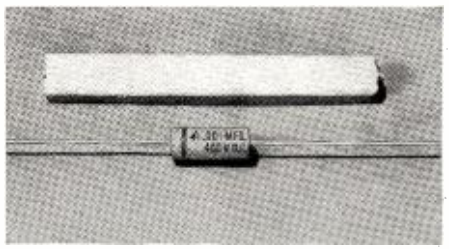
THE WORLD'S MOST POWERFUL ANTENNAS

They are designed for continuous operation at their rated d.c. voltages.

Currently these tubulars are available in from .001 μfd. to .5 μfd. at 200



volts; .001 μfd. to .5 μfd. at 400 volts; and .0001 μfd. to .25 μfd. at 600 volts. A data sheet covering the new Type 85LPT series is available from the company.

"JIFFY CLIPS"

Jiffy Clip Mfg. Co. of 128 Clinton Ave., Huntington, Long Island, New York is currently in production on a new type of test probe which features a unique gripping tip.

Designed for radio and television technicians, hams, and industrial workers, the new probe eliminates the need for accessory leads of the spring jaw type and leaves the worker's hands free to perform related procedures.

The spring clip is of phosphor bronze while the probes come equipped with 48 inches of kinkless rubber-covered copper wire. A choice of phone-tip, banana tip, or spade lug is offered.

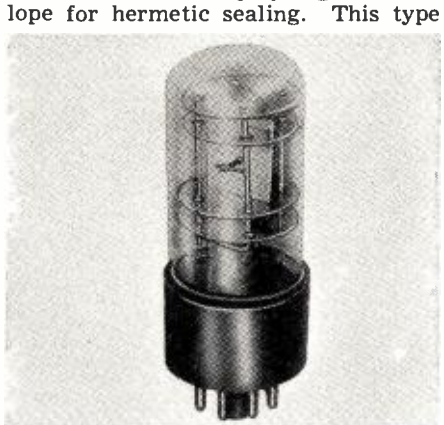
The manufacturer claims foolproof operation of these units. The grip tip is operated by pressing it onto the work and released by twisting it off. The unit is guaranteed not to pop off.

A brochure giving complete details on the new test probes, prices, and application data is available on request. Your request should be sent direct to the company at the above address.

"G" SERIES CRYSTALS

The James Knights Company of Sandwich, Illinois is now marketing a new line of crystals which have been designated the Series "G".

The new units employ a glass envelope for hermetic sealing. This type



of construction is said to result in higher crystal *"Q"* and freedom from the effects of supersonic reflections.

At the present time the new crystals are available only in limited quantity and only in the 90 to 200 kc. range but it is planned to expand production

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and use the same mounting technique on high frequency crystals.

Inquiries on these new crystals should be addressed direct to the company.

RECORDING TAPE

Jensen Industries, Inc., 329 South Wood Street, Chicago 12, Illinois, has entered the recording tape field with its new "Acoustic Tape."

The new tape is available in either plastic or paper base on 600 and 1200 foot plastic reels. The company claims that the new tape provides high fidelity with low distortion and noise.

Literature and additional details are available from the company.

-30-

International Short-Wave

(*Continued from page* 62)

England) *World Radio Handbook* lists schedule for this one as 0600-0700, 1200-1430.

Belgian Congo—At the time this was compiled, OTC2, Leopoldville, had returned to 9.767 from 9.800 (where it had suffered severe interference, particularly from c.w.) for the evening (EST) program which closes 0100; 9.767 appears much the better channel; evidently, OTC2 is now using 9.767 for both afternoons and evenings (EST). (Balbi, Calif.; Stark, Texas; Lane, South Dakota; Bellington, N. Y., others)

Brazil—Radio Sweden says *Radio Journal do Commercio*, Recife, Pernambuco, can be heard in Sweden on 15.130 from around 0400.

British New Guinea—VLT7, 9.52, Port Moresby, noted with mixed voices singing around 0130, then commentary in native; some QSB. (Winch, Calif.)

Bulgaria—Radio Sofia, 7.671, noted recently in *English* 1500-1530 and 1630-1645; however, the station announced daily *English* broadcasts for 0130, 1500, 1615. (Pearce, England)

Canada—Latest International Service schedules of the CBC are listed—*European Service*—0850-1130, CKNC, CKCX; 1130-1545, CKNC, CKCS; 1545-1600, CKCS; 1600-1645, CKCS, CKLO; 1645-1700, CKLO; 1700-1730, CKLO, CKRZ; 1730-1745, CKLO; 1745-1830, CHOL, CKLO. *Australasian Service*—2330-0005 (*except* Sat., Sun.), commentaries from the U.N., CKLX, CHOL; 0340-0450 (Sun. and Wed. *only*), CHOL, CKLO. *Caribbean and Latin American Service*—1850-2130, CKCX, CKRA; 2130-2235, CKCS, CKRA; *English* is at 2100-2130. *North West Territories* (Northern Messenger)—Sun. *only* at 2320 to approximately 0005 (sign-off varies), CKLO, CKOB. Channels are CKNC, 17.82; CKCS, 15.32; CKCX, 15.19; CKLX, 15.09; CKRA, 11.76; CHOL, 11.72; CKLO, 9.63; CKOB, 6.09, and CKRZ, 6.06.

Cape Verde Islands—CR4AA, Praia, has moved from 5.8925 to 5.9278 (measured), says Oskay, N. J.; heard around 1620. Programs are all-Portuguese and closedown is 1700 when signs with "A Portuguesa."

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Ceylon—The Commercial Service of *Radio Ceylon,* 9.52, noted 1930-2027 sign-off. (Balbi, Calif.)

Chile—CE1174, 11.740, Santiago, noted 2340, good level; at 2345 announced as *"Radio Nuevo Mundo,"* continued with music. (Ferguson, N. C.)

Colombia—HJCF, 5.96, good level signing off 2303. (Bellington, N. Y.) Bogota noted signing on 1300 on a Sunday on 6.200; heard there nightly with strong signal. (Fox, D. C.) Bogota has been noted recently on 5.963 with *English* at 2205. (Stark, Texas)

HJFA, 4.864, Pereira, noted 2030 with music; HJCW, 4.945, Bogota, heard 1950 with music, airlines QRM; HJGF, 4.845, Bucuramanga, noted 2025 with music; HJBB, 4.815, Cucuta, heard around 2000 with music. (Russell, Calif.)

HJCQ, 4.959, Bogota, noted 2255. (Treibel, Washington State)

HJCQ, 11.68, Bogota, noted with Spanish news in progress at 1805. (Bellington, N. Y.)

Cuba—COBZ, 9.0335V, Havana, measured here 0720 recently; previous measurement was 9.0256; apparently has shifted to avoid severe CWQRM present on former frequency. (Oskay, N. J.) Stark, Texas, also noted this one higher than usual of late, although it still announces as on 9.030.

COBL, 9.833, Havana, comes in fine after 0900. (Saylor, Va.) COKG, 8.955, Santiago, signs off with *English* announcement 0035. (Russell, Calif.)

Curacao—PJC2, 5.014.3, Willemstad, measured here at 1825; assigned and usual channel is 5.010 (Oskay, N. J.)

Czechoslovakia—Prague, 9.504 and 11.840, noted signing on 1015 with musical program. (Pearce, England) The 6.17 channel noted with *English* 1715-1730; mentioned 11.875 also. (Bellington, N. Y.) Noted on 11.875 with news 0715. (McWalter, Scotland)

Denmark—Copenhagen's OZH, 15.165, still has broadcasts 0500-0600 on Tue., Thur., Sat.; news 0552. (Pearce, England)

Dominican Republic—HI4T, 5.970, and HI2T, 9.735, parallel, still close 0000. (Grove, Ill.) HI8Z, 5.030, Santiago, noted 2020 with music. (Russell, Calif.)

Ecuador—HC1AC, 6.21, Quito, noted with station announcement in Spanish 2207. (Bellington, N. Y.)

Egypt—There is a "vague" report that the Egyptian State Broadcasting System has added a new short-wave transmitter for its "morning" and "afternoon" transmissions, operating around 7.770, reported heard at 1330. (Radio Sweden) *Report not confirmed.*

Tanczos, Ohio, reports SUX, 7.868, Cairo, with news in Arabic 1618.

England—At the time this was compiled, BBC schedules for the Western Hemisphere were listed—*North American Service* (Canada, USA, Mexico), 1045-1215, 17.790; 1300-1500, 15.140; Mon.-Fri., 1415-1545, 9.825; Mon.-Fri., 1545-1700, 9.825, and 1615-1700, 6.110. Special Program for the Falkland Islands (Sun. *only*), 1115-1145, 21.710, 15.260. Special Program for the West

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372	397	422	458	488	515	448
374	398	423	459	490	516	450
375	400	424	461	491	518	451
376	401	425	462	492	519	453
377	402	427	468	493	520	454
379	403	429	469	494	522	455
380	404	430	470	495	523	456
381	405	431	472	496	525	457
383	406	433	473	497	526	463
384	407	434	474	502	527	465
385	408	435	475	503	529	498
386	409	436	476	504	530	500
387	411	437	477	505	531	501
388	412	438	479	506	533	538
390	413	440	480	507	534	540
391	414	441	481	508	536	
392	415	442	483	509	537	each
393	416	443	484	511	each	
394	418	444	485	512	**69c**	**$1.49**
395	419	445	486	513		

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5.05	430	17.000	$2.50
10.1	468	17,300	100,000
18	800	20.000	120.000
43.5	920	25.000	120.000
50	1100	30.000	150.000
75	4300	33.000	220K
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CT-142	645VCT	.060	5V/2A,6.3V/1.2A	4.25
CT-825	360VCT	.340	6.3VCT/3.6, 6.3VCT/3A	3.95
CT-076	600V	.100	2 x 12.6V/1	1.95
CT-626	1500V	.160	2.5/12, 30/.100	9.95
CT-15A	350VCT	.070	6.3/.6, 6.3/1.8 3 lbs	2.95
CT-071	110V	.200	33/.200, 5V/10, 2.5/10	4.95
CT-378	2300V	4 MA	2.5/2	6.95
CT-367	580VCT	.050	5VCT/3A	2.25
CT-721	550VCT	.100	6.3/1, 2.5VCT/2	2.95
CT-99A	2x110VCT	.010	6.3/1A, 2.5 VCT/7A	3.25
CT-91A	726V	.100	5V/3A, 6.3/3.5	3.25
CT-441	50V	.200	5V/2.4, 5V/1.2	2.29
CT-408	350VCT	.026 MA	5V/3A	2.75
CT-931	585VCT	.086	5V/3A, 6.3V/6A	4.25
CT-610	1250	.002 MA	2.5V/2.1A, 2.5V/1.75A	4.95
CT-137	350VCT	.026 MA	5V/3A	2.75
CT-102	1080VCT	.055	25V/3A,6.3V/1.8A,6.3V/1.2A	5.95
CT-866	330V	.065	6.3V/1.2, 6.3V/600 MA	1.75
CT-319	330VCT	.085	5V/2, 6.3/7.5, 6.3/3	3.25

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FT-719	1.3V/6A	.79
FT-029	13.5V/1.1A	.79
FT-367	5VCT/3A, 58VCT/40A	1.10
FT-346	5VCT/13/5, 5VCT/6.75, 5VCT/6.75	5.95
FT-781	866 Trans. 2 x 2.5/5A	2.25
FT-511	3.4V/300A, 7½ H x 10" x 5"/2W	14.95
FTG-31	2.5V/2.5, 7V/7A (Tape @ 2.5V/2.5A), 16 lbs	9.95
FT-674	8.1V/1.5A	1.10
FT-157	4V/16A, 2.5V/1.75A	2.95
FT-391	6.4V/3A	1.10
FT-736	2 x 6.3VCT/3.2-1.2A	1.49
FT-461	2 x 6.3VCT/1A	1.10
FT-899	2 x 5 V/5.5A 29000 Rms	22.95
FT-418	6.3VCT/1A, 6.3VCT/7A	1.95
FT-735	6.3VCT/5A, 6.3VCT/1A	1.79
FT-101	6V/.25A	.79
FT-738	6.3VCT/1A, 5V/2A	1.69
FT-774	6.3V/1.6A	.79

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Item	Rating	Each
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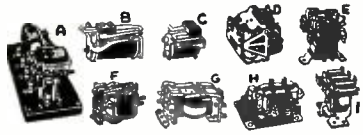
PT-46A	4080VCT N.L. 3⅝ to 1 8" H x 6" W x 7" L 20 lbs.	29.95
PT-033	4150V/400 MA 11½ x 9¼ W x 9" D 70 lbs	49.95
PT-75-2	3780/3446/3112VCT/77 MA	10.95
PT-28-1	4600VCT/.077	12.95
PT-403	Auto: 70V/1A	2.29
PT-160	1120VCT/770 MA, 590VCT/82 MA, 25 lbs	24.95
PT-170	Auto: 156/146/137/128—.71A.	3.29
PT-139	42V/46V/50V/55V/15.2A 7¾x7" W x 6¾" H.	10.95
PT-31A	2 x 300V/5 MA	.79
PT-976	120VCT/10 MA	.79
PT-67-1	62V/3.5A	2.95
PT-12A	280VCT/1.2A	2.95
PT-997	78V./.00754 KVA, AUTO.	1.49



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DPST (NO) 6A Cont. 6 VDC	33		5.E.2	1.10
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SPDT 28 VDC 2A Cont.	300	Allied	452-1298 TSL-C	.95
DPST (NO) 2A Cont. 24 VDC	350	Allied	BJ-ES6770S0-2 P84	.95
DPDT 24 VDC 5A Cont.	200	Allied	BA-11755-8 BO 6D35	1.15
DPST (NC) 2 A Cont. 24 VDC	260	Allied	BUX27	.95
DPST (NO) 2A Cont. 12 VDC	400	Allied	P-9-4	.95
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SPDT 3A Cont. Less Cover	....	FTR.	AD 1656	1.45
DPST (NO) 4A Cont.	490	....	GR206 452-1084	.95
SPST 24 VDC For TS16/APN 5A Cont.	526	Allied	227586-24 K 301	1.10
DPST (NC) SPDT 3A Cont.	5800	WE	D169615	.95
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4PST (NO) 24V 10A Cont.	....	GE	CR2791-G100k4	1.75
SPST (NO) (DB 1 Brk) SPST (NO) 24V 10A Cont.	42	Leach	1224-322	1.59
DPDT 28V 2A Cont.	50	Allied	P-8-4	.95
..... Dual w/arm	400	....	H704482	.95
..... w/arm	400	....	H70255-4	.95
SPST (NC) 5A Cont. Dual Coil	200	GM	12917-1 K52J521	1.20
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SPST (NO) 10Amp. Cont.	.016	Kohler	7110-2	1.50
SPST AIRCRAFT 24V High amp. Contact	....	CH	32324 type B4	.....
AIRCRAFT 24V 100 amp. Contact	....	SQD	9360 CN2 7472661-1	.....
DPDT 2 amp. Cont.	250	....	CR2791-G110F2	.50
DPDT 24V 3 amp. Cont.	200	Allied	P45	.95
DPST (NO) 6 VDC 6 amp. Cont.	33	Gentelev.	For GN45B G189	1.50
3PST (NO) SPST (NC) 2 amp. & 4A Cont.	490	....	452-1085 GR207	.95
DPDT 9-14V 5 amp.	....	Allied	K5819-LO8	.95
SPST (NO) DOUBLE BRK. DUAL RELAY 24V 10 amp. Cont.	160	Leach	1221-V 452-1155	1.29
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AT566	Input to Grid. 500/200 ohms: 50K ohms	.95
AT227	Output to line, 7500K 500 ohms CT 200—5kcy	1.45
AT353	Output PP 6L6 to 300/20/12/16 ohms 25 Watt	2.95
AT871	UNIV. Output, H1 F1, Pri 20K ohms nec. 15/7.5/5/3.75/1.25/500 ohms	2.79
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AT765	Input 600 ohms to 50K ohms	.79
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AT449	Driver 5K ohm to 4K ohm PP6L6 to PP805 Class B	3.89
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Type	Input Volts	Input Amps.	Output Volts	Output Amps.	Radio Set
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DM416	14	6.2	330	.170	RU 19
DY-2/ARR-2	28	1.1	250	.060	ARC-5
DM36	28	1.4	220	.080	SCR 508
DM25	12	2.3	250	.050	BC 367
	28	1.25	275	.070	BC 348
DM33A	28	7	540	.250	BC 456
DM42	14	46	515	.110	SCR 506
			1030	.050	
			2/8		
PE101C	13/26	12.6	400	.135	SCR 515
		6.3	800	.020	
BD AR 93	28	3.25	375	.150	
23350	27	1.75	285	.075	APN-1
35CO458	28	1.2	250	.060	
ZA-0515	12/24	4/2	500	.050	
ZA-0516	12/24	8/4	12/275	3/110	
B-19 pack	12	9.4	275	.110	Mark II
			500	.050	
D-104	12		225	.100	
			440	.200	
DA-3A	28	10	300	.060	SCR 522
			150	.010	
			14.5	.5	
5053	28	1.4	250	.060	APN-1
PE73CM	28	19	1000	.350	BC 375
DM21	14	3.3	235	.090	BC 312
CW21AAX	13	12.6	400	.135	
	26	6.3	800	.020	
			9	1.12	
BD 77KM	14	40	1000	.350	MC 191
PE94	28	10	300	.200	SCR
			150	.010	522
			14.5	.5	
PE 86	DM 32A	DY 22	ARC 3		DAG 33A

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64–72	110–1.25
72–87	110–1.25
75–84	110–1.25
88–106	110–1.50
107–129	110–1.65
130–157	110–1.75
130–150	70–1.50
130–180	110–1.85
158–191	110–1.85
161–180	110–1.75
189–210	110–1.95
200–220	110–1.95
270–300	110–2.10
324–360	110–2.40
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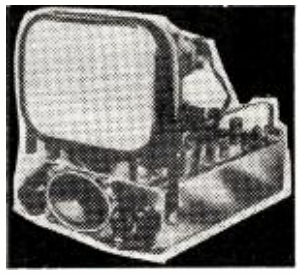

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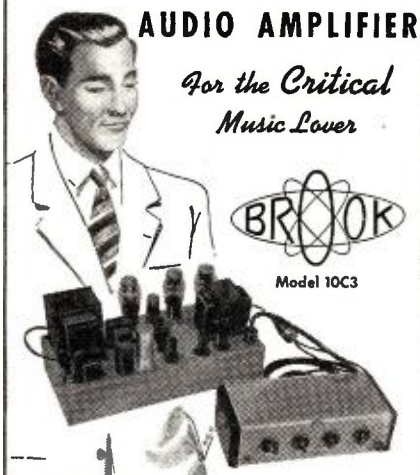

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Ethiopia—Radio Addis Ababa broadcasts *English* programs for more than an hour, beginning 1015, on 9.620. (Radio Sweden)

France—Paris-Inter, 6.200, comes in well in Scotland during musical session at 1030-1100. (McWalter)

French Equatorial Africa—Radio AEF, Brazzaville, noted on 9.960 with call 1330; news in French 1400; call 1415; at 1500 gives time as "9 p.m. Brazzaville Time," and closes in French "until tomorrow evening;" plays "La Marseillaise" before leaving the air. (Pearce, England) Stark, Texas, has noted this one some days as late as 1600 sign-off. Balbi, Calif., says that *Radio AEF,* 17.84, usually signs off 1000 but on Sat. runs to 1100.

French Morocco—Radio Maroc, 6.005, Rabat, has fair signal 0145-0300. (Saylor, Va.) Often noted with music around 1730. (McWalter, Scotland)

French West Africa—Radio Dakar has *new* schedule on 11.895 at 0200-0300, 0600-0830, 1300-1800; on 15.347 at 1400-1600. (Radio Sweden)

Germany—Radio Free Europe, 6.130, still signs on with bell tolling at 1020; program starts 1030; noted leaving air 1800 after calls in various Eastern European languages; bell tolls at 30-minute intervals. (Pearce, England) Leipzig, 9.728, noted with music, then news in German at 0015; played a selection from Strauss before 0100 sign-off; strong in California. (Winch)

Hamburg, 7.29, good 0250 in German by man, possibly newscast; Baden-Baden, 6.32, noted 0148, good signal but severe QRM; popular German songs; woman announcer; Frankfurt, 6.19, heard with German news by man 0203, good level. (Bellington, N. Y.)

Gold Coast—Zoy, 4.915, "This is the Gold Coast Station at Accra," noted with weather forecast, local news, 1245; severe CWQRM; at 1256 played recording and at 1759 call was given by woman, "Closing until 8 a.m." (local time); signed off with "God Save the King." (Pearce, England)

Greece—Armed Forces Station in Central Greece, 6.745, Larissa, noted with *English* program on Thursdays 1530-1545; also heard signing off 0200. Strong signal noted on 7.050 from a Greek Forces Station at 1615. *Radio Macedonia,* 7.950, heard with strong signal at 1500, recordings. (Pearce, England)

Greenland—A Danish listener informs *Radio Sweden* that the power of "minor" stations in Greenland varies from 150 to 600 watts. *Radio Sweden*

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says the "minor" (local) radio stations operate on 7.570 and 12.300 and that they carry news from the *Danish Radio* in Greenlandic and Danish. I have no reports that these stations have been heard in USA. According to Swedish sources, OXI, 5.942, Godthaab, now on the air 1645-1715, soon will extend its services, but no details were available at press time.

Guatemala—By this time, TGNA, missionary station in Guatemala City, 6.040 and 9.668, may also have put 11.850 into use. Grove, Ill., and Stark, Texas, point out that while normal sign-off is around 2230, on Wednesdays the "Mailbag" program extends to 2300 or later (sign-off varying).

TGQA, 6.402, Quetzaltenango, noted 2045 with marimba music; considerable CWQRM. (Russell, Calif.)

Haiti—4VBM, 9.660, Port-au-Prince, noted 2000-2025; all-French; music; commercials (including singing commercials); identified at 2015; mentioned Magloire Broadcasting Circuit; weak signal, bad fade, some CWQRM. (Patterson, Ga.)

4VRW, 9.8378 (measured), Port-au-Prince, noted 1845 with popular recordings, announcements in French. (Treibel, Washington State)

4VEH noted on 9.729 at 1830. (Sutton, Ohio) Bellington, N. Y., reports this one on 9.75 at 1745 with organ music. Balbi, Calif., reports it on 9.73 at 1030, and on 9.745 at 1730.

Holland—According to current schedules from Hilversum, the "Happy Station Program" is listed now for *only* Sundays at 0530-0700, 21.48, 17.775, 15.22, 6.025, to Australia, New Zealand, and the Pacific Area; 1100-1230, 15.22, 11.73, 6.025, to South and Southeast Asia; 1630-1800, 11.73, 9.59, 6.025, to South America, Africa, and Europe; and 2130-2300, 11.73, 9.59 to North America. *English* transmissions in the Overseas Service are listed (*weekdays only*) for 0530-0610 to Australia, New Zealand, and the Pacific Area, 21.48, 17.775, 15.22, 6.025; 1100-1130 to South Asia, 15.22, 11.73; 1500-1540 to South Africa, Great Britain, Ireland, and Europe, 11.73, 9.59, 6.025; and 2130-2210 to the United States and Canada, 11.73, 9.59. (Leinbach, N. Y.)

Honduras—HROW, 6.6602, Tegucigalpa, *"Radio Monserat,"* noted around 2320. (Treibel, Washington State)

Hungary—Radio Budapest, 6.247, noted with good signal around 1930-1955 sign-off. Still asks for reports to Radio Budapest, Budapest, Hungary. (Kroll, N. Y.) Strong in D. C. at 2350 on 6.247 in Hungarian; fair on 9.833. (Fox)

Iceland—Reykjavik's TFJ, 12.175, noted on Sunday at 1115 with call. (Pearce, England) Schedule is Sunday *only* at 1115-1145 in Icelandic for Icelanders abroad; announces "Ut varp, Reykjavik." (*World Radio Handbook*)

India—VUM2, 4.920, Madras, noted with news 1030-1045; VUB2, 4.840, heard with talk 1115. (Pearce, England) The 4.920 channel is fair some mornings here in West Virginia with news 0730.

Indo-China—Radio France-Asie, Sai-

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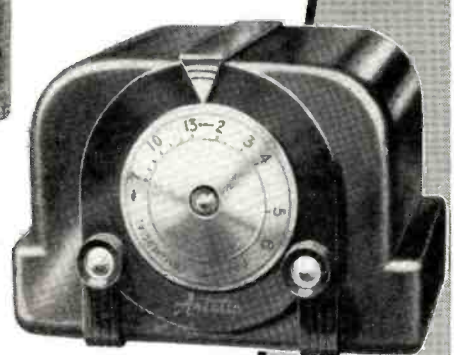

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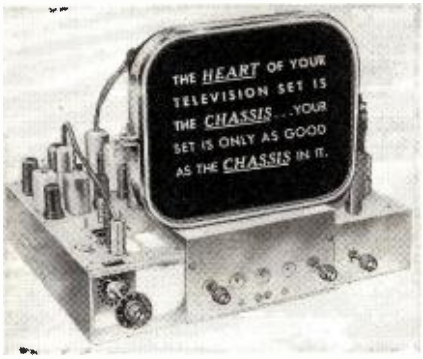

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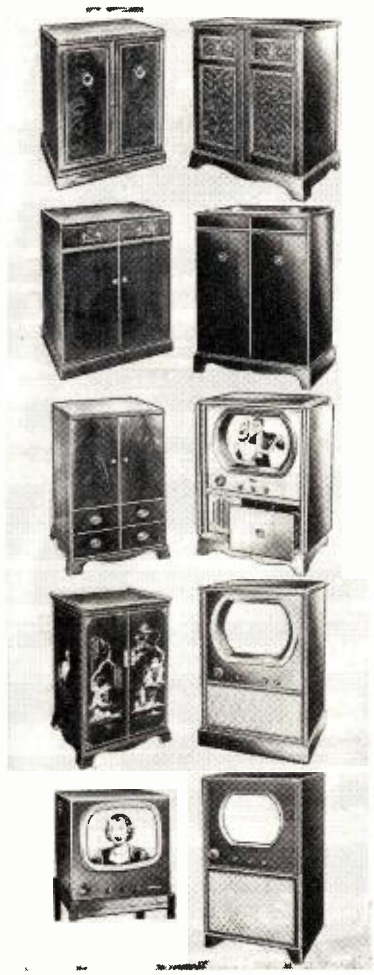

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gon, noted lately on 6.11, signing on 0400. (Balbi, Calif.) Dale, Calif., reports an Indo-Chinese station on 6.22 at 0915 with *English* news; may be *"Voice of Vietnam"?*

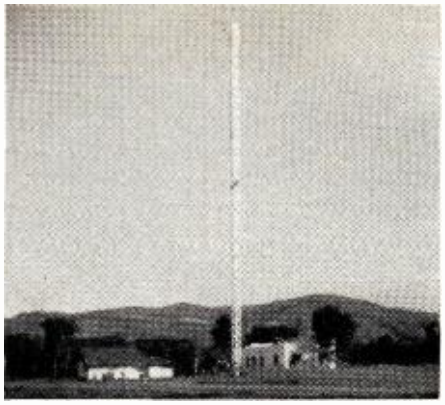
Iran—According to a *World Radio Handbook* Bulletin, EPP, 3.930, Teheran, is broadcasting a Persian program 1100-1140. This may be the unidentified station reported earlier by Peddle, Newfoundland, on or near this channel.

Ireland—Radio Eireann, 17.840, still has news 1330 to approximately 1350 (sign-off varies); has had QRM from Brazzaville but some words are readable. (Grove, Ill.) Also reported by Ferguson, N. C.

Israel—4X4EA, 6.725, Tel Aviv, "The Jewish Forces Broadcasting Station," noted with varied recordings at 1430; gives closing announcements at 1500 followed by sign-off of bugle sounding "Lights Out." (Pearce, England) Jerusalem, 6.830, noted with French program at 1615-1700; announced "Ici Jerusalem." (Sutton, Ohio) Tel Aviv, 9.0108, noted opening in native at 1200 with strong signal. (Fargo, Ga.)

Italy—Rome noted on 11.91 in *English* for South Africa 1345-1430. (Pearce, England) Heard on 9.575 with news 2145-2200. (Patterson, Ga.) I have heard Rome sign on at 1900 on the 9.575 channel.

Rome noted parallel on 3.97 and 6.255 at 1740 with Italian programs; still going at 1810; heard recently on 6.01 and 9.575 with *English* in progress when tuned at 1425; is directed to Great Britain at that time.



Transmitter building of TGNA, missionary voice in Guatemala City. This view is of the back of the building and shows the station's tallest antenna tower, 163 feet, with a 25-meter quad on top. This tower also supports the m.w. vertical wire.

Jamaica—Radio Jamaica still noted closing down daily 2300 on 3.360 and announcing sign-on for 0630. (Fox, D.C.) If not found on 3.360, try the "old" 4.950 channel. McWalter, Scotland, has heard this one on 3.360 from around 1830 onwards, fades out occasionally.

Japan—JKI, 4.910, noted 0500-0800 fade-out, fair level; JBD3, 15.225, heard 0130-0400 sign-off weak. (Saylor, Va.) JKH, 7.257, noted with recordings 0345 and still readable in Britain at 0500. (Pearce)

Kashmir—Radio Srinagar, 4.865, is heard to 1130.

Kenya—According to a DX session from OTC2, 9.767, Leopoldville, Bel-

ACID-FLUX SOLDER

By HERBERT S. BRIER

ELECTRONIC technicians, who are sometimes tempted to circumvent Ohm's Law, would rather eat oysters in July than to violate the command *"Thou shalt not use acid-flux solder."* As with most laws, however, there are times when it can be safely ignored. Consider the following:

You are servicing a receiver with, say, a defective filter condenser. Electrically, the repair is simple, but mechanically it is a headache. The old condenser, apparently the first part mounted, is riveted to chassis and completely surrounded by other parts. There is no room to drill out or file the rivet without removing the obstructing parts; therefore you bend the mounting strap back and forth until it breaks. Although the old condenser is now out, the rivet is still there. After searching unsuccessfully for another spot to put the replacement, you decide to solder the new mounting strap to the chassis. Usually, the chassis is dirty and, with no room to work, it refuses to tin. Of course, with patience, the job can be done at the cost of a few charred parts and burned knuckles.

This is what happens with rosin-flux solder. But what a difference a little acid-flux solder makes. The chassis tins easily and, after wiping with a bit of cloth to remove any excess flux, you solder the mounting strap to it with regular rosin-flux solder.

Occasionally, a receiver comes in with a pulley, swedged to a control shaft, loosened. Repair without damaging the control or other components generally requires removing the assembly from the chassis. Probably every technician facing the problem has tried soldering at least once. He usually discovers that either the shaft or the pulley is impervious to rosin-flux solder. Acid flux makes child's play of the job. Tin both parts with it and finish with rosin-core solder.

Rubber-covered "a.c. cord" sometimes solders with the greatest difficulty only after meticulous scraping of each individual strand of wire. Tinning first with acid-flux makes the task easier and usually results in a better job. Use it exceedingly sparingly—just enough to tin the wire, wipe off immediately, and finish with rosin-flux solder, applying heat long enough to cook out any residual acid. The last step is especially important because, of the three samples given, it is the only one where a little corrosion would do any important damage.

Other spots where acid-flux solder could be used to advantage have undoubtedly come to your mind. The important thing to remember is that it is a special-purpose tool. Used as above, it is invaluable, while, if used to solder something like an i.f. or r.f. coil, it is almost certain to result in an open coil or a very noisy receiver.

In my work, a single dime spool of acid-flux solder outlasts pounds of rosin-flux solder, but it is always ready when needed.

—30—

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0C3/VR105	1.49	3C30	2.95	212E	49.50	811	2.95	8014	29.95	0B2	
0D3/VR150	1.29	3C31/C1B	3.49	215A	.19	812	2.95	8020	1.29	0Z4	
1B22	3.49	3C45	12.75	217C	8.95	812H	6.90	8025	5.95	01A	
1B23	12.50	3CP1	2.25	227A/5C27	5.95	813	8.95	9001	2.25	1A3	
1B24	6.95	3CP1-S1	2.95	249C	3.95	814	3.95	9002	1.49	1A4P	
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1N21 Xtal	1.25	3FP7	3.95	293A	2.98	830B	3.95	C6A	7.95	1B5/25S	
1N21A Xtal	2.25	3GP1	4.75	294A	5.75	832	5.95	C6J	6.95	1B7GT	
1N21B Xtal	3.25	3HP7	3.95	300B	9.95	832A	8.95	C1OOD	1.49	1C5GT	
1N22 Xtal	1.35	4-65A	14.21	304TH	27.50	833A	37.50	CK502AX	2.95	1C6	
1N23 Xtal	2.25	4-125A	26.95	304TL	29.95	836A	3.95	CK503AX	2.95	1C7G	
1N23A Xtal	3.25	4-250A	29.95	305A	34.95	837	1.69	CK505AX	2.25	1D5GP	
1N23B Xtal	4.95	4AP10	4.95	307A/RK75	5.95	838	2.95	CK506AX	2.25	1D7G	
1N27	1.69	4B22/EL5B	9.95	310A	8.95	841	.45	CK507AX	2.25	1D8GT	
1N34	1.40	4B24/EL3C	7.95	316A	.65	843	.39	CK512AX	2.25	1E5GT	
1N34A	1.40	4B28/6CF	8.95	323A/B	24.50	845	4.95	CK517AX	8.45	1E7G	
1P23	3.95	4B26/2000	8.95	327A/5C37	4.95	849	29.50	CK1005	.89	1F4	
1P24	1.79	4B28	4.95	328A	13.95	851	69.50	CK1006	.95	1F5G	
1P36	2.95	4B32	9.95	331A	12.95	852	29.50	E1148	.35	1G4GT	
1S21	6.95	4C27/		350A	8.95	860	6.95	EF50	.69	1G6GT	
2AP1	8.95	CV92	49.50	350B	2.95	861	29.50	F123A	8.75	1H4G	
2AP5	6.95	4C35	29.50	368AS	7.95	864	.39	F127A	22.50	1H5GT	
2C21/RK33	.69	4D22	12.95	371A	1.49	865	1.45	F128A	89.50	1H6GT	
2C22/7193	.49	4D32	14.95	371B	.98	866A	1.39	F606	37.60	1J6GT	
2C26A	.49	4E27/		388A	2.75	866JR	1.29	F660	79.50	1L4	
2C34/RK34	.89	257B	17.95	393A	6.95	869B	39.50	FG17	3.95	1LA4	
2C39	24.50	5AP1	3.69	394A	4.95	872A	2.49	FG32	7.95	1LA6	
2C40	4.95	5AP4	3.69	417A	12.95	874	1.49	FG57	14.95	1LB4	
2C43	14.95	5BP1	5.95	434A	4.95	876	.59	FG81A	3.95	1LC5	
2C44	1.49	5BP4	5.95	446A	4.95	878	2.25	FG105	8.95	1LC6	
2C46	7.50	5CP1	4.95	446B	1.79	884	1.49	FG172	29.50	1LD5	
2C51	5.75	5CP7	4.95	450TH	47.50	885	1.49	FG146	8.95	1LE3	
2D21	1.79	5C22	49.55	450TL	44.50	902	8.95	FG434A	4.95	1LG5	
2E22	1.95	5D21	24.50	527	12.75	905	3.59	FG451	.89	1LH4	
2E24	4.89	5FP7	1.95	559	1.39	908	7.95	FG502A	1.85	1LN5	
2E26	3.99	5GP1	4.95	562	97.50	918	1.69	GL562	97.50	1N5GT	
2E30	2.29	5JP1	24.45	575A	13.95	919	2.79	GL592	14.95	1P5GT	
2J21A	9.95	5JP4	24.45	701A	5.95	922	.98	HF125	14.95	1R4	
2J22	8.45	5JP7	12.95	703A	3.95	923	1.05	HF300	19.95	1R5	
2J26	29.50	5J29	12.95	703A	7.95	927	1.59	HY114B	.79	1S4	
2J27	29.50	5J30	49.50	704A	1.05	930	1.05	HY115	.79	1S5	
2J30	39.50	5J32	99.50	705A	.89	931A	4.95	HY615	.29	1T4	
2J31	39.50	5LP1	13.95	706BY	39.50	954	.39	KC4	37.50	1T5GT	
2J32	39.50	5NP1	5.95	706CY	39.50	955	.45	KU610	6.95	1U4	
2J33	39.50	6AS6	3.69	706FY	42.50	956	.45	ML101	69.50	1V	
2J34	39.50	6C21	22.50	706GY	42.50	957	.45	REL21	3.25	2A3	
2J36	97.50	6F4	5.95	707B	17.95	958	.45	RK20	9.95	2A4G	
2J37	12.75	6J4	5.95	708A	4.95	959	.65	RK25	4.49	2A5	
2J38	12.75	7BP7	8.95	709A	3.95	991/NE16	.59	RK33	.69	2A6	
2J39	39.50	9GP7	14.95	710A/8011	1.75	1603	3.25	RK34	.89	2A7	
2J40	39.50	9JP1	14.95	713A	1.45	1613	1.25	RK48A	4.49	2B7	
2J46	39.50	9LP1	19.95	714AY	6.95	1614	1.95	RK59	1.49	2V3G	
2J48	29.50	9LP7	14.95	715A	7.95	1616	.98	RK60/1641	.98	2X2	
2J49	39.50	10BP4	18.95	715B	12.95	1619	.29	RK65	24.50	2X2A	
2J50	22.50	7DP4	17.95	715C	24.50	1622	1.98	RK72	.59	3A4	
2J54B	39.50	10	.49	717A	1.69	1624	1.98	RK73	.59	3A5	
2J55	97.50	12DP7	16.95	721A	2.59	1625	.45	RX21A	2.95	3A8	
2J61	49.50	12GP7	16.95	722A	2.95	1626	.35	RX120	8.95	3B7/1291	
2J62	49.50	12HP7	16.95	723A	9.95	1629	.25	V70D	6.95	3D6/1299	
2K25/		12LP4	22.50	723A/B	14.95	1630	.98	VR78	.69	3LF4	
723AB	24.95	15E	1.19	724B	3.89	1631	1.29	VR91	1.49	3Q4	
2K28	39.50	15R	.89	725A	7.95	1632	.79	VR92	.98	3Q5GT	
2K29	24.50	16AP4	42.50	726A	6.95	1633	.75	VT127A	3.95	3S4	
3AP1	9.95	16GP4	42.50	726C	29.50	1634	.75	VT158	14.95	3V4	
3B22/		19T8	1.29	730A	49.50	1636	3.25	VU29	2.95	5R4GY	
ELIC	2.95	23D4	.45	750TL	12.95	1638	.65	VU111	1.49	5T4	
3B23/		28D7	.98	800	79.50	1644	.98	WL468	12.95	5U4G	
RK22	4.85	30 Special	1.95	801A	1.95	1654	2.95	WL530	12.75	5V4	
3B24	5.95	35TG	4.95	802	.49	1665	1.45	WL531	12.75	5U4G	
3B24W	7.95	45 Special	.39	803	4.49	1851	1.89	WL532	2.95	5V4G	
3B25	4.65	53A	5.95	804	4.49	1960	.79	WL578	1.29	5W4	
3B26	3.95	75TL	6.95	805	9.95	1961	4.99	WL616	37.50	5X4G	
3B27	3.95	100R	.89	806	4.49	2050	1.25	WL619	18.95	5Y3GT	
3B28	8.95	100TH	9.95	807	29.95	2051	.65	WL677	34.50	5Y4G	
3BP1	8.95	121A	2.98	808	1.98	8005	5.95	WL681	22.50	5Z3	
3C22	64.50	203A	8.95		4.49	8011	1.75			5Z4	
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										89Y	
										117L7/M7	
										117N7	
										117P7	
										117Z3	
										117Z6	

DUE TO CURRENT NATIONAL EMERGENCY AND THE CRITICAL RECEIVING TUBE SHORTAGE, TUBES WILL BE SHIPPED AT PREVAILING PRICES. WE WILL QUOTE ON LARGE OR SMALL QUANTITIES.

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FULL-WAVE SELENIUM RECTIFIER STACKS
Voltage and Current Ratings Based on 35° C. Ambient, Self-Cooled

Max. A.C. Input Volts RMS	Max. D.C. Volts Output	Cell Size in Inches	Max. D.C. Amps. Output Continuous	Order by This Number	Price
SINGLE PHASE BRIDGE					
0-18	0-14.5	1¾" x1¾"	1.3	18B4D1S1	$ 2.95
"	"	2-3/16"x2-3/16"	2.4	18B4E1S1	3.95
"	"	3⅜" x3⅜"	6.6	18B4F1S1	5.45
"	"	4½" x5"	13.0	18B4K1S1	9.50
"	"	5" x6"	17.5	18B4J1S1	12.45
"	"	4½" x5"	26.0	18B4K1S2	18.65
"	"	4½" x5"	39.0	18B4K1S3	25.95
"	"	4½" x5"	52.0	18B4J1S3	31.50
"	"	4½" x5"	70.0	18B4J1S4	37.50
0-40	0-34	1¾" x1¾"	0.60	40B4D1S1	3.45
"	"	2-3/16"x2-3/16"	1.2	40B4EW1S1	4.45
"	"	3⅜" x3⅜"	3.2	40B4FW1S1	5.75
"	"	4½" x5"	6.0	40B4K1S1	10.50
"	"	5" x6"	9.0	40B4JW1S1	13.95
"	"	4½" x5"	12.0	40B4K1S2	19.89
"	"	5" x6"	18.0	40B4JW1S2	23.75
"	"	4½" x5"	25.0	40B4J1S3	33.95
"	"	4½" x5"	34.0	40B4J1S4	36.45
"	"	5" x6"	36.0	40B4JW1S4	41.95
0-120	0-100	1¾" x1¾"	0.60	40B4D3S1	8.45
"	"	2-3/16" x2-3/16"	1.2	40B4EW3S1	11.55
"	"	3⅜" x3⅜"	3.2	40B4FW3S1	17.95
"	"	4½" x5"	6.0	40B4K3S1	25.95
"	"	5" x6"	9.0	40B4JW3S1	34.25
CENTER-TAP					
10-0-10	0-8	1¾" x1¾"	1.2	20C2D1S1	$ 2.25
"	"	2-3/16"x2-3/16"	2.4	20C2EW1S1	2.95
"	"	3⅜" x3⅜"	6.4	20C2FW1S1	4.55
"	"	4½" x5"	12.0	20C2K1S1	5.89
"	"	5" x6"	18.0	20C2J1S1	8.45
"	"	4½" x5"	24.0	20C2K1S2	11.69
"	"	4½" x5"	36.0	20C2K1S3	15.25
"	"	4½" x5"	48.0	20C2J1S3	18.10
"	"	4½" x5"	64.0	20C2J1S4	21.49
"	"	4½" x5"	80.0	20C2J1S5	26.50
"	"	4½" x5"	84.0	20C2KW1S7	29.95
"	"	5" x6"	96.0	20C2J1S6	34.95
"	"	4½" x5"	128.0	20C2J1S8	45.50
3 PHASE BRIDGE					
0-120	0-150	1¾" x1¾"	0.90	40B6D3S1	$14.95
"	"	2-3/16"x2-3/16"	1.8	40B6FW3S1	16.65
"	"	3⅜" x3⅜"	4.75	40B6FW3S1	24.95
"	"	4½" x5"	9.0	40B6K3S1	42.50
"	"	5" x6"	12.5	40B6J3S1	46.89
0-240	0-300	1¾" x1¾"	0.90	40B6D6S1	$27.95
"	"	2-3/16"x2-3/16"	1.8	40B6EW6S1	31.50
"	"	3⅜" x3⅜"	4.75	40B6FW6S1	47.75
"	"	4½" x5"	9.0	40B6K6S1	85.95
"	"	5" x6"	12.5	40B6J6S1	97.25

Note: All Current Ratings Can Be Increased 2 to 2½ Times Normal Ratings by Fan Cooling.
When Moisture and Fungus Proof Is Desired Add Letter "M" to Last Number of Code

TRANSFORMERS—115V 60 CY
HI-VOLTAGE INSULATION

2700v @ 2 MA; 6.3v @ .6A; 2.5v @ 1.75A	$ 4.45
2500v @ 15 MA	3.49
1540v @ 5 MA; 340-0-340 @ 300 MA	4.35
925v @ 10 MA; 525-0-525v @ 60 MA; 2X5v @ 3A; 6.3v @ 3.6A; 6.3v @ 2A; 6.3v @ 1A	4.85
500-0-500v @ 175 MA	4.55
425-0-425v @ 75 MA; 6.3v @ 1.5A; 5v @ 3A	3.65
415-0-415v @ 60 MA; 5v CT @ 2A; 115/230 Dual Pri	4.25
400-315-0-100-315v @ 200 MA; 2x6.3v @ 9A; 5v @ 3A; 2.5v @ 2A	5.35
500-385-0-385v @ 200 MA; 3x6.3v @ 6A; 5v @ 3A; 2.5v @ 2A	4.75
375-0-375 @ 175 MA. 5v @ 3A. 6.3v @ 5A. 78 v @ 1A	3.79
350-0-350v @ 35 MA	2.49
325-0-325v @ 12 MA; 255-0-255v @ 240 MA.	4.25
300-0-300v @ 65 MA; 6.3v @ 2.5A; 6.3v @ 1A; 2x5v @ 2A	3.25
80-0-80v @ 225 MA; 5v @ 2A; 5v @ 4A	2.97
0-17.4/21.6/25.8v @ 400 MA; 6.4v @ .5A; 2.6v CT @ 2.5A Pri 115/230	3.85
12.6v CT @ 10A; 11v CT @ 6.5A	6.35
3x10.3v CT @ 7A. $6.95 6.3v @ 1A	.98
6.5v @ 12A; 6.3v @ 2A; 115v @ 1A	3.50
6.5v @ 8A; 6.5v @ 6A; 2.5v @ 1.75A	4.17
6.3v @ 1A; 2.5v @ 2A. $2.29 4-0-4v @ 1A	.87
6.3v CT @ 3.5A; 2x2.5v CT @ 3A	2.97
5v CT @ 20A; 10 KV INS	8.95
.6v @ 15A RMS	1.47

TRANSFORMERS—220v 60 Cyc

512.5-0-512.5 @ 427 MA	$ 5.35
3x5v @ 6A; 4v @ .25A	2.95
3x6.3v CT @ 3A; 6.3v CT @ 1.6A	2.95
10v CT @ 6.5A; 6.3v CT @ 2.5A; 6.3v CT @ 1.8A 220/440 Pri	3.95
Step Up/Down 110/220, 500 watt	10.95

EQUIPMENT SPECIALS

ATR Inverter 12v DC in 110v AC Out 125 w Int. 100 w Cont.	New	$14.95
AN/CRW-2 UHF Receiver Less Tubes	Good	5.95
BC433 Receiver	Good	24.94
BC456 Modulator	Good	1.98
BC434A Control Box/BC433	Used	1.95
BC459 Transmitter	Good	10.95
BC778 Gibson Girl	Good	3.95
BC950A-121 Xmitter 100-156 MC	New	69.50
BC1016 Tape Recorder	New	459.50
BC1206B Beacon Receiver, Less Tubes	Good	3.95
CF1 Navy Unit w/200KC Crystal	New	14.95
DM 19 Dynamotor 12v DC in 500v 200 MA Cont. Output	Good	6.95
MN26C Compass Receiver	Good	24.95
M110 Dynamic Chest Mike	New	3.95
PE94 Dynamotor/SCR522	Good	1.98
PE97A Vibrator Power Supply	New	6.95
PE103 Dynamotor	Like New	29.95
R89/ARN5 Receiver Less Tubes. Covers	Good	14.95
SCR518 Altimeter Complete	New	97.50
T17 Carbon Mike	Used	1.59

FILTER CHOKES HI V INS

.025 HY @ 1.36A	$1.98	10 HY @ 250 MA	$3.15
2 HY @ 175 MA	1.49	10/20 HY @ 85 MA	1.49
5 HY @ 50 MA	.39	13 HY @ 150 MA	1.55
5 HY @ 1A	13.95	15 HY @ 25 MA	.59
5 HY @ 70 MA/.2 HY 350 MA Dual	2.39	200 HY @ 10 MA	2.95
10 HY @ 700 MA	11.95	325 HY @ 2 MA	2.95
10 HY @ 55 MA	.89	600 HY @ 1 MA	2.95
10 HY @ 100 MA	1.49		

RADIO HAM SHACK Inc.
189 GREENWICH STREET . NEW YORK, N. Y.

PHONE DIGBY 9-0347

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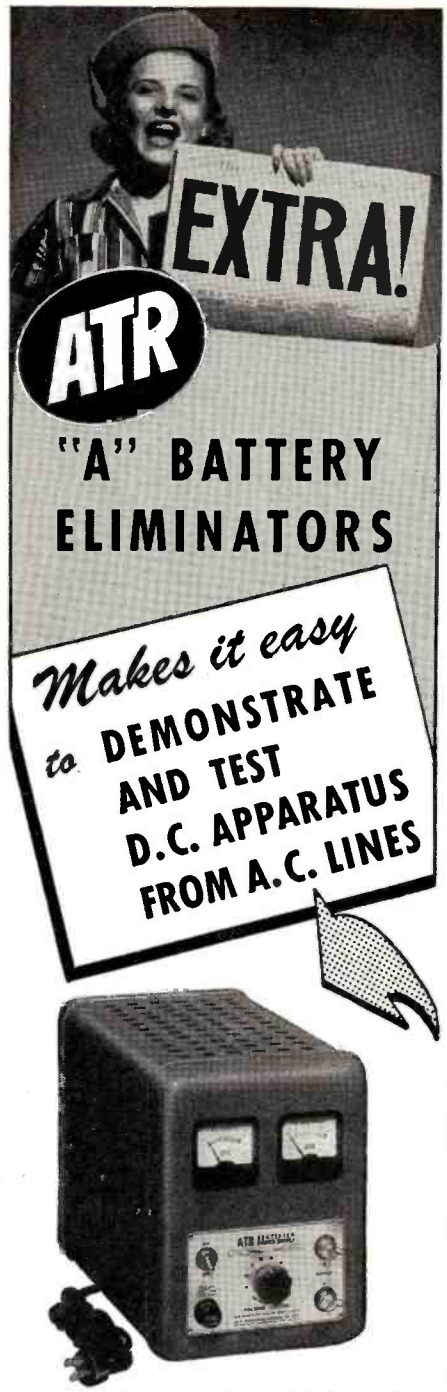

gian Congo, the Forces Broadcasting Service at McKinnon Road, is scheduled weekdays 2200-0000, 0400-1130, 0900-1400; Sundays 0000-0200. (Bellington, N.Y.) This is a "good catch;" seldom heard in USA, but has been logged a few times 2300-2400 by Stark, Texas; announcement seems to be simply "Forces Broadcasting Service," Stark says.

Nairobi, 4.855, noted with "Epilogue" and closing just before 1400. (Pearce, England)

Liberia—ELB2, 6.025, Monrovia, has been heard in New Jersey by Oskay and by myself in West Virginia, closing around 1845; announcements at close are by man in *English*, asking for reports "if you want these broadcasts to continue;" the Liberian National Anthem is played just before the station leaves the air; the announcer is John B. West, he says. QRA is Dr. John B. West, The Liberian Broadcasting Company, ELB2, Monrovia, Liberia (Africa). On a Sunday, Oskay noted the station 1745-1845 with a "Voice of America" program (an NBC drama) which probably was a recording.

Madagascar — Radio Tananarive broadcasts French programs on 6.172 and 9.515 on weekdays at 2230-0030, 0400-0600, 1000-1430; Sundays at (Sat. EST 2300)-0245, 0330-0600, 0915-1430. Malgache programs are radiated on 7.374 and 9.693 daily 2230-0000, 0320-0530, 0900-1200. (Radio Sweden)

Malaya—Red Network of *Radio Malaya*, 4.780, Singapore, logged 0945; woman announcer; closing announcements and sign-off with "God Save the King" is 1030. Same network noted on 4.825 at 1025 and signing off 1100 with "God Save the King." (Pearce, England) Singapore, 7.25, signs on 0530 most days but on Sat. and Sun. at 0430; closedown usually is at 1100; carries all-*English* programs; has news 0630 (carried parallel over Kuala Lumpur, 6.025). Also noted on a *new* channel of 6.135, signing on 0530; all-native; not in parallel with 7.20 when noted; the 7.20 channel signs on 0430 with all-native program.

Malta—Forces Broadcasting Service, Middle East, appears to be on the air from 2330 currently on (announced) 7.220, 6.015, 3.305; all are heard in USA. Pearce, England, reports the 7.220 channel signing off 1600; he recently noted this station on its "old" 4.965 channel at 1515 in parallel with 7.220 and 3.305. Noted on 11.895 with BBC relay 1115, fair signal in Calif., reports Balbi.

Mauritius—Forest Side, near 15.060, noted 1127 and to 1230 when closes with "God Save the King." (Pearce, England) *NATTUGGLAN*, Sweden, reports this one at 2200-2300.

Monaco—Radio Monte Carlo, 9.785, noted to after 1630; has CWQRM. (Stark, Texas)

Mozambique—Pearce, England, says CR7BU, listed 4.925, appears as low as 4.910 lately; noted 1240.

The 11.764 channel noted in *English* recently 0002-0035 with request musical numbers, frequent time checks, commercials. (Patterson, Ga.)

Saylor, Va., recently noted Lourenco Marques on 9.766 testing 0300 with powerful signal.

The Portuguese program noted from 2400 opening on 9.83 to 9.835, moved from 9.805. (Bellington, N. Y.)

New Zealand—ZL3, 11.782, noted 1557 relaying BBC. (Tanczos, Ohio) ZL4, 15.28, is heard well in Kentucky after 0000. (Roemer)

Now announces as "The New Zealand Broadcasting Service" *not* "Radio New Zealand." (Kinge, N.Y.)

Nicaragua—Radio Colonial, 5.983, Leon, noted to after 2145. (Stark, Texas)

Pakistan—Pearce, England, says that the only *English* broadcast he currently can hear from *Radio Pakistan* is at 0210-0220 on 17.770; an-

(*Continued on page* 125)

Robert R. Burton, head of communications for the Federal Civil Defense Administration in Washington, recently visited General Electric's Electronics Park in Syracuse. He met with members of the company's new Civil Defense committee and discussed the possible applications of two-way mobile radio for civil defense. The committee is directing a broad program of assistance in the electronics field to civil defense organizations. Members of the committee, left to rght, are: Neal F. Harmon, Lacy W. Goostree, Mr. Burton, Paul L. Chamberlain, Ellis M. Trefethen, and Roy D. Jordan.

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This is used as a distress call transmitter on boats and airplanes. It is the easiest transmitter in the world to operate. No instruction or experience necessary. No external power supply required for operation. It is merely necessary to turn the crank on the top of the transmitter and power is generated and the distress signal is automatically sent out on the international distress frequency. Brand New Transmitter complete with tubes. $9.95.

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RADIO KITS

Note: All diagrams; explanations in easy to understand language; and pictorial drawings are furnished with the following kits, so that they can be wired by almost anyone who can read. Useful information for this electronic age, that will remain with the builder a lifetime, will be derived from the technical material supplied and the opportunity to apply the information in construction of the kits, without even mentioning the satisfaction from years of use of the kit after it is properly wired, or possible profit from its sale. Radio kits sold less cabinets for $1.50 under quoted price.

4-TUBE AC-DC RADIO KIT BR-24

4 tube AC-DC superhet kit No. BR-24, with high gain iron core I.F. transformer. All parts and a cabinet, but not tubes, are furnished for $9.00. Tubes can be obtained locally or we will furnish for $5.00 per set when the kit is ordered.

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- Efficient loop antenna
- High ratio dial drive for hairline tuning
- Good tone
- Plenty of volume
- Razor sharp selectivity
- Super sensitivity

$10.00 complete except for tubes which can be purchased at your local radio store after the kit is wired, or purchased from us at the time the kit is ordered for $6.50.

5-TUBE SUPERHET KIT BR-25

5 tube superhet kit BR-26. Same specs. as BR-25, but larger chassis, larger speaker, larger cabinet, and straight line dial. Your cost complete for kit $12.00. Tubes $6.50 per set.

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Latest circuit utilizing greatly improved push-pull circuit for maximum gain.
Perfect operation on higher channels where other boosters fail.
Ceramic butterfly condensers. Coil sets for either low or high channels. 110V 60 cycle. Built up $29.95. Save half by buying the kit and wiring the parts together from the schematic and pictorial diagrams furnished. Kit $14.95

Our need for thousands of tubes for kits means that kit shipment can often be expedited by relying on a local radio store for tubes instead of ordering from us, as we delay kit shipment until tubes are available to go at the same time.

115 V., 60 Cycle TRANSFORMERS

Size of Set	Secondary	Price
4-5 Tubes	*650V.—40 Ma.—5V. & 2.5 or 6.3V.	$1.75
5-6 Tubes	*650V.—45 Ma.—5V. & 2.5 or 6.3V.	1.90
6-7 Tubes	*675V.—50Ma.—5V. & 2.5 or 6.3V.	2.35
7-8 Tubes	*700V.—70Ma.—5V. & 6.3 or Two 2.5V.	3.00
7-8 Tubes	700V.—70Ma.—5V. & 6.3 (25 cy.)	4.50
8-9 Tubes	700V.—90Ma.—5V.—3A. 2.5V.—3.5A. 2.5-V.—10.5A.	3.50
9-11 Tubes	700V.—5V. & 6.3V. at 4A.	3.50
10-15 Tubes	600V.—150Ma.—5V. & 6.3V.	4.00
Fil. Xfmr.	12V.—40VA.	1.35
Fil. Xfmr.	5V.—4 Amp. 10,000 V. Insulation	1.95
Fil. Xfmr.	6.3—1.5 Amp.	1.15
Fil. Xfmr.	6.3—15A., 6.3—15A.	3.95
Isolation	115V. to 115V.—3A. Can be used as auto xfmr. to double or halve voltage	2.95
Isolation	6.3 to 6.3—5A. Can be used as auto xfmr. 10,000V. insulation	1.25

* Specify whether 6.3 or 2.5V. Filament is desired.

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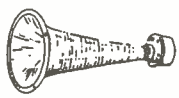

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Volts DC: 0-5/10/50/100/500/2000-1000 Ohms per volt
Volts AC: 0-125/25/125/150/250/1250
Milliamperes DC: 0-1/10/100
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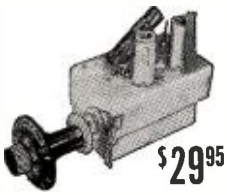

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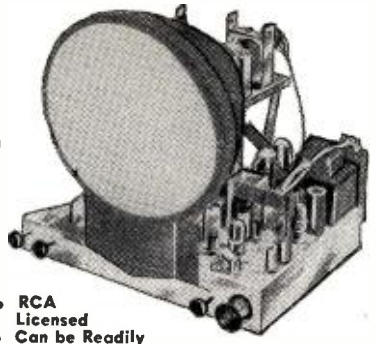

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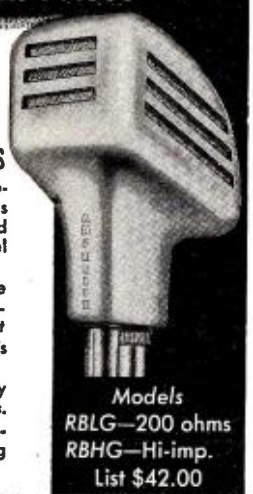

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Novel TV Installation

(*Continued from page 57*)

tenna must be located for the best signal; that an efficient transmission line must be used and that impedances must be carefully matched on the long runs.

An installation requiring a long transmission line is shown on page 57 (right-hand photograph). The receiver, located in a home at the bottom of a canyon, is about seventy-five miles from the TV transmitters and the signal strength was too low to measure. No test pattern could be seen with any antenna. A long a.c. line was run to the hill and measurements were taken at many places near and on top of the hill. The location shown was one of three possibilities, but was better from a construction standpoint. The antenna and mast are standard commercial items and are easy to erect. Three flat iron stakes four feet long were used for guy wire anchors. Guy wire on hilltop jobs should be fairly heavy. The 450 ohm transmission line was run as described, and four hundred feet was required. The line was anchored to the roof and a short piece of twin-lead was used as a matching section. The signal received was adequate on all channels except Channel 2 which was to be expected. The customer is quite happy with his set.

The left-hand photograph (page 57) shows a similar job that is chiefly interesting because it shows the advantage of open-wire line. The set came into the shop for repair, and worked well when completed. The customer could see only two channels, 2 and 5, at home, so I went to look at the antenna. It was a stacked folded dipole with reflectors on both high and low band. The antenna location was good but power line interference was bad and the orientation not too good. The signal strength was very good at the antenna location, but very little of it was getting to the set. The transmission line was 300 ohm twin-lead held up on steel wire with steel loops around the twin-lead. A "Radar-ray" type antenna took care of the interference and 450 ohm open-wire line was used down the hill to the set. A short section of 300 ohm twin-lead was used from line to set. The results were well worth the effort as all channels are now received quite well. That transmission line is four-hundred-ninety feet long.

Many technicians have been unwilling to do jobs such as these because they believe the results will not justify the effort and expense. Such installations do cost extra to complete chiefly because the transmission line is expensive, but it takes too much time to make up the line and it is awkward to handle when not properly packaged. The customers have been quite willing to pay for the excellent results, however. —30—

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Despite severe production difficulties, this new "BIG" TV Manual is ready for you. However, due to extreme paper shortages, we were unable to produce as many as we feel will be required. So make sure of your copy . . . order it from your jobber TODAY! This is another LARGE SIZE manual, with the equivalent of 2320 of our former 8½ x 11" page size, all filed in place. **$24.00**

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Recording Equipment

(*Continued from page 35*)

The red knob at the right of console is the master echo return, which controls the over-all amount of echo returning to the console to be mixed with the main program material.

Another interesting feature of this studio, which cannot be seen in the picture, is the presence of large (8 x 10) movable acoustic panels, (hardboard surface on one side and glass wool on the reverse) which are hung from tracks in the ceiling. They hang parallel to the walls. If a live sound is needed, all the panels are turned with the hard side out, although for most purposes about half the panels are turned with the absorbent (glass wool) side facing the room.

The mixers and recording engineers all have extensive musical backgrounds, which enable them to grasp quickly any problem involving the editing of the music, as required by the producer.

Capitol is firm in its belief that, in order to do a top-quality job on all recorded material from classical to hillbilly music at all three speeds, the equipment and the personnel must be geared to meet any of the many different problems which are posed by an inventive Repertoire Department. —30—

TRY THIS NEXT TIME!

By NICHOLAS B. COOK

ALL that the little a.c.-d.c. job needed was a new 12SK7. But no! Now there was distortion—plus a sharp tinny rattle when the volume was turned up.

I checked the coupling condenser to the output stage. Leaky. Changed. Still some distortion. Condenser from volume control looked bad—was bad. Changed. Still that sharp rattle.

Checked voltages again. Now OK. Checked speaker for loose parts. OK. Sound was good at low volume. Rattle on normal volume. I disconnected speaker and tried another. OK.

Restored speaker connections. Rattle. Tried warping cone with my fingers. Rattle much less.

Plainly speaker trouble. But cone made no scraping sound when voice coil was moved by hand. Suspicious.

Now I began to figure, "This is not a mechanical rattle. It's homemade static. Made right here in the speaker!"

This happened to be a speaker with voice coil not grounded. I suspected it was grounding during motion. I tried a neon light and 120 volts in series with voice coil and ground. Glowed when cone was moved with fingers. Ohmmeter also showed intermittent contact.

I started to pick at the dust cap so I could blow out the dust or whatever was in the gap. If no luck, new cone or new speaker. Too bad. But wait! Why not try burning it out?

Instead of a 1-watt neon, I used a 25-watt lamp in series with 120 volts a.c. There was a momentary slight flash of the lamp, then no more. Motion of cone had no effect. No further continuity could be established. And no more static in the output. None at all!

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MARS Station of the Month

MARS BEAMS WEEKLY BROADCASTS

MARS—Army Headquarters station, WAR, located at the Pentagon Building, Washington, D. C., broadcasts a weekly message each Tuesday at 0100Z and at 0400Z. (This is Monday at 8 p.m. and 11 p.m., Eastern Standard Time; Monday at 7 p.m. and 10 p.m., Central Standard Time; Monday at 6 p.m. and 9 p.m., Mountain Standard Time; and Monday at 5 p.m. and 8 p.m., Pacific Standard Time.)

Simultaneous broadcasts are made on frequencies 3497.5 kc., 6997.5 kc., 14,405 kc., and 20,994 kc. Each message is sent three times, once at 10 words per minute, once at 15 words per minute, and once at a higher rate of speed—usually 20 words per minute.

Designed especially to transmit quasi-official traffic and training information to MARS members, the broadcast offers an excellent opportunity for all amateurs to build up their code proficiency.

THE Tar Heel installation, A4WBK/K4WBK, located at Raleigh, North Carolina, has been named MARS Station of the Month by Major E. L. Nielsen, Chief of MARS-Army. The station is under the direct supervision of Lieutenant Colonel Gus A. Schattenberg, North Carolina Military District Headquarters. Sergeant Stanley J. Dvorak, A4PUK/W4PUK, is chief operator.

The station operates eight hours a day, five days a week, but could be placed on a 24-hour basis in case of disaster or emergency.

A4WBK serves the North Carolina Military District, commanded by Colonel R. F. Perry, and is net control station for the North Carolina State Net, which is under direct control of the Signal Officer, Third Army, Fort McPherson, Georgia.

The service which singled A4WBK out as Station of the Month is believed to be unique. The station regularly provides news for an Army information radio broadcast service.

The Public Information Office of the North Carolina Military District, headed by Captain Thomas B. Sawyer, writes and produces a news summary which is made available, free of charge, five days a week, to all radio stations in North Carolina.

Technical assistance in the production and dissemination of the show is furnished by personnel of Raleigh radio station WNAO. The purpose of the newscast is to furnish up-to-the-minute information to homefront listeners about Tar Heels in the service. Much of this information is available from the Armed Forces Press Service and other normal Army news channels. Local features and personalized stories are seldom available.

Sergeant Robert Erlander was assigned to organize and direct a news-gathering service. He uses MARS net-

Sgt. S. J. Dvorak (A4PUK) operates A4WBK for station visitors B. L. Porter, WNAO chief engineer; Ed Kirk, WPTF news director; Lt. Col. Gus Schattenberg, supply officer of North Carolina Military District; and D. A. Brown, WNAO program and commercial manager.

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works in North Carolina to obtain *local* news for parents and relatives at home about enlistees and inductees who are receiving their first taste of Army training.

Station A4WBK maintains radio traffic schedules Monday through Friday with military installations in North Carolina. This facility makes possible on a PIO-to-PIO basis the gathering of news and feature material. MARS nets handle the material as quasi-official, administrative traffic in the public interest.

The radio show, called "News from MARS", is also transcribed and wire recorded for rebroadcast. The transcriptions are used by the Army in its information program. -30-

New Ham Rules

(*Continued from page* 38)

the Novice Class, may be renewed upon proper application stating that the applicant has lawfully accumulated a minimum total of either 2 hours' operating time during the last 3 months or 5 hours operating time during the last 12 months of the license term. Such "operating time," for the purpose of renewal, shall be counted as the total of all that time between the entries in the station log showing the beginning and end of transmissions and during a "sequence of transmissions." A statement that the applicant can send by hand key, *i.e.*, straight key or any other type of hand operated key such as a semi-automatic or electronic key, and receive by ear, in plain language, messages in the International Morse Code at a speed of not less than that which was originally required for the class of license being renewed must be included.

Amateur operator licenses are normally valid for a period of 5 years from the date of issuance of a new or renewed license, except the Novice Class which is normally valid for a period of 1 year from the date of issuance. Modified and duplicate licenses shall bear the same date of expiration as the original licenses.

Examination Elements

Examinations for amateur operator privileges will comprise one or more of the following examination elements:

Element 1(A)—Code test at five (5) words per minute.

Element 1(B)—Code test at thirteen (13) words per minute.

Element 1(C)—Code test at twenty (20) words per minute.

Element 2—Amateur radio operation and apparatus, including radiotelephone and radiotelegraph.

Element 3(A)—Rules and regulations essential to beginner's operation, including sufficient elementary radio theory for the understanding of those rules.

Element 3(B)—Provisions of treaties, statutes, and rules and regulations affecting all amateur stations and operators.

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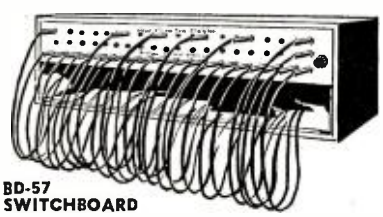

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Examination Requirements

Applicants for original licenses will be required to pass examinations as follows:

(*a*) *Amateur Extra Class:* Elements 1(C), 2, 3(B), and 4(B).

(*b*) *Advanced Class:* Elements 1(B), 2, 3(B), and 4(A).

(*c*) *General Class:* Elements 1(B), 2, and 3(B).

(*d*) *Conditional Class:* Elements 1(B), 2, and 3(B).

(*e*) *Technician Class:* Elements 1(A), 2, and 3(A).

(*f*) *Novice Class:* Elements 1(A) and 3(A).

An applicant for a higher class of amateur operator license who holds a valid amateur operator license issued upon the basis of an examination by the Commission will be required to pass only those elements of the higher class examination that were not included in the examination for the amateur license held when such application was filed. However, credit will not be allowed for licenses issued on the basis of an examination given by other than personal FCC examination.

An applicant for Amateur Advanced Class operator license will be given credit for examination element 4(A) if within 2 years prior to the receipt of his application by the Commission he held Class A privileges or an Advanced Class license.

An applicant for any class of amateur operator license, except the Extra Class, will be given credit for the telegraph code element if within 5 years prior to the receipt of his application by the Commission he held a commercial radiotelegraph first or second class operator license issued by the Federal Communications Commission.

The Novice class of license will not be issued to anyone who has previously held an amateur license of any class issued by an agency of the United States government, military or civilian.

No examination credit, except as herein provided, shall be allowed on the basis of holding or having held any amateur or commercial operator license. There have been minor revisions in some of the frequency allocations in the 160 meter band. Other than this, the frequency allocations remain the same. An additional 50 kilocycles have been authorized for A3 operation on the 75 meter band making the phone portion now read 3800 to 4000 kilocycles. The portion from 3800 to 3850 may be used for NBFM.

-30-

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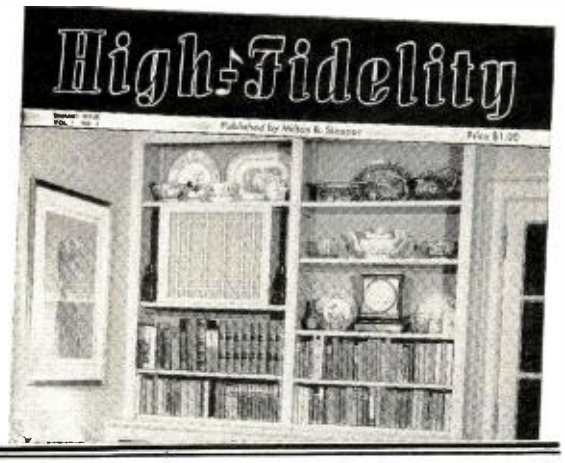

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about records, new and old: You'll be amazed and delighted to see the results of research and consultations with music authorities and collectors represented in this department, carefully compiled and classified, covering all types of recordings to meet all tastes and purposes.

if you're a beginner: Maybe, as an Audio-phile, you are now on the outside, looking in. If so, HIGH-FIDELITY has a special department for you with a door-mat that says *Welcome* to all those who want to join the fraternity, and learn the mysteries and delights of fine audio reproduction.

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He knows both original and recorded music, as an inveterate concert-goer and a collector of records. In these activities he has the support of Mrs. Fowler, who is an accomplished musician.

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tion will be required in recording applications of this type.

For recording music, dialogue, or vocal selections, it is desirable to separate the artist from the orchestra by the use of "flats". A flat consists of a group of hinged panels constructed of acoustic tile on a wooden framework, with a glass panel in its center. The flat is placed around the artist and the microphone, with the glass window facing the musical director. Separating the artist and microphone from the orchestra in this manner allows the sound mixer to secure better isolation and balance between the orchestra and the artist. No equalization is used in the vocal microphone circuit.

When recording vocal and piano, the vocalist should be placed near the center of the studio to reduce reflections from the walls. The piano top should be open, with the open side about 12 feet from the artist. The artist is placed 4 to 6 feet away from the microphone between the microphone and the piano, with his back to the piano. A microphone with a bi-directional field pattern (ribbon) is the most suitable for this type of pickup. Reflections from the rear of the microphone must be held to a minimum. Each studio presents its own problems, and to obtain the best results for a particular type of pickup will require a considerable amount of experimentation with microphone placement.

A number of excellent articles have appeared in this magazine on the subject of microphone placement and it is suggested that the reader refer to them for additional information.

To summarize, the size of the studio will be dictated by the maximum size orchestra to be recorded and the type program material. The studio should be proportioned to give a ratio of average height, width, and length of 1 : 1.6 : 2.5. For a volume of 16,000 cubic feet this will result in a studio of 16′ x 25′ x 40′.

Large parallel surfaces should be avoided and several polycylindrical diffusers used to give a high amount of diffusion of the sound to reduce the possibility of standing waves.

The shape of the diffusers (radius) is varied as well as the size. The bracing of the panels is staggered to vary the resonant frequencies.

The air conditioning system must be shock mounted and the inside of vents treated acoustically and baffled to reduce the entrance of extraneously generated noises.

If desired, carpeting may be placed on the floor for small orchestras, to obtain additional absorption. A small rug placed under microphones used for vocal pickup will prevent reflections from the floor.

For dialogue stages, the principal sound treatment should be that of the exterior walls, air conditioning, and doors, and the material used in the set

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construction of such kinds and types that the reflections are reduced to a minimum.

To insure the best quality of pickup, the microphone must be suspended from a boom, so that it can be "panned" with the movements of the actors. A dialogue equalizer must be employed to suppress the low frequencies to produce maximum intelligibility and naturalness of speech.

Portable flats should be used to secure separation between the orchestra and a vocal or dialogue microphone, when recording the two simultaneously.

The subject of recording studios will be further discussed in a subsequent article.

(*To be continued*)

Within the Industry

(*Continued from page* 26)

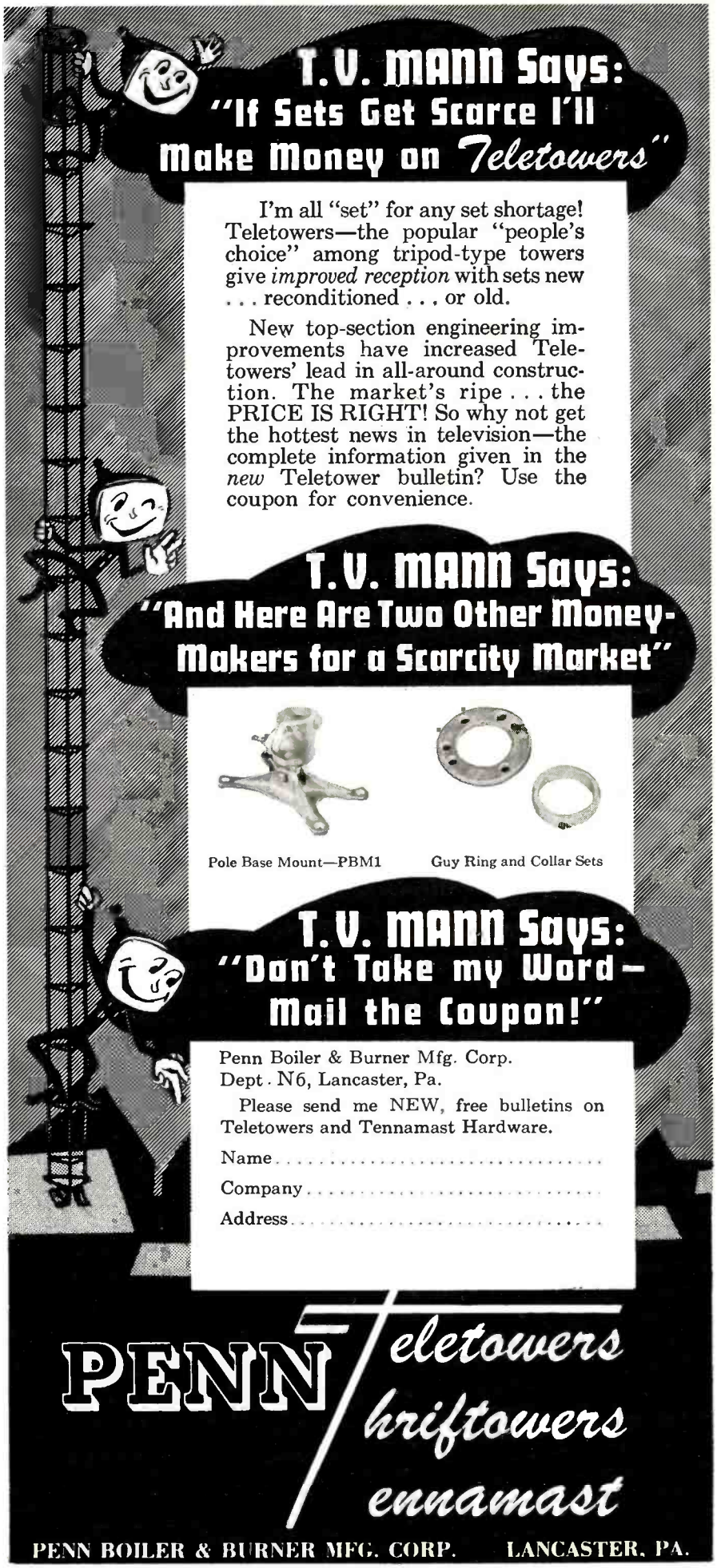
Signal Corps depot on a 1400 acre tract at Tobyhanna, Pa., near Scranton and Wilkes-Barre. Completion is scheduled for early 1953 and will provide 2,000,000 square feet of storage space . . . The **INTERNATIONAL RECTIFIER CORPORATION** has added a second story to its plant located at 6809 S. Victoria Avenue, Los Angeles 43. The new addition was built to handle increased production requirements . . . **MATTISON TELEVISION AND RADIO CORP.** of New York City has just opened a new cabinet factory at 742-760 Wythe Avenue in Brooklyn. The new factory provides 20,000 square feet of manufacturing space . . . **ALLEGHENY PLASTICS, INC.,** 618 Chestnut Road, Sewickley, Pa. has expanded its production facilities for printing, laminating, and forming plastics . . . **VARIETY ELECTRIC COMPANY, INC.** has recently moved into a new building at 468-470 Broad St. in Newark, New Jersey. In addition to providing increased warehousing space the new location affords convenient parking facilities for customers . . . **CADILLAC ELECTRONICS CORP.** has moved to 19 West 26th St., New York.

* * *

ROBERT F. FIELD, who has been associated with *General Radio Company's* Engineering Department for many years, recently retired after 21 years of service.

Prior to joining *General Radio,* Mr. Field was a member of the faculty of Harvard University. He is well-known for his work in impedance standardization, electrical measurements, particularly with bridge circuits, and the study of dielectric materials.

He is a Fellow of the IRE and the American Association for the Advancement of Science, a member of the American Institute of Electrical Engineers, the American Society for Testing Materials, and the American Physical Society. He is a Phi Beta Kappa and a member of Sigma Xi. —30—



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FOUR BANDS With A Flat Line

Additional details on the use of a single wire antenna to cover 80, 40, 20, and 10 meter bands.

By
AUBREY MEADOWS,
W4OLM

AFTER reading with considerable interest the article appearing in the February 1950 issue of RADIO & TELEVISION NEWS, entitled "A Two-Band Piece of Wire" by Karl Dreher (WØW0), we have nothing but the highest praise for him.

Like Mr. Dreher and many other amateurs, we desire to operate on all the four major bands, and also like many others, we are located in an apartment and cannot erect rotary arrays and other such fine but often objectionable-appearing radiators. We have given conventional multi-band antennas of the zepp and long-wire varieties what we consider to be fair trials, but the consequent vertical radiation from tuned feeders only serves to aggravate our broadcast interference.

For the benefit of those who do not have the February issue, the antenna described consisted of a flat top portion cut to resonate at the lowest frequency band to be used, while the antenna is fed by means of a 300 ohm line.

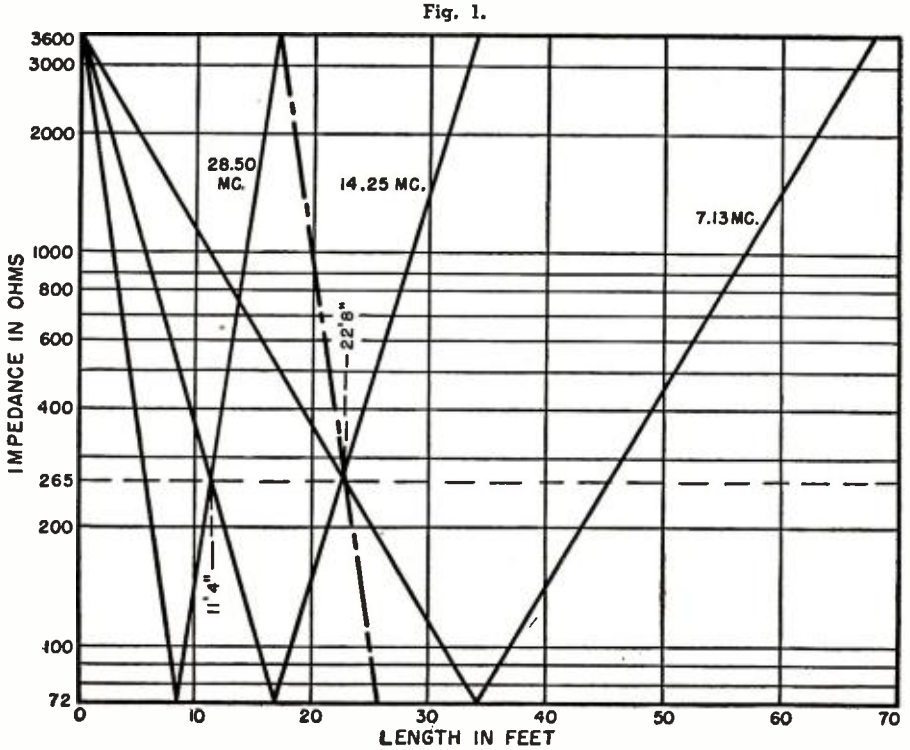
The point of attachment for the feedline was determined from a chart similar to Fig. 1.

The antenna is cut at the proper point and the feedline connected at this point. Measurements given on the chart are made from one end of the antenna.

Upon perusing Mr. Dreher's article, we immediately questioned his statement regarding the use of a 68-foot radiator on either the 40- and 20-meter bands or the 20- and 10-meter bands. The theory upon which he based the design of his antenna system we have found to be quite sound, insofar as he carried out his work. We do not, however, agree with his statement, "Ten and twenty meters at 11 feet, or twenty and forty meters at 22 feet—take your choice; it can't be both combinations with a single connection." It will be noted that, in basing his graph of impedance *versus* length of radiator, he only plotted the first half-wavelength as regards impedance on each band considered.

Consideration of his impedance-length diagram led us to question why he did not plot the second half-wavelength for the 10-meter harmonic. We

Fig. 1.



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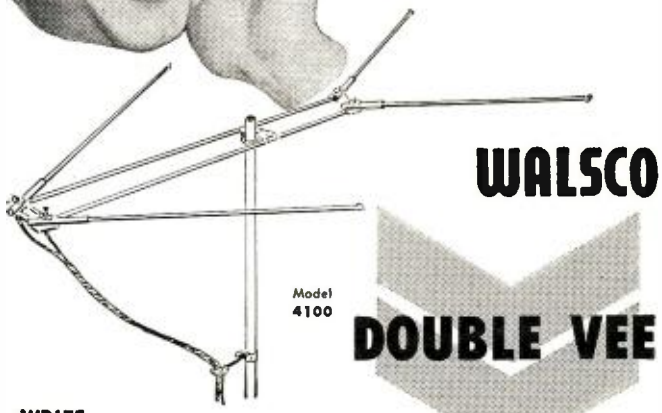

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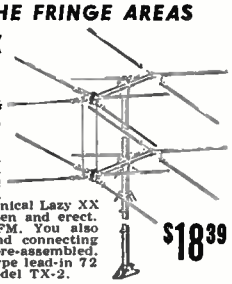

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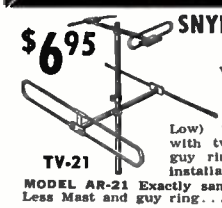

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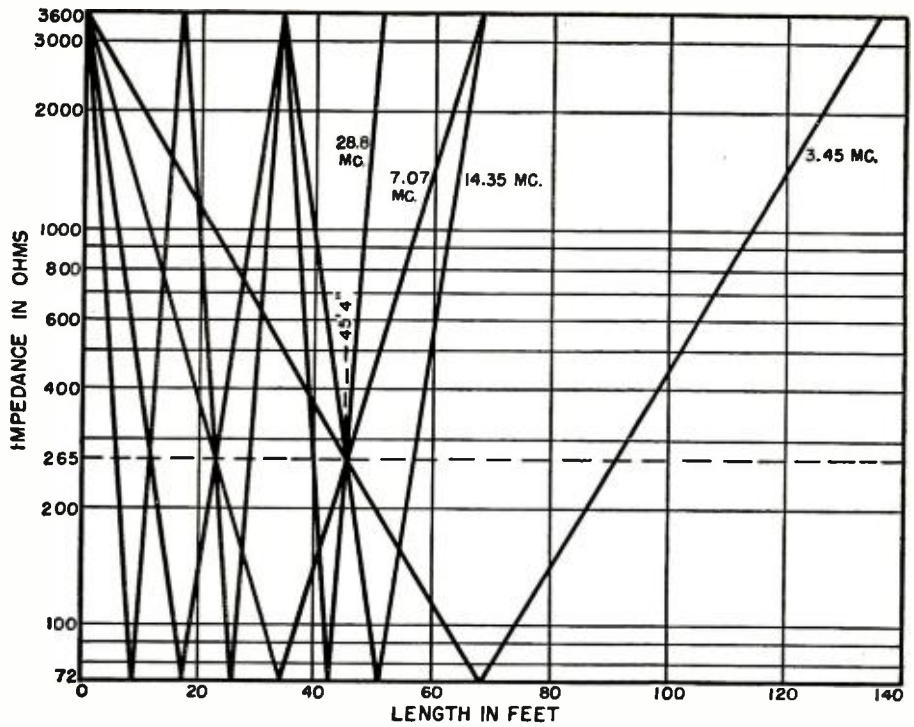


Fig. 2.

have continued the construction to that point and found that the impedance line of the third quarter-wavelength on 10-meters likewise crosses the common impedance point of 265 ohms at 22'8" from the end. Reference to Fig. 1 will serve to clarify our point, the dashed line being our own continuation of Mr. Dreher's plot.

This, then, led us by the same reasoning as that applied by Mr. Dreher to believe that three-band operation was theoretically possible from a single feed point employing 300-ohm non-resonant type line. Mr. Dreher stated that the impedance mismatch from 265 ohms to 300 ohms would not be of appreciable concern. We wholeheartedly agree with him, not only on that basis, but also because tests have shown that the so-called 300-ohm receiving twin-lead commonly employed will vary in impedance from approximately 240 ohms to something over 300 ohms.

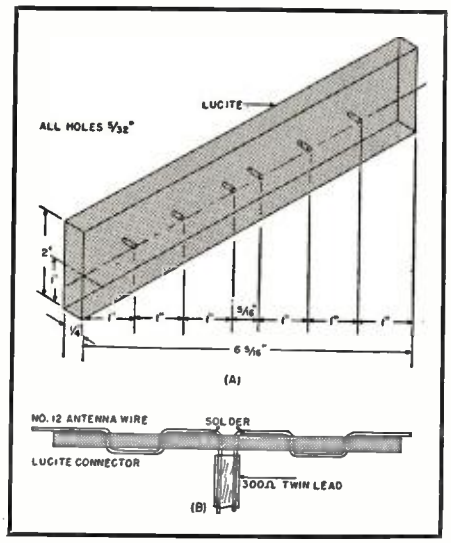
After further consideration of the subject, and still desiring to operate not only on the 40, 20, and 10-meter bands but also on the 75- and 80-meter bands, we selected a suitable length for a radiator on these bands. It is common knowledge that harmonic antennas are not resonant at exact harmonic frequency multiples, due to the end effect and its influence on the outer quarter-wavelength on each end of the wire. We therefore based our final impedance-length diagram on this fact, and selected the flat-top length for resonance at the highest frequency range desired, which was 28.8 mc. (selected for mid-band operation). This highest frequency band was selected because when off-resononce operation on some band is unavoidable a given mismatch in length will be a small percentage of a half-wavelength on the lower frequencies.

With a flat-top length of 136 feet, exact resonance occurs at 28.8 mc., 14.35 mc., 7.07 mc., and at 3.45 mc. Obviously, the worst mismatch is in the length for the 75- and 80-meter bands, but as stated, the mismatch is a relatively small percentage and operation within the 40- and 20-meter bands is possible with only a very small mismatch.

Having established the desired flat-top length, we plotted our impedance-length diagram once more and found our feed point to be located at a distance of 45'4" from one end, as indicated by the diagram of Fig. 2.

On account of our location, we found it impossible to erect the entire flat-top in the clear, so we mounted the feed point on stand-off insulators mounted on the window facing of the second story operating position. Construction of the feedline connecter is exactly like that suggested by Mr.

Fig. 3. Method of lacing wire through connector and attaching 300 ohm line.

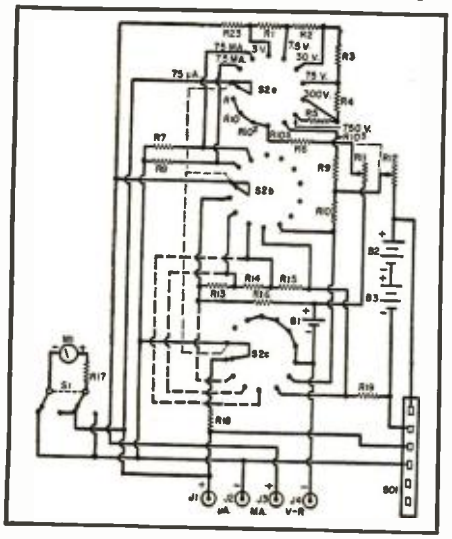


Dreher in his article, and a sketch of this connecter is reprinted in Fig. 3. The over-all length of feedline employed at present is approximately fifteen feet and operation on four bands has proven to be quite satisfactory. A comparison of this antenna with a standard folded dipole made of 300-ohm line was made with several other amateurs and signal reports were equally as good and in most cases 5 db. better.

The "rig" currently being used is a war surplus ART-13, running about 250 watts input to the final. With our four-band antenna and this power input we have had surprisingly good success in working out on the 75-meter phone band even during the congested early evening hours. Our first CQ on the 40-meter band netted us a W6 with a 579X report during the early evening hours. On 20-meter phone we have not had opportunity to test the antenna fully on account of the early closing of the band, but no difficulty was experienced in working an HK1 who was running similar power and using a three-element rotary beam.

As previously pointed out, broadcast interference is held to a minimum due to the absence of vertical radiation from the feeders. A check for standing waves indicates a very low s.w.r., even when working considerably off-resonance as is the case on the 75-meter phone band. All things considered, we are very well pleased with the results obtained and can now operate on all the major bands with a minimum of effort. We strongly recommend this antenna system to those who are, as we, unable to erect more than one antenna. It has given us exceptional results on all 80, 40, 20, and 10 meter ham bands. —30—

In an attempt to simplify the diagram of the v-o-m and grid-dip oscillator appearing on page 46 of the February issue, the ganged switch was shown as having 14 contacts per section. This would be correct in itself if the parts list and text had been altered to correspond with the diagram changes. To avoid any further confusion, we are reprinting the diagram of the v-o-m portion with the correct switch substituted. The dotted lines show the connections which were omitted previously.



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L-R Blower Wheel only, 3"x2"—⅜" shaft....**$1.00**

TRANSFORMERS 110 V. 60 CYCLE PRIMARIES: SEC.:	
24 V. ½ amp.	**$1.50**
24 V. 4½ amps.	**3.95**
12 V. 4 amps.	**3.95**
36 V. 4 amps.	**3.95**

WIRE—HEAVY DUTY, RUBBER COVERED:		
2/#16	20'	**$1.25**
2/#12	10'	**1.00**
1/#6 Shield.	15'	**1.50**
1/#6 Shield.	7½'	**.75**

SELSYNS: 115 V. 60 cycle #C78248, 3½" D x 5½" L. New sealed cans. Pair.....**$10.95**

AUTOSYN TRANSMITTER

Autosyn Transmitter for I-81 or I-82 Indicator. Operates from 26 Volt 400 cycle or 12 Volt AC. Removed from new LP-21A Loops. W/calibrated dial and correction pointer.

MC-507: **$6.95** MC-217: **$5.95**

JOHN OSTER MOTOR

Type A-16-B—26 VDC series rev. with reduction gear approx. 100 RPM and limit contacts. Size: 3½" x 1⅝". Slotted shaft at side ¼" x ⅛". Price **$5.95**

GUY CABLE

Regular Aircraft Control Cable, 3/32"—7x7—49 Strands galvanized weatherproof, 920 lb. Test. Ideal for television or radio mast guying. Prices:

2¾c per Ft.—1000 Ft. or more: 2½c per Ft.

WHIP ANTENNA EQUIPMENT

MAST BASES—INSULATED:

MP-48 Base (Illustrated at right) Insulated type with heavy coil spring. Requires 1⅜" mounting hole. Weight: 11 lbs. Price.....**$4.95**

MP-132 Base (Illustrated at left) 1" heavy coil spring. 2" insulator. Overall length: 11½". Weight: 2¾ lbs. Price.....**$3.95**

MP-22 Base—Spring action direction of bracket. 4" x 6" mounting. Price....**$2.95**

MAST SECTIONS FOR ABOVE BASES:

Tubular steel, copper coated, painted, in 3 foot sections, screw-in type. MS-53 can be used to make any length, with MS-52-51-50-49 for taper. Price, each, for any section ..... (Ea.) **50c**

MS-54—Larger section than MS-53.....**75c**
BAG BG-56 for carrying 5 Mast Sections.....**50c**

RECEIVER (MOBILE-BOAT-AIRCRAFT)

BENDIX RA-10 RECEIVER—8 Tube Set covering frequency range 150 to 1100 KC. and 2000 to 10000 KC. in four bands by use of remote control unit. Set size: 18⅜" L. x 10⅞" W. x 8¾₆" H. Wt. 32½ lbs. Comes complete with remote control unit, dynamotor, and plugs. BRAND NEW.

Order RA-10 CA f/ 14 Volt DC operation.
Order RA-10 DA f/ 28 Volt DC operation. **$49.95**

3/4 RPM ANTENNA ROTATOR MOTOR

High torque, reversible motor—operates directly from 110 Volt 60 cycle by use of condenser. Light weight, quiet running, ruggedly built, positive stop, easily mounted. Normally operates from 110 Volt 400 cycle. Complete—with instructions. NEW.... **$4.95**

10 MFD 400 Volt Cond., **$1.00.** SPST Momentary Switch, **35c.** DPDT Momentary Switch, **75c.** Resistor, 100 ohm 25 Watt. **50c.** 4 Wire Cable. **5c** per ft.

DYNAMOTORS:

INPUT	OUTPUT:	STOCK No.	PRICE
12 V. DC	220 V. 70 MA.	DM-24	**$6.95**
12 V. DC	220 V. 100 MA.	DM-18	**4.95**
12 or 24 V. DC	440 V. 200 MA. & 220 V. 100 MA.	D-104	**9.95**
12 V. DC	600 V. 300 MA.	BD-86	**7.95**
12 V. DC	330 V. 150 MA.	BD-87	**5.95**
12 V. DC	375 V. 150 MA.	BD-83	**6.95**
12 V. DC	1000 V. 300 MA.	BD-77	**7.95**
PERMANENT MAGNET FIELD DYNAMOTORS:			
12 or 24 V. DC	275 V. 110 MA.	USA/0516	**$3.95**
12 or 24 V. DC @ 6 V. DC	500 V. 50 MA. 240 V. 50 MA.	USA/0515	**2.95**

Tell Us Your Dynamotor, Inverter, & Motor Needs!

GEAR TRAIN MOTOR

Ball bearing, low inertia reversible type motor, 588 RPM. Low speed gear 14 RPM. Extra large Gear 7/8 RPM. Operates 26 V. 400 cycle or 12 V. 60 cycle. Price—each—only **$2.95**

GASOLINE ENGINE GENERATOR

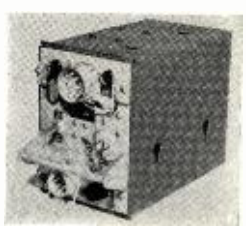
HOMELITE Gasoline Engine Generator—30 Volt DC 50 ampere (1500 Watts) Generator driven by single cylinder, two cycle air-cooled gas engine approx. 3 HP. Rope or electric starting. From unused Govt. vehicles, reconditioned. Shipping Wt. 150 lbs. Price.....**$59.50**

SELENIUM RECTIFIER UNITS
HEAVY DUTY—30 VOLT DC OUTPUT:

115/200 V. Three Phase 400 Cycle input:
TYPE 143 w/Transformer & VR 100 amp.....**$89.50**
TYPE 3FS-5 w/Transformer, VR. & Blower 200 amp. **99.50**
TYPE 52A-11 Rectifier only. Cased 200 amp..... **49.50**
TYPE A1 Rectifier only. Cased 300 amp..... **59.50**
TYPE RE-60 Rectifier only. Cased 40 amp..... **69.50**

AERIAL WIRE:	RG-8/U COAXIAL CABLE (W/PL-259 Plugs, ea. end):
Aerial Wire Phosphorous Bronze #16 Stranded. 200 lb. test. Weatherproof. 150 Feet on Reel RL-3 w/Clips....**$1.50**	65 Foot length...**$4.95** 50 Foot length... **3.95** 35 Foot length... **2.95**

HIGH VOLTAGE POWER SUPPLY



PM Field Dynamotor Supply, 12 or 24 Volt DC input; 500 Volt 50 MA and 275 Volt 110 MA output. Complete with hash filters, separate fuse for each output. Contains two separate dynamotors for the above output; also on and off switch, indicator light, switching relay, receptacles, etc. Heavy gauge metal case, size: 8⅜" x 6¼" x 11½". Used on No. 19 Mark II Radio Set.
Shipping Weight: 62 lbs. Price....Ea. **$7.95**
Metal Case and Punched Front Panel only **$2.00**

GENERATOR: 3/16 HP Generator. 3450 RPM. Shaft size: ½" x 1½". Output 240 VDC 100 MA and 12.5 VDC 4 amps. Model G-102. Price...**$14.95**

MOTORS:

6 or 12 Volt AC or DC heavy duty reversible motor, approx. 2500 RPM, 1/10th HP. Shaft size: 5/16" x 7/16". Motor size: 2¾" x 3". Flange mounting. NEW **$3.95**

6 Volt AC-DC Motor—ideal for auto fans, models, etc. Shaft size: ¼" x ⅝". Used. Tested.....**$1.50**

Address Dept. RN • Minimum Order $2.00 • Prices F.O.B., Lima • 25% Deposit on C.O.D. Orders

FAIR RADIO SALES 132 SOUTH MAIN ST. LIMA, OHIO

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Plays 10½" Reels!

Complete, for console installation with single or dual track heads: $345.00

CONCERTONE

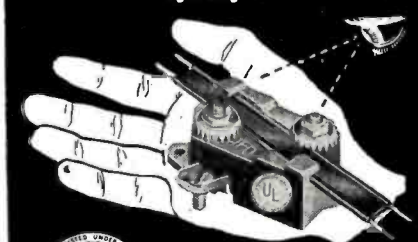
■ The *professional quality* tape recorder you have been waiting for! NAB standards; triodes throughout; 40-15000 cycles at 15", 40-8000 cycles at 7½". Three motors; flutter less than 0.1%; signal-to-noise better than 50 db. Three heads for simultaneous erase, record, playback. Quick change from single to dual track. *Write for booklet.*

FISHER RADIO CORPORATION • *Distributors* • 39 E. 47th St., N. Y.

MAGNETIC RECORDERS CO., 7120 MELROSE AVE., L. A. 46, CALIF.

JFD "Little Giant" TWIN LEAD LIGHTNING ARRESTER

Protects TV Sets Against Lightning and Static Charges



SEEING IS BELIEVING!

ONLY JFD Lightning Arresters offer you these exclusive patented features . . .

1. Patented strain-relief Retaining Lip which prevents pulling or straining against contact points.
2. You actually see positive contact made with lead-in wire.
3. Lead-in contact remains fully visible at all times.
4. No wire stripping. No Arrester Cover to Hide Poor Contacts!

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For Regular Twin Lead

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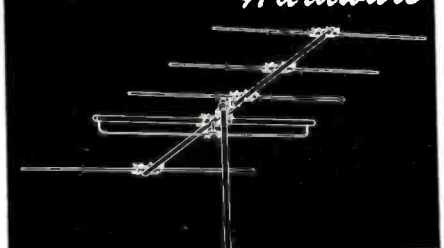
JFD MANUFACTURING CO., Inc.

6105-D 16th AVENUE, BROOKLYN 4, N. Y.

FIRST in Television Antennas and Accessories

Phoenix

· Speed-Tennas
· Speed-Mounts
· Hardware



NEW! SENSATIONAL GAIN

PHOENIX YAGI

- 300-ohm Impedance
- Exclusive Mast Clamp Design
- Quick Rig Installation
- Long-Lasting . . . Trouble-Free

PHOENIX ELECTRONICS INC. LAWRENCE, MASS.

Saturable Reactors

(*Continued from page 42*)

Control Oscillators

The conventional oscillator circuit performs many control and measurement functions in industrial equipment. In the circuit of Fig. 4, for instance, an iron vane brought into the space between the coils will impair feedback and cause the circuit to cease oscillating. When the circuit stops oscillating, no grid current will flow and no bias voltage will be developed across the grid resistor. With no bias, the plate current of the tube will increase and the relay will close. Thus, insertion of the metal vane causes operation of the relay. Some types of elevator leveling controls operate on this principle. If the iron vane is mounted under the elevator platform, and an oscillator is located at each floor level, the relay will operate when the elevator is properly aligned with the floor level. If power to the door-opening mechanism is supplied through this relay, it will be impossible to open the door except when the elevator is correctly leveled.

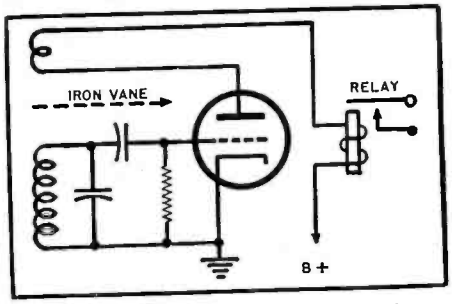
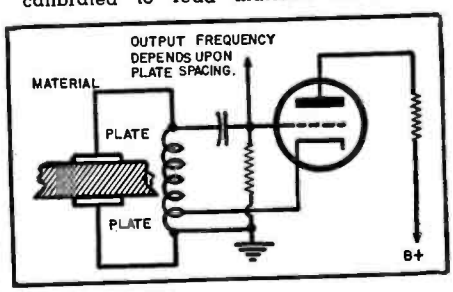


Fig. 4. Control oscillator. When the iron vane is placed between the coils, feedback is impaired and oscillation ceases. When the circuit stops oscillating, its plate current increases and closes relay.

Another variation on this same basic principle involves the control of liquid level in a container. Here, the iron vane is mounted on a float. When the liquid rises or falls to a predetermined level, the vane passes between the oscillator coils and operates the relay. The relay then activates an alarm, indicator, or filling or emptying mechanism.

Sometimes the oscillator coils are

Fig. 5. Use of the oscillator as a thickness gauge. If the thickness of the material increases it forces the plates apart, reducing the tank capacity and raising the oscillator frequency. A frequency meter connected to this circuit may be calibrated to read material thickness.



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made physically small and mounted on the face of a meter. When the pointer needle passes between the coils, the relay is energized. This arrangement may be used to prevent a current or voltage from rising above or falling below a predetermined value.

Fig. 5 shows how an oscillator circuit may be used as a thickness gauge or control. The material whose thickness is to be measured is passed between two metal plates. These plates serve also as the condenser of the tank circuit. If the thickness of the material increases, the plates are forced farther apart. The resultant decrease of capacity causes an increase of oscillator frequency. An FM discriminator may be used to detect this increase of frequency, and its output used to control the machine which determines the thickness of the material. In this manner, constant thickness may be maintained. A frequency meter connected to the oscillator may be calibrated to provide a direct reading of material thickness. -30-

CONSTRUCTION HINT

By GENE VINSON

IN constructing an i.f. signal generator I ran across something which may be of interest to other builders.

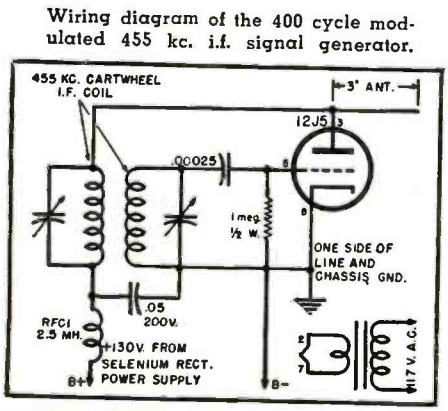
Originally, I intended to modulate the unit with a neon bulb relaxation oscillator but found that I had a lower percentage modulation until I changed the 50,000 ohm oscillator grid leak to a 1 megohm unit. When this was done it was impossible to get 400 cycles from the neon modulator by changing the modulator condenser size.

By disconnecting the neon modulator from the oscillator grid entirely it was found that the oscillator was self-modulated fairly close to 400 cycles. The percentage modulation was higher and the tone was much cleaner. The neon modulator alone had given a rough note.

I believe the 400 cycle modulation is produced by the time constant of the grid leak and grid condenser together with the grid-to-plate capacitance of the tube and/or the difference in frequency of the tuned-grid and tuned-plate circuit, although, with the exception of the tuned-plate, the oscillator is intended to be a series-connected Armstrong.

No connection to the radio is necessary. The three-foot antenna connected directly to the oscillator plate gives fair signal strength. -30-

Wiring diagram of the 400 cycle modulated 455 kc. i.f. signal generator.



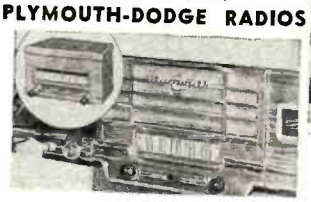
NEW for '51 Automatic Radio CUSTOM-BUILT AUTO RADIOS

RECORD SMASHING VALUES!

1949, 1950 and 1951 FORD AUTO RADIOS

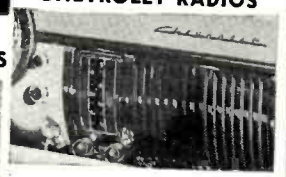
List Price.....$59.95

1949 AND 1950 PLYMOUTH-DODGE RADIOS



List Price.....$59.95

1949, 1950 and 1951 CHEVROLET RADIOS



List Price.....$59.95

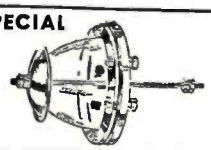
ATTRACTIVE DISCOUNTS TO DEALERS

CUSTOM-BUILT RADIO
1948-49-50 HUDSON
1951 HENRY J
1949-50-51 STUDEBAKER
List Price $59.95

UNIVERSAL MOUNT
M-90 .....$49.95

Each auto radio is specifically designed to fit all 1949 and 1950 cars shown above and all incorporate the same outstanding features. . . . Six-tube superheterodyne. Six-volt storage battery operation. Two dual-purpose tubes. Eight-tube performance. Installation in a few minutes. Three-gang tuning condenser and tuned R.F. stage for extreme sensitivity. Permanent magnet dynamic speaker with Powerful Alnico #5 magnet. Low battery drain. Weight 10 lbs.

SPECIAL



Navy entering type insulator. Porcelain flanged bowl with brass rod and fittings and aluminum shield. Dimensions: 4⅜" high, 6-5/16" O.D. at base.
New $3.95
Spare Bowl 50

CAPACITORS

	UPRIGHT MOUNT	EA.	TEN
2X.25 MFD	400 VDC	$ .35	$ .30
.5 MFD	400 VDC	.35	.30
1 MFD	500 VDC	.40	.35
2X.05 MFD	600 VDC	.40	.35
.25 MFD	600 VDC	.40	.35
2X.1 MFD	600 VDC	.45	.40
.1 MFD	600 VDC	.45	.40
.5 MFD	600 VDC	.45	.40
1 MFD	600 VDC	.45	.40
	BATH TUB		
40 MFD	25 VDC	$ .40	$ .35
4 MFD	50 VDC	.45	.40
4 MFD	100 VDC	.55	.50
2X.1 MFD	200 VDC	.30	.25
3X.1 MFD	400 VDC	.40	.35
2 MFD	400 VDC	.55	.50
.05 MFD	600 VDC	.35	.30
.25 MFD	600 VDC	.40	.35
.5 MFD	600 VDC	.40	.35
.1 MFD	600 VDC	.40	.35
1 MFD	600 VDC	.50	.45
2 MFD	600 VDC	.65	.60
2X1 MFD	600 VDC	.65	.60
.05 MFD	1000 VDC	.55	.50
2X.1 MFD	1000 VDC	.65	.60
	OIL FILLED AND GE PYRANOL		
.5-.5 MFD	400 VDC	$ .65	$ .60
.1 MFD	500 VDC	.55	.50
1 MFD	500 VDC	.70	.65
1 MFD	600 VDC	.85	.80
2 MFD	600 VDC	1.15	1.10
4 MFD	600 VDC	1.60	1.55
5 MFD	600 VDC	1.85	1.80
1-8 MFD	600 VDC	2.75	2.65
.5 MFD	1000 VDC	.95	.90
2 MFD	1000 VDC	1.65	1.60
.5 MFD	2000 VDC	2.00	1.90
.25 MFD	3000 VDC	2.85	2.80
.5 MFD	3000 VDC	2.95	2.90
.1 MFD	7500 VDC	7.50	7.00
1 MFD	7500 VDC	12.50	12.00
.1 MFD	12000 VDC	14.95	14.90
.0008 MFD	15000 VDC	12.50	11.75
.045 MFD	16000 VDC	12.95	12.50
	PAPER		
8-8 MFD	600 VDC	$2.25	$2.15
	Tobe Filtermite		
3X8 MFD	600 VDC	$2.55	$2.40
8-8-4 MFD	650 VDC	2.45	2.25
160-160 MFD	150 VDC	1.50	1.25
	ELECTROLYTICS		
2500 MFD	3 VDC	$ .40	$ .35
500 MFD	12 VDC	.90	.85
25 MFD	25 VDC	.40	.35
50 MFD	25 VDC	.60	.55
1000 MFD	25 VDC	1.25	1.15
150 MFD	50 VDC	.50	.45

TRANSFORMERS
PRIMARIES 115V 60CY

9V @ 750 MA, 6.3V @ 3.9A, 5V @ 6A, 2400 Test.....$3.25
6.6V @ 0.6A, 2000V Ins 2.60V @ 1.75A, 2700V Ins..... 2.75
6.4V @ 10A, 6.3 @ 0.6A..... 3.45
660/330V @ .08A CT 5.0/2.5 @ 3A CT..... 3.25
350-0-350 @ 120 MA, 5V @ 3A, 6.3V 4A CT 6.3V..... 4.25

SPECIALS

80.86 KC Crystal with Holder.$2.50
CD-501A Cord Connects BC-654 Transceiver to GN-45 Gen... 1.95
Balloon with Hydrogen Gen... 2.50
Gibson Girl Box Kite 17"x17"x36"..... 2.25
33-440 Mmf Variable Condenser .79
7-100 Mmf Variable Condenser. .79
24-750 Mmf Tapered Rotor Plates..... .90
American Blower and Motor—G.E. ⅛ HP 115V 1 Phase 60 Cy 1725 RPM. Brand New.....24.95

CHECK THESE VALUES

BC-709 Interphone Amplifier, ideal for aircraft-booster telephone. New.....$ 4.00
MN-26Y Radio Compass Receiver, 150-325KC, 325 - 695KC, 3.4 - 7.0 MCS, 28 volt Bendix. Brand new..... 44.50
RA-10DB Receiver, Bendix. New..... 39.95
BC-733D Receiver, new, less dynamotor..... 14.95
Used w/dynamotor..... 6.95
BC-224 Receiver, new, less mtg.....100.00
BC-412 5" Radar Oscilloscope..... 59.95
R5/ARN-7 Radio Compass Receiver, w/tubes, used, excel. cond.... 39.95
BC-433G Radio Compass Receiver, used, excel. cond. w/tubes..... 39.95

TUBES

2C34	$0.85	1629	$0.30
2X2/879	.90	2051	.95
3C24	2.20	7193	.50
7C4/1203A	.85	8011	2.40
10Y	.45	9006	.50
211	.65	C5B	9.75
15R	.85	CEQ72	1.40
39/44	.65	CK-70	4.25
30 Spec.	.55	CRP-72	1.40
45 Spec.	.35	E1148	.30
203A	5.95	HY-615	.40
316A	.75	RKR-72	.75
WL-531	4.95	RK-73	.75
702B	2.50	VT-127A	3.00
713A	1.45	VT-98	21.00
801A	.55	3BP1	3.45
803	4.45	5BP4	5.95
826	.95	5FP7	1.95
931A	5.50	1J6G	.95
864	.45	3A4	.60
869B	23.95	6SG7	1.95
CK1005	.85	6SJ7	1.45
CK1007	1.20	33	.65
1626	.95		

RELAYS

6 VDC DPST Contacts 6A Coil .33 Ohms.....$0.65
12 VDC DPST Allied Control Box #32..... 1.25
24 VDC 3 PDT 8 Amp..... .95
24 VDC Solenoid, Operates 2 Switchettes..... 1.75
40 VDC DPST-SPDT 1000 Ohm .80
110 VAC DPST 1 Amp Contacts Str'th's Dunn CXA 1970..... 3.65
110 VAC DPDT 25 Amp Contacts Ward Leonard..... 3.95
115 VAC DPST Str'th's Dunn CXA-2997..... 3.65
220 VDC DPDT Str'th's Dunn CX2122..... 4.50

Ceramic Rotary Switches

Pole	Position	Section	Shaft	Price
1	3	6	⅞"	$0.50
2	4	4	1"	.50
2	8	2	2½"	.55
4	10	2	¾"	.50
4	12	2	4"	.55
2	8	2	30A 9KVA Flash Over	2.50

2 Pole 2 Circuit 6 Cont W/Knob..... .40
DPST Toggle Switch 3A 250V..... .35

TRANSMITTING MICA

.063 MFD	1800 VDC	$ 0.65
.006 MFD	2000 VDC	.65
.003 MFD	2000 VDC	.65
.02 MFD	2000 VDC	1.20
.006 MFD	2500 VDC	1.15
.00025 MFD	2500 VDC	2.60
.00075 MFD	5000 VDC	2.75
.002 MFD	5000 VDC	2.95
.001 MFD	6000 VDC	3.50
.007 MFD	5000 VDC	7.50
.0002 MFD	6000 VDC	9.50
.0012 MFD	20,000 VDC	32.50

VALUES

De-Ion Line Starter DPST 115V 60 Cy 15A West. New..$6.95
Genuine Upright Desk Telephone and Ringing Box. New 4.95
1 Micro Second Delay Line 15 KVA 400 Cy 50 Ohm. New..24.95
CO-122 3 Conductor Cable.....

ROUND PANEL METERS

		Ea.	Ten
0-5 RF Amps—Westing	3½"	$4.50	
0-300 MA DC—Simpson	2¾"	3.75	
0-300 MA DC—Westing	2½"	3.75	
0-0-5 MA DC—Weston with 50 MA—Shunt	3½"	5.25	
0-50 Amps DC—Weston	3½"	5.75	
0-100 Amps DC—Hoyt	3"	5.00	
0-3 Volts DC—Sun	2½"	3.50	
0-15 Volts AC—GE	3½"	4.95	
0-2500 Volts DC—Simpson With Multiplier	3½"	5.95	
0-5KV DC 0-10 MA DC	3½"	5.50	
0-150 Volts DC—Hoyt	3½"	4.50	
10-0+60B—Weston	2½"	6.50	
PORTABLE METERS			
0-10 Amps DC—Weston	489	9.50	
0-3-6-30 Volts DC—Weston	280	19.95	
0-100 Amp DC—Weston with 100 Amp—Shunt	269	27.95	
0-25 Amps AC—Weston	433	37.50	
0-1.5-6 Volts AC Output-meter—Weston	571	14.95	

LINEAR POTENTIOMETERS WW

Ohms	Watts	Mfg'r	Ea.	Ten
200	2	Chicago Tel.	$0.40	$0.35
1000	2	Trefz	.50	.45
3000	2	Chicago Tel.	.55	.50
10,000	2	Chicago Tel.	.55	.50
5000	3	Trefz	.50	.45
7500	3	Trefz	.45	.40
10,000	3	Trefz	.55	.50
25,000	3	Wirt	.65	.60
50,000	4	Trefz	.90	.85
15	25	Dejur	.95	.90
20	25	Ohmite	.95	.90
25	25	Dejur	.95	.90
50	25	Dejur	.95	.90
100	25	IRC	.95	.90
200	25	Dejur	1.20	1.10
500	25	Dejur	1.20	1.10
1000	25	Dejur	1.30	1.25
3000	25	Dejur	1.40	1.35
15,000	25	Dejur	1.70	1.60
20,000	25	Dejur	2.00	1.95
150/Switch	50	AN 3155-50	2.15	2.00
200/W Switch	50	IRC	2.15	2.00
800	50	Ohmite	2.60	2.50
10,000	50	Dejur	2.95	2.75
15	60	Ohmite	2.95	2.75
15	75	IRC	2.95	2.75
750	150	Ohmite	3.95	3.85
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The Progressive Radio "Edu-Kit" offers you a home study course at a rock bottom price. Our Kit is designed to train Radio Technicians, with the basic facts of Radio Theory and Construction Practice expressed simply and clearly. You will gain a knowledge of basic Radio Principles involved in Radio Reception, Radio Transmission and Audio Amplification.

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The Progressive Radio "Edu-Kit" was specifically prepared for any person who has the desire to learn Radio. The Kit has been used successfully by young and old in all parts of the world. It is not necessary that you have even the slightest background in science or radio.

The Progressive Radio "Edu-Kit" is used by many Radio Schools and Clubs in this country and abroad. It is used by the Veterans Administration for Vocational Guidance and Training.

The Progressive Radio "Edu-Kit" requires no instructor. All instructions are included. All parts are individually packaged, and identified by name, photograph and diagram. Every step involved in building these sets is carefully explained. You cannot make a mistake.

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The Progressive Radio "Edu-Kit" uses the principle of "Learn By Doing." Therefore you will build radios to illustrate the principles which you learn. These radios are designed in a modern manner, according to the best principles of present-day educational practice. You begin by building a simple radio. The next set that you build is slightly more advanced. Gradually, in a progressive manner, you will find yourself constructing still more advanced radio sets, and doing work like a professional Radio Technician. Altogether you will build fifteen radios, including Receivers, Amplifiers and Transmitters.

THE PROGRESSIVE RADIO "EDU-KIT" IS COMPLETE

You will receive every part necessary to build 15 different radio sets. This includes tubes, tube sockets, variable condensers, electrolytic condensers, mica condensers, paper condensers, resistors, tie strips, coils, tubing, hardware, etc. Every part that you need is included. In addition, these parts are individually boxed, so that you can easily identify every item.

TROUBLE-SHOOTING LESSONS

Trouble-shooting and servicing lessons are included. You will be taught to recognize and repair troubles. While you are learning in this practical way, you will be able to do many a repair job for your neighbors and friends, and charge fees which will far exceed the cost of the Kit. Here is an opportunity for you to learn radio and have others pay for it.

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Manufacturers' Literature

Readers are asked to write directly to the manufacturer for the literature. By mentioning RADIO & TELEVISION NEWS, the issue and page, and enclosing the proper amount, when indicated, delay will be prevented.

SUN RADIO CATALOGUE

Sun Radio & Electronics Co., Inc., 122-124 Duane Street, New York 7, New York has just issued a comprehensive catalogue covering items of interest to industry, universities, research laboratories, broadcasting stations, service dealers, engineers, and experimenters.

Designated Catalogue No. 51, this 132-page catalogue contains literally thousands of items in the radio and electronic field. In addition to listing all sorts of component parts, the catalogue contains data on test instruments for servicing and industrial applications, meters, rectifiers, power supplies, inverters, selenium rectifiers, transformers, tubes and tube accessories, racks, cabinets, chassis, connectors, wire, cable, radio hardware, tools, and batteries.

Requests for copies may be made either by mail or by calling in person at the company's headquarters.

NEW INSTRUMENT STANDARD

The American Standards Association of 170 East 45th Street, New York 17, New York has issued its first standard covering portable and laboratory indicating instruments.

Entitled "Electrical Indicating Instruments," the new standard (C39.1-1951) covers both a.c. and d.c. instruments such as ammeters, voltmeters, single phase and polyphase wattmeters, power factor meters, varmeters, and frequency meters.

Charts covering 33 types of panel, switchboard, and portable equipment list rated accuracy, position influence, external temperature influence, sustained operation influence (maximum), external field influence (maximum), and magnetic platform effect (maximum).

The definitions and classification of materials for switchboard and panel instruments have been completely revised as well as extended to include portable and laboratory instruments.

This standard has been developed by a committee representing manufacturers, public utilities, testing laboratories, and government departments under the procedures of the ASA.

Copies of the new standard are $1.60 each.

SELENIUM RECTIFIER DATA

Of particular interest to engineers, *Sarkes Tarzian, Inc.* of 415 North College Avenue, Bloomington, Indiana has recently published a 64-page selenium rectifier handbook which contains practical information on power conversion and suggested applications of selenium rectifiers.

In addition to providing complete information on selenium rectifiers that have found wide use in radio and television receivers, the handbook contains data on power rectifiers for high current application and high voltage enclosed rectifiers for low current applications.

In requesting copies of this handbook, address your letter to the Rectifier Division of the company. The booklet is 25 cents and payment should accompany your request.

TRIAD TRANSFORMERS

Catalogue TR-51 covering the company's complete line of electronic transformers has just been released by *Triad Transformer Manufacturing Co.* of 2254 Sepulveda Blvd., Los Angeles 64, California.

Containing detailed specifications, illustrations, and price information on the electronic transformer line, the catalogue features 35 new items, including a series of transformers developed especially for regulated power supplies, television components, and a complete description of the company's new high fidelity amplifier kit.

Requests for copies of Catalogue TR-51 should be sent direct to the company.

CARRIER AMPLIFIER

A 4-page data sheet describing the company's Type 1-118 carrier amplifier has just been issued by *Consolidated Engineering Corporation* of 300 North Sierra Madre Villa, Pasadena 8, California.

The new bulletin, in addition to describing the applications of this new unit, carries complete specifications, details on the meter and controls, power supply data, information on the oscillator, input and output devices, and lists the special safety features of the instrument.

Persons engaged in mechanical-industrial design and development will undoubtedly wish to secure a copy of this publication which is free on request.

RCA SERVICE DATA

Radio Corporation of America, Camden, New Jersey has announced the availability of Volume 5 of the *"RCA Victor* Service Data" book.

This volume which provides service and technical data on all 1949 models of *RCA Victor* television and radio receivers and *Victrola* phonographs is available to service techni-

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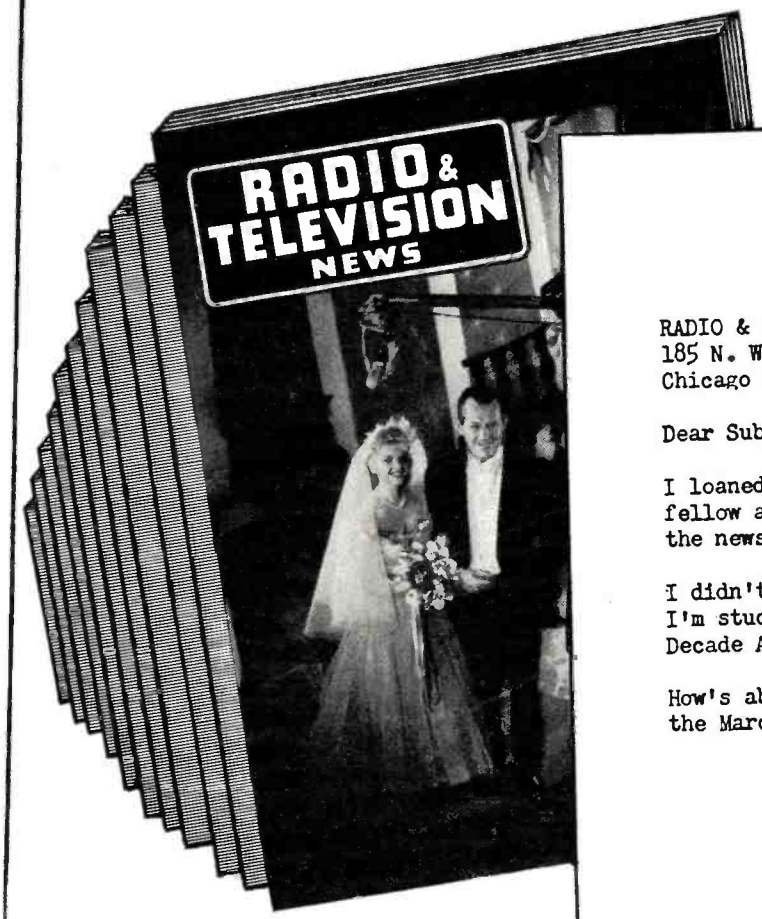
open letter *From a Subscriber:*



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March 14, 1951

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185 N. Wabash Ave.
Chicago 1, Ill.

Dear Subscription Mgr.:

I loaned my March subscription copy to a fellow at my shop who couldn't get one at the newsstand.

I didn't get it back, and now it looks like I'm stuck without that article on Resistance Decade Applications.

How's about sending me a duplicate copy of the March issue?

Yours truly,

Ralph K. Davis

Ralph K. Davis

p.s. I've got every copy back to 1941. Find them invaluable reference in my job as chief radio inspector.

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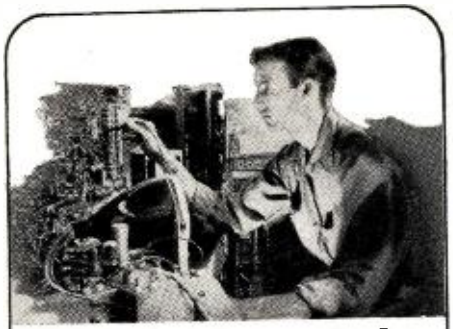

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cians through the company's distributors.

Designed as a permanent reference volume and bound in hard covers, the book contains the information provided by the single service data booklets issued during 1949 for individual *RCA Victor* instruments.

Essential servicing information covered by the volume includes schematic and wiring diagrams, electrical and mechanical specifications, alignment and adjustment procedures, complete service parts lists, and chassis layouts.

CARTRIDGE REPLACEMENT

Electro-Voice, Inc. of Buchanan, Michigan is currently offering copies of its handy new phono cartridge replacement chart and guide to service technicians and established radio parts distributors.

The chart, which measures 11 by 16½ inches open, can be hung on the wall or folded to 8½ by 11 inches for counter or binder use.

The new publication provides a comprehensive up-to-date replacement listing covering the products of several manufacturers, tells when to replace phono cartridges, how to make the proper tests, and the replacement type unit to use.

The company will send a copy of this chart, No. 161, to those writing direct or copies may be secured from the company's distributors without charge by applying in person.

VIDEO SWEEP GENERATOR

Manufacturers Engineering & Equipment Corp. of Willow Grove, Pennsylvania has recently issued an 8-page booklet covering its "Sweepmaster I," a video sweep generator.

The booklet includes a photograph of the instrument, complete details on the unit's rate and range, operation, applications, and information on mechanical specifications, electrical specifications, tube complement, and, finally, applications of the instrument.

The applications of the unit include the alignment of broadband amplifiers, checking termination of cables, and the location of self-resonant parts.

Copies of the booklet are available without charge when requests are sent direct to the company.

-30-

Carrier Current

(*Continued from page 41*)

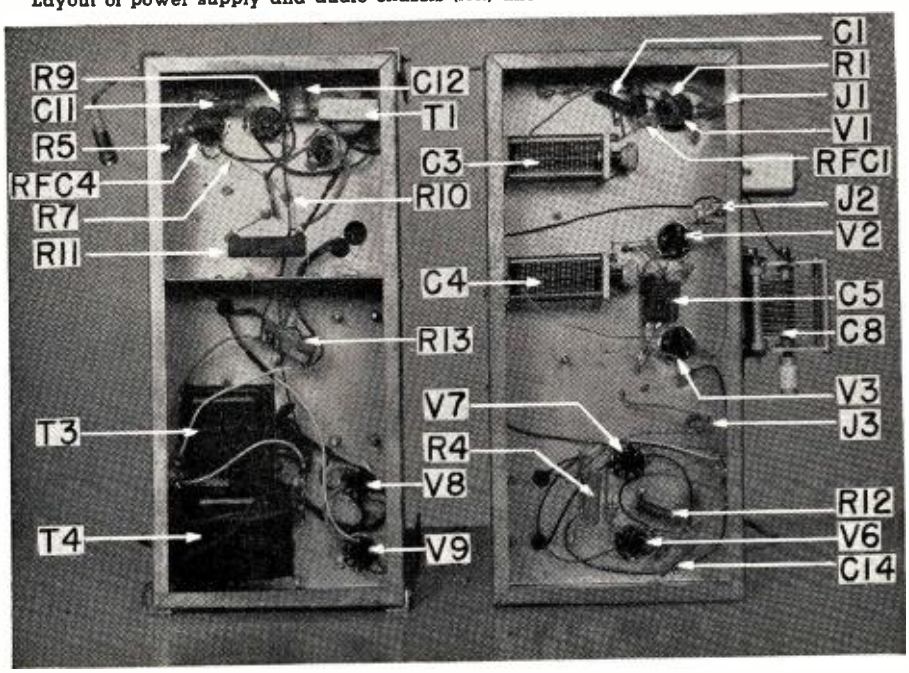
It will be necessary to vary condenser C_4 in the grid tank of the 807's as this varies the reflected load on the 6L6. This is sometimes necessary to get the 6L6 to oscillate. Next insert the meter plug into J_2 and tune C_4 for maximum reading. While doing this make sure that the meter polarity has been reversed for tuning the 807 grid stage. After tuning the grid tank for maximum, it may be necessary to retune the oscillator stage if major changes have been made. Tune the r.f. final last. Of course it is necessary to have the coupling link connected to the 115 volt line or some other form of dummy antenna. Tune the final stage for minimum reading.

After the unit was installed in the private home selected as the transmitter site, the oscillator and grid tanks were tuned. The meter was then left in the plate circuit of the final r.f. stages.

All that is necessary when putting the unit into operation is to turn the unit on, and then tune the final for minimum reading as indicated on the meter. The control for performing this operation is on the outside of the case where it is easily accessible to the operator.

-30-

Layout of power supply and audio chassis (left) and r.f. and modulator chassis (right).



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International Short-Wave

(*Continued from page* 106)

nounces next *English* periods for 0700 and 1015 over 15.270, but Pearce has not been able to hear these. Balbi, Calif., reports *Radio Pakistan* on 11.73 with news 1000. Stark, Texas, notes Pakistan on 9.750 to 0815 sign-off, good signal; no location mentioned. Says the 9.645 outlet is barely audible around 0825; still uses 7.140 for news 0700. *Radio Sweden* reports Pakistan heard on 9.490 at 1330 and signing off on that channel at 1415. Staples, England, lists Pakistan as heard on 15.27 with news 0110-0120.

Panama — HP5B, 6.032.5V, heard lately on this channel; measured at 0630; previous measurement was 6.030. (Oskay, N.J.)

Paraguay—ZPA1, 6.275, Asuncion, *Radio Nacional,* heard 1800 with considerable QRM. (McWalter, Scotland)

Peru—OAX4Z, 5.8985V, Lima, heard 0600 almost every morning; previous measurement was 5.894. (Oskay, N.J.)

OAX4J, 9.3342, Lima, heard with weak signal 2135; Latin American music. (Treibel, Washington State)

Philippines — DZH7, 9.73, Manila, heard 0500 with news; was parallel DZH6, 6.03; evidently dropped 15.30 for "local evening" period; the 15.300 channel, however, is heard at weak level 1800-2000. (Balbi, Calif.) *Radio Australia* says the 15.300 frequency is listed 2 kw. and that programs are beamed in a westerly direction.

Dale, Calif., reports DZB2, 3.320, at 0800-0900 sign-off (some days is on the air *after* 0900).

Poland—Warsaw, 6.115, noted recently with news 1300 during its 1245-1315 session. (Pearce, England)

Portugal—Lisbon noted on 9.747 at 1600. (Stark, Texas) Noted in Britain on 11.955 from 1230 sign-on and closing 1430. (Pearce) Heard on 11.955 at 0730, good level in Texas. (Stark)

Lisbon noted on approximately 15.380 signing on with "A Portuguesa" at 0915; heard on 11.955 at the same time but seemed to be carrying a separate program there. (Pearce, England) Lisbon appears to have dropped 11.040 and to be using 9.745 with 11.955 afternoons. (Bellington, N.Y.)

Portuguese Guinea—CQM4 is again using 5.8392 (measured); CMQ7, 6.993, appears to have been discontinued; noted on 5.8392 at 1740. (Oskay, N.J.) Closes 1800 with "A Portuguesa." *No English reported.*

Verified reception on approximately 5.840 but QSL card listed frequency of 7.948. (Pearce, England)

Roumania—A World Radio Handbook Bulletin lists full schedule of the daily short-wave service of *Radio Bucharest* as 0300-0315, 9.250; 0745-0830, 1130-1500, 11.887, 9.250, 6.210; German at 1300-1330; *English* at 1400-1430; French at 1430-1500.

Sao Tome—The 4.807 channel noted 1506 with news in Portuguese; call at 1515. (Pearce, England)

Saudi-Arabia—Djeddah now signs on

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"S" METER . . . *An outstanding buy!*

Here is a beautiful instrument exactly suited for use as an "S" meter. Illuminated face, (supplied with miniature lamp) with a full-scale reading of 5 ma. a standard value for most "S" meter circuits. Diameter across face is 2⅜", black bakelite case. reverse-set pointer. New, surplus . . . limited quantity. Only.....$1.95 ea.

836 hi-vacuum rectifiers. 2 for.....$1.50

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10H, 200 ma choke. Hermetically-sealed steel case. Also has hum-bucking tap. A beautiful item only $1.98.

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Charger or fil. trans. Pri. 110V, 60 cycle. Secondary, 9-10-11-12-13 volts @ 1.2 A. Fully cased. A buy at $1.49.

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Power transformer. 750V, CT @ 200 ma. 2.5V at 8a. 5V at 8A. 6.3V at 6A. Pri. 115V, 60cy. AC. Has electrostatic shield. Upright mount. Shipping weight 11 lbs. Only $5.95.

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Power transf. Pri. 115V. AC. 60 cy. Sec. 520-0-520 @ 200 ma. .....$5.25 ea.

Power transf. Pri. 115V, 60 cy. AC. Sec. 310-0-310 at 50 ma. Cased. upright mount..... .....only $1.95 ea.

Output transf. 50L6 to voice coil.....79c ea.

Choke, 6 henry, 200 ma. Strap mtg. ....only $1.95 ea.

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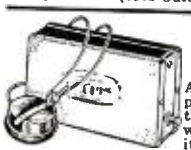
Complete kit (less outer housing) . . . .only $4.95



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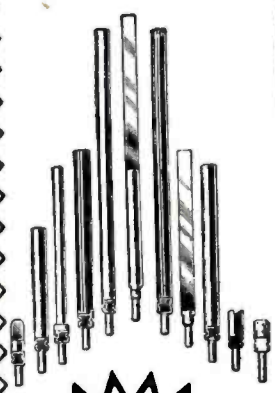

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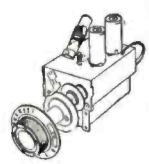

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its "local evening" beam at 1130; close-down varies; noted as late as 1310 one day, another day closed 1232; noted on channels of 11.950, 11.850, 5.975, 3.950; all-Arabic programs. (Pearce, England) Noted on approximately 5.975 around 2300-2345 (sign-off varies). (Bellington, N.Y.) Should be parallel at that time on 11.75, 11.85, 11.95, and perhaps 9.645.

South Africa — SABC's *"newest"* service is called "The All-Africa Service of the SABC." Schedule is Mon.-Fri. 0330-0700, 0900-1045, 1100-1505; Sat., Sun. 0330-1045, 1100-1515; frequencies are 17.750 *or* 14.230 until 1045, and 11.930 *or* 9.870 from 1100; carries "A" (*English*) programs on Tues., Thurs., Sat., "B" (Afrikaans) programs on other days. (*World Radio Handbook* Bulletin) These broadcasts have been reported as heard by Pearce, England; Bellington, N.Y., others.

Radio Australia says that SABC, Johannesburg, is eager to receive reports from all parts of the world on reception of these transmissions and will acknowledge all *correct* reports by QSL card.

Southern Rhodesia—Salisbury, 3.320, heard with news 1300; good level in Scotland. (McWalter)

Spain—A QSL from *Radio Nacional de Espana,* Madrid, lists frequency as 9.368, power as 40 kw. (Cohn, Ill.) This one now announces during *English* periods as "Spanish National Radio, Madrid." (Pearce, England)

EDV10, listed 7.170, seems to be around 7.180 of late; noted fair to good 1500-1900 sign-off. (Saylor, Va.)

Valladolid, 7.005, noted 1600. (Harris, Mass.)

Radio Nacional de Espana en Malaga now appears to have *English* broadcast on Mondays around 1600-1630; frequency is 7.022; the *English* period normally consists of Spanish songs, folklore, commentary. (Pearce, England)

Alicante, 7.950, noted with strong signal recently 1730-1800. (Sutton, Ohio)

Radio Sweden says *Radio SEU,* Madrid, has moved from 7.190 to 7.160. Ferguson, N.C., gives frequency as 7.160V, heard at 1655.

Madrid noted on measured 15.6257 with music when tuned 1135; closed at 1145 with march. (Ferguson, N.C.)

Spanish Morocco—Radio Tetuan is heard at 0900 over 6.030. (McWalter, Scotland)

Sweden — Stockholm 10.76, heard with strong signal around 1940. (Bellington, N.Y.)

Switzerland—Berne has "Mailbag" on Fridays 0815 over HER5, 11.865; HER6, 15.305, and HER7, 17.784, in *English* beam to Southeast Asia and Japan (this transmission is at 0745-0930); and the "Mailbag" is repeated at 1000 over 11.865 and 17.784 for India and Pakistan (this beam is at 0945-1130). (Grove, Ill.) The 11.865 and 17.784 channels noted parallel at 1145. (Baines, Nova Scotia)

Tahiti—Radio Tahiti, Papeete, at the time this was compiled, was being heard by Balbi, Calif., daily 2300-2345

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on 6.140; signal fair. Some U.S. DX-ers (both East and West Coasts) have heard a station signing on 0200 with "La Marseillaise," using French, on 6.030 or 6.040 that they believe may be *Radio Tahiti*. Has not been reported to me lately as having been heard on former 12.080 or 6.982.

Taiwan—At the time this was written, Taipeh was still using 11.735 and 15.235 at 2300-0100 (first hour in *English*); 15.235 channel seldom heard. (Balbi, Calif.) The 11.735 outlet is noted early mornings but usually is buried by COCY, 11.740, Cuba, by 0715. (Ferguson, N.C.) Still noted on 7.133 with news 0630, by Ferguson.

Tangiers—Radio Africa, near 7.125, noted after 0900. (Pearce, England) *Radio Sweden* lists schedule for this one as 0800-1100, 1400-1900.

Trinidad—VP4RD, 9.625, Port-of-Spain, heard in Scotland 1530 with music. (McWalter)

Turkey—TAS, 7.285, still noted with *English* broadcast 1600-1645; some days runs as late as 1700. (Goodman, Va.) The 9.465 (TAP) outlet parallels.

USI—YDB3, 7.272, Djarkata, noted 1040 with music; signing off 1130. (Russell, Calif.)

USSR—Radio Moscow noted opening in *English* on 15.180 at 0900. (Stark, Texas) This likely is for Asia.

Heard in *English* 0115-0130 on 7.34, 7.32 (announced), 6.11; also noted with *English* in progress at 1635 on 6.133, 6.000. (Bellington, N.Y.)

Moscow noted signing on 0200 on 7.250 with *English* talk to USA. (Sutton, Ohio) Moscow is noted daily on 6.02 with *English* from around 1540 or earlier to 1600 when says will return 1630-1730 on 6.00, 6.09, 7.34, and 1034 kc. m.w. (Bellington, N.Y.)

Current channels announced by *Radio Moscow* for its North American (*English*) daily beam are 15.23, 11.89, 9.69, 7.29, 7.25, 6.01; at 1820-2300. (Fox, D.C., others)

Moscow noted on 9.670 with *English* in progress at 1702. (Harris, Mass.) Heard recently on 11.960 with news 1500-1515. (Sutton, Ohio)

Radio Tashkent, 6.825, has been reported lately around 1100 with talks in *English;* sometimes has severe CWQRM. (*ISWL* Bulletin)

Petropavlosk, 6.07, heard irregularly, some days entirely off the air; usually signs on 0330, off 0400, back 0530. (Balbi, Calif.)

A Russian outlet on 7.180 usually opens at 2200; at times at least is parallel with 5.980; has clock signal for "6 a.m." (Stark, Texas)

Stalinbad, 7.445, noted 0100-0130 in Russian. (Sutton, Ohio)

Vatican—HVJ's 1000 news is announced for the 19-, 25-, and 31-m. bands. Noted recently on approximately 11.660 instead of regular 11.740; announced next *English* period for 1315 on 25.55, 31.10, 50.26 and 196 meters. Continued at 1015 with Polish. (Pearce, England)

Venezuela—YVKX, 3.500, Caracas, noted 2100-2230 sign-off; fine level in Va. (Saylor) YVMQ, 4.940, Baraquisimeto, noted 2110 with music; YVKF,

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1A6	1.69	3V4	.98	6BH6	1.90	6SA7	1.40	7E6	1.09	12SJ7	.91
1A7GT	1.04	5R4GY	1.49	6BJ6	1.90	6SA7GT	1.40	7E7	1.09	12SJ7GT	.89
1B3GT	1.77	5T4	1.70	6BQ6GT	2.95	6SB7Y	1.20	7F7	1.04	12SK7	1.65
1B5	.95	5U4G	1.25	6C4	1.10	6SC7	1.40	7F8	2.35	12SL7GT	1.05
1C6	.85	5V4G	2.10	6C5	.81	6SD7GT	1.27	7G7	1.29	12SN7GT	2.00
1C7G	.95	5W4	.81	6CB6	1.60	6SF5	.91	7H7	1.89	12Z3	.97
1D7G	.95	5X4G	.89	6CD6G	3.75	6SF7	.97	7J7	1.31	14A7	1.05
1F4	.75	5Y3GT	1.17	6C6	.87	6SG7	1.80	7K7	1.31	14B6	1.05
1F5G	.95	5Z3	.97	6C8G	.97	6SH7	1.24	7L7	1.31	14Q7	1.05
1G4GT	.97	5Z4	1.17	6D6	.87	6SH7GT	1.29	7N7	2.20	14R7	1.27
1G6GT	1.17	6A3	1.37	6D7G	.87	6SJ7	1.59	7Q7	.94	25L6GT	1.00
1J6G	.95	6A4	1.59	6E5	1.09	6SJ7GT	1.59	7R7	1.13	25Z6GT	1.25
1L4	.95	6A6	1.31	6F5	.81	6SK7	1.19	7S7	1.31	30	.88
1LA6	1.30	6A7	1.04	6G6	1.03	6SK7GT	1.19	7T7	1.01	32L7GT	1.67
1LC5	1.30	6A8GT	1.04	6F6G	1.03	6SL7GT	1.19	7V7	1.31	35Y4	.89
1LC6	1.30	6AB7	1.39	6F7	1.37	6SN7GT	1.75	7W7	2.40	35Z5GT	1.45
1LD5	1.30	6AC7	1.70	6F8G	1.47	6SQ7GT	1.25	7Y4	.89	50A5	1.33
1LN5	1.30	6AF6G	1.31	6G6G	.97	6SR7	1.50	7Z4	.93	50B5	1.60
1N5GT	.97	6AG5	1.90	6H6	1.13	6SS7	.89	12A6	.97	50C5	1.02
1P5GT	.97	6AG7	2.87	6J5	.79	6T8	2.70	12A8GT	.99	50L6GT	1.60
1Q5GT	.97	6AH6	3.45	6J5GT	.80	6U5	1.10	12AL5	1.80	56	.83
1R5	1.05	6AK5	2.75	6J6	2.90	6U7G	.89	12AT6	1.40	77	.83
1S4	1.19	6AL5	1.50	6J7	1.70	6V6GT	1.19	12AT7	2.65	2051	.89
1S5	.97	6AQ5	1.45	6J7GT	1.70	6W4GT	1.40	12AU6	1.85	28D7	1.33
1T4	1.04	6AR5	1.40	6J8G	1.39	6W6GT	1.60	12AU7	2.20	VR105	1.49
1T5GT	1.30	6AS5	1.85	6K6GT	.80	6X5GT	1.00	12AV6	1.35	VR150	1.65
1U4	.97	6AS7G	6.50	6K7	.75	6Y6G	1.19	12AV7	3.00	304TL	22.50
1U5	.94	6AT6	1.30	6K7GT	.79	7A4	.97	12AX7	2.40	307A	9.95
1V	.97	6AU5GT	1.75	6K8	1.04	7A5	1.09	12BA6	1.45	703A	3.95
1X2, 1X2A	1.77	6AU6	1.60	6K8GT	1.04	7A6	.89	12BA7	2.00	705A	2.55
2A3	1.27	6AV5GT	1.85	6L5G	.97	7A7	1.59	12BE6	1.55	707B	14.95
2A5	.88	6AV6	1.30	6L6	2.25	7A8	.89	12BH7	2.00	803	5.95
2A6	.88	6AX5GT	1.45	6L6G	1.97	7B4	1.39	12C8	1.34	805	4.95
2A7	.88	6B4G	1.89	6L7	.97	7B5	1.49	12F5	.89	807	1.85
2C44	1.49	6B7	1.35	6L7G	.97	7B6	1.49	12H6	1.65	813	8.95
2E22	1.37	6B8G	1.37	6N7	1.40	7B7	.89	12J7GT	.99	9004	.56
2X2/879	1.31	6BA6	1.60	6N7GT	1.25	7B8	.89	12Q7GT	.89	9006	.55
3A5	1.25	6BA7	1.20	6P5GT	1.23	7C4	.89	12SA7	1.03		
3D6/1299	.68	6BC5	1.90	6Q7	.87	7C5	.88	12SF5	.77		
3Q4	.97	6BD6	1.90	6R7	.97	7C6	1.59	12SF5GT	.79		

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5 WATT

	10 or more each	Price each
75 Ohms	$0.19	$0.21
90 Ohms	.19	.21
200 Ohms	.19	.21
5000 Ohms	.20	.22
6000 Ohms	.20	.22

10 WATT

1.5 Ohms	.19	.21
18.5 Ohms	.19	.21
23.1 Ohms	.19	.21
100 Ohms	.20	.22
300 Ohms	.21	.23
450 Ohms	.21	.23
10,000 Ohms	.22	.24
20,000 Ohms	.22	.24

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40—20—150 V ..... .39

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4.880, Caracas, heard 2050 with music, clock chimes at 2100. (Russell, Calif.) Incidentally, YVMQ, 4.940, signs off 0017.

YVMU, 3.340, heard after 2000; YVKP, 3.400, Caracas, noted after 2100; YVQE, 3.420, Merida, heard evenings. (Sutton, Ohio) YVKD, 5.062, Caracas, noted 2135 in Washington State. (Treibel)

Yugoslavia—Radio Belgrade, 6.100, heard at 1505 in foreign language; fairly good signal in N.Y. (Bellington)

* * *

Last Minute Tips

An Indian DX-er has informed Graham Hutchins, DX Editor, *Radio Australia,* that Nepal operates on 6.60 and 7.000 and has two programs daily beginning at 0330 and 0915, respectively. The first transmission apparently is of short duration, consisting of news in Nepali. The second transmission includes 0915 national songs and announcements followed by news in Nepali; local news and talk continue to 0940, then a five-minute newscast is given in Hindustani, followed by more national songs to 1003 closedown. A later report from *Radio Australia* says the 7.000 channel has *English* announcement at 0915 sign-on. At the time this was compiled, Nepal had not been reported as picked up in the USA.

CKLO, Canada, appears to be on 9.635 rather than listed 9.630 now.

INEXPENSIVE TV ANTENNAS

By FRANK R. CANNING

LIVING IN A "Garden Apartment" project where outside antennas were frowned upon by the landlord, I was forced to put my TV antenna inside the attic space of the building. While in the process, I wanted to experiment with the effect of various types of beams, but the expense of such a program seemed prohibitive. However, watching my wife wrap up left-over food in some of the household aluminum foil so popular these days gave me an idea! As the antenna would be indoors out of the weather, there was no need of building a strong structure—so why not make it of foil?

Ten minutes later such an antenna was in place and working very well; an antenna consisting of a piece of cardboard and a strip of foil. With all doubts set to rest, work commenced in earnest, and a rapid series of antennas sprouted forth. Some of the types tried are shown in the illustration. All of these were made by pasting sheets of household aluminum foil on large cardboard or plywood sheets, which were either tacked to the roof rafters or suspended by string so they could be rotated.

The four-element yagi was built of narrow wood strips—the kind known as "furring strips." Each element was wrapped with the aluminum foil; in the antenna element a half-inch or so at the center is left uncovered.

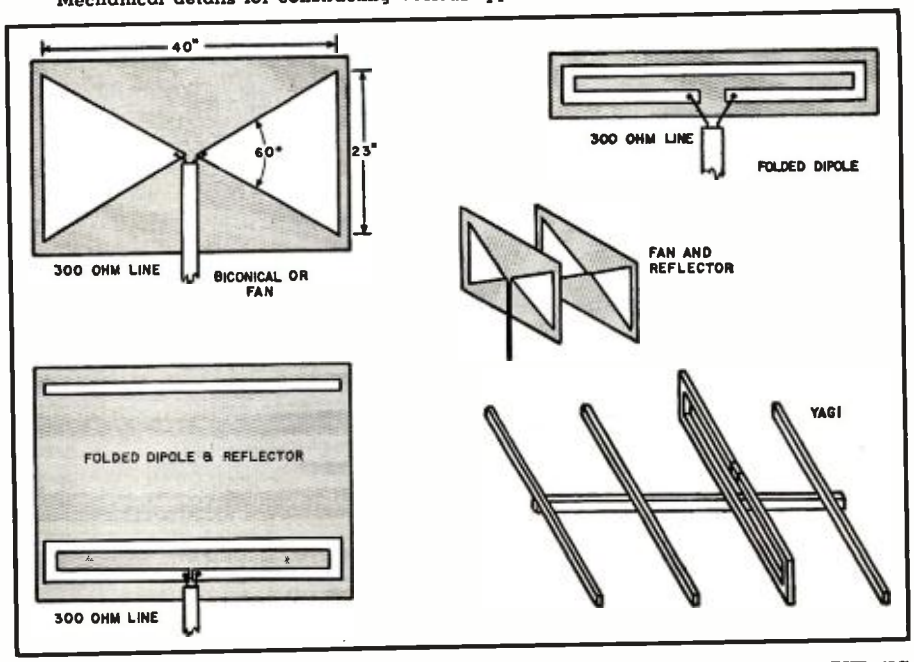
For persons living in fringe areas where a separate high-gain array is needed for each channel, such attic arrays offer a tremendous saving in cost—to put it mildly. A sixty foot roll of foil sells for well under a dollar, and contains enough material for dozens of arrays. Naturally, these antennas won't last a week if erected out-of-doors, but in nearly every case an indoor antenna will function just as well. Also, rain or snow have no chance of changing the antenna characteristics. If the feedline can be run down inside the house walls, its impedance cannot be changed by rain—a common trouble with outside installations.

Last, but not least, this idea will also serve for the amateur operator with lots of antenna ideas but no space in the backyard.

One word of caution: Better buy the wife another roll of foil when you start work—she won't be seeing very much of hers!

-30-

Mechanical details for constructing various types of antennas from aluminum foil.



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(Sutton, Ohio; Stark, Texas) CJCX, 6.010, Sydney, Nova Scotia, now has news 1715-1730. (Sutton, Ohio) Also noted here in West Virginia. Hoffman, N.Y., reports CHNX, 6.130, Halifax, Nova Scotia, good signal when checked at 1445 and again at 1835.

Radio Sweden reports that experimental transmissions are being carried out by Nordwestdeutscher Rundfunk from Osterloog, Germany, over a *new* short-wave transmitter on 11.795, output 400 watts; that the Home Service program is relayed on that channel at 0000-1800.

Radio International, 6.11, Tangiers, noted recently at 1530 with commercials, then announcements in French by male announcer. (Bellington, N.Y.)

GDX-aren, Sweden, reports a clandestine station operating in Spanish as *"Aqui Radio Euscadi"* on 6.090 at 0230-0245.

A *World Radio Handbook* Bulletin says CSB56, Portugal, is broadcasting on 6.003 at 0500-0700 on Sun. and 1200-1300 on Tues. and Thurs. (CS2EG, Lisbon, is listed on 6.003 but call may have been changed.—KRB)

Bellington, N.Y., has been hearing an unidentified station on approximately 6.090 with Arabic chanting around 2300-2330. Who?

John J. Oskay, N.J., an *ISW DEPARTMENT* monitor, now has a monthly page in *Short Wave News,* London.

An Arabic speaker heard on approximately 3.96 around 2300-2345 sign-off is believed to be Djeddah, Saudi-Arabia. (Bellington, N.Y.)

Anyone interested in getting International (*English*) Programs reinstated over ZYN7, The Ceara Radio Club, Fortaleza, Ceara, Brazil, should write to Raymond J. G. Staples, "The Listening Post," Quill Hall Farm, Amersham, Bucks., England, who is collecting such requests to forward to the station's officials.

* * *

Press Time Flashes

Stark, Texas, flashes that he has heard *Radio Belize,* British Honduras, on a *new* channel of approximately 4.965 with news at 1925; heard as early as 1835 and leaving the air 1933 with "God Save the King;" probably moved from 10.598.

Cushen, N. Z., reports Taipeh, Taiwan, heard on 3.220 from 0600 with calls BED9 and BED32; on Sat. has *English*-Chinese lesson 0600-0630; clear signal. (Radio Australia)

HRXW, 8.990, Comayaguela, Honduras, noted 2249-2307 with strong signal; all-Spanish. (Patterson, Ga.)

A recent *World Radio Handbook* Bulletin says *Radio Tibet* is operated by Reginald Fox, Lhasa, and is on the air Mon., Wed., Fri. at 1000-1100 on 7.255 in *English,* Chinese, and Tibetan. (*However, the report has never been reliably confirmed to me.*—KRB)

HOLA, 9.505, Panama, noted recently ending *English* session at 2200, asking for reports, then signing off. (Lane, South Dakota)

SIRA, Buenos Aires, has a *new,* at-

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SCR-718C	PP-39/TRC-2
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AN ARN-8	SO-7 Parts
APS-4	RC-79A
APS-6	APG-13A Radar
SCR-717	CP-11/APS-15
TBS 3, 4 or 5	R-5A/ARN-7
HS-33	MT-283/ART-13
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IE-56A	BC-348-L New
ARC-4	SCR-729 New
SCR-274 N	Plus many others

MODULATION TRANSFORMER. 50 watts, matches 807's to 2000 ohm RF load. Brand new.....$3.49
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BC-434A RADIO COMPASS CONTROL BOX. Complete with 5 Mil. meter. New.....$2.95

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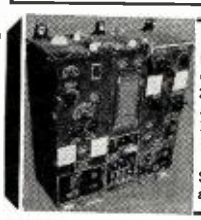
• ASB-7 RECEIVER. Contains 446 Lighthouse tube amplifier, 955 local oscillator, 955 mixer, 5 stages of I.F. amp, using 5—6AC7 tubes. Uses 2—6AC7 Video Amp, 1—6H6 detector and 1—6J5 tube. Used, good shape. Complete with tubes. $17.50
• ASB-7 TRANSMITTER. Contains 2—15E Osc. Tubes, 1—15R Rectifier Tube. Also has blower, relay and post transformer. Complete with coax tuning lines..... $6.95
• ASB-7 POWER SUPPLY. Supplies 2½ V, 5V, 6½V, 750V, 2000V, from 800 cycle source. Contains 2x2 rectifier, 5T4 Rectifier Tube, Filter Condensers and 1—6AC7 Tube. Complete with tubes. XInt shape..... $6.95

BC-1072 RADAR TRANSMITTER
Frequency range 157 to 187 megacycles. Comes complete with all tubes, 1½ amp GR Variac. Operates on 110V. AC 60 cycles and contains 3½" meter to measure up to 5 K.V. $18.95

TRIPLETT 1183-SC COMBINATION TUBE & MULTI-TESTER. Checks tubes, AF output, measures AC, DC volts, direct current, resistance, cap. Can be used as free-point tester for measurements at tube sockets while radio is on, without removing chassis. 0/10/50/250/500/1000 AC, DC volts. Ohms/volt; 10,000 DC, 2000 A.C. DC MA 0/1/10/50/250. Ohms: 0-500-15,000,0-1.5 or 15 megs. Used, good cond. Part of 1-56C test set. 14⅛"x7⅞"x4⅜". Weighs 5.2lbs. $49.50

CD-307 EARPHONE EXTENSION COROS. Used with HS-33 and HS-23 Head Sets. Used.....59¢



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10	UTC	500	60	12.95	7KV	Closed	28
12	Stancor	300	80	5.95	5KV	Closed	9
12	Thordarson	375	105	3.95	5KV	Closed	8
12	Thordarson	400	400	6.95	2KV	Closed	15
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A letter from 4VEH, Haiti, says the technician of the station is concentrating on getting a 10 kw. transmitter built before the materials get scarce; expects to retain present frequency; at press time the QSL cards were not yet ready for posting. (Herd, Dela.)

Radio Jamaica, Kingston, sent schedule of 0630-0900, 1200-1400 on 4.950; 1600-2300 on 3.360. Said "frequency of 3.480 was used in the days when this station was operated by the Government. Since July of last year, Radio Jamaica has been operated as a commercial station by the Jamaica Broadcasting Company, Ltd." An earlier verification listed power as 5 kw. and stated that the antennas were designed for 100 per-cent vertical incidence. (Lucas, N. Y.)

Port-au-Prince, Haiti, has been noted by Ferguson, N. C., on measured 8.990 around 1600-1900 sign-off.

Harris, Mass., Stark, Texas., others, report *Radio Martinique,* 9.700, Fort-de-France, can be heard from around 1730 (when a U. S. station leaves this channel) to around 1830. So far, all-French programs are noted.

Schedules from *Radio Warsaw,* Poland, list *English* sessions for 1200-1230 on 9.527; 1245-1315 on 11.740; 1350-1420 on 9.527, and 1630-1700 on 7.205; on Saturdays has a "Request Program" when the station answers listeners' requests for music and acknowledges reception reports; says programs for North America are transmitted on 9.570 at 1930-2000, 2300-2330, 0015-0100. (Fox, D. C.)

Moscow, 7.342, noted with news when tuned 0115; at 0130 said would be back at 0200. (Ferguson, N. C.)

OIX2, 9.555, Helsinki, Finland, heard 2200 with news for North America; at 2210 continues in language. (Ferguson, N. C.)

A *new* one is XECC, 15.205, Mexico City, noted around 1910 to 2120 when signal fades out; seems to relay XEMC and at 1945 announces "for a string of 'XE' outlets." (Ferguson, N. C.)

Rio de Janeiro, 15.3638, heard from around 1830 to after 1930 with native music; excellent level in Calif. (Russell)

Peking, 10.260, noted very weak signing on in Chinese 1800. (Leary, Indiana)

Prague sent North American schedules as 1900-2000, 9.550; 2100-2200, 9.55, 11.84; 2230-2300, 9.550, 11.840; first half-hour of first two transmissions is in *English* and third period is entirely *English.* (Garcia, N. J.)

XEBT, 9.625, Mexico City, noted

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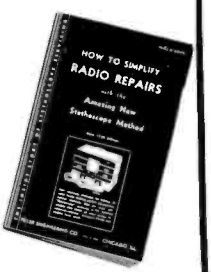

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weekdays around 2000-0100. (Boggs, Mo.)

HI4T, 5.98, HI2T, 9.735, noted recently with news and *English* talk at 2200. (Balbi, Calif.) Lately these Dominican Republic outlets have run to 2300 or later. (Stark, Texas)

FK8AA, 6.035, Noumea, New Caledonia, is still noted from 0200 to around 0530 sign-off; opens and closes with "La Marseillaise;" all-French programs. (Balbi, Calif.)

At press time, many DX-ers—from New York to Texas—were reporting reception of Monrovia, 6.025, Liberia, late afternoons to approximately 1845 sign-off.

Tips from Peddle, Newfoundland, include—Scutari, 8.170, Albania, 1445-1515. Nova Lisboa, 11.925, Angola, noted 1415-1545. ZEAF, Salisbury, Southern Rhodesia, sent schedule for 3.320 weekdays at 1055-1500, Sundays from 1300; 7.280 weekdays 0400-0615, Suns. from 0330; 9.490 weekdays 0400-0615, 1055-1500, Suns. 0330-0615, 1300-1500; was using 200 watts on 9.490 and 7.5 kw. on 3.320 when Peddle heard them; gave QRA of Office of the Chief Engineer, Dept. of Posts and Telegraphs, P.O. Box 37, Causeway, Southern Rhodesia. OTH, 9.210, Leopoldville, Belgian Congo, noted 1230-1330. OSK, 10.725, Brussels, heard with identification at 1430. OLR3B, 9.504, Prague, noted 1315-1330. HI2L, 3.290, Dominican Republic, heard 1900-2130. TY04, 9.115, Paris, noted with identification at 1600. Rome, 3.960, noted 1400-1730 parallel 6.250; heard on 9.570 in *English* 1415-1430; and in *English* 0600-0630 on 21.580, 17.750, 15.120, 11.810. Belgrade, 15.230, Yugoslavia, noted recently directed to BBC, London, at 1030-1045. CR5SB, 17.677, Sao Tome, noted Sundays 0700-0800, off with "A Portuguesa." TGWB, 6.440, Guatemala, noted with *English* announcement around 1955.

Finally, from Rio de Janeiro, Serrano sends these flashes—*Radio Tamandare* is a *new* station in Recife, Pernambuco, owned by "Emissoras Associadas," Brazil's greatest radio network; has been testing on 3.265 with 1 kw. and on m.w. with 20 kw. *Radio Arapuan,* Brazil, may have a s.w. outlet in the tropical band soon. La Paz, approximately 9.500, Bolivia, is heard at 1900. *New* is CE1515, 15.15, Santiago, Chile, *"Radio Corporacion;"* every half hour announces in Spanish, after gongs, and sometimes asks for reports; heard from 1100 to after 1800; signal poor to good; announces stations as CB114, m.w., clear channel of 1140 kc., 50 kw.; CE619, 6.19, 49-m. band; and CE1515, 15.15, 19-m. band. (The latter is also reported by Ferguson, N. C., as late as 2220.

* * *

Acknowledgment

My thanks, fellows, for the splendid reports during the winter months. Please keep them coming in spring and summer to Kenneth R. Boord, Short-Wave Editor, 948 Stewartstown Road, Morgantown, West Virginia, USA. . . . . KRB

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Eliminating TVI Caused by the BC-610

Crowded urban conditions make it more important than ever to stop annoying transmitter radiation.

By
R. H. MITCHELL,
W4RQR/5

WHEN the writer returned from overseas duty in 1947, TVI was just a problem encountered by other hams. The transmitter in use was a BC-610, and we were sure that, when TV invaded our neighborhood, the excellent design of the transmitter would guarantee no TVI.

Fortunately, until 1949, we lived far enough from anyone owning a television set to make that premise valid. Then we moved into a six-family apartment house in Quantico, Va. One television receiver was already installed in the building. Several more families were considering installing sets. There were at least a dozen more sets within 100 yards of the new transmitter location. Quantico is thirty to forty miles from the nearest TV stations, so the writer expected trouble.

The transmitter was installed. Checks with S-36 and SX-42 receivers showed tremendous harmonics all through the v.h.f. ranges. The writer then purchased a *Hallicrafters* seven-inch metal cabinet receiver. All channels were blocked by the transmitter six feet from the TV receiver. So, we started trying every measure we'd read about.

As one ham described it, the trouble wasn't TVI. It was TVE—television elimination. Five months later, we had the transmitter clean enough so that no interference was discernible in the receiver, other than a change in picture size with transmitter keying. This was cured quite easily by using a constant voltage transformer on the television receiver.

Heroic modifications had been made during this period. The r.f. deck of the BC-610 had been shielded, meters shielded, all leads to the supply deck shielded and double filtered, v.h.f. chokes and r.f. chokes installed, extra bypass condensers installed, line filters installed, *LC* ratios of all tuned circuits decreased, plate-to-ground and grid-to-ground condensers installed on all stages, traps tried (and discarded), low-pass filters of several types tried, one of the parallel 807 buffers removed, plus other measures. We found it necessary to install a line filter and high-pass antenna filter at the receiver in the early stages of modification.

During the entire period, at least two checks were made after each measure had been tried. The first was made with the TV receiver, in order to get a qualitative check on the success of the measure; the second with the S-36 for a quantitative check. The S-36 was four feet from the BC-610. Additional checks were made from time to time on an SX-42, some thirty feet from the transmitter, and on an S-37 that we couldn't borrow long enough to use continuously.

Certain facts stood out on our final tally sheet. Virtually every measure tried (with the exception of the tuned traps) did some good. Most of them, unfortunately, made only one or two decibels difference in the "interference quotient" of the rig, and the most difficult modifications made seemed to have done the least good. Three measures, the easiest three, had done the most good. These were a shielded low-pass filter, the shield bolted to the transmitter; a shielded line filter, also bolted to the transmitter; and double coaxial lines used for the leads from the a.c. outlet to the transmitter line filter.

Our earlier attempts with the antenna low-pass filters had been made with the filter lying on a table, some two feet from the transmitter. That wasn't effective, so we removed the antenna terminals from the 610, bolted the filter across the holes left on the side of the 610, and ran a lead from the 610 output link into the filter through a hole drilled in the filter can. (Incidentally, several home-built filters were tried, and all worked well. They varied from a 3-section to a 10-section with 6 M-derived sections.)

The same considerations applied to the power line filter. Unless it was shielded, and the shield bolted to the transmitter back, we might as well not have had the filter. The BC-610 uses a "Twistlock" power plug, so the filter can't be bolted over the hole for the plug. We compromised here, and ran flexible four inch leads from the power plug into the filter.

The last measure listed above, the double coaxial power leads, whipped a baffling problem. After everything else had been done, there was still some interference on the two high

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channels (7 and 9) we were using for a check. The interference was traced to the BC-610 power lead, and could be eliminated on one channel or the other, by coiling up the power lead or by moving it about. Then, it was noticed that if someone stood near certain points on the power lead, the interference increased greatly. We finally decided that the trouble was caused by incomplete bypassing action of the condensers in the line filter unit. Various condensers of all sizes were tried in the unit, but all were ineffective. (The "Hy-Pass" condensers were not available at the time. These might have cured the trouble.) RG-8-U had worked well in high voltage leads, eliminating TVI traceable to such leads. So, we cut two eight-foot lengths of RG-8-U and used them for power leads. The shields of the RG-8-U were tied together at each end, the shields on the a.c. end grounded to a waterpipe, and the shields on the filter end grounded to the transmitter.

That cured the trouble. Evidently, the 30 $\mu\mu$fd. of capacity in each foot of the RG-8-U acted as a good long-path v.h.f. bypass.

Thus, after five months, the 610 caused no TVI on our receiver. 80. 40, 20 and 10 meter bands were used. On 80, we used a vertical antenna which ran for forty feet within three feet of our TV lead-in. By this time there were three other TV sets in the building. None of these was treated for TVI (high-pass filter or line filters). None showed TVI. Checks with other neighbors (at least 20 TV sets within 100 yards, by now) revealed no TVI.

Shortly after this, W4PFC, the ham club of the Marine Corps Schools, Quantico, got a BC-610. Major Kozak, W4OUK, director of the club, asked the writer to help clear up TVI there. The station was causing interference over an area with a radius of about a half-mile. We decided to go at it the easy way. A shielded low-pass antenna filter and a shielded line filter were installed and RG-8-U power leads installed. No other corrective measures were taken. All TVI was gone. One man had installed a TV set in the barracks where W4PFC was located. The receiver was only thirty or forty feet from the transmitter, while the antennas were only fifteen feet apart at one point. No interference was discernible on this receiver. W4PFC was being operated on 80, 40, and 20 meters only at the time so no check was made on 10 meters.

Since then, these three measures have been taken on several commercially built transmitters, BC-610's, and other types. The measures were effective in every case.

The wiring system is such in some buildings that the power lines themselves can do considerable radiating.

Of course if the RG-8-U is doing its job properly this should not occur, but the addition of a good earth ground will help in difficult cases when all the other precautions have failed to reduce the interference to a tolerable

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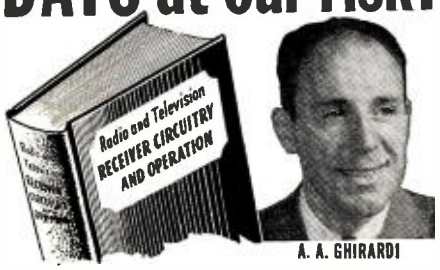

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level. The lead to the earth ground, if used, should be varied in length by experiment as a resonant length may simply add to the woes.

So, if you are troubled with TVI, don't start by ripping the rig apart. If your transmitter is of fairly decent design and is reasonably shielded, try these measures:

1. A shielded low-pass antenna filter, the shield bolted to the transmitter.
2. A shielded line filter, also bolted to the transmitter.
3. Parallel coaxial power leads.

These measures can't be guaranteed in every case, but they may save weeks or months of work.

A few items that were found during our test work may be of interest to anyone working on TVI problems.

1. Don't follow the recommended procedure of working stage-by-stage in TVI reduction, especially with pentode stages, unless each stage is loaded. We spent a month trying to get our 807 stage clean, only to find that it was clean when loaded. No unloaded pentode will be clean unless it is neutralized or made heavily degenerative. We got wise to this when it was found that the 250TH output caused far less trouble than the 807 buffer.

2. When a dummy antenna is used on the rig, make sure that the dummy is shielded. This has caused the writer and others much needless work.

3. In pentode stages using series plate and screen resistors, watch out for dynatron type oscillations when excitation is removed. In our 6L6 buffer, a 50,000 ohm resistor dropped 450 volts for the screen supply, while a 5000 ohm resistor dropped the 450 volts for the plate supply. This stage used cathode bias and oscillated badly when excitation was removed. A check with a v.t.v.m. showed 420 volts on the screen and 290 volts on the plate. Changing to voltage divider screen feed cleared up this trouble.

4. Plate-to-ground and grid-to-ground condensers do more good than any other single measure taken inside the rig. A 5 $\mu\mu$fd. ceramic condenser direct from grid-to-ground, and from plate-to-ground on lower power stages will be satisfactory. On high power stages, use high voltage vacuum or tubular condensers for a short plate-to-ground lead.

5. Keep plenty of capacity in grid tuning circuits. Remember that grid circuit impedance is much lower than plate circuit impedance in a class "C" amplifier.

6. With capacity coupled stages, use much higher than normally recommended values of coupling condensers. Values in the order of .002 μfd. at 80 meters, to 500 $\mu\mu$fd. at 10 meters make for a much stabler stage than do the usual values of 100 $\mu\mu$fd. or less. This will cure a nervous pentode stage, in a great many cases.

7. Don't get discouraged. TVI can be whipped, and with the information available to us now, it can be done in short order.

-30-

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Servicing Hints

(*Continued from page 61*)

the bulb. Excessively low voltages are usually below the striking voltage, consequently they will not light the neon lamp. Plate voltages in resistance coupled circuits will not sustain ionization of the lamp. Placing the probe on the plate of the 12SQ7, for example, will result in a momentary flash, or a series of flashes, but will not glow steadily due to the voltage drop occurring across the plate load resistor when the neon bulb draws additional current (approximately 2.4 ma.).

Check audio coupling condenser for leakage. In the absence of a suitable meter, leakage through the coupling condenser between the 1st audio plate and amplifier grid can be checked with the neon lamp. Disconnect the grid end of the condenser, turn the set on, and connect probe to the loose condenser lead. Leakage will be indicated by repeated flashing of the neon lamp. An initial flash indicates only the charging of the condenser. (Disconnecting the condenser in this manner is a good procedure, even when using a meter. When using a meter, presence of any sustained voltage indicates leakage.)

When using a signal generator or other instruments on an a.c.-d.c. set, it is not uncommon to experience an annoying 60 cycle modulation. Connecting these instruments to the ground as described previously will result in a "clean" signal. In sets with the common side of the line isolated from the chassis, it may be necessary to connect the ground lead from the test apparatus directly to the line instead of running it to the chassis. This can be done safely by observing the lamp to make sure the ground lead is connected to the neutral side of the line.

-30-

MASK ON TV TUBE

By H. LEEPER

CERTAIN TV receivers using an electrostatic picture tube have a rubber cushion or mask between face of the tube and cabinet opening.

When working on these sets it is best to keep the rubber mask on the face of the tube to keep it from being scratched or struck with tools.

-30-

Retain that protective picture tube mask during servicing and prevent accidents.

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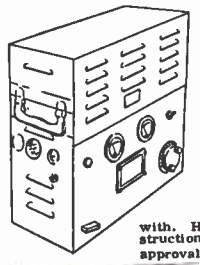

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Ham Transceiver

(*Continued from page 59*)

If a single-wire antenna is used the over-all length (including lead-in) should be between 50-60 feet. It is connected to the phenolic covered antenna lead which is located at the rear of the set. Details for constructing a single-wire antenna are given in Fig. 1A.

The construction of the half-wave doublet antenna is shown in Fig. 1B. The length of the antenna in feet is determined by dividing the constant 468 by the operating frequency in megacycles. Generally #12 and #14 enameled wire is best for this type of antenna. If the Novice wishes to purchase a ready-made doublet antenna he will find such units listed in the catalogues of leading parts distributors. These antennas are pre-cut and assembled, ready for erection. Since the impedance at the center of a doublet antenna is approximately 75 ohms, it should be fed with a 75 ohm twin-lead, twisted pair, or coaxial transmission line. In all cases the transmission line should leave the antenna at right angles to the horizontal portion of the wire.

One conductor is connected to the antenna lead at the rear of the set and the other to terminal "G" on the terminal strip. If a coaxial line is used the outer shielded conductor connects to terminal "G."

Receiving Antennas

A short, single-wire antenna of approximately 15 to 20 feet (including lead-in) is recommended for general c.w. reception. A full size antenna of either of the types illustrated for transmitting may be used for receiving modulated or weak code signals; however, the same antenna should never be connected to the transmitter and receiver simultaneously (parallel connected). Of equal importance is the precaution of separating the transmitting and receiving antennas by as great a distance as possible.

General Specifications

The general specifications for the Model SR-75 include a 5" PM speaker with a voice coil impedance of 3.2 ohms. The set uses five tubes plus a rectifier-doubler. The unit is tuned manually and operates from a 105-125 volt, 60 cycle a.c. power supply. The intermediate frequency is 455 kc. and the power consumption is 50 watts. Provision is made for an external antenna with a transmission line or single-wire feed. The headset output is high impedance 1500 to 5000 ohms.

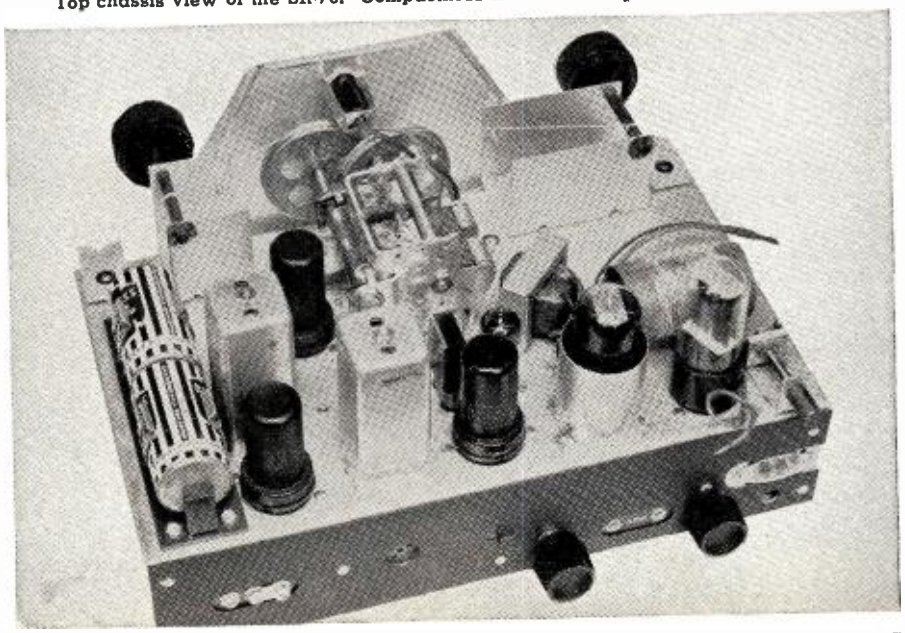
The receiver covers four bands with Position 1 of the band selector switch tuning from 550 to 1650 kc.; Position 2 from 1.65 to 5.1 mc.; Position 3 from 5 to 14.5 mc.; and Position 4 from 13 to 31 mc.

The transmitter has three crystal frequency ranges. From 3.5 to 3.85 mc. provides an output frequency of 3.5 to 3.85 mc.; the 7 to 7.2 mc. crystal frequency covers 7-7.2 mc., 14 to 14.4 mc., and 28-28.8 mc. The crystal frequency of 6.74-6.8 mc. gives an output frequency coverage of 26.96-27.2 mc. The emission is A_1 (c.w.), and the power input is 10 watts. The power output of the transmitter is 7½ watts on 80 meters to 4½ watts on 10 meters.

Many of the features incorporated in the design of this transceiver lend themselves to home construction of transceivers and simple receivers. It is well-known that plenty of DX can be worked with "flea power" rigs. The transceiver described can serve either as a beginner's complete station, and in these troubled times, as a standby or emergency transceiver for the more experienced ham. By eliminating the conventional power supply transformer a reduction of weight has been obtained thus making this little unit easily portable and amazingly compact.

-30-

Top chassis view of the SR-75. Compactness is achieved by careful parts layout.



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Mac's Service Shop

(*Continued from page 61*)

Mac's eyes swept fondly across the gleaming array of instruments on the back of his bench as he drawled, "It will take a stronger argument than that to make me toss in the sponge. You've got to remember that no amount of equipment will make a mechanic good, but a good mechanic can make a surprising amount of equipment—especially during these days of high-quality, low-cost service instrument kits and of many magazine articles that tell how to build broadband scope amplifiers, sweep generators, marker generators, vacuum tube voltmeters, and so on.

"In spite of what some of the calamity howlers would like you to believe, even if you buy factory-made instruments, you do not need enough money to make a down payment on a yacht to buy all of the equipment you require to do a bang up job of television servicing. The fellow who has, in addition to the usual radio shop equipment, a v.t.v.m., a good sweep generator, a scope with good gain and frequency response, and a dependable marker generator is equipped to tackle any TV service job, providing, of course, that he knows how to get the most out of these instruments; and a fellow who has either built these instruments or who has selected them after a great deal of catalogue-thumbing and comparing in an effort to make his limited funds go as far as possible, is very likely to be able to do just that."

"Yeah, but this writer says the small operator is short on know-how, too."

"That is a generality and is about as worthless as most generalities," Mac said with an impatient gesture. "Some lone-wolf technicians *are* technically unprepared to do TV work, but I know some mighty, mighty dumb ones who work for the big concerns, too. Come to think of it, where do these big outfits get their technicians? Most of them are recruited from the ranks of the independent technicians — especially those technicians who fail in making a go of their own shops. Wonder what magical quality it is that transforms these former 'screwdriver mechanics' into 'carefully trained technicians' just as soon as they are put on the payroll of a large concern!"

"For your money, then, a small operator is likely to be just as good a technician as a fellow working for a big shop."

"Affirmative! In the first place, a man has to have both initiative and self-confidence to strike out for himself, and these two qualities are the foundation for a good TV technician. When you don't have anyone else to whom you can pass the buck, you just have to buckle down and work out your own problems, and that is precisely how a good technician is made. Then, too, the man who is his own entire technical force has to be familiar

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A-8054	9000	8, 16	100 ma	10.86
A-8060	1500	500	200 ma	10.86
A-8061	2500	500	150 ma	10.86
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with every phase of television from the antenna installation right down to the picture tube and the speaker. He is not so likely to be a narrow specialist as is the case with large company technicians.

"Most important of all, though, the little guy has every possible incentive for doing the best work he is capable of doing. He knows that his whole business and all the time and money he has put into it depends upon the quality of the work he turns out. If the ability to work hard and carefully is in him at all, that knowledge will bring it out. Doing sloppy work and loafing on the job is about as smart for the one-man operator as cheating at solitaire."

"Do you think a technician can make as much money working for himself as he can working for a large shop?"

"That is impossible to answer because it depends upon so many variables, of which one of the most important is: how good a business man is the individual technician? Unfortunately, good technical ability and good business ability do not always grow naturally on the same tree, and that accounts for a great deal of the trouble encountered by the small service shops. This weakness has been recognized, though, and more and more space is being given in the trade publications to educating the technician along business as well as technical lines.

"But there is another important fact that no Big Time Operator will probably ever quite understand: money taken in is not the full measure of the independent technician's pay. A mind that is filled with inventories, manhours, depreciation, ten-day discounts, etc., can never quite grasp the deep satisfaction that a first-class mechanic receives from doing a fine job of repairing a broken or defective mechanism or circuit in his own way, on his own time, and with his own tools. There is something *creative* about that kind of work that makes it altogether different from doing the same thing for an employer's pay. A funny thing about an average American is that he prefers being the whole works of a small machine to being a small cog in a big machine. As long as this is so, we shall have independent technicians; and I hope I never see the day when it isn't so."

"Don't you think we ought to have large service shops?"

"Certainly we should have them. Large shops are needed, especially in cities, to take care of the immense amount of work that must be done and done fast. I have no quarrel with big shops, but I insist that there is plenty of room and plenty of work in this country for both the large and small shops. What I hate is this attempt on the part of a few large organizations—and it is by no means all of them—to try to 'smear' the independent operator with blanket charges of inefficiency and dishonesty.

"The auto service industry has been going through this same thing for

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years. Every time a new car design comes out, there are a few who cry that this advance will mean the end of the 'alley garages'; but these small garages are still with us and will probably be doing business when cars are equipped with atomic engines. The mechanic who works on my car and truck runs one of these little shops, and I will stack Homer's mechanical ability, thoroughness, honesty, and essential up-to-date equipment up against that found in any garage you can name. He is good enough that his customers patiently wait two or three weeks just to get their cars into his shop and have him work on it personally.

"I think that what grinds the large operators the most is that the independent technician usually charges less for his service than they do. They consider this 'price cutting' and say that such a practice sabotages the advancement of the whole service business. But that really isn't the case. The little guy is simply using one of his few advantages, low overhead, to offer more attractive rates to his customers. The big outfit can buy replacement parts cheaper because of the size of their orders, and they can smother him with their large advertising budgets, but on top of that they still want to set his charges for him!

"These outfits would do well to practice a fundamental business rule that the independents learned long ago: Don't knock your competitor — even your little competitor. Every time a radioman raises the Pharisee cry that *other* radiomen are crooks and stupid blunderers, he arouses doubts and suspicions in the minds of the people concerning *all* technicians." —30—

WISCONSIN HAMFEST

THE Annual Hamfest and Banquet of the Wisconsin Valley Radio Association will be held Saturday, April 21 at the Youth Building, Wausau, Wis.

The event has been scheduled to start at 6 p.m. and tickets to the affair are available from Lawrence Lapinske, W9EWM, P.O. Box 179, Wausau. The tickets are $2.75 each. —30—

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D2B1	1.5	7.60
E2B1	3.5	12.38
F2B1	6.0	16.34
G2B1	10.0	22.40
G2B2	20.0	40.00
G2B3	30.0	54.00

Input: 0-130 VAC Type No.	Current	Output: 0-100 VDC Net Price
C5B1	.750	$12.60
D5B1	1.5	16.20
E5B1	3.5	26.46
F5B1	6.0	33.84
G5B1	10 0	47.00

Input: 0-156 VAC Type No.	Current	Output: 0-126 VDC Net Price
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E6B1	3.5	30.02
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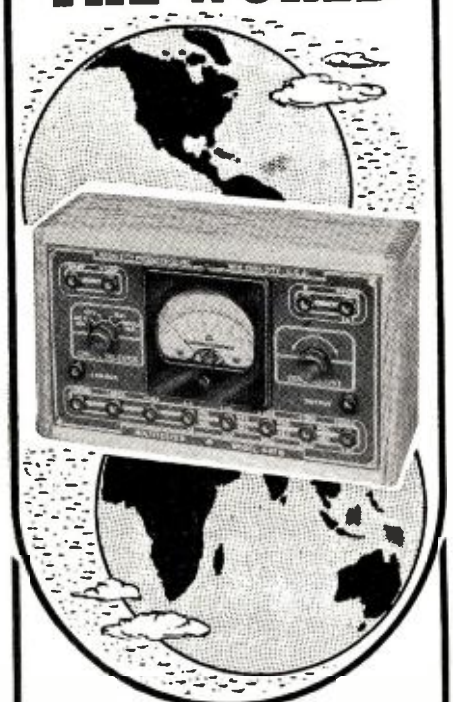

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National Defense Training

EVER since the end of World War II military spokesmen have loudly proclaimed that the next one—if it came—would be an electronic-atomic war which could be won or lost in a matter of months. With drawing board plans for extensive radar screens as a prime defense measure and a multitude of electronic devices like guided missiles as the core of the offensive plans for carrying the fight to the enemy, it has long been apparent that a veritable army of trained electronic technicians would be needed.

The present national emergency has been visible on the international political horizon for a long time. The government has spent untold millions of dollars for the work of "Planning Boards" that were supposed to have blue-printed national defense training programs that could be put into operation the minute a military emergency arose.

The service industry, the electronic manufacturing industry, and the armed services are all crying for skilled electronics technicians. But nowhere have we been able to ferret out any evidence of a studied plan to train the army of electronics technicians that, under certain conditions, could be required almost overnight.

Experience has proven time and again that it requires at least two years of training and experience for men with an aptitude for understanding these abstract forces that we term electronics, to become competent technicians on devices for which they are specifically trained—and much longer to reach a state of competence on a variety of electronics gear.

For more than six months our so-called planning boards have marked time on plans for the necessary extensive technician training programs waiting until manufacturing plans were completed and orders placed for the equipment. We presume then that this expensive electronic equipment will be produced and stacked up in warehouses or allowed to deteriorate under canvas in ordnance yards waiting for installation, maintenance, and the operating technicians to handle it.

Radio in Civilian Defense

Among the things we point to with great pride as an indication, or as proof, of the advanced state of our standard of living is the fact that there is practically no home in the country that does not have at least one radio receiver. And at any hour of any day or night in every community someone will be listening to some kind of a radio broadcast.

This almost universal use of radios provides us with a vitally important device for national civilian defense and protection—the ability to reach the entire populace with a message in a matter of minutes!

And the industry that has grown up to maintain these millions of radio receivers is, in itself, a phenomenon. The thousands of independent, small businesses that have come into existence to repair radios and to maintain associated mechanical and electronic equipment were not inspired by receiver manufacturers or their distributors. They came into being because the men who are these small businesses felt they could make a living working for themselves repairing radios.

The maintenance of the country's home radio receivers has been carried out so efficiently and unobtrusively that almost everyone takes continued radio set performance as a matter of course.

As a result, we hear no loud voice of protest when we read in a newspaper as influential as the *New York Times* that: "The electronics engineer or technician is one of the most sought after workers in the U.S. If TV is cut back, or if radio-TV manufacturers find government contracts to keep them going, *thousands* of self-employed servicemen will be feeding into aircraft plants."

Now suppose that such a statement were made about automobile repairmen quitting their jobs or closing up their repair shops to take jobs in manufacturing plants when the production of automobiles is curtailed. There would be a tremendous hue and cry. They would say that without an adequate supply of new cars to offset retirement from service through obsolescence it would take *more* mechanics to keep the old cars running. It would be pointed out that our privately owned automobiles give us national mobility—the ability to swiftly move the population from one area to another.

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Perhaps no one would bother to say that panicky, frightened people traveling in automobiles without the voice of radio to guide, advise, and direct them would create mass havoc.

Radios deteriorate, too, and they need repairs. There is a smaller percentage of men who possess the aptitude for comprehending the abstract forces of radio than there is for mechanics. And it takes longer for technicians to reach the stage of competence in the maintenance of radio and electronic devices.

It is important right now to realistically appraise the national picture on maintenance facilities as it relates to radio receivers in the home. AM radio is still the "backbone" of our universal communications network. It would be interesting to know the *average age* of AM radios now in use in the homes. If this average age were known it is quite likely that it would shock most people to learn the tremendous potential maintenance job—because of the deterioration through aging—we face to keep these radios going if AM radio production is seriously curtailed or abandoned altogether.

Thousands of people are still using prewar radios for their AM listening. In the event of sudden military developments the bulk of these radios would be in almost constant operation.

They can break down. They can quit operating by the thousands. Deny the independent, self-employed technician adequate supplies of tubes and replacement parts; encourage him to close up shop and take a job in an airplane factory—and you undermine the maintenance foundation for this vast communications network made up of our home and automobile radios.

To a great extent, the failure of the independent service operators and technicians to form an effective national association may prove to be a serious disservice to the American public.

Business, trade, and professional organizations are formed for two major reasons. The first is for the protection of the members employed in a common activity and to encourage the improvement of the services performed by that activity. The second is that through their specialized knowledge of the work they do they can,' by means of their national organization, protect users of the services they sell against thoughtless or selfish developments that are not in the best interest of the public. In other words, they are able to police their work for the benefit of the public.

If the radio-TV service industry possessed a strong, national voice today they could render a signal service to the public and the national defense effort by:

(1) Applying publicity pressure on defense officials to step up action on technician training programs to supply trained men for national defense and to stop the rapid depletion of the skilled technicians in the independent servicing industry, and,

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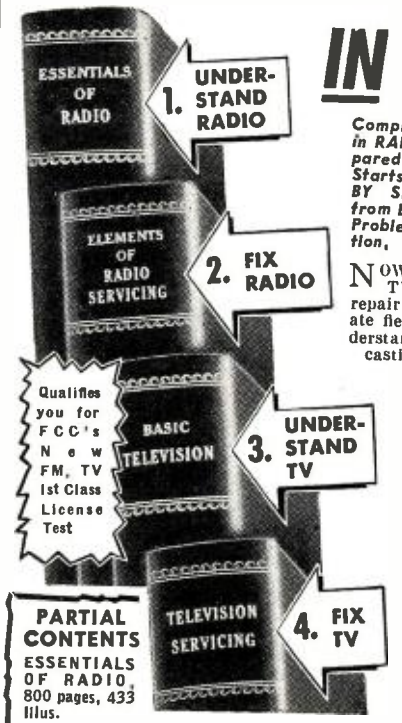

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Association News Briefs

Albert M. Haas was re-elected president of the Television Contractors Association of Philadelphia. Mr. Haas has served as president of this Association since its inception. TCA also re-elected Samuel A. Whittingham, vice-president, and Jack Phillips, secretary. Joseph F. Griffin was elected to the position of treasurer, replacing George F. Weber.

Frank J. Moch was re-elected president of the Television Installation Service Association of Chicago for his fourth consecutive term.

In an editorial in a recent issue of *ARSNY News,* Max Liebowitz, president of the Associated Radio-Television Servicemen of New York, emphasized the position of the New York State Federation with respect to the kind of a national organization they would support. Mr. Liebowitz pointed out that the "Empire State Federation of Electronic Technicians Association has recognized from its very inception the tremendous importance of an *effective* and *representative* national association, and its every effort has been directed toward the formation of such a group.

"The organization of individuals as independent as radio technicians must be on a local basis. Then, if a larger geographical group is desired, representatives from these local groups can organize into a unit such as a statewide organization. Finally, representatives from these state organizations may then move in the direction of their ultimate goal, a national organization."

The *ARSD News* arrived just in time to bring us up-to-date on the dynamic activities of the Associated Radio Service Dealers of Columbus, Ohio. This group is noted for its forward-looking programs and several years ago inspired the planning that is now crystalizing in the Bureau's package program series. J. P. Graham is back at his typewriter as editor of the *News* and the current issue is typical of his rapid, breezy coverage of the many monthly events that keep the Association's members interested in their organization. Officers elected for the current year are Charles Dykes, president; Fred Colton, vice-president; Don Blazer, secretary, and John Graham, treasurer.

Bureau Adds New Service

The Lecture Bureau is adding a new service in its expanding program of technical and business lectures for radio and television service operators and technicians. This new service will provide a complete 90 minute service meeting "package" that will enable service association officers and program chairmen to put on professionally-prepared monthly programs for their members without losing a lot of time.

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The heart of these "packaged" monthly service meetings will be a sound-slide film illustrated-recorded lecture on some currently important installation, maintenance, service, or business subject that is of immediate interest to members of the service industry.

This program will be ready for scheduling for the month of September to start the Fall meetings of the Associations that apply for it. The method used to "localize" the subject material has been developed by the Bureau from its experiences during the past three years in conducting service meetings in almost every State in the Union. Long needed by organized service groups whose officers are always hard-pressed for time to handle all of the details involved in planning and preparing interesting monthly programs for their members, this plan will provide for a series of six intensely interesting, professionally arranged meetings that will keep association members' interest at a high level throughout the entire 1951-52 season.

The Bureau will furnish these complete programs to accredited Associations without charge. In order to qualify for participation in this lecture-program series and to enable the Bureau to co-ordinate meeting dates, radio and television association officers and interested groups of non-organized service operators and technicians who want to study various phases of the technical and business operating problems of the service activity together—should write immediately for complete information on the plan and for a copy of the participation form.

Non-organized groups of service shop operators and technicians numbering ten or more people per group may schedule this entire series provided they select one member of the group who will assume responsibility for the equipment and lecture material which will be loaned to them.

It will be necessary to be accredited by July 1st to qualify for the September program so it will be advisable for interested groups to write for information immediately.

Address your inquiry to Service News Editor, RADIO & TELEVISION NEWS, 185 North Wabash Ave., Chicago 1, Ill.

The Pennsylvania State Federation of Radio Service Associations has accepted the Bureau's offer to conduct the first series of meetings using the "package" program.

During the month of March this program was used by seven of the Associations affiliated with the State Federation. The program was presented in Philadelphia, Harrisburg, Reading, York, Williamsport, Scranton, and Wilkes-Barre.

The Empire State Federation of Electronics Technicians Associations have scheduled this first "package" program for their affiliated organizations during the month of April after which it will be given by key Associations in many parts of the country.

-30-

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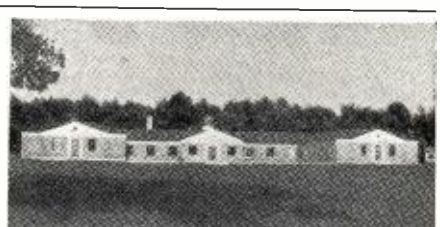

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AFCA NEWS

This Association is a patriotic non-profit organization, with chapters in most of the larger cities, dedicated to developing and maintaining efficient personnel, commissioned, enlisted, civilian, for the supply (including design and development), installation, maintenance, and operation of communications and electronic equipment for Army, Navy, and Air Force and their supporting civilian activities. It publishes a magazine "SIGNALS" at its national headquarters in Washington. Every American interested in any way in communications is eligible and invited to join. Dues are $5.00 per year. Application should be submitted to the secretary at 1624 Eye St., N. W., Washington 6, D. C., who will furnish details upon request.

Annual Convention

Technical forums in communications, electronics, and photography will highlight AFCA's fifth annual convention to be held in Chicago on April 19th and 20th at the Drake Hotel.

Nationally known industrial leaders will conduct the discussions pertaining to military and civilian defense and production. They will formulate plans for a closer coordination between military and civilian requirements.

Current problems of communications will be stressed by Leslie F. Muter, past president of the Radio Manufacturers Association, in the keynote address of the convention on April 19th.

Detailed discussion by industries will be conducted in forum meetings by nationally known leaders in the fields of land-lines and radio communications, and photography. Heading the "land-line" forum will be James H. Kellogg, president of the *Kellogg Switchboard and Supply Company.* William J. Halligan, Sr., president of the *Hallicrafters Company,* and an AFCA national director, will conduct the panel on radio communications. William C. DeVry, president of *DeVry Corporation,* will lead the discussion on photography.

Visitors to the convention will be accorded the privilege of a personal tour through Midwestern industrial plants producing vital communications, electronics, and photographic equipment.

Climax of the convention will be the annual banquet Friday evening, April 20th, attended by civilian and military leaders who will hear an address by Robert C. Sprague, chairman of the board of the Radio-Television Manufacturers Association, who will chart the course for the communication industry in the days ahead.

AFCA CHAPTER NEWS

Augusta-Camp Gordon

Dr. J. O. Perrine, assistant vice-president of the *American Telephone and Telegraph Company,* presented his demonstration-lecture "More Words—More Waves—Less Wires" before the Augusta-Camp Gordon Chapter's January 10th meeting.

Prior to Dr. Perrine's lecture, chapter members attended a dinner-meeting at the Camp Gordon Officers' Club. Guests included Brig. General and Mrs. Halley G. Maddox, commanding general, Camp Gordon; Colonel James H. Howe, chief of staff, Camp Gordon; Colonel Francis E. Howard, commandant, Provost Marshal General School, Camp Gordon; W. H. Mansfield and R. Grist of the *Southern Bell Telephone and Telegraph Company* of Atlanta.

More than six hundred persons attended the lecture as guests.

Baltimore

On January 18th, Dr. Perrine appeared in Baltimore under the joint sponsorship of the AFCA Baltimore Chapter and the Engineers Club of Baltimore and its affiliated societies. The meeting was held at the Maryland Casualty Auditorium and drew an audience of some 1700 persons.

In his opening remarks, Dr. Perrine likened the engineer to "energy" and concluded his theorizing with the development and derivation of the term "imagineering" as applied to those individuals engaged in engineering and research who are interested in the development of new ideas and gadgets for increased production.

Dr. Perrine, in layman's language, described the equipment used in his demonstration, namely, the signal generator, the oscilloscope, transmitters, and receivers, and showed how each played its part in the transmitting of conversations between locations via wire and radio. The voice frequencies were described and compared with the tone frequencies occurring in a symphony. By viewing the wave patterns on the oscilloscope, it was clearly shown that vowel wave patterns differ with each individual while consonant sounds give the same wave pattern regardless of how many different individuals speak them.

The next phase of the demonstration was the superimposition of modulated waves on carrier signals. First, each of four different conversations were fed through the wires and heard at the other end. Then the four conversations were fed together and the jumbled conversations heard on the other end. By use of the r.f. signal generator, four carrier signals were transmitted and each viewed on the oscilloscope, emphasis being placed on the sine wave effect. Then, one at a time, a modulated wave was superimposed on the carrier signal and transmitted. After all four conversations were combined

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with each of the four carrier signals, they were viewed and heard. Following this, all four modulated carrier waves were transmitted and heard at the other end. And then, one by one, the carrier signals were removed leaving the original conversation.

The demonstration was highly interesting and could be readily understood by those in attendance. Dr. Perrine further elaborated on the transmission of hundreds of signals over a single pair of wires in the manner he had so aptly demonstrated.

Chicago

The Chicago Chapter's January meeting was held at the *Coyne Electrical and Radio-Television School*, 500 South Paulina Street, Chicago. More than seventy members gathered for dinner at the nearby Medical Center YMCA where special catering had been arranged. After dinner, the group reconvened at one of the *Coyne* lecture halls for the evening program, followed by a tour of the *Coyne School* while it was in session.

Chapter President Oliver Read opened the meeting with a report on plans for the association's annual convention being held in Chicago on April 19th and 20th.

Raymond K. Fried, Chicago Chapter secretary and legal consultant on procurement, was asked to give the members a brief resumé of his recent experiences with the procurement and industrial mobilization offices in Philadelphia. Col. Fried advised the members representing small business and new business that patience in seeking government business would probably be rewarded by April or May, with contracts for those who convert to military production. The services and agencies are going forward with plans that naturally make first use of the known government suppliers of World War II who have been willing and able to maintain paid staffs specializing in maintaining and developing government supplies in the fields of communications and photography. Fried advised members interested in manufacture for the Signal Corps that Philadelphia is the location where contract details must be worked out, and not in Washington.

President Read next introduced the principal speaker of the evening, Mr. D. B. Miller, educational director of *Coyne School*, who spoke on "The Value of Technical Training in the Armed Forces." Mr. Miller sketched the rapid growth of technical skills required in the armed services, starting with the relatively modest requirements of World War I days, when the telephone, wireless telegraphy, automobile, and aircraft were just beginning to become significant parts of the military machine. He cited some of the problems of World War II, when service schools were rapidly expanded to train men for technical assignments in aviation, radio, and radar, and it was found necessary to call on public and private schools to supplement the technical training facilities.

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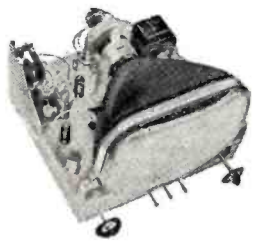

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Mr. Miller stated that while the number of trained technicians now serving in the armed services is withheld from publication for reasons of military policy, it is known that the total already exceeds that of the peak period of World War II. The trend of modern warfare, in Korea and at outposts in 16 other foreign countries, places increasing dependence on the installation, maintenance, and repair of electrical communications equipment in greater volume than ever before. A large part of *Coyne's* problem in World War II and in the present situation is to train men in the fundamentals of electricity, land-line and radio communications who will then be available for the specialized training of the armed services.

Mr. Miller outlined the pattern of training at *Coyne,* comprising about fifty per-cent classroom instruction and fifty per-cent shop work. Classroom instruction consists of lectures, demonstrations, discussion periods, and the use of visual aids, cut-away models, and manuals of work to be completed under the guidance of instructors. In the visual aid category are slide films, with and without sound, and an estimated seven miles of sound motion picture film subjects. The shop work is done on real equipment, supplemented with specially constructed training aids. The students become familiar with all forms of electrical devices and actually construct, operate, and trouble-shoot radio and television receivers and radio transmitters. Mr. Miller concluded his talk by showing a sound slide film of industrial applications of electronics, designed to acquaint the student with the varied possibilities in that field.

After the tour, the chapter members gathered in a lecture theater to view a timely U. S. Army Signal Corps film, "Guarding Against Sabotage," made available through the courtesy of the Signal Officer, Fifth Army.

Detroit

A complete coverage of the color TV question was presented to the February 2nd meeting of the Greater Detroit Chapter by Mr. Oscar Kusisto, prominent radio and television engineer from *Motorola Inc.* His talk included a description and evaluation of the various color systems, the possibility of converting present sets for color reception, and the economic factors influencing the question.

The meeting, held at the Veterans Memorial Building, was presided over by Chapter President E. C. Balch, chief engineer of the *Michigan Bell Telephone Company,* and was attended by one hundred chapter members and guests.

The program concluded with the showing of two Signal Corps films covering the Korean situation through October 1950—"Battle for Time" and "Turning of the Tide."

Philadelphia

More than twenty members of the AFCA Philadelphia Chapter participated in the highly publicized mock air

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raid on Camden, N. J., on January 11th.

The communications aspect of the raid was most efficiently handled. In contact by radio with twenty planes, nearly one hundred automobiles, two ambulances, and even a pack job, the communications plan called for the complete disruption of telephones and radio as a result of the bomb explosion. While the emergency net was put into operation (it took less than five minutes), the exact location of the bomb hit was relayed to the communications center by Boy and Sea Scout wig-waggers. Temporary telephone lines from the fourth floor desk of the city director permitted over-all control through the mobile control center on the ground.

Chief credit for the exemplary work of the two hundred persons serving communications is due to Col. Robert Pearson, an AFCA member, who heads up the Philadelphia Chapter's committee on Camden's Communications Civil Defense.

San Francisco

Captain A. L. Becker, commander of the San Francisco Naval Shipyard, was the principal speaker at the chapter's February 1st meeting, held at the Officers' Club of the San Francisco Naval Shipyards.

With "Communications—Weapon for Defense" as his subject, Captain Becker stressed the need for new and faster methods of communication in order to safeguard American defenses, as without communications there would be no defense. He cited the need for the expansion of coaxial cable facilities in order to relieve the shortage of copper now going into numerous wire and cable lines. He also stressed the need for long range television and facsimile equipment, as well as better undersea communications.

Prior to the dinner-meeting, the AFCA members were conducted on a tour of the shipyard by W. R. Pengro, public relations officer of the San Francisco Naval Shipyard. The tour included a trip through a submarine and a close-up view of most of the ships under construction or being recommissioned.

Seattle

Plans for programs at future meetings were formulated at the Seattle Chapter's January 10th meeting at the Chamber of Commerce Building. Demonstrations and lectures on new developments in the communications field will be emphasized. A local representative of the *General Electric Company* advised that a demonstration of an electronic selector system would be made available for the chapter's June meeting.

The advantages of membership in the AFCA were pointed out to the various guests present by Chapter President Marshall B. James and Membership Chairman Frank D. Keyser.

An interesting and informative *Pan American Airways* film on the "Clipper" planes concluded the evening's program.

-30-

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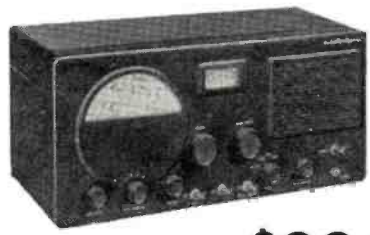

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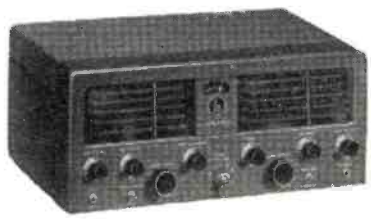

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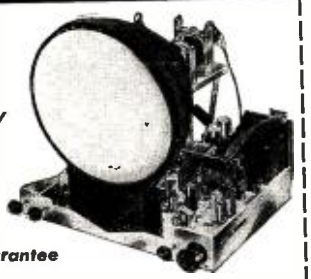

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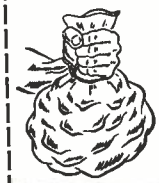

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Technical BOOKS

"MAKING MONEY IN TELEVISION SERVICING" by Eugene Ecklund. Published by *Howard W. Sams & Co., Inc.,* Indianapolis. 136 pages. Price $1.25.

This is a practical handbook for both the newcomer and the old timer in the television service business written by a man who has been "through the mill" himself.

Operator of a successful servicing business, the author discusses the various facets of the problem of going into business for yourself. Many of the questions cover points not ordinarily considered in books of this type but nonetheless vitally important to the success of the enterprise.

In a down-to-earth manner such matters as the over-all planning necessary when considering the establishment of a TV servicing business, the personal and economic considerations in starting such a business, initial investment, the selection of a suitable location, expansion. current finances. budget and control of finances, work control, overhead, service charges, purchasing, operating and personnel policies, business contracts, contacts, customer relations, collections, and advertising, are discussed without pulling any punches or idealizing the situation.

A valuable appendix lists essential and desirable equipment and supplies needed to operate efficiently. The listing is prepared for both one-man and 4-5 men shops along with the price range for the equipment.

Because of the gradually increasing number of business failures in the TV servicing field, we believe that shop owners should take time out to read such a book as this and decide just how their business stacks up and whether or not it is time for a careful re-evaluation of the entire problem of doing business for themselves.

* * *

"RECEIVING TUBE SUBSTITUTION GUIDE BOOK" by H. A. Middleton. Published by *John F. Rider Publisher, Inc.,* New York. 215 pages. Price $2.40.

With tube shortages again plaguing the technician and manufacturer alike, this revised edition of the publisher's "Wartime Radio Service" which originally appeared in 1944 is timely and helpful.

As pointed out by the author, this book can be used now to make the necessary tube substitutions in radio and electronic equipment and then when the tube crisis has passed may be used as a reference guide for restoring the equipment to its original state.

In addition to listing the tubes which can be substituted for units in short or critical supply, the text contains complete instructions for performing the often-necessary circuit changes.

One section has been devoted to a compilation of television receiver fila-

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ment circuit arrangements, another to servicing suggestions, while the fifth and final section provides such data as RTMA receiving tube ratings; tube base information; receiving tube characteristics; CR tube bases; CR tube characteristics; a cross-index of Army VT and commercial numbers; ballast tube and resistor codes, etc.

Service technicians and others concerned with the repair and maintenance of electronic equipment will find this book particularly helpful at the present time.

* * *

"RADIOFILE—1950 ANNUAL", compiled by Richard H. Dorf. Published by *Richard H. Dorf*, 255 West 84th Street, New York 24. 24 pages. Price 50 cents.

The new "annual" contains an index and cross index of articles covering the audio, radio, and television fields as published by 15 trade journals during the year 1950.

Designed for all persons interested in the various phases of radio and television, the booklet provides ready reference in easy-to-use form. Technicians, students, engineers, hams, and hobbyists will find that reference to the "annual" is an easy way to locate articles on any specific topic.

* * *

"HAM'S INTERPRETER" by Pentti Aarnio, OH2SQ. Distributed in the U. S. by *Ben E. Wilbur*, 32 Whittlesey Ave., East Orange, N. J. 36 pages. Price $1.00.

This slim little volume packs a lot of information into a relatively few pages.

Designed for the ham whose contacts include "far away places," this book lists in seven languages such data as the alphabet, numbers, all types of phrases needed in ham operation, and a listing of unusual words which might be needed during a contact.

The languages covered include English, French, Spanish, Italian, German, Swedish, and Finnish. With this book at hand, unilingual hams should be able to increase the scope of their contacts with non-English speaking amateurs throughout the world.

* * *

"RAPID TV TROUBLE SHOOTING METHOD" by H. G. Cisin. Published by *H. G. Cisin*, 200 Clinton St., Brooklyn 2, N. Y. 24 pages. Price $1.00.

This booklet outlines and explains in some detail the author's method for troubleshooting television faults.

The new method is based on three basic steps which consist of (1) recognition of the trouble by means of tabulated trouble symptoms, (2) the application of one or more of the thirteen special checks to be applied to the section of the receiver proven faulty, and (3) detailed instructions for locating the fault rapidly and efficiently.

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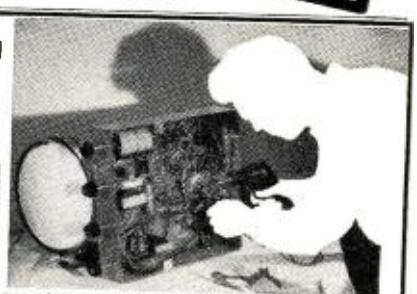

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ERRATA

An error appeared in the circuit diagram (Fig. 2, page 46 of the February 1951 issue) for the v-o-m and grid-dip oscillator. Please see page 119 of this issue for the correct diagram.

* * *

In the article "A Deluxe Signal Tracer," appearing in the January 1951 issue, an error appears in the diagram on page 66. The lower end of the 6V6 cathode resistor shown in Fig. 6 should be grounded.

* * *

The schematic diagram of the converter ("Ham Converter for 2-6-10-15 Meters") appearing on page 49 of the February 1951 issue is incorrect in that the heater of the 9002 oscillator should be connected to the cathode of the tube at the socket instead of being grounded.

* * *

The voltage designations on the switch shown in Fig. 2, page 57 ("An Electronic A.C. Voltmeter") of the February issue should be transposed.

* * *

The cathodes of the 6L6 tubes in Fig. 7 in the article "A Flexible Record-Reproduce System" (February 1951, page 64) should not be tied together.

* * *

In Fig. 1 of the article "A Self-Equalizing Preamp," appearing on page 49 in the November 1950 issue, a 470,000 ohm resistor should be inserted between C_7 and the top end of R_{11}.

* * *

It has been called to our attention that the suggestion for using an electric razor cord (page 149 of the February 1951 issue) is misleading. Many razor cords now on the market are made of #27 tinsel wire which is rated at 50 watts. Obviously cords of this type will overheat in time. Should you intend to use an electric razor cord, be sure it is of sufficient size to carry the load.

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www.americanradiohistory.com

866A KIT and XFORMER

2 Tubes, Sckts, xfmr 115v 60cyc Inpt, outpt 2.5vct/10a/10Kvins $6.98

DIODE PROBE TUBE! Unexcelled for NO-LOSS UHF Testing. Ultra-Sensitive Sub-Miniature—Envelope App. 1¼"x⅜". Element & Probe at Tip. Low Pwr. Htr. BRAND NEW w/Data. VR92..25c; 5 for $1

O.K. TUBE SPECIALS

Tested Perfect—Standard Brands
Keys Broken—Guaranteed

183GT	$1.33	6L6	$1.75	6W4GT	
5U4G	.98	6L6G	1.29		$ .90
5Y3GT	.65	6SC7	.98	12A6	.89
6AB7	.96	6SF5	.49	12SA7	.89
6AC7	1.45	6SF7	.49	12SN7GT	
6AG7	1.45	6SH7	.66		1.10
6BG6G	1.24	6SK7	.90	19BG6G	
6H6	.49	6SN7GT			1.79
6J5	.75		1.10	25L6GT	.54
6J7	.60	6SQ7	.75	25W4GT	
6K6GT	.75	6V6	1.59		1.00
6N7	.98	6V6GT	1.00	35Z5GT	.75

"WILLIAMSON" 10W HI-FI KIT

10cyc to 20Kc with Ease! Internationally Famous. To 1 Mc. for Experimenters. Incl Pwr Supply, RCA Chassis, Less Pre-Amp & Output Xfmr $29.95

W'mson Pre-Amp Kit & Tone Boost Amplifier 34.95

"W'mson" 32-page Booklet 69c

Super-Wide-Range Hi-Fi Kit: 20 cyc to 20Kc. 10W. Max Harmonic Distortion 1¾% @ Full Output; 0.5% /5W output. PreAmp, Tone Control, RCA chassis. Less Output Xfmr Triodes thruout $34.95

G-E Var Reluc Cartr. Cartridge RPX 050.. 8.69

G-E Var Reluc Cart. RPX040 or 041 .. 6.29

G-E Spkr S120ID 19.49

UTC Hi-FiOutptXfmr 30WPP8L6/2A3/6A5G Pri 4000 ohms CT: Sec 5 taps 2½ to 25 Ohms. 5.98

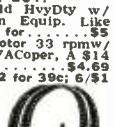
SENSATIONAL 10" Hi-Fi Spkr ideal 10Watt HomeSize. Concentric. Internationally the Best! Separate Driver Woofer & Horn Driver Tweeter—30 to 16000 cps Range! 16.98

DYNAMIC SPEAKER BUY! 5" DynSpkr 3000 ohm field HvyDty w/ OutptXmfr forPentode From Equip. Like New, Tested, Gtd. $1.39; 4 for $5

"G-I" Gov. Contrld PhonoMotor 33 rpmw/ Speed AdjLever.HvyDty 110VACoper, A $14 Buy. SPECIAL $4.69

Gov. Wts. for "G-I" Motors.2 for 39c; 6/$1

HEADSETS



24000 ohms—P16, 2 Rcvrs w/Band, Strap, 7 ft. cond. Plug. Brand New ...$4.49

8000 ohms—HS18. 2 Rcvrs w/PL54&C073A. Less Band 98c

600 ohms—HS33 2 Rcvrs w/Band, Cushion, Plug. Used Exc. $1.98

BUILD A BANTAM 1-WATT XMITTER

With This Bargain Foundation Unit

Free Instructions. Takes 2 plug-in FT-243 Xtals & Coil. W/140mmf Cndsr & Xtal Socket .....2 for 49c

Complete with Xtals & Coil ...2 for $1.69

Hi Gain Dynamic Mike & Xfmr. Buy

Comb. hi-gain Dyn Mike Xfmr UTC/ Super Elec 3 wdg. 600 ohm CT & 4000 ohms Tapped 250x150 ohms. Fully Shielded H'sid PLUS Exc. Fidelity Dyn Mike. Both for ONLY $1.98

Transformer only, 98c; 10 for 7.98

I-F TRANSFORMERS

456 Kc Double Slug Tuned. Shielded .....3 for $1; 8 for $2

10 to 14Mc FM&TV Double Slug Tuned, Shld'd...2 for $1; 5 for $2

2.2 to 2.7Mc COLLINS/USN Slug Tuned Coil. 5 prong Mtd...4 for $1

8.15 to 10Mc Double Slug Tuned, Shielded, Incl 2 Silv P16-25mmf Ceramic Trimmers, 6 Ceramicons & 3-A8 Resistors 98c

GE-2J1G1 Selsyns, You Pay Less, is Is. No Returns .....2 for 49c

FIRE EXTINGUISHER. CarbonTet PYRENE 1 gal, 200 lb. SelfCharging w/Mtr. Like New. Shipped Dry $10.98

Hardened Elec. Wrenches, 9 and 11/32, ¼ and 15/64", Pair 25c

GLYPTAL cement, per jar 35c

RADIOACTIVE Markers 1½" OD for Car, Bike, Boat. Clip Type .....5 for 25c

24 Above in Metal Box w/6 partitions Slight Corrosion 98c

HOLTZER-CABOT BELL! High Efficiency Type Perm Magnet 2⅞" Diam. 115Volts AC/DC Only .....98c; 6 for $4.98

CIRCUIT BREAKERS

Heinemann Magn Bkrs, Amps: 0.22, 1, 2, 3, 5, 7, 8, 12, 15, 20, 25, 30, 35, 40, 50, 70, 100, 150, 180. Each $1.69

Sq. D & CH Toggle Sw Bkrs. Amps: 5, 10, 15, 20, 25, 30. Each 98c

Klixon Thermal Push Button Bkrs, Amps: 5, 10, 15, 20, 30. Each 89c

PAPER CONDENSER BUYS!

WVDC	Mfd	Each	100 for
150	.002	6c	$ 5.40
200	.047	9c	8.10
	.05	12c	10.80
	.1	14c	12.60
	.5	21c	18.90
400	.002	8c	7.20
	.004	9c	8.10
	.01	10c	8.98
	.02	11c	9.98
	.04	13c	11.70
	.05	15c	13.50
	.1	19c	17.10
	.5	24c	21.60
	1	29c	26.10

Metal Cased—Oil Impregnated

WVDC	Mfd	Each	100 for
200	.04	29c	$26.10
300	.01	26c	23.40
400	.01	28c	25.20
	.25	46c	41.40
	.5	54c	48.60
600	.01	29c	26.10
	.02	33c	29.70
	.04	37c	60.30

Molded Bakelite Encased

200	.02	11c	$ 9.90
	.05	15c	13.50
300	.01	11c	9.90
400	.01	13c	11.70
	.05	17c	15.30
	.1	23c	20.70
500	.001	11c	9.90

WVDC	Mfd	Each	100 for
600	.0001	6c	$5.40
	.002	8c	7.20
	.004	10c	8.98
	.0042	10c	8.98
	.006	11c	9.98
	.01	12c	10.80
	.015	12c	10.80
	.02	14c	12.60
	.03	15c	13.50
	.05	17c	15.30
	.1	23c	20.70
	.3	25c	22.50
	.5	29c	26.10
1200	.01	15c	13.50
	.05	39c	$35.10
	.1	53c	47.70
	.5	65c	58.50
1000	.006	29c	26.10
1500	.01	75c	67.50
1600	.01	79c	71.10
	.02	95c	85.50
	.064	99c	89.10

Molded Bakelite Encased

500	.003	12c	$10.80
	.006	15c	13.50
	.01	17c	15.30
600	.005	16c	14.60
	.006	18c	16.20
	.01	21c	18.90
	.05	23c	20.70

STORAGE BATTERIES

36 Volt WILLARD Mini-BRAND. NEW! 5 oz. Designed Portable Equip Models .....98c; 4 for $3

2V/27AH Willard BB54 PLUS 2 Volt Vibrator $1.98

6V/6AH Willd NT6/BB214U 1.75

6V/40AH Willd ER40-6.... 6.98

Battery Acid. (B-Exp) 1 pt. 59c; 2 pts.$0.98

Hydrometer 1.06 to 1.24 Sp Grav... 1.98

Electrolyte Meas Tube. 12" Lg..... .25

Spec Grav Ind & Merc. Thermom... .98

DRY BATTERIES

Sig Corps—BRAND NEW—Tested. Shelf Dated—Guaranteed.

BA39 150/7½V 98c; 6 for $4.98

BA40 90/1½ Volts 98c; 6 for..... 4.98

BA43 90/45/1½ Volts 89c; 8 for.. 6.49

45/30Volt NEW 1949 Batty SimBURGESS XX30E. 1x2⅝x4¼" 79c; 3 for 2.00

ELECTROLYTIC CNDSR SPECIALS!

50 mf/350vdc FP.....3 for 98c

30-15-10mf/250vdc ....3 for 98c

40-20mf/250-25vdc .....4 for 98c

30-2x20mf/450-25vdc FP 2 for 98c

10-2x20mf/450-25vdc FP 3 for 98c

4mf/450vdc "Tyne-Dry" 2 for 98c

6000mf/15vac. SPECIAL $2.29

CIRCULAR SLIDE RULE

12" Equiv—2⅛" Radius PRINT STAYS ON. Laminated Plastic. Multiply, Divide, Logs, Dec Equivs, Case 98c

PARALLEL RULES, Handy Drafting Tool. 6" Lg Mfr BRUNING 39c

BANDPASS FILTER XFORMERS

SHARP CUTOFF HiQ CASED & SHIELDED 60, 90, 150 cys ea. $2.25.....3 for $5.95

UTC 854, 1024, 1250 cys ea. $1.95.....3 for $4.50

CRYSTALS

Mtd FT243 exacting S.C. Specs

3525Kc	4190Kc	5233Kc
3735Kc	4780Kc	5485Kc
3980Kc	5030Kc	ea. 98c; 3 for $2

Write for other Frequencies.

Hfr Over Xtals—HiAccy Stability 5010, 5025, 5055Kc, ea. $14.98

Rochelle Salt Xtals, 69c; 10 for $5.00

SOCKETS for CRYSTAL HOLDERS

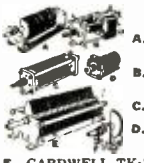
A. 4-crystal holder ⅛" Pins, ¾ & 1⅛" spacing 10c; 12/$1

B. HiFreq Dual Xtal holder FT243 10c; 12/$1

C. HF Xtal Holders ⅛" spacing ⅛" pins .....10c; 12/$1

D. Johnson Mycalex 3 pin BENDIX & WE ea. 35c

VARIABLE CONDENSERS



A. 150mmf/300VGap HF MILLEN, CARDWELL $1.39

B. BUD Dual 75mmf ea. Sect 1000V Gap. HF $1.29

C. JOHNSON 70H30 70 mmf/3000V Gap.$1.29

D. Cardwell Neut ZT/12 mmf 500 Volt Gap. w/Locknut 98c

E. CARDWELL TK-300-US 53 to 312 mmf. Can be made Split Stator. BRAND NEW $10.95

F. HAMMARLUND MC75S 80mmf. List $3.40. Special, each 98c

Vernier Drive 10 to 365mmf, each ... 69c

Midget 3 to 15 mmf, Midline, each .. 39c

Phasing Condenser 90 Degree Quadrants, 4 Taps, 360deg Sinewave Gen.....$4.98

2½ Meter Butterfly Cndsr 30mmf w/RF Tank & Choke.....59c; 2 for 98c

FRACTIONAL HP MOTORS

1/30 HP Motor, 117/234V, 47/63 cyc. 5/.35Amps, 2600-3100 RPM, 1 hp. ¼"dia. x1"Lg Shaft 3 lbs. NEW $5.98

1/100 HP Motor. 27.5VDC, 7000RPM Cont. OSTER. NEW $2.49

24VDC Motor, 1⅜"dia.x2¼" lg.Shaft ⅛"lb. NEW $1.95

Motor&Switch Assy, 28VDC/.6A/2000RPM cont., 6½x2⅜x4" overall. Cams drive 14 Silver Pl. Switches, NEW.....$4.98

INSULATORS

Thru-Panel Two ⅞"Hx 1¼" dia Sects & Hardware. Glazed Ceramic ..... 2 for 45c

Cylindrical, Glazed, Tapped 1¼"Hx½" dia. 10c; 1½"Hx¾" dia..... 12c

RELAYS—FAMOUS MAKE

CLARE Octal 115VAC/DPNC SPNO..$3.98

CH/88oper-7to34VDC/200to1200A... 2.98

S'DUNN 32AXX10 Reset&o'load 10 ma&115VAC 4.95

ADVANCE 4001BAntenna DPDT& SPNO 15 Amp. Ceramic, HF ins 75 to 110V. $2.75; WRect115VAC... 3.95

A-80'load adj18.1/15.2/12/9&5.3A. 3.98

GE inst V'Rel Calib 70,85,110,160V for 115VAC 9.95

GE CR2792B 117A3/28V/50A/SPNO. 1.98

KITS.....

Silver & Mica Cndsrs.....	30 for $2.50
Controls, 50 ohm to 2 Megs..	10 for 2.98
Resistors, ½&1W, to 2 Megs..	100 for 5.98
Vitreous WW Resistors.....	5 for .98
Sockets, Asstd, 8, 7, 5, 4P...	25 for 2.49
Rotary Switches, Asstd.....	6 for 1.75
G&P Tube Caps, Asstd.....	50 for 1.49
Coil Forms, Th'd Sm HF.....	50 for 1.00
Iron Core Slug & Screw.....	50 for 1.00
Elastic Stop Nuts, Asstd..	50 for 1.00
Knobs, Asstd, w/Insert.....	10 for .98
Spaghetti Sleeving, Asstd..	75 ft. for 1.00
Ceramicon Cndsrs, Asstd.....	12 for 1.00
Fuses, Asstd, LF & Buss.....	75 for 1.95
Grommets, Rubber Asstd.....	50 for 1.00
Resistors, 2 W Asstd.....	20 for 3.69
Tie-Point Lugs, Asstd.....	35 for .98

UHF ANTENNA

UHF ANTENNA 12"/30CM AT5/ ARR1 Usable Citzn & Ham Band Ins Coax Term Sliv Pl Cont Wpf Gask & H'ware Mobile Mtg. New. 39c; 4 for $1.00

PL259 for above..... .65

TV CONICAL ANTENNA (Dubl-X) Sturdy Prefab Const Versatile 72, 150 or 300 ohm Match. Incl 8 elements & 100 ft. All-Copper Twinex. Cross Bar & Hd'ware. Brand New. Only.....$8.49

Dubl-Stacked Conical Array Similar above, but with 16 elements & all hardware plus 2 crossbars & 100 ft. All-Copper Twinex. Brand New... $12.98

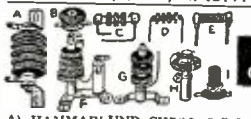
MICROWAVE ANT AS125/APR. 1000 to 3400Mc w/UG58U Term InBuilt HiPass Fltr Flange Mtg Incl H'ware. SPECIAL..$3.98

ANT AN130B, 33" Whip..... .98

ANT AN131A, 11 ft. 8 sect..... 2.89

Sectional Antennas

MS49-52, 12½ ft.....	$1.69
MS49-53, 16 ft.....	2.49
MS49-53 & extra 53, 19 ft.....	3.69
MS49-56 (2—53's), 26½ ft.....	5.98
BASES: MP22, $2.85; MP48.....	2.85



RF CHOKES

A) HAMMARLUND CH500/2.5 MH8ohms 500 ma 98c

A) 20 MH/500ma/14.75 ohms DCR 8mmf dist Cap mtg ft&4¼" mtg ctrs, ceramic cor 98c

B) SICKLES 85mh/250ohms/ceramic form 70c

C) NATIONAL R300/1mh/300ma/ 10ohms @ 28c 4/98c

C) Two 2.5mh/125ma & .01&.002cdsr & Resist 45c

D) 5mh/300ma, pi wound 29c

E) MILLER21½&5mtr/2.5inh/.27ohms/ 1A @25c 5/98c

F) Nat'IR152/80&160mtrs/4mh/600 ma/10ohms 98c

G) SICKLES HF 20mh/200ma75ohms.49c

H) Hash Chokes for MercuryVaporRec@ 25c 5/98c

I) SICKLES 1.5mh/200ma, ea. 25c 5/98c

Alignment Tools

(Top) Ideal NO-LOSS Alignment Screwdriver—long Insulated Shaft. Sure-Grip Knurled Knob. Only 49c

(Bottom) RELAY Spring Adjuster & Switch-Bd Tool Slot takes up to .022" WEC No. 293....98c

Precision Feeler Gauge TL147, Ideal Teletype & Relays. Individ Gauges .012/.018/ .025/.037/.055" 98c

BAKELITE KNOBS

Polished black bakelite, ¼" dia shaft, brass bushing, with set screws, white position indicator. Fluted, 1⅛"diax⅝"h 12c....10 for 98c

Bar Knob, 1¼"lgx¼"dia 10c; 12 for 98c

External Pwr Sup. Cord

CD277 & Plug PL114. Fits Skt SO-4 RcvrBC312,314,342 344 BRAND NEW $1.49

O'Seas Pkgd .....

PROFESSIONAL SHARPENING STONE

INDISPENSABLE for Lab or Workshop. Finest Silicon Carbide No. 124 Carborundum Co. Unsurpassed for Precision Grinding of Crystals, Knives, Fine Tools—6"x⅝". Like New. A $2.00 VALUE—ONLY..... 25c

Five for $1

OIL CAPACITORS

Mfd	Each	Mfd	Each
1000wvdc		10000 wvdc	
.1	.73	.03	3.49
.45	.79	12000 wvdc	
1	.99	.02	4.98
2	1.69	12500 wvdc	
4	2.29	.65	16.98
5	2.98	2	95.00
10	3.98	15000 wvdc	
15	4.98	.0016	9.98
1400wvdc		25000 wvdc	
.25	1.29	.00025	7.49
.5	1.39	1	95.00
1500wvdc		AC RATED 220vac/ 600vdc	
.5	1.59	2	.69
.75	1.69	4	.89
1	1.79	5	1.29
2	2.98	225vac/ 630vdc	
4	3.49	3.3	.79
5	3.98	230vac/ 630vdc	
6	3.98	5	1.29
24	8.98	330vac/ 1000vdc	
2000wvdc		1.25	.79
.1	1.49	1.5	.89
2x.1	1.75	1.75	.98
1	1.98	2	1.19
2	2.49	2.5	1.09
3	3.98	2.8	1.15
4	4.49	3	1.19
5	5.39	4	1.29
8	9.49	5	1.49
2500wvdc		12	3.49
.25	2.29	15	3.98
3000wvdc		25	6.49
.1	2.49	40	9.98
.5	3.98	405vac/ 1200vdc	
2	4.49	.15	1.29
2	10.98	600vac/ 1800vdc	
4	19.98	16	6.98
5500wvdc		660vac/ 2000dc	
2	12.98	5	4.49
7000wvdc		6	4.98
.002	1.89	10	6.98
.0075	1.98	16	7.98
.1	4.98		
7500wvdc			
.03	2.98		
.05	3.49		
.1	5.98		

"TAB" THAT'S A BUY

RECTIFIERS

30Vin/28Vout/150Ma Selen w/mtg flange. 2 units can connect in C. T. for Full Wave; 4 units usable as Full Wave Bridge. Ea. Unit, 36c; 2 for 60c; 4 for $1.00

Sensational BRADLEY Double Bridge. Balanced Current & Temp 10% from −40° to +68°C. Inpt to 4.5VAC. Output to 3VDC/ 5Ma. Only 98c

Full Wave Bridge Selen for relays or Pwr, Inpt 115 to 130 vac; Outpt 115vdc/40Ma. Ea. 69c; 10 for..... $5.98

Copper Oxide V'Dbir Wstghs 15Vin/30V out/100Ma 98c

SELENIUM RECTIFIERS

Volts In	Volts Out	Amps.	Each
HALF-WAVE			
18	12	.15	$ .69
130	120	.075	.59
130	120	.09	.69
130	120	.2	.98
216	120	.225	1.29
	144	.075	1.75
FULL-WAVE CENTER-TAPPED			
36	28	1.5	2.39
FULL-WAVE BRIDGE			
18	14	1.5	$2.49
18	14	3.5	3.69
18	14	6.4	4.89
18	14	8	6.98
36	14	12	7.98
36	28	1	3.69
36	28	3.5	4.98
36	28	10	13.95
52	32	.75	3.98
56	32	2	4.98
90	60	.15	2.85
120	100	1	8.98
130	120	2.4	12.29

PRECISION RESISTORS

Over 2½ Million in Stock

"TAB"—Specialists in Precision Resistors

No	Mfrs Choice—We Ship			Stock
0.116	271	1200	3100	14550	90000
0.42	275	1223	3163	14600	91000
0.425	280	1250	3259	15000	92000
0.607	286	1260	3290	16000	95000
0.7	289	1300	3333	16500	100000
1.03	299	1350	3384	16800	110000
1.3	300	1355	3500	17000	115000
1.75	310	1400	3509	17500	116667
2.5	311.5	1488	3700	17977	120000
3	320	1495	3730	18000	130000
3.83	325	1500	3760	18300	135000
4	330	1510	4000	18380	140000
4.35	340	1518	4030	18500	141000
5	350	1600	4200	18800	145000
5.025	360	1640	4220	19000	147000
5.25	366.6	1648	4280	19500	150000
6.5	370	1650	4300	20000	155000
7	375	1670	4314	20441	160000
7.8	380	1680	4440	20500	165000
7.9	389	1710	4444	21000	166750
8	390	1712	4500	21500	167000
10.38	400	1740	4720	22000	169200
11.25	410	1770	4750	22500	175000
12	414.3	1800	4850	22990	180000
13.52	418.8	1818	4885	23000	180600
14.2	425	1830	4900	23150	185000
14.25	426.9	1865	5000	23335	186000
14.5	427	1892	5100	23400	190000
15	440	1894	5210	23500	198000
16	450	1895	5235	24000	200000
17	452	1896	5270	24600	202000
19	460	1897	5300	25000	205000
19.2	470	1898	5500	25200	210000
20	475	1899	5600	25400	215000
22	478	1900	5730	25833	220000
23	480	1901	5770	26000	225000
24	487	1902	5910	26500	229000
25	500	1903	6000	26600	230000
26	520	1904	6100	27000	235500
28	525	1905	6125	27500	238000
30	540	1906	6140	28000	240000
31.5	550	1907	6200	28430	245000
37	575	1908	6300	28500	250000
48	580	1909	6495	29000	265000
49	588	1910	6500	29500	268000
50	600	1911	6840	29550	272000
51.78	612	1912	6990	30000	275000
55	625	1913	7000	31000	294000
56.7	633	1914	7320	31500	300000
60	640	1915	7500	32000	307500
63	641	1916	7700	33000	311000
64	645	1917	7717	35000	314000
74	649	1918	7900	37000	316000
75	650	1919	7930	38140	325000
80	657	1922	7950	38500	330000
81.4	665	1924	8000	39000	333500
88	668	1926	8094	39500	350000
89.8	670	1960	8250	40000	353500
95	673	1980	8500	42000	375000
100	675	2000	8700	43000	380000
101	680	2045	8770	45000	400000
105	681	2080	9000	.....	402000
105.7	684	2095	9100	47500	420000
107	689	2141	9445	48250	422000
120	697	2142	9500	48660	423000
121.2	699	2145	9710	49000	450000
125	700	2150	9800	50000	458000
130	711	2160	9900	52000	478000
135	733	2180	9902	55000	480000
147.5	740	2187	10000	56000	520000
150	750	2195	10430	57065	521000
160	800	2200	10500	58333	525000
165	806	2250	10600	59000	543000
170	850	2300	10900	61430	550000
175	854	2400	10936	62000	570000
179	899	2450	11000	64000	575000
182	900	2463	11400	65000	600000
182.4	910	2485	11500	66666	620000
200	917	2490	11690	66650	640000
209.4	946	2500	12000	67500	654000
216	978	2525	12500	68000	660000
220	1000	2560	12800	70000	690000
220.4	1030	2625	13000	72000	700000
225	1056	2635	13100	73500	750000
230	1059	2700	13500	75000	761300
235	1067	2750	13550	80000	800000
240	1100	2850	13600	82000	813000
245.4	1110	2860	14000	84000	850000
245.4	1150	2870	14250	85000	900000
250	1155	2900	14400	85750	930000
260	1162	3000	14500	88000	950000

Any Size Above, Each 35c; Ten for $3.29

MEGOHMS

1.	1.57	2.25	3.673	6.	8.02
1.1	1.579	2.5	3.75	6.5	8.5
1.2	1.65	2.7	3.9	6.6	9.05
1.25	1.75	2.75	4	6.7	9.5
1.3	1.8	2.8	4.23	7	10
1.35	1.9	2.855	4.25	7.5	11.55
1.39	2	3	4.5	7.62	12
1.4	2.11	3.3	5	7.74	12.83
1.5	2.2	3.5	5.5	8	13
					13.85

Any Size Above, Each 70c; Ten for $6.49

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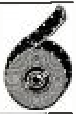
Image-Converter Tube HiSensitivity simplified design 2" dia., Willemite screen—Resolution up to 350 lines/in. Complete data & tube. "TAB" SPECIAL, each $4.98; 2 for $9.49

35mm and 16mm FILM Guaranteed Govt. Surplus



35mm Plus-X Pan 20 Exp Cartridges..........5 for $1.00

16mm PAN film GSAP camera, dated, Gtd Perfect 54 rolls (1320 ft.) $5.98

NEW TV COMPONENTS

HiV Horiz & Defl Output Xformer Sim RCA 211T5 for 15-16" Picture Tubes.$1.98
Width Control Sim 201R4 .... .39
Focus Coil Sim 202D2 .... 4.98
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TV Yoke SPECIAL............ 2.49
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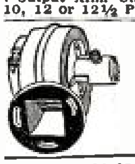
Ion Trap Magnet RCA 203D1...... 1.49
Ion Trap Perm Magnet type....... .98
RCA HiV Defl Xfmr 211T1........ 4.98
V'Output Xfmr Sim RCA 204T2.... 2.69
10, 12 or 12½ Picture Frame Mask. .59

BLOWERS



Cool That Tube!

40 CFM 28vacdc...$4.98
70 CFM 115v/400 cy 4.49
250 CFM 28vacdc.. 9.95
250 CFM & 28 to 115 vac Transformer..11.95
100 CFM 115vacdc. 7.98
175 CFM 220vac...11.98

IN34 XTALS, 75c

10 for $7.30
100 for $71.00

FILTER CHOKES

8HY/150ma New UTC..$1.98
12HY/300ma, Csd..... 3.95
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50HY/125ma, Csd..... 1.95
Dual 2HY/300ma..2 for 1.98
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10HY/200ma, Csd HiVinsltd....... 1.95

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10Amp/130vacdc Csd USN 0.1 to 1000 Mc's.......$1.29
30Amp/250vacdc Csd USN 0.1 to 1000 Mc's Ea. $3.98; 2 for $6.00.
50Amp/600vdc/250vac. Fltrs both sides of line. SOLAR "Elim-O-Stat." New $9.98; 2/$18; 5/$39.
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Range or Voice. Filters 1020cyc Audio. Exc for CW work. 85c ... 2 for $1.49

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Complete Pwr Supply w/cndsrs. Lamp, data 115 VAC.....$29.95
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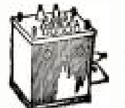

115V 60 Cyc Input

TV&CR Pwr Xfmr for 7" to 20" Tubes. Hi VOLTS to 20KV (w/quadrupler ckt). ALL Tubes, PL & FIL wndgs dlvrng; 300 VDC/275Ma Full-wave. 6.4V/10.3A, 5.4V/8A. 2.5V/3A Hypersil Core, Oil impreg......$8.98
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1320V & 375VCT/110ma, 5V/3A, 2.5V/3.25A, 6.3V/2.75A H'Sld, H.Vinsltd.$9.98
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1000vct/45ma, 795vct/80ma & 360 vct/55ma, 3x5v/3a, 6.3vct/1a, 6.3vct/.3a Csd, HiVinsul $5.98
900v/35ma, 2x2.5v/2a, Xcellent 1800 V' Dblr, two 2x2 fil. wndgs, H'sld HVins.$3.49
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420vct/90ma, 6.3v/1.9a w/inpts 6-12-24-115vdc & 115/230vac, $1.98; 2 for $3.49
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3000V/10ma, Csd HiVinsul....... 6.49
1800v/4ma, H'Sld HiVins........ 4.49
490 & 355vct/325ma Csd HiVins.. 4.98
2x330vct/10ma (or 660vct) H'Sld.. 1.69

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6.3vct/4A (gud 6.5A) H'Sld HiVins.. 2.69
6.3v/2A, $1.39; 6.3v/.6A HVins... 1.98
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12.6vct/1.25A, $1.98; 24v/2a csd.. 1.98

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MODUL/240 Watts Peak PP Par 807's to PP807's RF/2000 ohm Load STANCOR/USN H'Sld $6.95
UNIV OUTPT/12 Watts Any Tube Any Voice Coil UTAH 5999......$1.29; 2 for $1.98
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EE8 RingingGen Assy. Like New, Less Handset(TS-9),$7.98; Handset forEE8 4.98
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RM29 Control Unit, BRAND NEW.. 11.98
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R74/CRW Rcvr, Less Tubes, As Is.. 2.49
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PE97 Plate Supply Unit, Less Tubes 9.98
I-108 Range Calibrator, Metal Case. 29.98
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BC455 Rcvr (6-9Mc), LT*, Dyn, As Is 4.95
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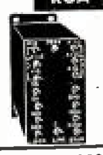
RCA UNIV OUTPUT XFMR



10W. to 10KC. Matches ANY Line or Spkrs w/VC's 3 to 4 or 150 ohms to ANY Load & Tube IMP bet 50 & 10240 ohms. Over 1000 combinations! Acts as EXC Band Pass Fltr or Freq. Attn Unit for Dyn Mike. Cuts HI's or LOWS. IDEAL Lazy Q-5 action CWor Phone. Gets ONLY Signal you WANT to hear. W/data $1.89; 3 for $4.98.

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0Z4 .86
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1F6 .98
1F7G .98
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1N6G .98
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1Q26 69.00
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1Y2 3.98
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2E24 5.05
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6AQ5 2.00
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6C6 .89
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6C8G .98
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6CD6G 6.00
6D4 2.85
6D6 .89
6D7G .89
6D8 .98
6E5 1.10
6E6 1.39
6E7 1.39
6F5 .83
6F6 1.04
6F6GT .85
6F7 1.39
6V7G 1.18
6W4GT 1.80
6W4WGT 2.50
6W5GT .98
6W6 2.00
6W7G 1.33
6X4 1.50
6X5GT 1.50
6Y5 1.83
6Y6G 1.25
6Y7G .98
6Z5/12Z5 1.18
6Z7G .98
6ZY5G .98
7A4/XXL .98
7A5 1.10
7A6 .90
7A7 1.62
7A8 .90
7AD7 1.56
7AF7 .87
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7AH7 1.15
7B4 .87
7B5 1.80
7B6 1.80
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7B8 .90
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14B6 1.08
14B8 1.10
14C5 1.29
14C7 1.20
14E6 1.10
14E7 1.33
14F7 1.10
14F8 1.29
14H7 1.17
14J7 1.33
14N7 1.35
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930 1.05
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955 .49
956 .39
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958A .69
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CK505AX 1.79
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CK522AX 1.79
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CK528AX 1.79
CK529AX 1.98
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CK546DX 1.98
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CK548DX 1.98
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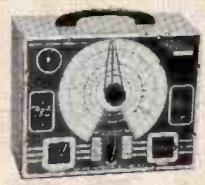

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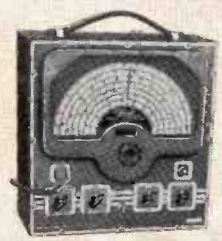

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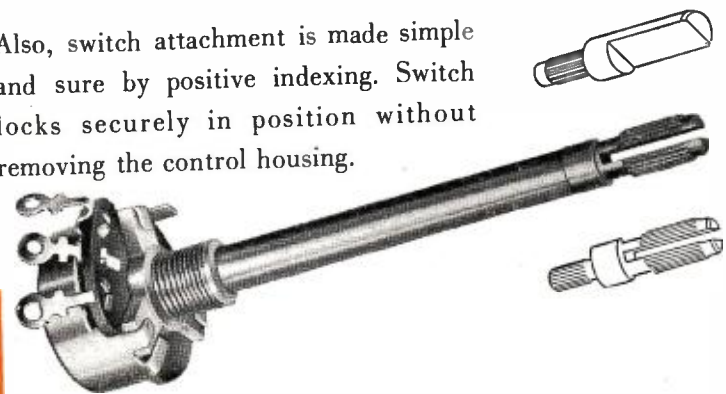

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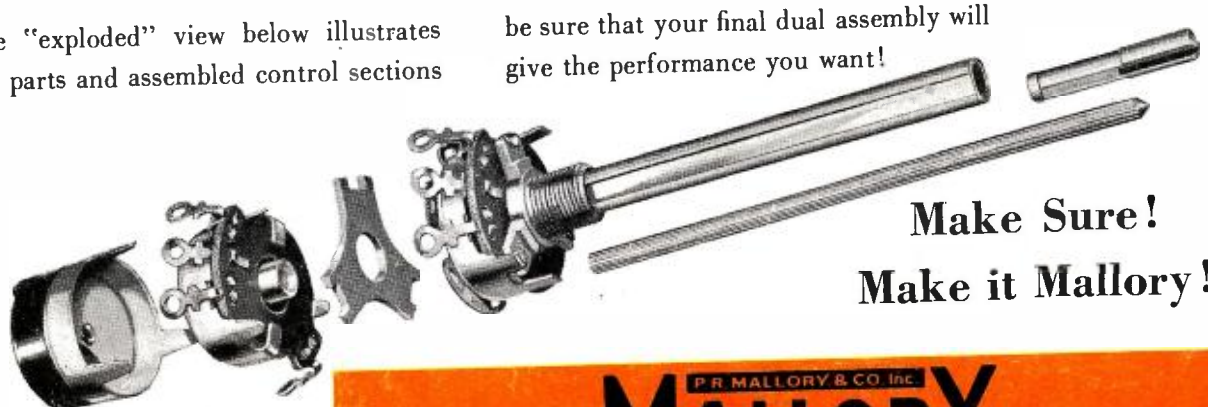

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